Leading Pedestrian Intervals: a brief overview

Paul Moser, PE
DelDOT Active Transportation & Community Connections
Wilmington City Council
10/19/2026

DELDOT
DELAWARE DEPARTMENT OF TRANSPORTATION



Excellence in Transportation

Every Trip.

We strive to make every trip taken in Delaware safe, reliable and convenient for people and commerce.

Every Mode.

We provide safe choices for travelers in Delaware to access roads, rails, buses, airways, waterways, bike trails and walking paths.

Every Dollar.

We seek the best value for every dollar spent for the benefit of all.

Everyone.

We engage our customers and employees with respect and courtesy as we deliver our services.

2026 Delaware Traffic Fatalities

as of 10/19/26

	2026	2025				2024			
	Year-to-date	Year-to-Date			Total	Year-to-Date			Total
Fatalities	89	93	↓	-4%	117	109	↓	-18%	130
Delaware Residents	80	70	↑	+14%	90	91	↓	-12%	110
Person Types									
Vehicle Occupant	46	50	↓	-8%	67	58	↓	-21%	65
Pedestrian	21	21		0%	27	24	↓	-12%	34
Bicyclist	6	3	↑	+100%	4	3	↑	+100%	5
Motorcyclist	15	17	↓	-12%	17	19	↓	-21%	21
Other Person Type	1	2	↓	-50%	2	5	↓	-80%	5
Crash Types									
Curve Related	17	12	↑	+42%	15	20	↓	-15%	23
Roadway Departure	34	41	↓	-17%	50	37	↓	-8%	42
Intersection Related	25	29	↓	-14%	37	43	↓	-42%	48
Median Crossover	3	1	↑	+200%	2	0	↑	+100%	0
Wrong Way	0	4	↓	-100%	4	4	↓	-100%	4
Work Zone	3	5	↓	-40%	7	5	↓	-40%	5


DEATH AND SERIOUS INJURIES ARE UNACCEPTABLE • HUMANS MAKE MISTAKES • HUMANS ARE VULNERABLE • RESPONSIBILITY IS SHARED • SAFETY IS PROACTIVE • REDUNDANCY IS CRUCIAL •
SAFE SYSTEM APPROACH
Safer People
Safer Vehicles
Safer Speeds
Safer Land Use
Safer Roads
Post-Crash Care

What is a “Leading Pedestrian Interval”

A traffic signal timing strategy which **gives a 3-7 second head start to the pedestrian signal prior to the parallel green light** and *conflicting left/ right turns*

Also known as **LPI**



Pedestrians have 3-7 seconds of advanced WALK indication on the pedestrian signal



This allows them to get ahead of vehicles, **improving their visibility** and **removing the occurrence of conflicts** between cars and crossing pedestrians if they cross during the LPI

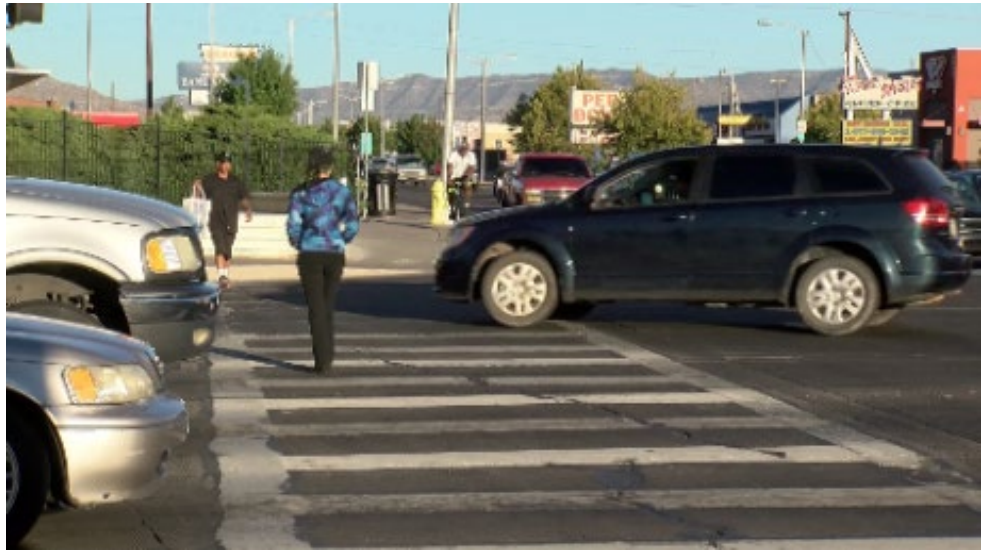


Leading Pedestrian Intervals (LPI): Why it's best paired with APS - Polara

Mitigates conflicts with **turning vehicles** who have a green light while the pedestrians have WALK

During the LPI, pedestrians have a short **protected-phase** where they don't have to worry about conflicting turning traffic

When the LPI is over, *the pedestrian phase is still sharing the time with turning vehicles*





Motorist left turn into pedestrian – parallel path

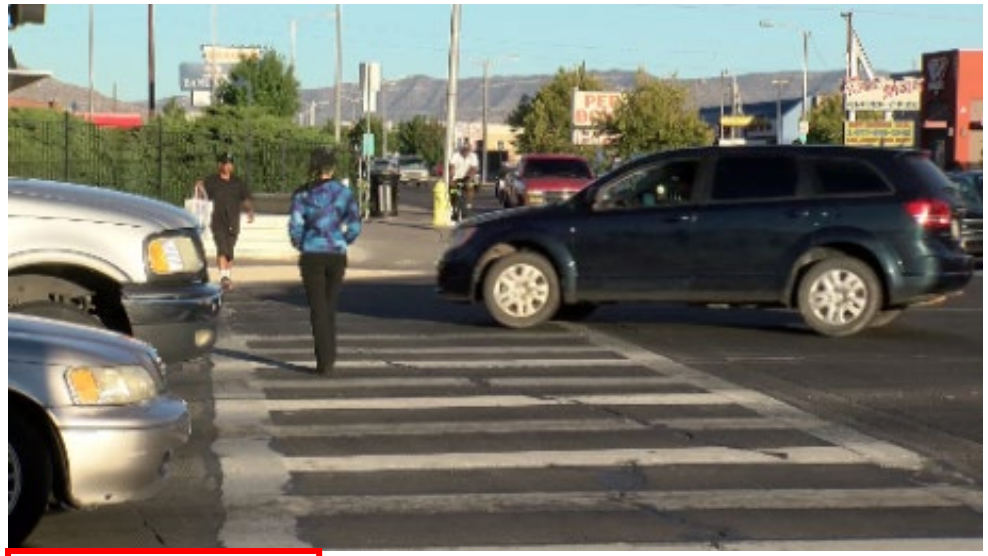


Motorist right turn into pedestrian – parallel path

Mitigates conflicts with **turning vehicles** who have a green light while the pedestrians have WALK

During the LPI, pedestrians have a short **protected-phase** where they don't have to worry about conflicting turning traffic

When the LPI is over, *the pedestrian phase is still sharing the time with turning vehicles*





Motorist left turn into pedestrian – parallel path



Motorist right turn into pedestrian – parallel path

One of the most hazardous pedestrian conflicts at a signalized intersection

Included on a list of **‘Proven Safety Countermeasures’** by the Federal Highway Administration

NYC saw a reduction in fatal/ serious injury crashes between 2000-2014 at LPI locations:

- **-56%** from **left turn** conflicts
- ***-74%*** from ***right turn conflicts***



[Leading Pedestrian Interval | FHWA Proven Safety Countermeasures]

Pedestrian and Bicyclist Injuries at LPI Locations

		Left	Right	Through	Other*	Total
Pedestrian and Bicyclist Injuries	Before (3 Years)	282	113	304	137	839
	After (3 Years)	243	102	265	145	749
	Change	-14%	-10%	-13%	6%	-11%
Pedestrian and Bicyclist KSI	Before (3 Years)	41	19	40	16	115
	After (3 Years)	18	5	40	15	73
	Change	-56%	-74%	0%	-6%	-37%

* “Other” includes “U-Turn” and “Unknown”

[Evaluation of Protected Left-Turn Phasing and Leading Pedestrian Intervals Effects on Pedestrian Safety (2021)]

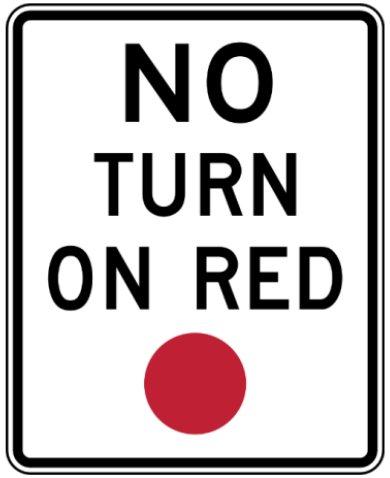
[DON’T CUT CORNERS - Left turn Pedestrian & Bicyclist Crash Study (2016)]

NO RIGHT TURN ON RED or Red Right Arrow , may be helpful in capturing the safety benefits from conflicting right-turns



As well as **TURNING VEHICLES YEILD TO PEDESTRIAN** signage





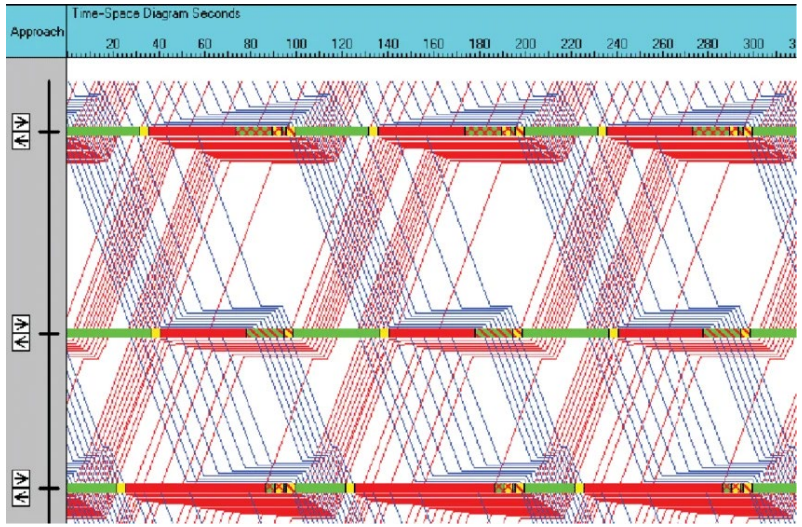


3-7 seconds may not sound like a lot of time, but in some locations during peak hour *it really is*

Wilmington's Traffic Signal Network is **pre-timed**. Along streets with coordinated traffic signals, changes to time allocation need to be considered as part of a system

LPIs can be more efficient in traffic-constrained places when **pedestrian push buttons** are used





LPI without the use of **Accessible Pedestrian Signals (APS)** which give an audible indication announcing the beginning of the LPI, can cause safety issues for blind pedestrians



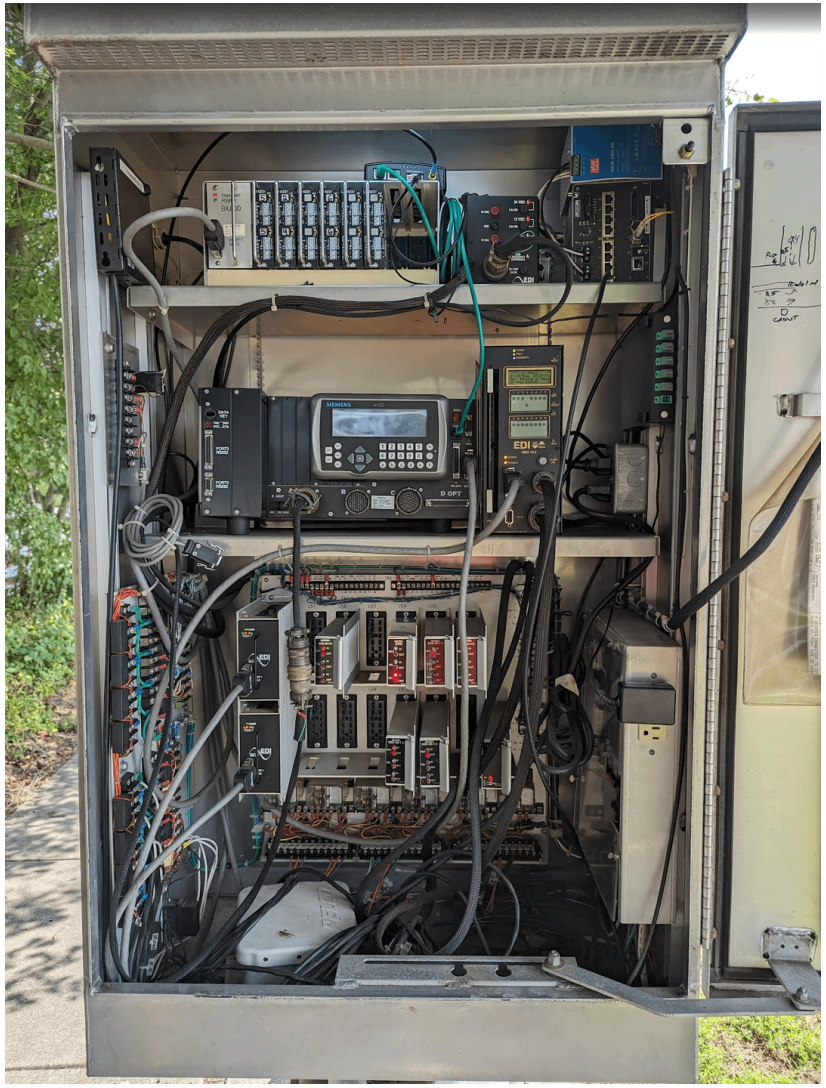
One study found that 15-28% of blind pedestrians did not depart at the beginning of the LPI and 40-82% did not complete their crossing before the DON'T WALK indication

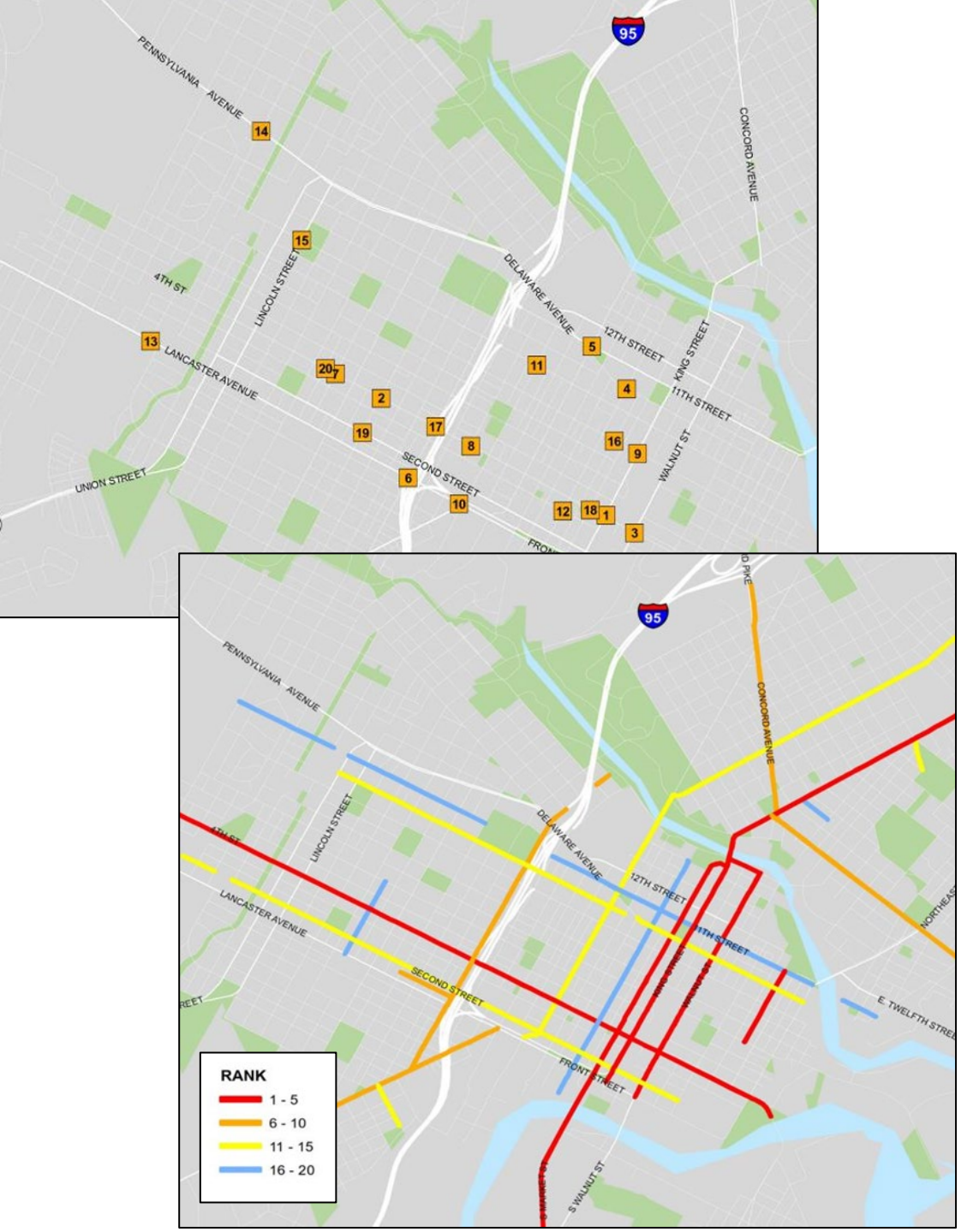


Leading Pedestrian Intervals at Urban Crosswalks: Effects on Safety for Travelers Who Are Blind - Eugene A. Bourquin, Joy Bieder, Robert Wall Emerson, Lukas Franck, 2023

Newer generation of traffic signal controllers which have recently been installed around the City (Siemens M60 controllers) can be programmed for LPI

Older legacy units still in use cannot be programmed for LPIs





- 20 highest ranked intersections with pedestrian crashes (Crash Severity Index*)

Rank	Intersection	Signalized?	Fatal Crashes	Injury Crashes	PDO	Total Crashes	Crash Severity Index
1	King St. @ 4th St.	YES	0	27	3	30	124.5
2	4th St. @ Franklin St.	YES	1	12	0	13	94
3	Walnut St @ 4th St.	YES	0	19	1	20	86.5
4	10th St. @ Orange St.	YES	1	6	0	7	67
5	11th St. @ Washington St.	YES	0	14	0	14	63
6	Lancaster Ave. @ Jackson St.	YES	1	5	0	6	62.5
7	4th St. @ Rodney St.	YES	1	4	1	6	59
8	4th St. @ Monroe St.	YES	0	12	0	12	54
9	8th St. @ King St.	YES	0	12	0	12	54
10	Maryland Ave./MLK Blvd. @ Lancaster Ave./Madison St.	YES	1	2	0	3	49
11	9th St. @ Madison St.	NO	1	2	0	3	49
12	Orange St. @ 3rd St.	NO	1	2	0	3	49
13	Lancaster Ave. @ Woodlawn Ave.	YES	1	1	0	2	44.5
14	Pennsylvania Ave. @ Woodlawn Ave.	YES	1	1	0	2	44.5
15	9th St. @ Lincoln St.	YES	1	1	0	2	44.5
16	8th St. @ Shipley St.	YES	1	0	1	2	41
17	4th St. @ N. Jackson St.	YES	0	9	0	9	40.5
18	4th St. @ Market St.	YES	0	9	0	9	40.5
19	2nd St. @ Franklin St.	YES	0	9	0	9	40.5
20	4th St. @ Delamore Place	NO	0	9	0	9	40.5

***Crash Severity Index = Fatal Crashes x 40 + Injury Crashes x 4.5 + PDO Crashes x 1**

City of Wilmington Pedestrian Safety Study (2023)

Potential Systemic Treatments

- Review and update pedestrian clearance times at signalized intersections
- Install TURNING VEHICLE YIELD TO PED signs (R10-15) at signalized intersections where RTOR or LTOR is permitted
- Implement No Turn on Red operations at intersections with turning movement and pedestrian conflicts
- Implement Lead Pedestrian Interval (LPI) phasing
- Convert all pedestrian signals to countdown indications
- Refresh painted crosswalks and utilize "piano key" style crosswalks throughout City
- Clear corner sight obstructions
- No parking signage/curb painting at intersections
- Install pedestrian signals at all signalized intersections and on all legs of the intersection
- Curb bump outs to decrease crossing distances
- Pedestrian crossing warning signage at unsignalized intersections





[City of Wilmington Pedestrian Safety Study (2023)]

DelDOT currently does not have any active LPIs implemented around the state (to the best of my knowledge), but we are able to partner with the City on DelDOT projects to implement them where appropriate



DELDOT

DELAWARE DEPARTMENT OF TRANSPORTATION

THANK YOU!

https://linktr.ee/delawaredot