



Rio Road Corridor Plan

SUBMITTED AS DRAFT

April 14, 2022

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INTRODUCTION



INTRODUCTION TO RIO ROAD CORRIDOR STUDY

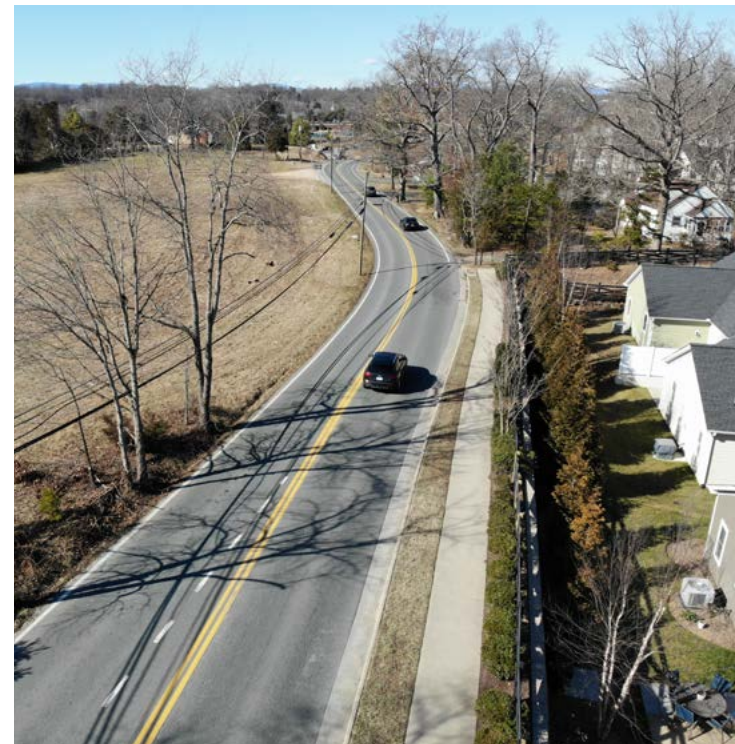
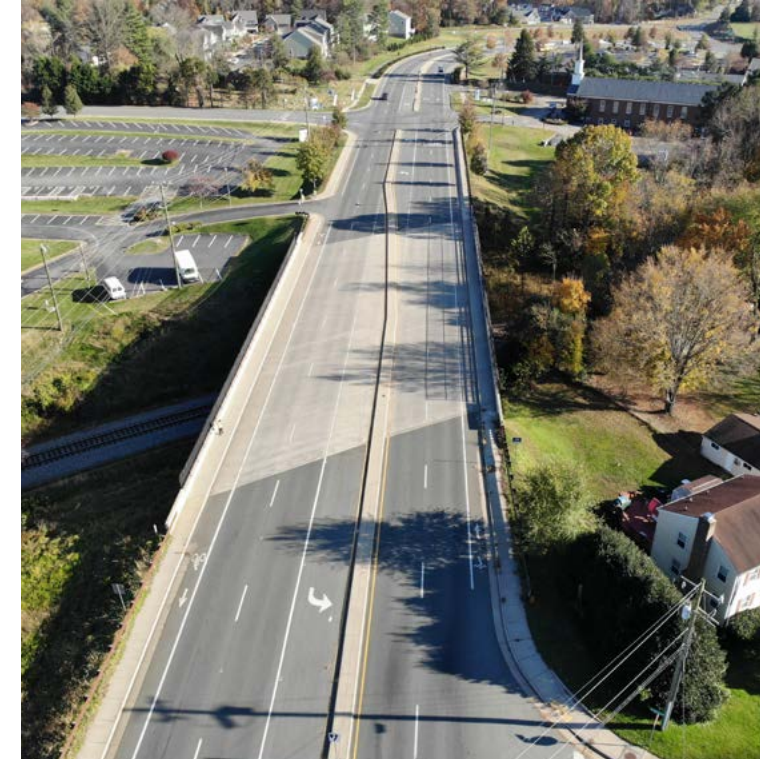
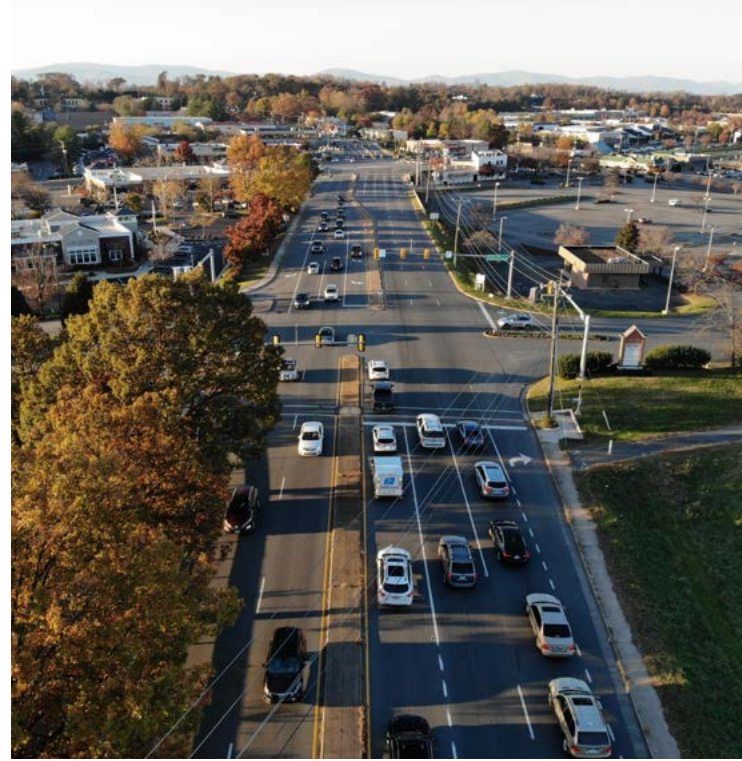
RIO ROAD EAST (ROUTE 631) creates a vital link between the County of Albemarle and the urban center in the City of Charlottesville. The areas of the county that directly surround the urban core are, themselves, becoming increasingly urban as the region continues to experience rapid growth and development. This growth necessitates that the public infrastructure respond accordingly.

The Rio Road Corridor Plan is an opportunity to engage the diverse community partners who utilize the corridor on a daily basis and to establish a vision to unify the corridor experience. This corridor plan considers two portions of Rio Road - Phase 1 from the limits of the Rio29 Small Area Plan (Rio/29 SAP) to the John W. Warner Parkway (JWWP) Intersection and Phase 2 from JWWP southeast to the Charlottesville city limit. The corridor has been organized into these phases based on roadway characteristics that change sharply near the JWWP intersection. Phase 1 exhibits relative uniformity in terms of the roadway characteristics and has diverse land uses and frontage designations. Whereas the Phase 2 roadway showcases a number of unique roadway characteristics but has a relatively uniform frontage conditions along the roadway.

This Corridor Plan is an opportunity to establish informed growth management strategies which will have a direct effect on the residents, property owners, developers, and the County administrators. It is also an opportunity to identify how the infrastructure of the corridor can promote human scale, meaning that the infrastructure of the roadway itself is proportioned based on human dimensions and is at a size appropriate and comfortable to people.

This document shall serve as a guide both to identify future projects (for the County) and to guide construction on adjacent lands as the corridor continues to (re)develop. Future work should be rooted and established in the guidance presented here, in the County's Comprehensive Plan, and in accordance with all applicable codes and standards.

The ideas presented herein have been developed based on feedback and insights from neighbors, commercial property owners, developers, administrators, adjacent municipalities, commuters, as well as VDOT. Though this document is intentionally brief, the Appendices contain additional and detailed information that was used to support the ideas and evidence presented. All proposed solutions as developed herein are conceptual in nature and will require further study and design prior to implementation.■



TO RESTORE A HUMAN SCALE

CURRENT EXPERIENCE



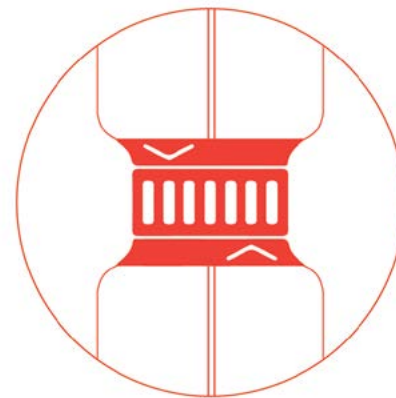
The wide areas of hard surfaces throughout the corridor contribute to the lack of distinguishable characteristics to break up the trek. According to public input, portions of Rio Road have been described as “just plain ugly,” “a dump,” and “a mess.”



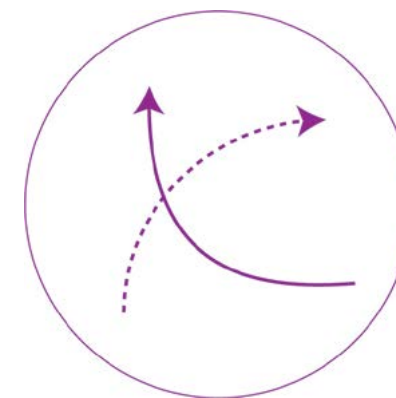
As further detailed on Page 6, the County canvassed the residents and community along the corridor to solicit their experiential knowledge and receive feedback about conceptual ideas. Applicable feedback has been incorporated into this document, and a FAQ page is included on Pages 35 and 36.

GUIDING PRINCIPLES

Roads and sidewalks that are **safe** for our families, our neighbors, and friends
Equal Access to places where we walk, bike, and drive
 Protection of the **environment** and creation of vibrant **public spaces**
 Promote **optimal travel** and reasonable solutions to known transportation challenges



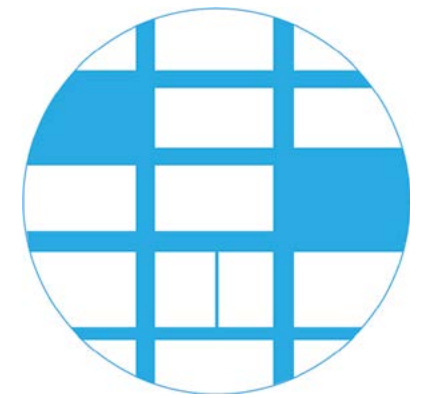
Safety For All



Equity Through Access



Unity Through Environment + Public spaces



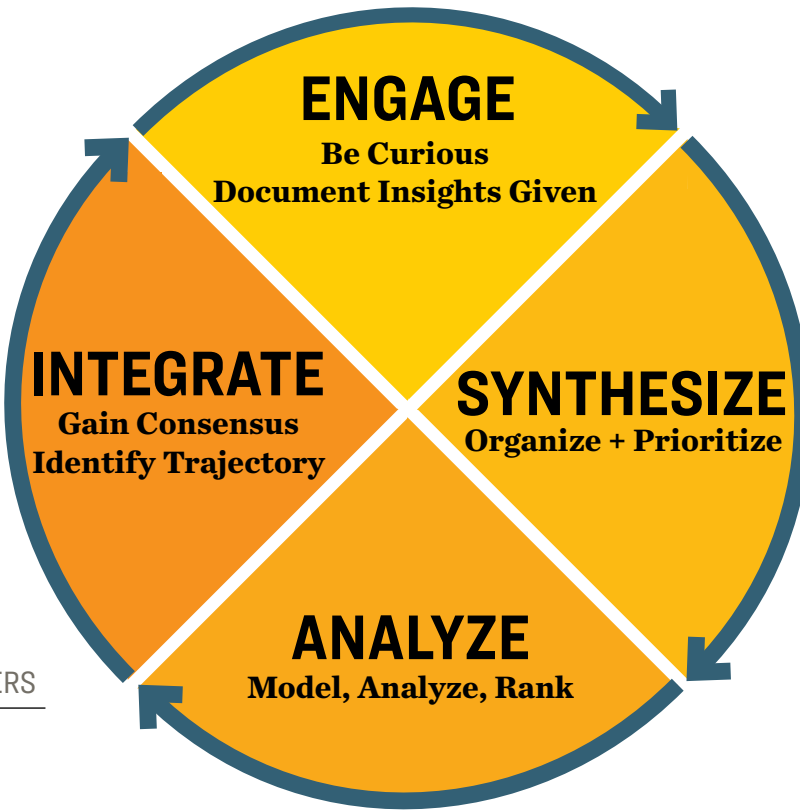
Effective Transportation + Optimal Mobility

CALL TO ACTION

*To restore a **HUMAN SCALE** along Rio Road, to **UNIFY** the community that lives along, and adjacent to, the corridor while making provisions for **SAFE** and **EFFECTIVE** transport of the many members of the community that use the corridor for travel and commuting.*

WORKING WITH STAKEHOLDERS

TO MAXIMIZE PUBLIC ENGAGEMENT in the Rio Corridor Plan, County staff and consultants offered a variety of engagement opportunities to the public, including opportunities for education and input in several formats and advertised through an assortment of methods. The goal of the activities was to generate genuine interest and public input from a cross-section of area residents. The project website (www.publicinput.com/riocorridor) served as the online hub of information where the public could access informational materials ranging from documents to videos, and respond to questions to help the project team understand the challenges and opportunities presented by the Rio Corridor. Three in-person pop-up events were created at three different locations and times to provide a face-to-face opportunity to share ideas, comments, and concerns with the project team.

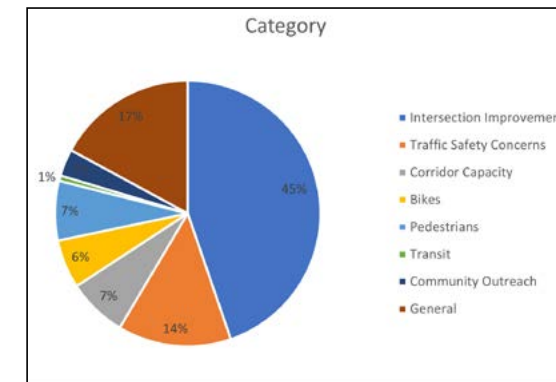
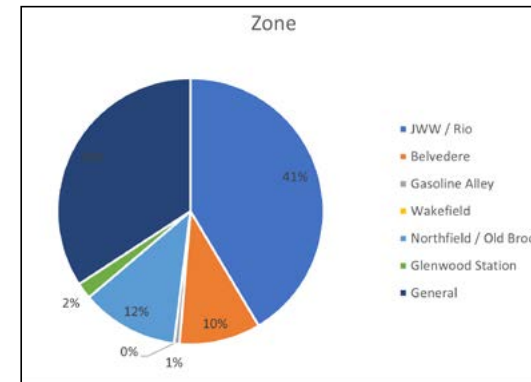
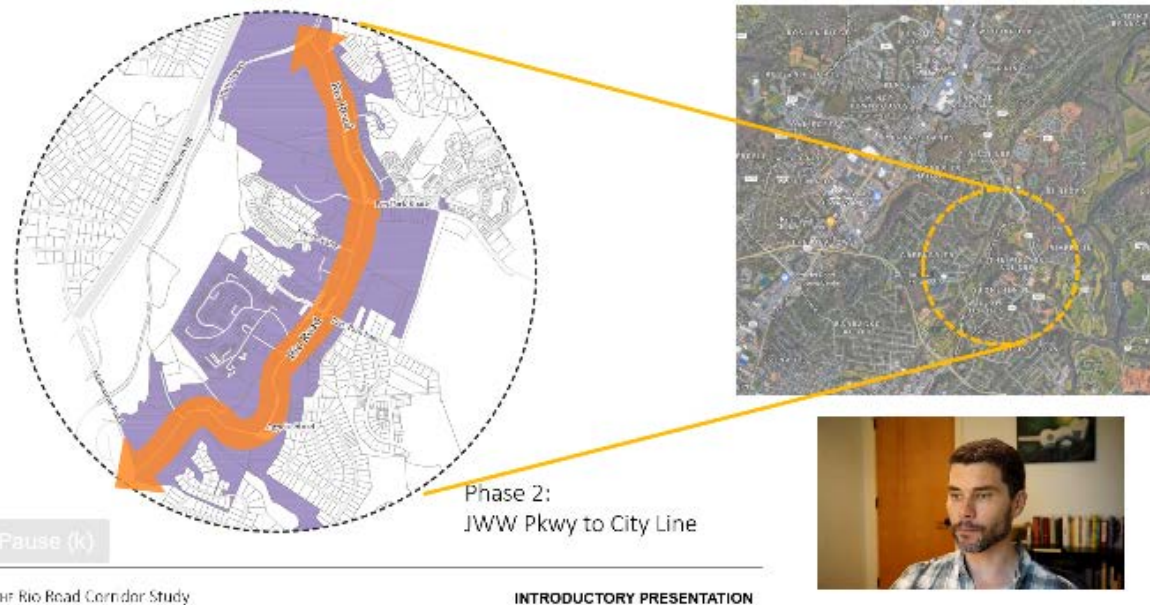


PUBLIC ENGAGEMENT BY THE NUMBERS

- Online Engagement Hub Participants 338
- In-Person Pop-Up Participants 114
- Virtual Meeting Attendees 108
- Podcast Listens 493
- Video Views 825

#	Prompt	Yes	No	Other	Blank	Comment	Totals
1	Does the content presented in the introduction video reflect your experience of the corridor? [#115721]	53	18	4	49	0	75
2	Comments: Does the content presented in the introduction video reflect your experience of the corridor? [#115721]	0	0	0	90	34	34
3	Other: Does the content presented in the introduction video reflect your experience of the corridor? [#115721]	0	0	0	121	3	3
4	Comments: What information from the video was new or surprising to you? [#115550]	0	0	0	112	12	12
5	Comments: After watching the video, what topics would you like to learn more about? [#115722]	0	0	0	107	17	17
6	Does the proposed intersection concept at Hillsdale appear to alleviate the traffic and safety concerns you experience at that intersection? [#115723]	8	22	1	93	0	31
7	Comments: Does the proposed intersection concept at Hillsdale appear to alleviate the traffic and safety concerns you experience at that intersection? [#115723]	0	0	0	108	16	16
8	Other: Does the proposed intersection concept at Hillsdale appear to alleviate the traffic and safety concerns you experience at that intersection? [#115723]	0	0	0	123	1	1
9	Does the proposed intersection concept at Belvedere appear to alleviate the traffic and safety concerns you experience at that intersection? [#115725]	10	27	3	84	0	40
10	Comments: Does the proposed intersection concept at Belvedere appear to alleviate the traffic and safety concerns you experience at that intersection? [#115725]	0	0	0	110	14	14
11	Other: Does the proposed intersection concept at Belvedere appear to alleviate the traffic and safety concerns you experience at that intersection? [#115725]	0	0	0	121	3	3
12	Does the proposed intersection concept at John Warner Parkway appear to alleviate the traffic and safety concerns you experience at that intersection? [#115726]	8	36	4	76	0	48
13	Comments: Does the proposed intersection concept at John Warner Parkway appear to alleviate the traffic and safety concerns you experience at that intersection? [#115726]	0	0	0	97	27	27
14	Other: Does the proposed intersection concept at John Warner Parkway appear to alleviate the traffic and safety concerns you experience at that intersection? [#115726]	0	0	0	124	0	0
15	Do the proposed corridor concepts appear to integrate the needed improvements you think should be included? [#115724]	8	26	1	89	0	35
16	Comments: Do the proposed corridor concepts appear to integrate the needed improvements you think should be included? [#115724]	0	0	0	113	11	11
17	Other: Do the proposed corridor concepts appear to integrate the needed improvements you think should be included? [#115724]	0	0	0	123	1	1
18	Comments: What additional feedback or questions do you have for our project team? [#115551]	0	0	0	105	19	19
Totals		87	129	13	1845	158	387

Where are the limits of the Study?



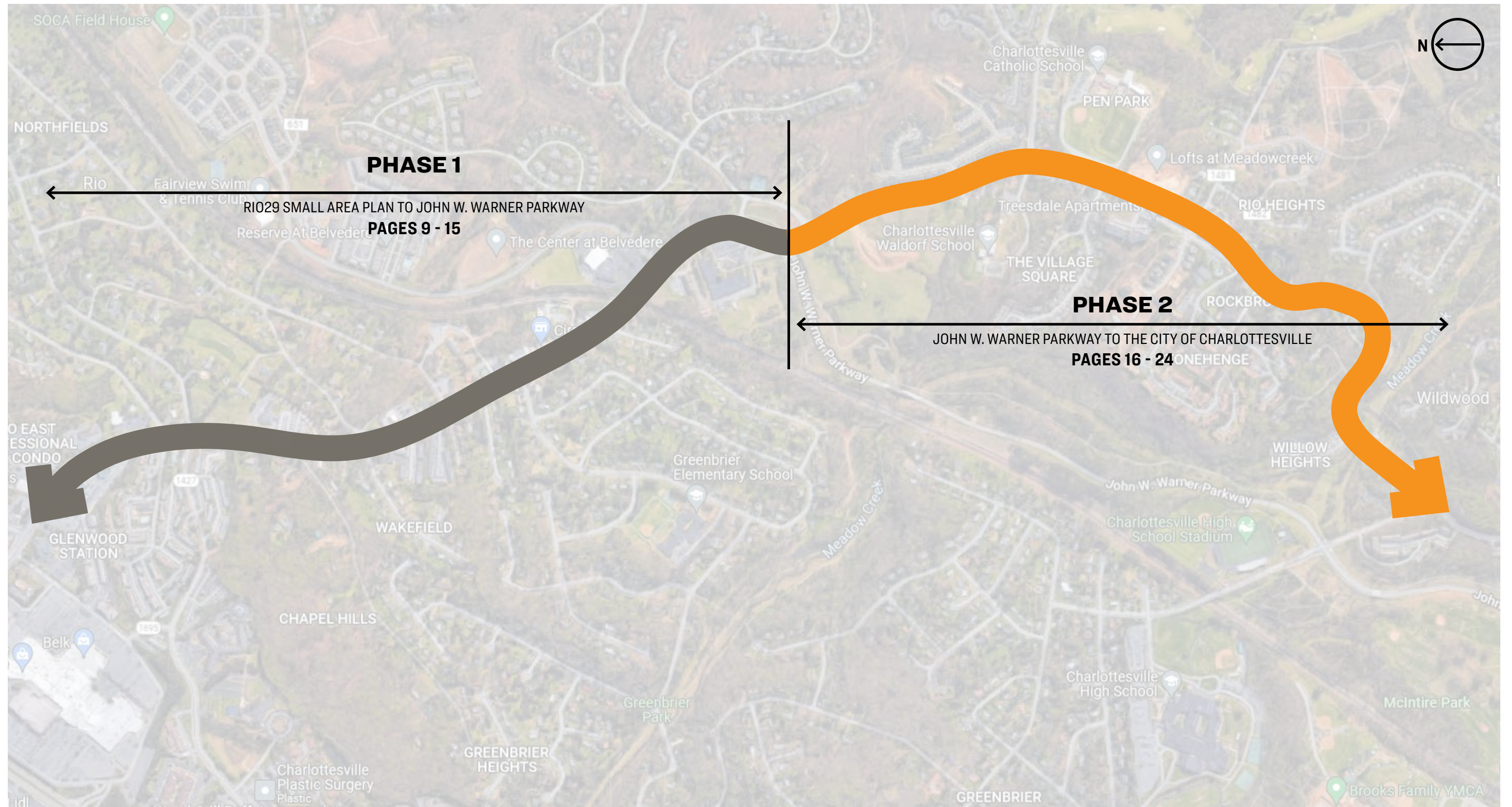
Zone	Number of Comments	Category	Number of Comments
JWW / Rio	63	Intersection Improvements	68
Belvedere	15	Traffic Safety Concerns	21
Gasoline Alley	1	Corridor Capacity	11
Wakefield	0	Bikes	9
Northfield / Old Brook	18	Pedestrians	11
Glenwood Station	3	Transit	1
General	52	Community Outreach	5
		General	26

The duration of this study has largely corresponded with the COVID-19 pandemic. As a result, the consultant team and the County utilized a number of virtual and online resources to continue engaging the community. The virtual environment in no way can replace the value of in-person engagement. That said, the methods employed in this work made the most effective use of the many tools available.

Corridor Priority Matrix	Intersection Improvements	Traffic Safety Concerns	Corridor Capacity	Bikes	Pedestrians	Transit	Community Outreach	General	Total
JWW / Rio	48	4	1	1	7	0	0	2	63
Belvedere	5	6	1	0	1	0	0	2	15
Gasoline Alley	0	1	0	0	0	0	0	0	1
Wakefield	0	0	0	0	0	0	0	0	0
Northfield / Old Brook	10	2	3	1	0	0	0	1	17
Glenwood Station	1	1	0	0	1	0	0	0	3
General	3	7	6	7	2	1	5	21	52
Total	67	21	11	9	11	1	5	26	151

For full list of comments received online, please see Appendix C.

PHASES OF STUDY



FOCUS AREAS



PHASE 1

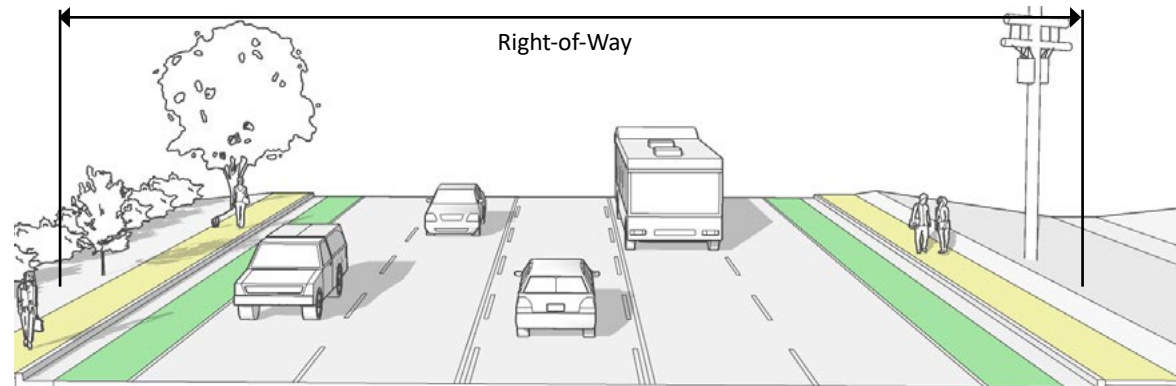


PHASE 1: CORRIDOR BACKGROUND DATA AND EXISTING CONDITIONS



EXISTING ROADWAY TYPICAL SECTION

The existing roadway typical section consists of sidewalks, bicycle lanes, and travel lanes adjacent to one another in both north and south-bound directions. A median turn lane spans most of the corridor.



Select Roadway Elements	Corridor Observations
<p>Buffer Strips A buffer strip is an area of separation, typically vegetated, between vehicular lanes and pedestrian or cyclist travel-ways. It serves as an added protection against vehicle-pedestrian/bicycle collisions.</p>	<ul style="list-style-type: none"> There are no buffer strips between the vehicular and bicycle lanes along this corridor. Buffer strips between the vehicular lanes and sidewalks are only included along the frontage of CATEC.
<p>Street Lighting Street lamps located at regular intervals to provide minimum levels of lighting for the safety of pedestrians, cyclists, and vehicles.</p>	<ul style="list-style-type: none"> No street lighting currently exists along the corridor.
<p>Pedestrian Crossings Visually identifiable areas where pedestrians (and cyclists) can safely cross the vehicular traffic lanes.</p>	<ul style="list-style-type: none"> Inconsistent or absent crosswalk markings make crossing locations less apparent to those driving and therefore more dangerous.
<p>Pedestrian Facilities Improvements which provide for public pedestrian foot traffic including sidewalks and shared use paths.</p>	<ul style="list-style-type: none"> Sidewalks are 5 feet wide, which is the minimum standard. Signs, poles, railings, and vegetation encroach in many areas, making the usable width less than 5 feet.
<p>Bicycle Facilities Improvements which provide for public bicycle traffic including bicycle lanes and shared use paths.</p>	<ul style="list-style-type: none"> Bicycle lanes 6 feet wide are present along both sides of Rio. Lanes feel much narrower due to gutter pan and encroaching vehicles.
<p>Transit Facilities A place providing access to transit services, in this case bus stops. These can include signs, seating, shelter, and lighting for ease of access.</p>	<ul style="list-style-type: none"> Many bus stops exist throughout the corridor. Stops consist only of signage - no seating, shelter, or lighting.

The nature of this table is to provide observations related to select elements of the corridor and is not intended to imply that this table accounts for all corridor elements.



Pedestrian X-ing

The example to the left is an indication of the confusion and lack of safety for pedestrians to cross Rio Road.

Spacing Standards

Currently the spacing of many commercial entrances and intersections along the corridor are substandard. Areas of inadequate spacing seemingly correlate with areas of high crash-rates.

ACCESS MANAGEMENT AND ACCIDENT DATA

Entrance/Intersection	Crashes 2014-2021
Fashion Square Dr	4
Putt Putt Pl	46
(Charlottesville Aldersgate United Methodist Church)	1
Rio E Ct / Glenwood Station Ln	5
(Rio Center)	0
Old Brook Rd	24
Northfield Rd / Hillsdale Dr	42
Chapel Hill Rd	6
(Northside Baptist Church)	0
Wakefield Rd	4
(Charlottesville Church of the Brethren) / Carrington Pl	1
Fountain Ct	3
Huntington Rd / Pine Haven Ct	19
Denice Ln	5
Rio School Ln	2
(Zoomcash Consumer Loans)	4
(Marathon Gas) / Greenbrier Dr	17
(Kangaroo Express N)	18
(Kangaroo Express S)	7
Gasoline Alley	3
(Exxon N)	0
(Exxon S) / Greenbrier Terrace	6
(Covenant Church)	0
Belvedere Blvd / (City Church N)	13
(City Church S)	1
Dunlora Dr	0
Rio Rd E (at JWP) / CATEC	55

For clarity and conciseness this table only includes accidents within the functional area of intersections.

Entrance/Intersection	VDOT Type 1-4	Existing Spacing (ft)	Spacing Requirement (ft)	Required Spacing Available
Mall Dr	3	282	470	60%
Putt Putt Pl	3	483	470	100%
(Charlottesville Aldersgate United Methodist	3	282	470	60%
Rio E Ct	2	956	660	100%
Glenwood Station Ln	2	908	660	100%
(Rio Center)	3	279	470	59%
Old Brook Rd (E)	1	220	1050	21%
Old Brook Rd (W)	1	216	1050	21%
Northfield Rd	1	220	1050	21%
Hillsdale Dr	1	216	1050	21%
Chapel Hill Rd	3	537	470	100%
(Northside Baptist Church)	3	372	470	79%
Wakefield Rd (E)	2	375	660	57%
Wakefield Rd (W)	2	343	660	52%
(Charlottesville Church of the Brethren)	2	326	660	49%
Carrington Pl	2	334	660	51%
Fountain Ct	3	85	470	18%
Huntington Rd	2	326	660	49%
Pine Haven Ct	2	334	660	51%
Denice Ln	3	305	470	65%
Rio School Ln	3	61	470	13%
(Zoomcash Consumer Loans)	3	61	470	13%
(Marathon Gas)	1	2538	1050	100%
Greenbrier Dr	1	2454	1050	100%
(Kangaroo Express N)	3	121	470	26%
(Kangaroo Express S)	3	121	470	26%
Gasoline Alley	3	136	470	29%
(Exxon N)	3	116	470	25%
(Exxon S)	2	672	660	100%
Greenbrier Terrace	2	651	660	99%
(Covenant Church)	4	259	250	100%
Belvedere Blvd	2	672	660	100%
(City Church N)	2	651	660	99%
(City Church S)	4	169	250	68%
Dunlora Dr	4	390	250	100%
Rio Rd E (at JWP)	1	1804	1050	100%
(CATEC)	1	1672	1050	100%

ACCIDENT HOT SPOTS



ACCESS MANAGEMENT HOT SPOTS



DETAILED ACCIDENT ANALYSIS

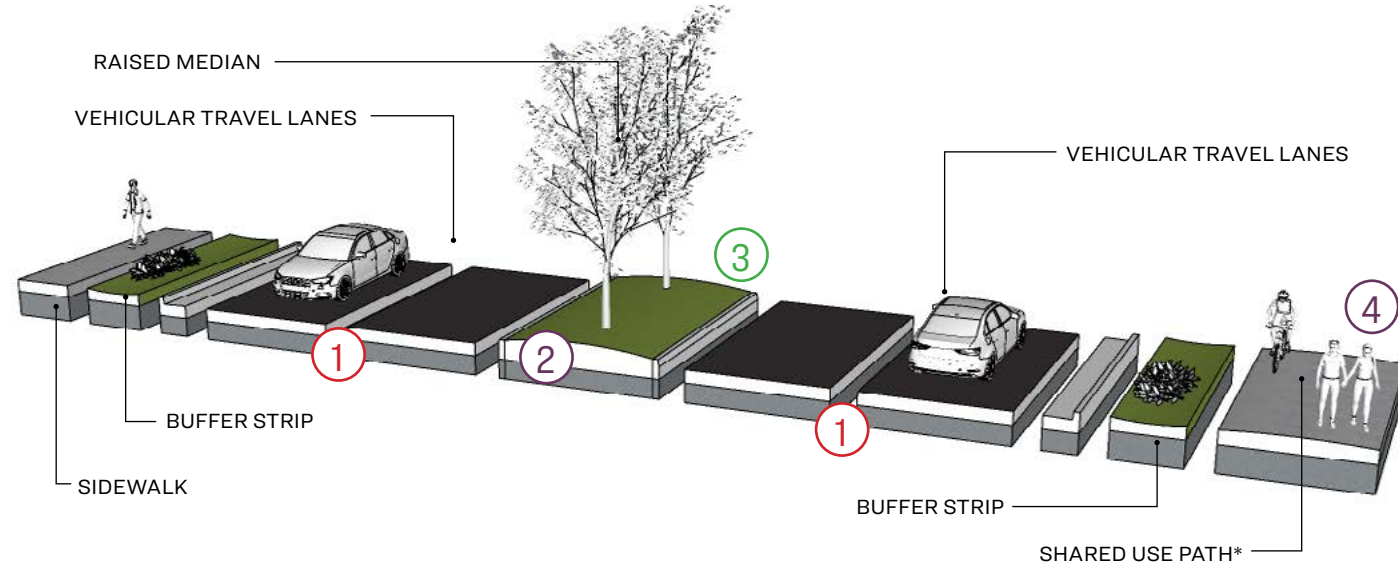
The "hot spot" diagrams included herein are necessarily simplified to support basic understanding and to suggest simple mitigation measures. A detailed and robust accident analysis has also been developed to support this work, refer to Pages 28-30.

PROPOSED SOLUTIONS FOR CORRIDOR TYPICAL SECTION AND ROADWAY

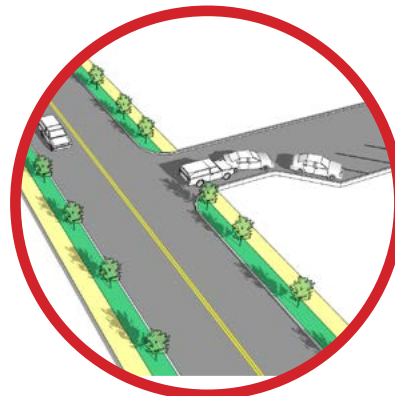


THE FUTURE OF RIO ROAD WILL BE A CORRIDOR THAT IS MUCH MORE COMMUNITY FOCUSED. The community values that have been shared are not only about getting from Point A to Point B quickly, but about the safety, quality, and flexibility of the trip. Though a typical section looks at one sliver of road width at a time, the culmination of typical sections has great influence over the character of the entire corridor as well as its functionality.

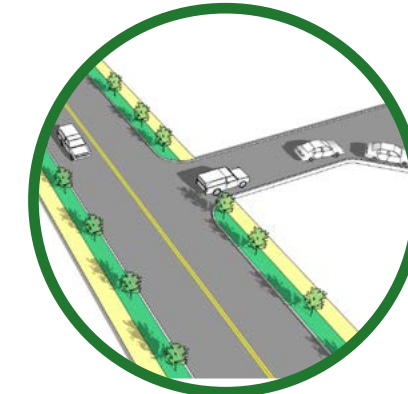
The goal of the proposed typical section is to redistribute the available space in the right-of-way to provide safer and more enjoyable spaces for all. This typical section includes buffer strips and a raised median to break up the pavement and to separate vehicles from pedestrians. A shared use path consolidates the sidewalk and bicycle lane in order to remove the bicycle lane from the road. When taken together these aspects of the Rio Road corridor can overhaul the corridor from a vehicle-centric thoroughfare to a transportation corridor reflective of the needs of the community. Providing safe pedestrian crossings and walking paths, slowing vehicle speeds, promoting transit as a viable transportation option, and establishing a series of visual cues through materials and lighting all help to reinforce the intention for a shared environment.



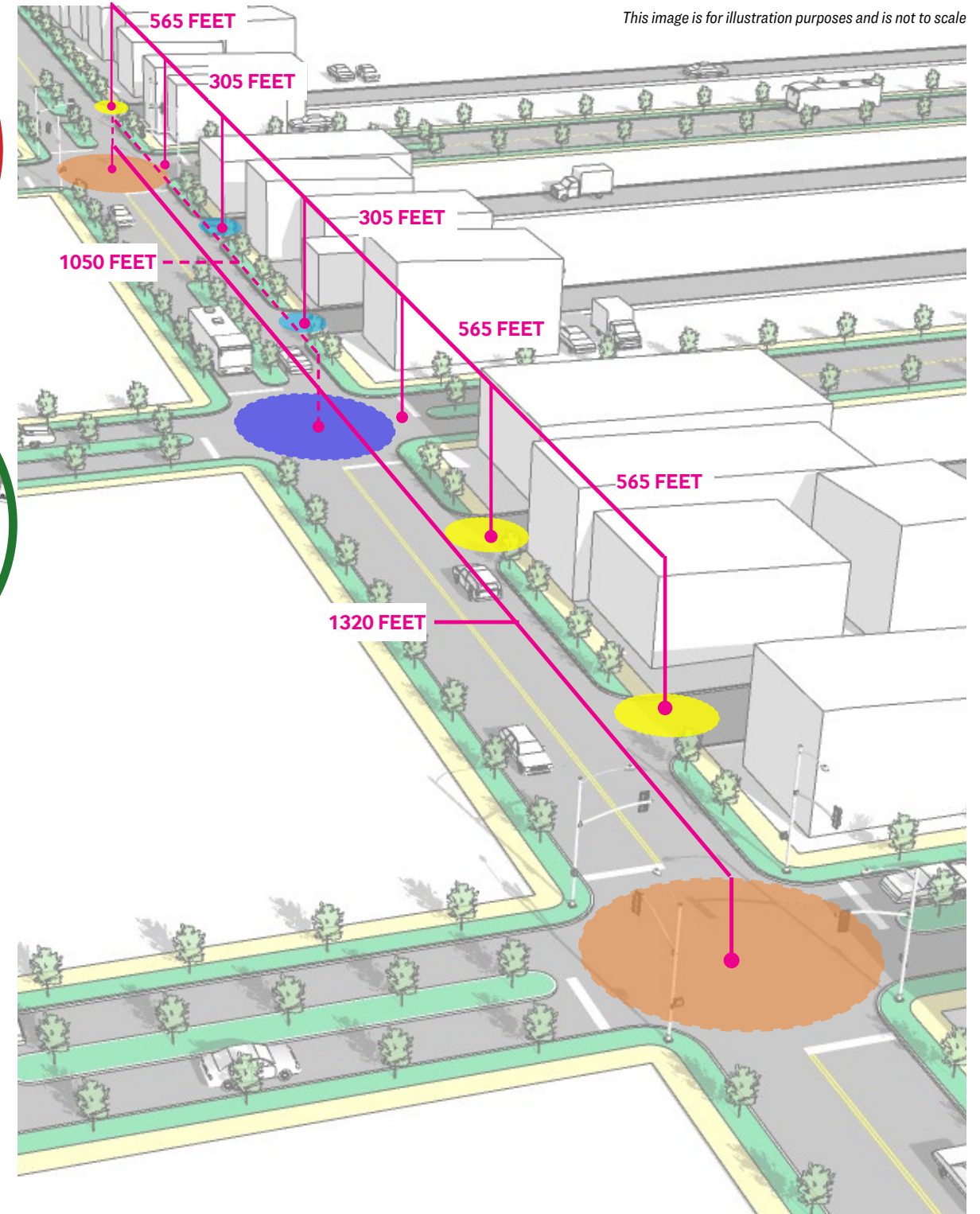
VDOT ACCESS MANAGEMENT CRITERIA FOR SAFETY



Incorrect throat length.



Correct throat length.



This image is for illustration purposes and is not to scale

Proposed Roadway Elements	Proposed Resolutions
<p>Buffer Strips A buffer strip is an area of separation, typically vegetated, between vehicular lanes and pedestrian or cyclist travel-ways. It serves as an added protection against vehicle-pedestrian/bicycle collisions.</p>	<ul style="list-style-type: none"> • Buffer strips 4-6 feet wide are recommended to separate pedestrians and cyclists from vehicles and allow for the planting of trees. • This is not only a safety improvement but an environmental improvement.
<p>Street Lighting Street lamps located at regular intervals to provide minimum levels of lighting for the safety of pedestrians, cyclists and vehicles.</p>	<ul style="list-style-type: none"> • Street lighting is recommended in locations of high pedestrian activity, especially at crossings and bus stops. • Lights should be full cut-off.
<p>Pedestrian Crossings Visually identifiable areas where pedestrians (and cyclists) can safely cross the vehicular traffic lanes.</p>	<ul style="list-style-type: none"> • Crossings should be clearly and consistently marked. • Directional crossings should be implemented more frequently.
<p>Pedestrian Facilities Improvements which provide for public pedestrian foot traffic including sidewalks and shared use paths.</p>	<ul style="list-style-type: none"> • ADA accessibility of pedestrian facilities should be a priority. • This includes proper maintenance of sidewalk surfacing, adequate usable sidewalk width, and curb ramps at crossings.
<p>Bicycle Facilities Improvements which provide for public bicycle traffic including bicycle lanes and shared use paths.</p>	<ul style="list-style-type: none"> • Shared-use paths should be implemented to replace bicycle lanes. • Remaining bicycle lanes should be separated from vehicle lanes by use of either vegetated or striped buffer.
<p>Transit Facilities A place providing access to transit services, in this case bus stops. These can include signs, seating, shelter, and lighting for ease of access.</p>	<ul style="list-style-type: none"> • At a minimum, seating and lighting needs to be provided at the existing bus stops. • Shelters should be considered at high-volume stops.

- 1 Narrow Travel Lanes**
Travel lanes providing only the minimum required width promote vehicles traveling at or near the posted speed limit. Raised medians and planted buffer strips also help.
- 2 Reduction of conflict points**
Reducing conflict points creates safer roadways for all user groups.
- 3 Reduction of Impervious Cover**
Reducing impervious surfaces reduces stormwater runoff, lowers heat-island effect, and provides spaces for vegetation.
- 4 Multi-Modal Network**
Establishing a shared-use path along Rio Road creates a much needed multi-modal link between the John W. Warner Parkway and Berkmar Drive extended.

*The Shared Use Path along Rio Road effectively creates the Northtown Trail. Connecting the JWWP Greenway to the Rio29 SAP and eventually to Berkmar Drive.

THE HILLSDALE DRIVE, OLD BROOK ROAD, NORTHFIELD ROAD and Rio Road intersections experience more vehicular crashes than any other intersection along the corridor. Their proximity (220 feet apart) substantially deviates from any professional guidance for intersection spacing – and thus the condition will continue to be unsafe until a new strategy can be implemented.

These intersections are also the topographic high-point of the corridor, making the area a logical point of a gateway experience to include the visual cues that the roadway context is shifting from the Rio29 Small Area Plan to a less intense land use – particularly residential density.

For the purposes of this Corridor Study, three (3) alternatives have been explored which could rectify the safety and geometric challenges at this intersection.

1. Combine the intersections into a singular intersection;
2. Encourage some vehicles to choose a different route of travel;
3. Combine or reroute crossing roads to create two 3-way intersections.

In consideration of these alternatives, it is also suggested that County determine the viability of the Hillsdale Drive realignment suggested in the Rio29 Small Area Plan. This long-range planning concept should be held in tension with the alternatives considered here.

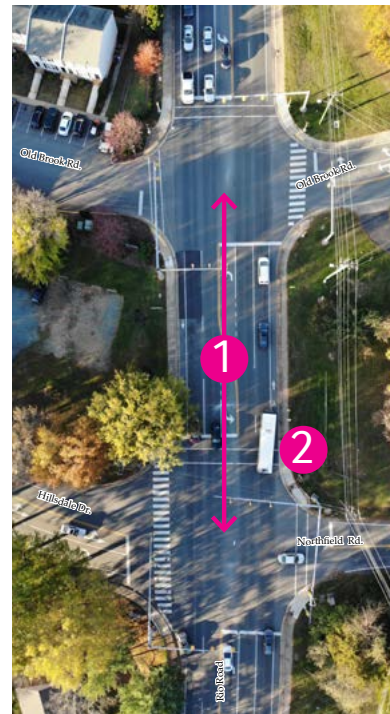
Given the long-range nature of the Hillsdale Drive realignment, this study will explore the three (3) alternatives listed above.

1 The proximity of these intersections effectively makes one large and congested intersection.

VDOT standards suggest these intersections be at least 1,050 feet apart. Currently they are 220 feet apart.

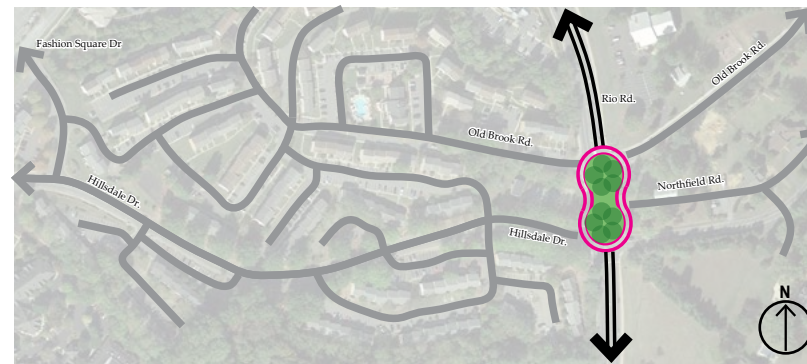
Inadequate spacing inherently means inadequate storage lengths for vehicles, as well as insufficient time to merge into the desired lane.

2 There is a high bus volume in this area, though lane widths are only 10 ft. Turning vehicles and buses often cross into the bicycle lane.



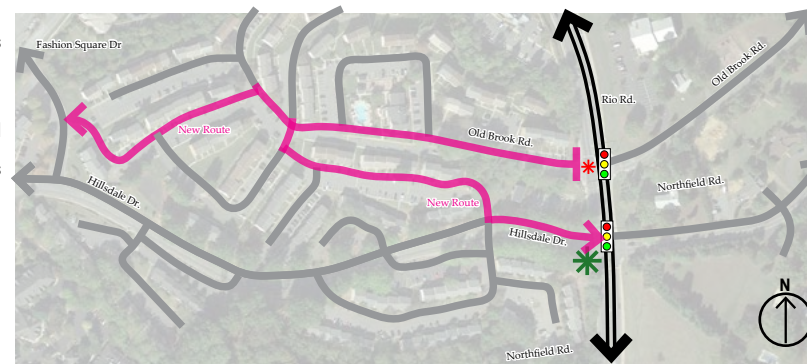
ALTERNATIVE 1: COMBINE THE INTERSECTIONS INTO A SINGULAR INTERSECTION

- All intersection movements remain full access
- All intersection movements are yield controlled
- Vehicle speeds are reduced and safety is increased
- Two intersections become a single intersection



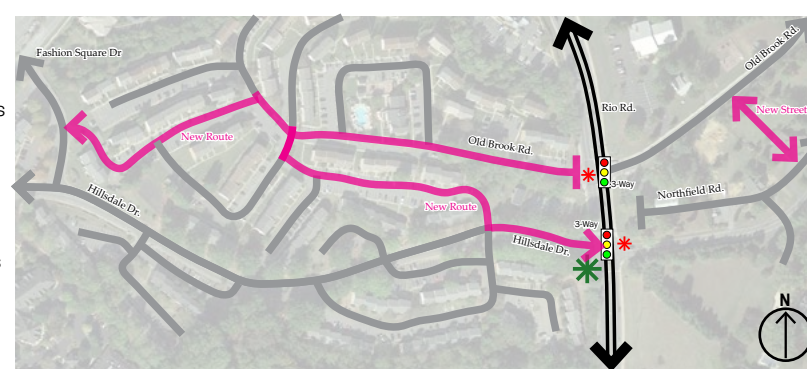
ALTERNATIVE 2: ENCOURAGE SOME VEHICLES TO CHOOSE A DIFFERENT ROUTE OF TRAVEL

- Full access for some intersection movements is reduced
- Vehicular volumes in intersection are reduced
- Pedestrians and cyclists are not specifically benefited by this improvement



ALTERNATIVE 3: COMBINE + REROUTE CROSSING ROADS TO CREATE TWO 3-WAY INTERSECTIONS

- One full intersection leg is removed from each intersection
- Two 3-way intersections are created
- A new street will be required to enable this solution
- Pedestrians and cyclists are not specifically benefited by this improvement

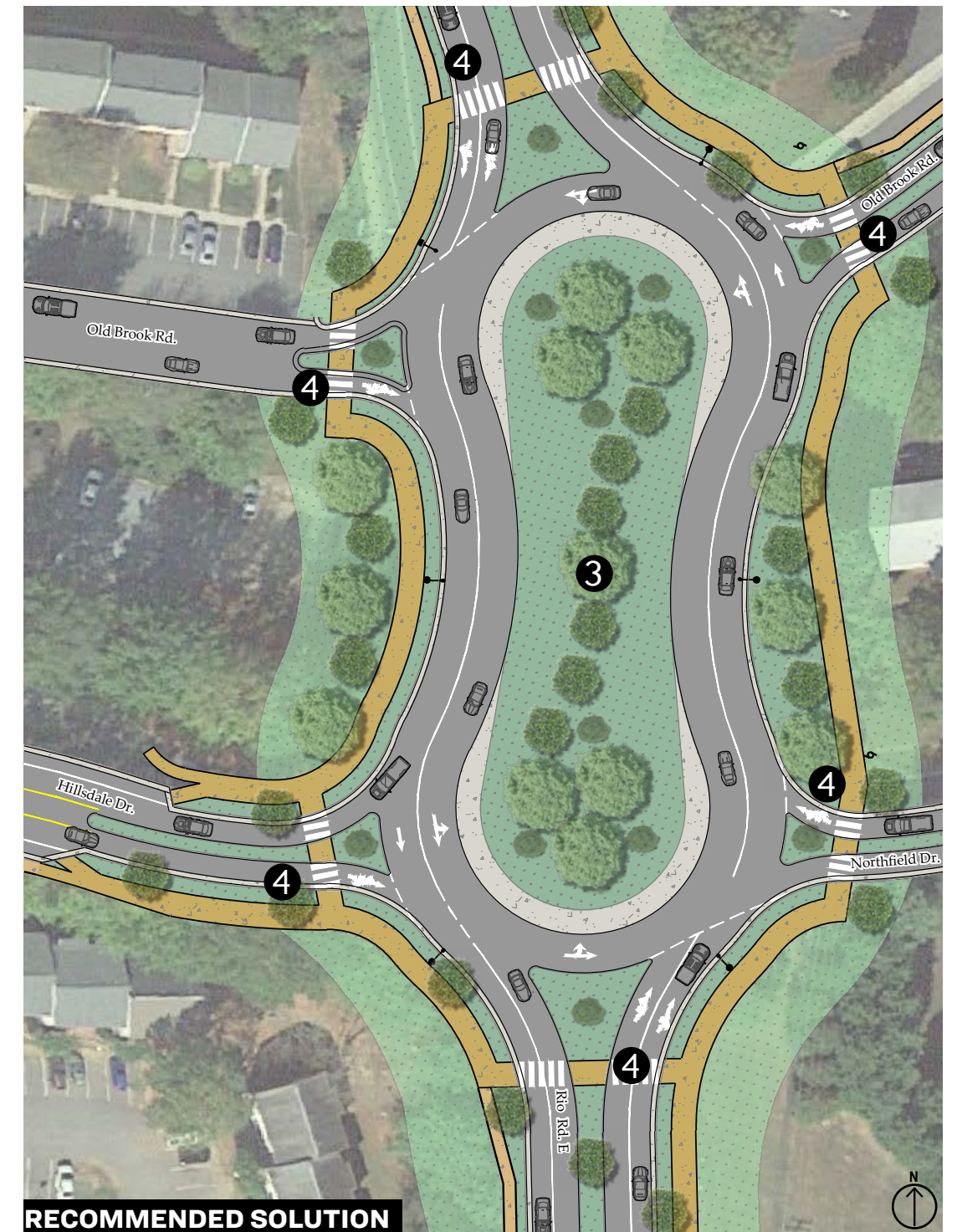


OPPORTUNITIES

- Promote context change
- Integrate two intersections as one
- Create consistent and comprehensive pedestrian access
- Create gateway experience at topographic high-point
- Promote vehicle calming

GENERAL FEEDBACK

- Positive response from VDOT
- Some citizens have expressed confusion
- Everyone recognizes a need for improvement



RECOMMENDED SOLUTION

- 3** A bean shaped roundabout allows the major infrastructure to remain in place while the safety and efficiency of the intersection are improved.
- 4** Pedestrian crossings have been integrated at every leg of the intersection and the crossing distances are shorter.

BELVEDERE BLVD.



THE BELVEDERE BOULEVARD INTERSECTION poses unique challenges to the Rio Road corridor. First, the intersection experiences substantial delays (as much as 8 minutes) for left-hand turning movements out of Belvedere and, second, the intersection is also the primary commercial entrance for City Church. These challenges suggest that the intersection has both operational and geometric deficiencies which need to be resolved.

Two (2) alternative solutions have been explored which could improve the functional capacity of the intersection and promote safety for various users. These options are succinctly described as:

- 1) Continuous Green-T intersection;
- 2) Signalized intersection.

In exploration of these alternatives, it is recommended that County staff and leadership ensure that the planned improvements at the John W. Warner Parkway intersection can be well integrated with these options. Previous VDOT studies have included both of these intersections because of the interconnected nature of how these intersections operate.

It is anticipated that when the JWWP intersection is converted to a roundabout that the gaps in traffic flow may be decreased and this could further complicate the operational capacity of this intersection. However, the Continuous Green-T (CGT) alternative developed as a part of this study can offset some of this traffic flow by way of allowing left-hand turn movements to be organized into a two-step process where vehicles exiting Belvedere only need to navigate one direction of crossing travel at a time instead of two.

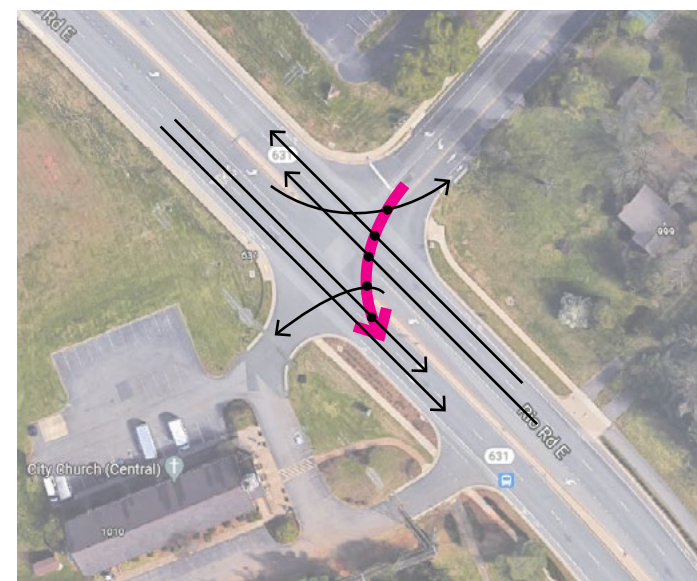


Diagram representing the current conflict points for left-hand turning movements exiting the Belvedere Boulevard Intersection

- 1 Vehicles making a left-hand turn movement out of Belvedere currently experience delays exceeding 500 seconds (over 8 minutes).
- 2 The commercial entrance of a church is located within the functional area of the intersection.
- 3 The secondary entrance to this same church does not meet the VDOT spacing requirements.
- 4 Existing curb ramps are oriented to direct pedestrians into the middle of the intersection.

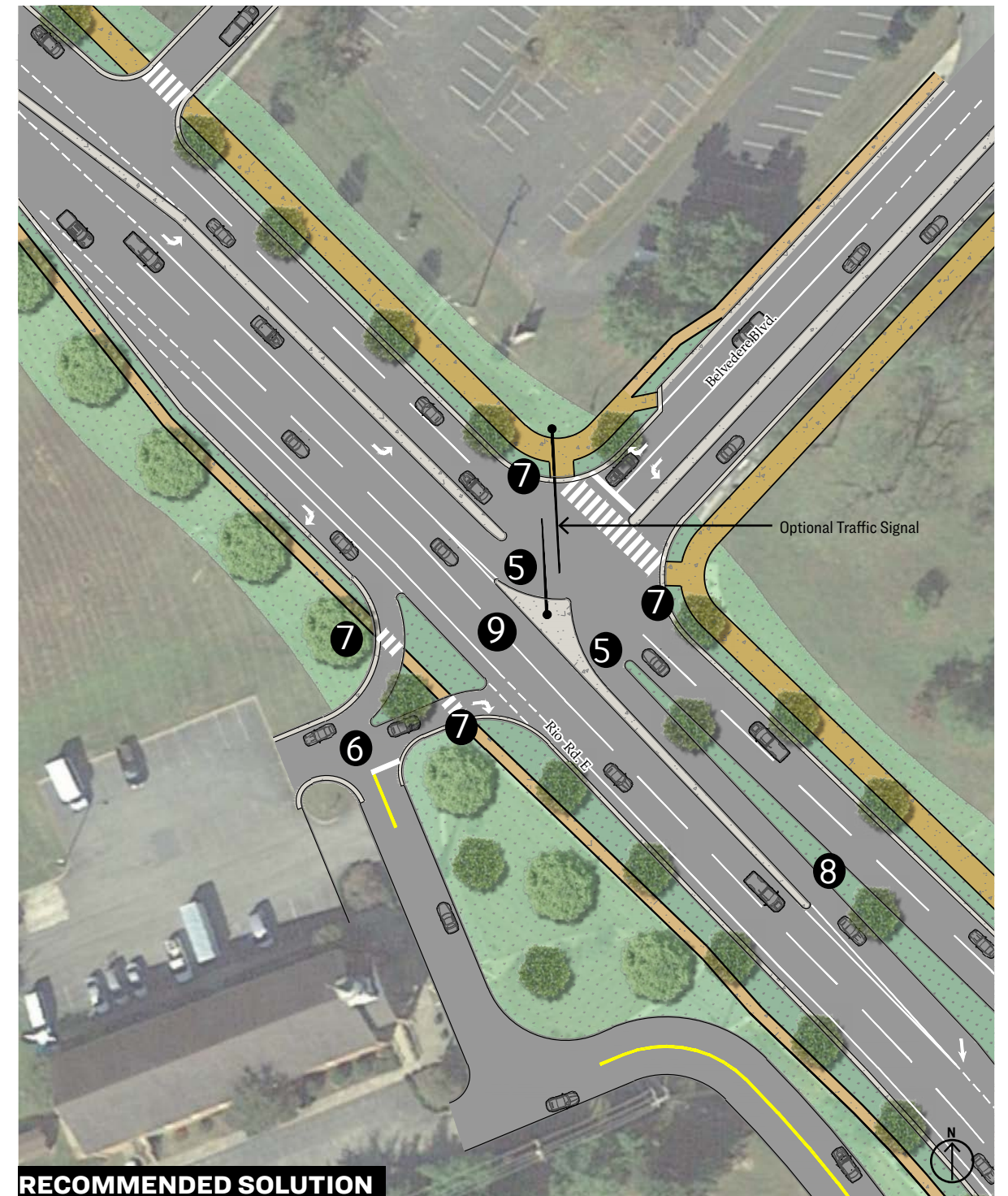


OPPORTUNITIES

- Implement safety improvements
- Improve access at church to benefit church and County
- Integrate pedestrian program for safe and equitable access
- Minimize conflict points
- Increase Level of Service (LOS)
- Partial signalization possible if warranted

GENERAL FEEDBACK

- Intersection needs to be improved
- Safety is of concern
- Consider peak hour traffic signal



RECOMMENDED SOLUTION

- 5 The proposed Continuous Green-T intersection provides a refuge area for both left-hand turning movements.
- 6 Consolidating the church entrances and providing a frontage road allows these entrances to conform with VDOT spacing requirements. This frontage road also serves CATEC, which is currently part of the JWWP intersection.
- 7 Curb ramps are reoriented to promote clear direction of travel and crossing for pedestrians.
- 8 Street trees planted within roadway medians and buffer strips contribute to cooler pavement temperatures.
- 9 One direction of travel along Rio is free-flow even if a signal is used, which reduces delays compared to a traditional signalized intersection.

JOHN W. WARNER PARKWAY



The Rio Road intersection with John W. Warner Parkway is complex and encounters high volumes of peak hour traffic. Peak hour traffic volumes will continue to increase in the near future. These pending developments only highlight the importance of long-range transportation planning needs.

This intersection has previously been studied, both by VDOT as well as traffic engineers who represent the developers considering the adjacent projects. Information from the VDOT study is most relevant and is summarized below. Original traffic study documents can be found in Appendix F.

VDOT STUDY

as developed by Kimley-Horn and Kittelson & Associates

In March 2020 VDOT published a study that evaluated the JWWP and Rio Road intersection as well as the Belvedere intersection. (A more robust summary of this traffic study can be found on Page 31). The findings of the study suggested that the existing signalized John W. Warner Parkway intersection should be replaced with a dual-lane roundabout. After the study was issued to VDOT and the County, the improvements for this intersection were funded for implementation. A summary of the study's findings are as follows:

- The proposed roundabout should be dual-lanes and include a non-yielding bypass lane for westbound Rio road.
- The roundabout will be located where the existing signalized intersection is located and will include direct access to CATEC.
- The existing wild-flower meadow is proposed to become the stormwater management basin for the project.
- Dunlora Drive will connect to Rio Road, similar to the current condition, however left-hand turns onto Rio Road southbound will not be permitted.
- A third travel lane will be added to Rio Road between JWWP and Belvedere to accommodate the non-yielding bypass lane.

The study concluded that by replacing the signalized intersection with the dual-lane roundabout that the intersection's Level of Service during the peak hour would be improved from Level E to Level A. The study also suggested many findings were conceptual and preliminary in nature and the concept (shown at right) will be further developed during the Preliminary Engineering Phase of the project.

OPPORTUNITIES

- Improve transportation for local traffic and commuter traffic
- Create additional outdoor space
- Improve access and mobility for pedestrians and cyclists
- Consolidate access points

GENERAL FEEDBACK

- VDOT response was supportive of Alternative 1 as a replacement to their study
- Community members prefer VDOT Study concept
- Desire to know more about how roundabouts work

ALTERNATIVE CONSIDERATIONS

As a result of the County initiating the Rio Road Corridor Study, the JWWP Rio Road intersection was additionally evaluated. The Rio Road Corridor Study agrees with the VDOT study in that a dual-lane roundabout will be the appropriate intervention to improve LOS at this intersection. The question evaluated by the Corridor Study was not what is the correct intervention strategy, but rather, *where* should the intersection be located for optimal and efficient traffic movements within the corridor as a whole.

Alternative 1

This design idea seeks to simplify the infrastructure at and around the intersection to make navigating the intersection intuitive and predictable. The location was identified by creating a natural crossroad geometry for all roadways (refer to blue dashed lines in diagram indicating crossroads location). A summary of this alternative includes:

- Reduction in conflict points
- Reduction in impervious cover
- Reduced impervious area and stormwater runoff volumes
- Consolidated infrastructure
- Expanded outdoor access
- The Rio Road infrastructure is proximally nearer to residential properties

Alternative 2

Similar to Alternative 1, this idea seeks to centrally locate the roundabout but not with increased proximity to residential properties. The result is an option which simplifies the VDOT concept, and allows existing infrastructure to remain in place. Particularly Dunlora Drive and Varick Street. A summary of this alternative includes:

- Hybrid option between VDOT study and Alternative 1
- Reduction in conflict points (similar to Alt 1)
- Expanded outdoor access (similar to Alt 1)
- Wildflower meadow is replaced by stormwater basin (similar to VDOT study)
- Dunlora Drive and Varick Street remain as is (similar to VDOT study)

VDOT STUDY CONCEPT: REPLACE SIGNALIZED INTERSECTION WITH ROUNDABOUT

- Replace the signalized intersection with a roundabout
- Dual-lane roundabout for level of service
- Add third-travel lane for Rio Northbound between JWWP and Dunlora
- Eliminate Dunlora Drive left-hand turn onto Rio Road
- Eliminate wildflower meadow for stormwater management



ALTERNATIVE 1: CENTRALLY LOCATE INTERSECTION AND OPTIMIZE EXISTING INFRASTRUCTURE

- Replace traffic signal with dual-lane roundabout and relocate roundabout ~200' north
- 40% reduction in conflict points as compared to VDOT study
- 20% reduction of impervious surfaces as compared to VDOT study
- Expanded and consolidated outdoor space for equitable access to recreation
- Improved pedestrian safety
- Roundabout is relocated to be nearer to residential properties



ALTERNATIVE 2: HYBRID OPTION BETWEEN VDOT AND ALTERNATIVE 1

- Replace signal with roundabout but not in exact location of existing signal
- Encroachment toward CATEC instead of residential properties
- Stormwater program per VDOT study
- Moderate increase of public space per Alt. 1
- Elimination of 3rd lane per VDOT study



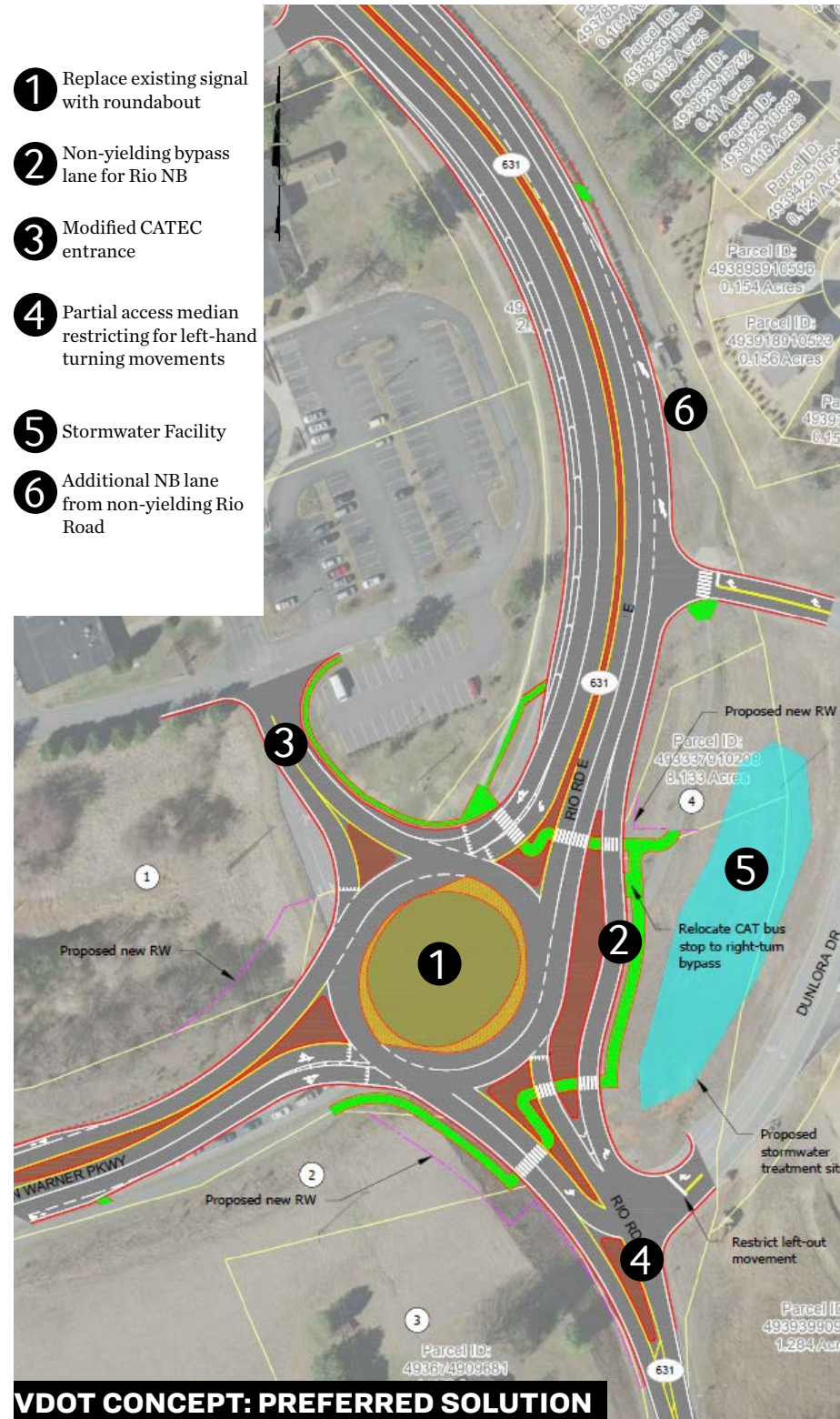
JOHN W. WARNER PARKWAY



VDOT STUDY

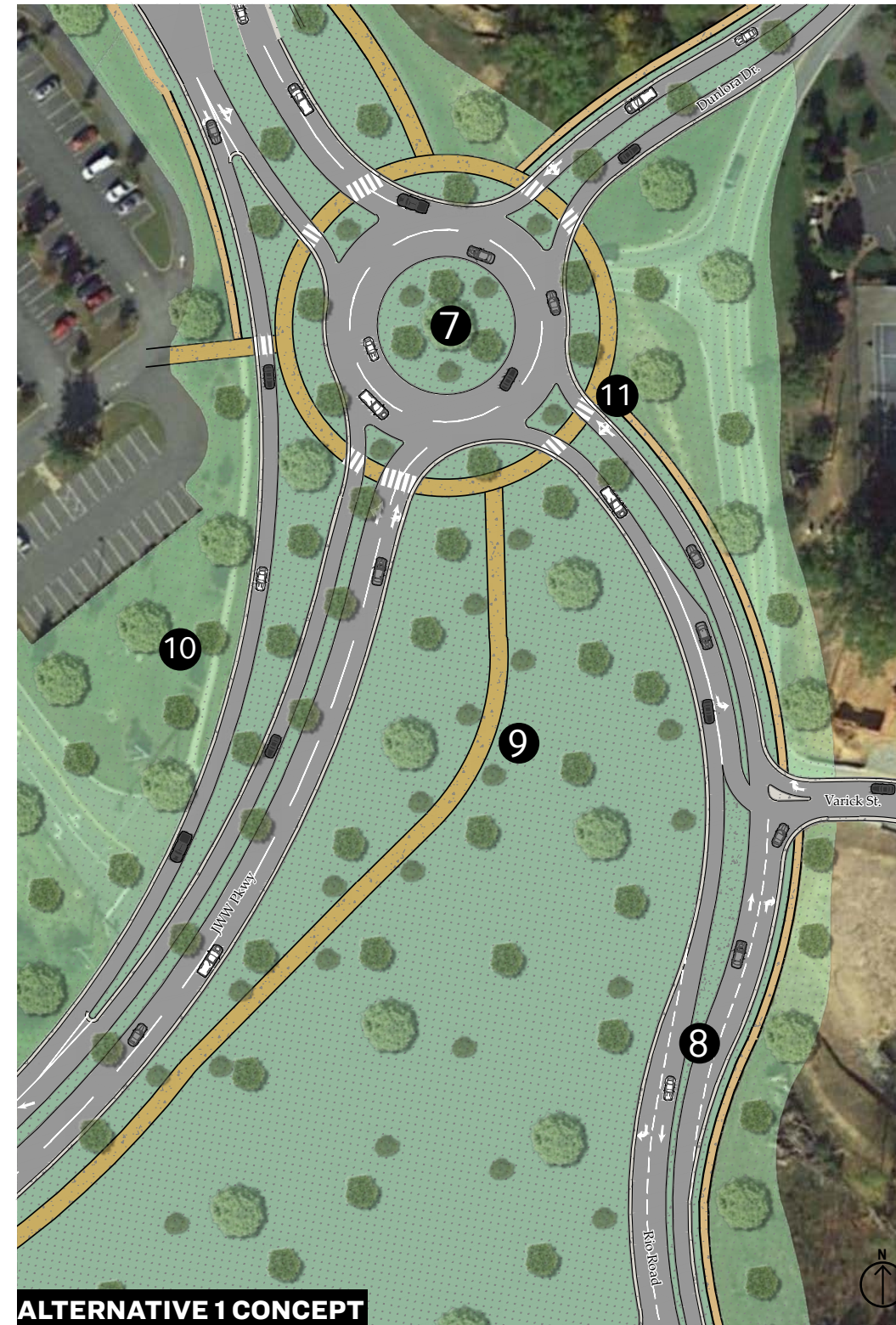
as developed by Kimley-Horn and Kittelson & Associates

- 1 Replace existing signal with roundabout
- 2 Non-yielding bypass lane for Rio NB
- 3 Modified CATEC entrance
- 4 Partial access median restricting for left-hand turning movements
- 5 Stormwater Facility
- 6 Additional NB lane from non-yielding Rio Road



VDOT CONCEPT: PREFERRED SOLUTION

ALTERNATIVE CONSIDERATIONS



ALTERNATIVE 1 CONCEPT

- 7 Roundabout relocated northward, proximally closer to residential properties
- 8 New alignment of Rio Road Northbound
- 9 Consolidated green space from existing wildflower garden, former Rio Road, and proffer from developer
- 10 CATEC access is altered and no longer enters directly into the intersection
- 11 Pedestrian made safer by virtue of slower vehicle speeds, shorter crossing distances and refuge islands



JOHN W. WARNER PARKWAY INTERSECTION SUMMARY

A more detailed analysis between these alternatives including their carbon emissions, vehicular miles traveled, maintenance concerns, stormwater runoff and environmental considerations can be found in Appendix E3.

Based on public comment and feedback it has been determined that the original VDOT concept is the preferred concept for this intersection. Given the time-frame of the planned improvements as performed by VDOT, the alternative recommendations presented herein are not currently being considered for implementation.

It is noteworthy to reiterate that the traffic analysis developed by VDOT, and expounded upon in the review of traffic studies on Page 31, will adequately address the traffic concerns in this area. Some traffic movements will be enhanced and others will be frustrated, but the overall solution establishes that the Rio Road and JWWP intersection will operate at an increased level of service.

PHASE 2



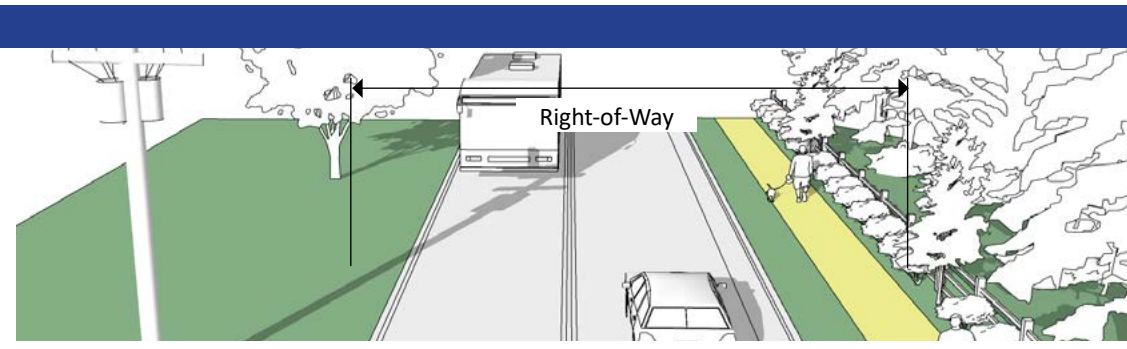
PHASE 2: CORRIDOR BACKGROUND DATA AND EXISTING CONDITIONS



EXISTING ROADWAY TYPICAL SECTIONS

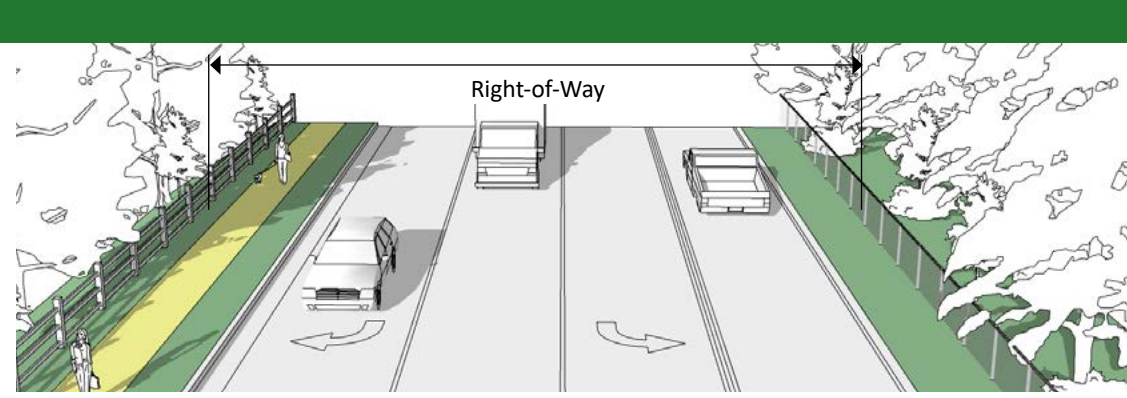
NORTH

From JWWP to Pen Park Road the roadway consists of 2 through-lanes with dedicated left or right turn lanes in discrete locations. A sidewalk with a buffer strip is present along the eastern side of the road.



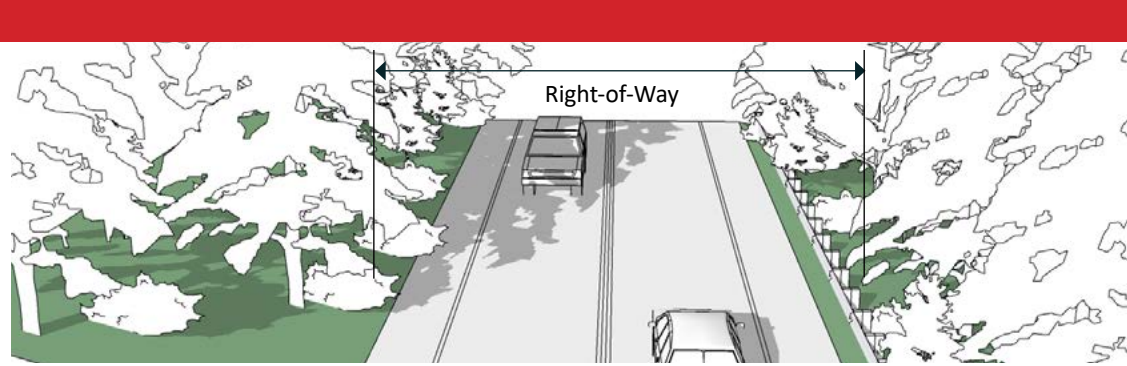
CENTRAL

From Pen Park Road to Stonehenge Road the corridor exhibits a highly variable typical section. The main source of variation along this portion of the corridor is the lane widths, which fluctuate between 10-14 feet in width as well as the inconsistent edge treatments, including turns lanes, curbs, and grass shoulders.



SOUTH

From Stonehenge Road to the City jurisdictional boundary at Melbourne Road the typical section is consistently 2-lanes with no pedestrian or cyclist infrastructure. The corridor in this area exhibits winding curves and steep terrain as well as extremely wide paved shoulders in discrete areas.



Select Roadway Elements	Corridor Observations
Pedestrian Facilities Improvements which provide for public pedestrian foot traffic including sidewalks and shared use paths.	<ul style="list-style-type: none"> Sidewalks are intermittent and disconnected. The County is actively infilling some areas which will improve connectivity. In places where sidewalks are provided, buffer strips are present. These buffers range from 2-4 feet. The discontinuity of sidewalks discourages their use.
Bicycle Facilities Improvements which provide for public bicycle traffic including bicycle lanes and shared use paths.	<ul style="list-style-type: none"> No bicycle lanes are present throughout the entire corridor. No shared use paths are present. Several adjacent neighborhoods contain connections to trails.
Pedestrian Crossings Visually identifiable areas where pedestrians (and cyclists) can safely cross the vehicular traffic lanes.	<ul style="list-style-type: none"> There are signalized crossings at the ends of this corridor (JWWP and Melbourne), but no designated pedestrian crossing in between.
Transit Facilities A place providing access to transit services, in this case bus stops. These can include signs, seating, shelter, and lighting for ease of access.	<ul style="list-style-type: none"> 5 total bus stops in North and Central areas. None in South. One stop has seating and shelter; others have only signage. Ridership data shows 6 or less riders per day on average for each stop.

The nature of this table is to provide observations related to select elements of the corridor and is not intended to imply that it accounts for all corridor elements.

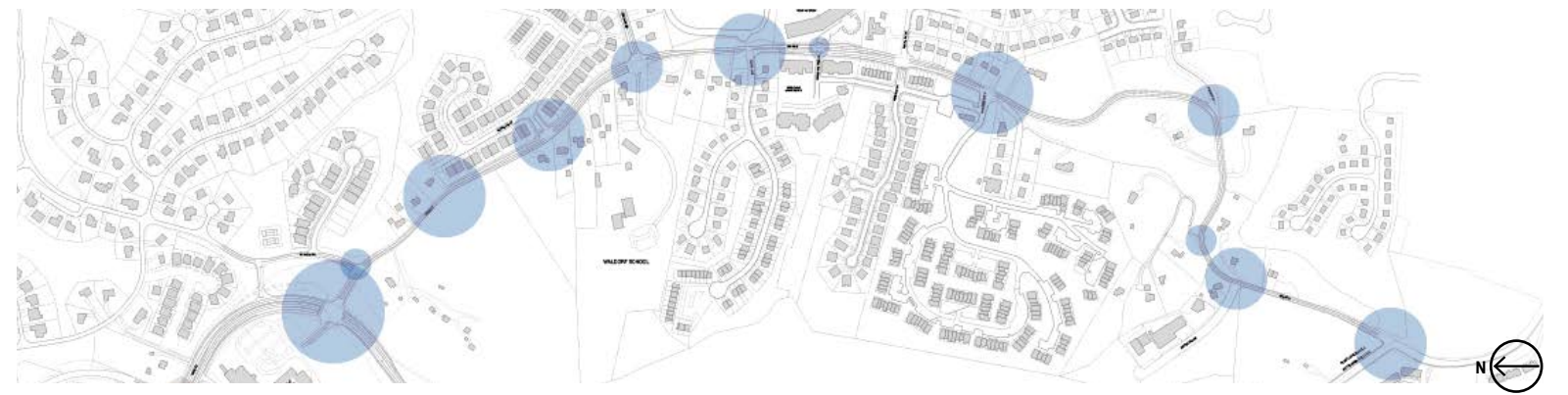
ACCESS MANAGEMENT AND ACCIDENT DATA

Entrance/Intersection	Crashes 2014-2021
*John W. Warner Pkwy	11
Dunlora Dr	1
(Future Parkway PI Entrance)	8
Dunlora Forest Dr	6
Pen Park Rd/Waldorf School Rd	4
Towne Ln	6
(Lofts at Meadowcreek)/Treesdale Park Ln	1
Pen Park Ln/Penfield Ln	0
Stonehenge Rd	11
Rockbrook Dr	0
Agnese St	6
(Future Ecovillage Entrance)	0
Alwood Ln	2
Brookway Dr	6
Melbourne Rd	6

For clarity and conciseness this table only includes accidents within the functional area of intersections.

Entrance/Intersection	VDOT Type 1-4	Ex. Spacing (ft)	Spacing Requirement (ft)	Required Spacing Available
John W. Warner Pkwy	1	1804	1050	100%
Dunlora Dr	3	268	470	57%
(Future Parkway PI Entrance)	3	500	470	100%
Dunlora Forest Dr	3	630	470	100%
Pen Park Rd	1	2133	1050	100%
Waldorf School Rd	1	2133	1050	100%
Towne Ln	3	611	470	100%
(Lofts at Meadowcreek)	3	462	470	98%
Treesdale Park Ln	4	362	250	100%
Pen Park Ln	2	1433	660	100%
Penfield Ln	2	1433	660	100%
Stonehenge Rd	3	92	470	20%
Rockbrook Dr	3	92	470	20%
Agnese St	3	1753	470	100%
(Future Ecovillage Entrance)	3	391	470	83%
Alwood Ln	3	299	470	64%
Brookway Dr	3	299	470	64%
Melbourne Rd	1	1220	1050	100%

ACCIDENT HOT SPOTS



ACCESS MANAGEMENT HOT SPOTS



DETAILED ACCIDENT ANALYSIS

The "hot spot" diagrams included herein are necessarily simplified to support basic understanding and to suggest simple mitigation measures. A detailed and robust accident analysis has also been developed to support this work, refer to Pages 28-30.



JOHN W. WARNER PARKWAY TO PEN PARK ROAD



This northern area of the Phase 2 corridor is characterized as transitional, and ultimately leading to suburban. There is visual evidence of recent pedestrian improvements along Rio Road within this area, but the real transitions will be realized in the years ahead as several large properties adjacent to the corridor are developed into residential communities. The redevelopment of these properties will accelerate the opportunity for positive change but also introduce previously unforeseen challenges.

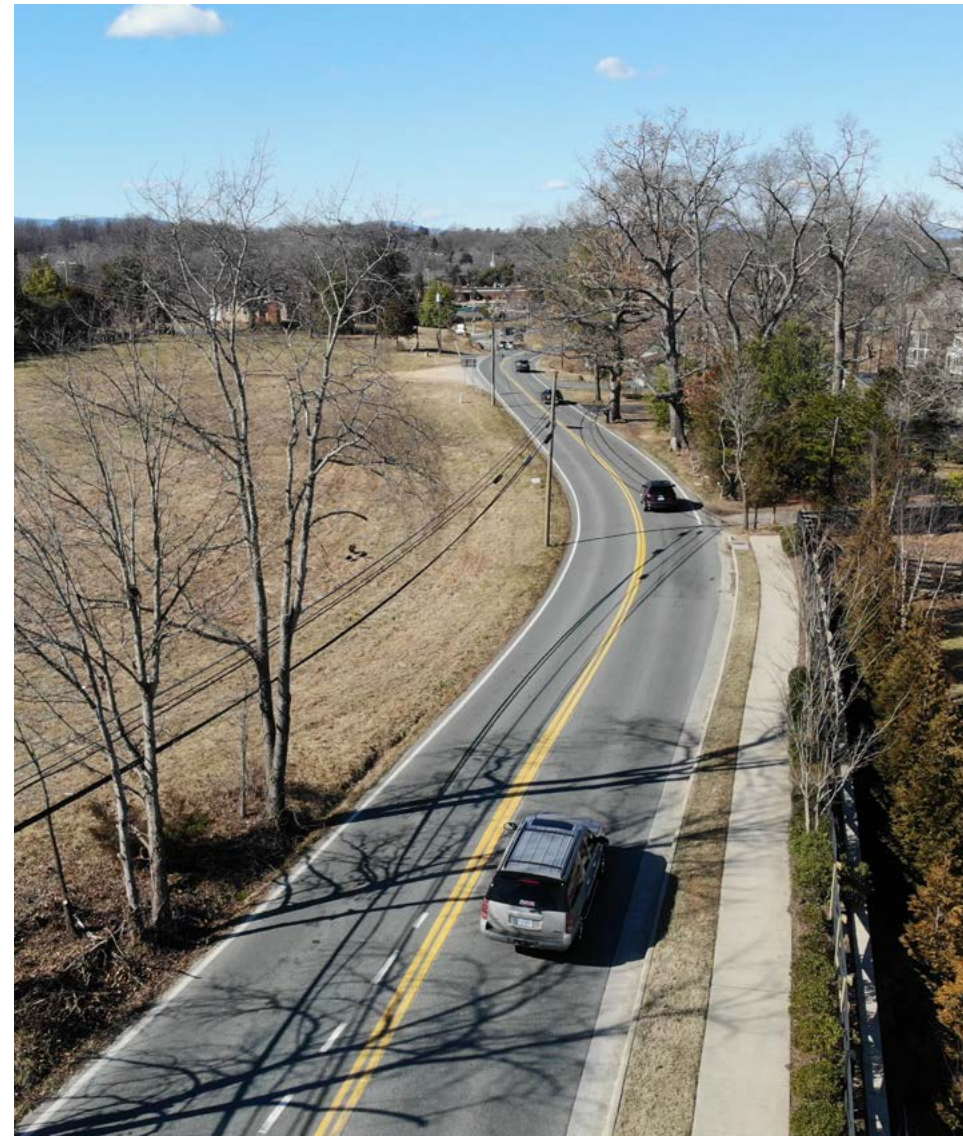
Positive opportunities include the chance to redefine the frontage characteristics along the road, and in particular, to expand the pedestrian and cyclist infrastructure. The pending Rio Point Development and the Rio Commons Development can provide the shared use path design along their frontage, creating a direct connection to the JWWP greenway trail. Establishing this connection creates the opportunity for residents in the area (current and future) to travel by means other than vehicles. Future connection opportunities exist to connect this shared use path to the Pen Park intersection, completing the connection with the JWWP greenway trail.

It is understood that these pending developments will also bring increased traffic. The future traffic volume map on Page 27 suggests that this increase will not be slight. This increase in traffic will put additional burden on the small residential side streets as well as the JWWP intersection and Pen Park Road intersection.

It is the intent of this study to balance the positive opportunities available to the corridor in such a way as to also provide solutions to the pending (traffic) challenges.

The pending developments in the corridor will drastically affect the operational efficiency of the corridor, particularly if each development implements only what is minimally necessary to support their individual burdens. As can be seen in the Roadway Allocation Diagram, at right, the 2,200 feet between JWWP and Pen Park Road will experience eleven (11) different lane configurations/allocations.

The complexity of this portion of the corridor is a result of intermittent left-hand turns. Potential solutions available to address this complexity include: incorporating predictable and organized left-hand turning movements throughout this portion of the corridor (Alternative 1), or removing left-hand turning movements altogether, (Alternative 2). Diagrammatic representations of each are shown at right.



A corridor on the brink of transition. Note recent development on right, and future development area on left.

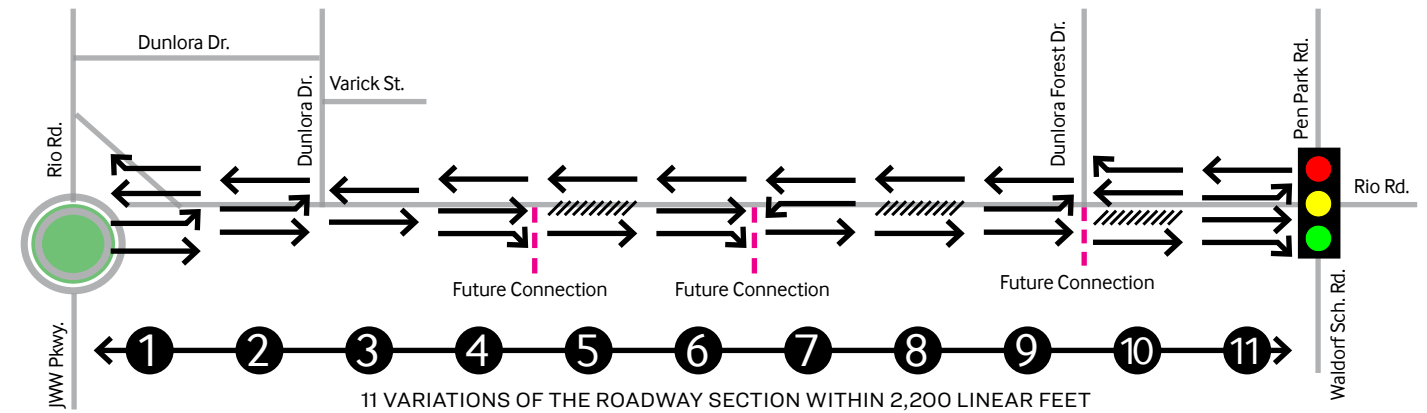
OPPORTUNITIES

- Create a uniform and logical typical section from JWWP to Pen Park Road
- Establish safe pedestrian and cyclist zones and identify logical pedestrian crossing areas
- Create integrated solutions that allow for increased traffic and safety
- Define visual aesthetic and character of roadway for visual cues including landscaping, building engagement and pedestrian areas

GENERAL FEEDBACK

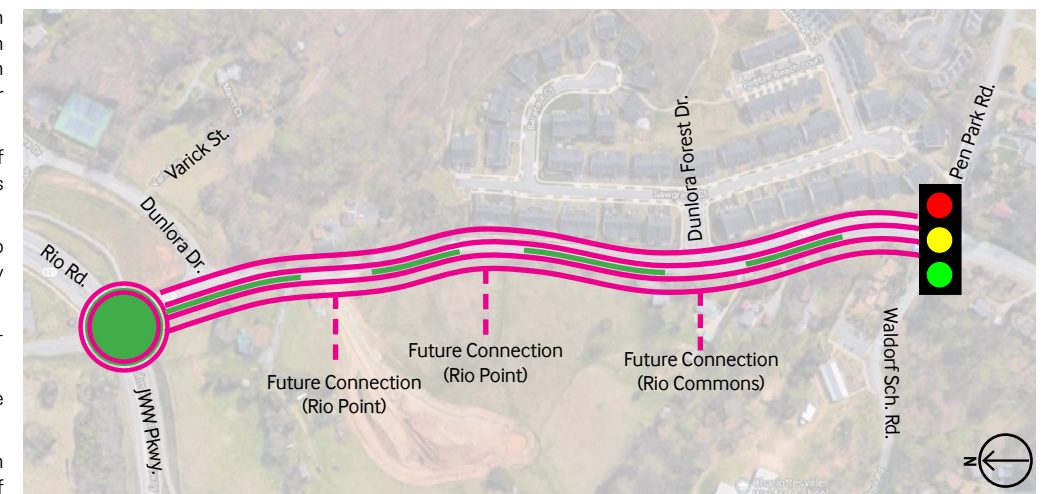
- Pedestrian activity needs to be made safer
- Road design needs to account for traffic from future developments
- Roundabout at Pen Park Road is not desired by residents

ROADWAY ALLOCATION DIAGRAM: Representing Roadway Configuration After Rio Point + Rio Commons Develop



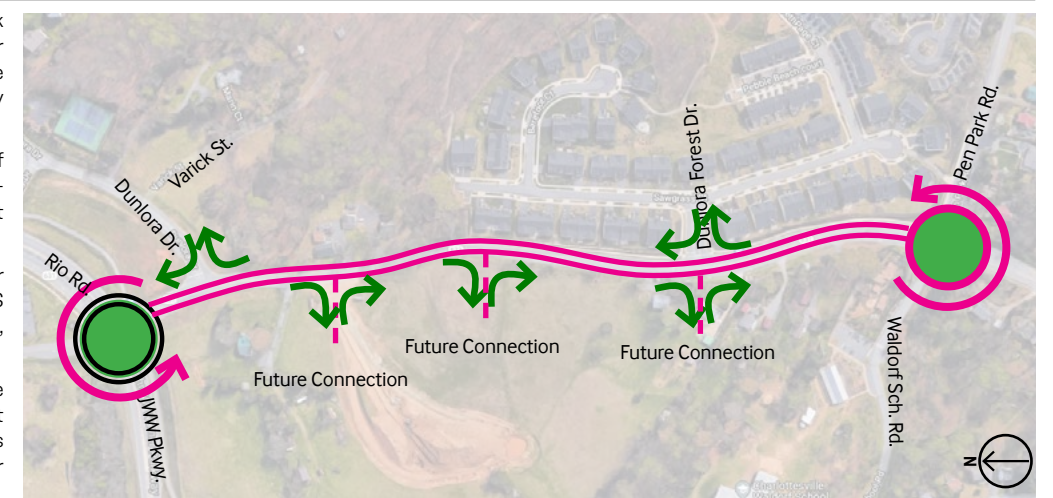
ALTERNATIVE 1: TYPICAL SECTION CONTROLLED ALTERNATIVE (FREE FLOW)

- Establish a consistent and uniform roadway typical section that can incorporate the left-hand turn lanes in a predictable and uniform manner for the duration of the corridor.
- All movements into and out of residential communities can remain as proposed.
- Use pending development projects to establish typical section uniformity along development frontage.
- Use raised medians to support mid-block crossing safety.
- Include a shared use path for the duration of corridor.
- The traffic signal at Pen Park can still be replaced with a roundabout, if desired.



ALTERNATIVE 2: REMOVE LEFT-HAND TURNING MOVEMENTS (CIRCULATORY FLOW)

- Utilize a roundabout at Pen Park Road to establish the opportunity for vehicles to make left-hand turns at the intersection instead of at the property entrances.
- All movements into and out of residential communities are right-hand only. The Pen Park roundabout would be needed near term.
- This design results in increasingly poor performance of the intersection LOS and will increase vehicle miles traveled, both negative effects of this option.
- This alternative results in a more compact roadway typical section that could include multi-modal options without additional ROW and has fewer conflict points.

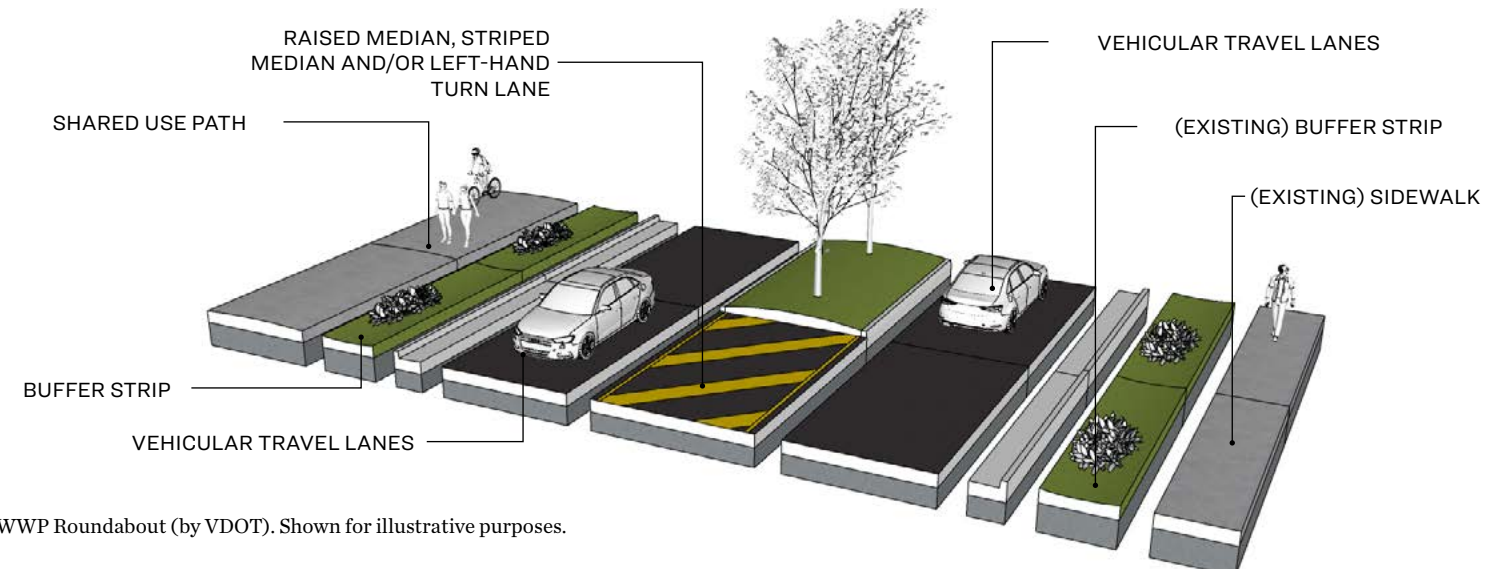


JOHN W. WARNER PARKWAY TO PEN PARK ROAD



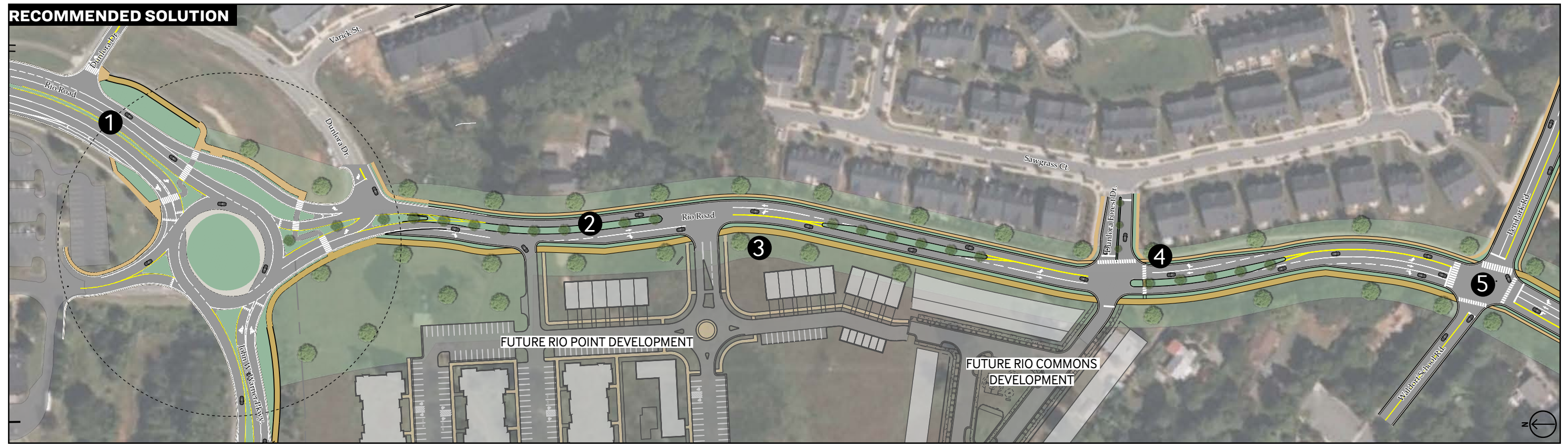
Observations	Resolutions / Suggestions
<p>Zoning / Density</p> <ul style="list-style-type: none"> Zoning designations along the North and Central sections are largely residential, with similar density As development increases, North and Central sections will look increasingly similar 	<ul style="list-style-type: none"> As development increases within the North section, the new typical section should be established by increasing the road width to the east, where the new developments are planned The developments should also allow for the needed median, refer to typical section suggestions at right
<p>Typical Section</p> <ul style="list-style-type: none"> There are a high number of off-road accidents along this stretch of road. People are hitting fixed objects within the clear zone No curb and gutter exists along this section (except for Dunlora Forest frontage) 	<ul style="list-style-type: none"> Establish consistent roadway width and add a median for current and future left-hand turns. The median could be striped or raised, concrete or planted Left-hand turns are warranted at every development along Rio Road. By adding the median, the through-lane capacity of the road is preserved The median should be 12 ft wide. The travel/through lanes should be 11 ft wide
<p>Intersections</p> <ul style="list-style-type: none"> Pen Park / Waldorf is the most significant intersection in Phase 2 It is the largest controller of the overall roadway capacity; recent county projects make it the only marked pedestrian crossing of Rio (within PH 2); it is central to 95% of all residences in PH 2 (less than 1/2 mile walk); two (2) different schools have primary access through this intersection 	<ul style="list-style-type: none"> Increase the storage of the left hand turn lane into Waldorf (within Central section; see Page 21) Crossing of Rio Road at Pen Park Road should be expanded to include future shared-use-path traffic. (Note: based on recommendations with the Central Section the SUP will switch sides of the roadway here)
<p>Pedestrian Connectivity</p> <ul style="list-style-type: none"> Pending developments will construct a SUP on west side of road, leaving a gap from Rio Commons to Pen Park Road 	<ul style="list-style-type: none"> Coordinate SUP installation with Rio Point and Rio Commons. The SUP shall be 10 ft wide County should plan to connect the SUP from Rio Commons to Pen Park Road

ALTERNATIVE 1: TYPICAL SECTION CONTROLLED ALTERNATIVE



- 1 JWWP Roundabout (by VDOT). Shown for illustrative purposes.
- 2 Raised median with plantings unless left-hand turn lane is warranted.
- 3 10 ft paved shared use path from JWWP to Pen Park Road with dedicated pedestrian phase in signal timing for crossing at Pen Park Road.
- 4 Mid-block crossing with pedestrian refuge at future Rio Commons development entrance and existing Dunlora Forest entrance.
- 5 Dedicated pedestrian crossing phase within Pen Park Road signal timing.

RECOMMENDED SOLUTION



PEN PARK ROAD TO STONEHENGE ROAD



The Central region of the Phase 2 corridor is characterized as suburban given the context of land-use surrounding the corridor. Surrounding land uses include single family residential, multi-family residential, and institutional. When viewed through the lens of what a suburban corridor should include within the typical section, the corridor lacks several programmatic elements that would be considered standard within the roadway. Items such as continuous sidewalks, marked pedestrian crossings, accommodations for cyclists via either bike lane or shared-use-path, and adequate sight distances for side streets are all noticeably absent. Unlike the Northern portion of this Phase 2 corridor, there are not any pending development projects which can assist to infill and create the necessary infrastructure improvements. This does not suggest that future projects are not possible in this area; when and if any adjacent parcels do redevelop, the County can work with the developer to make necessary improvements.

The primary objectives within this Central portion of the corridor will be to create unity with the northern portion (thus

creating a unified corridor) as well as to establish necessary multi-modal infill and safety improvement projects so the programmatic elements of this suburban corridor are present and accounted for.

As shown in the corridor diagram at right, the pedestrian network along the corridor is nearly complete along the west side of the road but incomplete along the east side of the road. The missing portions of the sidewalk network are further complicated by the odd alignments of the existing portions of sidewalk in this area. These meandering alignments are more representative of shared use paths or trails than traditional sidewalk facilities.

There are also several unsafe and poorly defined entrances along this portion of the corridor. Given the increased development and the suburban context of this area, each entrance and intersection within this corridor needs to be clearly defined and meet basic safety criteria such as adequate sight distances and clear traffic control (signage and painting, etc.).

OPPORTUNITIES

- Create uniformity and consistency within the North section of Rio
- Establish a consistent typical section and uniform median with left-hand turn lanes for each development
- Establish wayfinding and signage along corridor for multi-modal connections including the pedestrian bridge at Lochlyn Hills as well as connections to the JWWP trail
- Rehabilitate the Stonehenge and Rockbrook intersection area for safety

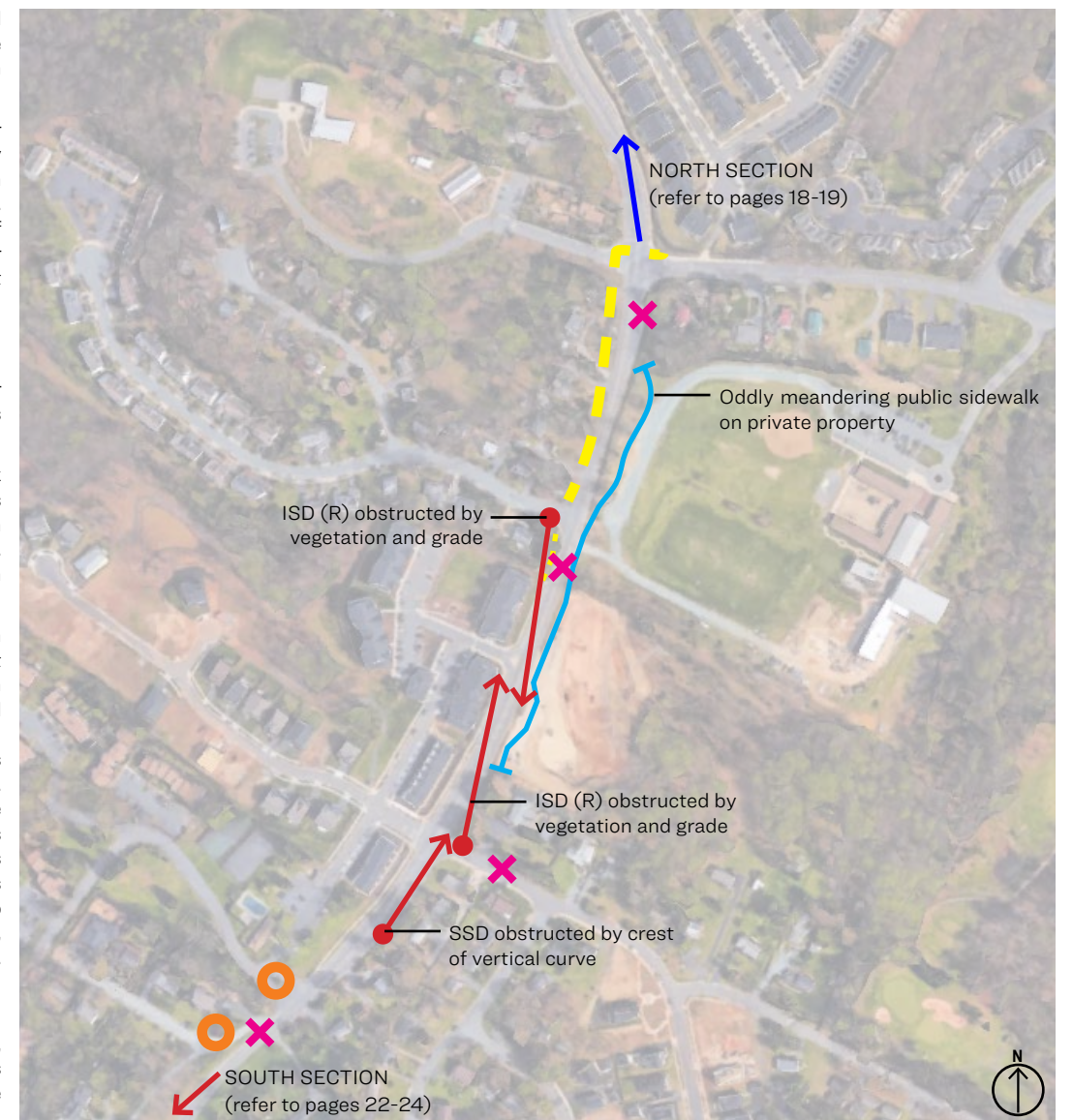
GENERAL FEEDBACK

- Creating connections to multi-modal infrastructure adjacent to the corridor will be important.
- Implement roadway design characteristics that will deter drivers who simply want to “pass through” the corridor. This includes slowing the speed limit, adding a median, more pedestrian crosswalks, etc.
- Suggestions by consultant are long-term improvement strategies. What are short-term strategies for cyclists?



CORRIDOR DEFICIENCY MAP: IDENTIFYING OPPORTUNITIES FOR IMPROVEMENT

- ↑ Several intersections exhibit impaired intersection sight lines for vehicles. These challenges are of specific safety concern and should be addressed.
- ✗ There are several areas where the vehicular accident data suggests that the roadway does not provide the required design parameters for safe operation of vehicles. The data indicates that clear delineation of turn lanes, proper length of turn lanes or additional pavement markings to correct driver confusion will prove helpful.
- The County is currently working to infill this portion of missing sidewalk. This will help pedestrian movements, but further pedestrian and multi-modal improvements are still required.
- Stonehenge Road and Rockbrook Drive pose a very challenging access management condition. This condition is reflective of the accidents in this area. Refer to an aerial photo of this area on Page 17.
- ~ The pedestrian sidewalk along the eastern margin of the corridor is incomplete - not reaching either of the intersections (Pen Park Rd and Pen Park Ln.) on either end of this portion of the corridor. Aside from this lack of continuity, the alignment is not consistently parallel with the roadway. The “public” sidewalk along the frontage of Charlottesville Catholic School crosses into private property, makes numerous horizontal alignment shifts and ends abruptly. Pedestrians are forced to navigate complex terrain to reach the road, or enter and cross the school campus. Neither option is desirable.



It is noteworthy to express that several side streets (Pen Park Ln., Stonehenge, Towne Ln.) also have incomplete sidewalks and do not allow pedestrians to make safe crossings or connections to the corridor.

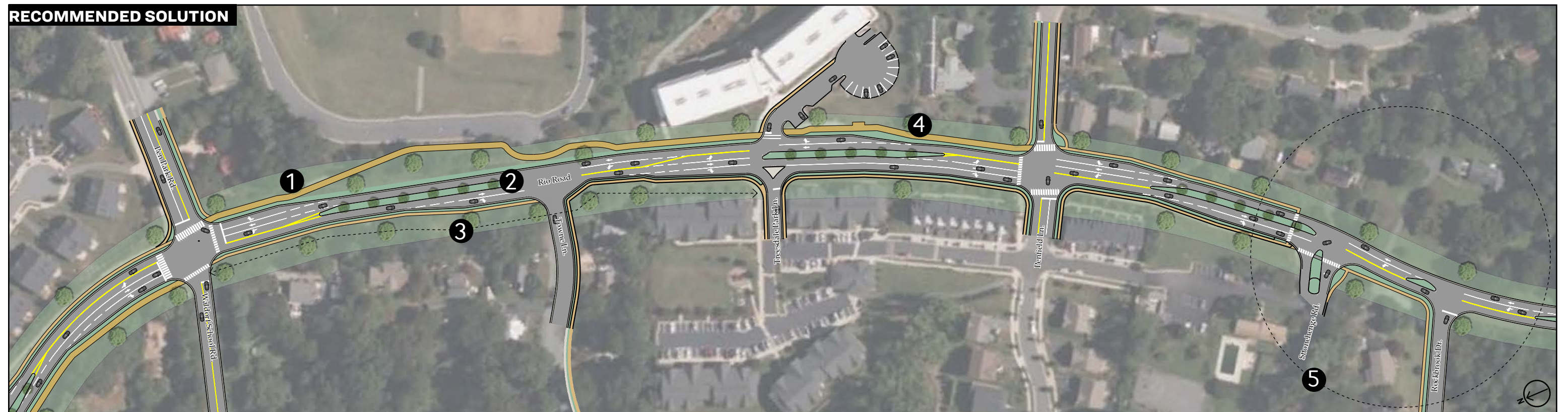
Observations	Resolutions / Suggestions
<p>Typical Section</p> <ul style="list-style-type: none"> Lane widths vary widely. The SB through lane adjacent to Treesdale is 14 ft wide whereas the corresponding NB lane is 11 ft wide. Median tapers for left-hand turns are inconsistent. 	<ul style="list-style-type: none"> Using the Penfield Lane and Waldorf School left-hand turn lanes as an example, these turn lane tapers both start or end near Towne Lane, which is noticeably missing a left-hand turn lane. Implementing the typical section at right would correct this challenge and improve the vehicular safety in this area. (Refer to Accident Analysis on Page 28).
<p>Intersections</p> <ul style="list-style-type: none"> No left-turn lane for Towne Lane. Pen Park Lane will experience doubled traffic volumes when Lochlyn Hills is finished developing. The capacity of the 2-way stop controlled intersection at Pen Park Ln. is unknown but this traffic increase will exacerbate capacity challenges. As shown in the Corridor Deficiency Map on Page 20, the ISD (R) for this intersection is compromised. Stonehenge Road to Rockbrook Drive is less than 100 ft. No left-hand turn lane exists for either entrance. Furthermore, pavement markings indicating the intersection (i.e., break in double yellow) are also missing. Stonehenge has curb and gutter, though Rockbrook does not. 	<ul style="list-style-type: none"> Working to unify the typical section along the corridor will bring needed left-hand turn lane capacities as well as safety improvements addressing the accident concerns. Improving the intersections to have adequate sight distances as well as uniformity of appearance (i.e., conforming with MUTCD and VDOT standards for entrances) will greatly increase the safety of the corridor and address capacity concerns. Introducing a raised and planted median approaching the Stonehenge and Rockbrook intersection will establish a context shift as vehicles enter or leave the southern section of the corridor. Left-hand turn lanes should be established for Stonehenge. Extend median and splitter islands at Stonehenge to require vehicles to use Stonehenge instead of Rockbrook.
<p>Pedestrian Connectivity</p> <ul style="list-style-type: none"> Existing pedestrian facilities along east side of road provide little use given the lack of connectivity. No bicycle facilities exist. CAT ridership is very low despite new bus stop at Meadowcreek Lofts which offers seating and shelter. 	<ul style="list-style-type: none"> Consider replacing the meandering and incomplete sidewalk along the east margin of Rio with a shared use path (SUP). The meandering alignment is more suggestive of an SUP. Consider reclaiming the space from the Meadowcreek Lofts bus stop and replacing with an SUP. Connect with both Pen Park Road and Pen Park Lane intersections.

RECOMMENDED SOLUTION



- 1 10 ft paved shared use path from Pen Park Road to Penfield Lane (replacing the existing sidewalk)
- 2 Raised median with plantings unless left-hand turn lane is warranted
- 3 Recent County sidewalk installation project, to be completed summer 2022
- 4 Replacement of dedicated bus stop with SUP and reduced turnlane storage length
- 5 Revised intersection geometry and safety improvements at Stonehenge Rd. and Rockbrook Drive

RECOMMENDED SOLUTION



STONEHENGE ROAD TO CITY OF CHARLOTTESVILLE



The South section of Rio Road, the portion of the corridor that directly carries traffic into and out of the City of Charlottesville, is unlike the rest of the corridor in all respects. Development density is sparse (at least for now), the corridor navigates challenging terrain as the roadway descends into the Meadow Creek basin, and the roadway has no turn lanes, no sidewalks, wide paved shoulders, and multiple compound curves with radii that are less than the minimums allowed by VDOT (based on the posted speed limit). It is hard to believe that this stretch of the corridor is a direct link between the urban core of Charlottesville and the increasingly urban ring of Albemarle County.

Central to these observations is the question: what role does this portion of Rio Road need to play within the corridor as a whole? And, what role does it need to play for those who use this portion of the road frequently?

The current conditions of the road exhibit a lack of many appropriate safety provisions and a lack of corridor amenities, while the topography along the corridor complicates any safety improvement implementations.

Further solidifying the distinctive characteristics of this portion of Rio Road is the integration with Meadow Creek. Currently, Meadow Creek crosses below Rio Road near Melbourne Road, below an existing bridge with limited ability to accommodate additional roadway programming. Directly adjacent to Rio Road is the confluence point of Shenks Branch with Meadow Creek, and the waterway exhibits extensive erosion directly adjacent to Rio Road. In fact, the erosion is within feet of undermining the existing guardrail posts. It is not difficult to foresee that this erosion will continue and will eventually jeopardize Rio Road itself. Addressing the long-term stability of this waterway creates an opportunity for this corridor to improve the roadway conditions and could reduce the long-term liability of infrastructure to the County. This concept warrants additional study and evaluation.

As previously stated, this portion of the Rio Road corridor is unlike any other portion of the corridor. As such, the proposed resolutions will likewise be unique. As a starting point, this portion of the corridor needs basic safety improvements. Not including the Melbourne Road intersection, 46% of all accidents within this section are single-vehicle incidents, which reflects the dangerous nature of the road. More than any other implementations, the recommendations for this portion of the roadway will center around basic safety and serviceability improvements such as advisory speed signs, improved pavement markings and signage, upgrades to modern guardrails, and installation of built practices to encourage slower vehicular speeds.

Intersection geometry should also be evaluated to improve sight distances and, where at all possible, left-hand turn lanes should be provided. Given the proximity to the City, particularly at Agnese Street, there is certainly mutual benefit to both agencies, and cost sharing is worth discussing.

In response to the questions above, this portion of Rio Road needs to contribute to the overall safety of the corridor. As can be seen from the Accident Analysis portion of this document there is a need to increase the safety of this roadway. In doing so, the general public will be well served by these improvements.



Observations	Resolutions / Suggestions
<p>Zoning / Density</p> <ul style="list-style-type: none"> EcoVillage is the only known potential development. There are several other parcels along the road which could be redeveloped in accordance with the comprehensive plan density, meaning 3-6 units per acre. 	<ul style="list-style-type: none"> Encourage interparcel connectivity (i.e., EcoVillage to Stonehenge).
<p>Roadway Geometry, Typical Section and Alignment</p> <ul style="list-style-type: none"> Guardrail along east side of road is not up to current standards. This may contribute to the increased severity of accidents involving the guardrail (refer to Accidents, below). Two (2) 11 ft lanes. One (1) in each direction. Shoulders are paved. West shoulder includes a paved ditch and is in need of repair. Noteworthy deficiencies include several deep potholes, vegetation encroachment, and debris and litter clogging paved ditch and inlets, negatively affecting water quality. No turn lanes. Centerline radii are tight and this results in inadequate sight-distances along the road (refer to Accidents, below). One advisory speed sign for NB traffic. None for SB traffic which is at a greater risk. Grade of road varies between 3.5% and 6.5% (average of 5%) Steep slopes along both sides of road complicate opportunities to implement safety improvements. 	<ul style="list-style-type: none"> Upgrade guardrail to current standards. Advisory speed signs should be installed near Stonehenge for SB traffic. Re-stripe pavement markings for better sight distances. Maximize use of existing corridor space, which means the paved ditch should be overhauled to place drainage under ground. Add a left-hand turn lane at Agnese for SB approach.
<p>Intersections</p> <ul style="list-style-type: none"> All intersections in this section are one-leg stop controlled. Agnese intersection: <ul style="list-style-type: none"> 70 degrees away from perpendicular Located in second tightest curve in the corridor (150' CL radius) Stopping sight distances encumbered Vertical sight distances obstructed due to steep grades Pavement markings and signage need maintenance Left-turn lane warranted Ecovillage Entrance: <ul style="list-style-type: none"> ~400 Vehicles per day Left-hand turn lane desirable, but unrealistic due to effort required to widen road Brookway: <ul style="list-style-type: none"> Intersection sight distance encumbered Drainage provisions encumbered (5 accidents due to rain) 	<ul style="list-style-type: none"> Redefine Agnese entrance to include a splitter island for NB Rio Road and a revised right-hand turn radius onto Agnese. Relocate stop-bar and stop sign to provide the best sight distance possible. Joint project with City of Charlottesville Second entrance near Stonehenge would relieve conditions at primary proposed entrance. Turn warrant justification should include increased traffic on Rio Rd. County should permit disturbance of preserved slopes to increase sight-distances along tight turns adjacent to Ecovillage. Comprehensive drainage improvements are needed. Bypass Meadow Creek and Shenks Branch with box culvert
<p>Pedestrian Connectivity</p> <ul style="list-style-type: none"> No pedestrian facilities exist for majority of roadway, exception being the bridge over Meadow Creek No bike facilities exist Few destinations along this portion, exception being Rivanna Trail at Melbourne 	<ul style="list-style-type: none"> Roadway improvements should focus on safety. Bike and pedestrian improvements can be made "off-corridor" but until the roadway itself is safer, adding bike and pedestrians into roadway is not recommended. Seek to make connections within broader bike/trail network (i.e., Rivanna Trail and JWWP trail)
<p>Accidents</p> <ul style="list-style-type: none"> Accidents reflect the nature of the roadway. Accidents are not specifically concentrated at intersections, but instead distributed along the sharpest curves along the road. 25% of accidents at Melbourne Road intersection Not including Melbourne intersection, 46% of accidents are single vehicle events, which reflects the dangerous nature of the road. Of the accidents involving multiple vehicles, 54% were rear-end collisions and most of them seem to have occurred in the SB lane, which is the lane that has the worst stopping sight distance due to the downhill grade. 	<ul style="list-style-type: none"> Focus on improvements that increase safety in this portion of the corridor

STONEHENGE ROAD TO CITY OF CHARLOTTESVILLE

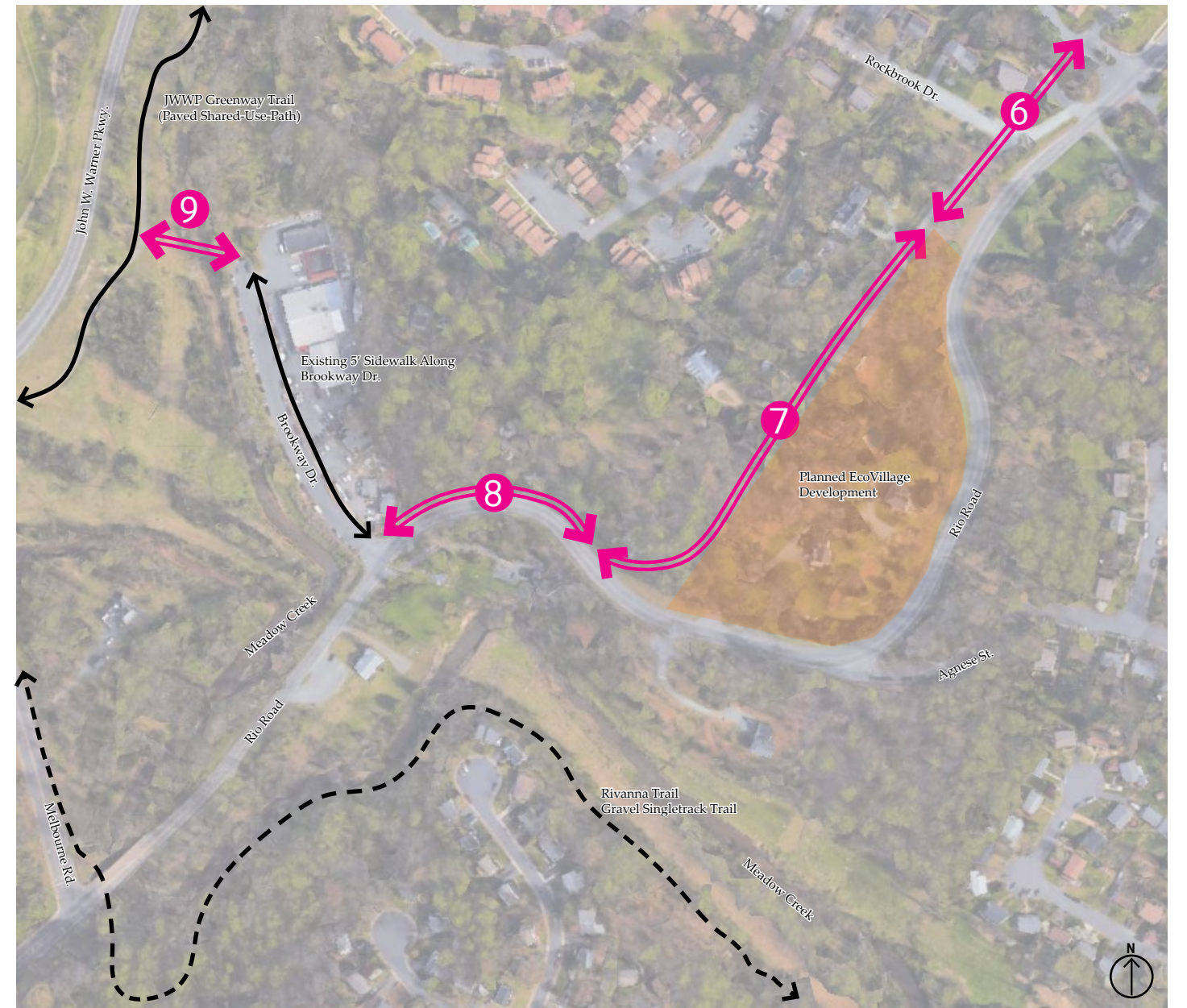


CORRIDOR SAFETY IMPROVEMENT PLAN: ADDRESSING KNOWN DEFICIENCIES



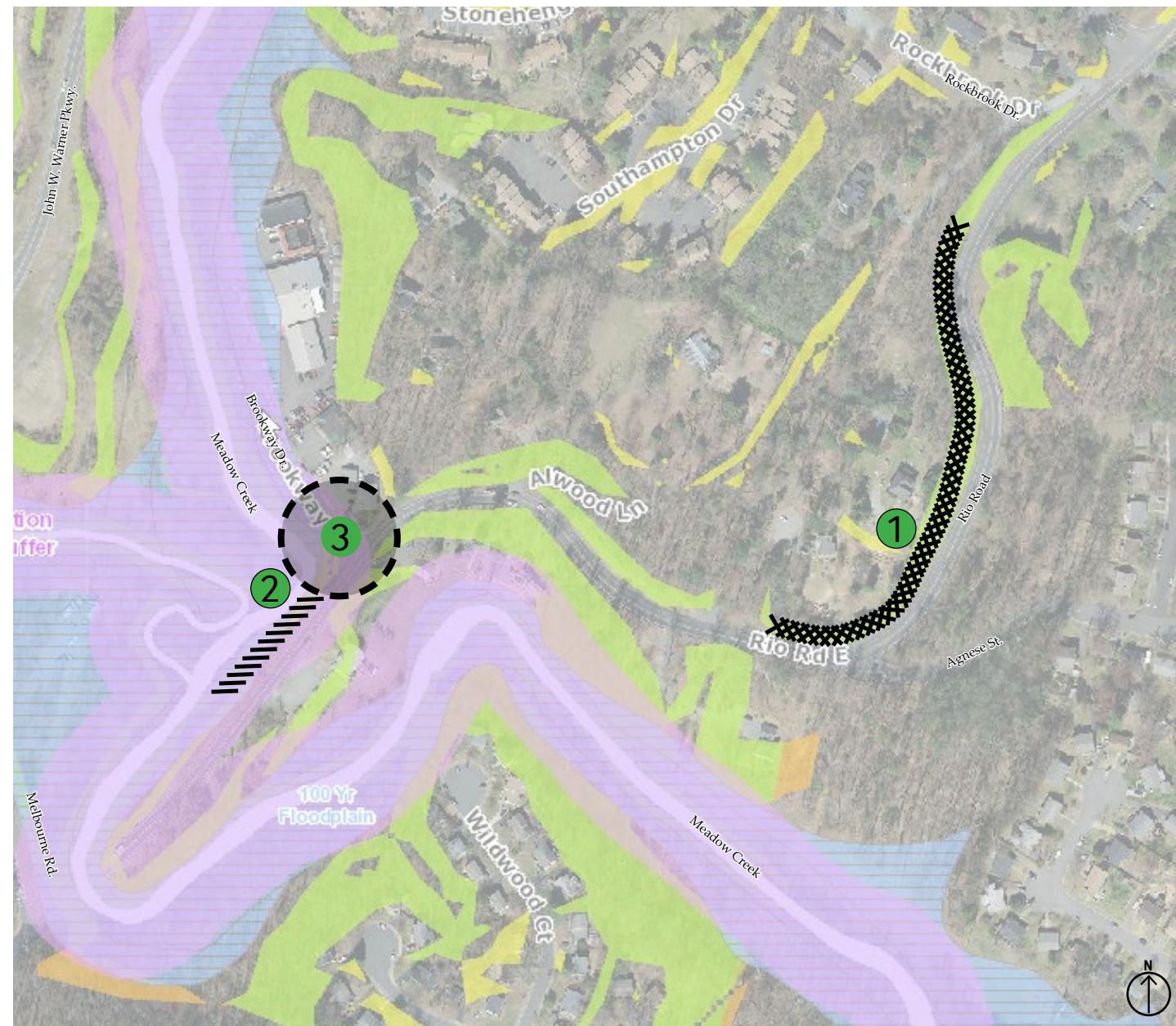
- 1 Vehicular guardrails should be brought up to current standards throughout this corridor
- 2 Intersection improvements to correct drainage deficiencies as well as intersection sight distances
- 3 Intersection improvements to promote safe interaction between vehicles and improved sight distances
- 4 Address erosion and degradation within Meadow Creek to ensure safety of Rio Road
- 5 When EcoVillage is developed, the critical slopes should be granted a waiver to be re-graded to improve sight distances along Rio Road

MULTI-MODAL CONNECTIONS CONCEPT PLAN: OPPORTUNITIES FOR PEDESTRIAN AND CYCLIST IMPROVEMENTS



- 6 Opportunity to extend frontage road or bike + pedestrian connection between Treesdale, Stonehenge and (Future) EcoVillage
- 7 Extend shared use path along utility easement (EcoVillage Development could incorporate into their Site Plan)
- 8 Following the implementation of roadway safety improvements (at left), shared use path or sidewalk connection from EcoVillage to Brookway Drive
- 9 Pedestrian bridge across Meadow Creek connecting Rio Road to the JWWP Greenway system

HYDROLOGIC AND ENVIRONMENTAL CONSIDERATIONS: ADDRESSING DEFICIENCIES AND OPPORTUNITIES



- 1** The critical slopes within the EcoVillage site inhibit the vehicular sight distance along Rio Road. County Staff should consider a Critical Slopes Waiver to correct this condition.
- 2** Meadow Creek exhibits deeply incised banks and significant erosion adjacent to Rio Road. This condition poses environmental and public safety concerns. County staff should consider further study to improve Meadow Creek as well as integrate the natural resources with the built environment in this area.
- 3** Portions of Brookway Drive are within the 100-year floodplain. This may be associated with the observed drainage deficiencies and accident data suggesting wet conditions played a part in vehicular crash incidents.

RECOMMENDED SOLUTION



- 4** Dedicated left-hand turn lane and through lane for SB vehicles
- 5** Painted median splitter island
- 6** Revised intersection geometry promoting improved sight distances
- 7** New pavement markings conforming with current MUTCD guidance

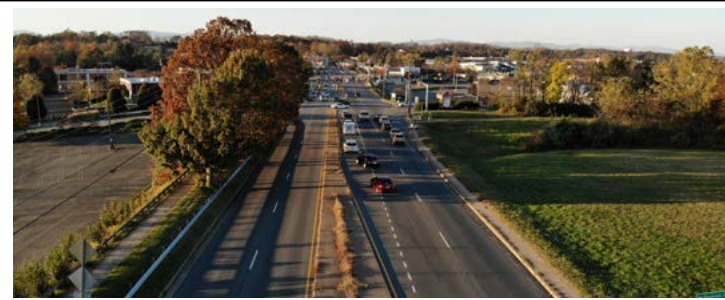
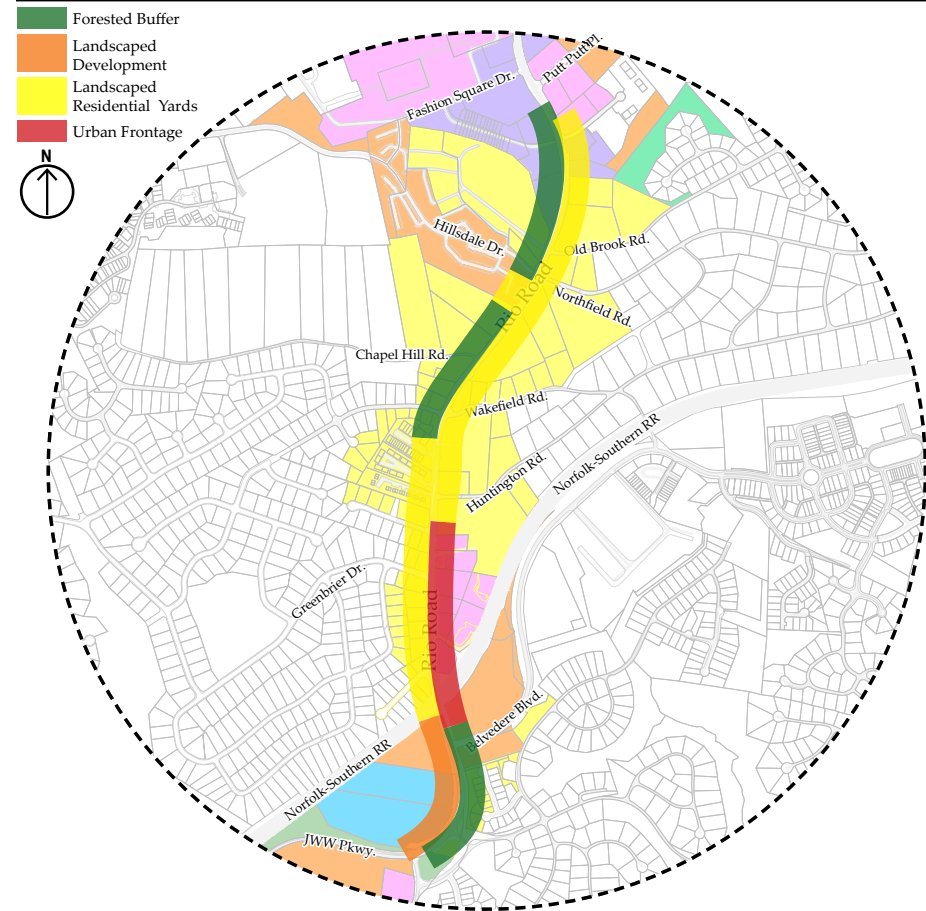
SUPPLEMENTAL INFORMATION



ROADWAY FRONTAGE CONDITIONS + THE PUBLIC REALM



PARCEL FRONTAGE CATEGORIES ALONG RIO ROAD



EXISTING FRONTAGE CONDITIONS

The land adjacent to the corridor is essentially an extension of the typical section of the corridor. Even though this land is private, the County still has some control regarding how it gets developed. The County Zoning Ordinance provides regulations not only for what type of development is allowable, but also for the building and parking lot placement, required parking, building height, and vegetation, among other things. Depending on the execution, these regulations can have the unintended consequence of creating a vehicle-centric site and therefore a vehicle-centric corridor with lack of human scale.

Along this corridor, many parking areas are situated directly outside of the right-of-way, severing the public linkages between the surrounding buildings and businesses and further degrading the sense of community by prioritizing and showcasing the vehicle. The “transition zone,” the space between the right-of-way and the building, should instead be designed with the pedestrian experience in mind.

outcomes. Simply put, when tall buildings feature a narrow transition zone, an urban character is produced. When smaller buildings feature a wide transition zone, a suburban character is produced. And depending on how the building and its first floor activity are intended to relate to the public realm, certain geometric outcomes are more appropriate than others.

Based on the corridor’s wide range of development possibilities, the building’s height, transition zone size, and activity within need to be calibrated in a way that engages a building to the public realm in an appropriate manner.

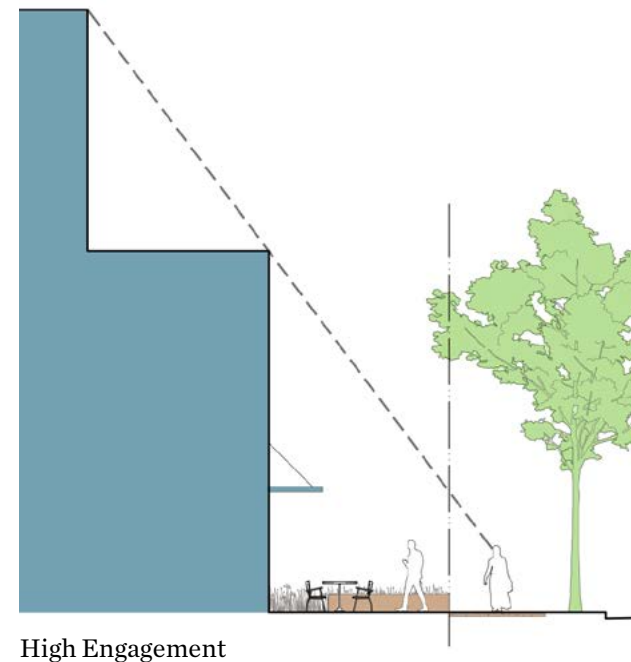
- Buildings with High Engagement should be developed in a way to invoke an urban character where the sidewalk, public spaces, and building entry are seamless, traversable, and centered around active public space.
- When people are not encouraged to peek through windows in a Medium Engagement condition, the transition zone should provide a physical, but not visual, buffer between the public sidewalk and building’s first floor use.
- In situations where additional privacy is warranted, Low Engagement patterns should be used to further separate public and private uses while still tethering the public realm.
- Based on existing constraints like topography, utility infrastructure, and environmental context, a building may visually disengage from the public realm in a No Engagement condition, but is generally discouraged unless deemed critical.
- Additionally, pending the design of a building’s first floor use, some buildings may feature more than one engagement zone within the same footprint. These differing engagement types create a flexible framework while also reinforcing a vibrant public realm.

PROPOSED FRONTAGE CONDITIONS

A building’s height and transition zone treatments play a critical role in how a development relates to the public realm and it should be noted that different building heights and transition zone depths lead to different

BUILDING ENGAGEMENT

Refer to Appendix B for additional detail on Building Engagement



High Engagement



Medium Engagement



Low Engagement

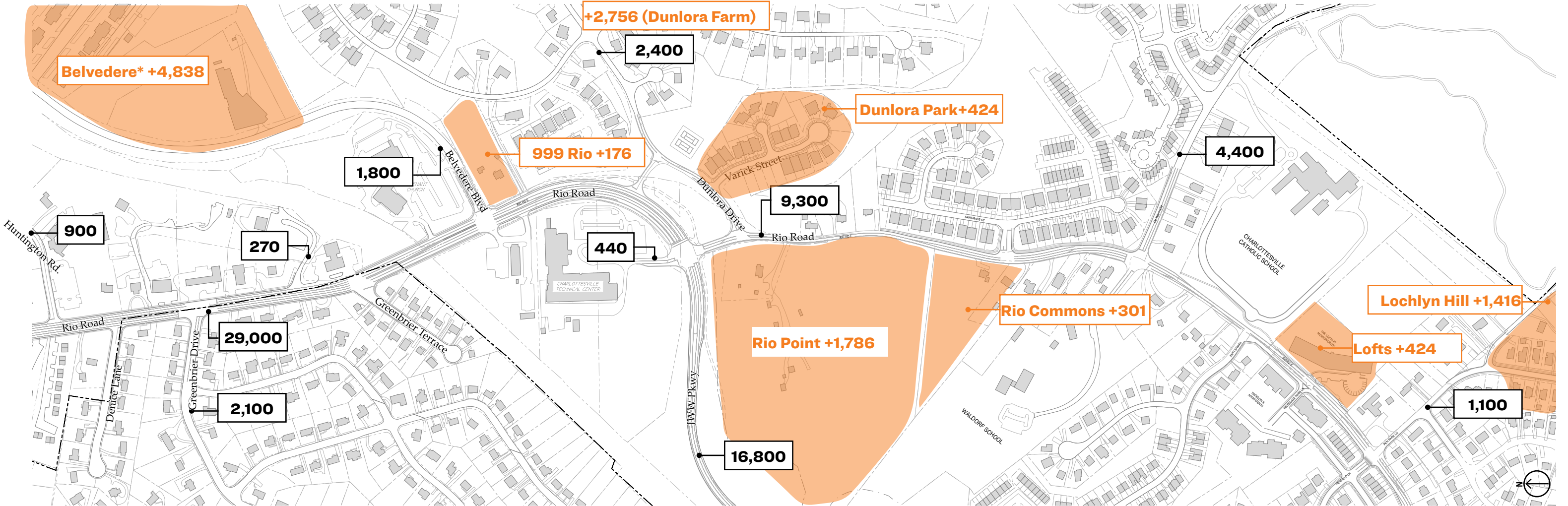


No Engagement

TRAFFIC VOLUMES FROM RECENT AND PLANNED DEVELOPMENTS



KNOWN TRAFFIC VOLUMES AND KNOWN TRAFFIC GROWTH FROM DEVELOPMENT PROJECTS

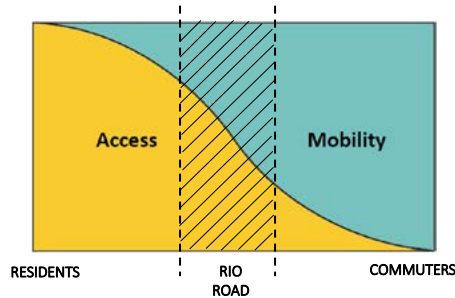


RIO ROAD WILL CONTINUE TO PROVIDE A DUAL service to the community: it both conveys commuter traffic traveling into the urban-core of Charlottesville and carries local traffic which has a different mobility pattern as well as different user-groups (i.e., walkers and cyclists).

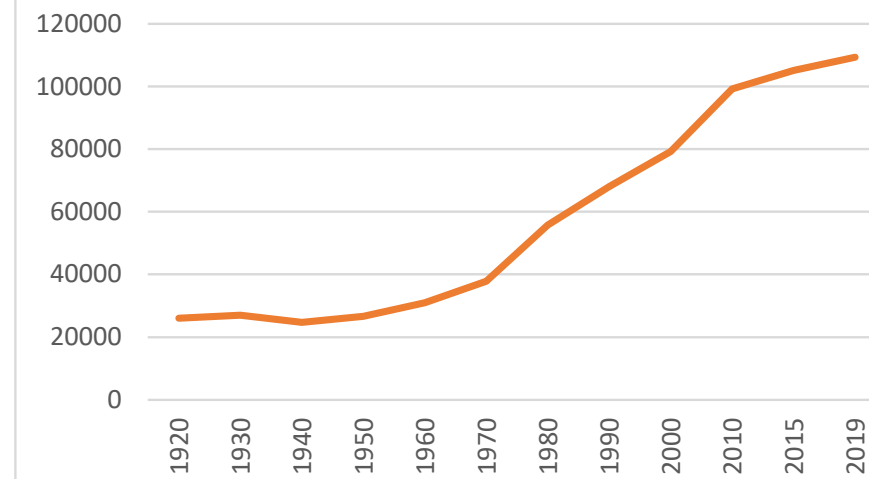
The improvements to the corridor which are recommended in this document will enable the corridor to increase the capacity of the roadway to more appropriately accommodate local traffic without compromising the ability to convey commuter traffic.

The intersection improvement concepts as well as the recommended typical section will do a good job to promote a safer environment, increase functional capacity and prepare for the needs of a corridor which will experience continued growth.

The map above indicates current traffic volumes as well as known increases from planned and recent developments. This map does not account for the future traffic volumes as a result of by-right redevelopment projects which can increase density at the time of redevelopment. It is safe to say that based on the population growth and population density trajectories shown at right the corridor will continue to experience increased traffic volumes in the future.



POPULATION GROWTH



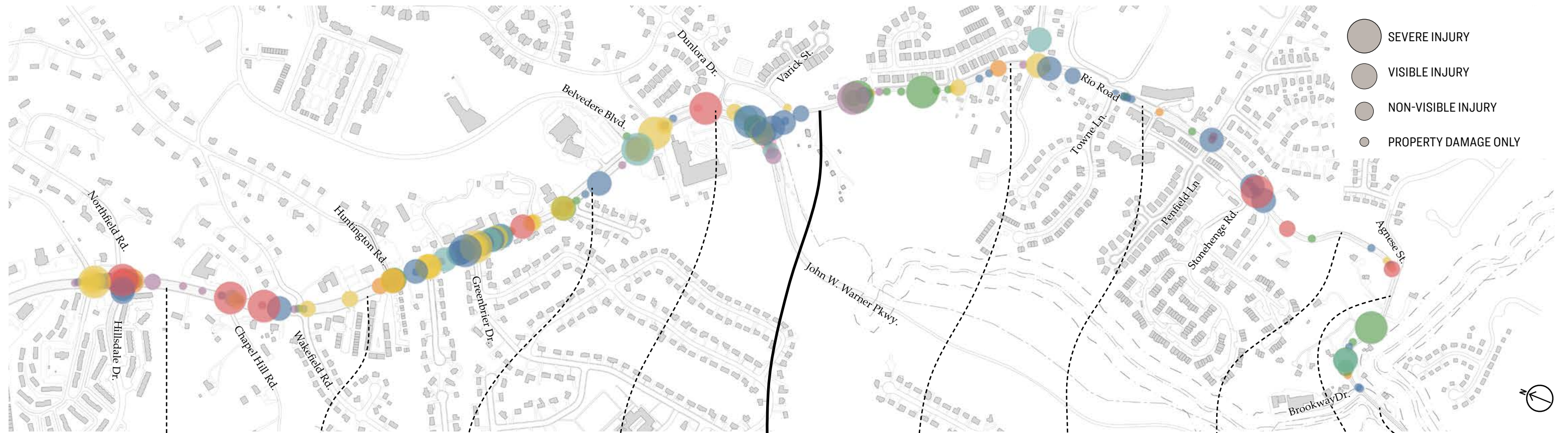
Census Data from Social Explorer, 2021

RIO ROAD EAST PH 2

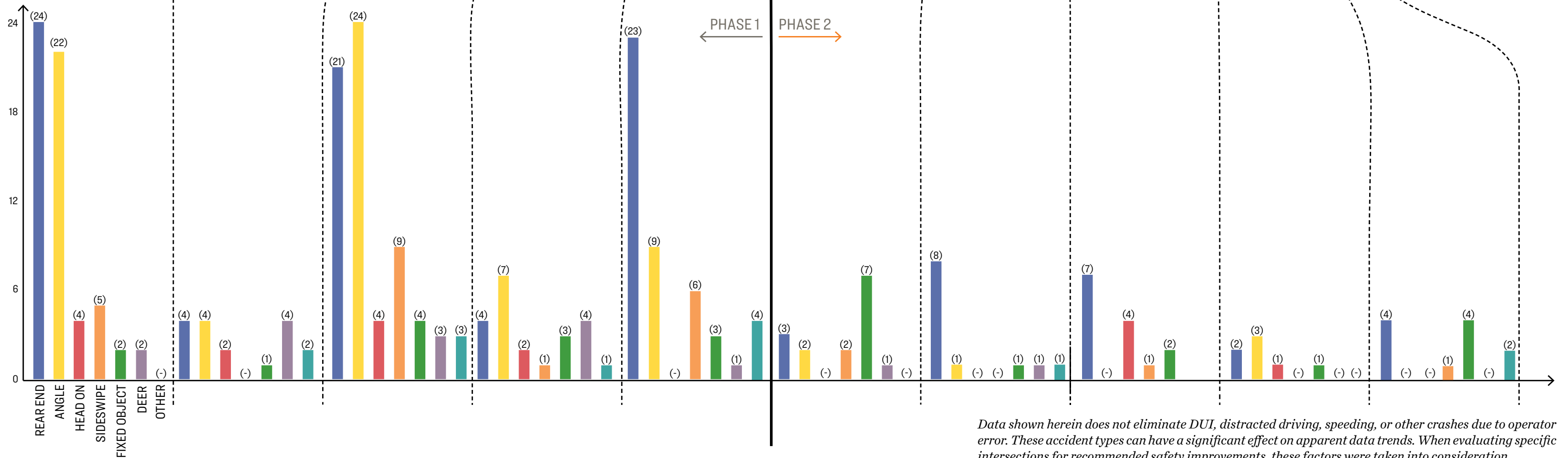
2019 VDOT Data suggests: 9,300 Vehicles Per Day (VPD) along Rio Road (within Phase 2)

Recent, pending and planned development projects will increase the traffic volumes by an estimated 4,351 VPD over the 2019 VDOT volumes.

ACCIDENT ANALYSIS: TYPOLOGY AND SEVERITY

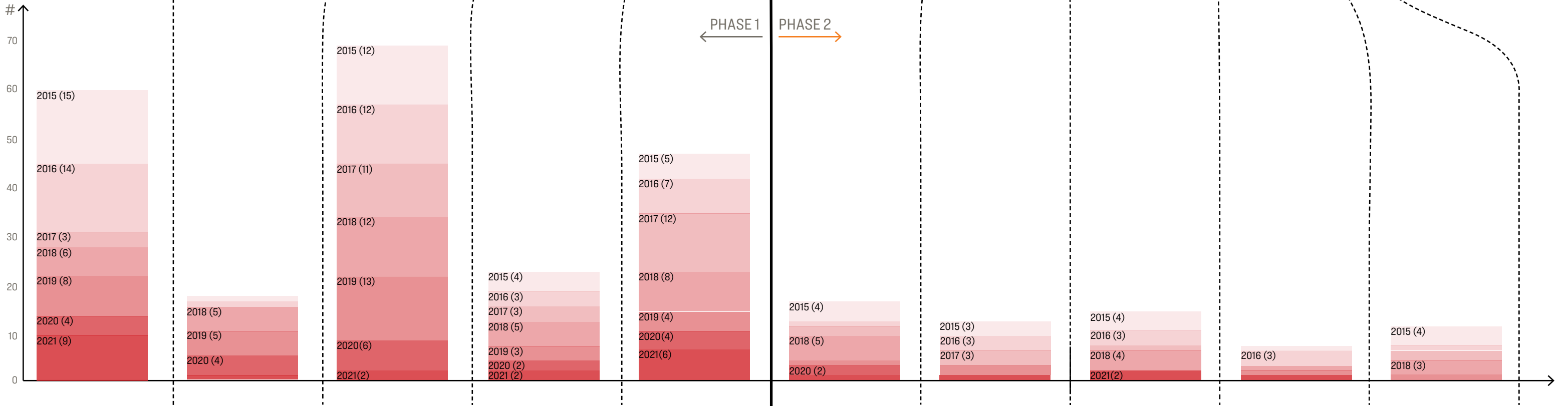


- SEVERE INJURY
- VISIBLE INJURY
- NON-VISIBLE INJURY
- PROPERTY DAMAGE ONLY



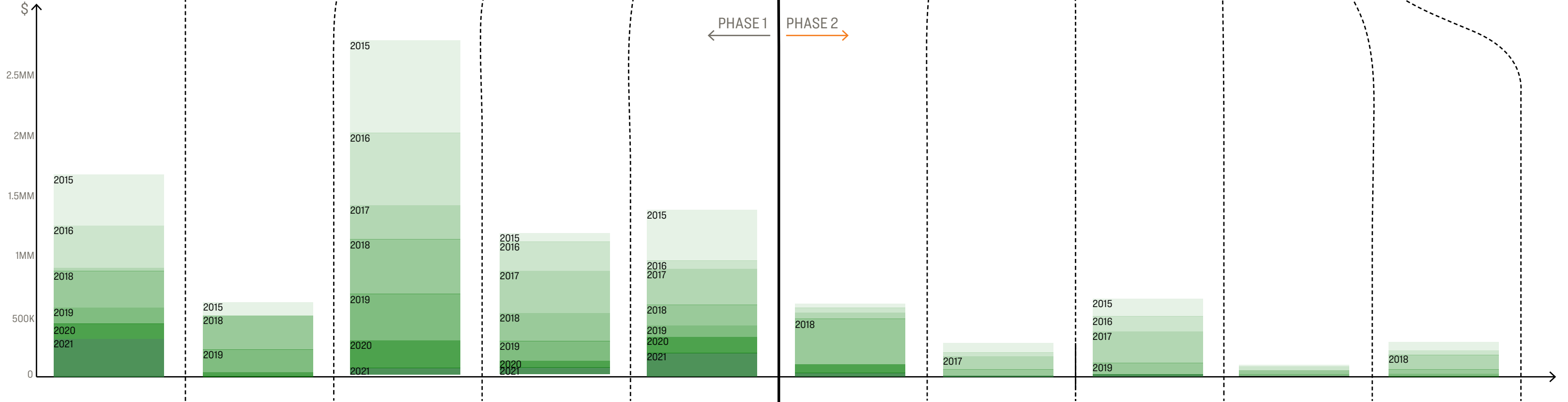
Data shown herein does not eliminate DUI, distracted driving, speeding, or other crashes due to operator error. These accident types can have a significant effect on apparent data trends. When evaluating specific intersections for recommended safety improvements, these factors were taken into consideration.

ACCIDENT ANALYSIS: CRASHES PER YEAR



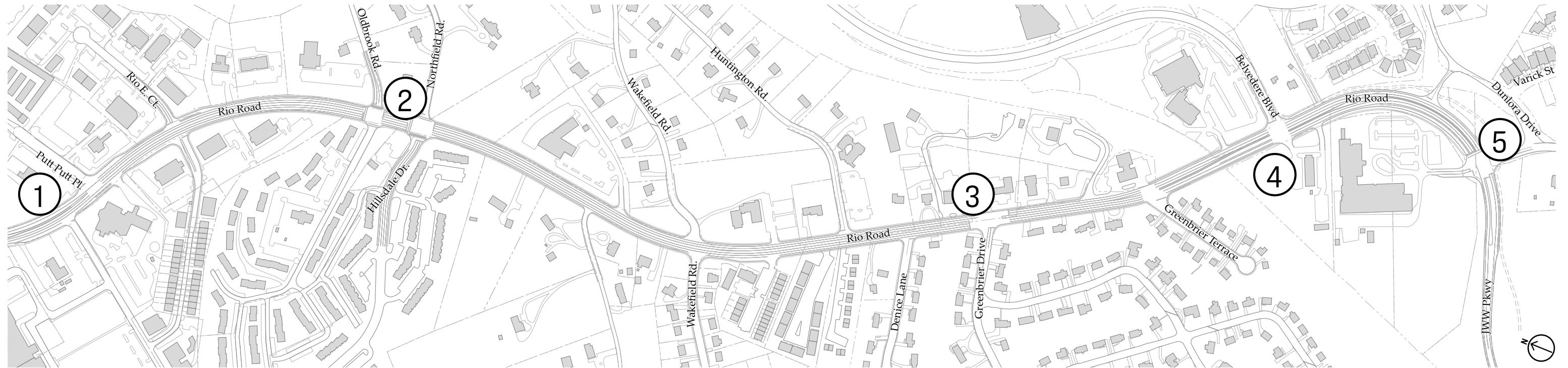
Crash data before 2015 not available on the VDOT website

ACCIDENT ANALYSIS: ECONOMIC IMPACT



Costs have been determined from crash severity, as defined in Section 2.3 of the Manual on Classification of Motor Vehicle Traffic Accidents ANSI Std D16.1-2007. Dollar amounts have been adjusted to 2021 dollars.

RIO ROAD CORRIDOR SHOWING AREAS OF FOCUSED TRAFFIC STUDIES AND RECENT PROJECTS



1. FASHION SQUARE DRIVE + PUTT PUTT PLACE

Technically beyond the boundary of this Corridor Study, the intersection of Rio Road with the Fashion Square Mall and Albemarle Square Shopping Center access roads has been evaluated by the Rio/29 Small Area Plan Study. The intersection currently operates at a LOS D. The future success of this intersection is integrally linked to the synchronization and capacity of adjacent intersections, specifically the Putt Putt Place intersection.

The Rio29 Small Area Plan Study suggests that Hillsdale Drive be realigned to cross through the Fashion Square Mall Property and establish a new intersection with Putt Putt Place. This realignment of Hillsdale Drive will alleviate the congestion at other intersections. The study recommends this new intersection at Putt Putt Place be a roundabout which will help maintain intersection capacity as adjacent lands are redeveloped.

An initial review of this proposed relocation suggests that implementation of this plan could have a substantial impact on private properties around the intersection.

2. OLD BROOK / NORTHFIELD / HILLSDALE

Despite being one of the least safe intersections in the entire county, this intersection has received very little formal attention in terms of traffic study and analysis.

As noted in Key Note 1 (left) the Rio29 Small Area Plan suggests relocating Hillsdale Drive through Fashion Square Mall property and connecting to Putt Putt Place. Should this plan prove infeasible due to legal, physical or financial constraints the County will need to implement a plan at this intersection to promote safe and effective operation.

In 2007, A. Morton Thomas and Associates, Inc. (AMT) designed pedestrian signal phasing improvements and upgraded the crosswalks to provide means of accessibility improvements at the intersection.

In 2017, EPR, PC developed a TIA supporting the Arden Place Phase 2 proposed development. This TIA study suggests that both the Old Brook/Rio and Northfield/Hillsdale/Rio intersections were operating at a LOS B and that the proposed development would not have an adverse impact on the intersections.

It is noteworthy to express that the EPR study does suggest that several specific movements within these intersections do operate at LOS D; and that the intersection proximity does not allow for improvements which would add capacity (i.e., turn lanes cannot be extended due to the distance between the intersections).

The nuance and complexity of these intersections warrants additional detailed study and analysis.

3. GREENBRIER DRIVE

Greenbrier Drive is currently a signalized intersection along Rio Road. No known traffic studies have been conducted at this intersection. The portion of the Rio Road Corridor around this intersection is prone to access management and safety challenges as shown on Page 10 of this study.

The intersection received pedestrian signal phasing in 2019 as well as upgraded crosswalks and ADA ramps.

This intersection may warrant specific study in the future at such a time when the gas-station commercial properties redevelop.

4. BELVEDERE BOULEVARD

In 2020 VDOT performed a study which evaluated the performance of the Belvedere intersection. The study concluded that the intersection was operating at a LOS C during the morning peak hour and at a LOS E during the evening peak hour. Of specific importance to the Belvedere community is the substantial delay experienced during the evening peak hour. The long delay, coupled with the known volume of vehicular crashes at this intersection suggest that improvements are warranted.

As the traffic volumes map on Page 27 suggests, future development will continue to increase the traffic volumes until the development reaches the full operational build-out which includes additional housing, a soccer complex and additional programming at The Center. It is estimated that the final developed condition at Belvedere will include an additional 2,380 vehicles per day, as well as the 999 Rio Development which will contribute an additional 161 daily trips. These

additional traffic volumes will only exacerbate an already untenable condition.

The VDOT study concluded that a Restricted Crossing U-Turn (RCUT) was an adequate solution for the intersection. However, this solution was not preferred as it did not take into account the character and the context of the corridor and required vehicles to make a U-Turn at Greenbrier Terrace, which is a residential street.

As presented in this study, a preferred alternative to the VDOT RCUT is a Green-T which is indicated on Page 13. This alternative accomplishes many of the same goals as the RCUT and also has the option to include a traffic signal in the future.

5. JOHN W. WARNER PARKWAY

The aforementioned VDOT Study in Keynote 4 also included a study of the JWWP intersection. The study established that the intersection operates at a LOS E during both morning and afternoon peak hours.

The study concluded that a dual-lane roundabout with a non-yielding west-bound Rio right-turn lane would establish a LOS A during morning and peak hours. This solution establishes a high-performing intersection. The proposed improvements also include a third northbound Rio Road Lane.

The Rio Point Development also included a TIA study supporting their increased residential density within the property that occupies the southeast corner of the JWWP/Rio intersection. This TIA study, performed by Ramey Kemp Associates (RKA), accounted for continued increased residential density along the Rio Road corridor. The RKA study suggests that the anticipated increased density along the corridor will downgrade the Level

of Service at the JWWP/Rio intersection from an A to a B, increasing the average delay through the intersection by 3 seconds. The inclusion of the future residential density in the area suggests that this final LOS of B is a comprehensive level of service for the corridor for the foreseeable future.

The RKA TIA also included an analysis of nearby adjacent intersections, notably the Dunlora Drive intersection with Rio Road. The RKA study suggests that the Dunlora Drive intersection currently operates at various Levels of Service throughout the day, depending on the preferred vehicle movement.

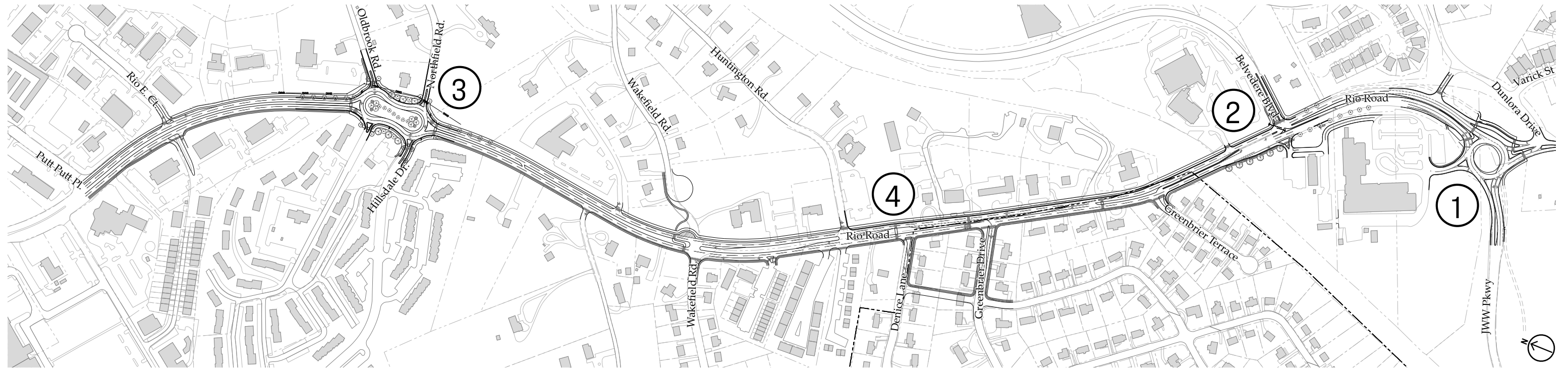
In the final build-out condition, including the JWWP/Rio Roundabout and the Rio Point Development, the Dunlora Drive intersection will operate at a LOS D during the morning peak hour and LOS C during the evening peak hour. These proposed movements are reflective of the new partial access intersection allowing only left-in and right-out movements as shown on Page 15.

The proposed traffic conditions at the JWWP/Rio and Dunlora Drive/Rio intersections do not account for future increased density at the Dunlora Farm Properties adjacent to the Dunlora neighborhood. It is unknown when or if these properties will ever redevelop. However, if they were to redevelop the increased traffic would affect the operation of the Dunlora/Rio intersection.

ADDITIONAL INFORMATION

Relevant pages from the traffic studies summarized on this page are included in Appendix F.

IDENTIFIED PROJECTS FOR IMPLEMENTATION



IMPLEMENTATION STRATEGY

The recommended strategy for project implementation is to:

- Maximize the use of existing infrastructure
- Address critical areas first (least safe, least serviceable)
- Establish high functioning intersections
- Infill linear pedestrian and cyclist improvements as properties along the corridor redevelop
- Establish the North Town Trail
- Perform discrete, small projects on an as-needed basis

The implementation strategy is to use what we have and what we know is going to be happening soon. Namely, the JWWP intersection will be overhauled in the near future. This is an opportunity to catalyze the findings of this study with visible progress. As such, the JWWP intersection is identified as the first step in implementing the Phase 1 improvements.

Next, it is recommended that the Belvedere intersection be addressed as soon after the JWWP as financially feasible. This is recommended due to its direct proximity to JWWP as well as the fact that the Belvedere community will continue to see substantial increases in traffic generation (refer to “Traffic Volumes from Recent and Planned Developments,” Page 27). As will be noted by the VDOT study in Appendix F, VDOT evaluated the JWWP and Belvedere intersections at the same time, and their integrated nature is of specific interest to the functioning of this corridor.

Having established high functioning and integrated intersections at the southern terminus of Phase 1, attention is then turned to the other end of the corridor, to the Hillsdale/Northfield/Old Brook intersection. As expounded upon in the pages specifically devoted to this area, this intersection not only needs to be improved

from a serviceability and safety standpoint, it also represents an opportunity to change the context of the corridor from what can best be described as a commercial boulevard within the Rio29 Small area plan to what is becoming increasingly a residential collector street within the limits of this study. This intersection can serve as an established context change with visual cues that a character shift is about to occur. It is also noteworthy to express that this context shift happens at the topographical high-point of the corridor, which further supports the notion of establishing a gateway feature integrated with this context shift.

Having established the high-functioning intersections on either end of the corridor, the work then shifts in nature and focuses on the typical section. Typical section improvements include, among other things, establishing a raised median with opportunities for U-turn movements. Careful and deliberate attention should be paid to Rio Road between Greenbrier Drive and Gasoline Alley where there are many commercial properties and numerous access management challenges. This area can, indeed, receive a raised median (Refer to Appendix A), however, the installation of this raised median ought to coincide with the properties being redeveloped. It is anticipated that the value of these properties, coupled with the trend away from reliance on fossil fuels, will eventually lead to a higher and better use of these commercial properties, and that the County will have an opportunity to address the concerns raised here.

Finally, once the raised median and typical section work has reached a tipping point of completeness, the County can work toward establishing the shared use path, which is proposed to replace the on-road bike lanes. Establishing the shared use path for the duration of this corridor will largely complete the Northtown Trail which will create an important connection for users of non-motorized transit between the urban core of Charlottesville and the Places 29-North development area.

1. JOHN W. WARNER INTERSECTION

This project has been approved for construction by VDOT and the County of Albemarle. The estimated Cost is \$7.144 MM not including right-of-way acquisitions.

As of Q1, 2022, VDOT has begun the initial steps of the Preliminary Engineering (PE) phase of this project, specifically an as-built survey of the project vicinity. However, the actual schedule of design improvements is unknown.

When VDOT and/or their consultant begins formal design work on this intersection it is anticipated that the community will be notified and that VDOT will be referred to this study for background information. The concepts as presented here will be refined into a formal schematic plan and then an engineered plan.

2. BELVEDERE BOULEVARD INTERSECTION

This project has not been approved for construction, preliminary design or further analysis. Initial estimates suggest this work will cost approximately \$2.7 MM.

This project would make a strong candidate for a Smart Scale Application given the safety and congestion challenges at this intersection. The project is a strong candidate given VDOT's previous involvement studying ways to mitigate these challenging circumstances.

3. HILLSDALE / NORTHFIELD / OLD BROOK

This project has not been approved for construction, preliminary design or further analysis. Initial estimates suggest this work will cost approximately \$8.2MM not including right-of-way acquisitions.

It is advised that the County make a determination about this intersection improvement versus the Putt Putt Place roundabout recommended in the Rio29 Small Area plan. Both intersection improvements are likely not necessary as both seek to address some of the same safety and serviceability challenges. When a consensus is established it is recommended that the County apply for funding to finance this improvement as well as identify a fiscal year when the County can commit to this work.

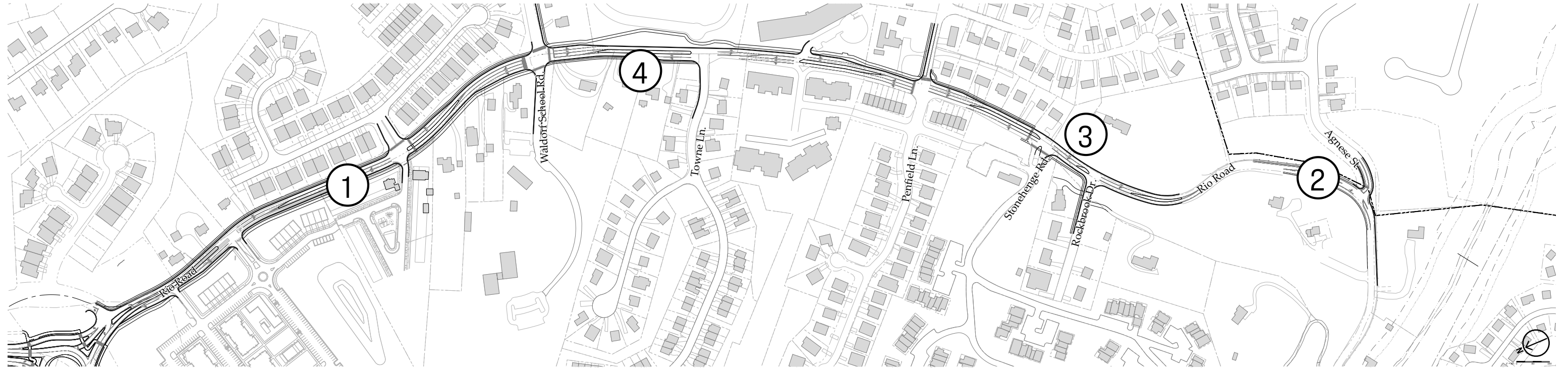
4. INFILL IMPROVEMENTS

Infill improvements do not consist of a single project, but rather discrete opportunities to continue developing the corridor in accordance with this plan -- specifically working to implement the ideal typical section.

Developing the ideal typical section over time will take vigilance to work with landowners who are redeveloping their properties as well as identifying funding sources which correlate with the discrete tasks.

County staff must remain mindful of the recommendations of this study and continually use this document as a resource to identify projects which can be built with local capital improvement dollars as well as work with development professionals who can proffer improvements as recommended herein.

IDENTIFIED PROJECTS FOR IMPLEMENTATION



IMPLEMENTATION STRATEGY

The recommended strategy for project implementation is to:

- Work with developing properties to implement the desired roadway improvements across the frontage of the parcel(s).
- Implement necessary safety improvements along portions of Rio Road that have been deemed unsafe and deficient.
- Identify access management improvement projects which can be completed with local dollars (non-grant funded).
- Complete the shared use path from Pen Park to Penfield Lane and complete small streetscape improvement projects.

The implementation strategy is to leverage the inertia of pending development projects to accomplish the vision of the North area along Rio Road. The two (2) pending developments enable the County to achieve approximately 80% of the improvements along the corridor - specifically related to the shared use path and turn lanes.

Next, it is recommended that the County look to make safety improvements along Rio Road in the South section. The accident data (Pages 28-30) suggest that several specific improvements are needed in this area including new guardrails, new pavement markings, and intersection improvements.

Having leveraged the inertia of the pending developments to improve the North area and having focused on making discrete safety improvements within the South area, the remaining projects are infill in nature and will likely require local dollars to complete. The County would benefit from adding several of these infill projects onto the priority list for future projects.

1. STREETScape FROM JWWP TO PEN PARK

The work along this portion of the corridor will largely be incorporated with the two development projects currently planned, Rio Point and Rio Commons. Having two (2) adjacent developments which afford the opportunity to realize the recommendations of this study is beneficial to the County. Though development often comes with negative connotations and the additional burdens on public infrastructure, the recommendations of this plan can mitigate these impacts and allow the character of this corridor to be changed.

It is recommended that County Staff work with the developers and recommend the solutions presented in this document. This is not anticipated to have an adverse impact on the developers or developments.

Following this approach, the North section of this corridor will reflect the suggestions of this study, and only a small portion of the shared use path will remain to be built (from Rio Commons to Pen Park). It is therefore recommended that the County identify this remaining portion of the SUP as a County project and allocate funding to complete this work.

2. SAFETY IMPROVEMENTS (AGNESE TO BROOKWAY)

The intersection of Agnese Street and Rio Road can be drastically improved with the recommendations of this report. Due to size and scale, these projects are not likely to receive grant funding; however, these improvements are paramount. Furthermore, the proximity to the City, particularly at Agnese, could lead to a cost-sharing agreement between the two agencies.

This report specifically recommends these safety improvements be implemented as soon as feasibly possible. The accident data in these areas suggest that the collisions and threat to public safety will continue until mitigating measures are implemented.

3. INTERSECTION IMPROVEMENTS

Within the Central section of the corridor there are several intersections which warrant improvements, specifically Stonehenge Road, Rockbrook Drive, and Penfield Lane. Each of these intersections exhibit specific deficiencies in need of mitigation. However, similar to Agnese, the scale of these improvements suggests that local funding would be appropriate.

4. INFILL IMPROVEMENTS

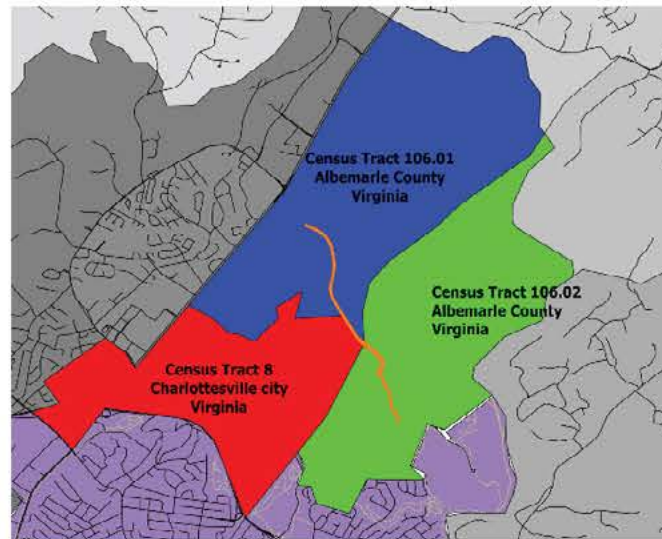
Infill improvements do not consist of a single project, but rather discrete opportunities to continue developing the corridor in accordance with this plan (i.e., working to implement the ideal typical section and pedestrian and cyclist connections to destinations near the corridor).

Developing the ideal typical section over time will take vigilance to work with landowners who are redeveloping their properties and to identify funding sources which correlate with the discrete tasks.

County staff must remain mindful of the recommendations of this study and continually use this document as a resource to identify projects which can be built with local capital improvement dollars and to work with development professionals who can proffer improvements as recommended herein.

SUMMARY OF DEMOGRAPHICS

Information and Data as provided from County of Albemarle Office of Equity and Inclusion



Following the completion of the Rio/29 Small Area Plan, and having received recommendations for road improvements along Rio Rd, a corridor study is being undertaken along that route in order to guide future development patterns. The road connects 29 North with Downtown Charlottesville and points east, and on its northern segment is punctuated by commercial office and retail. It quickly transitions to residential developments, is flanked by several churches and multifamily units on the eastern side.

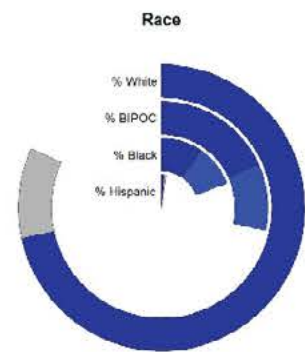
The study area intersects three Census Tracts, two in Albemarle, and a third in Charlottesville. Of note, Tract 106.01 includes a significant amount of affordable housing, evident in the lower income figures, and much higher poverty rates. In both 106.01 and 8, poverty among those under the age of 5 is much higher than the municipal average.

Engagement with lower income residents of the study area is imperative in future planning and implementation efforts in the corridor.

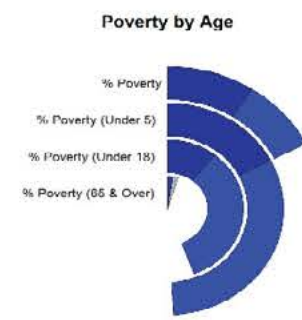
Source: Albemarle County, American Community Survey 5-year estimates (2019)

106.01

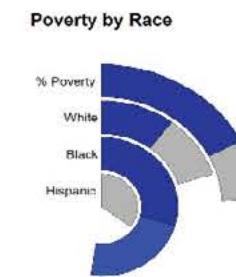
The affluent Carrsbrook and Woodbrook developments are in this tract, but the impact of the multi-family housing and the affordable housing units included in the Mallside Forest development bring income below average.



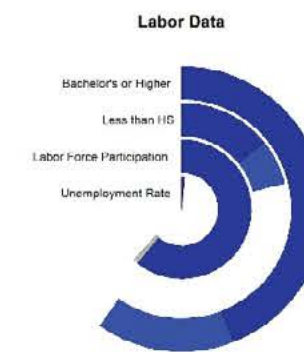
Population
6,330



Median Age
42.7

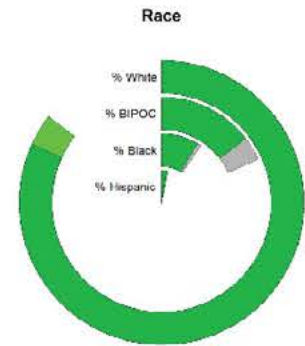


Median Household Income
\$62,500

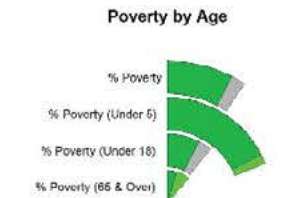


106.02

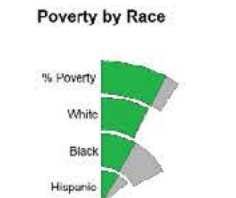
The southern portion of this tract includes the newer Belvedere neighborhood, while the norther portion includes several multifamily developments, churches, and older housing stock. Gasoline Alley is the only retail destination in the tract.



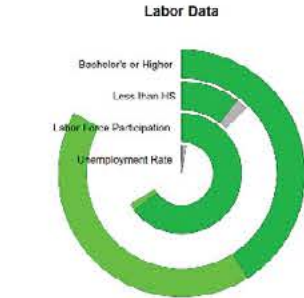
Population
4,314



Median Age
39.5

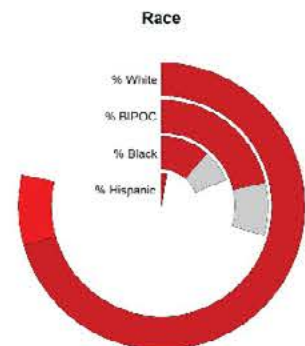


Median Household Income
\$93,458

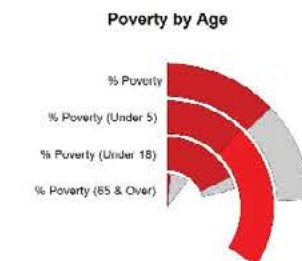


8

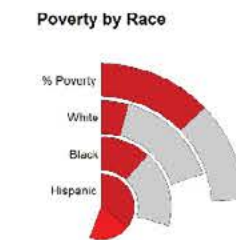
Much of this tract is made up of the affluent Greenbrier neighborhood, and the more mixed income Greenbrier Heights. Two grocery stores (Whole Foods and Kroger) are available in this tract, though access from the Study area involves either 29 or the recently completed Hillsdale Drive Extended.



Population
3,896



Median Age
45.2



Median Household Income
\$71,648



Albemarle

Population
107,405

Median Age
39.1

Median Household Income
\$79,880

FREQUENTLY ASKED QUESTIONS OR CONCERNS

Over 200 comments were received online, with many more comments via public outreach sessions, emails, CAC meetings, and phone conversations. All comments were documented and sorted through for redundancies, as many community members voiced similar concerns. The best effort has been made to respond to each comment and update the document as appropriate. Though positive feedback was received, most of that feedback does not elicit a response other than “thank you for sharing, we appreciate it” (which we do) and has not been included in this section. Please see Appendix C for the entirety of comments provided online. Thank you to everyone who has contributed their knowledge and energy to this study.

GENERAL / MISCELLANEOUS

Why is Putt Putt Place not being considered in this study? This intersection is very difficult to turn left out of and there is currently no stop light.

This intersection was studied as part of the Rio29 Small Area Plan. It was not included in this study so as not to duplicate efforts. If you are interested to learn more information, please visit the County’s website.

While the recommended intersection improvements have been highlighted, it is of concern that there are not smaller scale pedestrian projects included in the implementation plan.

The recommended pedestrian improvements differ for Phase 1 and Phase 2.

Within Phase 1: pedestrian improvements largely consist of upgrading the pedestrian and cyclist infrastructure to include a continuous shared use path along the north margin of the road, effectively completing the Northtown Trail. In order for this amenity to be successfully installed it is recommended that the County first improve the primary intersections along the corridor (JWWP, Belvedere, Hillsdale/Old Brook) and then the pedestrian improvements can infill between these intersection nodes. When considered purely from a programmatic standpoint, Rio Road (within Phase 1) has continuous bike lanes and sidewalks on both sides of the road. Once the new typical section is implemented it will need to be done continuously between intersections. It is for this reason that the pedestrian improvements in Ph 1 are not “small scale”.

Within Phase 2: many of the pedestrian improvements are “small scale” given the context of this portion of the corridor. These improvements can be implemented as recommended in the study and as summarized on Page 33 of this document.

Is this study considering future traffic? Many proposed developments in the area pose a concern for traffic along this corridor.

This study does consider future traffic volumes. Please refer to “Traffic Volumes from Recent and Planned Developments” on Page 27.

There seem to be a lot of roundabouts proposed in this area in the various conceptual studies. Why are roundabouts the new buzz word?

Back in 1920, stoplights were the new buzz word! After 100+ years of experience and growth, we have new tools and understanding that inform traffic engineering decisions. Beyond this, VDOT recommends that roundabouts be considered at all new intersections for their ability to handle higher traffic volumes in a safer manner. For more information on roundabouts, please see Appendix D.

Raised medians with vegetation are proposed. Who will be responsible for their care?

This is a great discussion point. Maintenance of landscaping is an important consideration in many areas of the County, not just this road corridor. Providing an attractive and environmentally beneficial road corridor is an important element toward creating a high-quality urban environment. VDOT and the County will need to continue discussions regarding a great commitment to maintaining these environments. This study is only recommending that planted medians be a priority for the County.

Why is demographic information included for areas such as the Greenbrier neighborhood included in this plan?

The demographic information includes the Census Tract Areas surrounding the Corridor. Each tract area has a predefined boundary, as shown in the graphic on Page 34. This information is simply included to give an idea of the demographics of those who may use the corridor on a daily basis. Whether County or City, the use of the corridor is shared by the general public and their safety and welfare is not dependent on which side of a jurisdictional boundary they live.

There are neighborhoods along the corridor that are not mentioned, such as Dunlora Park and Dunlora Forest. Why are these not included?

All surrounding neighborhoods were considered equally in their impact to traffic on Rio Road – which is the focus of this study.

The shared use path puts cyclists and pedestrians on the same path, which is a safety hazard for pedestrians.

While this is a valid concern, it is much safer for cyclists and pedestrians to share a path located away from and buffered from vehicles, than to leave conditions as they are currently. The shared use path is recommended at a minimum width of 10 feet, which is twice the size of the current sidewalks. This allows space for pedestrians and cyclists to coexist safely. Any cyclist/pedestrian conflict would be regrettable and yet likely to leave both parties with minor injuries. Whereas a vehicle conflict with either a pedestrian or a cyclist is likely to leave the non-vehicle user seriously injured or dead.

It is confusing to have two different speed limits on the corridor – from 40 MPH near U.S. 29 to 35 MPH near JWWP. There should be one consistent speed limit.

Posted speed limits reflect the maximum safe speed for a section of roadway, as determined by several criteria including roadway geometry, roadway classification, traffic volumes, and extent of development along the roadway. There is a change in speed limit along the corridor because the character and geometry of the roadway change. Specifically, the drop in speed from 40 to 35 miles per hour is likely reflective of the horizontal curve from Belvedere to the John W. Warner Parkway. VDOT has established the maximum safe speed for this curve to be 35 mph. A speed limit change could be warranted; however, if the roadway criteria have not significantly changed from the last time the speed limit was established, it is unlikely to warrant a change. First, the character of the roadway must change to be more uniform before VDOT will consider justifications for a uniform speed limit. More information on how speed limits are established can be found on VDOT’s website in the FAQ section about speed limits, along with the speed limit change process policy.

Speed is an issue on this road which makes it unsafe for bicyclists and pedestrians.

The recommendations of this study include numerous examples of how the speeds along Rio Road can be lowered based on built interventions. Whether that be roundabout intersections, or the narrowing of travel lanes, or including a raised median. Many of these strategies can aid in lowering vehicular speeds.

I am concerned that these projects on Rio Road will take precedence over more important projects (e.g., the roundabout that has already been proposed at Putt Putt Place).

Each and every project under consideration is important. County staff and leadership will evaluate which projects are prioritized.

Why did the County approve all the development along Rio Road without a plan for the corridor? Isn’t this backwards?

By State law, the County is not allowed to prohibit development that meets the Zoning Ordinance and all applicable regulations. The County has recognized the need for a cohesive vision for this corridor as it continues to develop. The recommendations of this study are still relevant and helpful even with the many planned and approved developments.

The idea of taking away bike lanes when the County is trying to build additional corridors for cyclists to connect with the existing bike lanes makes no sense.

This study does not suggest removing bike infrastructure. This study recommends relocating this infrastructure to a shared use path instead of in-road bike lanes. This recommendation accomplishes several purposes: first, it establishes the missing Northtown Trail Connection, and second, it creates a safer condition to allow more members of the community to use the amenity. For example, very few people will take their children on a bike ride within the current Rio Road bike lanes. Many more people would be willing to ride a bike with their children within the infrastructure recommended in this document.

Has there been a study to determine what this new construction and traffic pattern will do to affect home and property values?

There are published studies that suggest that increases in traffic volumes correlate with increased home values. There are also published studies suggesting that walkable streets are more economically productive. For further study on these topics feel free to read Street Smart by Samuel Schwartz or visit www.strongtowns.org.

The place I feel safest crossing Rio is at Old Brook where there is a walk sign for pedestrians. Is it possible to make more safe crosswalks available by installing pedestrian-controlled traffic lights?

This is helpful feedback. During the course of this study, a pedestrian-activated crossing signal has been installed at Greenbrier Drive. The intersection renovations in this study do not include pedestrian-controlled signals as there are no traffic lights proposed. The corridor plan, as indicated in Appendix A, includes several mid-block crossing opportunities along the corridor.

FREQUENTLY ASKED QUESTIONS OR CONCERNS

Were traffic studies actually done about cross traffic? This study seems to lack data.

The study is meant as a high-level planning and visionary document. In fact, much of the more technical information in the first draft was recommended to be moved to the appendix such that the body of this study could be more accessible to a wider audience. Traffic studies that were used to inform this study are included in Appendix F.

More detailed designs are needed to truly understand the proposal.

This study includes conceptual designs, which inherently lack detail. We have done our best to provide enough information to understand the general pros and cons of each design. Please refer to Appendix A for more detailed conceptual design information.

Is access to all intersections and entrances along the corridor going to be considered? If not, this study is incomplete.

Every entrance and intersection were considered. Please refer to Appendix A.

The designs favor commuters and through traffic, not those living off of the corridor.

The design favors the safety and serviceability of all who use the corridor. Please refer to Page 10 which discusses access and mobility and how this corridor must effectively manage both.

How is Gasoline Alley being addressed? Those wide open access points are dangerous for pedestrians and cyclists.

We believe your reference to Gasoline Alley is to the several gas-stations adjacent to one another along Rio Road, and not to the road named Gasoline Alley.

If so, please refer to the information presented in the Proposed Typical Section and to Appendix A which shows this typical section implemented along this portion of the corridor.

That said, this improvement cannot be achieved until these parcels (the gas stations) redevelop given the current conditions and the entitled access to these businesses.

HILLSDALE / OLD BROOK / NORTHFIELD

There is no current problem with this intersection. Signal phasing adjustments made years ago have significantly increased the safety and efficiency of this intersection.

There are numerous problems with this intersection as evidenced by this study and the information included in the appendices.

According to VDOT, flashing yellow arrows were installed in 2019 to alert drivers making left-hand turns off of Rio that oncoming traffic still has the green light and that they are to proceed with caution. While this is a significant safety improvement, it does not solve the spacing issue of the intersection nor reconcile all the conflict points or accidents.

The current intersection area is dangerous because vehicles often speed through one light on a yellow just to be stopped on red at the next light. The proposed peanut shaped roundabout may be a minor inconvenience but is much better than what is in place now.

We have heard a lot of mixed feedback about whether this intersection is currently safe and functioning properly. However, we must look at the data – which shows high collision rates and woefully inadequate spacing. We do anticipate this design to function much more effectively, thank you.

The issues at the intersection can be solved with adjustments to the signal phasing.

While adjustments to signal phasing can affect the safety and capacity of the intersection, there are limitations. With increasing traffic, adjustments to signal phasing cannot solve the issues of inadequate storage lanes nor minimize the numerous conflict points in this intersection.

The lack of a signaled pause in traffic makes crossing on a bicycle more dangerous. Roundabouts may increase the speed of traffic while reducing the opportunity to cross, especially during periods of high flow.

Please refer to the information on roundabouts in Appendix D. The perspective expressed in this question is in conflict with technical guidance presented therein.

JOHN W. WARNER PARKWAY

I do not experience any issues with the current signalized intersection. I do not think a roundabout needs to be implemented here at all.

This decision was a result of the VDOT conducted studies.

Line and Grade's proposed roundabout moves traffic closer to homes. There is a reason this road was realigned years ago to be moved away from homes. The Dunlora HOA worked with VDOT to extend Dunlora Drive and create a buffer between homes and Rio Road. This design was purposeful to lessen the noise and air pollution that this heavily trafficked road brings to the Dunlora neighborhood.

The realignment of Rio did create a buffer between Rio and Dunlora; however, this was happenstance, not the purpose of the realignment. Communication with a County transportation engineer who was the project manager for this realignment has revealed that the true purpose for the chosen alignment was to provide a sweeping curve to connect to the proposed John W. Warner Parkway (pka Meadow Creek Parkway) with the least impact to Meadow Creek, among other things. Please see the direct email correspondence included at the end of Appendix C.

Why is Line and Grade's concept included in the document as an alternative concept if the VDOT concept has been chosen?

It is important to note that the VDOT alternative and the Line and Grade alternative are both concepts. County leadership has advised to the preference of the VDOT concept; however, as this design progresses toward preliminary engineering the concept is subject to change.

The Line and Grade alternative is included herein to document new understandings of this intersection, primarily the detrimental effect the VDOT design will have on Dunlora residents. Though it was not chosen as the preferred concept, there are still technical components of the design that may be useful to VDOT when it comes time to prepare the final roundabout design.

The roundabout will have a negative effect on homes and the new wildflower meadow, which shows a disregard for the environment. The new intersection will have more pavement, more runoff, and will be unsafe for pedestrians.

Please refer to Appendix E3 for a detailed analysis of these two options.

The roundabout is not a good solution. I literally watched accidents happen almost daily at the airport roundabout when I worked up there. Having one with higher speeds and way more cars could be really bad.

According to VDOT Crash Data (which was also used to analyze Rio Road), 10 accidents occurred between 2014-2021 at the Airport Road roundabout. Of those accidents, 9 were property damage only. One was a minor injury, and that was a single-vehicle accident with a fixed-object collision. The traffic on Airport Road is much less than on Rio (less than 1/3); however, the number and severity of accidents at the Airport Road roundabout does not indicate that a roundabout is unsafe compared to a signalized intersection. Research shows that roundabouts are safer in general. While they may not decrease the number of accidents, they decrease the severity of them. Please refer to Appendix D for more information on roundabouts.

BELVEDERE BOULEVARD

The Green T is a good solution. The flexibility of its design is a strength in that it can be adapted in the future with a northbound stop light if needed.

You are correct that this approach allows for flexibility at the intersection in the future. This point has been added to Page 13.

A traffic signal at this intersection may be a better solution. The document should include more detail about the pros and cons of a signalized intersection at Belvedere.

In general, VDOT recommends that innovative intersection designs be implemented instead of traditional signals where feasible. This is due to the delays in through traffic that signals can cause, increased risk and frequency of rear-end crashes, and cost impacts for installation and maintenance of signals.

The Green T solution does not solve the fact that you still need to cross two lanes of northbound traffic to head southbound (left out of Belvedere). With a roundabout at JWWP, there will be fewer pauses in the traffic to allow vehicles to cross these NB lanes.

That is correct that you will still need to cross two lanes of traffic. Please refer to Page 13 for additional detail about this intersection, particularly the reduction of conflict points and the safety of merging movements versus crossing movements.

DEFINITIONS AND RESOURCES

DEFINITIONS

Access Management - a term borrowed from the Virginia Department of Transportation (VDOT) that focuses on the location, spacing, and design of entrances, street intersections, median openings, and traffic signals

Buffer Strip - an area of separation, typically vegetated, between vehicular lanes and pedestrian or cyclist travel-ways

Conflict Points - locations where vehicle travel paths intersect. These conflict points result from either crossing, merging, or diverging movements.

Continuous Green T (CGT) - Intersection design where one major street direction of travel (the top side of the "T") can pass through the intersection without stopping and the opposite major street direction of travel is typically controlled by a traffic signal

Human Scale - the proportion of space in relation to human dimension

Intersection Sight Distance (ISD) - the distance a motorist can see approaching vehicles before their line of sight is blocked by an obstruction near the intersection

Level of Service - a qualitative measure used to relate the quality of motor vehicle traffic service. Ratings are A through F, in order from best to worst conditions.

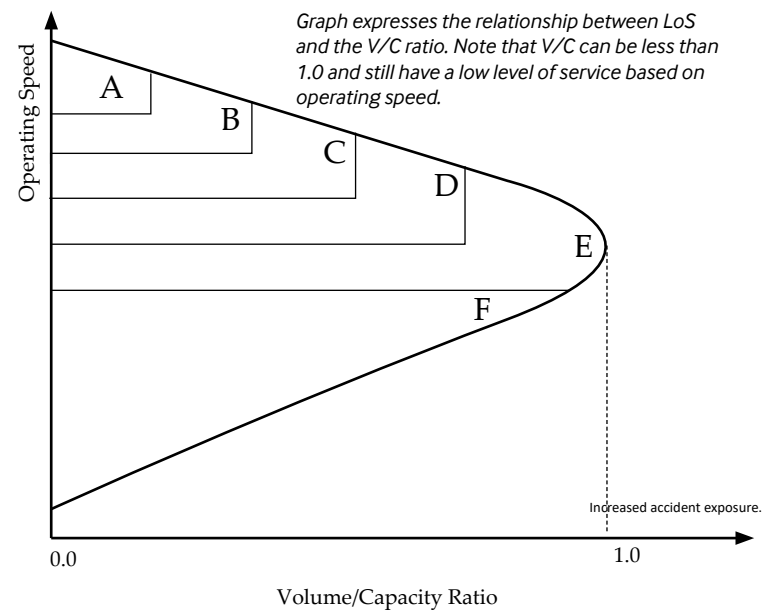
Public Realm - the publicly-owned street rights-of-way and other publicly accessible open spaces such as parks, squares, plazas, courtyards, and alleys

Restricted Crossing U-Turn (RCUT) - An intersection design where all side street movements begin with a right turn. Side street left-turn and through vehicles turn right and make a U-turn at a dedicated downstream median opening to complete the desired movement.

Roundabout - a road junction at which traffic moves in one direction around a central island to reach one of the roads converging on it; a traffic circle

Stopping Sight Distance (SSD) - The stopping sight distance is the sum of the braking distance and the distance traversed during the brake reaction time. In other words, it is the length of roadway that should be visible ahead of the driver, in order to ensure that the vehicle will be able to stop if there is an object in the travel path.

Volume to Capacity and Level of Service



Level of Service Visual Examples



Level of Service A: Free-flow traffic with individual users virtually unaffected by the presence of others in the traffic stream.



Level of Service D: High-density flow in which speed and freedom to maneuver are severely restricted and comfort and convenience have declined even though flow remains stable.



Level of Service B: Stable traffic flow with a high degree of freedom to select speed and operating conditions but with



Level of Service E: Unstable flow at or near capacity levels with poor levels of comfort and convenience.



Level of Service C: Restricted flow that remains stable but with significant interactions with others in the traffic stream. The general level of comfort and convenience declines noticeably at this level.



Level of Service F: Forced traffic flow in which the amount of traffic approaching a point exceeds the amount that can be served. LOS F is characterized by stop-and-go waves, poor travel times, low comfort and convenience, and

RESOURCES

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