



Incorporación de Contramedidas de Seguridad para los Usuarios Vulnerables de la Vía Pública

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- Ingeniero Profesional (PE) en PR, VA, DC, MD, TX, FL, NC y AZ.
- Miembro del Institute of Transportation Engineers (ITE) y certificado como Professional Traffic Operations Engineer (PTOE) y Road Safety Professional Level 2 – Infrastructure (RSP2I).
- Más de 20 años de experiencia en consultoría y diseño de infraestructuras viales, seguridad vial y análisis de tránsito en Puerto Rico y EE.UU.
- Experiencia en:
 - ✓ Diseño y gestión de proyectos para la Autoridad de Carreteras y Transportación (ACT).
 - ✓ Diseño de sistemas de semáforos, rotondas modernas y estudios de tránsito.
 - ✓ Evaluación de seguridad vial y estudios de mitigación de riesgos.
- Presidente de Klein Engineering, PSC, firma consolidada como líder en ingeniería de transporte y vialidad.

Design Vehicles and Characteristics

Which one of these is this vulnerable user we keep talking about?

Class 1 Motorcycles		Class 7 Four or more axle, single unit	
Class 2 Passenger cars		Class 8 Four or less axle, single trailer	
Class 3 Four tire, single unit		Class 9 5-Axle tractor semitrailer	
Class 4 Buses		Class 10 Six or more axle, single trailer	
Class 5 Two axle, six tire, single unit		Class 11 Five or less axle, multi-trailer	
Class 6 Three axle, single unit		Class 12 Six axle, multi-trailer	

Source: FHWA

88 Highway and Street Design Vehicles: An Update

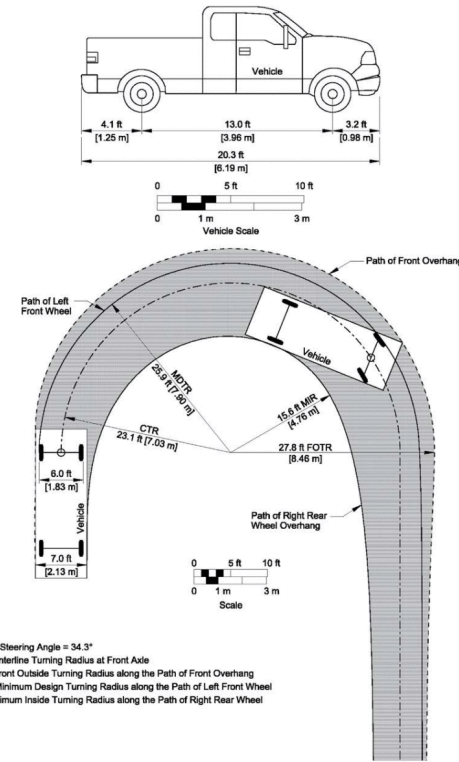


Figure 57. Turning template for recommended pickup truck (PU) design vehicle.

Source: Web

Vulnerable Road Users according to FHWA

- A vulnerable road user is a nonmotorist with a fatality analysis reporting system (FARS) person attribute code for pedestrian, bicyclist, other cyclist, and person on personal conveyance or an injured person that is, or is equivalent to, a pedestrian or pedalcyclist as defined in the ANSI D16.1-2007. (See 23 U.S.C. 148(a)(15) and 23 CFR 490.205).
- A vulnerable road user may include people walking, biking, or rolling. Please note that a vulnerable road user:
 - Includes a highway worker on foot in a work zone, given they are considered a pedestrian.
 - Does not include a motorcyclist.

Who is the VRU you are designing for?



A city transformed...



1990's

Source: Business Insider



Today

Source: Visitnyc.com

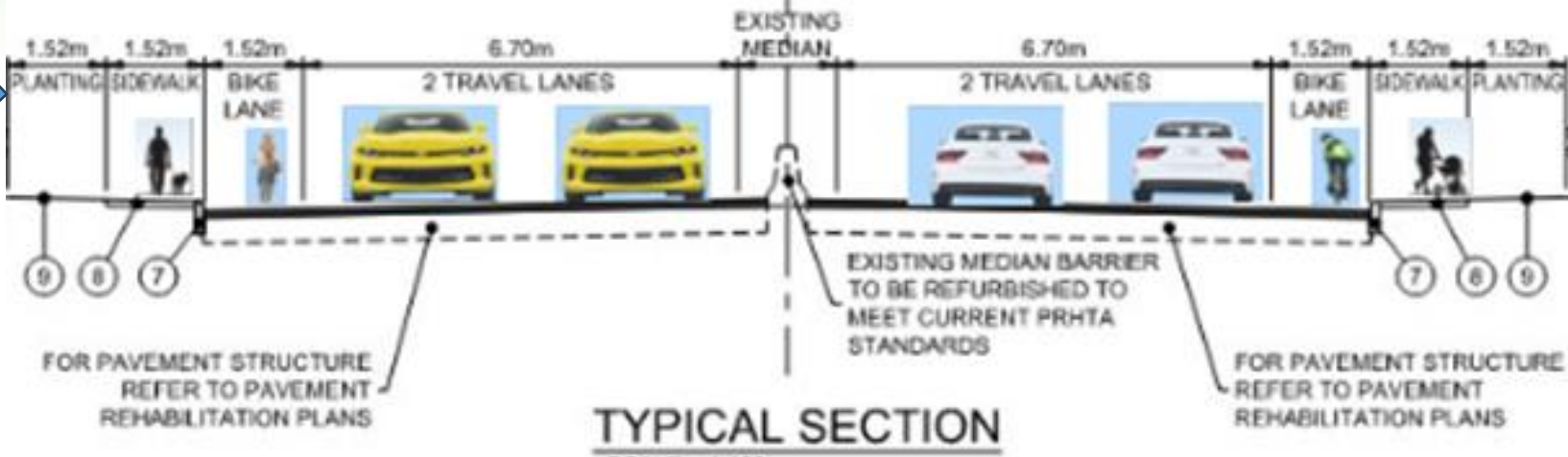


Source: Google

“The pedestrian zones are packed with food trucks serving tacos, dumplings, you name it—street food’s a big deal now. Hotels tower overhead, with rooftop bars offering views that stretch to the Hudson.” – visitnyc.com



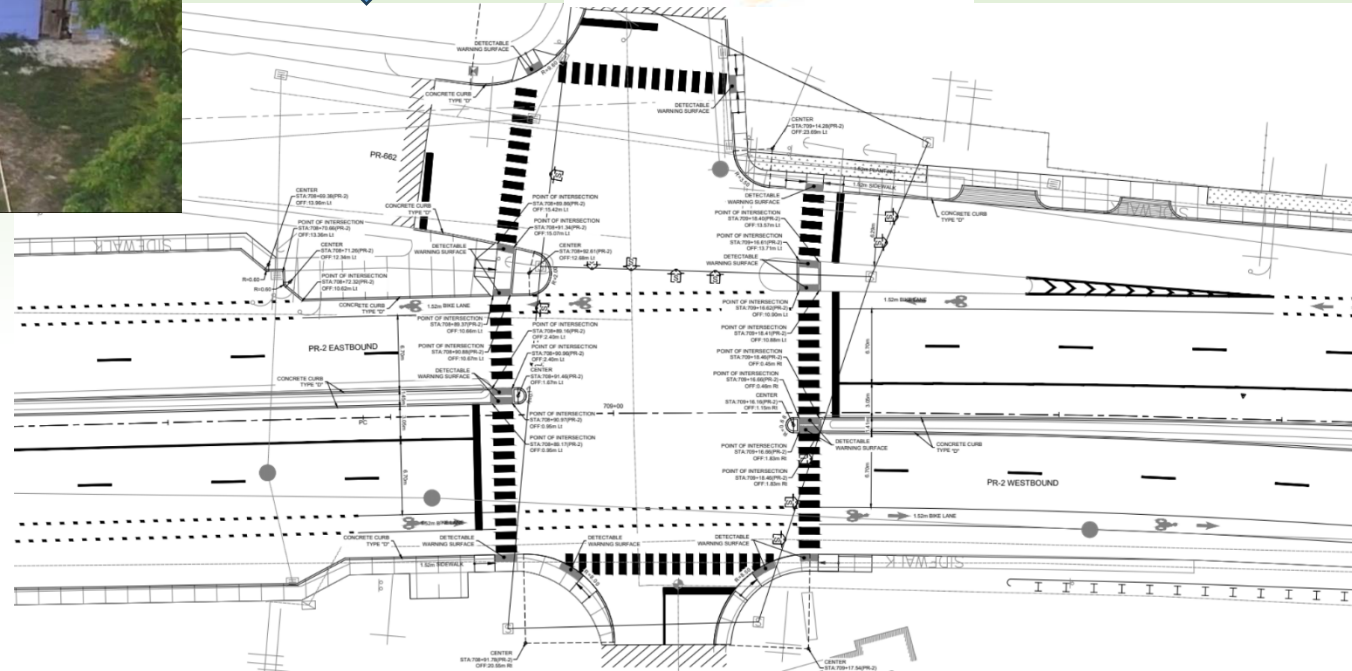
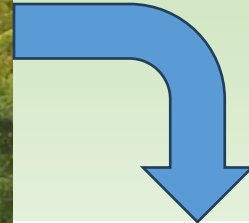
What if?







What if?



Where to go???



Safety Benefits:

RRFBs can reduce crashes up to:

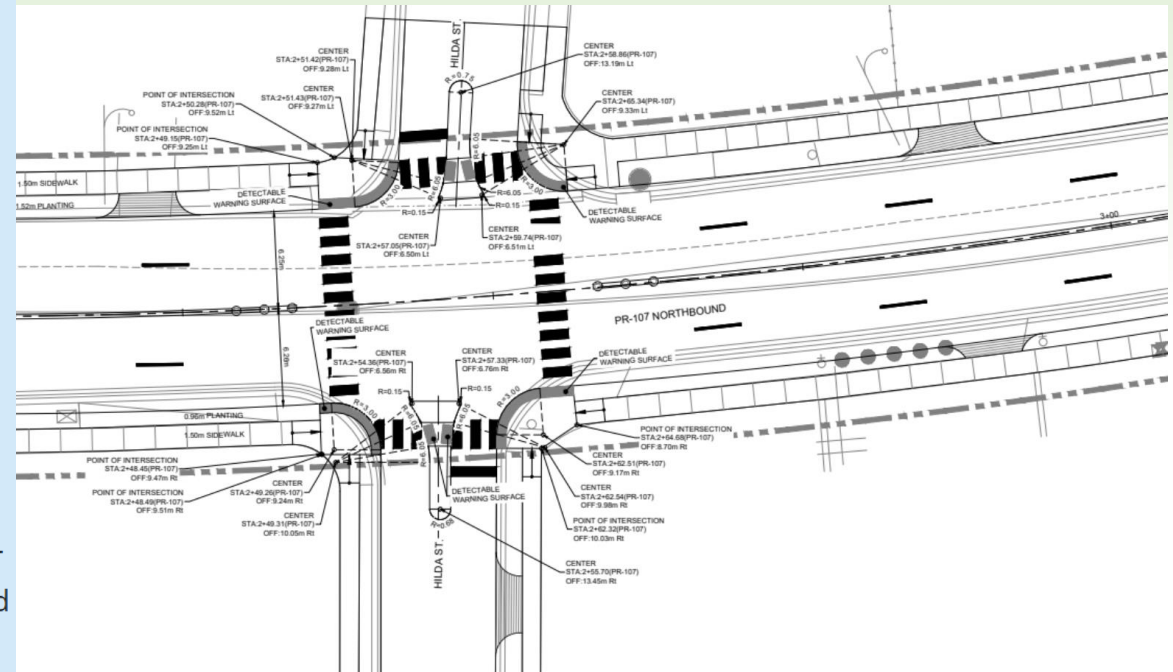
47%

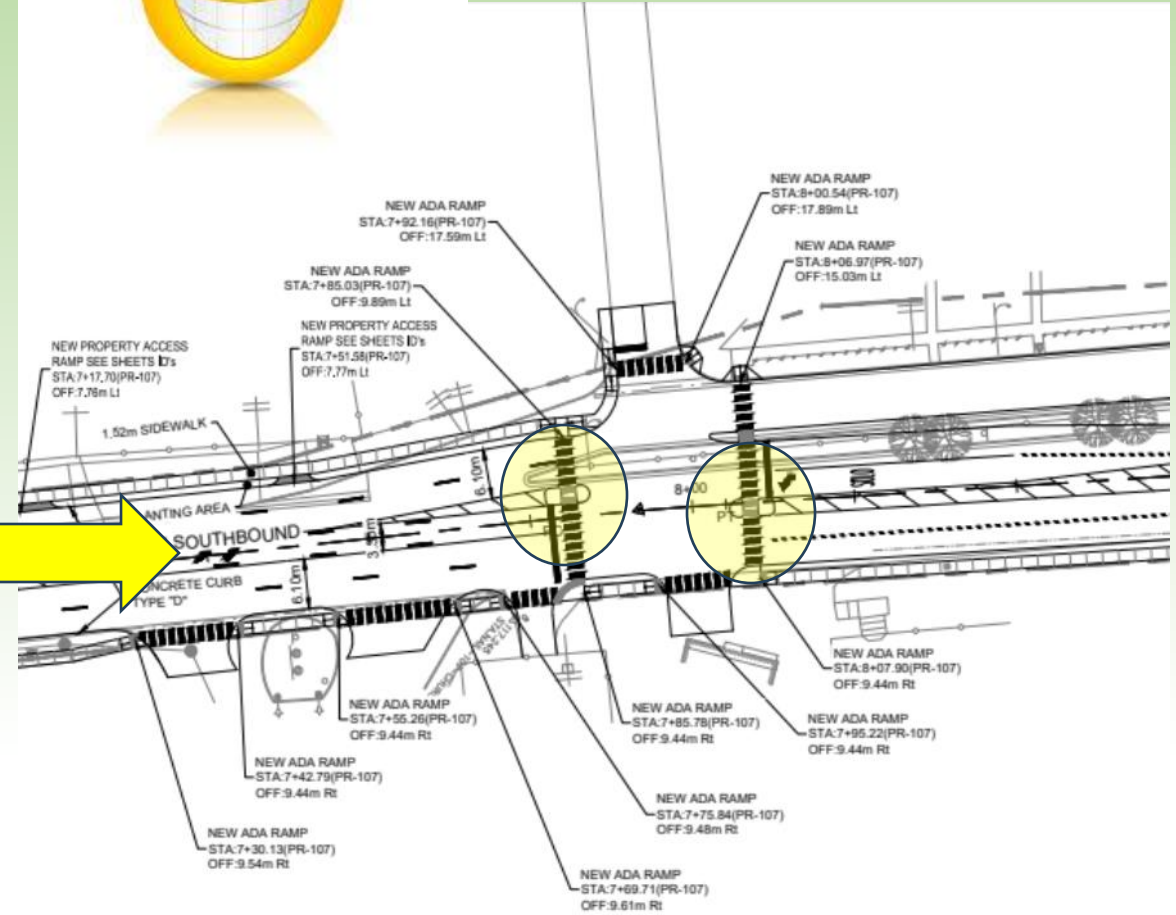
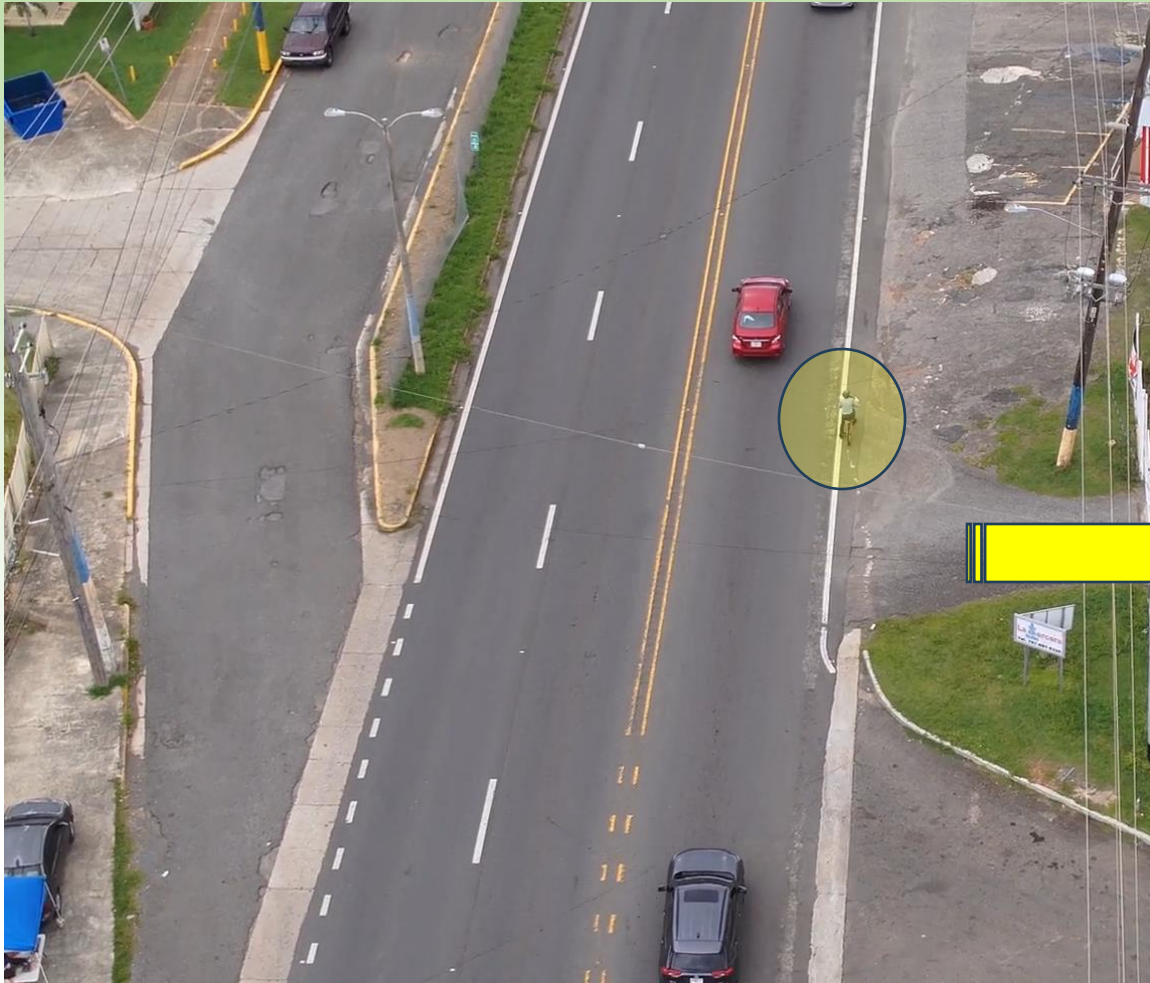
for pedestrian crashes.⁴

RRFBs can increase motorist yielding rates up to:

98%

(varies by speed limit, number of lanes, crossing distance, and time of day).³

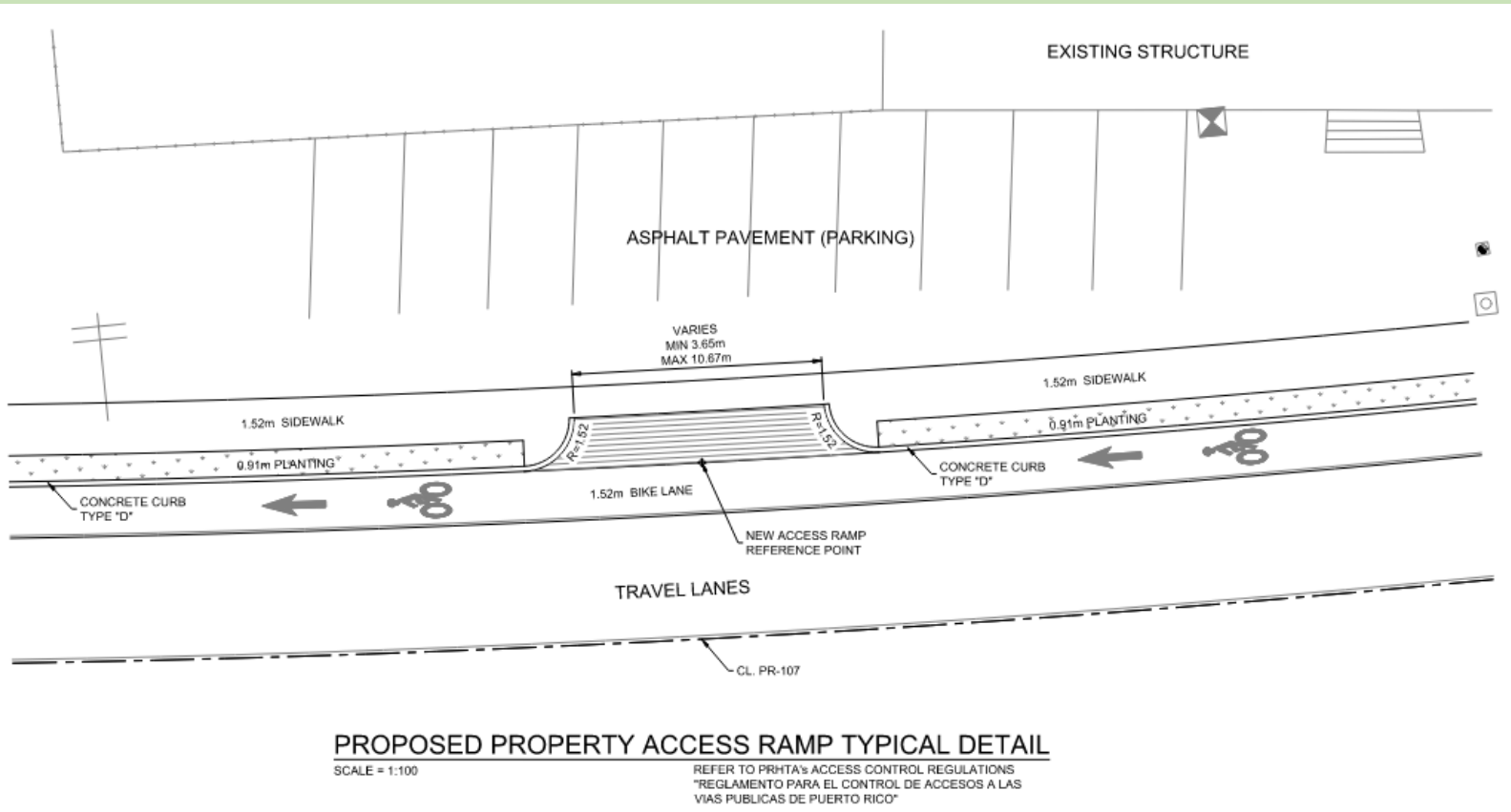




Maintenance

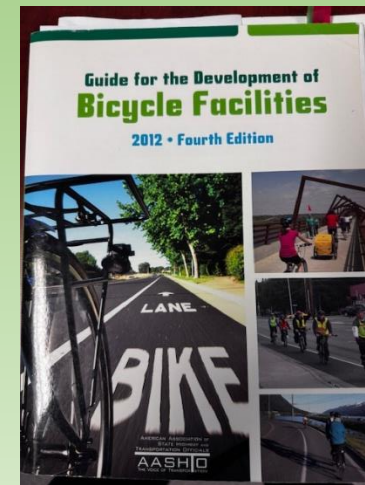
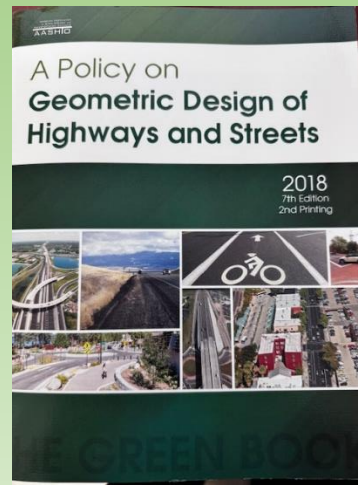


Access Management

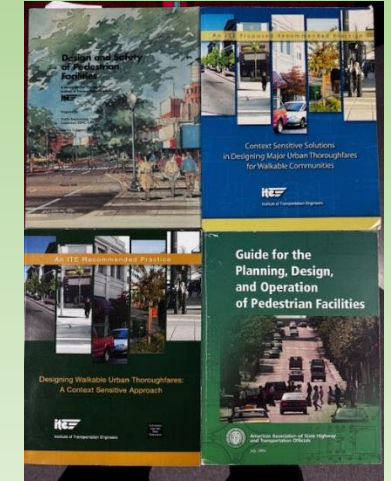


Looking Ahead

- Opportunities
 - Leadership's support: Federal and State
 - Success stories and examples
 - History, culture, and attractions
- Challenges
 - Paradigm shift
 - Focus on substantive safety instead of nominal safety
 - Standards and specifications



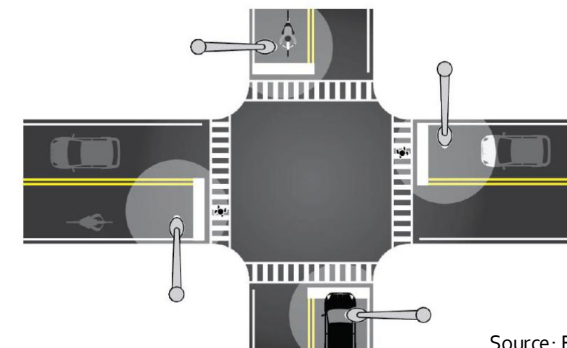
Source: AASHTO



Source: ITE



Source: NBC



Source: FHWA

A Safe System

- Death and Serious Injuries are Unacceptable
- Humans Make Mistakes
- Humans Are Vulnerable
- Responsibility is Shared
- Safety is Proactive
- Redundancy is Crucial
- Everyone must be involved!!!



Thank You

