# Porter County Passing Zones

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# General Overview

- Installing no-passing (double yellow) pavement markings can reduce crashes by half
  - Costs time and money to survey roads
- Specific roadway locations:
  - straight road with elevation differences in terms of hills and valleys
  - Roadway with both hills and valleys as well as different directional curves
  - one of the most high-crash areas in the county
  - Meridian Road, one of the busiest roads in the county, with over 8,000 cars per day.

# Question & Hypothesis

Can an algorithm can be created to evaluate the three dimensional roadway data to determine the location of no-passing zones?

We hypothesize:

YES!!!

# Tools and Data

- LiDAR
  - Used to determine pavement surface elevation for the vertical curve.
- Aerial
  - Used to determine location of the edge of road.
- Right-of-way
  - Parcel boundaries data in the entire county.
- Road Centerlines
- Python3
- A Policy on Geometric Design of Highways and Streets
  - From the American Association of State Highway and Transportation Officials

# Layered Development Schedule

Layer 1: Data Preparation and Preprocessing

- Write code for accessing the data from the server.
- Write code for any necessary data cleaning.
- Transform and combine data into a conveniently manageable form for Python.
- Do exploratory data analysis.

Layer 2: Proof-of-Concept

- Create a traversal (“floating eyes”) algorithm

Layer 3: Minimum Viable Product

- Have the traversal algorithm consider elevation of a roadway to determine passing status.

# Layered Development Schedule (continued)

Layer 4: Desirable Target

Have the traversal algorithm consider right-of-way when relevant.

Have the traversal algorithm include a margin of error or confidence intervals in addition to a recommendation regarding passing status

Layer 5: High Target

Scale-up no-passing identification algorithm to larger portions of county dataset and other areas of Indiana.

Have the traversal algorithm consider adjustable speed limit data.

Allow industry constants to be adjusted, such as driver height, reaction time, and the particular rules for road line placement.

Layer 6: Extras

Identify roadway geometry (specifically centerlines and edgelines) from a LiDAR data set and (maybe) aerial photography.

Have the traversal algorithm check for visual obstructions within right-of-way.