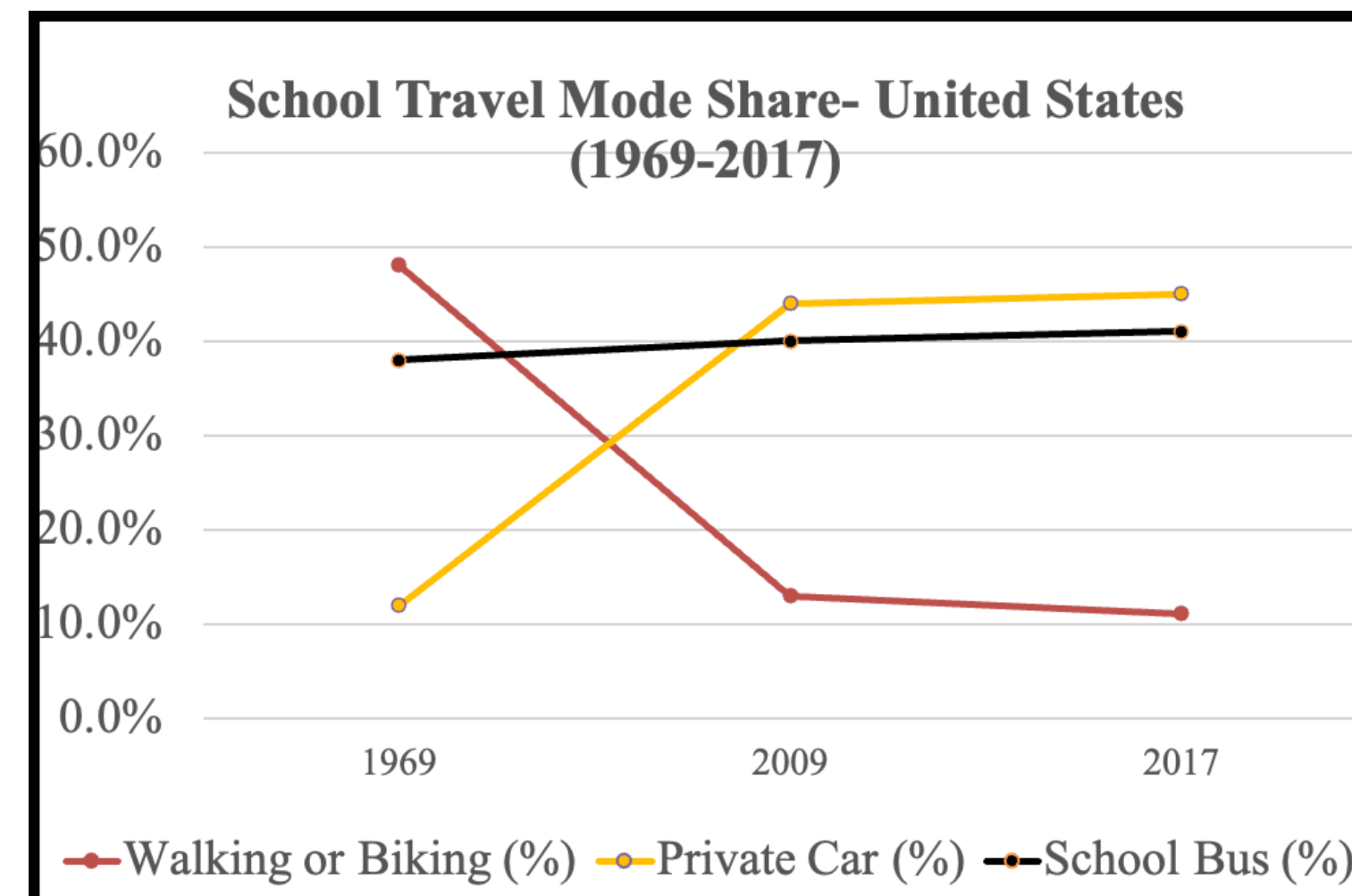
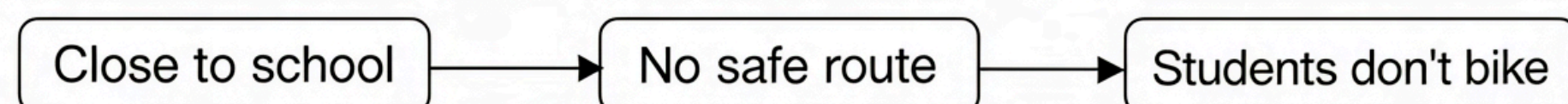


Problem Statement

- In Howard County, thousands of K–12 students live within non-transportation zones (≤ 1.5 mi) where HCPSS **Policy 5200** provides no bus service, yet the road network makes biking unsafe

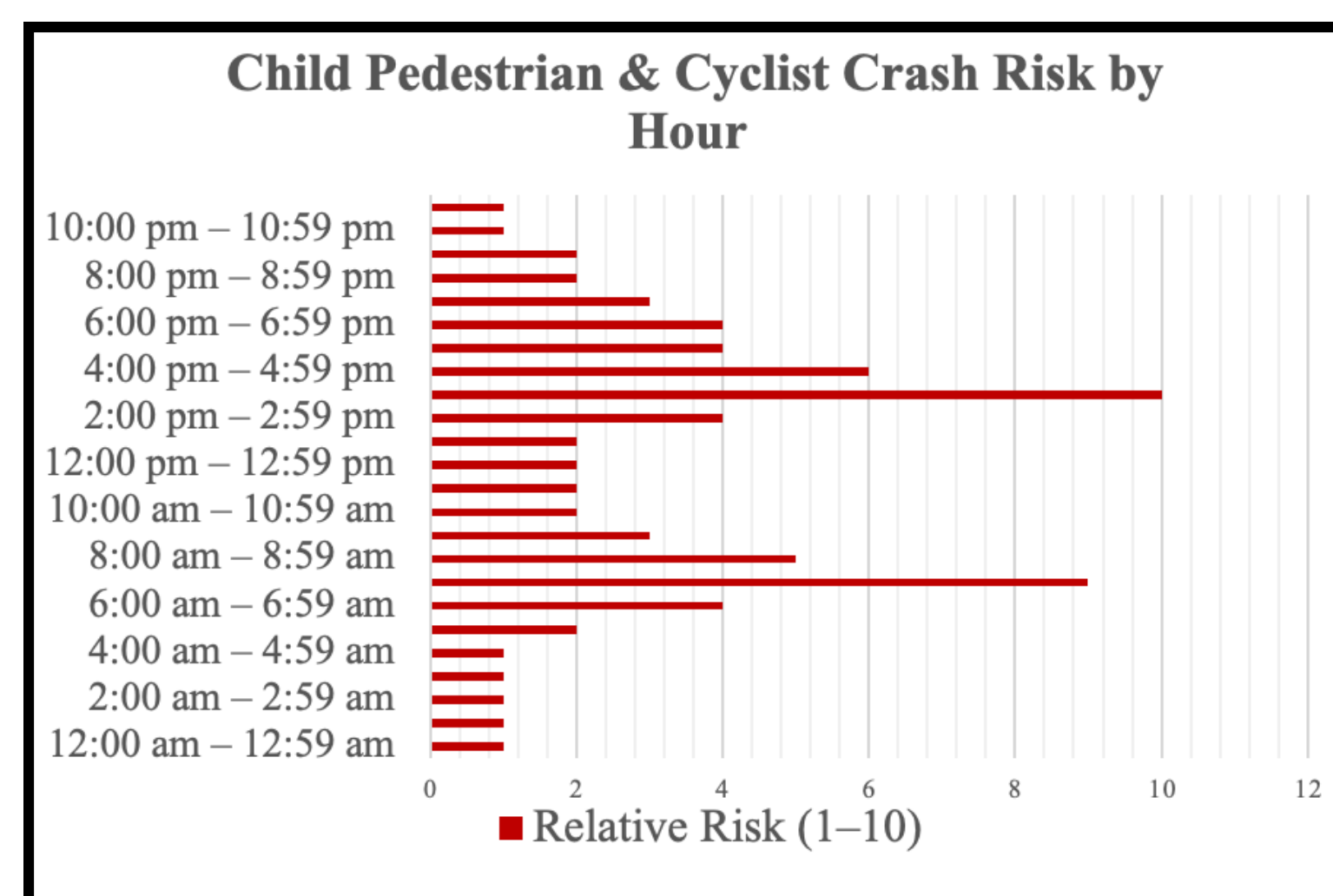


Source: National Highway Travel Survey



Safety Conditions & Crash Risk

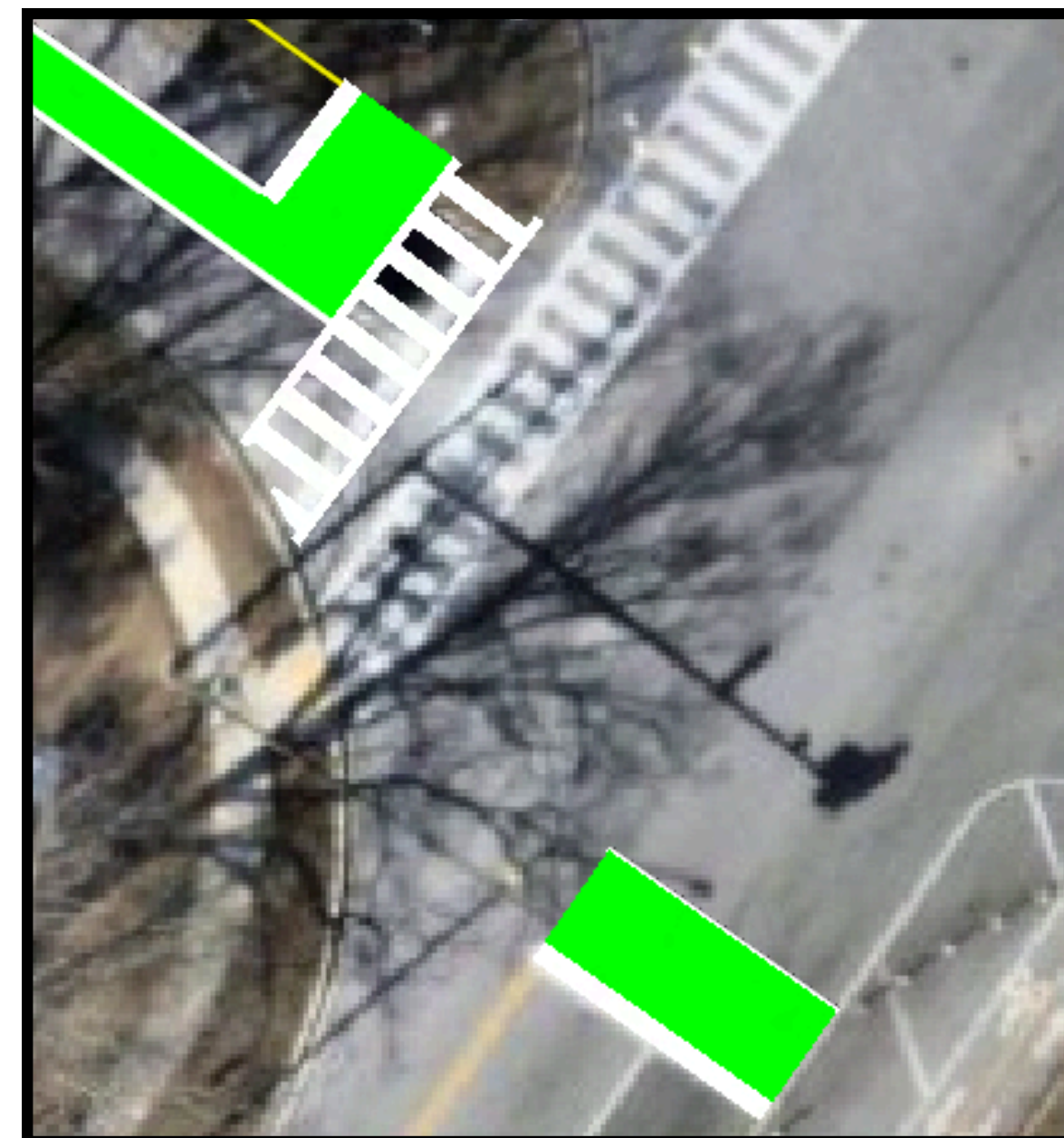
- Crash risk** peaks sharply during school commute windows
- 8–9 AM and 3–4 PM account for the highest relative risk exposure for child cyclists, precisely when FES and OMHS students are traveling



Source: NHTSA, School-Transportation-Related Traffic Crashes: 2014–2023 Data

Final Design

- Road geometry and cross-section redesigns developed in **Microstation** for Oakland Mills High School, per **NACTO**, **AASHTO**, and the **Howard County Design Manual**
- Three intersection improvements prioritized via field survey, **GIS LTS scoring**, and HCPSS non-transportation zone density data



Bike Box

Advanced stop area (ASL) per NACTO §3.2 places cyclists ahead of motor vehicle stop line, reducing right-hook conflicts and improving sight lines at signalized intersections near OMHS



Constrained vs Separated Lanes

6 ft protected bike lane with physical buffer (NACTO). Constrained corridors receive 5 ft marked bike lanes with chevron sharrows per MUTCD §3D.01

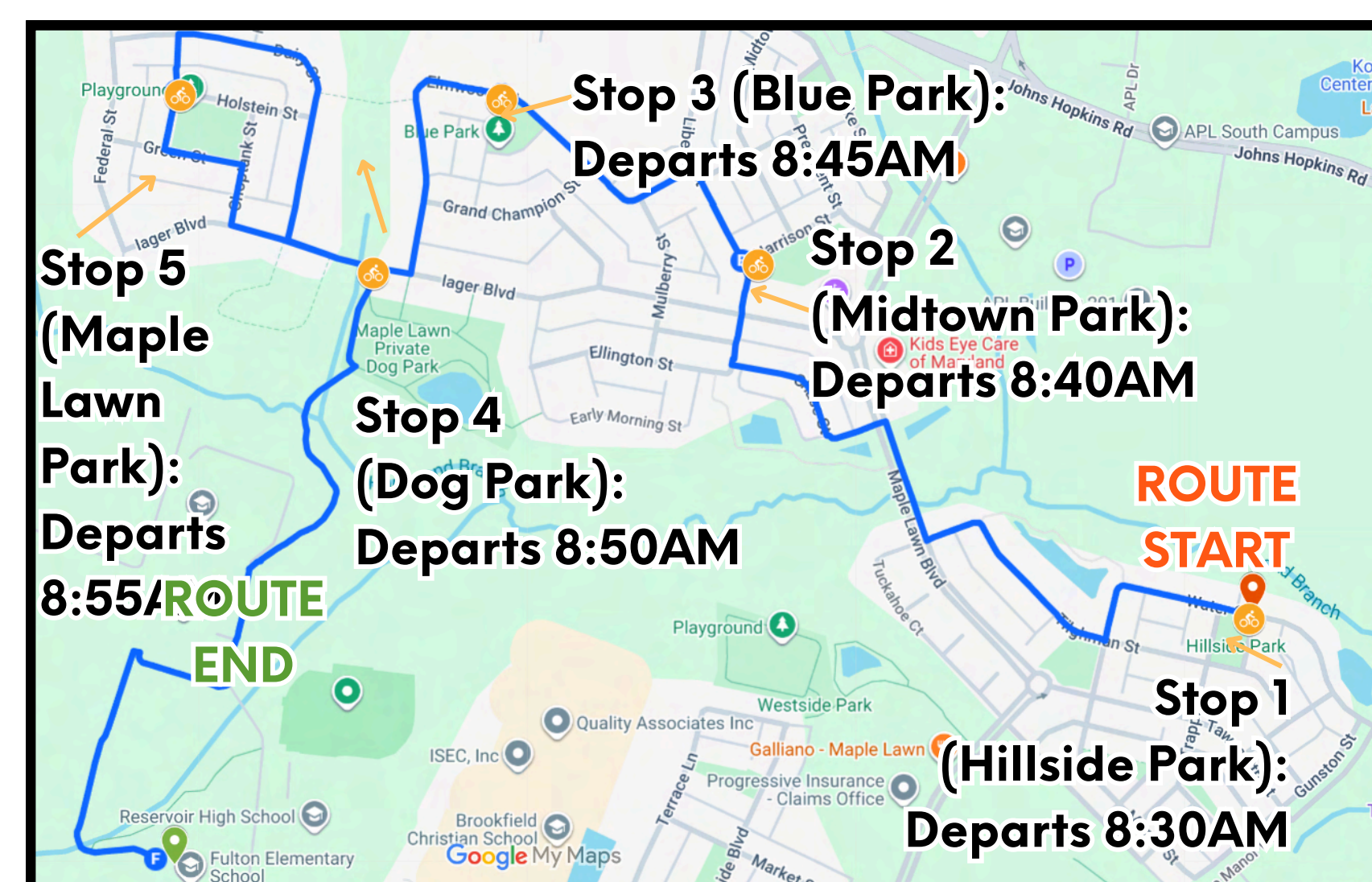


Turn Lanes

Two-stage turn queue boxes and through-bike bypass lanes eliminate bicycle–turning-vehicle conflicts at Oakland Mills Rd / Stevens Forest Rd per NACTO §4.4.

Implementation: Bike Bus

- Route optimization applied GIS network analysis to minimize **LTS-3/4** road segments, while connecting five neighborhood stop locations to school arrival by 9:00 AM
- Target: $\geq 5\%$ modal shift at FES vs. $< 2\%$ HoCo baseline
- Program performance monitored via monthly feedback surveys tracking participation rates, safety conditions, and barriers



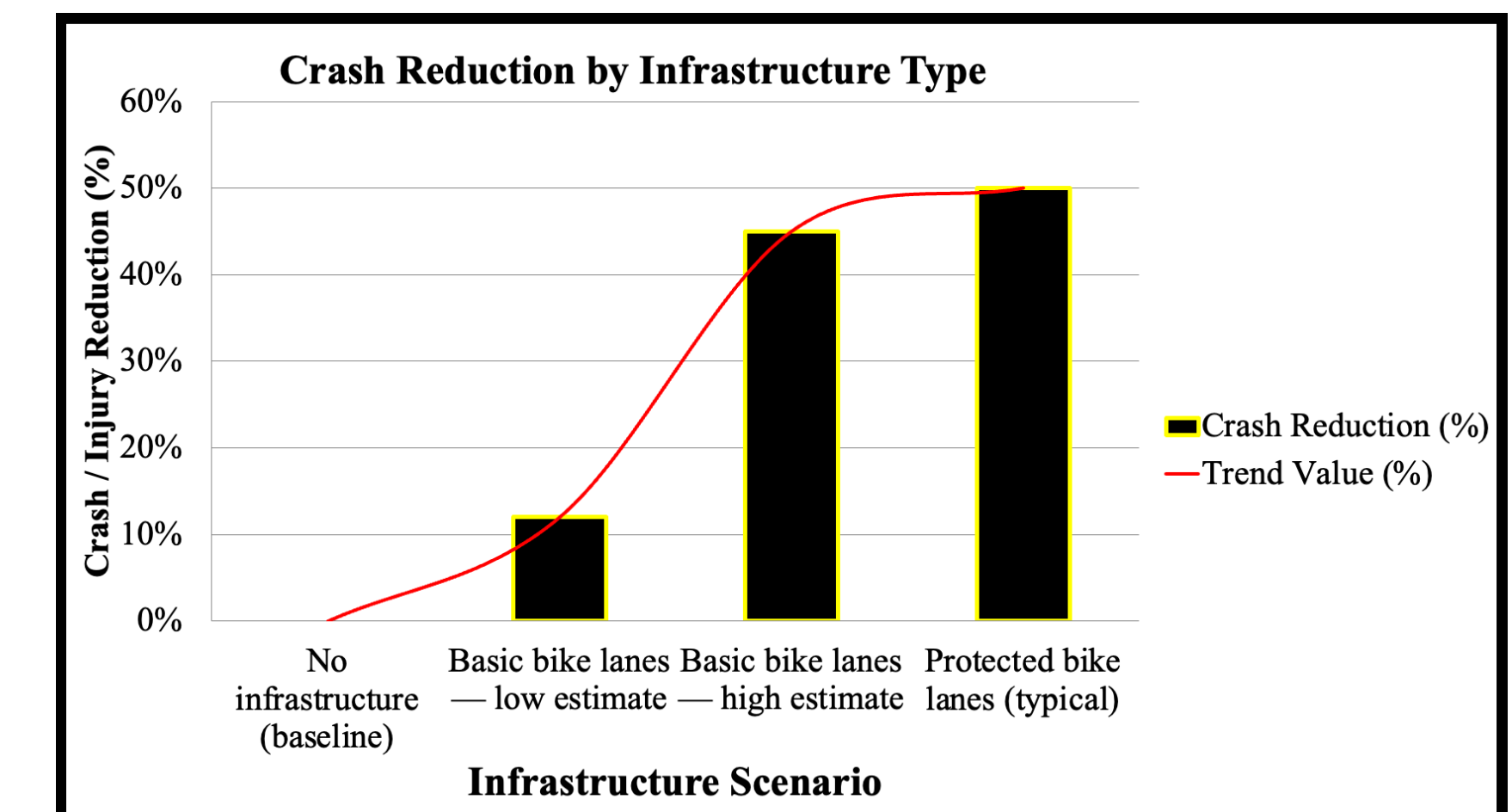
Designed bike route for Fulton Elementary



1st bike bus kick off on 14APR2026

Design Calculations

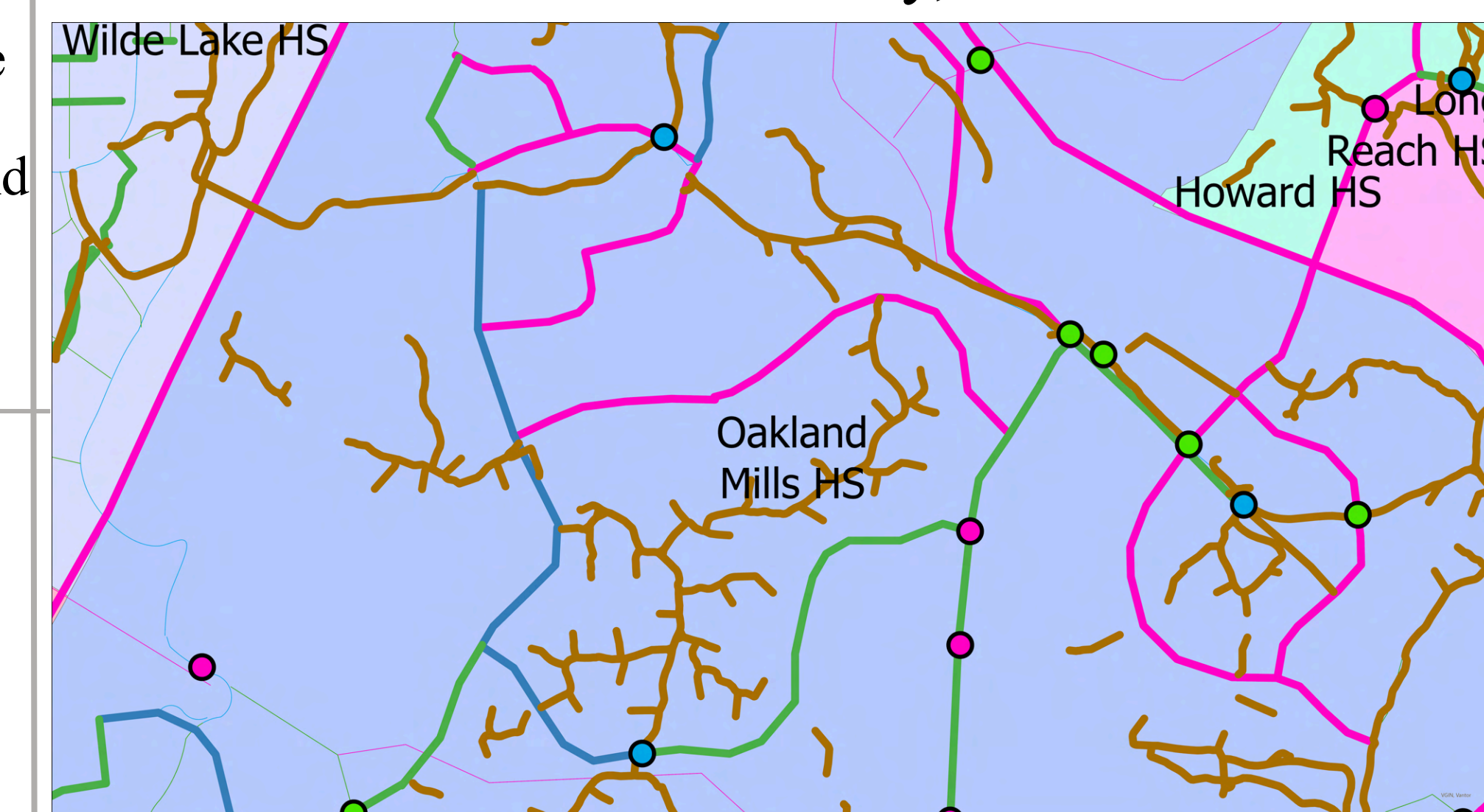
- No dedicated bike lanes or shared-use path on Oakland Mills Rd or Stevens Forest Rd. Represents the baseline (no infrastructure) scenario in **FHWA** crash data



Source: Federal Highway Administration (FHWA, 2021; FHWA, 2023)

Methodology: GIS

ArcGIS multi-criteria network analysis — Howard County, MD



Legend
BikeHoward Spot Recommendations (Green dot)
Separated Bike Routes (Blue line)
BikeHoward Road Recommendations (Pink line)
Long Term (Green line), Mid Term (Blue line), Short Term (Red line)

- BikeHoward 2023, Maryland Bicycle LTS (**MDOT**, 2022), and HCPSS district boundaries were overlaid in ArcGIS to identify infrastructure gaps and rank schools by need. Non-transportation zone boundaries and equity emphasis indices confirmed OMHS and FES as highest-need locations

Summary: Through ArcGIS route analysis, NACTO/AASHTO-compliant road redesign drawings, and a launched weekly bike bus program, a replicable active transportation framework for Howard County was delivered