MD 99 Corridor Investigation

MD 99 / OLD FREDERICK ROAD / ROGERS AVENUE

SUMMARY OF TRAFFIC CONDITIONS
AND PRELIMINARY RECOMMENDATIONS

DECEMBER 11, 2018 7:00 PM - 8:30 PM
MT. HEBRON HIGH SCHOOL
1. Welcome
2. Background and purpose of meeting
3. Existing Conditions
4. Evaluation and findings
5. Potential Congestion and Multi Modal Strategies Background
6. Summary of Recommendations
7. Questions
8. Visit boards and talk to staff-balance of the evening
Welcome and Introductions

**Project Team**

- Howard County Office of Transportation
- Maryland Department of Transportation
- SABRA & Associates
- Howard County Police

**Study Purpose**

To address community concerns about:

- Traffic congestion along the corridor, particularly around school bell times
- Traffic safety (crashes, speeding, sight distance)
- Traffic signal operations/new traffic signal needs
- Cut-through traffic
- Lack of walking and biking infrastructure

**MDOT State Highway Administration**

- Recent and Current Related projects and role
Project Genesis

• Long-standing concerns by some residents and public input into FY 2018 Priority Letter process

• County Executive decided to include in Priority Letter - MD 99 is a state road

• Howard County Office of Transportation initiated the project
What area was studied?
<table>
<thead>
<tr>
<th>Year</th>
<th>Improvement Type</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>Modified signal phasing</td>
<td>Marriottsville Rd.</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>Installed additional signs</td>
<td>MD 99 Westbound near Alpha Ridge Park entrance</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td>Entrances of Mount Hebron High School</td>
<td>Widened lanes and provided right turn lane</td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td>West side of St. Johns Lane</td>
<td>Upgraded pedestrian signals</td>
</tr>
<tr>
<td>2013</td>
<td>Removed passing lane</td>
<td>West of Marriottsville Road</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>Installed signs and pavement markings</td>
<td>Eastbound of Old St. Johns Lane</td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>Project</td>
<td>Location</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
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<td>-------------</td>
</tr>
<tr>
<td>2013</td>
<td>Bethany Lane &amp; Old Mill Rd.</td>
<td>Separate left turn lanes</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>Butterfly Court</td>
<td>Installed signs</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>Bethany Lane</td>
<td>Adjusted signal timing during even peak time</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>St. Johns Lane</td>
<td>Adjusted signal phasing</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>Melba Avenue</td>
<td>Modified pavement markings</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>North Farm Rd., Weatherburn Rd., Waverly Woods Dr.</td>
<td>Installed signs</td>
<td></td>
</tr>
</tbody>
</table>
Existing Conditions

- 2-lane roadway
  - Limited or no shoulders, sidewalks or bike lanes
- 5.5 mile segment from Marriottsville Road to Rogers Avenue/ Old Fredrick Road
- Average Daily Traffic volumes range from 6,500 east of Marriottsville Road to 16,500 near US 29
- Peak hour volumes
  - Up to 1,200 vehicles per hour eastbound AM and 1,200 westbound PM near US 29
  - Between 25 to 50 pedestrians per day @ Bethany Lane, St. Johns Lane, Wetherburn Road and Patapsco Valley Drive
- Four schools: Mt. Hebron High School, Waverly Elementary School, Hollifield Station Elementary School and Patapsco Middle School
- State maintained from Marriottsville Road to US 29, County maintained from US 29 to US 40
Traffic Signals
- Marriottsville Road
- Woodstock Lane
- Wetherburn Road/ Maple Lane
- Bethany Lane
- St. John’s Lane/ Mt. Hebron High School
- US 29
- Patapsco Valley Drive/ Orchard Avenue

Traffic signals operate independently (e.g. not coordinated) but do have detection to activate side streets and left-turn phases when vehicles are present on those lanes.

Roundabouts
- Rogers Avenue/ Old Frederick Road

Stop Signs (Side Street)
- Maple Rock Drive
- Melba Road
- Mount Hebron Drive
- Tiller Drive
- McKenzie Road
- Weatherstone Drive
- Liter Drive
- Taylor Farm Road
- Green Clover Drive/ Waverly Woods Drive
Traffic Operations - Signals

- Signals with left-turn lanes
  - Marriottsville (all directions)
  - Wetherburn/ Maplewood (EB and WB)
  - Bethany (all directions)
  - St. Johns (EB and WB)
  - US 29 (WB)
  - Patapsco Valley (EB and WB)

- Signals with left-turn arrows
  - Marriottsville (all directions)
  - Wetherburn / Maplewood (EB and WB)
  - St. Johns (EB and WB)
  - US 29 (WB)
  - Patapsco Valley (EB and WB)

- Residual Queuing (vehicles unable to clear the intersection in one traffic signal cycle)
  - SB MD 99 and EB and WB Marriottsville Rd, AM
  - EB Wetherburn Through, AM*
  - SB Woodstock Lane, AM
  - EB MD 99 at St. Johns Lane, AM and SB Hebron HS, AM*
  - NB US 29 @ MD 99, PM
  - NB Bethany Lane LT PM
  - EB Rogers at Patapsco Valley, PM*
  - EB Rogers @ Old Frederick, AM and PM*

* Bell time school congestion issue
Current Development

Legend
- Commercial Development Plans
  26,237 total commercial square footage
- Residential Development Plans
  516 total residential units

Howard County Planned Development Data 2015 - 2017
Vehicle Traffic Volume Peak Times

Hourly Volume Along MD 99 between Bethany Lane and St. John’s Lane (Sum of EB and WB)

Surge at 2:30
Origin-Destination Study

- Identify potential non-local neighborhood cut-through traffic along Michaels Way and Greenway Drive avoiding MD 99

- Approximately 2,000 vehicles per day on Michaels Way and 1,500 on Greenleaf Drive

- 4,200 vehicles sampled across all O-D stations over 7 days, only 200 non-local trips paired along Michaels Way or Greenleaf Drive
Corridor Field-Measured Travel Times

MD 99 (Marriottsville to Rogers/Old Frederick)

- AM Peak hour (7 to 8 AM)
  - Eastbound 10 to 13 minutes
  - Westbound 9 to 10 minutes
- PM Peak hour (5 to 6 PM)
  - Eastbound 9 to 10 minutes
  - Westbound 9 to 10 minutes

I-70 (Marriottsville to US 29)

- AM Peak hour (7 to 8 AM)
  - Eastbound 6-10 minutes
  - Westbound 4-6 minutes
- PM Peak hour (5 to 6 PM)
  - Eastbound 4-6 minutes
  - Westbound 6-10 minutes
I-70 Vehicle Speeds and Congestion

I-70 Speeds for April 2018 - Averaged by 15 minute intervals for every weekday

4:00 PM – 6:00 PM

6:30 AM - 8:30 AM

Graphic from INRIX, using INRIX April 2018.
Signalized Intersection Level of Service Definitions

**Level of Service**

**D**

AVG. STOPPED DELAY PER VEHICLE

\( \leq 10 \text{ SECONDS} \)

**E**

AVG. STOPPED DELAY PER VEHICLE

\( > 10 \text{ – 20 SECONDS} \)

**F**

AVG. STOPPED DELAY PER VEHICLE

\( > 20 \text{ – 35 SECONDS} \)

**A**

AVG. STOPPED DELAY PER VEHICLE

\( > 35 \text{ – 55 SECONDS} \)

**B**

AVG. STOPPED DELAY PER VEHICLE

\( > 55 \text{ – 80 SECONDS} \)

**C**

AVG. STOPPED DELAY PER VEHICLE

\( > 80 \text{ SECONDS} \)
## Traffic Operations - Level of Service

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Level of Service</th>
<th>Level of Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marriottsville Road</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Woodstock Lane</td>
<td>D</td>
<td>C</td>
</tr>
<tr>
<td>Wetherburn Road/ Maple Lane</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>Bethany Lane</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>St. John’s Lane/ Mt. Hebron High School</td>
<td>F</td>
<td>D</td>
</tr>
<tr>
<td>US 29</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Patapsco Valley Drive/ Orchard Avenue</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>Rogers/ Old Frederick</td>
<td>F</td>
<td>F</td>
</tr>
</tbody>
</table>
Bell Time Speeds and Intersection Level of Service

School Zone Speed Enforcement Before Vs. After

Benefits of reduced speeds include reduced crash risk and increased gaps for side street traffic to enter.
Vehicle Queues

MD 99 Looking East @ St. Johns
AM  High School Bell Time

MD 99 Looking West @ Weatherstone
AM  High School Bell Time
Vehicle Queues

Rogers Avenue
Approaching Roundabout
Eastbound PM

Rogers Avenue
Approaching Orchard Avenue
Eastbound PM
Observed Vehicle Queues
Vehicle Delay – Stop Control Side Street

Level of Service D for stop-controlled intersections = 35 seconds
(average traffic signal cycle length is 1-2 minutes)
Crash Experience

- January 2015 - June 2018
- Highest number of crashes occurred at
  - US 29 (19)
  - Marriottsville Road (9)
  - Bethany Lane (11)
- 34% of crashes occurred during school bell times
- 1 Pedestrian crash
- 1 Bicycle crash
- Most frequent crash types
  - Rear-end (30)
  - left-turn (22) – 6 at Marriottsville, 8 at Bethany, 7 at US 29
  - single vehicle/fixed-object (28)
  - angle (12)
Crash Map – Location & Type

Legend
- Head On
- Head On Left Turn
- Same Direction Rear End
- Same Direction Side Swipe
- Opposite Direction Side Swipe
- Same Direction Right Turn
- Same Direction Left Turn
- Same Direction Both Left Turn
- Same Movement Angle
- Angle Meets Left Turn
- Angle Meets Left Turn Head On
- Single Vehicle
- Other
- Unknown
- Bike Involved Collision
- Pedestrian Involved Collision
- * Black Outline denotes a recent collision between April 2015 - June 2018

Covers all recorded collisions from January 2015 - June 2018
Crash Experience - Bell Time
### Intersection Sight Distance (Stop Controlled)

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Stopping Sight Distance (for mainline traffic) Met?</th>
<th>Intersection Sight Distance (for entering vehicles) Met?</th>
<th>Issue</th>
<th>Potential Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taylor Farm Rd</td>
<td>√</td>
<td>×</td>
<td>Vegetation</td>
<td>Trim/ remove</td>
</tr>
<tr>
<td>Liter Dr</td>
<td>√</td>
<td>√</td>
<td>None</td>
<td>n/a</td>
</tr>
<tr>
<td>Weatherstone Dr</td>
<td>×</td>
<td>×</td>
<td>Gateway Signage</td>
<td>relocate</td>
</tr>
<tr>
<td>McKenzie Rd</td>
<td>×</td>
<td>×</td>
<td>Vegetation</td>
<td>Trim/ remove</td>
</tr>
<tr>
<td>Mt Hebron HS West Ent</td>
<td>√</td>
<td>√</td>
<td>None</td>
<td>n/a</td>
</tr>
<tr>
<td>Tiller Dr</td>
<td>√</td>
<td>×</td>
<td>Roadway curvature</td>
<td>Advisory speed limit</td>
</tr>
<tr>
<td>Maple Rock Dr (SB)</td>
<td>√</td>
<td>×</td>
<td>Vegetation</td>
<td>Trim/ remove</td>
</tr>
<tr>
<td>Maple Rock Dr (NB)</td>
<td>√</td>
<td>×</td>
<td>Roadway curvature</td>
<td>Advisory speed limit</td>
</tr>
<tr>
<td>Mount Hebron Dr</td>
<td>√</td>
<td>×</td>
<td>Roadway curvature</td>
<td>Advisory speed limit</td>
</tr>
<tr>
<td>Melba Rd</td>
<td>×</td>
<td>×</td>
<td>Vegetation</td>
<td>Trim/ remove</td>
</tr>
</tbody>
</table>
Intersection Sight Distance - Roadway Obstructions

Melba Rd. – Looking west for a right turn

Maple Rock Dr. – Looking west for a right turn

Weatherstone Dr. – Looking west

Signage

Photos Taken
08/2018
Intersection Sight Distance - Roadway Curvature

Tiller Dr. – Looking west for a left turn
Crest Curve

Maple Rock Dr. – Looking east for a left from the south leg

Mount Hebron Dr. – Looking west for a left turn
Curve

Photos Taken
08/2018
Pedestrian and Bicycle Network
Mitigation Strategy Menu

Mode Shift / Demand Management

Traffic Signal Operations And Management

Geometric / Safety Improvements
Potential Congestion Management and Multi-Modal Safety Strategies

Traffic Signal Operations
- Timing-US 29 cycle length
- Detection-St. Johns Lane
- Phasing
  - St. Johns Lane
  - NB Bethany new left turn arrow
  - Woodstock Road left turn arrow
- Lane assignment-US 29

Intersection improvements
- MD 99 @ Woodstock Road (extend developer improvement)
- Access Modifications
  - Mt. Hebron High School

Traffic Control Modifications
- No new traffic signals warranted

Pedestrian and Bicycle Network
- Sidewalk retrofits to expand school walksheds

Transportation Demand Management
- Incentives and programs to reduce bell time car traffic
• Open Questions

• Breakout Session – what to comment on:
  • Comments on existing conditions
  • Comments on proposed recommendations
  • Priorities

• Next Steps
  • Final Analysis and Report incorporating public input
  • Engineering Design and Construction Cost Estimates
  • Funding and programming
  • Implementation of recommendations by (DPW, HCPS, MDOT SHA)
Contact Information

https://www.howardcountymd.gov/Departments/County-Administration/Transportation/Transportation-Projects/Maryland-Route-99-Investigation

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