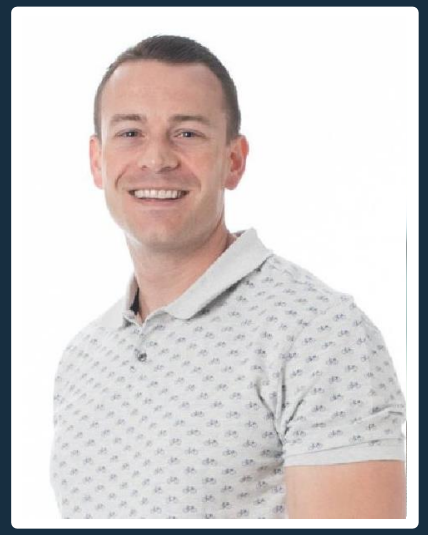
Safe System Approach Methodology & Tradeoffs



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The High Injury Network: How did we get here?

Safe Streets Central Ohio

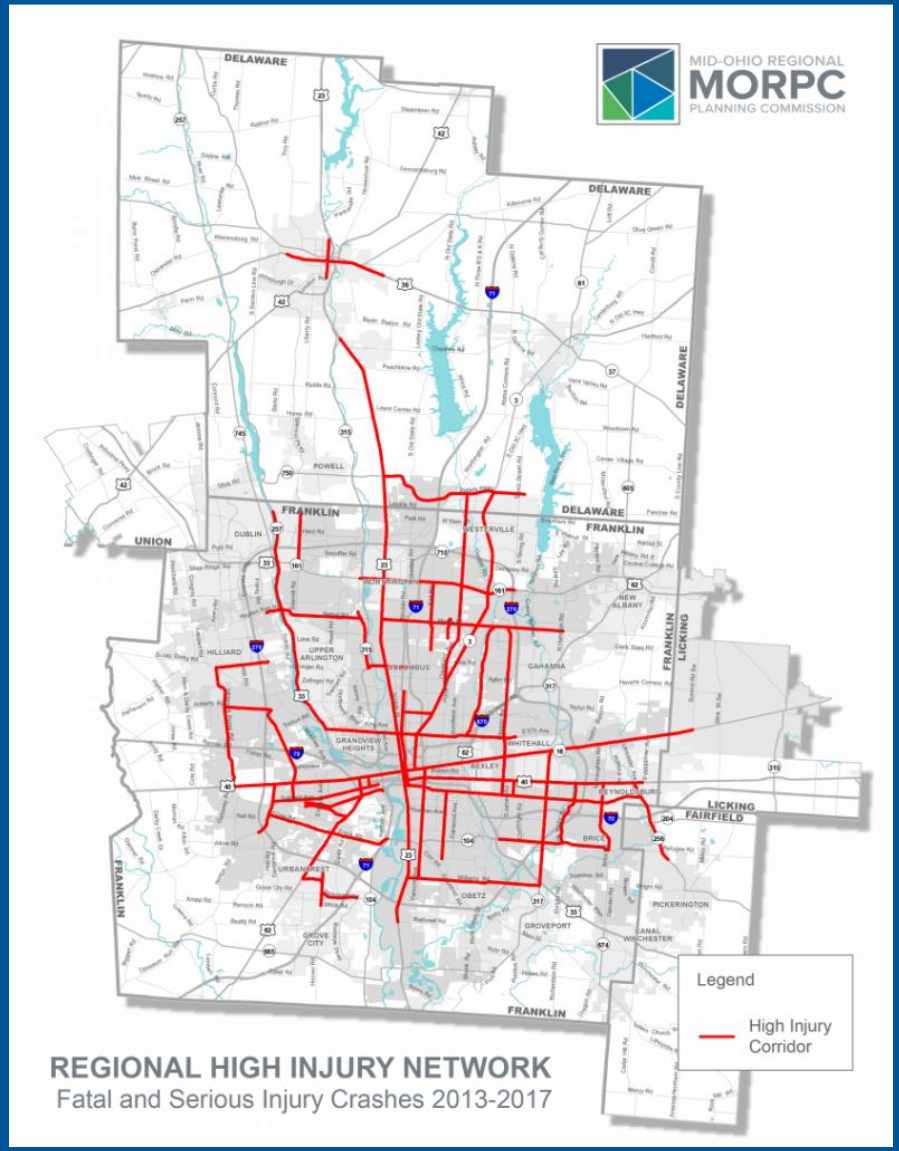
Thursday, September 26, 2024

Letty Schamp, PE, Director of Transportation & Mobility

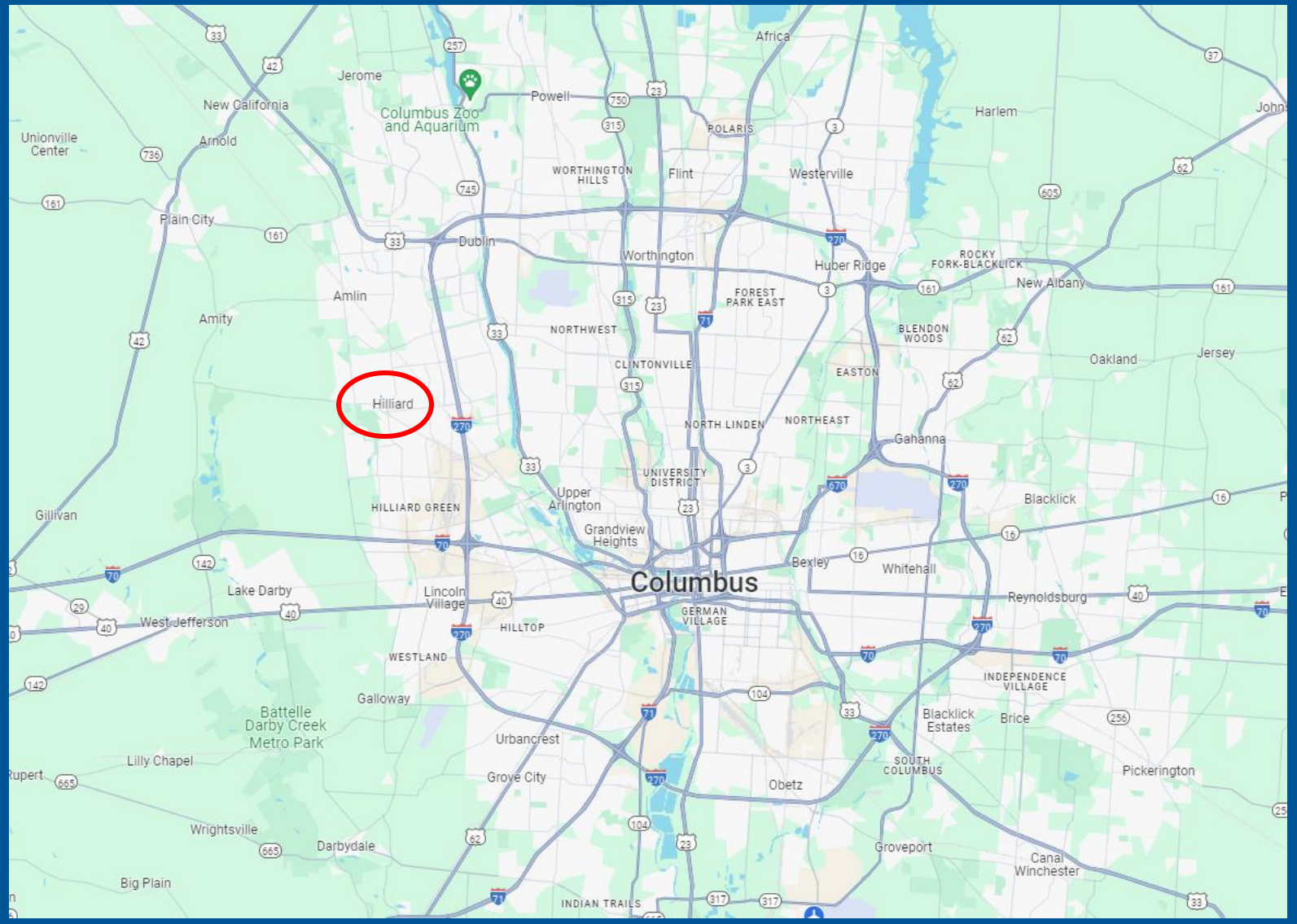
CITY OF HILLIARD OHIO • 1853

What is a High Injury Network (HIN)?

- Corridors that experience a high number of ***fatal or serious injury*** crashes
- Typically involve vulnerable road users (peds/bikes)

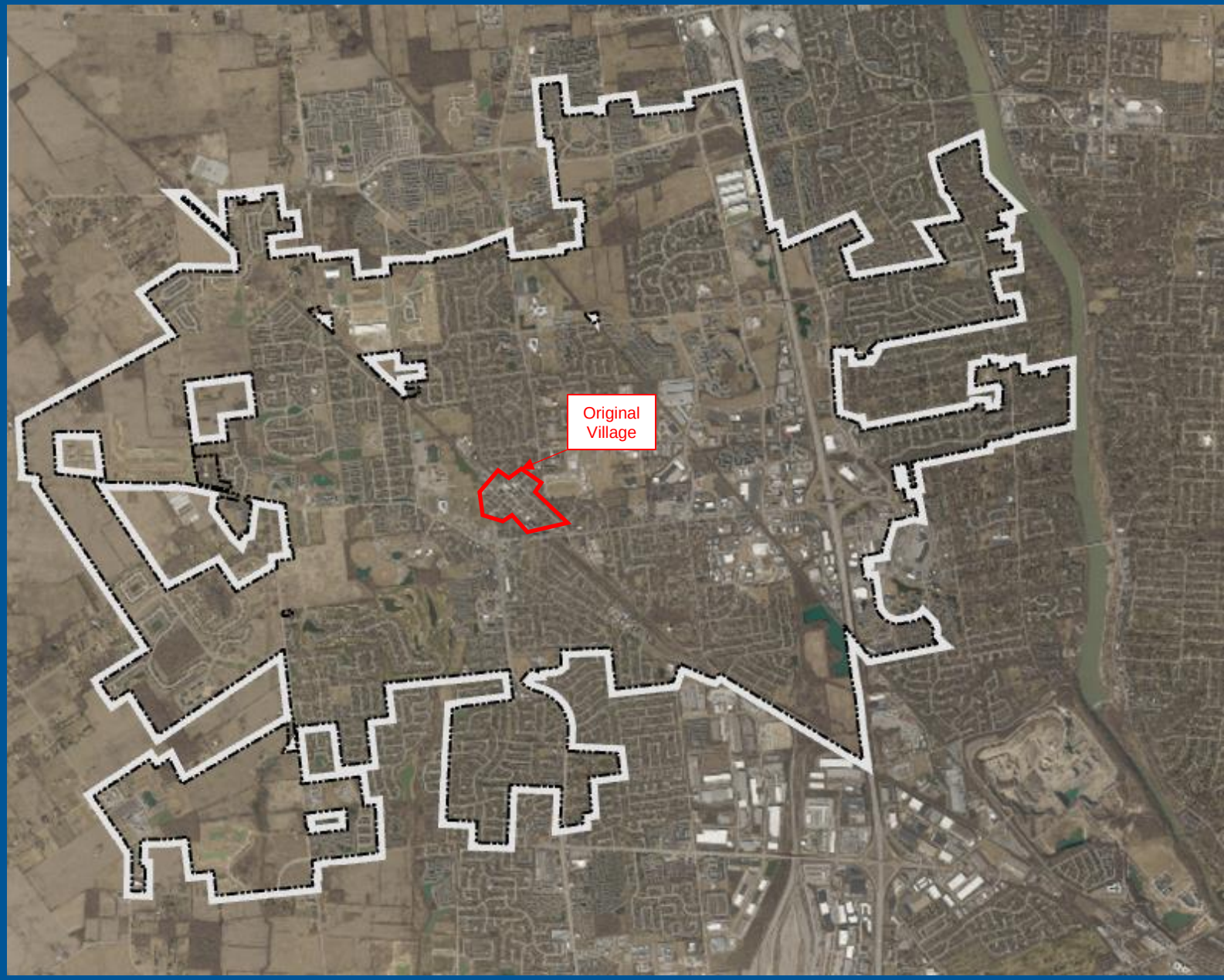


Our HIN Story: Hilliard, Ohio

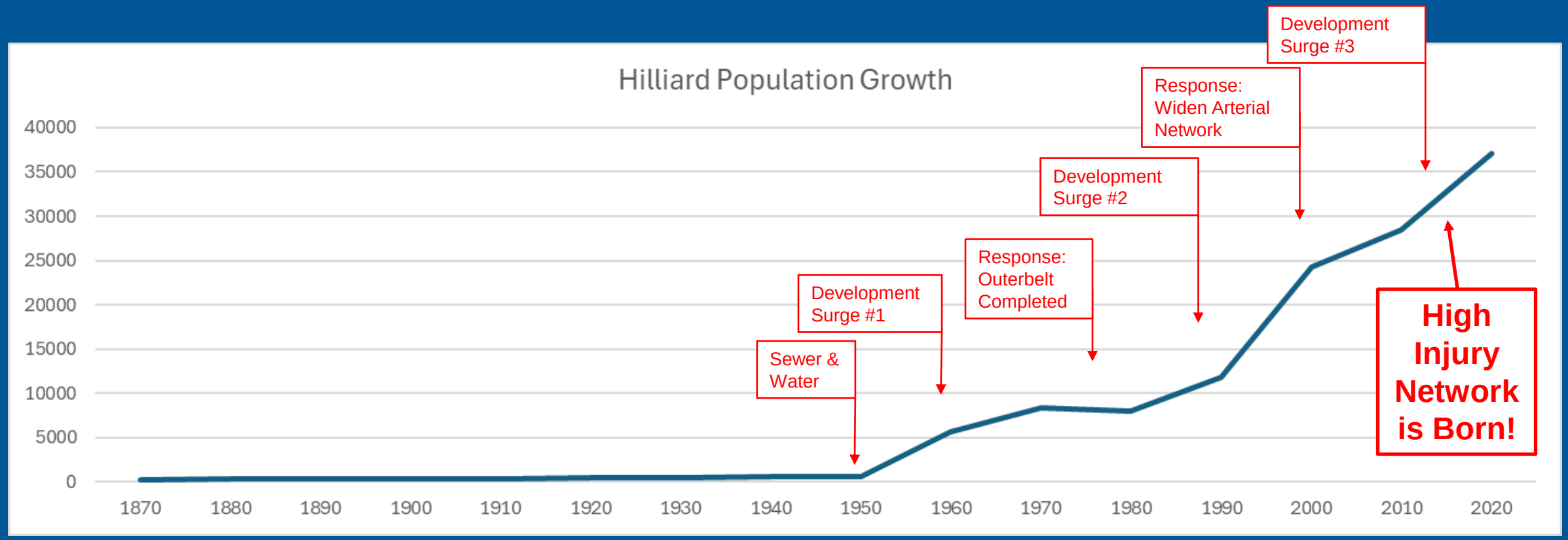


Hilliard Today

- 2020 Population: 37,114



Hilliard Development & Transportation



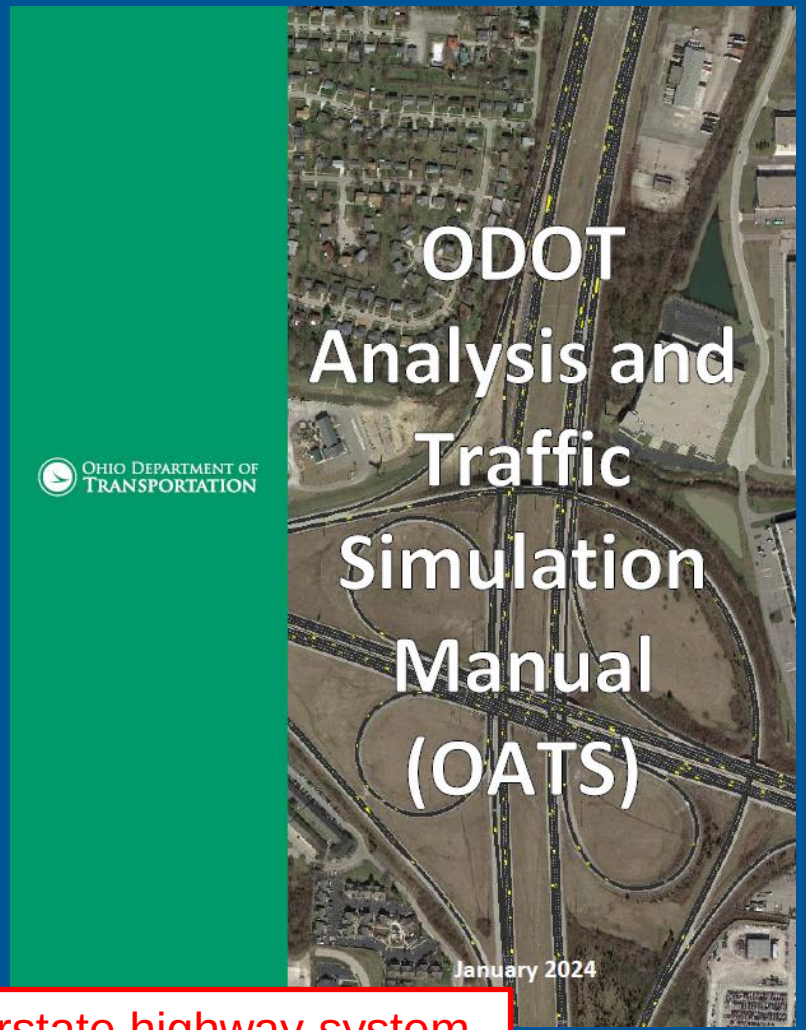
Suburban Development Pattern Cycle

1. Single Land Use Zoning
2. Driving is the only option
3. Commercial development follows residential along major streets
4. Traffic pressure
5. “Do Something!!!”
6. Widen the streets
7. More development
8. Poor quality of life, safety concerns, severe injury crashes
9. “Do Something!!!”

??

We are here

Traffic Engineering & Highway Standards



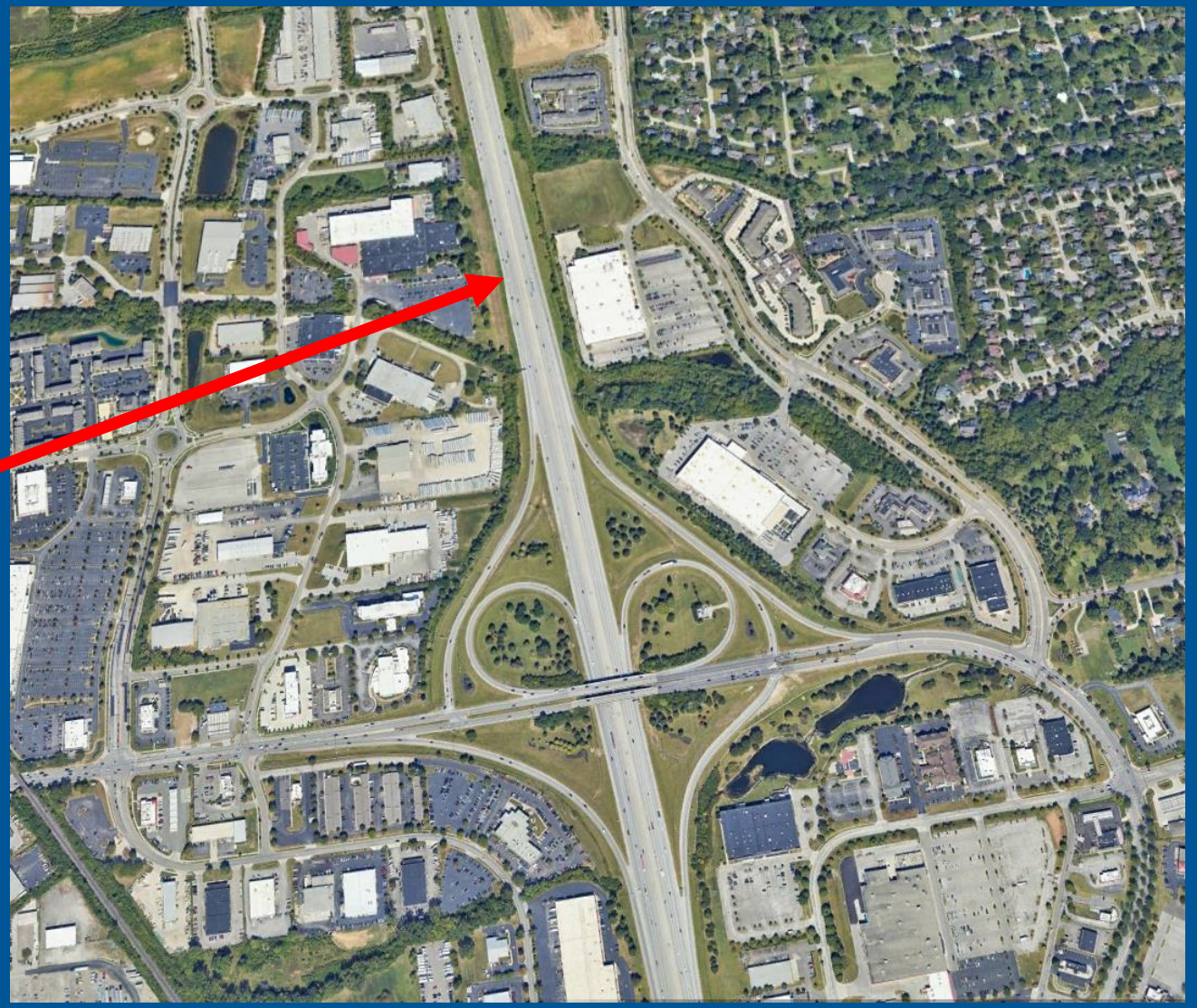
Originated in the 1950s & 1960s with the development of the interstate highway system.
Federal guidance & practices adopted by States.

Highway Design Goals

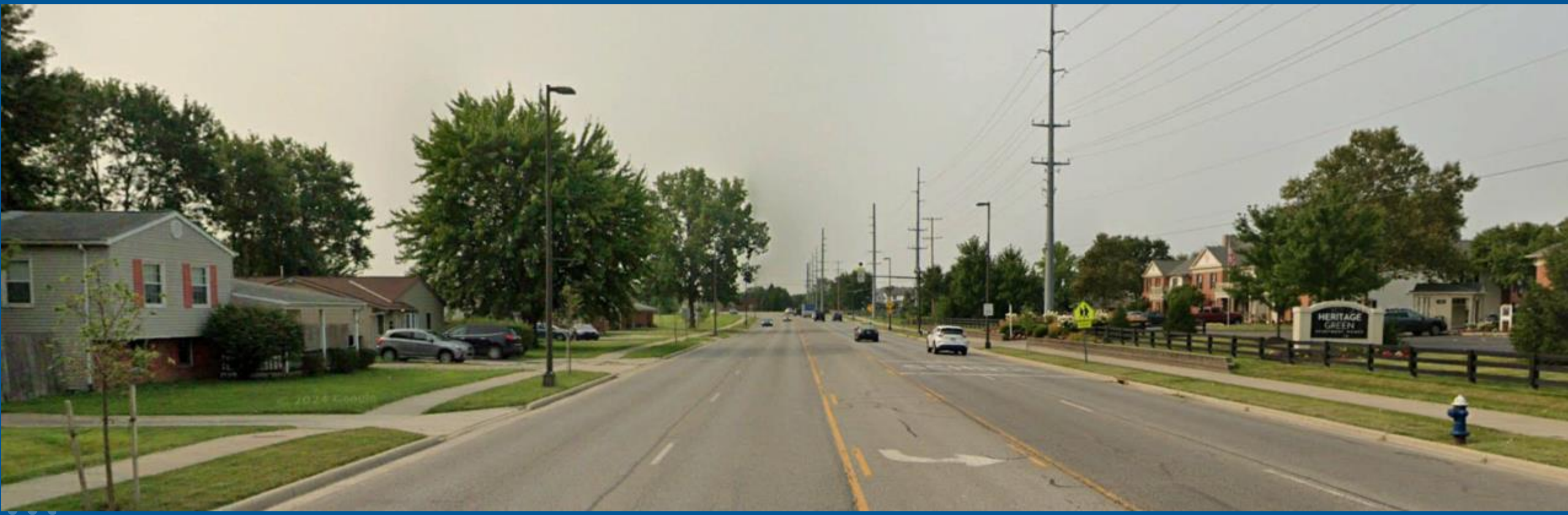
- ✓ Plan for future growth (protect the public investment)
  - ➢ Estimate traffic growth based on land use and historical growth
  - ➢ Create 20-year design traffic volumes
- ✓ Prioritize vehicle traffic operations (in response to “Do Something!!”)
  - ➢Reduce vehicle delay
  - ➢Reduce vehicle queues
  - ➢Ensure vehicle demand does not exceed highway capacity in peak periods
  - ➢Improve free flow running speed on corridors
- ✓ Be *conservative* in design principles (“Idiot-proof” the infrastructure)
  - ➢Accommodate large semi trucks
  - ➢Wide lanes, large clear zone, smooth curves, large shoulders, large buffers
  - ➢Design speed – 5 mph over speed limit (just for good measure to make it extra safe!)

Result: Improved Safety of Highways

Q: What is a highway?

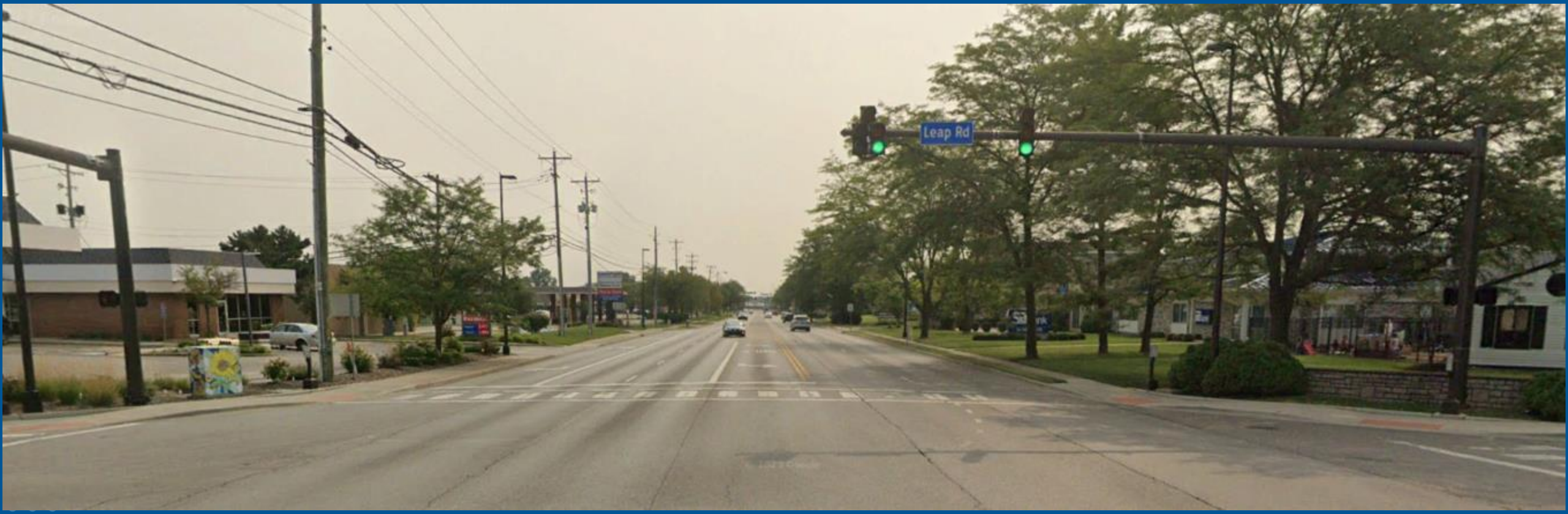


Highway or City Street?



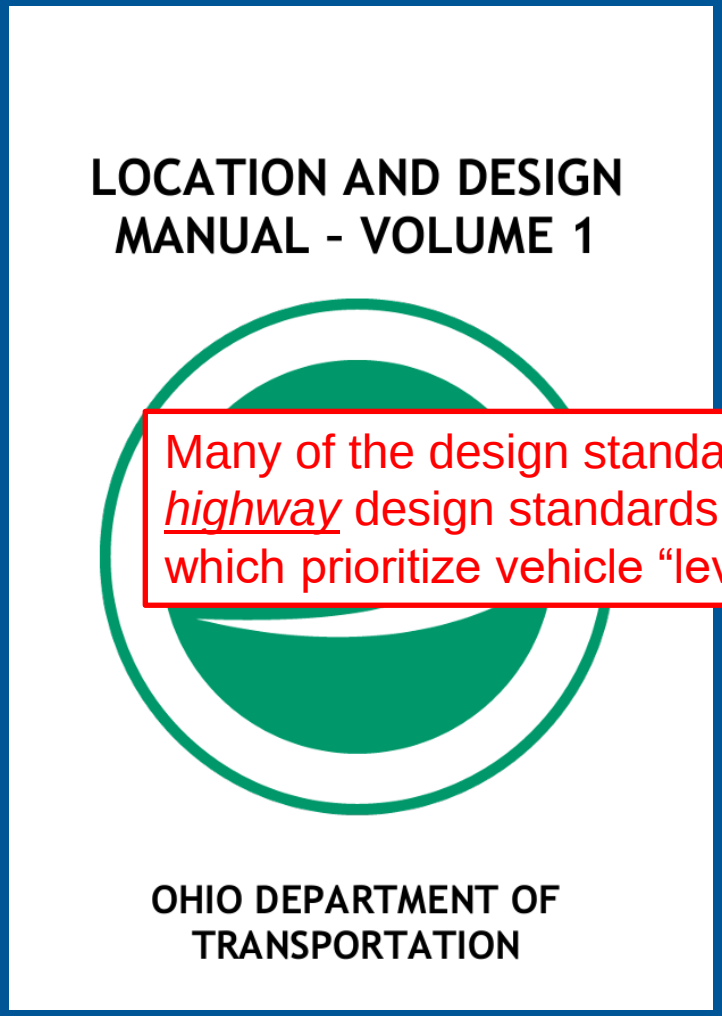
HIN

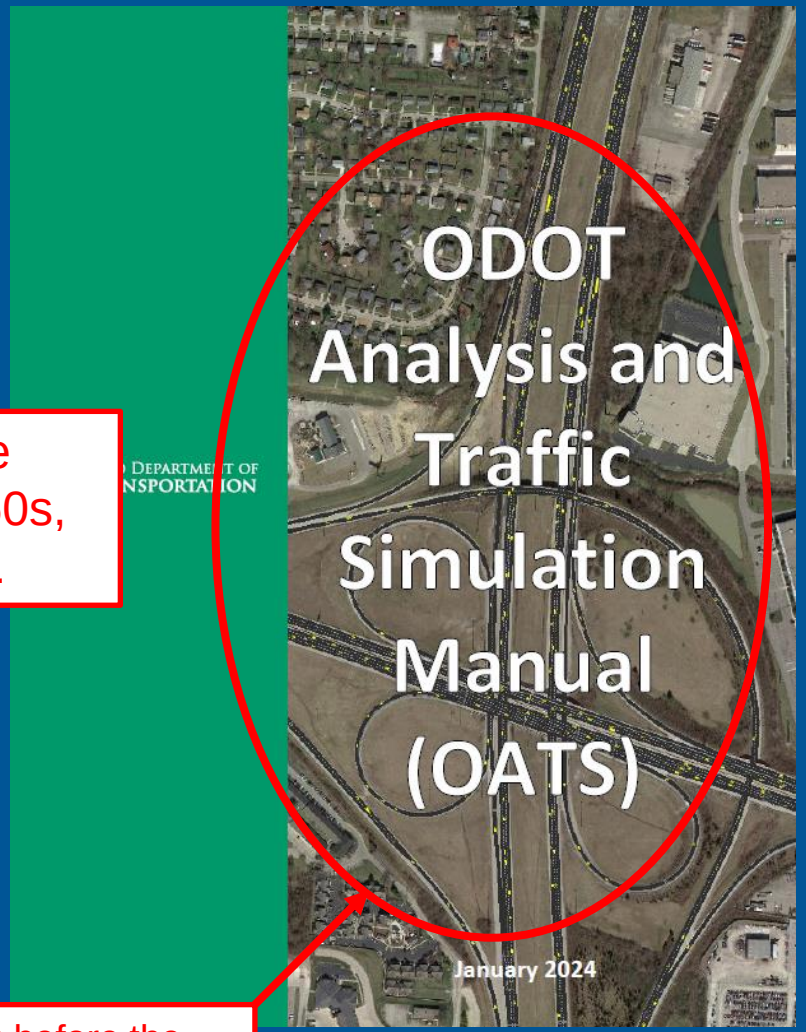
Highway or City Street?



HIN

Traffic Engineering & Highway Standards





Many of the design standards that we use today for *city streets* are *highway* design standards originally developed in the 1950s & 1960s, which prioritize vehicle "level of service" and efficient flow of traffic.

OATS manual establishes the basic parameters before the geometric design of a street or intersection begins (# lanes)

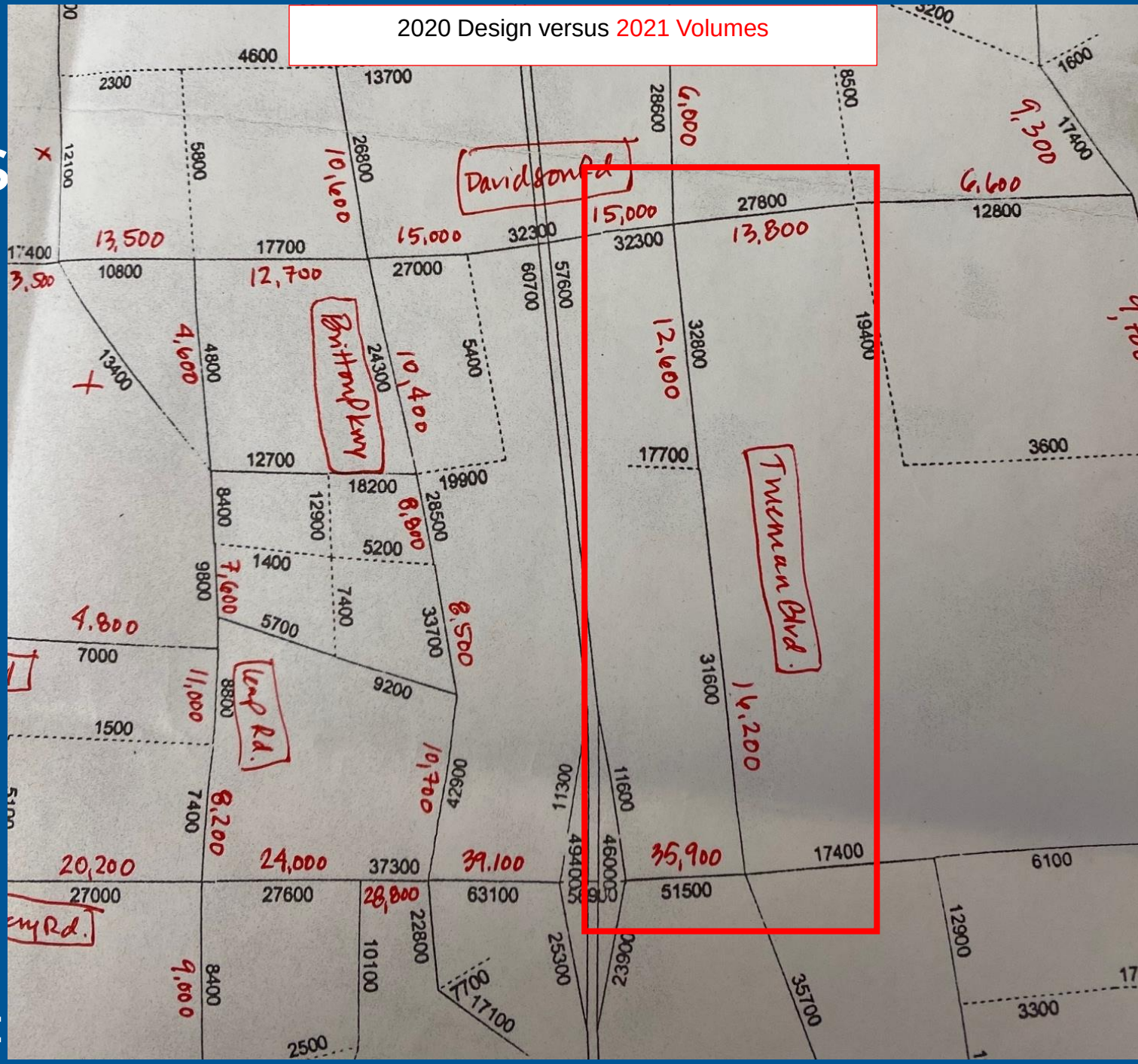
Hilliard Example: Trueman Blvd

Trueman Blvd Design Parameters

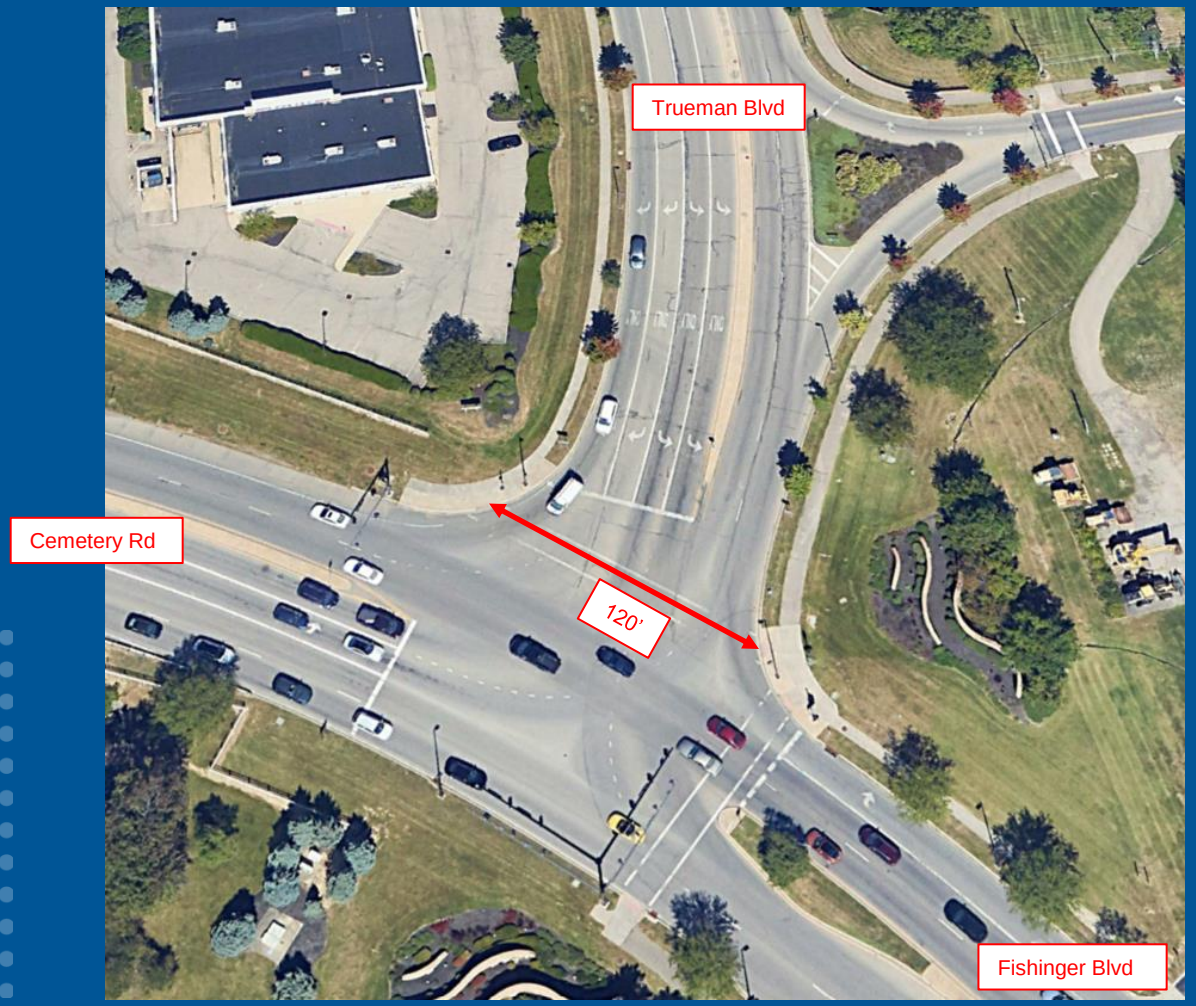
(~2002)

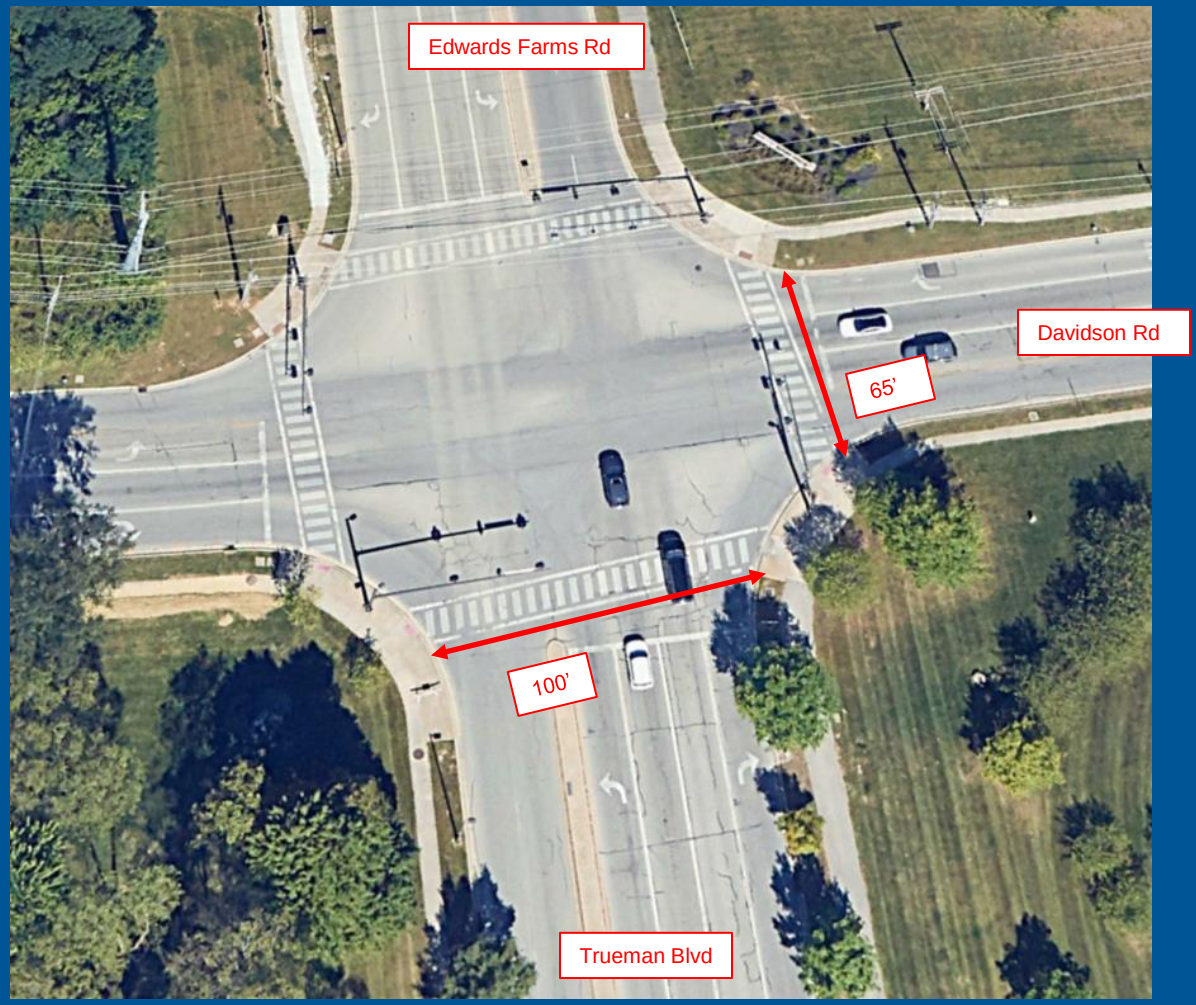
- Speed Limit: 40 mph
- Design Speed: 45 mph
- Trip Generation:
  - Big Box Retail
  - Heavy Office Use
- Design Vehicle: WB-62 (large semi)
- Superelevation on curves
- 12-foot vehicle lanes
- Buffer to median

Traffic Projections:



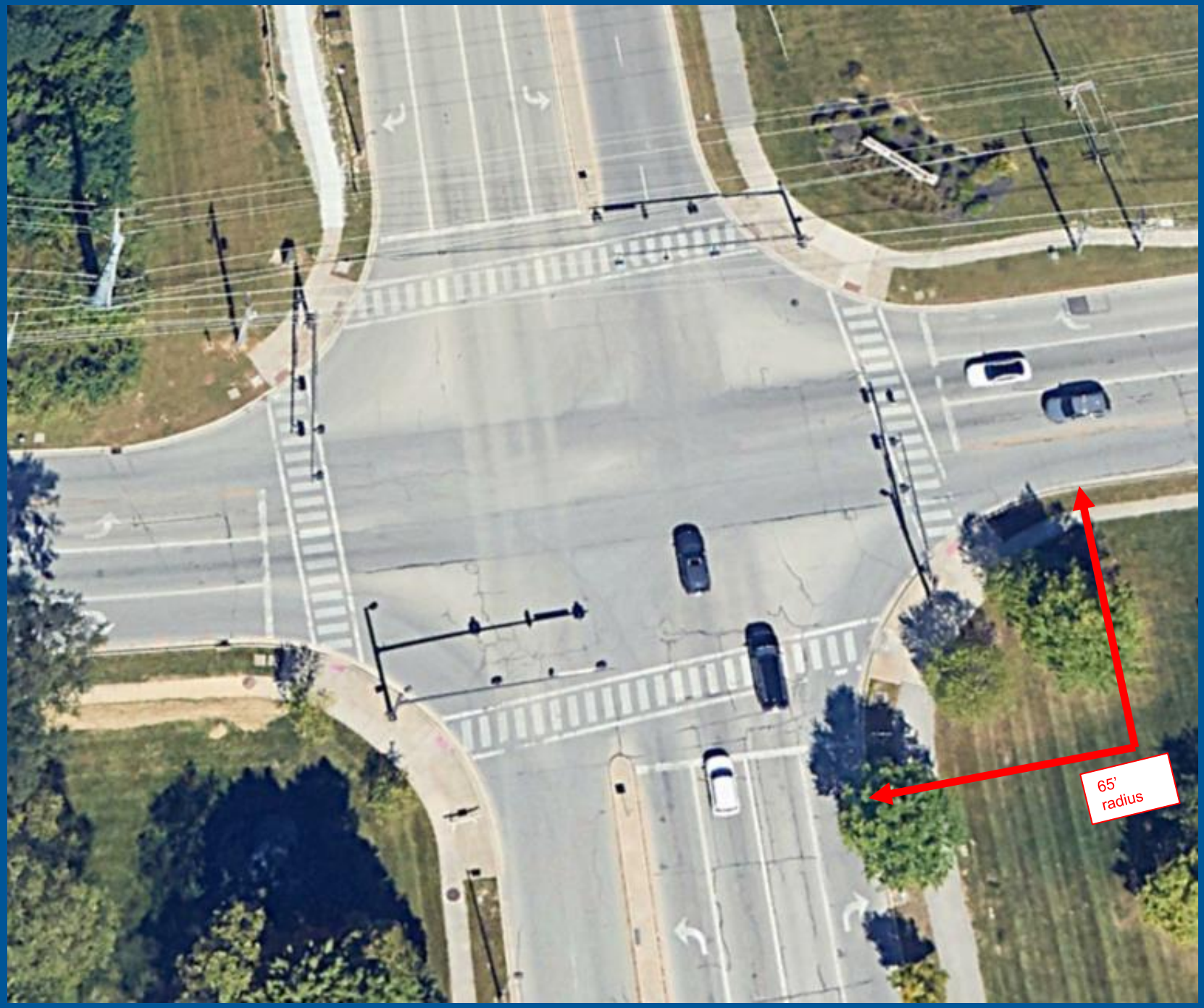
The Result: Intersection Footprints





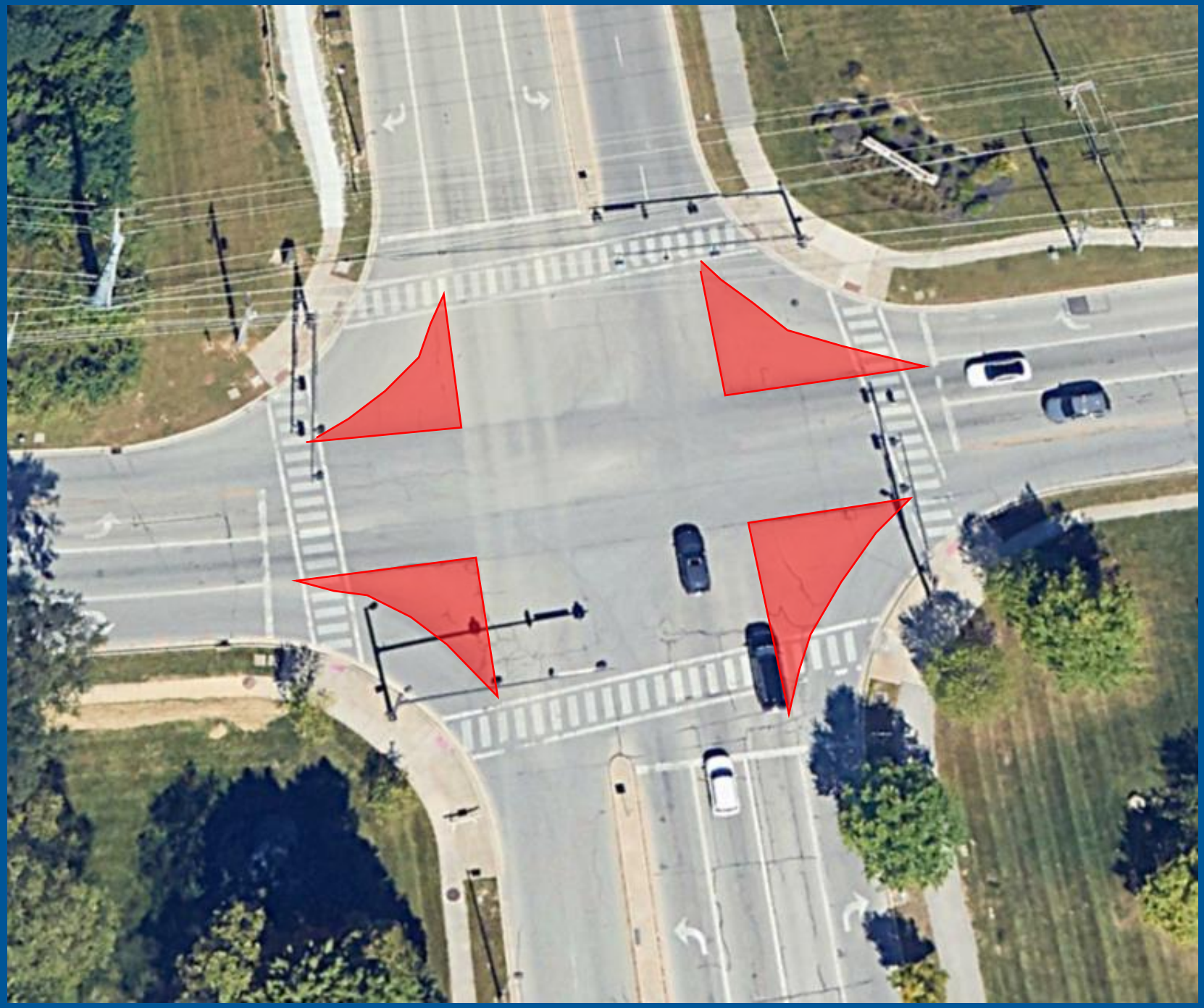
Trueman/ Davidson: A Closer Look

- Large turning radii
  - Faster speeds around curves
- Right turn only lanes
  - Force cars to roll into crosswalk to see oncoming traffic
- Crosswalks set back
  - Peds/bikes in crosswalks are hard to see for turning traffic (many near misses!)
- Huge intersection
  - Inefficient signal operations
  - High speeds
  - Red-light running
  - Long crosswalks increases ped exposure to vehicle traffic
- Injury crash uptick
- Citizen complaints



Classic Example of Over-Building

- Born out of traffic engineering & “highway” design practices
- Lots of unused space
- Expensive to fix
- Solutions are politically difficult
- HIN intersection expected as land use changes



A Critical Point

- We know now what creates a High Injury Network
- We are set up for the next big “Do Something!”
  - Big employers are coming
  - Location & cost of housing
- Now is the time to change the vicious “*highway*” widening cycle
- We must shift from *reactive* safety countermeasures to *pro-active* design decisions at the very beginning of project development

Without a viable alternate option to get around in urbanized areas (other than car), the pressure to widen streets will continue & our streets will be less safe

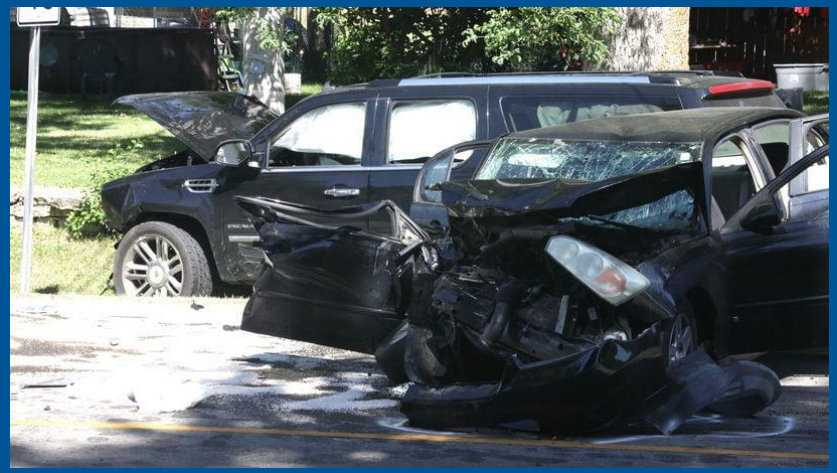
“Conservative” Design Principles

- Outcomes are completely different, depending on the infrastructure

Safe Systems Approach (more forgiving of error)

The Physics of a Crash

$$KE = \frac{1}{2}mv^2$$



Every time we make a planning level or design decision to make our city streets faster, we make them ***exponentially less safe***, especially for people not in a vehicle.

Engineers' Creed

As a Professional Engineer, I dedicate my professional knowledge to the advancement and betterment of public health, safety, and welfare.

I pledge:

- To give the utmost of performance;
- To participate in none but honest enterprise;
- To live and work according to the highest standards of professional conduct;
- To place service before profit, the honor and standing of my profession before personal advantage, and the public welfare above all other considerations.

In humility, I make this pledge.

We know better now. Let's do better!

Thank You!

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