# Design and Spacing Guidelines for Marked Pedestrian Crossings

**APBP Conference, Portland OR**

August 26, 2019

PBOT
PORTLAND BUREAU OF TRANSPORTATION

# PedPDX

PORTLAND'S CITYWIDE PEDESTRIAN PLAN

PBOT

PORTLAND BUREAU OF TRANSPORTATION

FEBRUARY 2019

PUBLIC REVIEW DRAFT

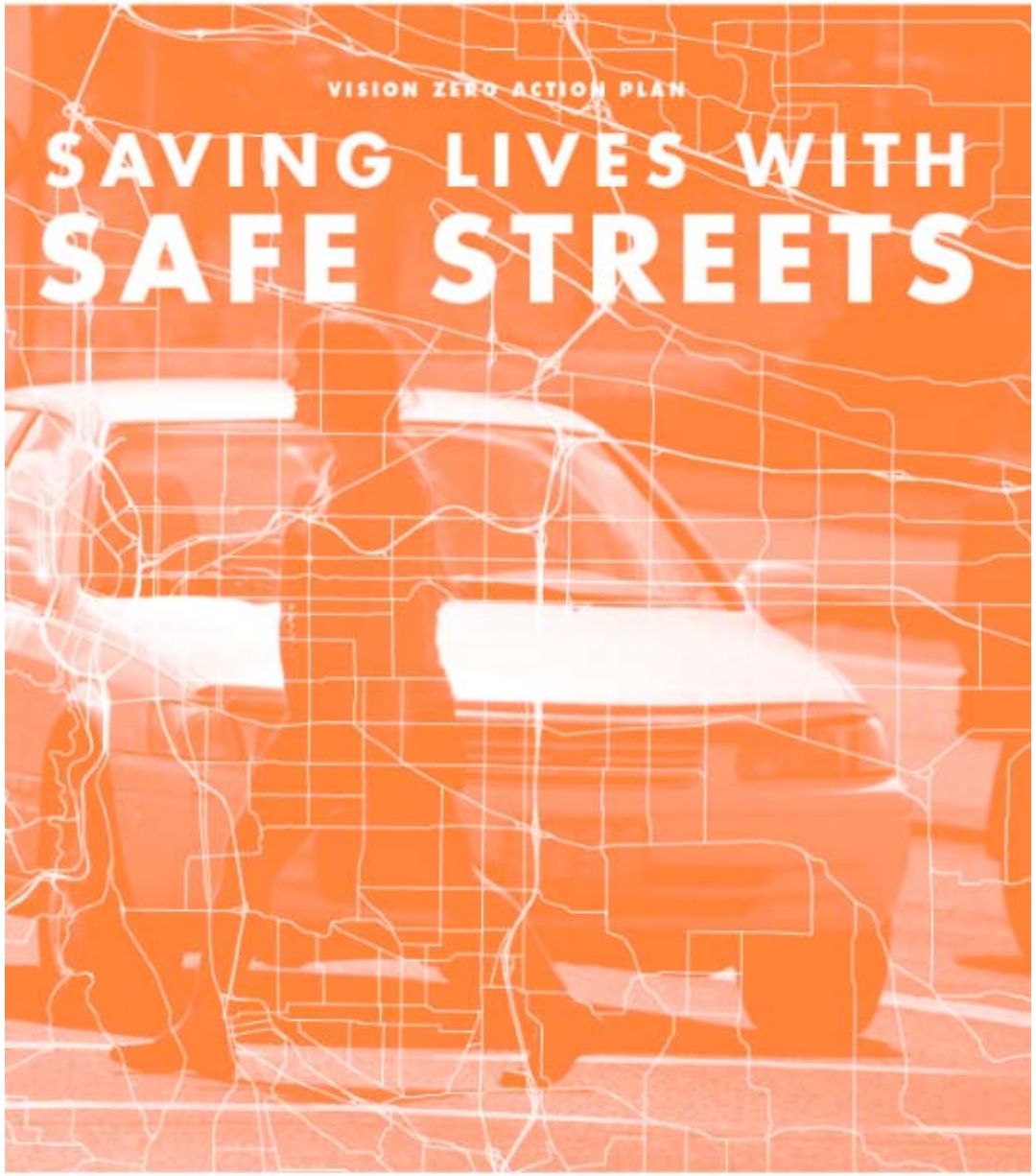
PedPDX is Portland's Citywide Pedestrian Plan. It prioritizes sidewalk and crossing improvements and other investments to make walking safer and more comfortable across the city. The plan identifies the key strategies and tools we will use to make Portland a great walking city for everyone.

# WHAT IS THE STATE OF WALKING IN PORTLAND?

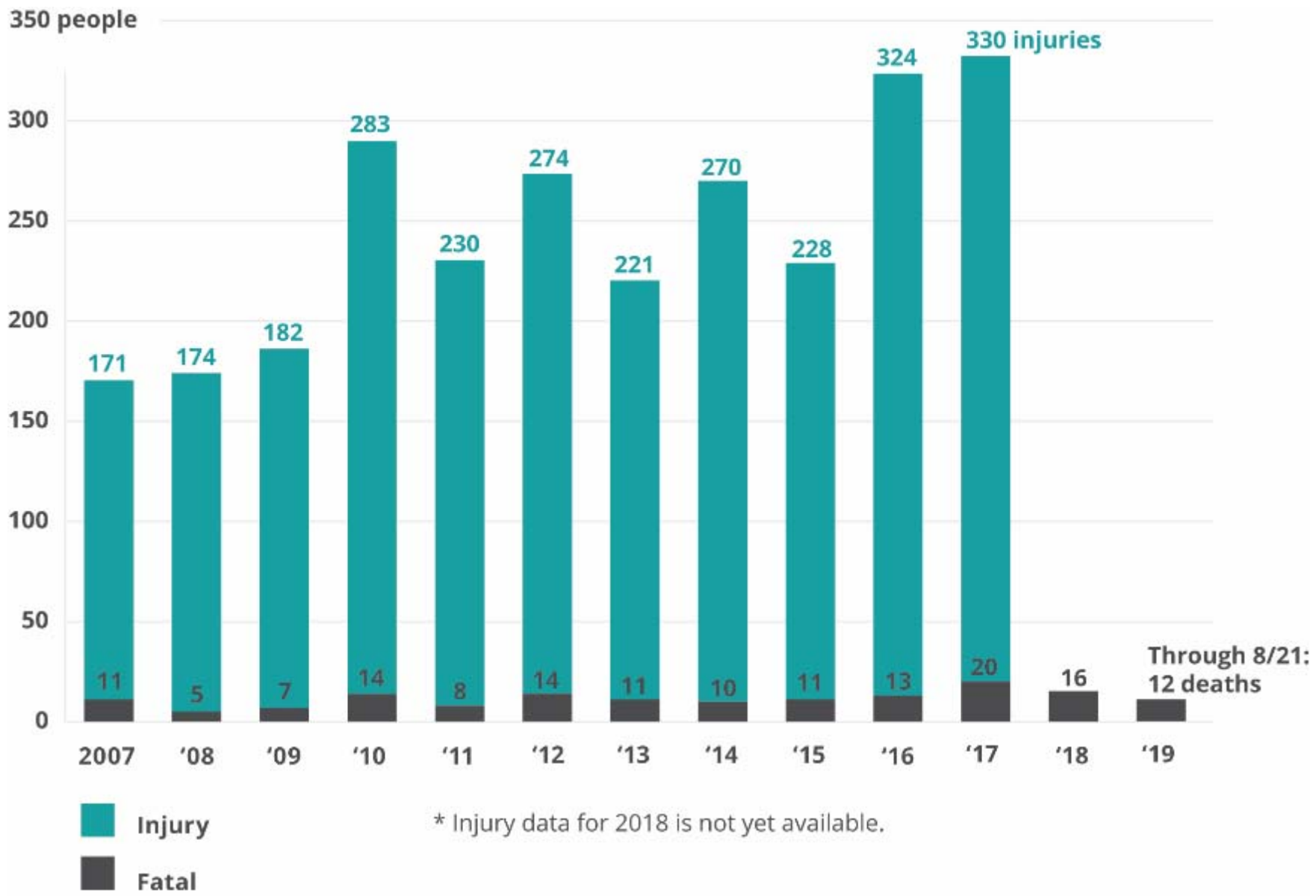
# PedPDX citywide pedestrian crash analysis

THE CITY OF PORTLAND

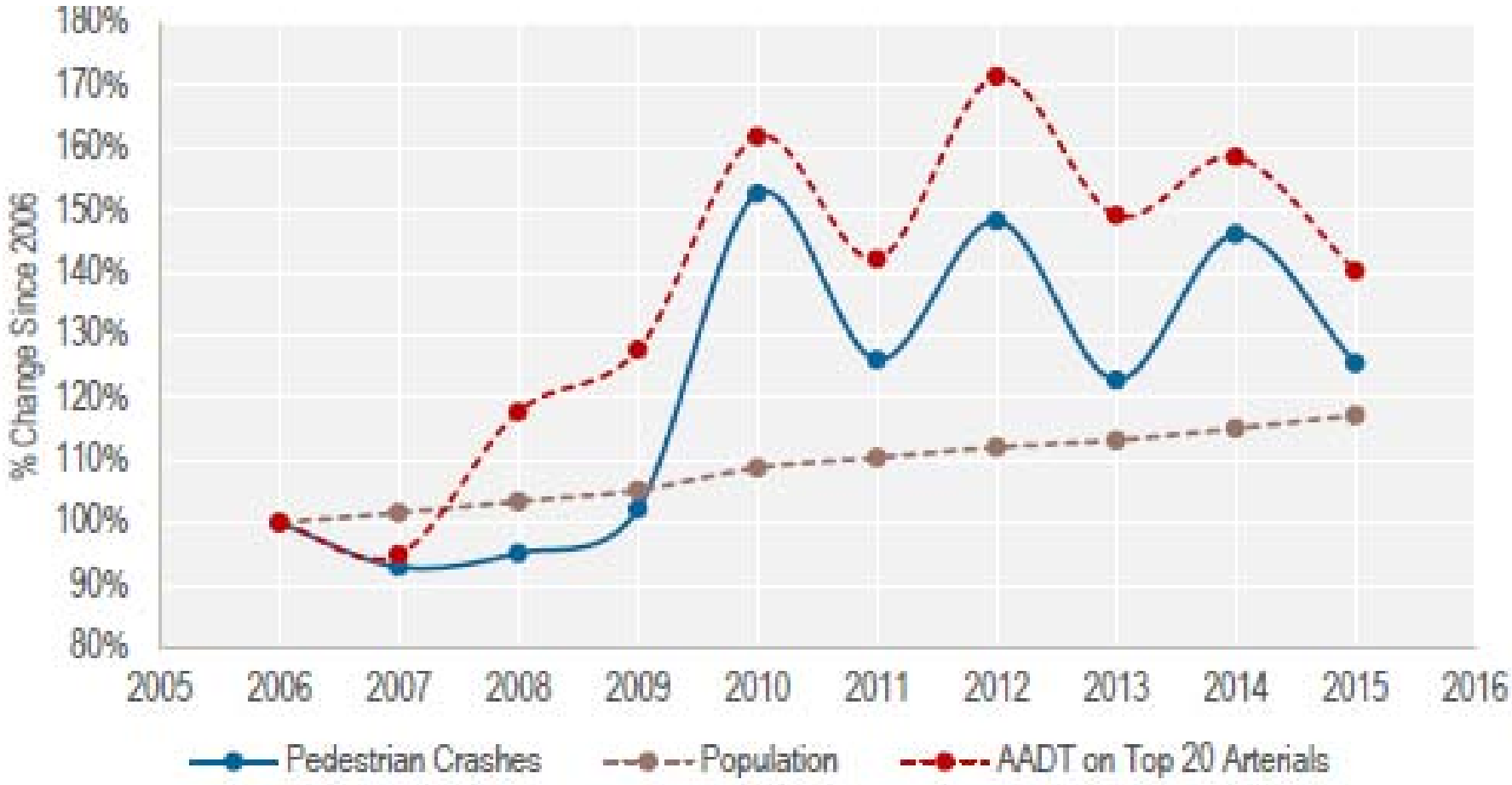
DECEMBER 2016

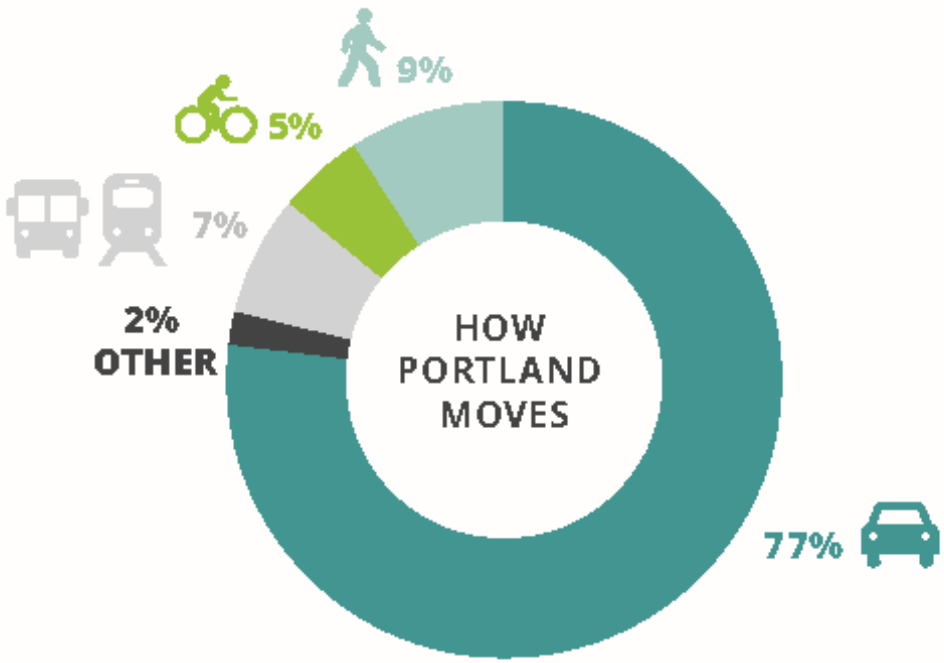


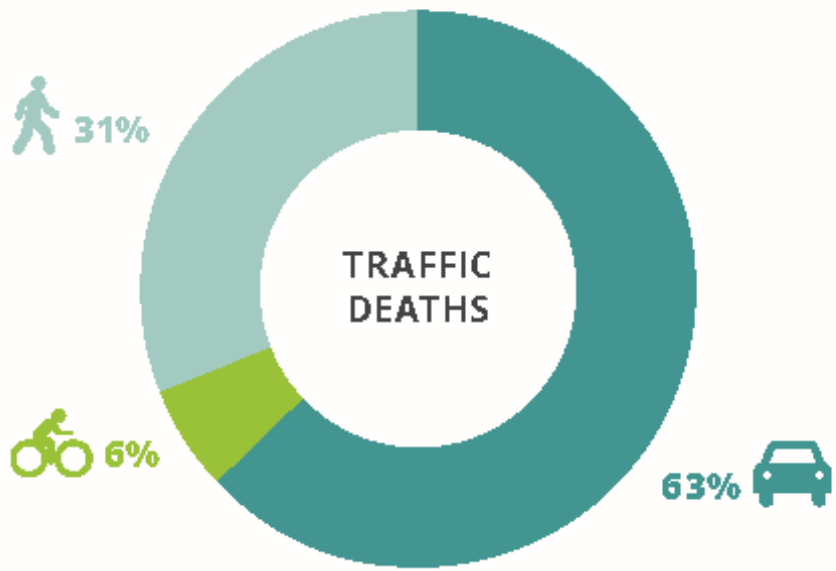

VISION ZERO


350 people
300
250
200
150
100
50
0
171
174
182
283
230
274
221
270
228
324
330 injuries
11
5
7
14
8
14
11
10
11
13
20
16
Through 8/21:
12 deaths
2007
'08
'09
'10
'11
'12
'13
'14
'15
'16
'17
'18
'19
Injury
Fatal
* Injury data for 2018 is not yet available.

# Annual Pedestrian Crash Growth Relative to Pop and AADT Growth






*Source: 2004-2013 ODOT*
*Crash data: 2015 City of Portland Community Survey*

**People walking in Portland are ten times more likely than people driving to sustain a serious or fatal injury**

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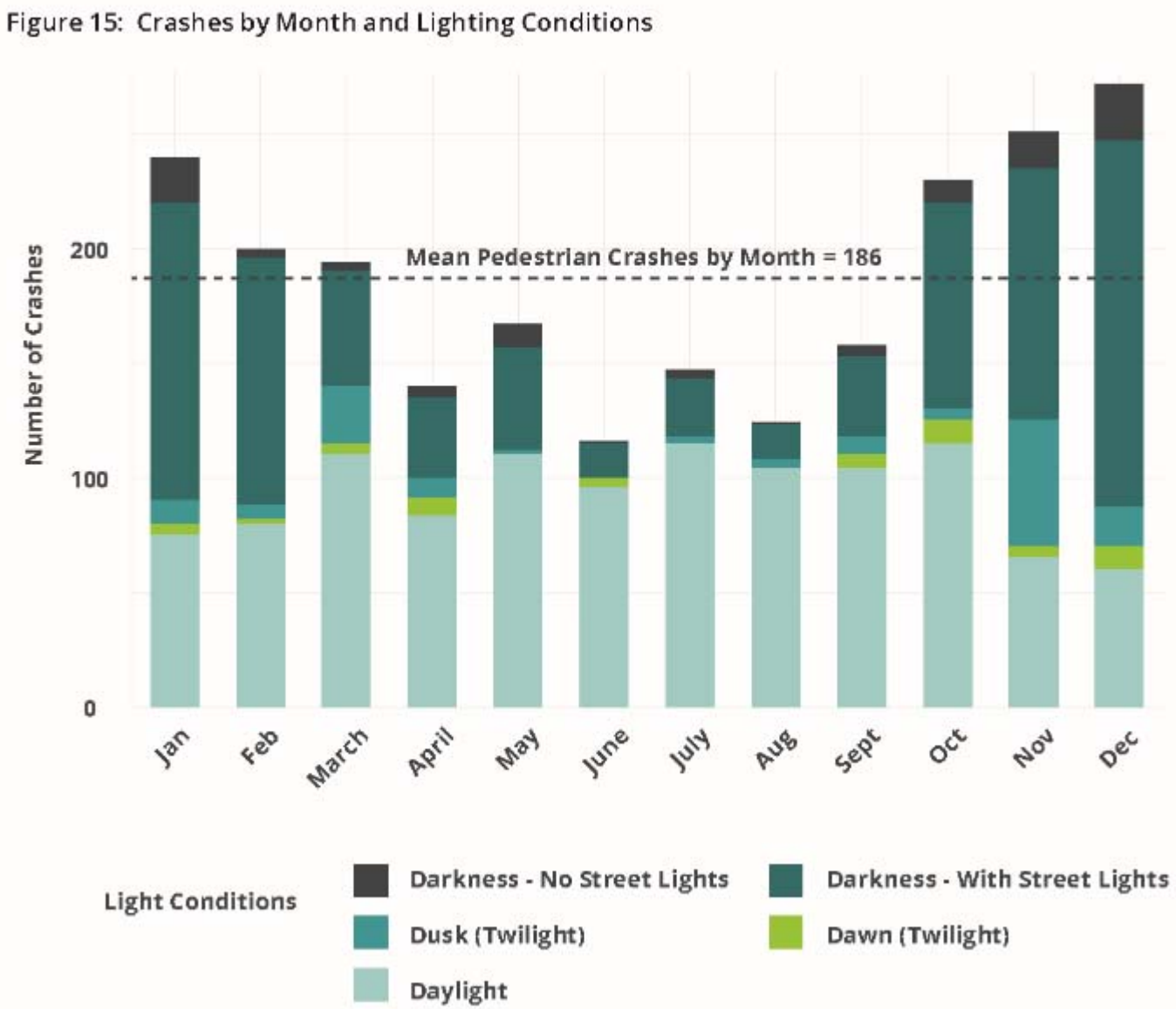
**Portlanders that have to walk (including those who are transit-reliant) are most exposed to these systemic safety issues**

# When are crashes happening?



# Where are crashes happening?

Table 3: Pedestrian Crash Location Type Summary (2006-2015)

| LOCATION TYPE | NUMBER OF CRASHES | PERCENT OF CRASHES | NUMBER OF KSI* CRASHES | PERCENT OF KSI* CRASHES | PROBABILITY OF A KSI* CRASH |
|---|---|---|---|---|---|
| Signalized Intersections | 971 | 43.5% | 97 | 33.4% | 13.1% |
| Unsignalized Intersections | 614 | 27.5% | 127 | 25.5% | 15.8% |
| Mid-block | 567 | 25.4% | 148 | 38.9% | 26.1% |
| Driveway | 78 | 3.5% | 8 | 2.1% | 10.3% |
| **Total** | **2,230** | **100%** | **380** | **100%** | **17.0%** |

** KSI = Killed or Serious Injury Crash*

*Source: The City of Portland provided the crash data for this analysis, which it received from the Oregon Department of Transportation (ODOT) Crash Analysis and Reporting Unit.*

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OVER **40%** of pedestrian crashes

AND **30%** of severe/fatal crashes citywide

**OCCUR AT SIGNALIZED INTERSECTIONS**

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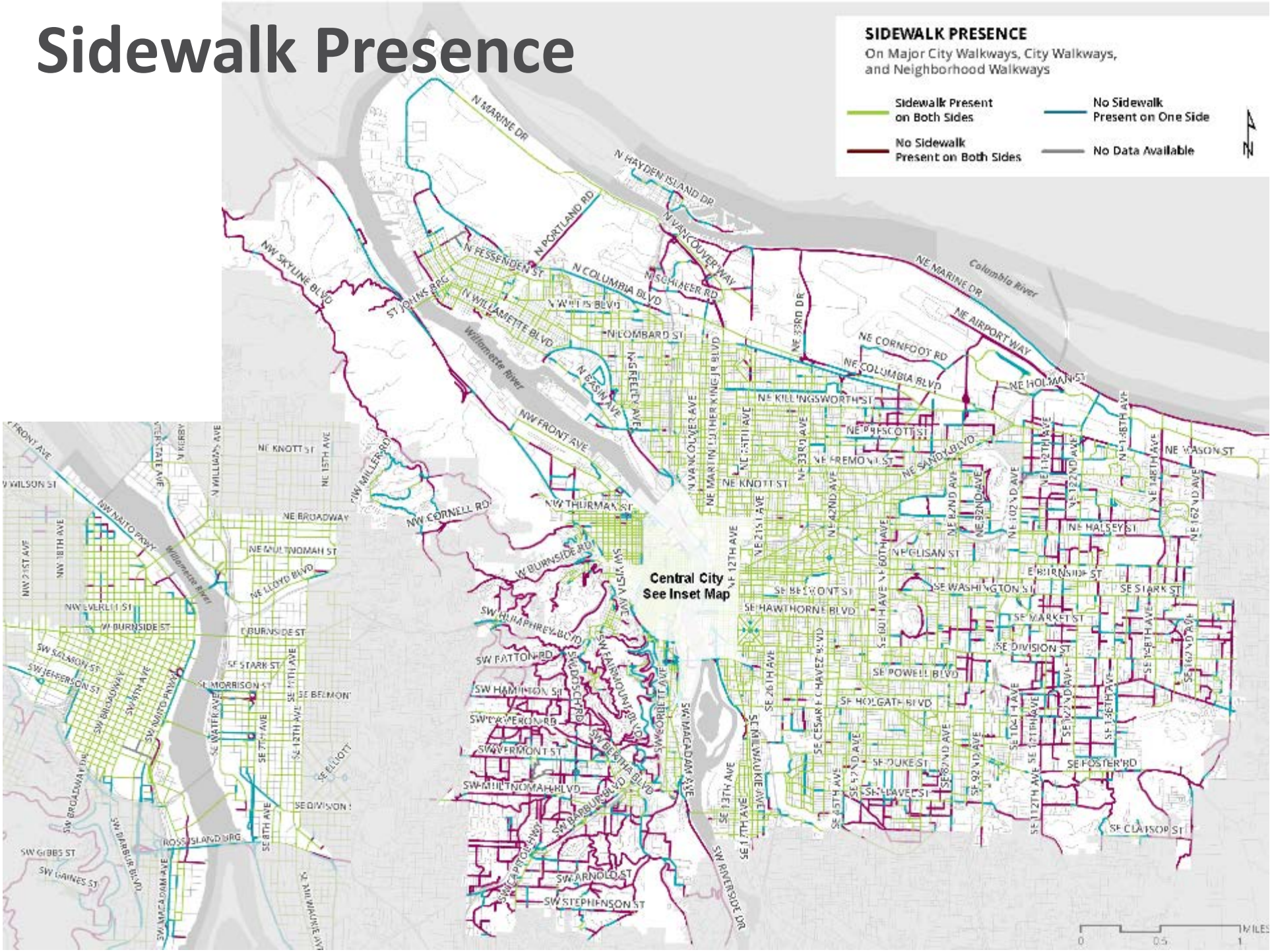
# In Portland, insufficient marked crossing opportunities may contribute to pedestrian crashes

# Sidewalk Presence



# But where (and how frequently) should marked crossings be provided?

# Existing Crosswalk Design Guidelines

## CROSSWALK DESIGN BY ROADWAY TYPE*

| | VEHICLE ADT > 4,000 - 9,000 | | | VEHICLE ADT > 9,000 - 12,000 | | | VEHICLE ADT > 12,000 - 15,000 | | | VEHICLE ADT > 15,000 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <30 MPH | 35 MPH | 40+ MPH | <30 MPH | 35 MPH | 40+ MPH | <30 MPH | 35 MPH | 40+ MPH | <30 MPH | 35 MPH | 40+ MPH |
| TWO LANES | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and enhanced/active warning (islands and RRFB's) |
| THREE LANES WITH RAISED MEDIAN | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and enhanced/active warning (islands and RRFB's) |
| THREE LANES WITHOUT RAISED MEDIAN | Marked Crosswalk | Marked Crosswalk, island or curb extensions, enhanced signing and striping | Marked Crosswalk and pedestrian hybrid or full signal | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and pedestrian hybrid or full signal | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and pedestrian hybrid or full signal | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and pedestrian hybrid or full signal |
| MULTILANE WITH RAISED MEDIAN | Marked Crosswalk, island or curb extensions, enhanced signing and striping | Marked Crosswalk, island or curb extensions, enhanced signing and striping | Marked Crosswalk and pedestrian hybrid or full signal | Marked Crosswalk, island or curb extensions, enhanced signing and striping | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and pedestrian hybrid or full signal | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and pedestrian hybrid or full signal | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and pedestrian hybrid or full signal |
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** All crossings must be scoped by an engineer to ensure recommended treatment is appropriate and ADA ramps and illumination are in place.*

- Marked Crosswalk
- Marked Crosswalk, island or curb extensions, enhanced signing and striping
- Marked Crosswalk and enhanced/active warning (islands and RRFB's)
- Marked Crosswalk and pedestrian hybrid or full signal

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# Guidance still needed…

- No guidelines regarding desired frequency between marked pedestrian crossing opportunities
- Without this, difficult to identify network gaps where crossing improvements are needed (and to understand level of investment needed to fill those gaps)
- Allows for a proactive, programmatic response to citywide crossing improvements

# Existing research?

- Research on exactly how far a pedestrian will travel out of direction to access a “safe” crossing is scant
- General rule of thumb: people walking will typically take the shortest route from point A to Point B
- Increasing the number of marked/enhanced crossing opportunities increases the number of options for people to safety cross the street

# New PedPDX crossing spacing guidelines

## Inside Pedestrian Districts:

**DESIRED SPACING OF**

**530 feet**

*between marked crossings*

### City Walkways and Major City Walkways within Pedestrian Districts

**DESIRED CROSSING FREQUENCY**

**530 ft**

Pedestrian Districts are areas where high levels of pedestrian activity exist or are planned, including the Central City, Gateway regional center, town centers, and near MAX stations.

For Major City Walkways and City Walkways within Pedestrian Districts the desired spacing between marked pedestrian crossings is 530 feet.

Demonstrating existing crossing demand will not be required to justify new marked crossings within Pedestrian Districts.

On a street with standard 200-ft blocks, the 530-ft crossing frequency results in a marked pedestrian crossing approximately every other block.

## Outside of Pedestrian Districts:

**DESIRED SPACING OF**

**800 feet**

*between marked crossings*

### City Walkways and Major City Walkways outside of Pedestrian Districts

**DESIRED CROSSING FREQUENCY**

**800 ft**

City Walkways and Major City Walkways provide walking access to important land use and transit destinations. The desired spacing between marked pedestrian crossings on these streets is 800 feet.

On a street with standard 200-ft blocks, the 800-ft crossing frequency results in a marked and/or enhanced pedestrian crossing approximately every three blocks.

To ensure that new marked crossings on streets with lower pedestrian volumes do not result in driver disregard of crosswalks, a minimum of 20 pedestrian/bicycle crossings per peak hour will be required to provide new marked/enhanced crossings on City Walkways and Major City Walkways outside of Pedestrian Districts or where there is not a transit stop.

## At Transit stops:

**WITHIN OF ALL TRANSIT STOPS**

**100 ft**

### Transit Stops

**DESIRED CROSSING WITHIN**

**100 ft**

Moving forward, PBOT practice will be to provide a marked pedestrian crossing at all transit stops[2], regardless of street classification.

Demonstrating existing crossing demand will not be required to justify new marked crossings at transit stops.

Marked crossing requirements at transit stops may be implemented by providing new marked crossings at existing transit stops, and/or by strategically relocating or consolidating transit stops such that they are located at existing marked crossings. This will require PBOT capital project managers to collaborate with TriMet to consolidate, relocate, or otherwise confirm stop locations.

2. Engineering judgement may deem marked crossings unwarranted in some locations, particularly on two-lane streets with very low vehicle volumes and low transit ridership

# City / Regional Connectivity Standards

**33.654.110 Connectivity and Location of Rights-of-Way**

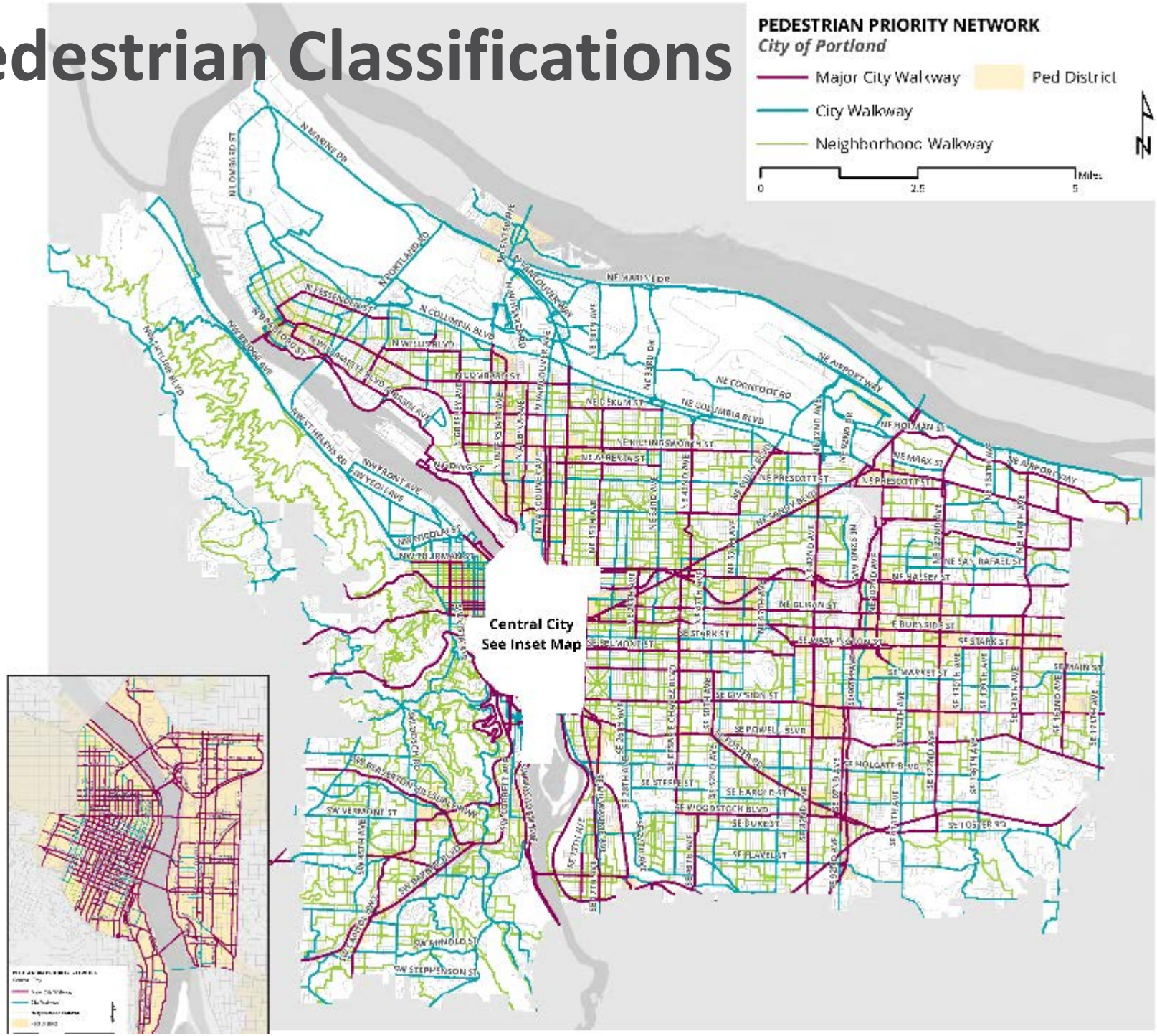
**A. Purpose.** The regulations of this section ensure provision of efficient access to as many lots as possible, and enhance direct movement by pedestrians, bicycles, and motor vehicles between destinations. Direct routes for bicycles and pedestrians from residential areas to neighborhood facilities, such as schools and parks, are particularly important to increase the convenience of travelling by foot or bicycle. The specific location of rights-of-way is influenced by a variety of conditions, including existing development, streets and lot patterns, and environmental features.

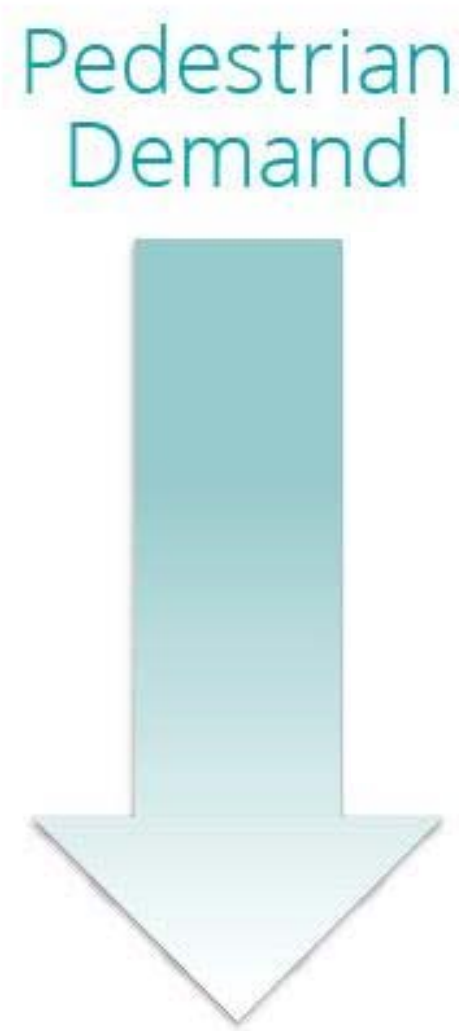
**B. Approval criteria.**

1. Through streets and pedestrian connections in OS, R, C, and E Zones. In OS, R, C, and E zones, through streets and pedestrian connections are required where appropriate and practicable, taking the following into consideration:

   a. Through streets should generally be provided no more than 530 feet apart, and pedestrian connections should generally be provided no more than 330 feet apart. Through street and pedestrian connections should generally be at least 200 feet apart;

# Pedestrian Classifications






## Pedestrian Districts

- Land use demand: Includes all Comprehensive plan "centers"
- Transit demand: ¼ mile walksheds to major transit stations

## Major City Walkways

- Land use demand: Comp plan "corridors" and "main streets"
- Transit demand: Frequent transit streets
- High-demand regional trails

## City Walkways

- Transit demand: Non-frequent transit streets
- All other arterials/collectors
- Moderate-demand trails

## Neighborhood Walkways

- SRTS (local streets)
- Neighborhood Greenways (existing and funded)
- Neighborhood trails

# Within Pedestrian Districts

- Maximum desired spacing of 530 feet

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- Results in marked crossing a approx. every other block

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- Maximum desired spacing of 530 feet
- Results in marked crossing a approx. every other block
- Minimum 20 crossings/hour not required to justify marked crossing

# Corridors outside of Pedestrian Districts

- Maximum desired spacing of 800 feet

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- Results in a marked/enhanced crossing approx. every three blocks

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- Results in a marked/enhanced crossing approx. every three blocks
- Minimum of 20 crossings/hour required where there is not a transit stop

# Transit stops

- Marked/enhanced crossings should be provided within 100 feet <u>at all transit stops</u> (regardless stop ridership)

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- Minimum 20 peds/hour not required to justify marked crossing

# Example: Outer Division

Existing: 17 crossings (in almost 100 blocks)

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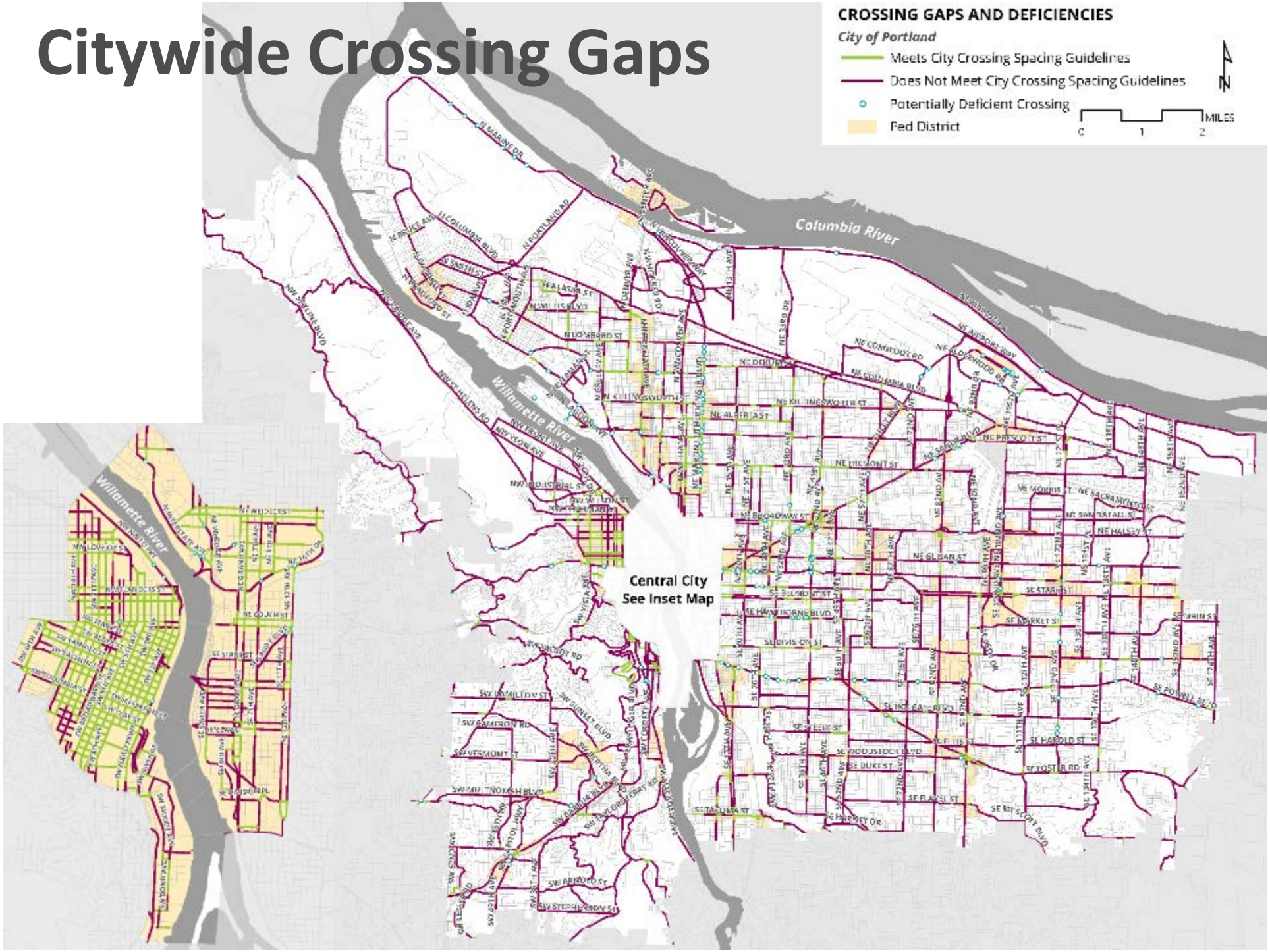
Existing: 17 crossings (in almost 100 blocks)

Coming Soon: **40** crossings total

# Citywide Crossing Gaps



**Approximately <u>3,500</u> marked crossing gaps on arterial/collector network**

# PRIORITIZING PEDESTRIAN NEEDS

# Why a data-based approach?

- Make sure we are directing limited resources to the greatest needs first

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- Aligns spending with adopted City goals/objectives

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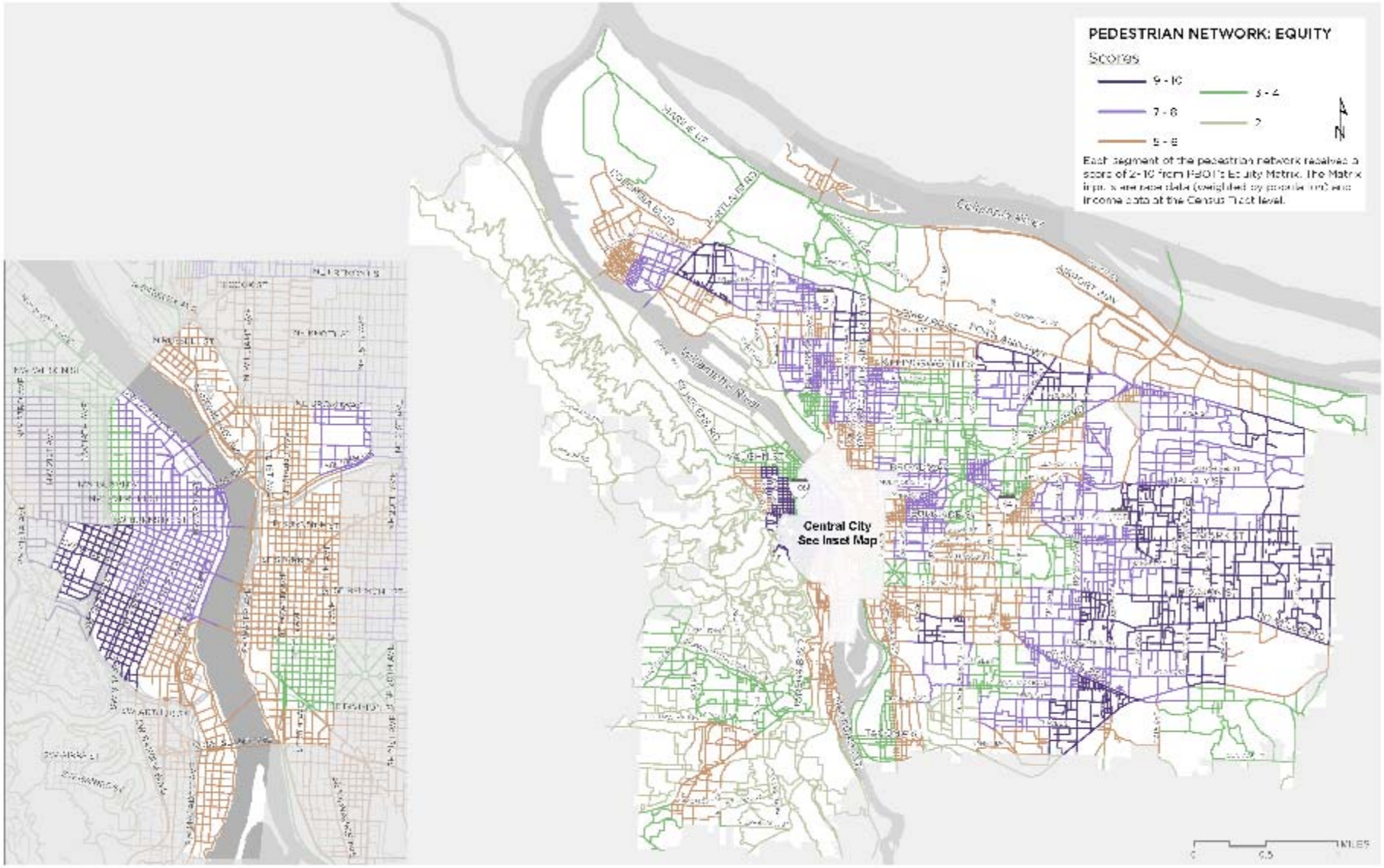
- Make sure we are directing limited resources to the greatest needs first
- Aligns spending with adopted City goals/objectives
- Help ensure we provide improvements in an equitable manner across the city (not complaint-based)

## Which kinds of places are the most important to improve for walking in Portland?

| | | Citywide |
|---|---|---|
| EQUITY | Areas that serve people who need to rely on walking the most | 5.11 |
| SAFETY | Streets where people walking have been killed or injured | 5.08 |
| DEMAND | Streets connecting people to transit/ bus stops | 5.06 |
| SAFETY | Along and across busy streets | 4.99 |
| DEMAND | Streets connecting families and children to schools | 4.99 |
| DEMAND | Streets connecting people to neighborhood commercial districts | 4.73 |
| | Streets connecting people to community facilities like libraries | 4.66 |
| | Areas where the most people live and/ or work | 4.55 |
| | Residential streets lacking sidewalks or walking paths | 4.54 |
| | Streets connecting people to parks | 4.52 |

# Equity

| Factor | Equity Score |
|---|---|
| **Race** (by census tract per ACS, weighted by tract population) | 1 to 5 |
| **Income** (by census tract per ACS) | 1 to 5 |
| *Overall Equity Score* | *Sum (2 to 10)* |



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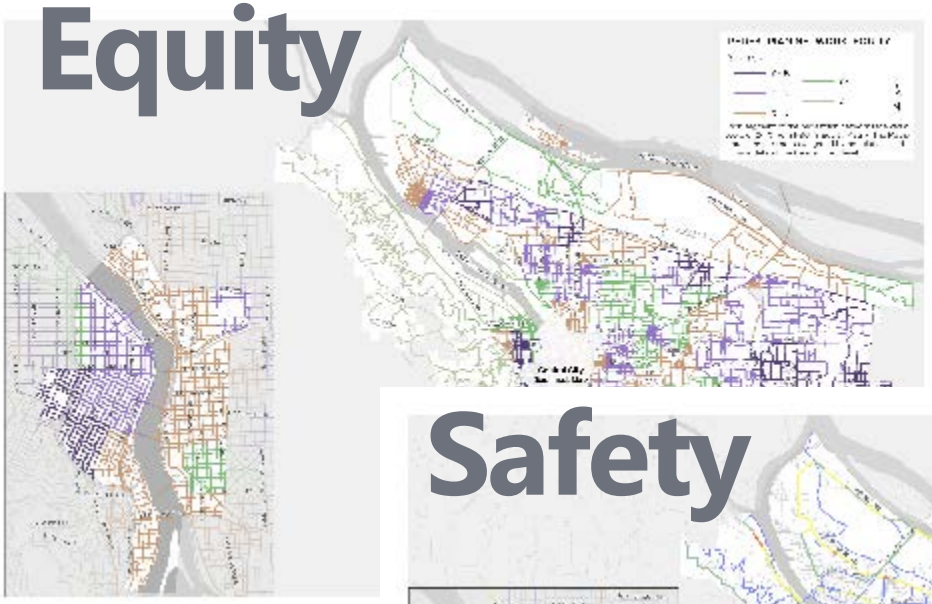

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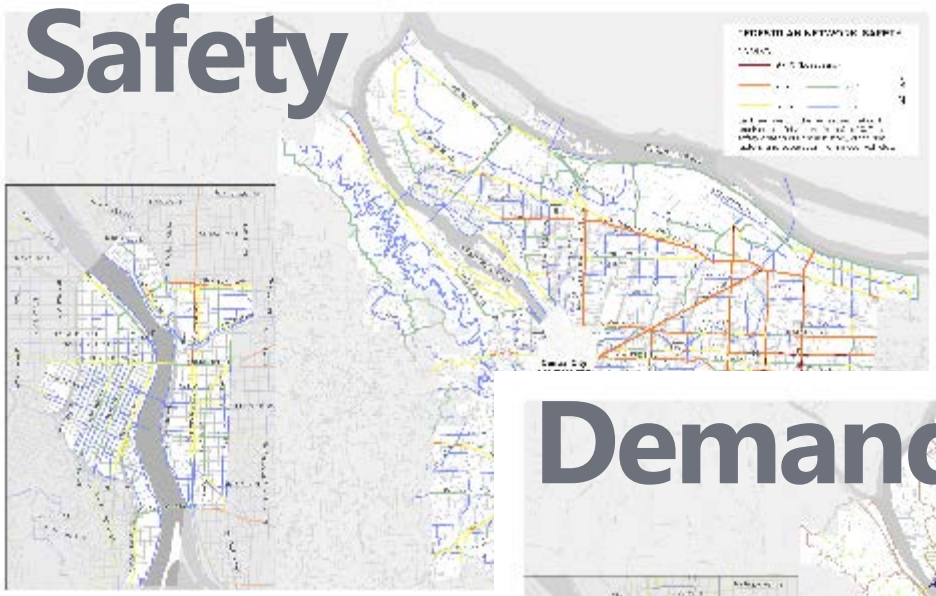
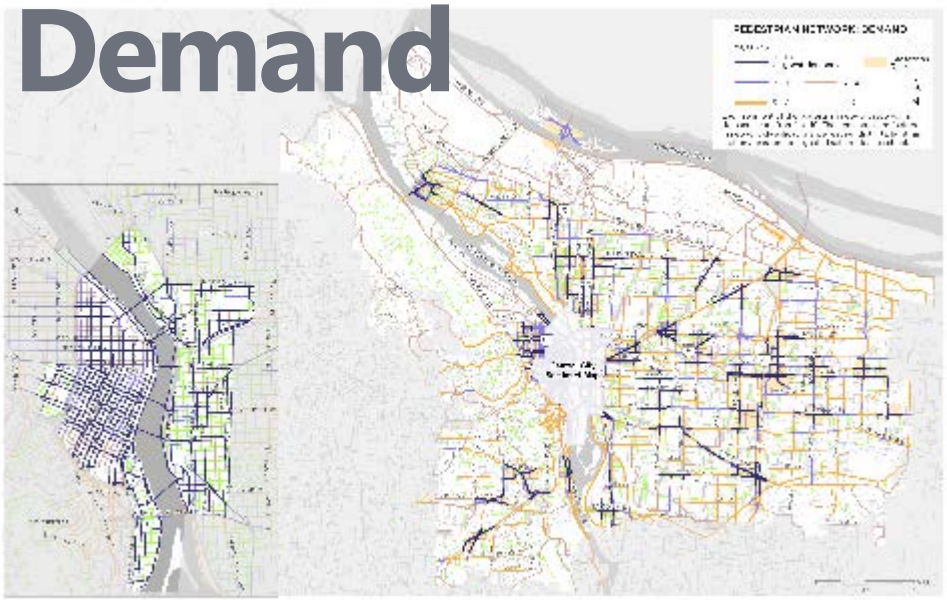


# Demand



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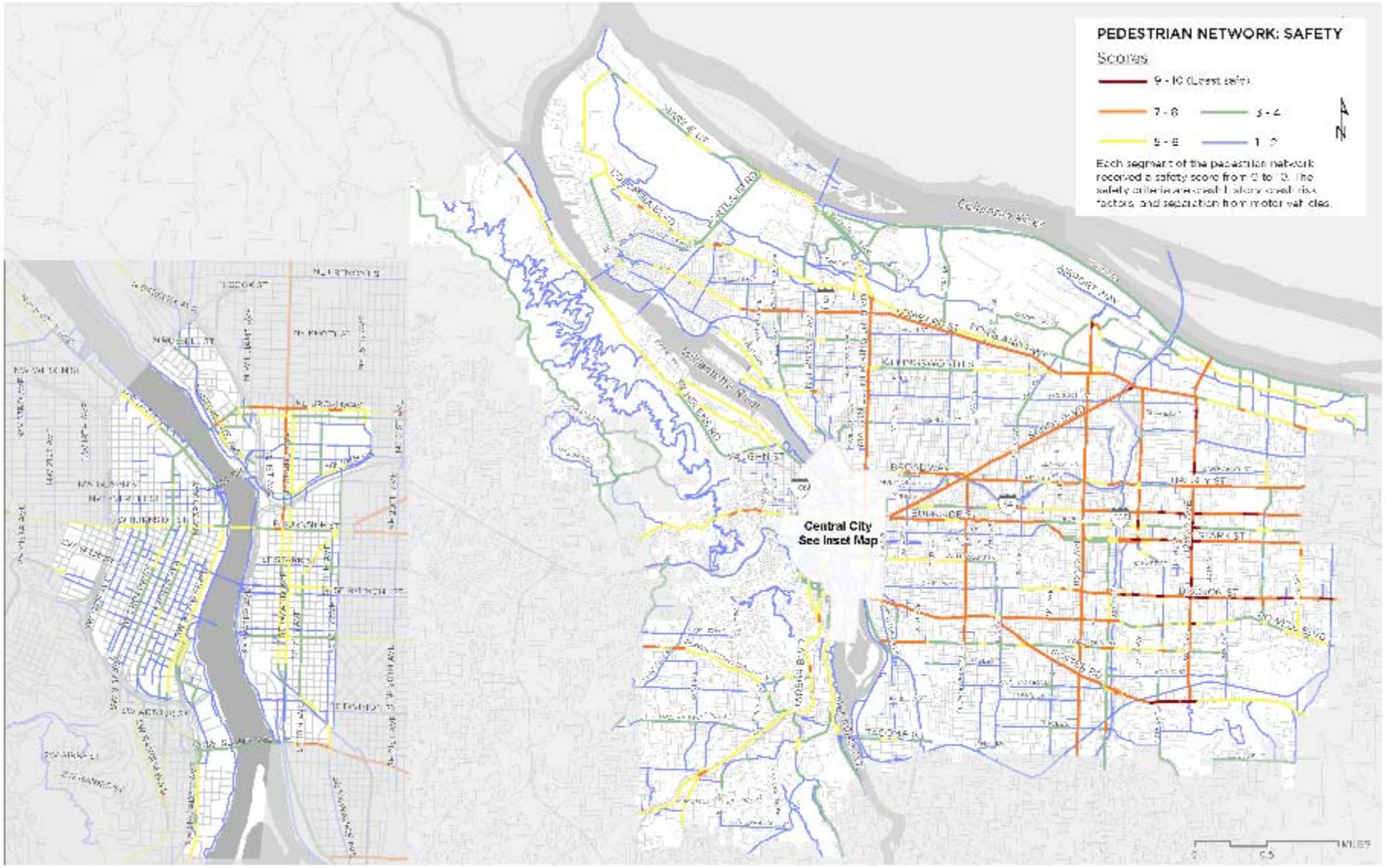
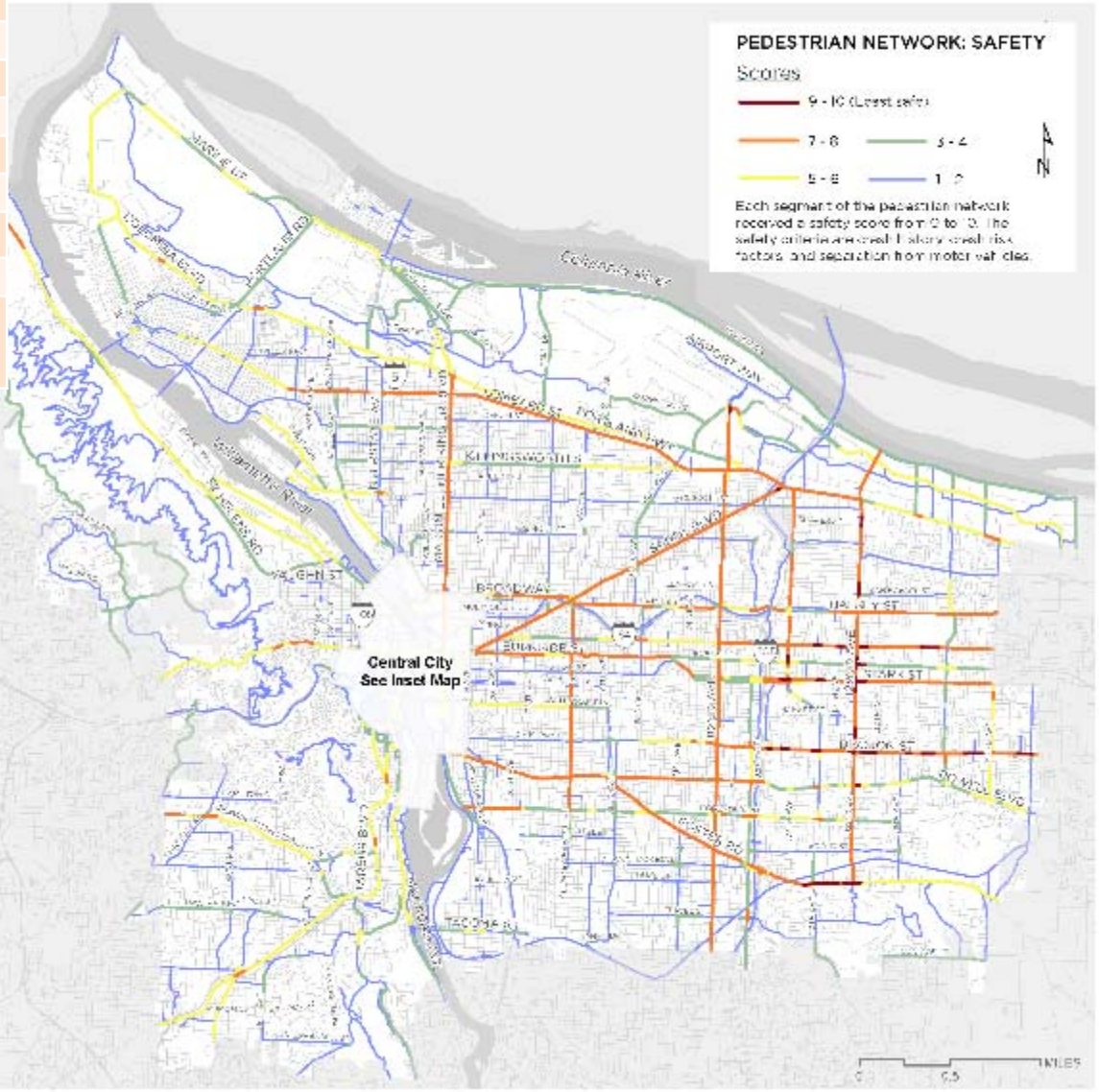
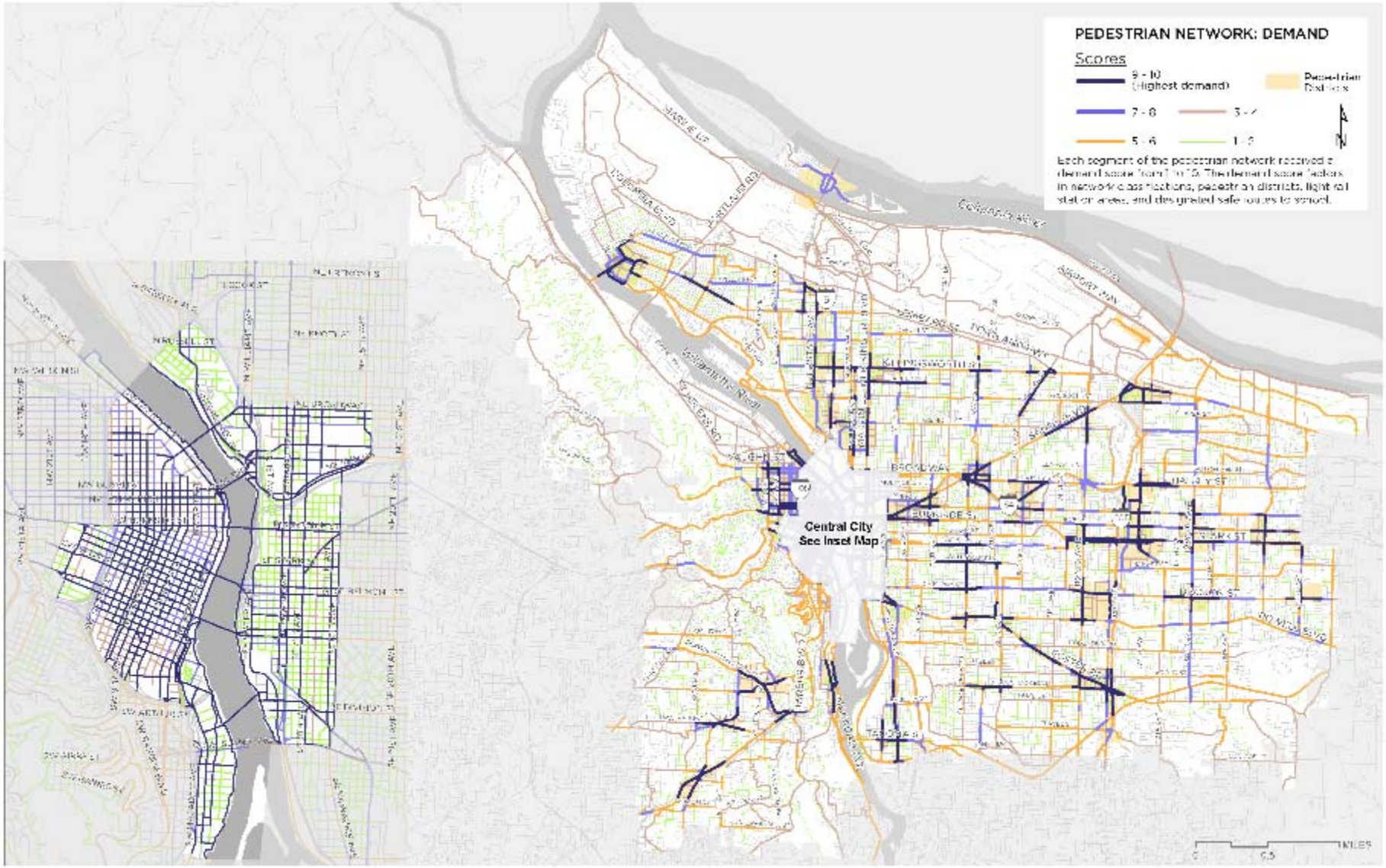

PEDESTRIAN NETWORK: SAFETY
Scores
9 - 10 (Least safe)
7 - 8
5 - 6
3 - 4
1 - 2
Each segment of the pedestrian network received a safety score from 0 to 10. The safety criteria are overall traffic crash risk factors, and separation from motor vehicles.
Central City
See Inset Map
MILES

| Condition | Safety Score |
|---|---|
| ***Collision-based Factors*** | |
| Pedestrian High Crash Network | 2 |
| Street segments with **one** KSI pedestrian collision | 1 |
| Street segments with **multiple** KSI pedestrian collision | 2 |
| ***Risk Factors*** | |
| Streets with three travel lanes (two-way street) | 1 |
| Streets with three travel lanes (one-way street) | 2 |
| Streets with four or more travel lanes | 3 |
| Locations with posted speeds of 30 mph or higher | 2 |
| Locations with posted speeds of 40 mph or higher | 3 |
| ***Off-Street Factor*** | |
| Trail segments separated from motor vehicles | 2 |
| **Overall Safety Score** | **Sum Total (0-10)** |

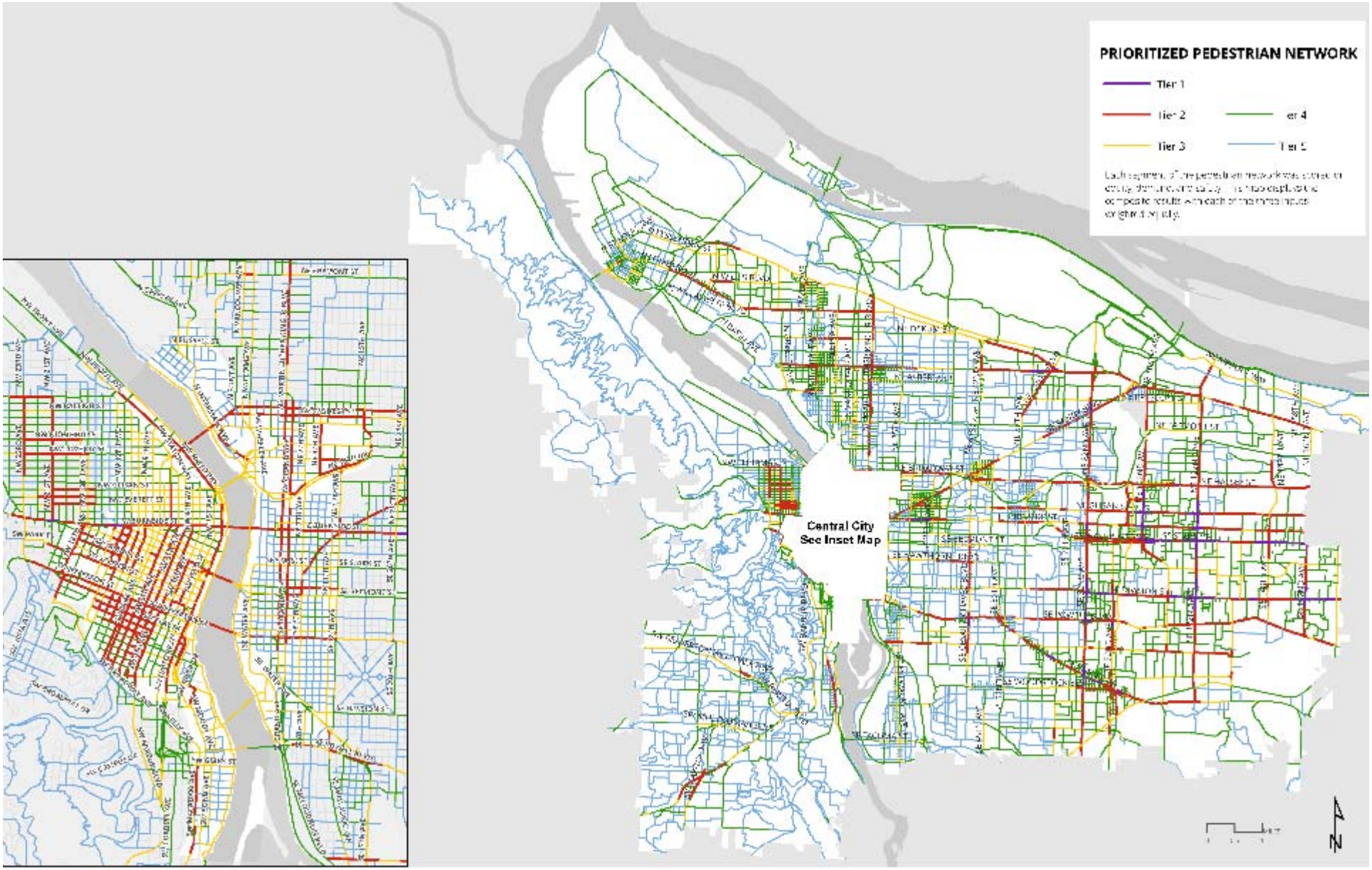


# Demand

| Network Classification | Pedestrian Districts | LRT Station Areas | SRTS | Outside of Districts |
|---|---|---|---|---|
| Major City Walkway | 10 | 8 | 8 | 6 |
| City Walkway | 8 | 6 | 6 | 4 |
| N'hood Walkway | 4 | 2 | 1 | 1 |
| Local Streets | 2 | 1 | N/A | N/A |

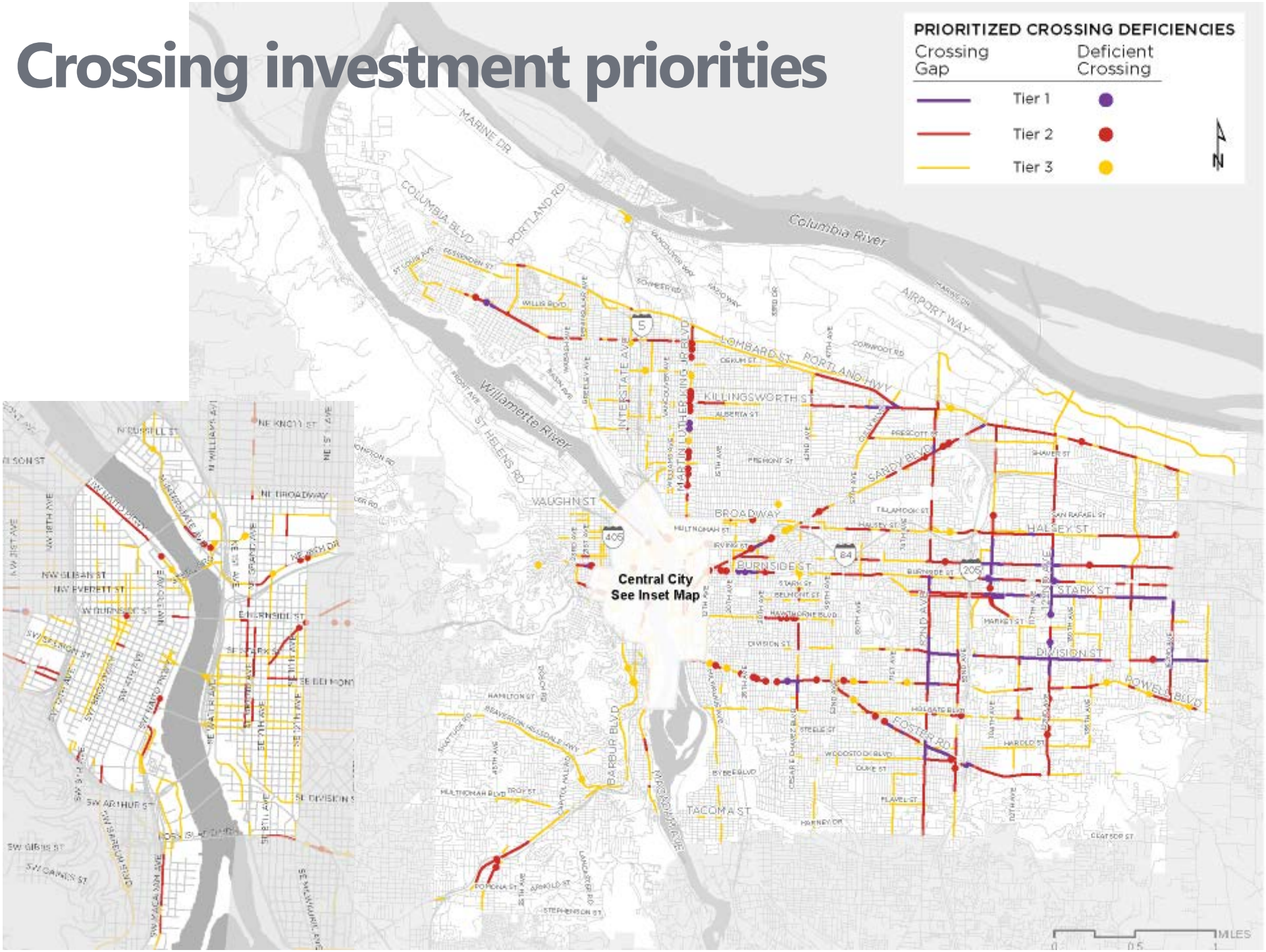


# Equity + Safety + Demand



# Sidewalk investment priorities

# Crossing investment priorities

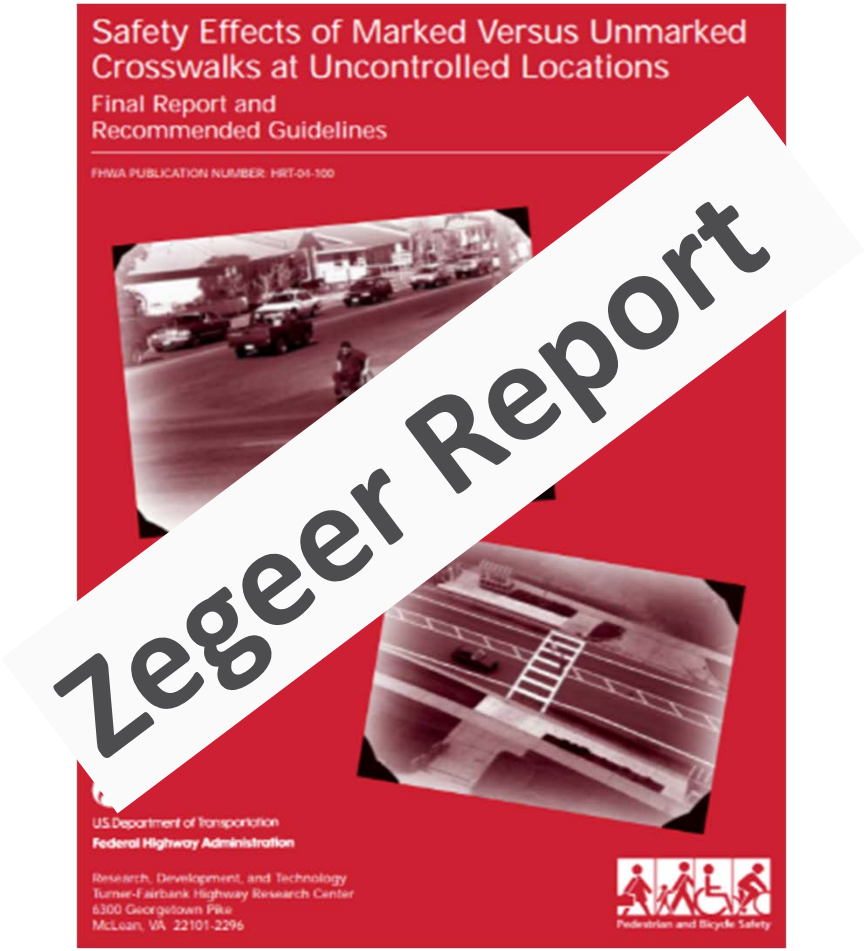


# Addressing crossing gaps

- **City Traffic Engineer has adopted PedPDX crossing spacing as new PBOT design guidance for all capital projects**
- **All capital projects must address identified crossing gaps as part of project scope**
  - Corridor projects (transit projects, paving, striping modifications, bicycle facilities, and other multi-modal corridor improvements)
  - Does not apply to spot improvements where no civil work is proposed (e.g., signal modifications, striping for turn pockets)
- **Priority needs used to populate CIP**
- **Pedestrian Network Completion Program provides spot improvements as prioritized in PedPDX.**

# What happens next ?

# Undergo engineering guidance



# ZEGEER REPORT FINDINGS

As # lanes & volumes increase, so do crashes at marked crosswalks

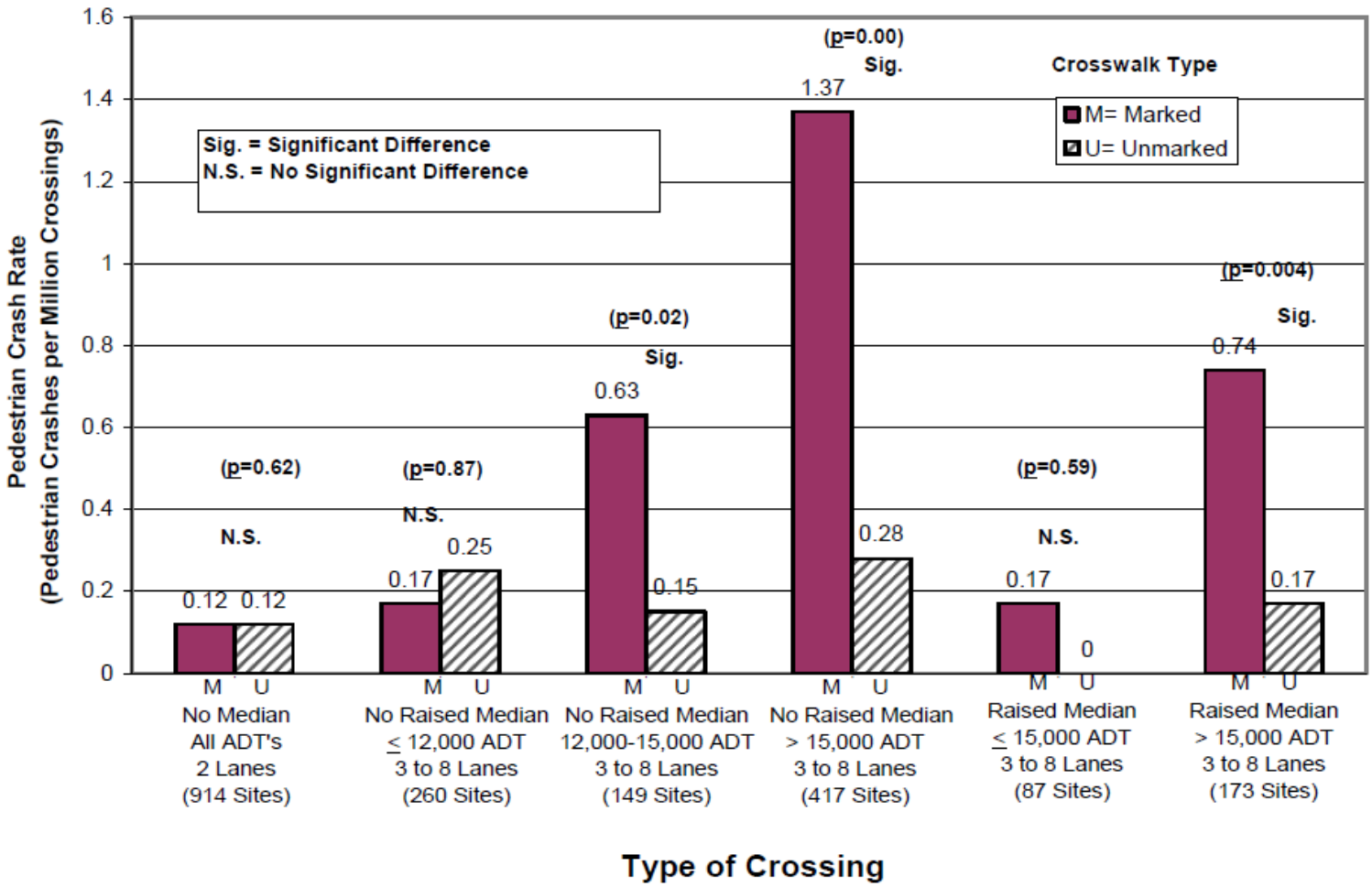



Figure 18. Pedestrian crash rate versus type of crossing.

# ZEGEER REPORT FINDINGS

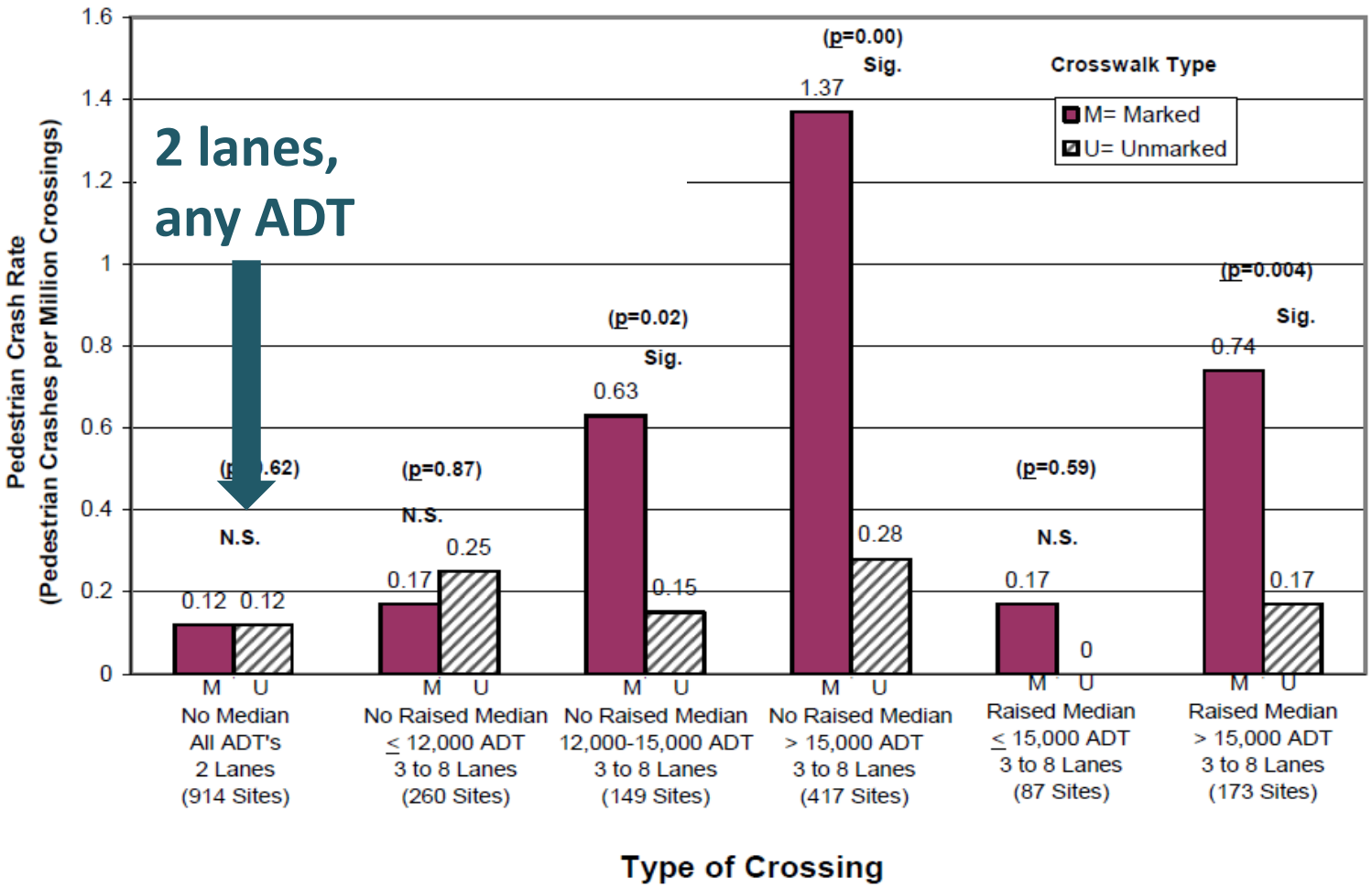



Figure 18. Pedestrian crash rate versus type of crossing.

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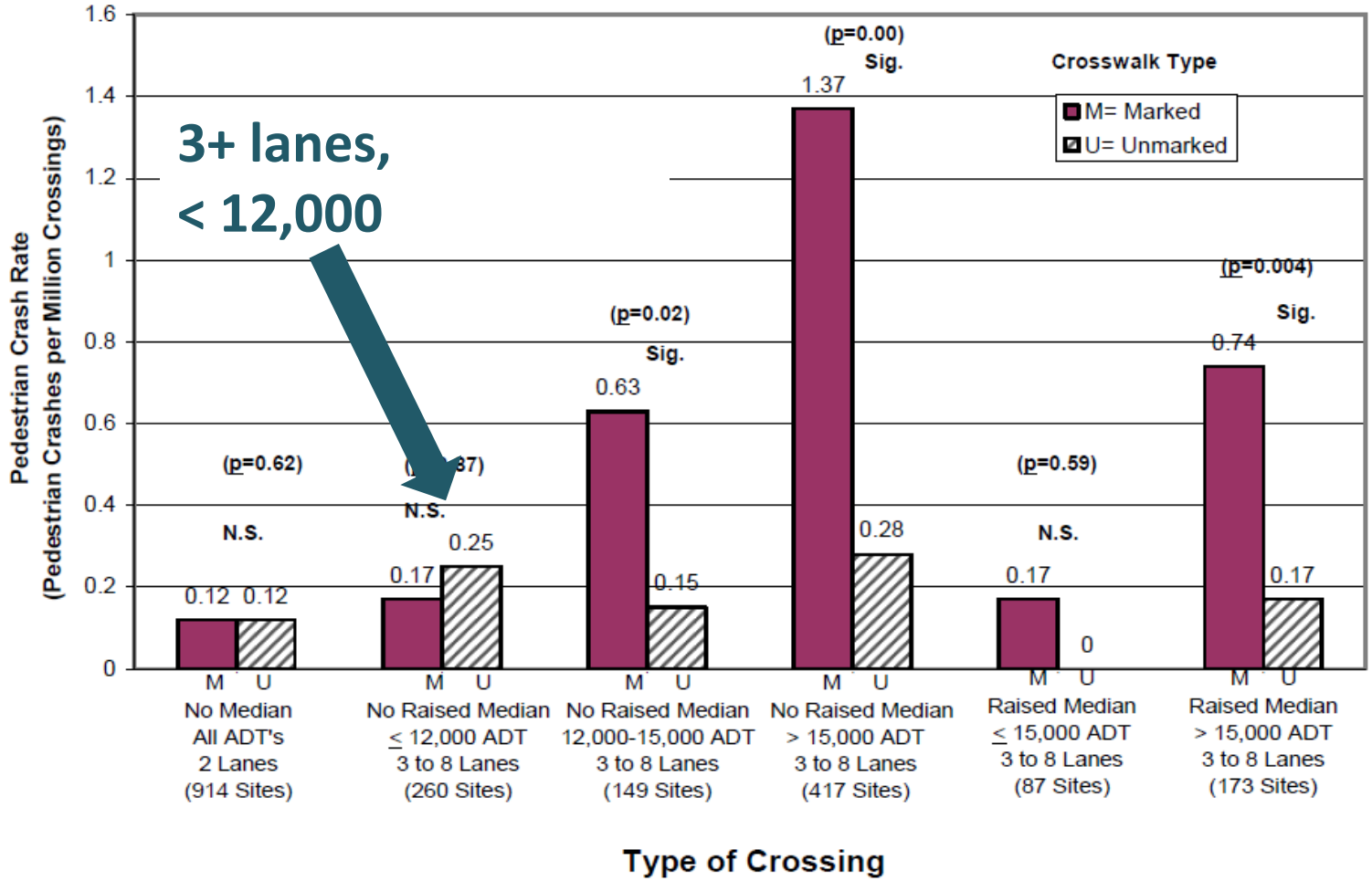


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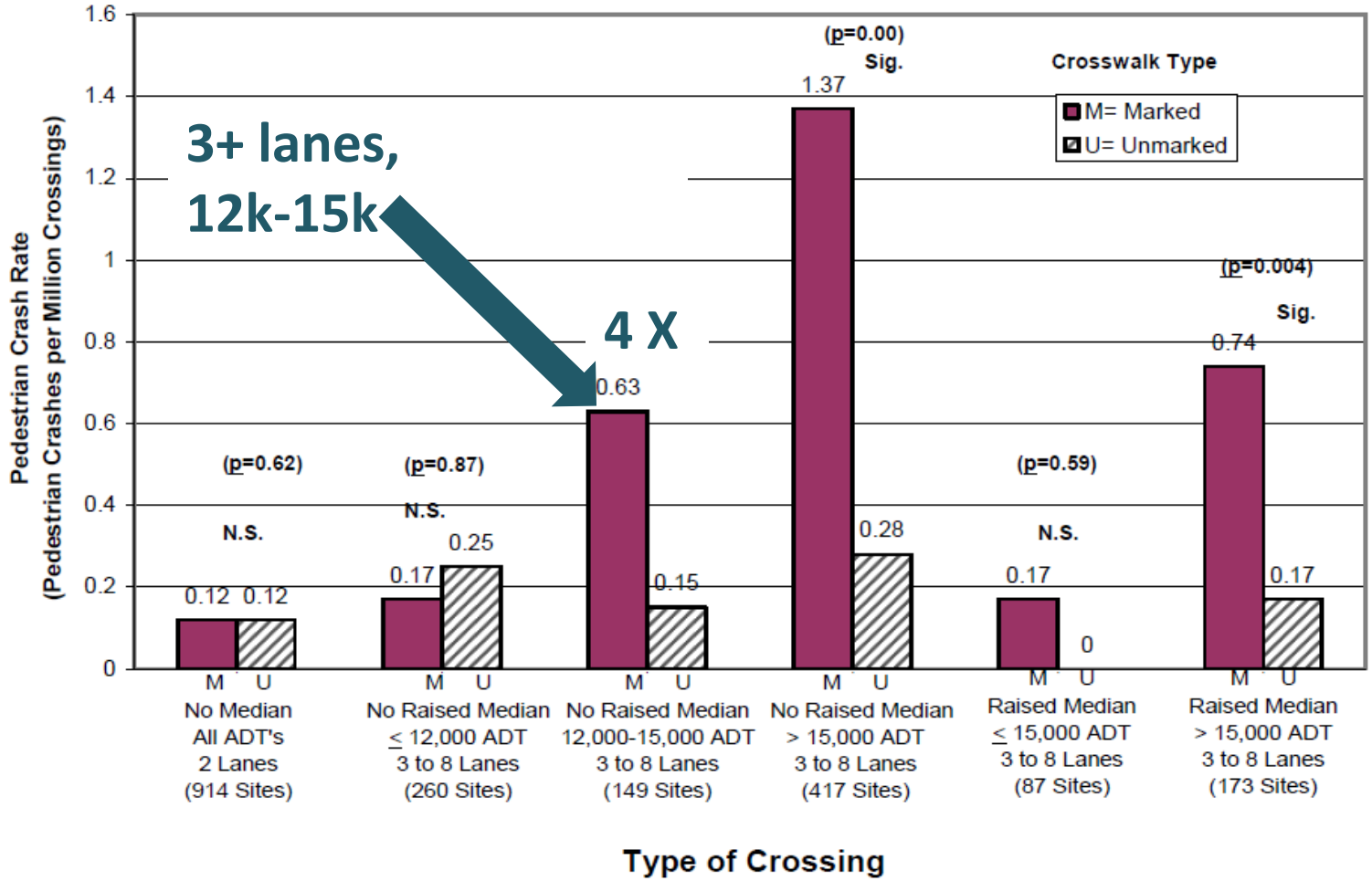


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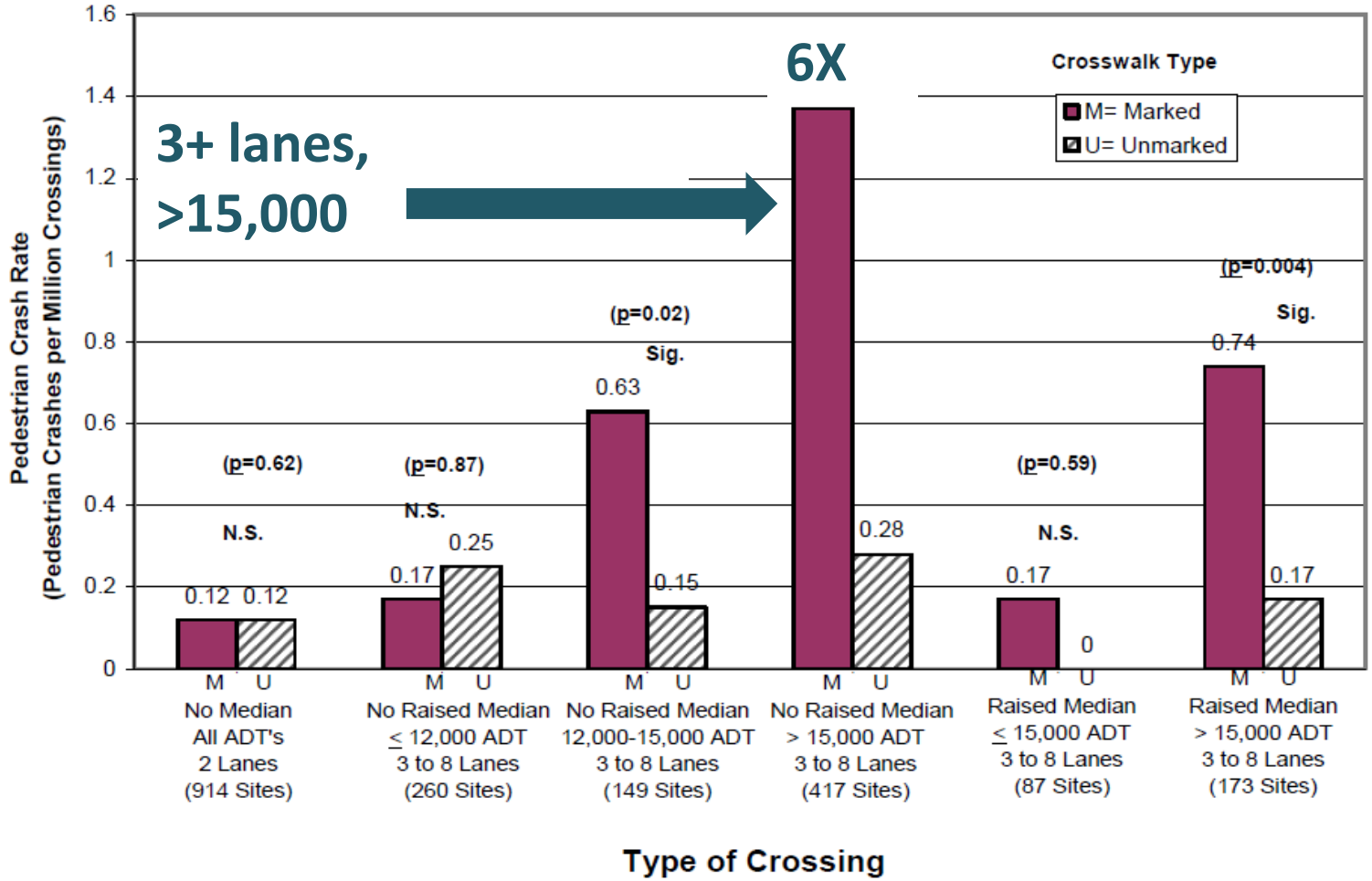


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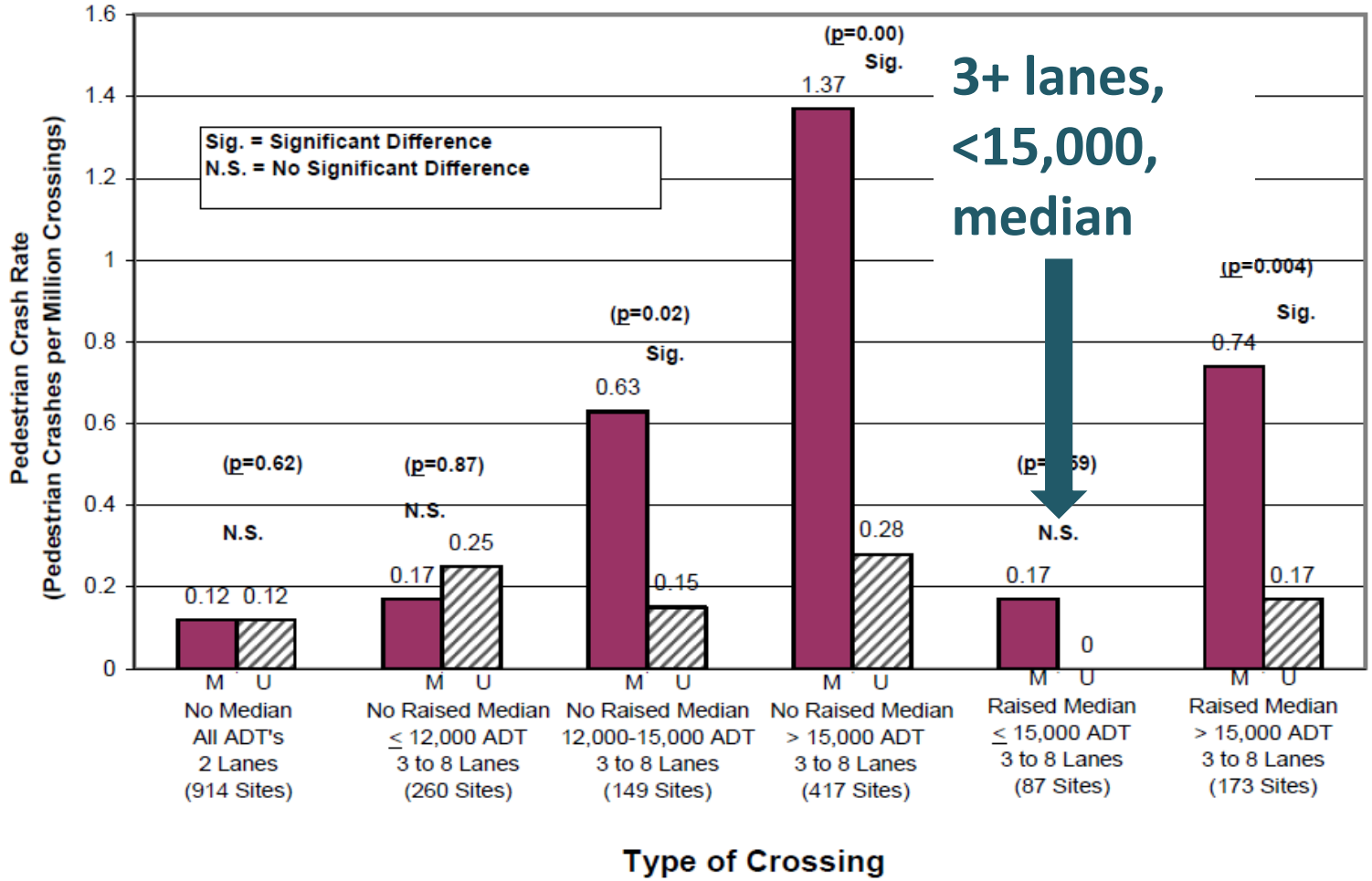


Figure 18. Pedestrian crash rate versus type of crossing.

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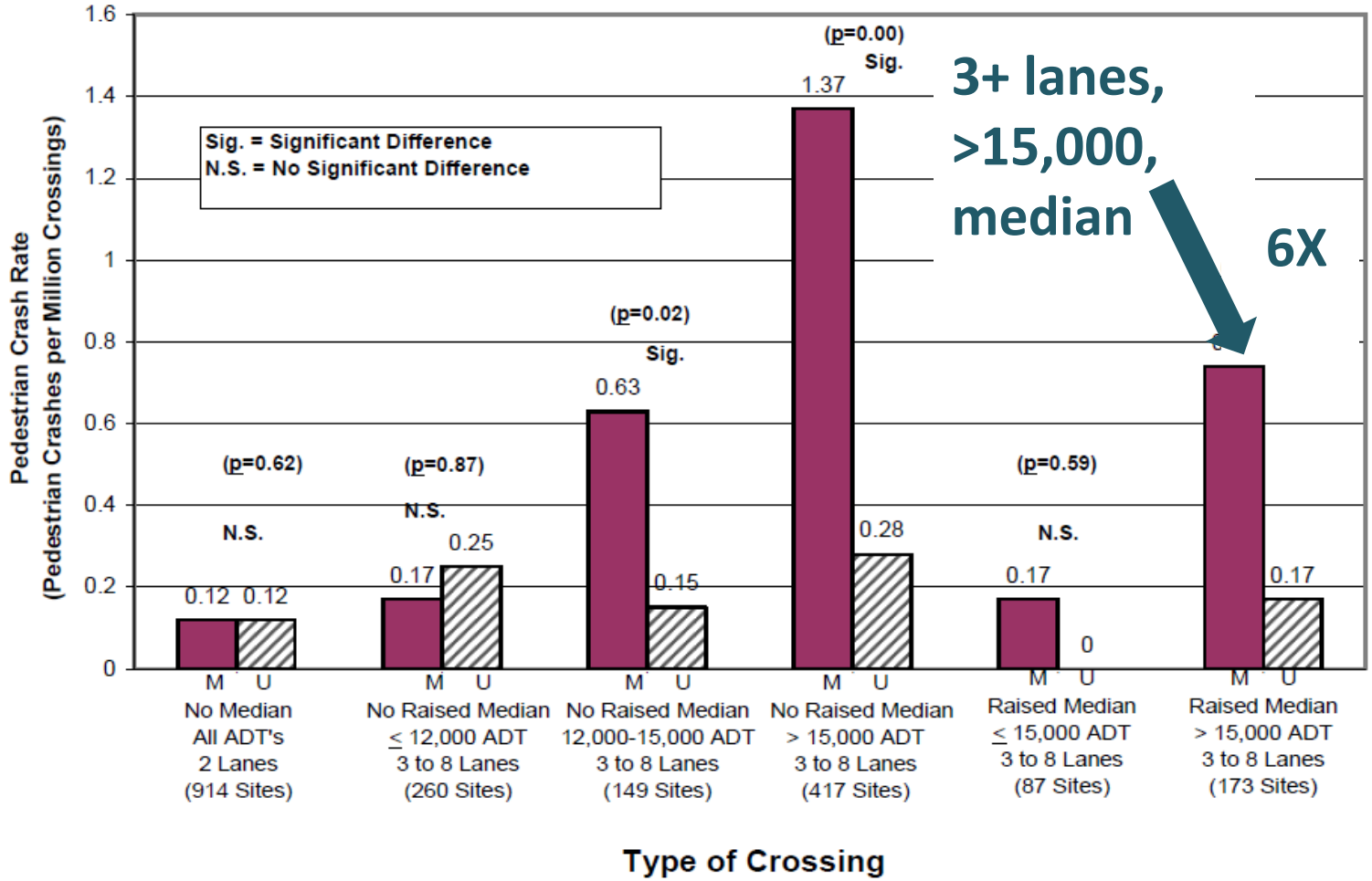



Figure 18. Pedestrian crash rate versus type of crossing.

# ZEGEER REPORT FINDINGS

**At speeds under 40 MPH:**

- 2 Lanes, Any Volume
- < 12,000 ADT
- 3 Lanes + Median

# ZEGEER REPORT FINDINGS

High volume or high speed streets need higher level treatments

# NCHRP 562 REPORT

- Crossing treatments based on ped volumes and walking speed, width of roadway, traffic speeds and volumes.
- Recommended treatments are based on pedestrian delay and expected motorist compliance.
- Incorporates MUTCD pedestrian traffic signal warrants based on pedestrian volumes.

# NCHRP 562 WORKSHEET

| | | | |
|---|---|---|---|
| **Step 1: Select worksheet:** | | | |
| Posted or statutory speed limit (or 85th percentile speed) on the major street (mph) | | *1a* | 30 |
| Is the population of the surrounding area <10,000? (enter ***YES*** or ***NO***) | | *1b* | no |
| **Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a traffic control device?** | | | |
| Peak-hour pedestrian volume (ped/h), $V_p$ | | *2a* | 40 |
| **Result: 1** | | | |
| **Step 3: Does the crossing meet the pedestrian warrant for a traffic signal?** | | | |
| Major road volume, total of both approaches during peak hour (veh/h), $V_{maj\text{-}s}$ | | *3a* | 1168 |
| [Calculated automatically] Preliminary (before min. threshold) peak hour pedestrian volume to meet warrant | | *3b* | 207 |
| [Calculated automatically] Minimum required peak hour pedestrian volume to meet traffic signal warrant | | *3c* | 207 |
| Is 15th percentile crossing speed of pedestrians less than 3.5 ft/s (1.1 m/s)? (enter ***YES*** or ***NO***) | | *3d* | NO |
| If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50%. | % rate of reduction for *3c* (up to 50%) | *3e* | |
| | Reduced value or *3c* | *3f* | 207 |
| **Result: The signal warrant is not met. Go to step 4.** | | | |
| **Step 4: Estimate pedestrian delay.** | | | |
| Pedestrian crossing distance, curb to curb (ft), L | | *4a* | 39 |
| Pedestrian walking speed (ft/s), $S_p$ (suggested speed = 3.5 ft/s) | | *4b* | 3.5 |
| Pedestrian start-up time and end clearance time (s), $t_s$ (suggested start-up time = 3 sec) | | *4c* | 3 |
| [Calculated automatically] Critical gap required for crossing pedestrian (s), $t_c$ | | *4d* | 14 |
| Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), $V_{maj\text{-}d}$ | | *4e* | 1168 |
| Major road flow rate (veh/s), v | | *4f* | 0.32 |
| Average pedestrian delay (s/person), $d_p$ | | *4g* | 271 |
| Total pedestrian delay (h), $D_p$ The value in 4h is the calculated estimated delay for all pedestrians crossing the major roadway without a crossing treatment (assumes 0% compliance). If the actual total pedestrian delay has been measured at the site, that value can be entered in 4i to replace the calculated value in 4h. | | *4h* | 3.0 |
| | | *4i* | |
| **Step 5: Select treatment based up on total pedestrian delay and expected motorist compliance.** | | | |
| Expected motorist compliance at pedestrian crossings in region: enter ***HIGH for High Compliance*** or ***LOW for Low Compliance*** | | *5a* | High |
| **Treatment Category:** | **ACTIVE OR ENHANCED** | | |

Speed

Ped volume

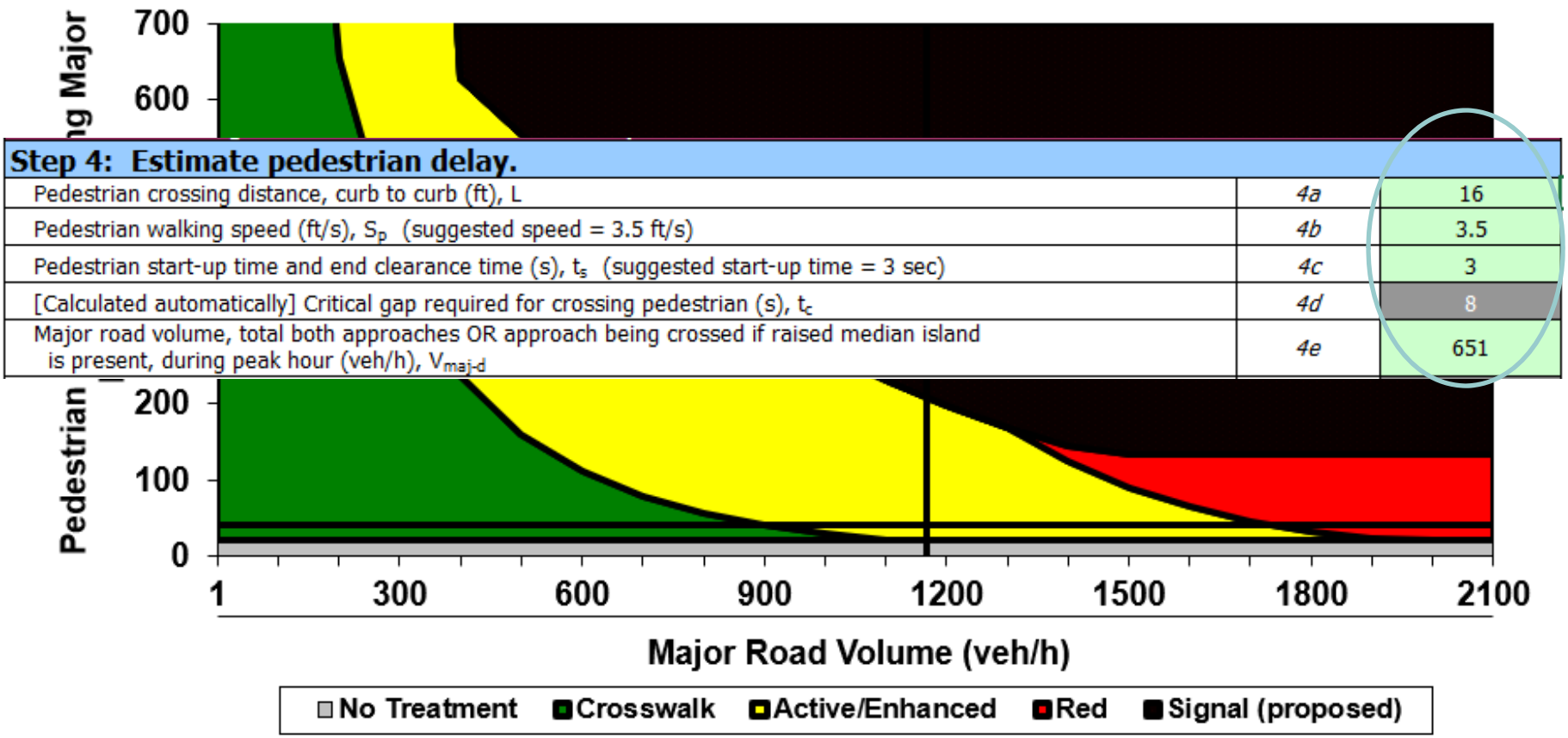
Peak Hour Volume

Crossing distance

*Adjust for islands & curb ext*

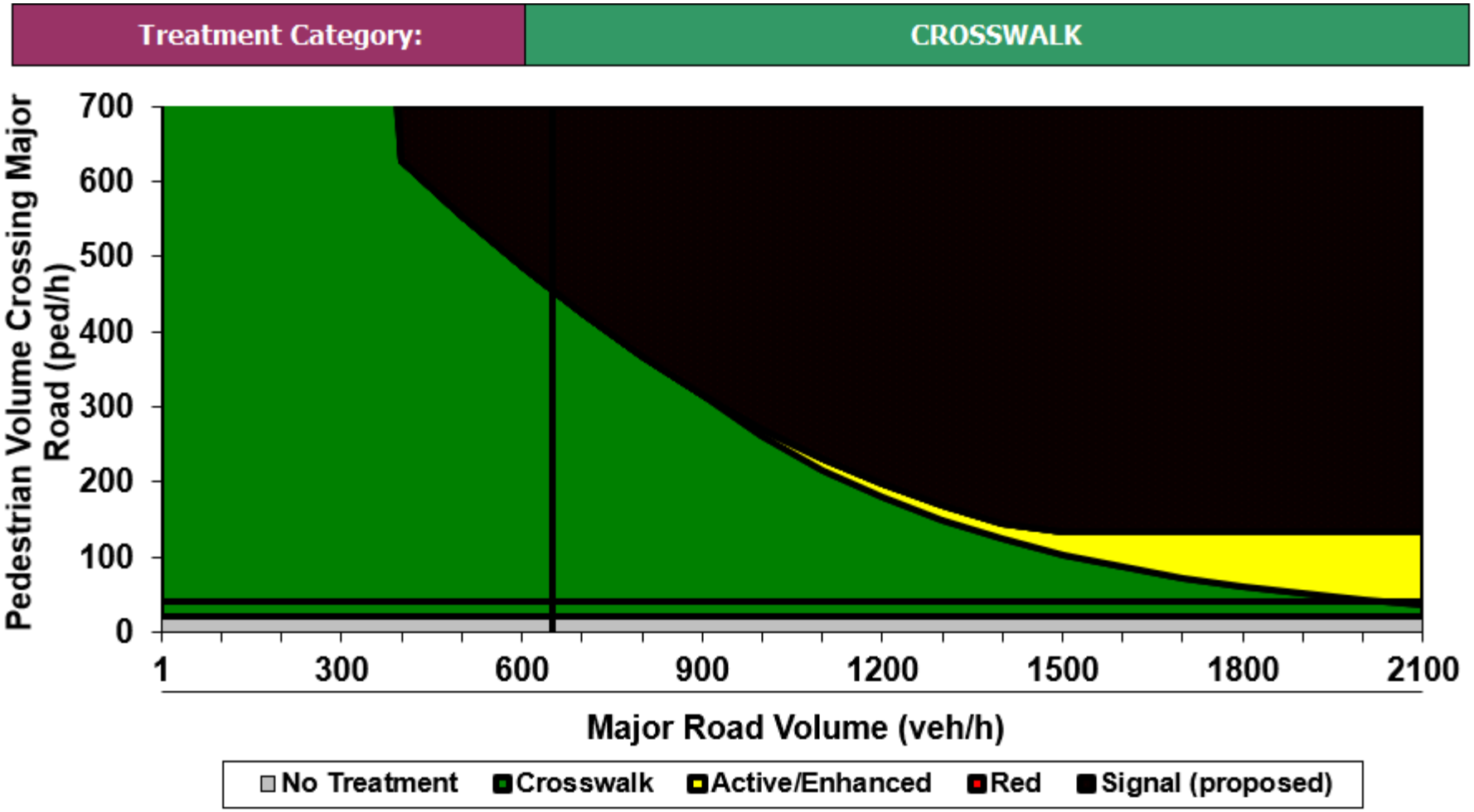
# NCHRP 562 WORKSHEET

| Treatment Category: | ACTIVE OR ENHANCED |
|---|---|




| Step 4: Estimate pedestrian delay. | | |
|---|---|---|
| Pedestrian crossing distance, curb to curb (ft), L | *4a* | 16 |
| Pedestrian walking speed (ft/s), $S_p$ (suggested speed = 3.5 ft/s) | *4b* | 3.5 |
| Pedestrian start-up time and end clearance time (s), $t_s$ (suggested start-up time = 3 sec) | *4c* | 3 |
| [Calculated automatically] Critical gap required for crossing pedestrian (s), $t_c$ | *4d* | 8 |
| Major road volume, total both approaches OR approach being crossed if raised median island is present, during peak hour (veh/h), $V_{maj\text{-}d}$ | *4e* | 651 |

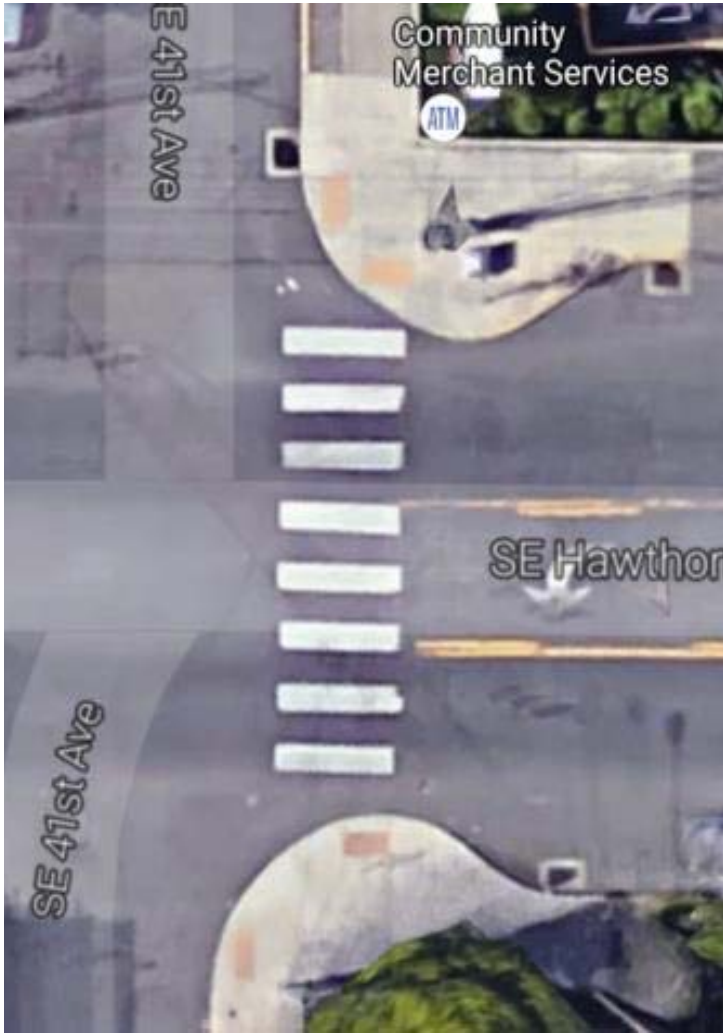
# NCHRP 562 WORKSHEET



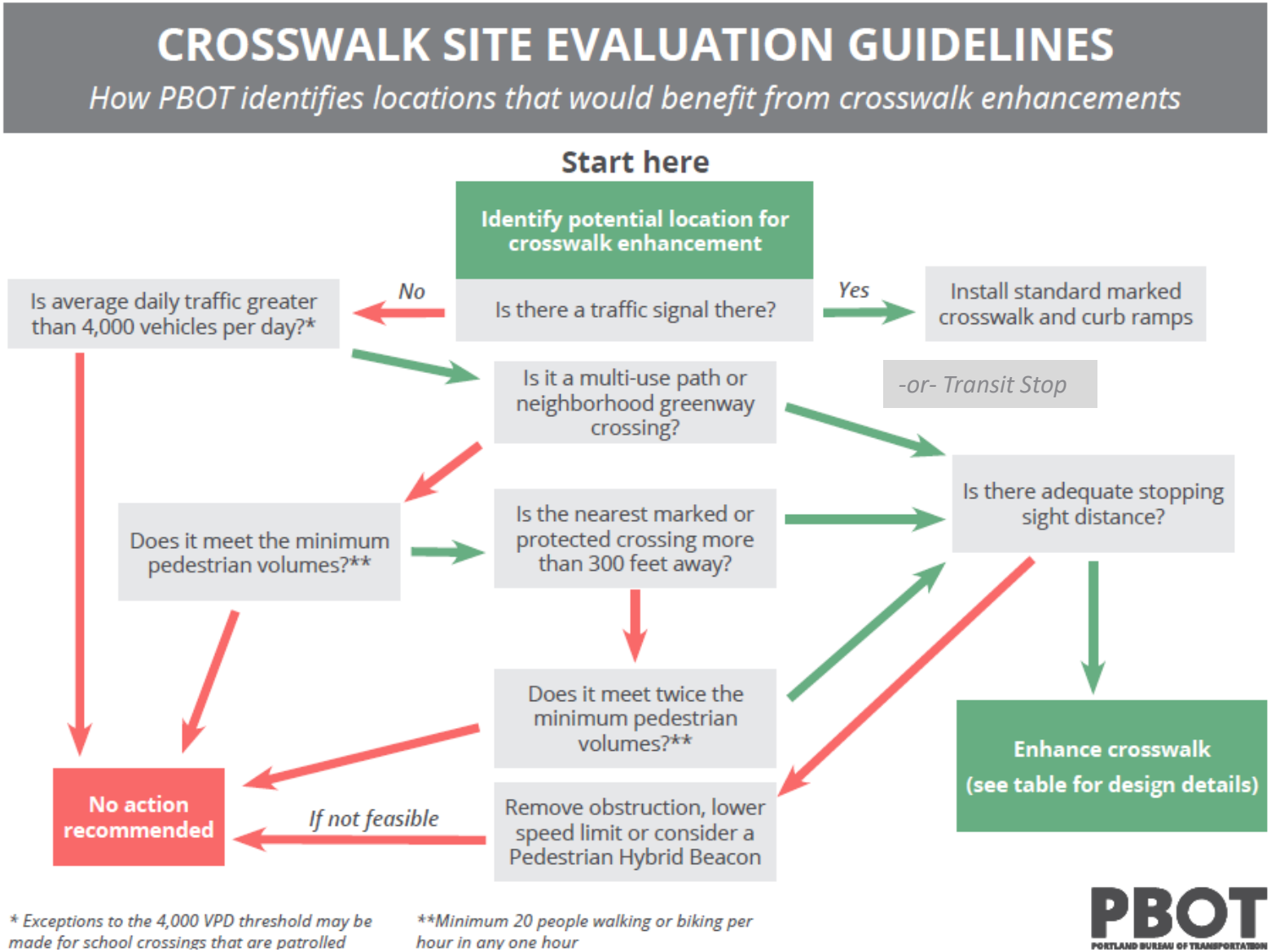
# WHERE DOES PBOT MARK CROSSWALKS?

- All signalized intersections
- Patrolled school crosswalks and, often, along Safe Routes to School
- Neighborhood Greenway Crossings*
- Transit Stops*
- When an engineering study warrants*

**Traffic volumes must be above 4000 ADT*



# Engineering Guidelines




**add LPI, if feasible*

# Engineering Guidelines

## CROSSWALK DESIGN BY ROADWAY TYPE*

| | VEHICLE ADT > 4,000 - 9,000 | | | VEHICLE ADT > 9,000 -12,000 | | | VEHICLE ADT > 12,000 -15,000 | | | VEHICLE ADT > 15,000 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <30 MPH | 35 MPH | 40+ MPH | <30 MPH | 35 MPH | 40+ MPH | <30 MPH | 35 MPH | 40+ MPH | <30 MPH | 35 MPH | 40+ MPH |
| TWO LANES | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and enhanced/active warning (islands and RRFB's) |
| THREE LANES WITH RAISED MEDIAN | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and enhanced/active warning (islands and RRFB's) |
| THREE LANES WITHOUT RAISED MEDIAN | Marked Crosswalk | Marked Crosswalk, island or curb extensions, enhanced signing and striping | Marked Crosswalk and pedestrian hybrid or full signal | Marked Crosswalk | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and pedestrian hybrid or full signal | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and pedestrian hybrid or full signal | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and enhanced/active warning (islands and RRFB's) | Marked Crosswalk and pedestrian hybrid or full signal |
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** All crossings must be scoped by an engineer to ensure recommended treatment is appropriate and ADA ramps and illumination are in place.*

- Marked Crosswalk
- Marked Crosswalk, island or curb extensions, enhanced signing and striping
- Marked Crosswalk and enhanced/active warning (islands and RRFB's)
- Marked Crosswalk and pedestrian hybrid or full signal

PBOT
PORTLAND BUREAU OF TRANSPORTATION

Supplemental Signs & Markings:

# Marked Crosswalks

Geometric Elements:

# Medians & access management

Crossing Devices:

# Active Warning Beacon or RRFB's

Crossing Devices:

# Half-signal

Crossing Devices:

# Full signal

Crossing Devices:

# Full signal

- When MUTCD pedestrian volume warrants are met
- History of pedestrian crashes
- To separate left turn movements from pedestrian movements
- When signal coordination is required for efficient traffic and transit flow

Crossing treatment:

# ROAD REORGANIZATION

Design consideration:

# STREET LIGHTING

- More than 50% of the pedestrian fatalities and serious injuries occur in dark conditions.

- Lighting upgrades must be considered in the design of pedestrian crossings.

# Thank you!

**Michelle Marx** | Pedestrian Coordinator
Portland Bureau of Transportation
Michelle.Marx@portlandoregon.gov

**Wendy Cawley**, P.E. | Traffic Safety Engineer
Portland Bureau of Transportation
Wendy.Cawley@portlandoregon.gov

# NYC ENHANCED CROSSINGS

## PEDESTRIAN DEMAND VS CAR CULTURE

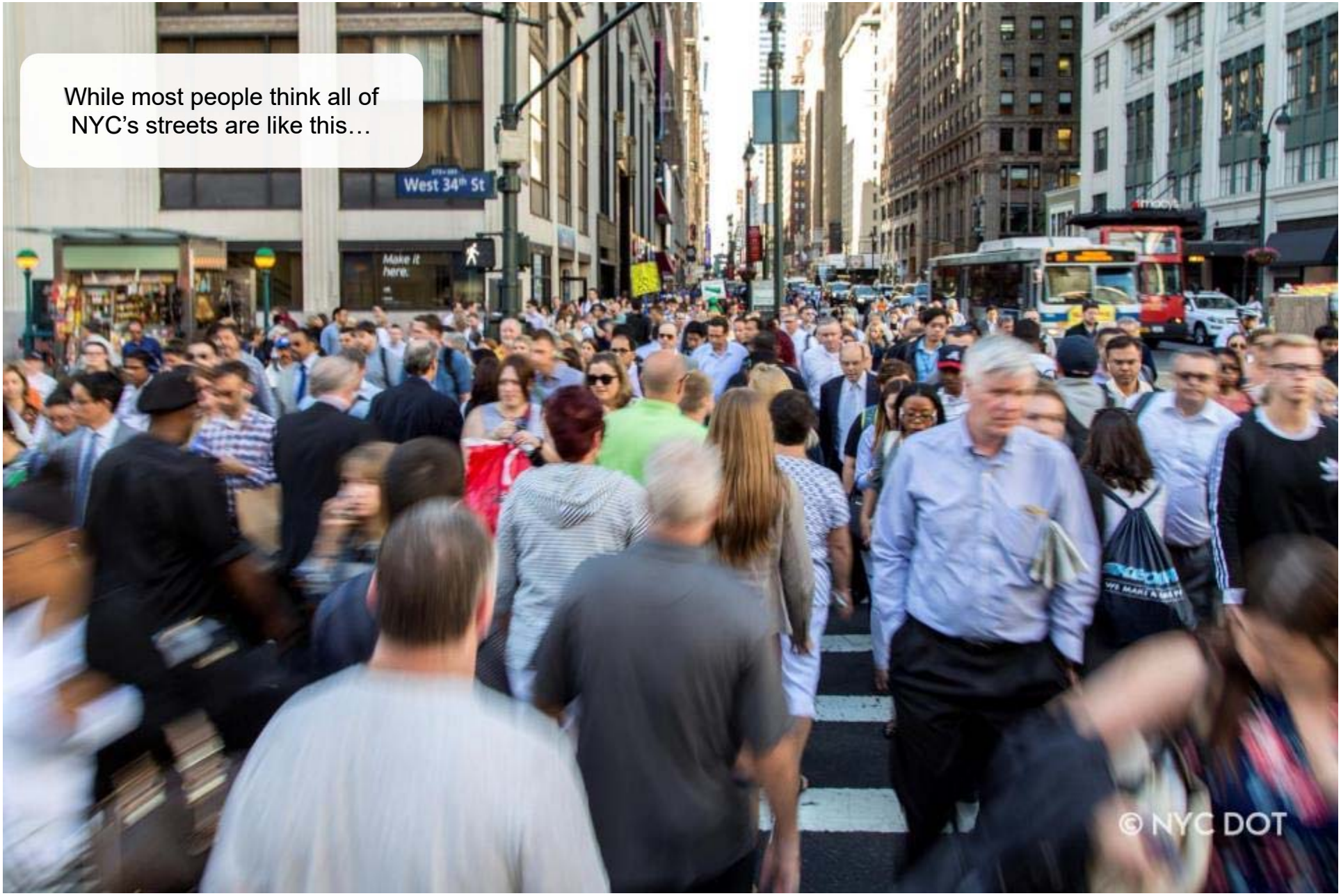
APBP Conference 2019: Portland

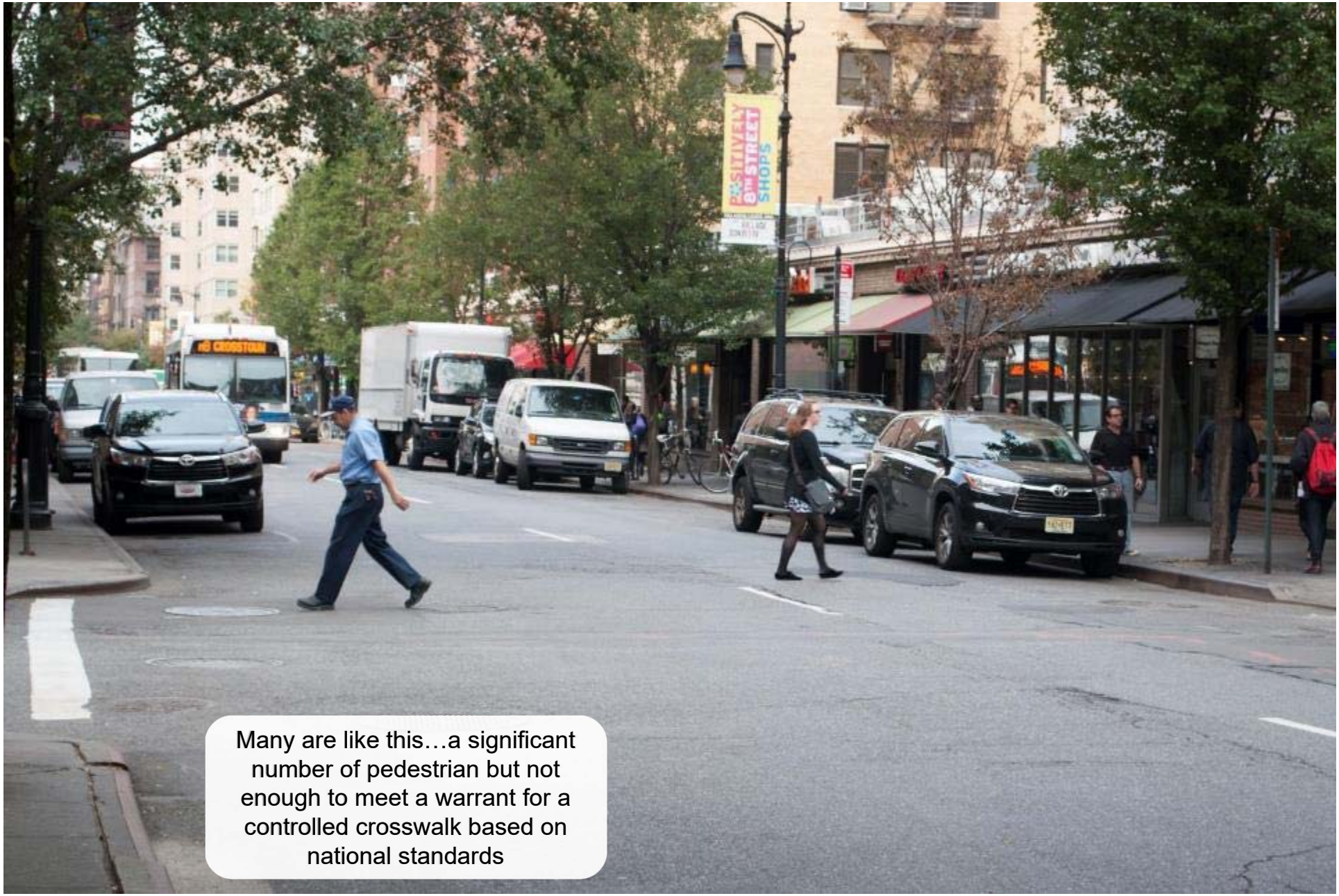
VISION ZERO
nyc.gov/visionzero

NEW YORK CITY DOT

# Enhanced Crossings Background

1


While most people think all of NYC's streets are like this…
West 34th St
Make it here.
© NYC DOT


Many are like this…a significant number of pedestrian but not enough to meet a warrant for a controlled crosswalk based on national standards

# PEDESTRIAN DEMAND

- Because most New Yorkers are pedestrians, they expect to find pedestrian facilities wherever they go
- NYC DOT receives ~2,500 requests for traffic controls per year
- NYC has ~40,000 intersections; ~13,000 are signalized

# ENHANCED CROSSING BACKGROUND

- Uncontrolled marked crosswalks, are a common treatment outside of NYC
- Prior to 2013, uncontrolled marked crossings were not an accepted treatment by NYC DOT
- First Enhanced Crossings (ECs) were piloted in 2013 to help satisfy the overwhelming public demand for marked crossings
- Criteria developed based on MUTCD, but more conservative

# PRIORITIZATION

- Observations, including in larger projects
- Community requests
- T-intersections
- Starting a Pedestrian Master Plan

Before Street Improvement Project

After Street Improvement Project, with EC

After Street Improvement Project, no EC

# COMMUNITY RESPONSE

- 176 ECs installed over six years has allowed us the opportunity to observe their success
- NYC doesn't have a culture of yielding!
- Driver and enforcement confusion about the pedestrian signage
- ECs don't always satisfy the community's desire for a safe crossing
  - Many requests to do further work at EC locations
  - 9 ECs have been upgraded to a control
  - Multiple instances where community has been upset with loss of parking due to daylighting

# Criteria and Design

# 2

# CRITERIA: VOLUMES

- Average Daily Travel (ADT) under 8,000, or 12,000 if two way street has median
- Minimum peak hourly pedestrian volume is 60, unless the distance between the two nearest controlled crossings is 1000’ or greater, in which case the minimum peak hourly pedestrian volume is 30
- Community request for a marked crosswalk

# CRITERIA: ROAD DESIGN

- No more than one travel lane in each direction (including turn lanes)
- Location is 250 ft. or more from the approach to a traffic signal
- Distance between nearest controlled crossings is equal to or greater than 500’
- Clear visibility (no obstructions such as curves or hills)

# CRITERIA: SAFETY

Must include the installation of a traffic calming device where: there is existing speeding; or, there have been crashes with severe pedestrian injuries

Speed Bumps/Raised Crosswalks

Medians

Neckdowns

# DESIGN

- Neckdowns should be considered to improve visibility and shorten crossing distances on one-way streets wider than 30’ and two-way streets wider than 40’

- Where neckdowns are installed, signage should be placed within neckdowns to increase visibility of signage

# DESIGN

Signage should be placed on both sides of the road on one-way streets; and on the sidewalk and median, where they exist, on two-way streets

One-way street

Signage on median on two-way street

# Studies and Policy

# 3

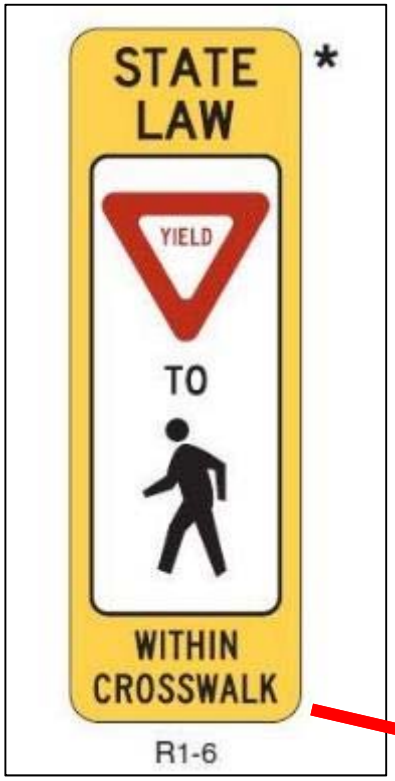
# EDUCATION AND POLICY

- 2018 study tested an alternative to the typical pedestrian sign to test the impacts on yielding rates

- While results varied by site, the alternative/test signage did not result in a clear improvement in yielding behavior. In some instances it resulted in decreased yielding

# STUDIES

Next Step: studying the impact of different design interventions on driver yielding behavior:

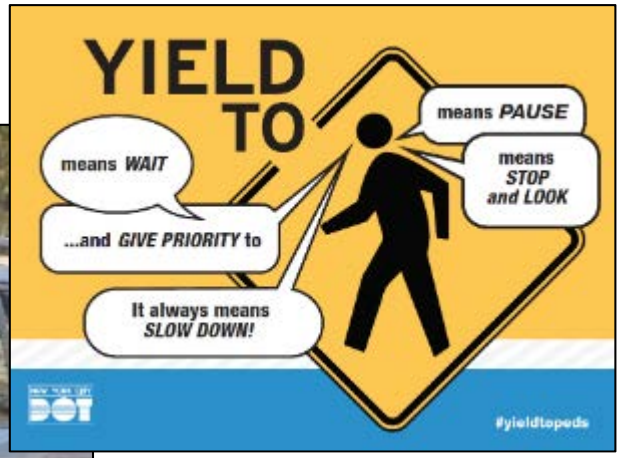


On-street pedestrian warning markings approaching ECs

In-road pedestrian warning signage on two-way streets

# EDUCATION AND POLICY

- Website/social media, including educational video
- Outreach events with Safety Education and NYPD
- Working toward changing city law from “Yield to Pedestrians” to “Stop for Pedestrians”
- Further consider signage changes, working with MUTCD
- Refine criteria used for approval of controls to better address pedestrian need



# THANK YOU!

https://www1.nyc.gov/html/dot/html/pedestrians/enhanced-crossings.shtml

NYC DOT NYC DOT nyc_dot NYC DOT