



*Karen Henry, Director*

## TECHNICAL MEMORANDUM

TO: File  
FROM: Erik Terry, Engineer III, Traffic Engineering Division  
SUBJECT: Riedel Road - Midblock Trail Crossing  
DATE: January 1, 2024

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### Purpose

Residents have concerns about the mid-block trail crossing on Riedel Rd just north of its intersection with Vinyard Ln and Montauk Dr. The purpose of the study will be to document residents concerns and will include

- Existing traffic controls
- Observations
- Vehicle volume
- Vehicle speeds
- Pedestrian sight line analysis
- Potential alternatives

### DPW Authority

DPW has and retains the authority and responsibility to determine what changes to the roadway and/or traffic control, if any, are appropriate [County Code, Article 13, Sections 2-101(a) and 2-301]. Safety concerns and sound engineering judgment shall take precedence in all decisions.

## Existing Conditions



Aerial photo showing location of subject mid block pedestrian crossing

### *Site Information*

The subject crossing is located on Riedel Road. Riedel Rd is a 2.3 mile three lane road, two travel lanes separated by a two way left turn lane (TWLTLN). The Anne Arundel County Office of Transportation has functionally classified Riedel Road as a Minor Arterial. Riedel Road runs in a predominately north/south direction and is the main access road for thousands of County residences.

The pedestrian crossing is located mid-block on the northern third of Riedel Road between its intersection with Montauk Dr & Vineyard Ln and Bethel Rd & Jed Forest Dr. The crossing connects to a Shared Use Path (SUP) which runs in an east/west direction. The SUP is approximately  $\frac{3}{4}$  of a mile long



and connects to many of the community sidewalks. The SUP safely provides pedestrian access throughout the community by avoiding many of the community roadways.



Northbound approach





Southbound approach

Crossing specifics:

- Crossing type: mid-block
- Roadway configuration: NB - 1 thru lane. SB - 1 thru lane. Between the two travel lanes is a TWLTL which becomes a painted median near the crossing. There is a ~6' shoulder area defined by a solid white edge line on both sides of the road.
- Marked crosswalk - High visibility ladder style




- Crossing length – 50 feet (from curb to curb), 18 feet (from handicap ramp to pedestrian shelter island), 11 feet (across single travel lane)
- Signage for pedestrians: none
- Signage for vehicles:

	<p>State Law Stop For Pedestrian Signage (R6-1a)</p>
	<p>Pedestrian crossing signs (W11.2) with arrow plaque (W16.7p) for NB/SB at/near crossing</p>



	<p>Advance Pedestrian crossing signs (W11.2) for NB/SB approach</p>
	<p>Keep Right signs (R4.7) and object marker (OM1-3) installed in 'nose' of pedestrian shelter island</p>
	<p>No Parking Any Time (R7.1) installed in crossing area to prevent vehicles from parking on shoulder and blocking sight lines for crossing</p>

- Illegal signs:

	<p>Sign clutter adds to driver confusion</p>
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- Pedestrian signals: none
- Other pedestrian amenities: pedestrian shelter island



## Data Collection

Statrak radar devices were set at various locations along Riedel Road and Johns Hopkins Road from December 11, 2023 through December 17, 2023. Vehicle speeds, traffic volumes and vehicle class data was collected and averaged for a 7 day period to determine the median speed (50%), the prevailing speed (85%) and average daily traffic (ADT).

### *Speed & Volume Data Summary Table*

Year	Method	Location	Posted Speed Limit (mph)	Median Speed - 50% (mph)	Prevailing Speed - 85% (mph)	Average Daily Traffic (veh/day)
2023	Statrak	Riedel Rd south of Macallister Ln	35	37	41	10,861
2023	Statrak	Riedel Rd between Johns Hopkins Rd	35	34	38	16,164

Notes: The median speed is the speed below which 50% of motorists travel. Similarly, the prevailing speed is the speed at below which 85% of motorists travel.

## Pedestrian Crossing Sight Distance Analysis

### *Minimum Pedestrian Sight Distance*

Field measured: 204' from east side of crossing (northbound vehicles). 204' will be used for calculations as it is the minimum measured stopping sight distance for the crossing and is the constraining factor.



### *Estimated pedestrian crossing time*

Using a conservative walking speed of 3 feet per second and using field measured crossing length from ramp to pedestrian shelter island - 18' of crossing distance.

$$(18 \text{ ft}) / (3 \text{ ft/sec}) = 6 \text{ seconds of crossing time required}$$

### *Calculate required sight distance to allow pedestrians to cross to shelter island*

$$[(85\% \text{ speed (mph)} \times 5,280 \text{ ft/mi}) / 3,600 \text{ sec/hr}] \times \text{pedestrian crossing time (sec)}$$

$$[(41 \text{ mph} \times 5,280 \text{ ft/mi}) / 3,600 \text{ sec/hr}] \times 6 \text{ sec} = 361'$$

- Recommended/ideal pedestrian sight distance to cross to shelter island (18'): *361' of sight distance recommended*
- Available sight distance: *204'*
- Difference: *-157' (deficit)*

## **Field Observations**

### *Potential Americans with Disabilities Act (ADA) compliance issues:*

- Ramping appears to be sloped improperly
- There are no detectable warning surfaces (truncated domes)

### *Potential geometric or construction/maintenance issues present:*

- Large trees close to ramping
- Numerous electrical/BGE boxes near crossing

### *Pedestrian/bicycle approaches*

- Existing sidewalk on both sides of Riedel Rd
- 6-8 shoulder area (not marked for bicycle lane)
- Shared use path crossing



### *Other field observations*

- There are several large trees adjacent to the crossing which creates a dark canopy. When the trees are in full foliage, the ramping area is dark and becomes very difficult to see pedestrians waiting to cross.
- The street lighting just south of the crossing appears to be blocked by tree branches. This street light is the only light illuminating the crosswalk
- Some signs are obscured by vegetation and could be better placed for approaching driver's visibility.
- There is a wooden bollard in the middle of the SUP prior to the ramping to provide a warning to the trail users that the crossing is ahead. There are no signs indicating to stop prior to the crossing.
- While there is a double yellow pavement marking near the crossing, the adjacent intersections utilize the TWLTL for side street access. This creates an 'open' painted median near the island.
- The use of the R6.1A is not allowed on the pavement surface (Md MUTCD).
- Due to tree canopy, there may be issues using solar powered devices.

### **Existing/Previous Pedestrian Crossing Enhancements**

The MDOT-SHA Pedestrian Safety Treatments Best Practices Guidelines was consulted for this crossing location. Using the table, the site ADT of 16,164, three or more lanes (without raised median), 35 mph speed limit, and reduced pedestrian walking speed shows that additional treatments are required beyond a standard marked crosswalk. The Traffic Engineering Division has previously enhanced this crossing with the following:

- High visibility crosswalk markings
- Pedestrian refuge island. Reduces single crossing from 50' to two separate 18' crossings

## **Potential Additional Pedestrian Enhancements for Crossing**

### *Signage Improvements*

- Upgrade pedestrian warning signage to trail crossing warning signs (hiker/biker)
- Improve visibility of signage (replacement/relocation)
- Remove sign clutter
- Install stop signs for trail crossing

### *Pavement Marking Improvements*

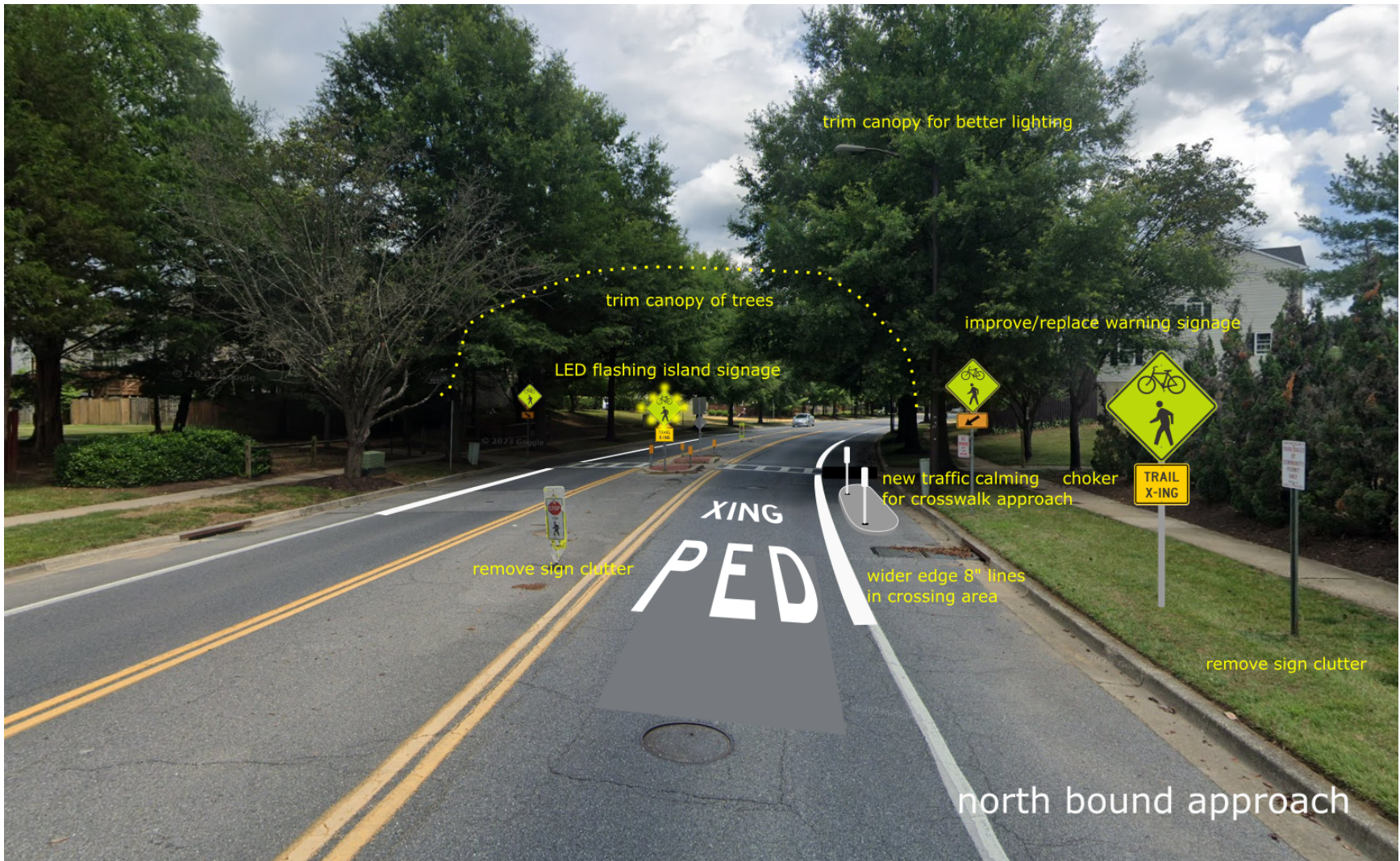
- Advanced yield/stop line
- On-pavement warning markings
- Rumble strips
- Wider 8" edge lines on approach to crossing
- 'Close' painted median (remove TWLTL and install dedicated left turn lanes into adjacent intersection)
- Flex posts along edge line on approach to crosswalk

### *Beacons and Flashing signage*

- Advanced warning beacons
- Pedestrian activated warning beacons
- Automated pedestrian detection

### *Site Improvements*

- Bring curb ramping up to ADA compliance
- Stop signs for trail users
- Detectable warning surfaces on ramping (truncated domes)
- Detectable warning surfaces on refuge island (truncated domes)
- Trim/raise tree canopy to allow for better visibility/lighting (Road Operations)
- Traffic calming chokers in shoulder on approach to crosswalk. Allows for refuge in shoulder area and shortens crossing from 18' to 11' (travel lane). There are clear sight lines to the shoulder area.
- Remove trees to improve visibility/lighting



*Photo showing some of the potential trail crossing enhancements*



## Appendix

**ALL TRAFFIC**  
SOLUTIONS



Start: 2023-12-11  
End: 2023-12-17  
Times: 0:00:00-23:59:59

## Traffic Analysis Report

Riedel Rd #1, XB

Speed Range: 1-150 mph  
Violation Threshold: 10  
Lanes Included: 1, 2

### Speed

Speed Limit	35 mph
85th Percentile Speed	41 mph
50th Percentile Speed	37 mph
Average Speed	36.7 mph
Pace Speed Range (10 mph)	32 - 42 mph
Max Speed	77 mph
Min Speed	12 mph

### Vehicles

Total Vehicles	72555 counts
85th Percentile Vehicles	64500 counts

### Volumes

	Time	5 Day (Mon-Fri)	7 Day (Sun-Sat)
ADT		10861	10365
AM Peak	8:00 - 9:00	824	699
PM Peak	17:00 - 18:00	968	875
	Over Threshold	% Violators	Avg Violator Speed
Sunday	139	1.9	48.1
Monday	174	1.7	47.7
Tuesday	196	1.8	48.0
Wednesday	238	2.2	48.2
Thursday	216	2.0	48.2
Friday	240	2.0	48.0
Saturday	263	2.4	48.2

### Class Counts

	Number	%
Small (Class 1)	107	0.1
Medium (Class 2-3)	71159	98.1
Large (Class 4-12)	1289	1.8



Start: 2023-12-11  
End: 2023-12-17  
Times: 0:00:00-23:59:59

Speed Range: 1-150 mph  
Violation Threshold: 10  
Lanes Included: 1, 2

## Speed

Speed Limit	35 mph
85th Percentile Speed	38 mph
50th Percentile Speed	34 mph
Average Speed	33.5 mph
Pace Speed Range (10 mph)	29 - 39 mph
Max Speed	63 mph
Min Speed	5 mph

## Vehicles

Total Vehicles	109263 counts
85th Percentile Vehicles	98335 counts

## Volumes

	Time	5 Day (Mon-Fri)	7 Day (Sun-Sat)
ADT		16164	15609
AM Peak	8:00 - 9:00	1164	997
PM Peak	16:00 - 17:00	1426	1337
	Over Threshold	% Violators	Avg Violator Speed
Sunday	61	0.5	48.9
Monday	43	0.3	47.6
Tuesday	79	0.5	47.8
Wednesday	82	0.5	48.3
Thursday	74	0.5	48.3
Friday	75	0.4	48.6
Saturday	84	0.5	47.8

## Class Counts

	Number	%
Small (Class 1)	917	0.8
Medium (Class 2-3)	106211	97.2
Large (Class 4-12)	2135	2.0

**MDOT-SHA Pedestrian Safety Treatments Best Practices Guidelines**

The following table presents minimum criteria for installing a marked crosswalk at uncontrolled locations and provides guidance where additional treatments are necessary. **It should be noted that engineering judgment is required for determining potential additional treatments at locations identified in the table as “standard marked crosswalk is acceptable”, where additional pedestrian issues are present.**

Average Daily Traffic	Posted Speed (MPH)	2 Lanes	3 Lanes	4 or More Lanes (with raised median)	4 or More Lanes (without raised median)
≤ 10,000	25	✓	✓	✓	✓
	30/35	✓	✓	✓	✓
	40	✓	✓	✓	◇
> 10,000 and ≤ 15,000	25	✓	✓	✓	✓
	30/35	✓	✓	◇	◇
	40	✓	◇	◇	◇
> 15,000 and ≤ 20,000	25	✓	✓	◇	◇
	30/35	✓	✓	◇	◇
	40	◇	◇	◇	◇
> 20,000 and ≤ 35,000	25	◇	◇	◇	◇
	30/35	◇	◇	◇	◇
	40	◇	◇	◇	◇

**ONLY FULLY CONTROLLED MARKED CROSSINGS OR GRADE SEPARATED PEDESTRIAN CROSSINGS ARE RECOMMENDED FOR ROADWAYS WITH SPEEDS GREATER THAN 40 MPH**

✓ STANDARD MARKED CROSSWALK IS ACCEPTABLE

◇ REQUIRES ADDITIONAL TREATMENTS

Source: DRAFT Pedestrian Safety Treatments Best Practices Guidelines (MDOT-SHA, 2018)

Curran Kirchner added a comment 01/03/2024 01:18 PM

NB W ramp- 927'

SB W ramp- 962'

NB E ramp- 204'

- 1) horizontal alignment; curve.
- 2) Mature tree trunk.
- 3) Crosswalk Ahead sign too close; approx. 150' prior to crosswalk (35 MPH zone).

SB E ramp- 305'

- 1) horizontal alignment; curve.