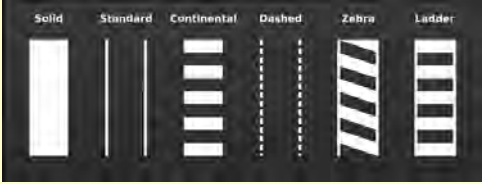






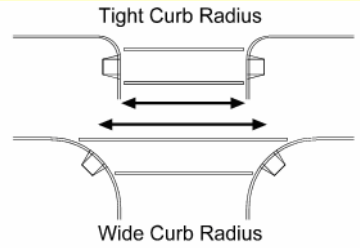



ATTACHMENT F
Example Treatments

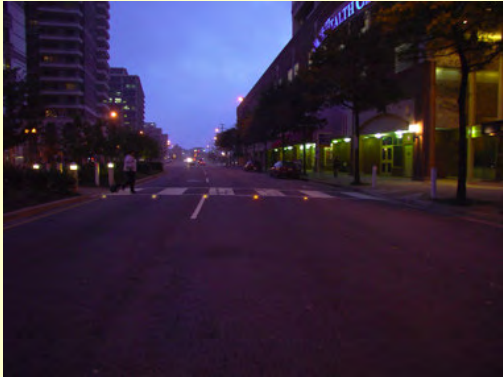

Attachment F: Example Treatment Summary

EXAMPLE TREATMENTS			
Measure	Description	Benefits	Application
Level 1			
<p>Marked Crosswalk</p>  <p><i>Image source: www.walkinginfo.org/pedsafe/</i></p>	<p>Marked crosswalks should be installed to provide designated pedestrian crossings at major pedestrian generators, crossings with significant pedestrian volumes (at least 15 per hour), crossings with high vehicle-pedestrian collisions, and other areas based on engineering judgment</p>	<p>Marked crosswalks provide a designated crossing, which may improve walkability by signaling a clear “channel” for pedestrian pathways to both pedestrians and vehicles.</p>	<p>Marked crosswalks alone should not be installed on multi-lane roads with more than about 10,000 vehicles/day. Enhanced crosswalk treatments (as presented in this table) should supplement the marked crosswalk.</p>
<p>High-Visibility Signs and Markings</p>  <p><i>Image source: exodusinnovations.com</i></p>	<p>High-visibility markings include a family of crosswalk striping styles such as the “ladder” and the “continental.” High-visibility fluorescent yellow green signs are made of the approved fluorescent yellow-green color and posted at crossings to increase the visibility of a pedestrian crossing.</p>	<p>FHWA recently ended its approval process for the experimental use of fluorescent yellow crosswalk markings and found that they had no discernable benefit over white markings.</p>	<p>Beneficial in areas with high pedestrian activity, as near schools, and in areas where travel speeds are high and/or motorist visibility is low.</p>
<p>Advanced Yield or Stop Lines</p>  <p><i>Image source: www.saferoutesinfo.org</i></p>	<p>Standard white stop or yield limit lines are placed in advance of marked, uncontrolled crosswalks. Stop or yield lines are determined based on state vehicle codes (requiring the driver to either stop or yield to the pedestrian).</p>	<p>This measure increases the pedestrian’s visibility to motorists, reduces the number of vehicles encroaching on the crosswalk, and improves general pedestrian conditions on multi-lane roadways. It is also an affordable option.</p>	<p>Useful in areas where pedestrian visibility is low and in areas with aggressive drivers, as advance limit lines will help prevent drivers from encroaching on the crosswalk. Addresses the multiple-threat collision on multi-lane roads.</p>




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EXAMPLE TREATMENTS			
Measure	Description	Benefits	Application
<p>In-Street Pedestrian Crossing Signs</p>  <p><i>Image source: www.seton.com</i></p>	<p>This measure involves posting regulatory pedestrian signage on lane edge lines and road centerlines. The In-Street Pedestrian Crossing sign may be used to remind road users of laws regarding right of way at an unsignalized pedestrian crossing. The legend STATE LAW may be shown at the top of the sign if applicable. The legends STOP FOR or YIELD TO may be used in conjunction with the appropriate symbol.</p>	<p>This measure is highly visible to motorists and has a positive impact on pedestrian safety at crosswalks.</p>	<p>Mid-block crosswalks, unsignalized intersections, low-speed areas, and two-lane roadways are ideal for this pedestrian treatment. The STOP FOR legend shall only be used in states where the state law specifically requires that a driver must stop for a pedestrian in a crosswalk.</p>
Level 2			
<p>Curb Extension/ Bulb Outs</p>  <p><i>Image source: Dan Burden</i></p>	<p>Also known as a pedestrian bulb-out, this traffic-calming measure is meant to slow traffic and increase driver awareness. It consists of an extension of the curb into the street, making the pedestrian space (sidewalk) wider.</p>	<p>Curb extensions narrow the distance that a pedestrian has to cross and increases the sidewalk space on the corners. They also improve emergency vehicle access and make it difficult for drivers to turn illegally.</p>	<p>Due to the high cost of installation, this tool would only be suitable on streets with high pedestrian activity, on-street parking, and infrequent (or no) curb-edge transit service. It is often used in combination with crosswalks or other markings.</p>
<p>Reduced Curb Radii</p>  <p><i>Image Source: www.ci.austin.tx.us</i></p>	<p>The radius of a curb can be reduced to require motorists to make a tighter turn.</p>	<p>Shorter radii narrow the distance that pedestrians have to cross; they also reduce traffic speeds and increase driver awareness (like curb extensions), but are less difficult and expensive to implement.</p>	<p>This measure would be beneficial on streets with high pedestrian activity, on-street parking, and no curb-edge transit service. It is more suitable for wider roadways and roadways with low volumes of heavy truck traffic.</p>
<p>Staggered Median Pedestrian Island</p>  <p><i>Image Source: www.tfhr.gov</i></p>	<p>This measure is similar to traditional median refuge islands; the only difference is that the crosswalks in the roadway are staggered such that a pedestrian crosses half the street and then must walk towards traffic to reach the second half of the crosswalk. This measure must be designed for accessibility by</p>	<p>Benefits of this tool include an increase in the concentration of pedestrians at a crossing and the provision of better traffic views for pedestrians. Additionally, motorists are better</p>	<p>Best used on multi-lane roads with obstructed pedestrian visibility or with off-set intersections</p>


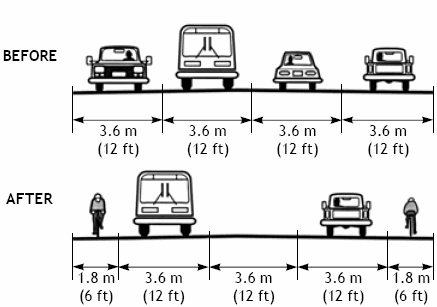
Attachment F: Example Treatment Summary

EXAMPLE TREATMENTS			
Measure	Description	Benefits	Application
	including rails and truncated domes to direct sight-impaired pedestrians along the path of travel.	able to see pedestrians as they walk through the staggered refuge.	
Level 3			
<p>In-Roadway Warning Lights</p>  <p><i>Image Source: www.tfhr.gov/</i></p>	<p>Both sides of a crosswalk are lined with pavement markers, often containing an amber LED strobe light. The lights may be push-button activated or activated with pedestrian detection.</p>	<p>This measure provides a dynamic visual cue, and is increasingly effective in bad weather</p>	<p>Best in locations with low bicycle ridership, as the raised markers present a hazard to bicyclists. May not be appropriate in areas with heavy winter weather due to high maintenance costs. May not be appropriate for locations with bright sunlight. The lights may cause confusion when pedestrians fail to activate them and/or when they falsely activate.</p>
<p>Overhead Flashing Beacons</p>  <p><i>Image source: tti.tamu.edu</i></p>	<p>Flashing amber lights are installed on overhead signs, in advance of the crosswalk or at the entrance to the crosswalk.</p>	<p>The blinking lights during pedestrian crossing times increase the number of drivers yielding for pedestrians and reduce pedestrian-vehicle conflicts. This measure can also improve conditions on multi-lane roadways.</p>	<p>Best used in places where motorists cannot see a traditional sign due to topography or other barriers.</p>


Attachment F: Example Treatment Summary

EXAMPLE TREATMENTS			
Measure	Description	Benefits	Application
<p>Stutter Flash*</p>  <p><i>Image source: mutcd.fhwa.dot.gov</i></p>	<p>The Overhead Flashing Beacon is enhanced by replacing the traditional slow flashing incandescent lamps with rapid flashing LED lamps. The beacons may be push-button activated or activated with pedestrian detection.</p>	<p>Initial studies suggest the stutter flash is very effective as measured by increased driver yielding behavior. Solar panels reduce energy costs associated with the device.</p>	<p>Appropriate for multi-lane roadways.</p>
Level 4			
<p>Hawk Beacon Signal*</p>  <p><i>Image Source: www.tfhrc.gov/</i></p>	<p>HAWK (High Intensity Activated Crosswalks) are pedestrian-actuated signals that are a combination of a beacon flasher and a traffic control signal. When actuated, HAWK displays a yellow (warning) indication followed by a solid red light. During pedestrian clearance, the driver sees a flashing red “wig-wag” pattern until the clearance interval has ended and the signal goes dark.</p>	<p>Reduces pedestrian-vehicle conflicts and slows traffic speeds</p>	<p>Useful in areas where it is difficult for pedestrians to find gaps in automobile traffic to cross safely, but where normal signal warrants are not satisfied. Appropriate for multi-lane roadways.</p>
Level 5			
<p>Traffic Signal</p>  <p><i>Image source: www.livablestreets.com</i></p>	<p>Conventional traffic control devices with warrants for use based on the Manual on Uniform Control Devices (MUTCD)</p>	<p>Reduces pedestrian-vehicle conflicts and slows traffic speeds</p>	<p>Must meet warrants based on traffic and pedestrian volumes; however, exceptions are possible based on demonstrated pedestrian safety concerns (collision history)</p>

Attachment F: Example Treatment Summary

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Measure	Description	Benefits	Application
<p>Pedestrian Overpass/ Underpass</p>  <p><i>Image source: omahamidcenturymodern.blogspot.com</i></p>	<p>This measure consists of a pedestrian-only overpass or underpass over a roadway. It provides complete separation of pedestrians from motor vehicle traffic, normally where no other pedestrian facility is available, and connects off-road trails and paths across major barriers.</p>	<p>Pedestrian overpasses and underpasses allow for the uninterrupted flow of pedestrian movement separate from the vehicle traffic. However, for underpasses, security is known to be a major issue.</p>	<p>Grade separation via this measure is most feasible and appropriate in extreme cases where pedestrians must cross roadways such as freeways and high-speed, high-volume arterials. Use of either type of facility falls off rapidly when the additional time required for such use amounts to 20% or more of the time required to cross at grade. This measure should be considered only with further study.</p>
<p>Consider for All Multi-Lane Roads</p>			
<p>Road Diet (aka Lane Reduction)</p>  <p><i>Image Source: www.tfhrc.gov/</i></p>	<p>The number of lanes of travel is reduced by widening sidewalks, adding bicycle and parking lanes, and converting parallel parking to angled or perpendicular parking.</p>	<p>This is a good traffic calming and pedestrian safety tool, particularly in areas that would benefit from curb extensions but have infrastructure in the way. This measure also improves pedestrian conditions on multi-lane roadways.</p>	<p>Roadways with surplus roadway capacity (typically multi-lane roadways with less than 15,000 to 17,000 ADT) and high bicycle volumes, and roadways that would benefit from traffic calming measures.</p>

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Measure	Description	Benefits	Application
<p>Median Pedestrian Island</p>  <p><i>Image source:</i> http://thegoodcity.wordpress.com/category/transportation/</p>	<p>Raised islands are placed in the center of a roadway, separating opposing lanes of traffic with cutouts for accessibility along the pedestrian path.</p>	<p>This measure allows pedestrians to focus on each direction of traffic separately, and the refuge provides pedestrians with a better view of oncoming traffic as well as allowing drivers to see pedestrians more easily. It can also split up a multi-lane road and act as a supplement to additional pedestrian tools.</p>	<p>Recommended for multi-lane roads wide enough to accommodate an ADA-accessible median</p>
<p>* Treatment not included in the current version of the MUTCD</p>			