

# STARS

STRATEGICALLY TARGETED AND  
AFFORDABLE ROADWAY SOLUTIONS

## MPO Technical Meeting

1. US 29 Corridor: Hydraulic Rd to Woodbrook Rd
2. US 29/250 Bypass Interchange with Emmet St

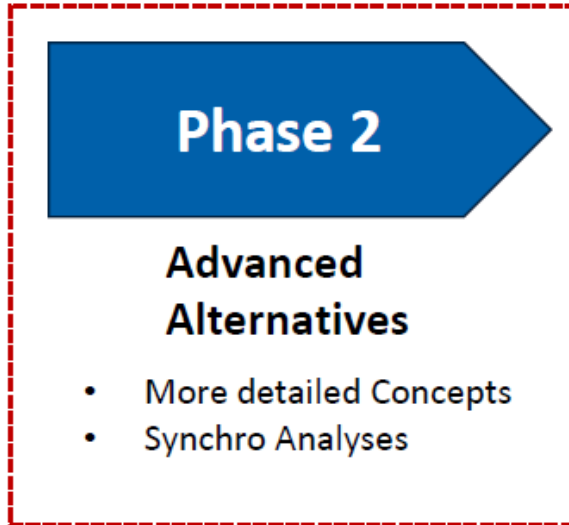
*June 2, 2026*

# STARS ALTERNATIVE DEVELOPMENT OVERVIEW



## Preliminary Alternatives

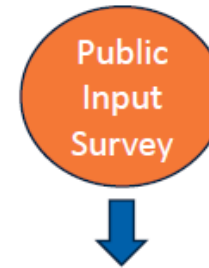
- High Level Concepts
- Vjust Screening



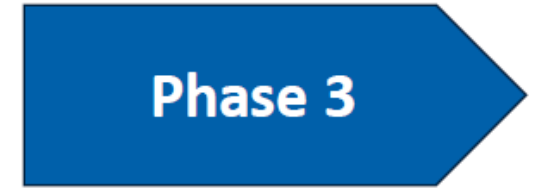
## Advanced Alternatives

- More detailed Concepts
- Synchro Analyses

We are here



SWG Finalize Preferred Alternatives



## Preferred Alternatives

- SMART SCALE level Concepts
- VISSIM Analyses

# STUDY #1

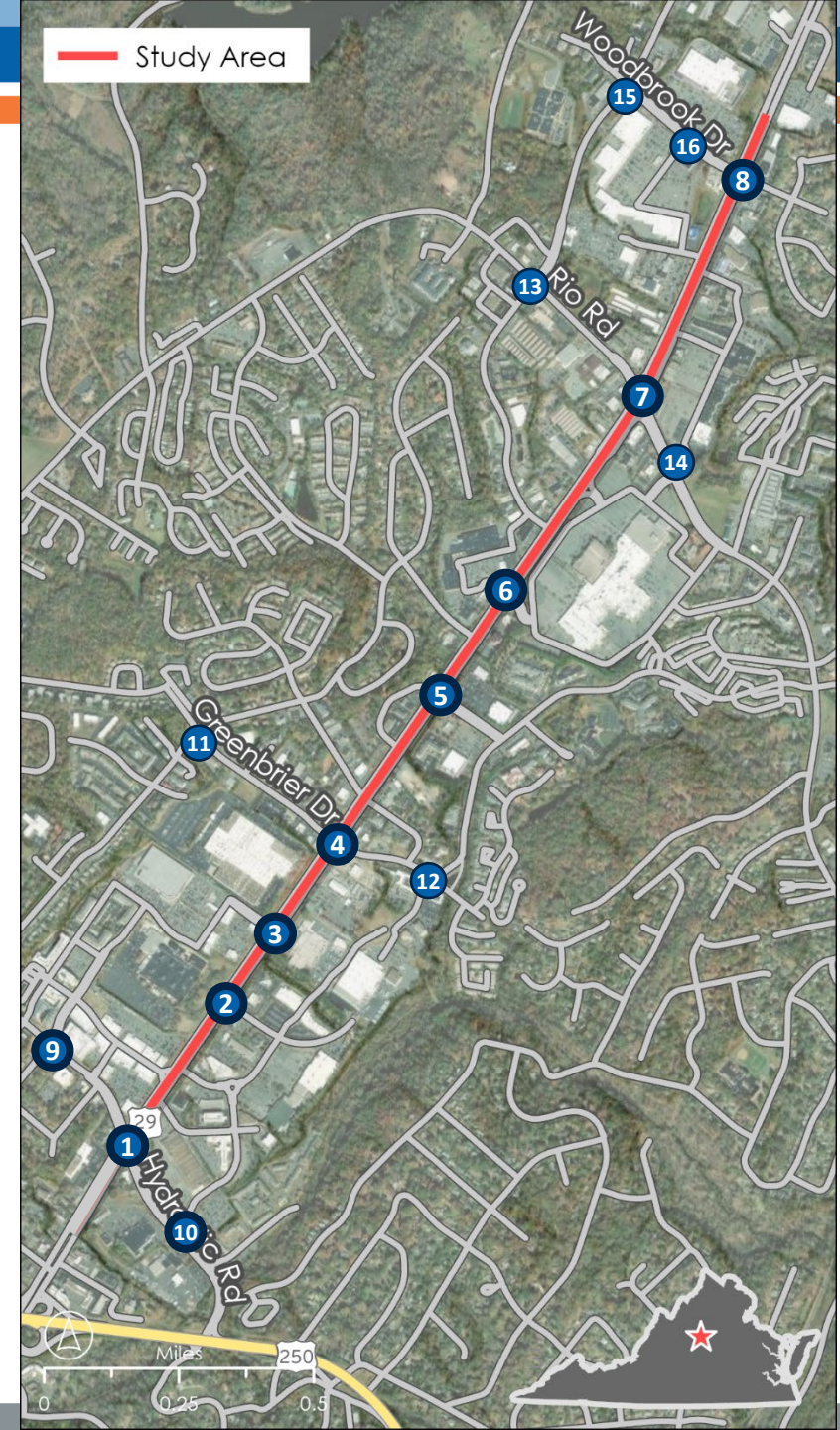
## US 29 CORRIDOR: HYDRAULIC RD TO WOODBROOK RD

### 1 Data Collection (TMCs) on US 29:

1. Hydraulic Road
2. Seminole Court
3. Lenox Avenue
4. Greenbrier Drive
5. Branchlands Boulevard
6. Fashion Square Drive
7. Rio Road
8. Woodbrook Drive
9. Hydraulic Rd and District Ave/Cedar Hill Rd
10. Hydraulic Rd and Hillsdale Dr

### 11 Supporting Data Collection (TMCs) :

11. Greenbrier Dr and Commonwealth Dr
12. Greenbrier Dr and Hillsdale Dr
13. Rio Rd and Berkmar Dr
14. Rio Rd and Fashion Sqare Dr
15. Woodbrook Rd and Berkmar Dr
16. Woodbrook Rd and Rio Hill Center



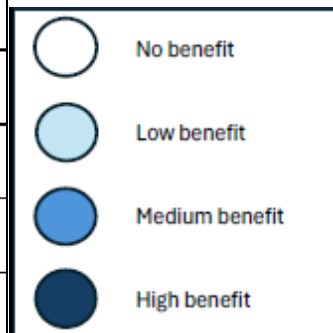
## STUDY GOALS – US 29 CORRIDOR

- Incorporate County goals to create placemaking corridor with safe efficient crossings on US 29
- Incorporate VDOT goals to improve safety, reduce congestion, and maintain throughput
- Connect activity centers along US 29
- Alternatives will not preclude or depend on a future Hillsdale Drive relocation
- Alternatives will not preclude future development
- Enhance existing transit within study area

Increase level of  
comfort for pedestrian  
access across US 29

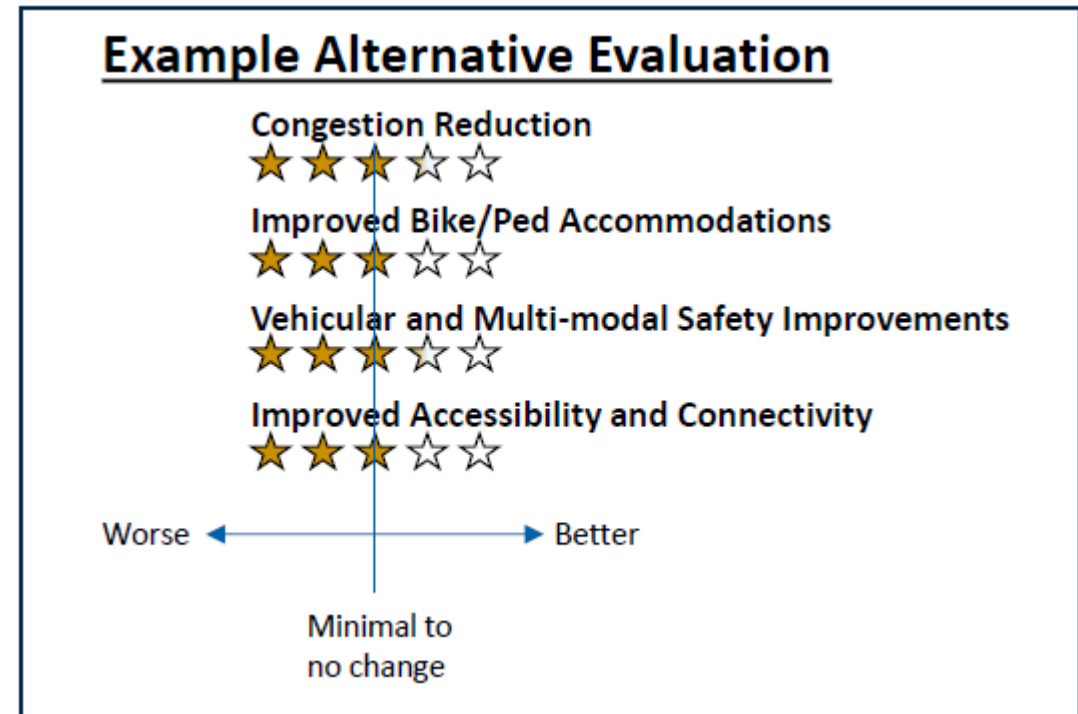
# PRELIMINARY ALTERNATIVES

Alternative	Bike/Ped Needs		Transit Needs			Vehicular Needs	
	Bike/Ped Safety Improvement	Bike/Ped Connectivity	Increased Transit Access	Transit Travel Time on Existing Routes	Potential for Existing Transit Stop Improvements	Capacity Preservation / Congestion Mitigation	Vehicular Safety Improvement
Hillsdale Drive Shared-Use Path	High benefit	High benefit	Low benefit	No benefit	High benefit	No benefit	No benefit
Hillsdale Drive Parallel Route	No benefit	No benefit	No benefit	No benefit	Low benefit	Medium benefit	Low benefit
Seminole Ct Movement Restrictions	Low benefit	No benefit	Low benefit	Low benefit	No benefit	Low benefit	Low benefit
Lenox Avenue SB Right-Turn Lane	No benefit	No benefit	No benefit	Low benefit	No benefit	Low benefit	Low benefit
Greenbrier Drive Single Loop (Relocate NB lefts)	Low benefit	No benefit	No benefit	Low benefit	Low benefit	Medium benefit	Low benefit
Greenbrier Drive Single Loop (Relocate EB lefts)	Low benefit	No benefit	No benefit	Low benefit	Low benefit	Medium benefit	Low benefit
Greenbrier Drive Single Loop (Relocate SB lefts)	Low benefit	No benefit	No benefit	Low benefit	Low benefit	Medium benefit	Low benefit
Greenbrier Combination	Medium benefit	No benefit	No benefit	Medium benefit	Low benefit	Medium benefit	Medium benefit
Branchlands Blvd RIRO	Low benefit	High benefit	High benefit	Low benefit	Medium benefit	Low benefit	Low benefit
Branchlands Blvd Close Median	Low benefit	No benefit	No benefit	Low benefit	No benefit	Medium benefit	Medium benefit
Greenbrier/Branchlands Combo	Medium benefit	Low benefit	Low benefit	Medium benefit	Low benefit	High benefit	High benefit
Branchlands Blvd RCUT	Medium benefit	High benefit	High benefit	Low benefit	Medium benefit	Low benefit	Medium benefit
Series of RCUTS: Seminole Ct to Branchlands Blvd	Medium benefit	High benefit	High benefit	No benefit	Medium benefit	Medium benefit	Medium benefit
Woodbrook Drive Bowtie	Low benefit	Low benefit	No benefit	No benefit	No benefit	Low benefit	Medium benefit
Woodbrook Drive Northbound Improvements	No benefit	No benefit	No benefit	No benefit	No benefit	Low benefit	Medium benefit <sup>1</sup>



# ADVANCED ALTERNATIVES FOR PUBLIC REVIEW

- **US 29/Fashion Square Drive Intersection**
  - Pedestrian Crossing Improvements (Thru-cut)
  - Pedestrian Crossing Improvements (RCUT)
- **US 29/Branchlands Boulevard Intersection**
  - Pedestrian Crossing Improvements (RCUT)
  - Construct Sidewalk from US 29 to Hillsdale Drive
- **US 29/Greenbrier Drive Intersection**
  - Pedestrian Crossing Improvements (Relocate NB left-turns)
- **US 29/Seminole Court Intersection**
  - Convert Northrup Grumman Approach to Ingress Only and Restripe Seminole Court Approach to include two left-turn lanes
- **Woodbrook Drive NB Improvements**
  - Install barrier to eliminate weave from Rio Road overpass to Woodbrook left turn
  - Added per feedback at the 5/26 SWG meeting



# FASHION SQUARE DRIVE INTERSECTION

## Pedestrian Crossing Improvements (Thru-Cut)



### Congestion Reduction



### Improved Bike/Ped Accommodations



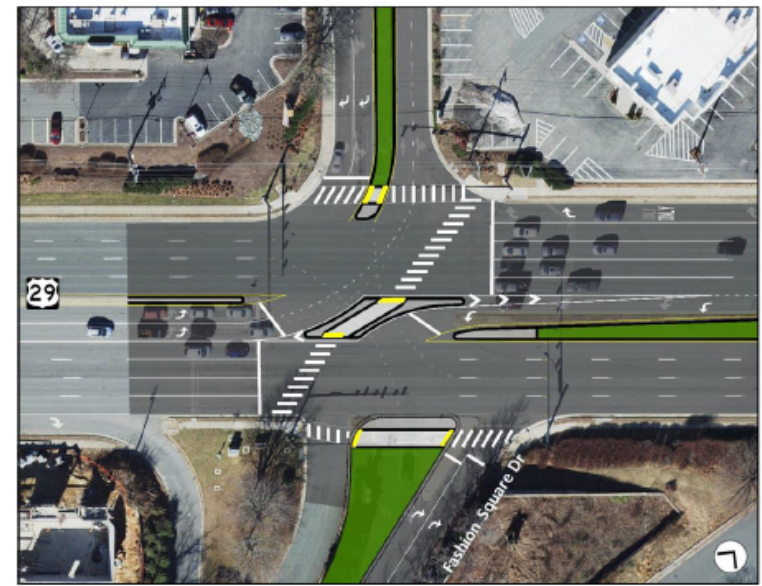
### Vehicular and Multi-modal Safety Improvements



### Improved Accessibility and Connectivity



## Pedestrian Crossing Improvements (RCUT)



### Congestion Reduction



### Improved Bike/Ped Accommodations



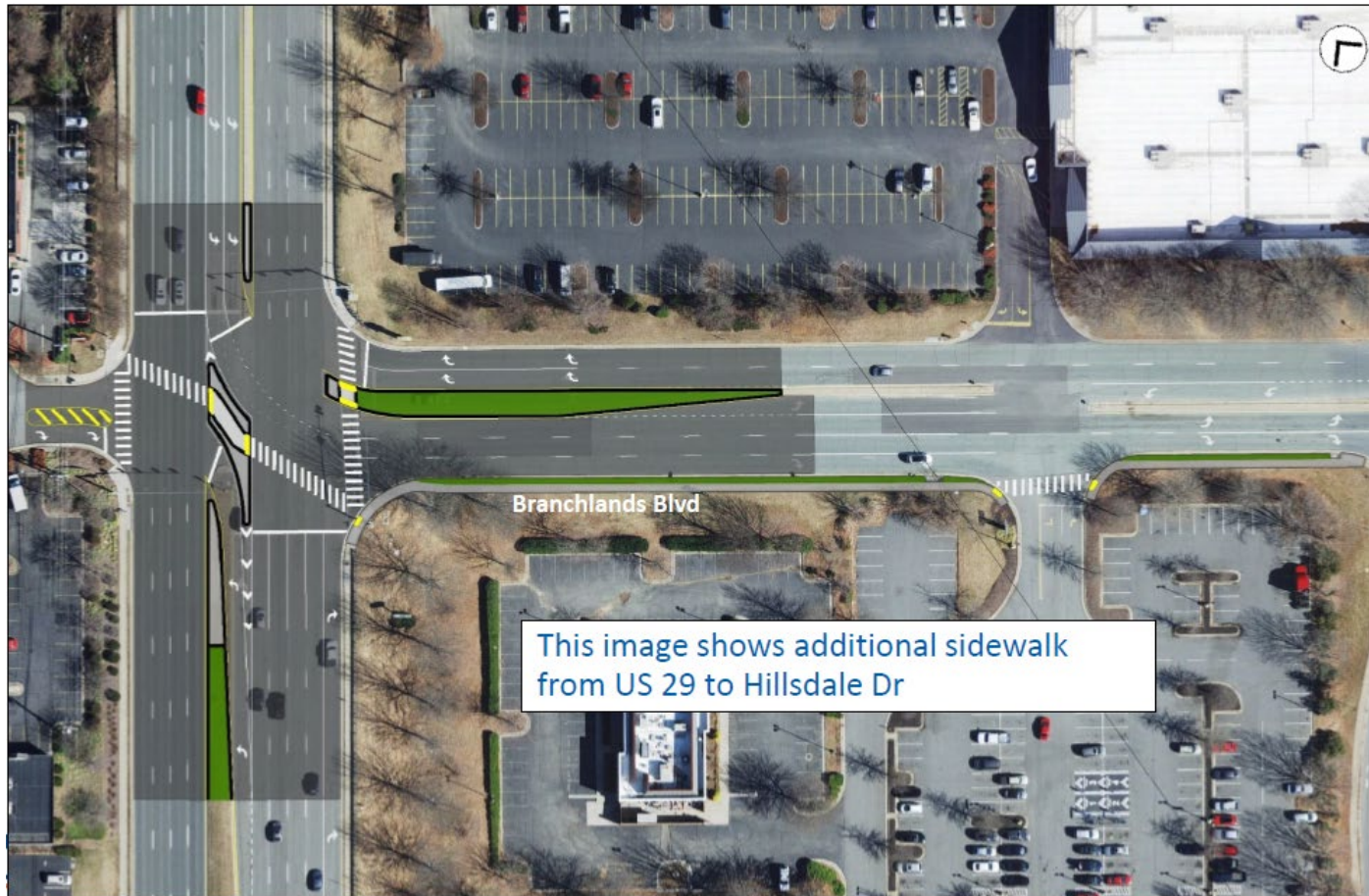
### Vehicular and Multi-modal Safety Improvements



### Improved Accessibility and Connectivity



# BRANCHLANDS BOULEVARD INTERSECTION – RCUT AND SIDEWALK



## Congestion Reduction



## Improved Bike/Ped Accommodations




## Vehicular and Multi-modal Safety Improvements



## Improved Accessibility and Connectivity



-  Significant impacts to bike/ped red flag assessment
- Improve Flag 1: Motor Vehicle Right-Turn Conflicts
- **Improve Flag 7: Multilane Crossings**
- **Improve Flag 9: Undefined Crossings at Intersections**
- **Improve Flag 10: Motor Vehicle Left-Turn Conflicts**
- Introduce Flag 3: Nonintuitive Motor Vehicle Movement
- Introduce Flag 8: Long Red (wait) Times

# GREENBRIER DR INTERSECTION – PEDESTRIAN CROSSING IMPROVEMENTS (RELOCATE NB LEFT-TURNS)



## Congestion Reduction



## Improved Bike/Ped Accommodations



## Vehicular and Multi-modal Safety Improvements



## Improved Accessibility and Connectivity



### Significant impacts to bike/ped red flag assessment

- Improve Flag 1: Motor Vehicle Right-Turn Conflicts
- Improve Flag 7: Multilane Crossings
- Improve Flag 10: Motor Vehicle Left-Turn Conflicts



# SEMINOLE COURT INTERSECTION – OPERATIONS AND SAFETY IMPROVEMENT



## Congestion Reduction



## Improved Bike/Ped Accommodations



## Vehicular and Multi-modal Safety Improvements



## Improved Accessibility and Connectivity



Impacts to bike/ped red flag assessment

Improve Flag 1: Motor Vehicle Right-Turns

Improve Flag 4: Crossing Yield/Uncontrolled Vehicle Path

Improve Flag 11: Driveways/Side Streets Intersect Path

# WOODBROOK DRIVE NB IMPROVEMENTS

- Additional evaluation information will be developed for public survey



## ADDITIONAL SHORT-/LONG-TERM RECOMMENDATIONS (NOT TO BE INCLUDED IN PUBLIC SURVEY)

### These items will be referenced as short-term or long-term solutions in the report

- Update NB and SB guide signs on US 29 prior to Rio Road grade separation (short-term)
- Install flex-posts or delineators for Fashion Sq Dr Right-in/Right-out access point (short-term)
- Median Fence to restrict pedestrian crossings at unmarked locations (short-term)
- Phase 2 of Greenbrier intersection – relocate all left-turns (long-term)

# UPDATE NB AND SB GUIDE SIGNS PRIOR TO RIO ROAD GRADE SEPARATION

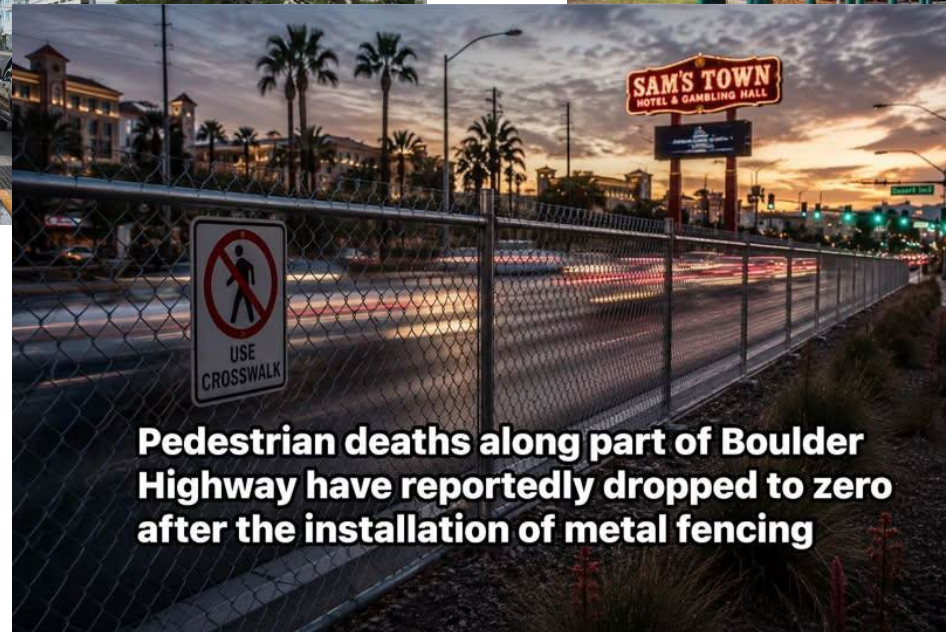


Better signing for weave area north of Rio Road will decrease lane departure crashes and rear-end crashes

# INSTALL FLEX-POSTS OR DELINEATORS TO PREVENT RIGHT-OUTS FROM ENTERING UNDERPASS LANES



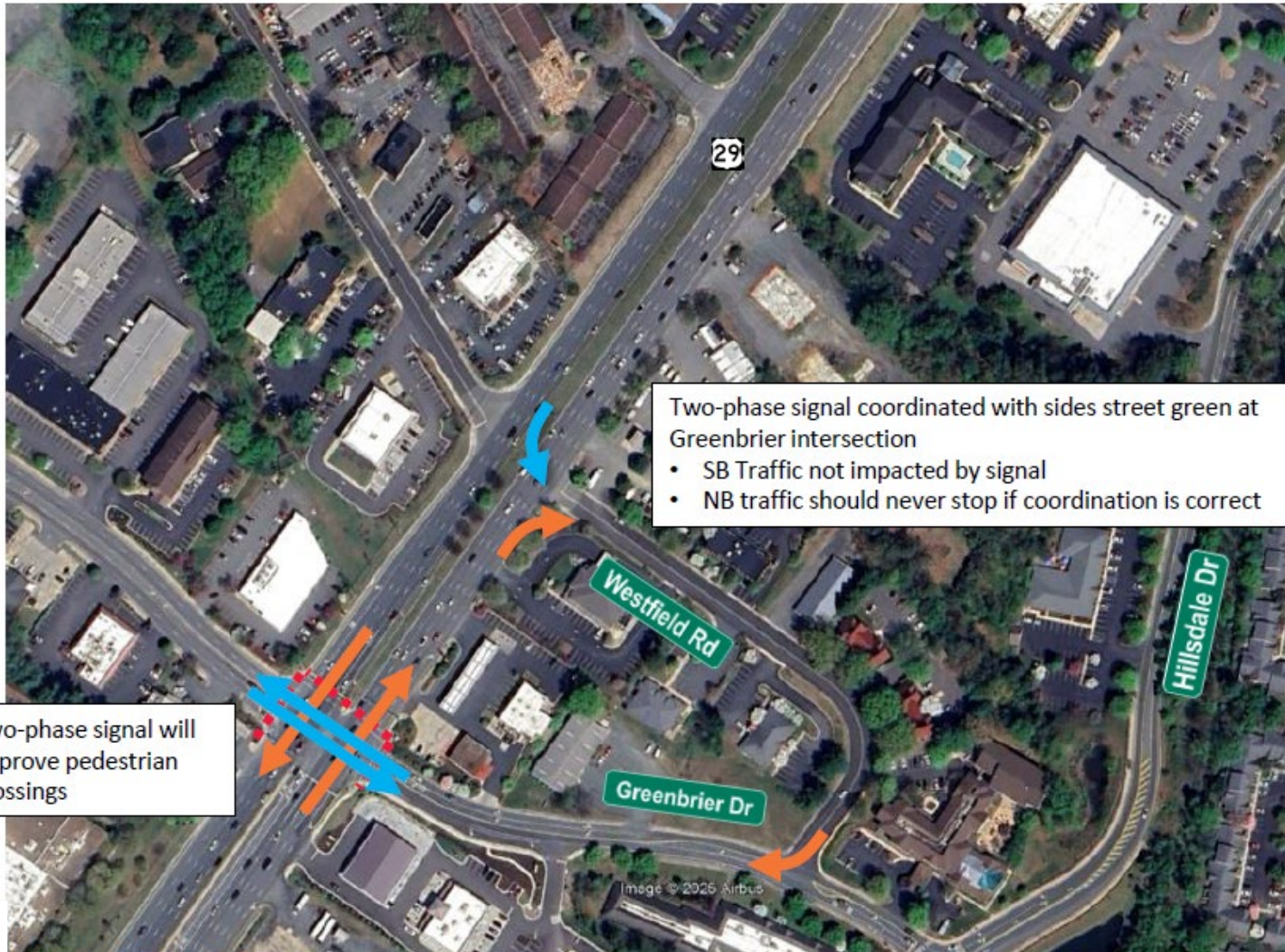
# MEDIAN FENCE TO RESTRICT PEDESTRIAN CROSSINGS AT UNMARKED LOCATIONS



**Pedestrian deaths along part of Boulder Highway have reportedly dropped to zero after the installation of metal fencing**

“Every year, we were averaging five pedestrian fatalities year over year. And I’m happy to report that in the time that we’ve had that, almost two years now, we’ve had zero,” said Captain Jeff Clark of LVMPD.

# GREENBRIER DR INTERSECTION PHASE 2 IMPROVEMENTS – RELOCATE ALL LEFT-TURNS



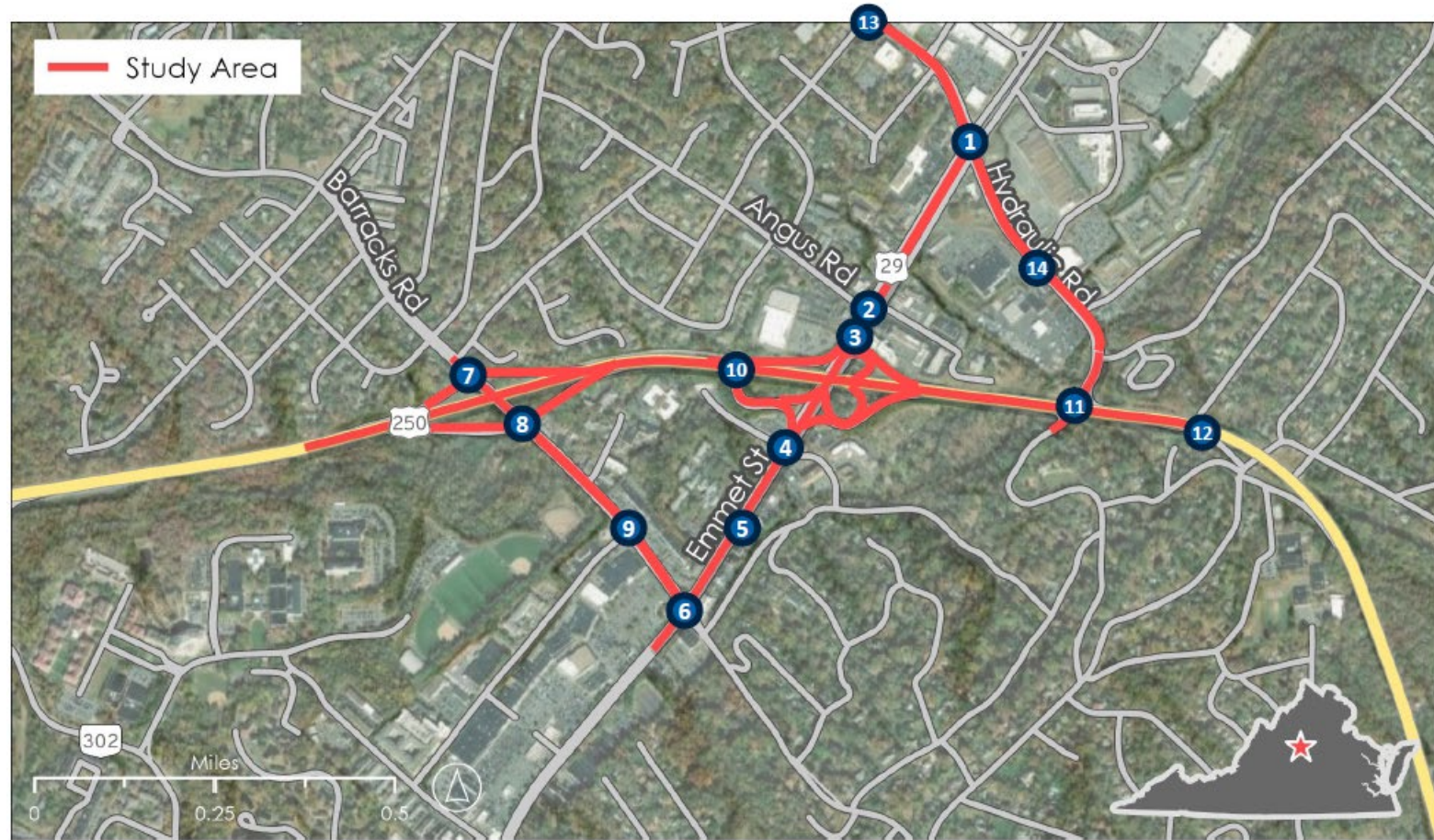
**Reconfigure Greenbrier Dr intersection to remove all left-turning movements and construct partial crossover at Westfield Rd**

- More predictable vehicular paths
- Pedestrians cross 9 lanes instead of 11
- Reduction of pedestrian-to-vehicle conflict points
- Will require Westfield Road to be used as a loop-road
- Signal coordination will allow both NB and SB traffic on US 29 to only stop once between both intersections

# US 29/250 BYPASS INTERCHANGE WITH EMMETT STREET

## ■ Study Intersections:

1. US 29 and Hydraulic Road
2. US 29 and Angus Road
3. US 29 and US29/250 Bypass WB ramps
4. Emmet St and Earhart St/Morton Dr
5. Emmet St and Entrance to Fed Exec Institute
6. Emmet St and Barracks Rd
7. Barracks Rd and US29/250 Bypass WB ramps
8. Barracks Rd and US29/250 Bypass EB ramps
9. Barracks Rd and Millmont St
10. US29/250 Bypass and Ramp to SB Emmet St
11. Hydraulic Road and US29/250 Bypass
12. US29/250 Bypass and Ramp to Dairy Rd
13. Hydraulic Road and District Ave
14. Hydraulic Road and Hillsdale Dr



## STUDY GOALS — BYPASS/INTERCHANGE

- **Reduce Congestion**
- **Increase safety**
- **Improve Bike/Ped Accommodations**
- **Improved Accessibility and Connectivity**
- **Do not preclude future Enhanced Transit on US 29**

# ADVANCED ALTERNATIVES REVIEWED

- **Angus Road Intersection**

- Right-out only

- **US 250 Interchange with Emmet Street**

- Eliminate/Relocate low volume ramps
- DDI
- Hillsdale Drive Extension

- **Hydraulic Road/US 250 Intersection**

- Rugby RI/RO
- Triple Lefts
- Jughandle
- Westbound Overpass
- Partial DLT

# ADVANCED ALTERNATIVES FOR PUBLIC REVIEW

- **Angus Road Right-out**
  - Convert side streets to right-out only
  - Maintain two-stage ped crossing
- **Eliminate low-volume ramps at US 250 interchange with Emmet Street**
  - Eliminate the NB to WB loop ramp and the EB to SB left turn
  - Redirect those vehicle movements to the Barracks Road interchange
- **Hillsdale Drive Extension**
  - Extend Hillsdale Drive south from the intersection with Hydraulic to connect directly to the bypass
  - Eliminate the WB on- and off-ramps
  - Provide multi-modal improvements along the Hillsdale extension
- **Rugby Road Right-in/Right-out**
- **Hydraulic Rd SB Triple Lefts and EB left-turn lane extension**
- **Hydraulic Rd Jughandle**

# ANGUS ROAD INTERSECTION — RIGHT-OUT



- 🚩 Significant impacts to bike/ped red flag assessment
  - Improve Flag 3: Nonintuitive Motor Movements
  - Improve Flag 5: Indirect Ped Paths
  - Improve Flag 8: Long Red Times
  - Improve Flag 10: Vehicle Left-Turn Conflicts

## Right-out Only

- Increased through-put on US 29 due to removal of signal phases
- Increased safety due to removal of side-street left-turns
- Provides safer pedestrian movements due to decrease in veh-ped conflict points
- Minimal ROW required

### Congestion Reduction



### Improved Bike/Ped Accommodations



### Vehicular and Multi-modal Safety Improvements



### Improved Accessibility and Connectivity



# ELIMINATE/RELOCATE LOW VOLUME RAMPS

## Relocate WB to SB ramp volumes to Barracks Road Interchange



- Improves Safety by eliminating left-turn from freeway
- Slight degradation in operations at Barracks Rd intersection

### Congestion Reduction



### Improved Bike/Ped Accommodations



### Vehicular and Multi-modal Safety Improvements



### Improved Accessibility and Connectivity



## Relocate NB to WB ramp volumes to Barracks Road Interchange



- Improves Congestion/Safety by eliminating weave on NB US 29
- Slight degradation in operations at Barracks Rd intersection

### Congestion Reduction



### Improved Bike/Ped Accommodations



### Vehicular and Multi-modal Safety Improvements



### Improved Accessibility and Connectivity



# HILLSDALE DRIVE EXTENSION

- Similar concept submitted in SMART SCALE Round 4
- Will avoid impacts to 2000 Holiday Drive

## Hillsdale Road Extension



- Replaces the current WB to NB ramp and NB to WB loop
- Expected to draw WB right-turning traffic from US 250 to Hydraulic
- Provides sidewalk and SUP, also connects to existing sidewalk along US 250
- ROW impacts to multiple buildings/parcels
- Improved safety and operations on NB US 29 and WB US 250

### Congestion Reduction



### Improved Bike/Ped Accommodations



### Vehicular and Multi-modal Safety Improvements



### Improved Accessibility and Connectivity



# US 250/HYDRAULIC ROAD – LOW-COST ALTERNATIVES

## SB Triple Left-Turns and Extended EB Left-Turn Lane



- Minimal impacts to ROW
- Potential to include pedestrian signal equipment
- Can redistribute green time for improved operations
- Extended left-turn lane reduces possibility of queuing into mainline

### Congestion Reduction



### Improved Bike/Ped Accommodations



### Vehicular and Multi-modal Safety Improvements



### Improved Accessibility and Connectivity



## Convert Rugby Road to Right-in/Right-out



- Does not remove full signal phase but does provide more mainline green time
- Rugby Road thru and left-turns would be redirected to Dairy Road interchange
- Potential to include pedestrian signal equipment
- Can combine with SB triple left-turns and extended EB left-turn lane

### Congestion Reduction



### Improved Bike/Ped Accommodations



### Vehicular and Multi-modal Safety Improvements




### Improved Accessibility and Connectivity



# HYDRAULIC ROAD JUGHANDLE WITH TRIPLE LEFT-TURNS

### Jughandle with Triple Left-turns



- Significant operational improvements
- Requires reconstructing Hydraulic Road/recent improvements
- Eliminating left-turns increases safety
- Significant impacts to Rugby Road
- Potential to include pedestrian signal equipment

**Congestion Reduction**  
★ ★ ★ ★ ☆

**Improved Bike/Ped Accommodations**  
★ ★ ☆ ☆ ☆

**Vehicular and Multi-modal Safety Improvements**  
★ ★ ★ ★ ☆

**Improved Accessibility and Connectivity**  
★ ★ ☆ ☆ ☆

Minimal impacts to bike/ped red flag assessment

## NEXT STEPS

- **Conduct additional analysis on advanced alternatives**
- **Advanced alternatives survey later this summer**
  - Separate surveys for two study areas will run concurrently
- **SWG will review public feedback and identify preferred improvements**