## **VIRTUAL LOCATION PUBLIC HEARING**

**CHESTERFIELD COUNTY, VA** 

March 16, 2021





Bailey Bridge Connector (Brad McNeer Parkway – Bailey Bridge Road)

State Project No. 0000-020-820, UPC 111713 Federal Project No. STP-5A27(616)



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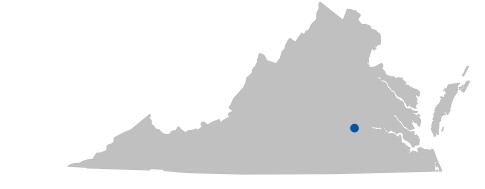


# BAILEY BRIDGE CONNECTOR Locally Preferred Alternative - September 30, 2020

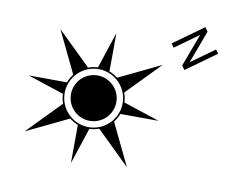


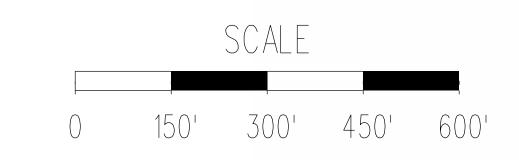


## Project Location



## North Arrow & Scale





LOCALLY PREFERRED ALTERNATIVE



**BRIDGE** 

DOMINION ENERGY TRANSMISSION POLE

**PARCELS** 

**EASEMENTS** 

FLOODPLAIN

PROPOSED RIGHT OF WAY

## Contact Information

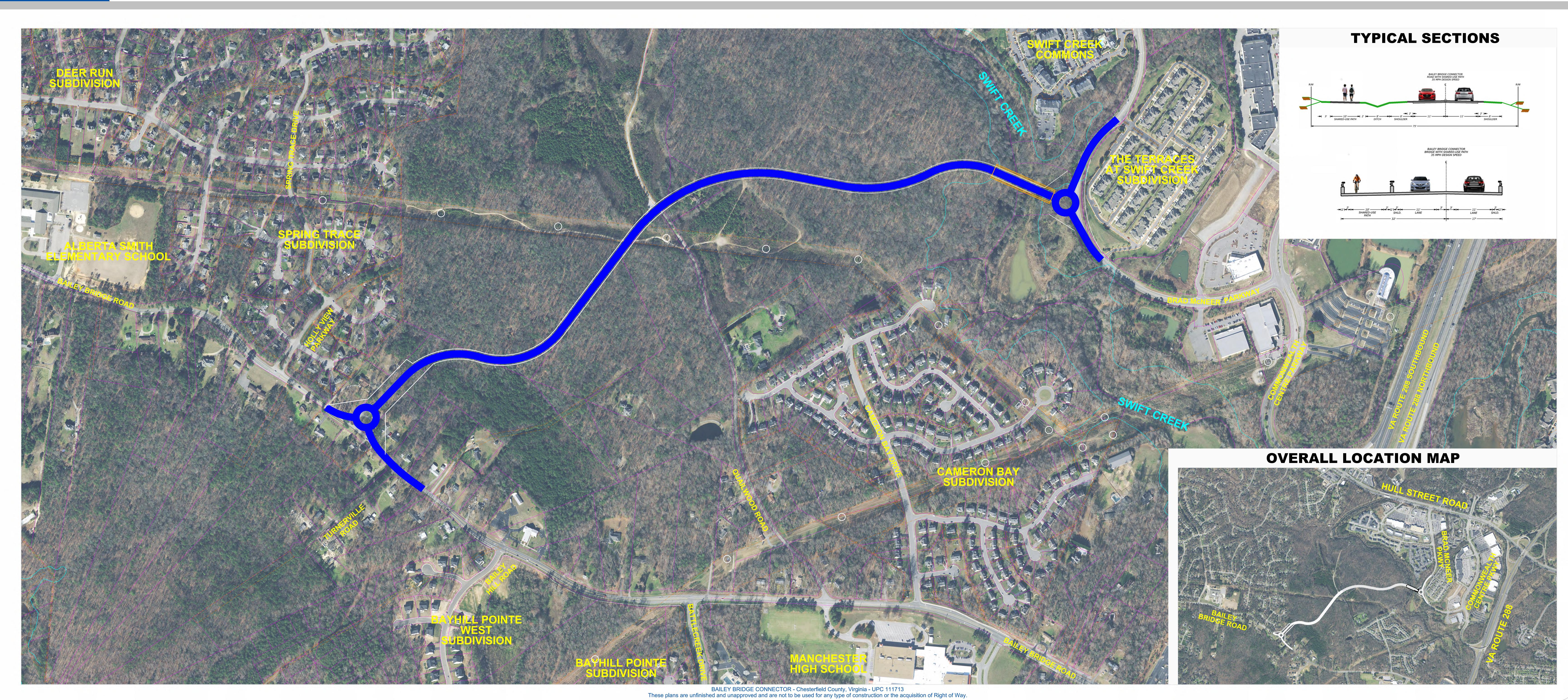
Chessa Walker, P.E.
Chesterfield County Department of Transportation
9800 Government Center Parkway
P.O. Box 40
Chesterfield, VA 23832 Comments may also be sent to: WalkerCh@chesterfield.gov

Bailey Bridge Connector Chesterfield, Virginia State Project Number:

These plans are unfinished and unapproved and are not to be used for any type of construction or the acquisition of right of way. Additional easements for utility relocations may be required beyond the proposed right-of-way shown on these

Imagery courtesy of VGIN, copyright 2017





## Bailey Bridge Connector at Brad McNeer Parkway Rendering



Bailey Bridge Connector at Brad McNeer Parkway Before Photo



Bailey Bridge Connector at Brad McNeer Parkway After Rendering



## Video Flythrough

The video flythrough of the project corridor can be found at the following link: <a href="https://www.youtube.com/watch?v=LbQggPv0uvM&feature=emb">https://www.youtube.com/watch?v=LbQggPv0uvM&feature=emb</a> title

Screenshots from the video are provided below for reference.



Roundabout at Bailey Bridge Road



Roundabout at Brad McNeer Parkway & bridge over Swift Creek



## Location Public Hearing Bailey Bridge Connector

Thursday, October 29, 2020

VDOT Project 0000-020-820, UPC 111713 Federal Project STP-5A27(616)



https://www.streamlinechesterfield.com/

Welcome to the Virtual Location Public Hearing for the Bailey Bridge Connector project.

This virtual event provides an opportunity for the public to review the project exhibits and give Chesterfield County comments and/or suggestions on this project.

Questions and concerns, raised as a result of this Location Public Hearing, will be considered by Chesterfield County before the project begins preliminary design.



Bailey Bridge Connector at Brad McNeer Parkway -After Rendering

## **Project Overview**

The following tentative schedule has been proposed:

Citizen Information Meeting	October, 3 2020
Location Public Hearing	October 29, 2020
Design Public Hearing	February 2021
Right-of-Way Acquisition	Fall 2021 to Spring 2023
Private Utility Relocation	Fall 2022 to Spring 2023
Construction	Fall 2023 to Spring 2025

Existing Project Funds — \$22,960,000

From — Brad McNeer Parkway

To — Bailey Bridge Road

Total Project Length — 7,200 linear feet (1.37 miles)

Bailey Bridge Connector — Approx. 5,000 linear feet (0.95 mile)

Bailey Bridge Road — Approx. 1,000 linear feet (0.19 mile)

Brad McNeer Parkway — Approx. 1,200 linear feet (0.22 mile)

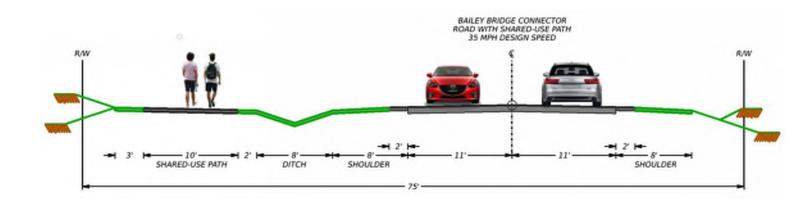






### Project Description - Bailey Bridge Connector

The purpose of this project is to provide an alternate route for areas along Bailey Bridge Road to Route 288 and amenities along Route 360 (Hull Street). Along with the connector road the improvements for this project will include a roundabout at Bailey Bridge Road, a roundabout at Brad McNeer Parkway, a bridge over Swift Creek, and a shared use path. The Bailey Bridge Connector will reduce traffic volumes on Route 360, provide direct access to businesses and services along Route 360, and provide a safe travel alternative for pedestrians and cyclists.



### **Provide Input**

Written questions or comments may be submitted by visiting the website below and clicking on the "Provide Input" tab. Written comments may also be submitted by email to <a href="WalkerCh@chesterfield.gov">WalkerCh@chesterfield.gov</a> or by mail to the address provided on this sheet no later than November 8, 2020. Please reference "Bailey Bridge Connector Virtual Location Public Hearing Comments" in the subject line.

### **Contact Information**

Chessa Walker, P.E.

Chesterfield Department of Transportation 9800 Government Center Parkway P.O. Box 40 Chesterfield, VA 23832-0040

(804) 748-1037 WalkerCh@chesterfield.gov

### Visit us online

https://bailey-bridge-connector-timmons-group.hub.arcgis.com/

See Location Public Hearing project videos, maps, project updates and how you can get involved.

#### Virtual Location Public Hearing Website Statistics

A citizen information meeting was held October 3, 2019. Three alternatives were presented to the public for consideration. Based on the feedback from this meeting and engineering due diligence, a locally preferred alternative was determined. The locally preferred alternative was featured on the Explore tab of the project website and a *Virtual* Location Public Hearing was held to solicit feedback.

Under the current COVID-19 circumstances, getting information to the public to keep them informed and engaged has taken a different path from what has been historically done in terms of holding inperson public forums only. The intent of the project website was to host all information that is normally presented at a public meeting. Doing so allowed the public to review map exhibits and other materials at any time.

The Location Public Hearing was held as a virtual event only. No formal presentation was made on October 29, 2020. An online survey function was provided to solicit feedback and the results of the survey and responses to comment are contained in this transcript.

Because this was not an in-person public meeting, there is not a Sign-In Sheet available. The comment response spreadsheet does include the contact information for those who provided feedback. In addition, below are statistics from the website tracked from the date of advertisement (September 30, 2020) through the public comment period (November 8, 2020) to show the level of public engagement:

- 4,158 views of the LPH website home page
- 1,009 views of the video flythrough
- 565 views of the Overview tab
- 817 views of the Explore tab. This includes the following visualizations:
  - Locally Preferred Alternative exhibit
  - o Interactive map
  - Before and After Rendering
- 449 views of the Provide Input tab



#### **Bailey Bridge Connector: Location Public Hearing Survey Results**

	Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	The information presented on this website was clear and easy to understand.	9	29	5	4	2
2	The interactive map on the Explore tab gave me a better opportunity to understand the project limits in relation to the surrounding area.	16	22	6	3	2
3	Please indicate your level of support for the project.	15	13	10	3	8
4	The video of the project corridor on the home page gave me a better understanding of the project.	12	26	6	2	3
5	For the future Design Public Hearing would you prefer an online format similar to this or an in-person meeting if possible?		Online For	mat: 34 In-Person	Format: 15	

#### **Bailey Bridge Connector: Comment Summary**

Forty-Nine (49) survey forms were completed and three (3) emails received prior to the comment period expiration date on November 8, 2020. One individual submitted both a survey form and email; therefore, a total of 51 individuals provided feedback

Name	Email	Street Address	City	Zip Code	Comment	Response
1 Brian Kingery	briankingery87@gmail.com	12119 Sunset Point Court	Midlothian	23112	I live in Bayhill Pointe and look forward getting to places while not having to get on Hull Street.	Thank you for your comment.
2 Emily Agnolucci	Emily.agnolucci@gmail.com	7907 Longfellow Ct	Midlothian	23112	Great Job! (No written comment, only provided survey question responses)	. , , ,
3 David J Billingsley	Daveb1952@hotmail.com	12530 Buffalo Nickel Dr.	Midlothian	23112	There are much better alternatives to this project. For instance, a western quadrant loop from Hull Street Road west of Magnolia Green to the Powhite Parkway. Eventually this will need to be done. Routing this major traffic from southwest Chesterfield county developments onto Bailey Bridge is short sighted at best, will increase traffic congestion for the current residents along Bailey Road, potentially reducing real estate values, as well as another boondoggle of unnecessary costs.	Extending the Powhite Parkway, from its current ending point at Charter Colony Parkway to Route 360 in the vicinity of Beaver Bridge Road, is an important component of the county's Thoroughfare Plan. However, the Powhite Parkway Extension would not provide an attractive alternate route for the significant amount of traffic destined for points south of Route 360 and east of Winterpock Road. The need for improvements to the 288/360 interchange was documented in the 2015 US 360/Route 288 Interchange Area Study, (http://virginiadot.org/projects/richmond/u.s360-rt288_interchange_area_study.asp) which considered the planned extension of the Powhite Parkway. While the Powhite Parkway Extension is a priority as development continues in the western part of the county, the Streamline 360/288 Improvements are necessary to address existing and future traffic conditions at the 360/288 interchange and along Route 360. Information on the Powhite Parkway Extension can be found at the following link: https://www.chesterfield.gov/5240/Powhite-Parkway-Extension
4 Ryan Townley	emerican16@hotmail.com	8106 Hillcreek Drive	Midlothian	23112	I am looking forward to the completion of the project. This will make travel in my area easier to	Thank you for your comment.
5 Sharon Mahoney	sharonlmahoney@gmail.com	12319 HILLCREEK TER	Midlothian	23112	get to places I want to go and back to my residence. (No written comment, only provided survey question responses)	
6 Sarah Christman	smschristman25@gmail.com	9118 Bailey Oak Dr	Midlothian	23112	(No written comment, only provided survey question responses)	
7 David Stephens	dave@dominion motors ports. net	7012 Chateaugay Ln	Midlothian	23112	While I like the idea of easy access for residents close by this will only lead to more traffic on Bailey Bridge to Spring Run corridor. The ultimate relief from Hull Street West from 288 is for the Powhite Extension to be completed. I do not understand how Bailey Bridge Connector is a priority over the Powhite Extension.	Extending the Powhite Parkway, from its current ending point at Charter Colony Parkway to Route 360 in the vicinity of Beaver Bridge Road, is an important component of the county's Thoroughfare Plan. However, the Powhite Parkway Extension would not provide an attractive alternate route for the significant amount of traffic destined for points south of Route 360 and east of Winterpock Road. The need for improvements to the 288/360 interchange was documented in the 2015 US 360/Route 288 interchange Area Study, (http://virginiadot.org/projects/richmond/u.s360-rt288_interchange_area_study.asp) which considered the planned extension of the Powhite Parkway. While the Powhite Parkway Extension is a priority as development continues in the western part of the county, the Streamline 360/288 improvements are necessary to address existing and future traffic conditions at the 360/288 interchange and along Route 360. Information on the Powhite Parkway Extension can be found at the following link: https://www.chesterfield.gov/5240/Powhite-Parkway-Extension
8 Mike Venaglia	venaglia@aol.com	12306 Hillcreek Turn	Midlothian	23112	Looking forward to being able to get to Hull St Rd with a 1.5 mile drive vs. the current 4 mile drive. Video was very well done. Thank you.  I am a nearby resident (Cameron Bay subdivision) that this project would directly effect. I can	Thank you for your comment.
9 Michael Pool	michaelpool28@gmail.com	12500 Village School Lane	Midlothian	23112	ovoch for many members of our community and say that this project would be a great addition. We all have wished this would happen for some time and this would make our travel much more convenient to shops and restaurants along rt. 360. My wife and I frequently visiting the American Family Fitness and the Kroger off Brad McNeer, this is a huge positive to our everyday lives. From an overall logistical perspective, there is much congestion at times on Baily Bridge Rd. since currently the main route is towards route 360. When school is in session the congestion is much worse, this project will help alleviate that. The safety of the residents will be improved once this is completed.	Thank you for your comment.

Name	Email	Street Address	City	Zip Code	Comment	Response
10 Susan Turner	turnerskt7@verizon.net	7107 SPRING TRACE TRN	MIDLOTHIAN	23112	I fully agree this is needed to reduce the rush hour traffic on Rt. 288 & Rt.360 interchange. Thanks goodness I "lived" to be able to retire! I traveled that area every day and saw many wrecks and bad backups.  This will make life easier for me to get groceries and head other places quicker. Can't wait for the completion!  However I am not too excited about the complex to be built with I think it is 800+ residential/ commercial units very close to this project.  If you know the location of this project please add it to your map. Thanks	Thank you for your comment. For information regarding zoning and potential development please reach out to the County Planning Department.
11 Tom Anderson	bearsprey@gmail.com	5716 Harbour Ridge Rd	Midlothian	23112	Will there be additional traffic control at Commonwealth Center Parkway (CCP) and Brad McNeer Parkway (BNP)? For the connector to improve traffic flow on 288 and Hull Street Rd, 5/B 288 traffic heading to Bailey Bridge area would presumably exit on CCP, then turn left onto BNP before taking the Bailey Bridge Connector. This intersection is on a hill and currently only has a stop sign on BNP, but the increased amount of traffic and left turns would most likely warrant different/better traffic control (light or roundabout) at CCP & BNP.	The Brad McNeer Parkway and Commonwealth Centre Parkway intersection is being analyzed and funding is being pursued to provide improvements.
12 Paul Branch	paul.branch4@verizon.net	12925 Bailey Bridge Road	Midlothian	23112	The corridor should begin at the intersection of Bailey Bridge Road and the entrance at Bayhill Point. It would significantly reduce the footprint impact of disturbing actual homes and would allow a much more smoother transfer of traffic.  The original surveying of residents affected was disproportionately/unfairly skewed based on the few residents who actually reside on Bailey Bridge Road in comparison to those residing in Bayhill Point.  I along with many concerned residents on Bailey Bridge Road strongly "disapprove" of the final location.	Thank you for your comment. The October 2019 Citizen Information Meeting solicited feedback from citizens within the project area. Citizen feedback and the estimated impacts of each alternative, summarized in the memorandum and Evaluation Matrix found here https://www.streamlinechesterfield.com/project-details/bailey-bridge-connector/, were used to select the Locally Preferred Alignment.
13 Jarrad T. Ellis	jarradellis@yahoo.com	13000 Bailey Bridge Rd	Midlothian	23112	intention to build an older adult community behind my home and that they need a road to do so; disguising this as a need for relief of traffic on 360 during peak "rush hour" is a farce. Second, no other property surveys were conducted; mine was the only one for this effort. It is bad practice to do this especially considering the 2nd to last property owner of my land had a construction company and used this property as a dumping ground for over a decade. Lastly, I vehemently disagree with the implication that in the post covid world there exists justification for this project. A new assessment should be performed to better evaluate the impacts covid has had on the	connector/, were used to select the Locally Preferred Alignment.  No field studies were performed until after the Locally Preferred Alignment was selected.  We recognize that COVID-19 has had an impact on traffic and could
14 Richard Moyer	richard.a.moyer@gmail.com	13010 Bailey Bridge Rd	Midlothian	23112	I don't expect that the expenditure of taxpayer money will be worth the benefit of the project. The congestion on Hull Street is more the result of large-block zoning than a lack of roads. Enormous areas of Chesterfield County have no commercial or industrial zoning, and require everyone living in those areas to travel to or through Hull Street or Iron Bridge in order to work or shop. It would be far more beneficial to add additional commercial or industrial zoning in South Chesterfield county before it is heavily developed than to try to remedy the inevitable traffic issues that will continue result from its continued development. Rezoning now will be far easier than it will be in the future when large tracts have been parceled into neighborhoods.	Thank you for your comment. We encourage participation in all public meetings the County holds where decisions on zoning are made.
15 Flip Harrison	flipmel@verizon.net	11924 Longfellow Drive	Midlothian	23112	I am all for this project as long as the round abouts look like the ones depicted. Please don't build one like the new one at Bailey Bridge and Springrun. That one is, without a doubt, the single ugliest round about I have ever seen. Whoever approved that eyesore should be fired. I'm glad I don't live on that corner and have to look at it everyday.	The two roundabouts proposed on this project will be different from the one installed at the intersection of Bailey Bridge Road and Spring Run Road. The project rounabouts are currently proposed with lighting, landscaping, and pedestrian accommodations.
16 Vincent X Williams	booda@comcast.net	12600 Buffalo Nickel Drive	Midlothian	23112	I like the final location of the round about on Bailey Bridge Rd for the connector extension.	Thank you for your comment.

	Name	Email	Street Address	City	Zip Code	Comment	Response
17		jeffmurray2003@gmail.com	12403 Cameron bridge court	Midlothian	23112	We have lived in Cameron Bay for the last 17 years and this project is a good start. It seems to be one of many new roads that is needed for this area due to the high volume of sub-divisions. The 228 and Hull street corridor is the best location in Chesterfield but the number of residence and businesses have overwhelmed the road system. But overall a good start to alleviate the congestion.	Thank you for your comment.
18	Tim Ward	ward.timj@yahoo.com	12018 Longfellow Dr	Midlothian	23112	Maybe I completely missed it but I was searching the site for a simple map that would show me where the start/end of the project was. Not until I came to this feedback form did I find the interactive map. The virtual flyover doesn't orient you to where anything is so i was unable to make sense of it. The interactive map should be more prominent on the webpage and could really use some annotation to more clearly identify the connector. At least by smartphone it took a while to zoom, scroll, search to finally find it.	Thank you for your comment. This feedback will be used for consideration of future project websites.
19	Kevin Steinke	Kevinfs98@gmail.com	8801 HOLLOW OAK RD	MIDLOTHIAN	23112	First it will be a time saver. However I live in bayhill point. How do you plan on handling the potential increase in traffic on bailey bridge. Getting onto bailey bridge during the weekday when school starts is hell. Has anyone seen the traffic at 7 AM when school is in session.  Next, are the traffic circles going to be cheaply made like chesterfield did at the new circle on bailey bridge and springfield. That looks like crap.  I will wait and see if anybody responds.	Recently completed improvements along Bailey Bridge Road include a roundabout at the intersection with Spring Run Road, and roadway realignment and shoulder widening between Spring Run Road and Sunday Silence Lane. Lane widths and shoulder conditions within the vicinity of the Bailey Bridge Connector intersection at Bailey Bridge Road will be improved. No additional improvmenets to Bailey Bridge Road are planned at this time. Traffic conditions along Bailey Bridge Road will be monitored once traffic redistributes with the construction of the connector and future improvements evaluated as necessary.
20	Sally Roberts	dseroberts@verizon.net	8218 Preakness Court	Midlothian	23112	I see a huge traffic problem on Bailey Bridge Road. Keep in mind that there are five (5) schools that will be impacted. In addition to several subdivision, most which have been there for many years. I believe Bailey Bridge should be widen and a lanes addressed prior to the extension. The people living in the area deserve to be served first.	Recently completed improvements along Bailey Bridge Road include a roundabout at the intersection with Spring Run Road, and roadway realignment and shoulder widening between Spring Run Road and Sunday Silence Lane. Lane widths and shoulder conditions within the vicinity of the Bailey Bridge Connector intersection at Bailey Bridge Road will be improved. No additional improvmenets to Bailey Bridge Road are planned at this time. Traffic conditions along Bailey Bridge Road will be monitored once traffic redistributes with the construction of the connector and future improvements evaluated as necessary.
21	Ashley Pillar	ashleypillar82@gmail.com	11900 Markey Cir	Midlothian	23112	What impact is expected to traffic by Crenshaw Elem. is this going to be another Lucks Ln disaster?  How much traffic is expected to increase at Hull St and Bailey Bridge for people who are now going to cut around to avoid 288/Hull st exit? That intersection is already dangerous and backed up?  (continue below)	The County will work with VDOT to evaluate measures to reduce the risk and likelihood of construction delay.  Traffic volumes are expected to decrease along the US Route 360 corridor and at the Bailey Bridge Road intersection due the proposed Bailey Bridge Connector. The proposed Connector will provide a shorter access point for traffic to reach the Bailey Bridge Road corridor and without needing to utilize US Route 360. The proposed Connector will allow local travel to/from Bailey Bridge Road and is not intended to provide a secondary access to US Route 360. Traffic that plans to use the Bailey Bridge Road at US Route 360 intersection can use the Route 288/US Route 360 interchange and reach their destination in less than 1.5 miles. If a vehicle were to avoid the Route 288/US Route 360 interchange by using the proposed Bailey Bridge Connector to reach the Bailey Bridge Road at US Route 360 intersection, the vehicle would be required to travel approximately 5 miles to reach the destination, a more than 2x increase in travel distance and time.

	Name	Email	Street Address	City	Zip Code	Comment	Response
						(continued from above)  Will Bailey Bridge be widened or straightened out from Hull St to Claypoint? That is already too congested for people to get in and out of neighborhoods safely.  Why take out the light and use a circle? No one knows how to use traffic circles properly no matter how many get put in. So all this traffic is going to dump into the light at Kroger? Thats already impossible to get out of.	At this time, the County does not have plans to update Bailey Bridge Road. Recently completed improvements along Bailey Bridge Road include a roundabout at the intersection with Spring Run Road, and roadway realignment and shoulder widening between Spring Run Road and Sunday Silence Lane. Lane widths and shoulder conditions within the vicinity of the Bailey Bridge Connector intersection at Bailey Bridge Road will be improved. No additional improvements to Bailey Bridge Road are planned at this time. Traffic conditions along Bailey Bridge Road will be monitored once traffic redistributes with the construction of the connector and future improvements evaluated as necessary.  Roundabouts have an excellent track record of both reducing congestion and serious crashes.
	John William Curren	jwcurren66@gmail.com	12307 Hulsey Drive	Chesterfield	23838	(No written comment, only provided survey question responses)	
23	George Hastings	Uhburrito@gmail.com	7818 secretariat drive	Midlothian	23112	(No written comment, only provided survey question responses)	
24	Cyndie Litten	Steelerscl@verizon.net	6924 sika lane	Midlothian	23112	When I moved here 18 years ago. I was not told it was the cut through for people who love on bailey bridge and spring run. All these people who don't live here cut by my house and it's like a race way. I never would have bought this house knowing this. It's a neighborhood that should not be used to cut through. I wish it was closed off. But this new route would help out a lot with traffic	Thank you for your comment. The roundabout installed at Bailey Bridge Road will have a design speed of 25 mph whereas the current posted speed along Bailey bridge Road is 35 mph. This means the roundabout will act as a traffic calming measure to slow speeds.
25	Kaysie Hall	Kaysie623@hotmail.com	8324 Amington Lane	Chesterfield	23832	Very happy about this! Hull Street traffic is horrendous heading home every afternoon. Glad to see this will help ease that.	Thank you for your comment.
26	Taylor	Taylormckesson@gmail.com	Springhouse Dr	Chesterfield	23832	While I agree that this project is much needed, I want to me sure with the major flooding we had in August is going to projected into this project. And I mean as will and engineer come in and look at what flood we just had and how it would affect a bypass in that area.	The design of this project will meet all county and state requirements as it relates to drainage. The specific August 2020 rain event referenced was beyond a 100-year storm and not what roadway projects are designed to. However, the Bailey Bridge Connector will improve redundancy in the transportation network and could provide relief for other areas along Bailey Bridge Road impacted by future flooding.
27	Teagan Wiley	ltzlogicc@gmail.com	13501 buck rub drive	Midlothian	23112	The amount of traffic through the deer run subdivision is ridiculous, people speed through the neighborhood where children are playing with no regard to the stop signs or people in the area. Traffic is a continues problem even in to the late hours of the night. Its a "Cut through" from hull street to Bailey bridge road and swift creek. Can't even let your kids play out side because of it. We definitely need this bad.	Thank you for your comment.
28	Ann-marie Taranto	annmarie_taranto@yahoo.com	13524 Winning Colors Lane	Midlothian	23112	As a long time resident of Deer Run, I welcome this plan. It would alleviate traffic on Hull St and provide us a much needed way to get to the shopping area without having to use the busy 360	Thank you for your comment.
29	Melodie anderson	Mlanderson7731@msn.com	7731 Whirlaway dr	Midlothian	23112	Thanks for the visual It is difficult for me to conceptual use without seeing actual area- will there be sidewalks down Bailey bridge to spring /bike path to accommodate increased traffic- would love bike path.  I live near Bailey and spring run road- can I have sound wall put up- the traffic noise is horrible and the sound volume shakes the house	Thank you for your comment. A bike path from the proposed roundabout on Bailey Bridge Road all the way towards Spring Run Road is not part of the scope with this project. A noise analysis was completed for this project and determined that there are no locations where sound walls are warranted.
30	Virginia Baker	Valhoffman09@gmail.com	11818 Longtown Dr	Midlothian	23112	I think this project is a wonderful addition. It would cut down on already congested hull street traffic and make commute times easier. The sooner this can go in, the better.	Thank you for your comment.
31	Stephanie Bowlin	Stephanie.ayres.bowlin@gmail.com	14379 Forest Row Trl	Midlothian	23112	Would be fine with any of the three variations. We definitely need this connector. If there is an accident on Hull it's almost impossible to get home. This is a great alternative and will help alleviate some of the major traffic backups on Hull.	Thank you for your comment.
	Rachel Kubin		9137 Penny Bridge Court	Midlothian	23112	It looks great, thanks for your hard work. Still have concerns about Brad McNeer at commonwealth center for the increased traffic. It is a blind turn there. It may be out of the scope of your project but this project will be increasing the hazard there. Thank you	Thank you for your comment. The Brad McNeer Parkway and Commonwealth Centre Parkway intersection is being analyzed and funding is being pursued to provide improvements.
33	Wilber Mallory Jr	wilbermalloryjr@me.com				(No written comment, only provided survey question responses)	
34	Mandy Brown	taterandpickle@gmail.com	14007 Faline Court	Midlothian	23112	I think that alternative route 3 looks to be less intrusive. What route has the least expensive proposal?	Alternate 2 is estimated to be the least expensive of the three options evaluated.

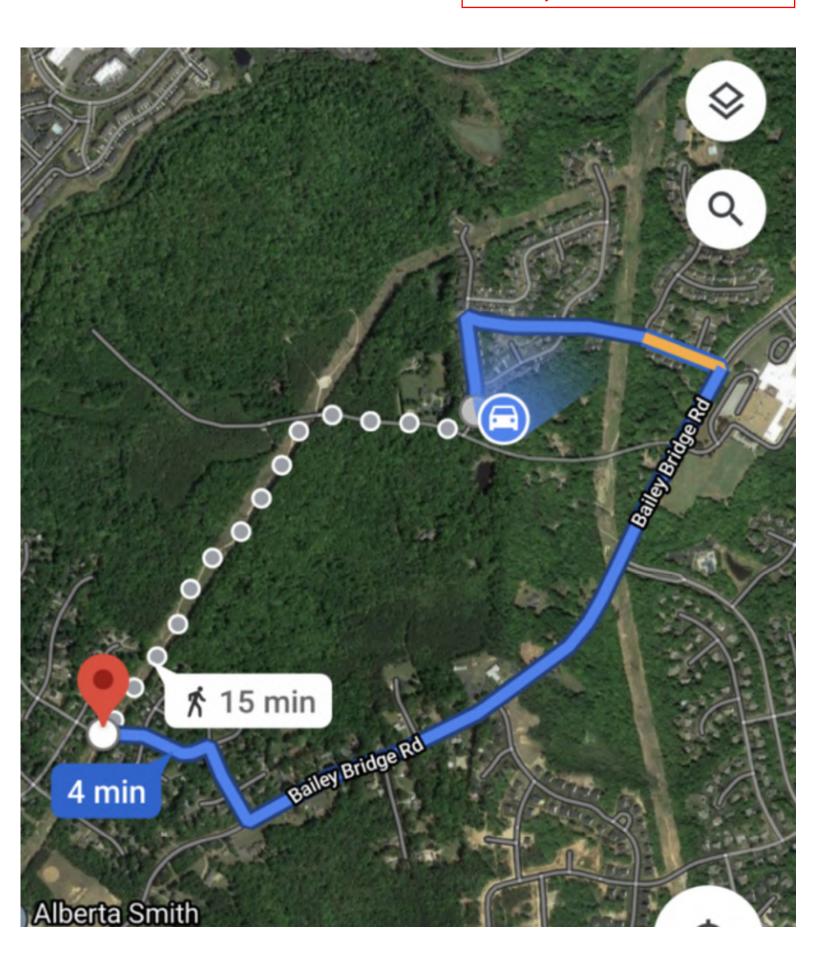
Name	Email	Street Address	City	Zip Code	Comment	Response
35 Leonard Largen	Mtn52boy@yahoo.com	5406 Creek Heights Drive	Midlothian	23112	1.Reduce the "Share Use Path" width to eight feet to reduce impacts to adjacent property and to save the mature trees.  2.The grade of the pavement at the front entrance of The Terraces at Swift Creek is eight per cent or greater. A concern of the property owner is that in order to meet the ADA regulations maximum two percent cross slope for the "Share Use Path" to cross of our entrance would create a need to reconstruct it and make the grade steeper than it is presently.  3.Shift the "Share Use Path" to the south side of Brad McNeer so future construction would tie into the existing sidewalk at the Kroger shopping center.  4.Do not want the "Share Use Path". It would encourage people to walk or ride bikes through our neighborhood.  Due to the Covid 19 virus, I understand that a an online presentation may be needed; however if that is the case, there should be a designer dialogue to explain the project and available to answer questions.	1. During detailed design, alternative path widths will be explored. However, the county cannot guarantee the health of trees that are in close proximity to construction where roots may be impacted.  2. All crosswalks will be ADA-compliant. Alternatives for this crossing location will be explored during detailed design.  3. Consideration for alternative locations of the Shared Use Path will be analyzed during detailed design.  4. The County has made themselves available upon request and has met with The Terraces on multiple occasions to help address comments and feedback from the residents. An open dialog will continue through the design of the project.
36 Vincent Shelton	VINCESHEL@YAHOO.COM	12307 HILLCREEK TURN	MIDLOTHIAN	23112	Any additional traffic onto Bailey Bridge Road requires widening the road. Already, it must accommodate 5 schools (school buses are wide) and teenage drivers. More traffic congestion only creates environment for accidents. Wider Bailey Bridge will allow free flow of traffic to and from schools.	Recently completed improvements along Bailey Bridge Road include a roundabout at the intersection with Spring Run Road, and roadway realignment and shoulder widening between Spring Run Road and Sunday Silence Lane. Lane widths and shoulder conditions within the vicinity of the Bailey Bridge Connector intersection at Bailey Bridge Road will be improved. No additional improvmenets to Bailey Bridge Road are planned at this time. Traffic conditions along Bailey Bridge Road will be monitored once traffic redistributes with the construction of the connector and future improvements evaluated as necessary.
37 Wallica Gaines	wallica@gmail.com	4932 Terrace Arbor Circle	MIDLOTHIAN	23112	I would like to see the following concerns addressed in this project:  1. The landing areas in the round about seem small. Can two elderly people cross & fit in each landing? Can two adults with a stroller fit? How fast does a person have to move to get across with the amount of traffic expected.  2. I'd like to see the shared use path extended to 360. If you are walking toward 360 on the Terraces side, you are walking in the road.  3. What plans are place to slow the traffic down as cars travel from 360 toward the roundabout downhill? We may not be able to get our of our entrance(s).  4. I don't want people walking through our neighborhood.  5. I don't want cars cutting through the neighborhood. These are private streets, we have to pay for the wear and tear.  6. Will our air quality suffer with all the vehicles congregating at the round about?  7. What will be done to assist with the increased noise for the Terraces neighborhood?  8. Pedestrian safety should be as high a priority as routing traffic. More attention should be paid to pedestrian safety, as the number of victims among people crossing at intersections is constantly increasing year after year (Bungum et al., 2005, Olszewski et al., 2015). (continue below)	1. The width of the landing areas are 10 feet and meet the VDOT standard for pedestrian crossings at a roundabout. Refuge areas will be provided and serve as a place for pedestrians to rest if they cannot traverse the entire crossing at once.  2. The proposed shared use path will terminate at the entrance to the Terraces at Swift Creek. The County will continue to look for funding opportunities to extend the facility north.  3. There will be signage along Brad McNeer Parkway approaching the roundabout from each side. The roundabout itself will act as a traffic calming measure as vehicles will have to slow down to navigate it.  4. Comment noted.  5. Comment noted.  6. Air quality is not expected to suffer.  7. A noise analysis was completed for this project and determined that there are no locations where sound walls are warranted.  8. Pedestrian safety is always a priority when incorporated in to road projects.

	Name	Email	Street Address	City	Zip Code	Comment	Response
						(continued from above)  9. We have people who are blind/vision impaired in the Terrace's community, what accommodations have been made to cross safely?  10. How quickly will drivers see pedestrians? What is slowing drivers down before entering the round about?  11. How can older residents be confident about crossing the roundabout?  12. What lighting will be in the roundabout? Is it enough to see clearly when walking at night? Are there lights along the shared path?  13. Will the lighting be bright enough to disturb the residents in the front of the Terrace's community?  14. Will the green space be maintained such that it will be considered an asset to the community?	9.The cross walks will be ADA-compliant. Detectable warning surfaces will be placed at the crosswalk for the visually impaired pedestrians.  10.Advanced crosswalk signage will be placed prior to the roundabouts and the crosswalks themselves will be striped. Roundabouts are designed to reduce vehicle entry speeds by controlling the amoutn of deflection on the approaches.  11.Educational resources on how to navigate roundabouts can be found here https://www.chesterfield.gov/696/Roundabouts under the "Addtional Resources" tab. If citizens who would like to know more about crossing this specific roundabout, please contact the Transportation Department and someone will be happy to explain it in detail.  12. While not required, pedestrian scale lighting will be provided around the footprint of the roundabouts. Roadway lighting along the project corridor will not be provided.  13. Light pollution of nearby residents is not allowed.  14. The greenspace between he road and shared use path will be under VDOT responsibility and on their maintenance schedule.
38	Vincent X Williams	booda@comcast.net	12600 Buffalo Nickel Drive	Midlothian	23112	We are satisfied with the location of the connector. We did not want the traffic circle in front of the Bayhill Pointe subdivision.	Thank you for your comment.
39	Roger L. Fisher	rlfisher628@aol.com	11341 Danforth Road	Chesterfield	23838	I'm concerned with the road conditions on Bailey Bridge going to Spring Run. With this proposal it will put more traffic on a roadway that's in need of updating now. More traffic on Bailey Bridge vs. 360 to Spring Run. Any plans to update Bailey Bridge?	Roadway and intersection improvements have recently been constructed along Bailey Bridge Road including: 1) a roundabout at the intersection with Spring Run Road, and 2) roadway realignment and shoulder widening between Spring Run Road and Sunday Silence Lane. Additionally, lane widths and shoulder conditions within the vicinity of the Bailey Bridge Connector intersection at Bailey Bridge Road will be improved. No additional improvements are planned at this time. Traffic conditions along Bailey Bridge Road will be monitored once traffic redistributes and future improvements evaluated as necessary.
40	Gary Coderoni	grcoderoni@gmail.com	5303 Creek Heights Drive	Midlothian	23112	The "share path" is a great idea and i think that 8 ft. would be a sufficient width. However, it doesn't manage to alleviate the biggest problem we have in terms of walking ability out of the development. the Terraces is an island. In order to go towards the Kroger shopping center one is required to walk on one side or the other on Brad McNeer depending upon how brave one might be. I would like to see the share path extended to connect to the side walk in front of the Crowns apartment complex. Brad McNeer is dangerous no matter how you try to navigate it. I understand the wetlands issue but certainly a simple solution of concrete pipes under a path would not be overly expensive, disruptive or time consuming if done when all the other construction is occurring. Thanks.	Thank you for your comment. Consideration to an alternative shared use path location will be vetted during detailed design.
41	Joshua Doyle	Joshuadoyle88@gmail.com	12506 Village School Ln	Midlothian	23112	I would like to provide some additional information for consideration regarding the area of the proposed new road where it will intersect with one of the Dominion transmission lines just south of Quailwood Rd.  Several pedestrians and even cyclists or other recreational vehicles may use the trail that runs parallel with the lines as a scenic walkway that can also provide a traffic-free "short cut" between the Cameron Bay and Deer Run neighborhoods. As I know this is not a designated pedestrian route, I do not expect any signage or crosswalks; but I am curious if there will be any sort of fencing or barricading that may prevent future cross-traffic of any kind here, or if there may be some signage warning of the potential hazards of crossing at that location. I am also providing a screenshot of Google Maps offering this trail as an option for walking directions as well.	The area referenced is not on the County's Bikeways &Trails Plan and there is no plan to provide a pedestrian facility across that private property at this time.

Name	Email	Street Address	City	Zip Code	Comment	Response
42 Joan Miller	jem4748@gmail.com	5411 Creek Heights Dr.	Midlothian	23112	Being a resident of the Terraces at Swift Creek I am very concerned about the shared use walking path on our side of the circle/Brad McNeer Rd. it would be best to not have this here at all, as there is no way to cross our main entrance with the grade of our entrance. It is connected to nothing and goes to nothing. It would be a nuisance for our community. If the shared use path is constructed, the sidewalk is too wide and should be decreased to 6 ' to have less impact of bringing the project as close to our property - we feel that it will encourage people to entre our property.  I would like for the shared use path not to be constructed at all along this VERY BUSY street. I myself would be afraid to walk along such a busy street.	Thank you for your comment. Consideration to an alternative shared use path location will be vetted during detailed design.
43 Louie Love	louiewlove@verizon.net	9018 Penny Bridge Mews	Midlothian	23112	Continue to provide opportunities for me and my wife to review how the Bailey Bridge Connector Project is progressing.	The next opportunity to provide public input will be at the Design Public Hearing. You can track the project at https://www.streamlinechesterfield.com/project-details/bailey-bridge-connector/
44 Richard Miller	rkmtsc@gmail.com	5411 Creek Heights Dr	Midlothian	23112	The shared use path should be moved to the other side of the road which would do 2 thingsit would keep people from having to cross Brad McNeer twice, which is a real danger. and would tie into existing sidewalk at top of hill in front of the Apts.  OR  The shared use path should be reduced to 8' so it would not take down maple trees in front of our community. The path could have to trees right beside it for very nice look. This would have less of an impact on our community.  The shared use path should not extend from the roundabout up towards Commonwealth. This would help keep people from coming up the path, which dead ends at our back entrance, and then coming into our community.  I also have great concern about how the grade of this path will effect our front entrance. It would change the grade to a much greater one than it is now and possibly have to come up into the entrance and change the street. This is a big negative.	Thank you for your comment. Consideration to an alternative shared use path location will be vetted during detailed design.
45 Yvonne Ricciardelli	ym.ricci@gmail.com	5406 Creek Heights Drive	Midlothian	23112	1. Extend shared use path to tie into our existing asphalt path. 2. Reduce the share use path to eight feet to lessen impacts to existing trees. 3. Compensate for all tree loss. 4. Look at all avenues to reduce speeds on Brad McNeer Parkway.	Thank you for your comment. Consideration to an alternative shared use path location will be vetted during detailed design, including reducing the existing width.  Project impacts will be discussed with propertry owners during the Right-of-Way acquisition phase.  Speeding along Brad McNeer Parkway will be taken in to consideration and address with a combination of signing, striping and physical attributes such as the roundabout itself.
46 Michael Young	MDY_M1A@YAHOO.COM	7007 Holly Bark Drive	Midlothian	23112	Once folks are past Bailey Bridge and Winterpock we DO NOT see how this "accident" circle/by-pass will relieve traffic congestion. There are far more people headed out towards Amelia on 360, more than the people turning off 360 before Winterpock. I think this is Gov't saying we have money, where can we throw it away. Besides this may cause more speeders since I already have enough proctologist behind me in the 35 mph zone on Bailey Bridge including School Buses close enough that all you see is grill which just makes me slow down more.	Thank you for your comment.
47 Patrick Keough	Gkeough@gmu.edu				(No written comment, only provided survey question responses)	
48 Bruce & Sharon Berkheimer	sherry.berkheimer@yahoo.com	12926 Bailey Bridge Rd	Midlothian	23112	Berkheimer residence is aware of the most recent information regarding the roadway and changes that will have to take place on their property especially with the main one regarding the primary water source-our well. A new well will have to be provided to replace our existing as we do not want county connection. All other changes to our property will be dealt with as this project progresses and affects our well being.	Thank you for your comment. We will be reviewing means to maintain water access for this property as the detailed design progresses.
49 Elizabeth S. Geiger	esgeiger@comcast.net	5400 Creek Heights Drive	Midlothian	23112	This box cannot contain my thoughts regarding this highway project. I am, therefore attaching a file to be viewed and thoroughly considered. I am currently a resident of The Terraces of Swift Creek condo community on Brad McNeer Parkway. I have been a resident of Chesterfield County all of my life and have serious concerns to share and questions to ask. Please see the attached file below.	Thank you for your comment. Answers to the attached questions are documented below in #52.

Name	Email	Street Address	City	Zip Code	Comment	Response
50 Kasey Wilkins	kaseywilkins20@gmail.com				I'm not really sure what I need to say but I do know this project needs to happen if at all possible. We live in deer run off of Bailey bridge and spring run road and it is such a cut through for traffic. So bad our kids can't go on the road. I can't walk my dogs. People fly. They cut through to hull st and Bailey bridge. I actually know this because I did it before I moved here. Now I know how frustrating it is. Hopefully this project would cut down on a lot of the cut through traffic and avoid some of these issues. Thanks for reading!	Thank you for your comment.
51 Mike	irrationaljingo@comcast.net				Why, in the wake of a global pandemic, would this community want our streets torn up and rerouted? I don't believe the issues that were perceived back in 2011, when these proposals originated, even exist anymore. At best, what we have here, is a bad idea at the wrong time. If you take the outdated Streamline project and break it into color-coded parts, then you still have multiple "bad" ideas, just piled up, each worse than the next. If you have to add 3 round-a-bouts to a single block, just to "make it work", perhaps the planners are trying too hard and need to take a step back. Let us take a good look at where we are, right now, and re-approach the drawing board. For each individual part, let's consider an alternative. That alternative being "do nothing". I believe in 100% of these, you will find that "the way it is now" is way better than the so called "improvements" that are suggested. By the time you are adding multiple intersections, forcing traffic to turn right, and then u-turn to travel in the direction they used to simply turn left for, you are introducing the most arcane and dangerous traffic pattern I've ever heard of. I don't believe this level of chaos is a good idea for any community, especially at this point in history. The best proposal so far, is to leave it alone. Problem solved. Money saved. And a community retaining logical, intuitive traffic patterns that are safe and effective. So yes, while 3 rights do make a left, 2 wrongs do not make a right. Do the right thing, give this county a break and put this outdated, unnecessary Streamline project to rest. Thank you, Mike	Thank you for your comment.
52 Elizabeth S. Geiger	esgeiger@comcast.net	5400 Creek Heights Drive	Midlothian	23112	The questions below are paraphrased from the attachment received. The full attachment has been included in the transcript for record purposes:  1.Can the project be put on hold? Are there reasons beyond traffic flow not known to the public that are motivating the quick delivery schedule?  2.How can the proposed project possibly ensure safer, more efficient travel for residents and businesses on Brad McNeer Parkway and Hull Street?  3.How can abolishing left turns at intersection possibly ensure safer, more efficient travel?  4.Why do we feel that these County plans address the convenience of Bailey Bridge Road residents' access to Hull Street Road via Brad McNeer Parkway at the expense of Brad McNeer Parkway's local citizens' access to areas beyond our living quarters?  (continue below)	1) The county is proceeding with the project to provide an alternate route to Route 360.  2) The Bailey Bridge Connector will provide an alternate route to US 360. This will reduce traffic volume at the Route 288/US 360 interchange and along Route 360; thereby, improving safety and reducing congestion. The additional connection will improve network redundancy and improve emergency service access to the area.  3) When left turn movements are prohibited, it is done in order to reduce the number of potential conflict points between the turning vehicle and through traffic. Alternatives such as U-turns and Roundabouts reduce the opportunity for vehicle conflicts  4) This project endeavors to provide safer and more convenient travel for the maximum number of citizens possible.

N	lame Email	Street Address	City	Zip Code	Comment	Response
						5) A noise analysis was completed for this project and determined that
						there are no locations where sound walls are warranted. Typically, the
					(continued from above)	installation of noise barriers requires additional right-of-way which has
						a greater impact on adjacent property. Brad McNeer Parkway is, and
					5. How are you going to address the noise issue with The Terraces community? This can be a	the proposed intersection with the Bailey Bridge Connector will be, at
					serious issue for condos in the rows directly parallel to Brad McNeer Parkway. If this goes	an elevation lower than the elevation of the Terraces community
					forward, what kind of natural sound walls are options?	which is also setback from the roadway, this will help mitigate
						additional noise generated by the proposed improvements.
					6. How would the current natural barrier of trees be compromised, if they have to be removed?	
					What can the County offer in terms of replacements? The shared-use path is not a viable option!	6) The impact of the proposed Shared Use path on the trees along Brad
						McNeer Parkway will be further evaluated during the detailed design
					7. How will our two entrances and exits to The Terraces at Swift Creek Condominium Community	stage of this project.
					be impacted when the project begins? Will one or both of our entrances/exits be blocked at any	
					time?	7) While some impacts are unavoidable during construction, at no
						point will access be closed.
					8.Once begun, what are your construction plans if you encounter long-term delays?	
						8) The County will work with VDOT to evaluate measures to reduce the
						risk and likelihood of construction delay.



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## The safety and conspicuity of pedestrian crossing at roundabouts: The effect of median refuge island and zebra markings



Valeria Vignali\*, Margherita Pazzini, Navid Ghasemi, Claudio Lantieri, Andrea Simone, Giulio Dondi

Department of Civil, Chemical, Environmental and Material Engineering (DICAM), University of Bologna, Viale Risorgimento 2, 40136 Bologna, Italy

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#### ABSTRACT

Roundabouts are one of the most used road intersections because, compared to signalized ones, they reduce conflict points between traffic flows and moderate driving speed. Great attention should also be paid to vulnerable road users at roundabouts. According to accident statistics, in fact, accessibility of pedestrians and cyclists is not always ensured.

This paper has evaluated the effects on the visibility of pedestrian crossing before and after the displacement of zebra markings, moved before intersections, and the introduction of media refuge islands and "Yield here to pedestrians" vertical signs. The above effects have been assessed by before-after analysis of speed and visual behaviour of drivers approaching the crosswalk.

Moreover, the analysis of the drivers' eye movements has highlighted the most salient elements of the pedestrian crossing. The relation between the drivers' visual behaviour and the vehicle speed have also been calculated. Results have confirmed that the intervention carried out has increased both visibility and safety of the studied pedestrian crosswalks.

Zebra markings and the median refuge island have turned out to be the most glanced elements, respectively seen by 93.75% and 56.25% of the drivers, followed by the "Yield here to pedestrians" vertical sign. The mean distance of first fixation of the crosswalk increased from 21.98 m before the intervention, to 40.69 m after it. The drivers perceived the pedestrian crossings from a longer distance after the intervention, and they continued to glance at the crosswalk while approaching it, enhancing their visual attention.

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#### 1. Introduction

Road safety is influenced by road design and signalling which affect the drivers' perception of the external environment and the possible dangerous situations (Bucchi, Sangiorgi, & Vignali, 2012; Dondi, Simone, Lantieri, & Vignali, 2011). In recent years an increasing attention has been paid to traffic problems which could modify the drivers' cognitive and emotional condition (Chu, Wu, Atombo, Zhang, & Özkan, 2019). Driving is a complex situation, requiring a constant attention and prompt reactions to fast changes. During long trips, the drivers' behaviour might result into stressful responses due to an excessive cognitive workload (Ringhand & Vollrath, 2019).

<sup>\*</sup> Corresponding author.

In order to increase safety, fluidity of road traffic and to reduce the velocity, roundabouts are often built especially in urban areas (Hydén & Várhelyi, 2000). They allow a higher entry capacity than grade intersections and a reduction of conflict points, from 32 for a grade intersection, to 8 in case of a roundabout (Gross, Lyon, Persaud, & Srinivasan, 2013; Turner, 2011). In addition to facilitating the traffic flow, roundabouts also reduce the velocity and the drivers' stress (Hydén & Várhelyi, 2000). The negative aspects of roundabouts are linked to crosswalks which reduce the roundabout capability and are critical points as far as pedestrian safety is concerned (Bergman, Olstam, & Allström, 2011; Meneguzzer & Rossi, 2011; Vijayawargiya & Rokade, 2017). Studies related to roundabout safety have generally focused on drivers, overlooking the importance of safety of the vulnerable users, pedestrians and cyclists (Perdomo, Rezaei, Patterson, Saunier, & Miranda-Moreno, 2014). In urban areas, pedestrians need to cross at intersections, and zebra crossings are often present close to access and exit ramps of roundabouts. Pedestrian crosswalks at roundabouts are useful for pedestrians and increase safety. They should be placed in a proper way both to attract the maximum number of pedestrians, who would otherwise cross the street at random, and to give drivers enough time to stop safely (Cohen, Bar-Gera, Parmet, & Ronen, 2013).

Recent studies have shown the importance of a correct design for pedestrian crossings at the intersections. More attention should be paid to pedestrian safety, as the number of victims among people crossing at intersections is constantly increasing year after year (Bungum, Day, & Henry, 2005; Olszewski, Szagała, Wolański, & Zielińska, 2015). Literature does not suggest many countermeasures aimed at reducing the problems for pedestrians crossing at roundabouts (Perdomo et al., 2014). Anyway, a significant reduction of speed of vehicles in a complex road environment, such as collector roads provided with signalled intersections, roundabouts, road circles or stop signs, would be highly recommended and it can only be obtained with different multi-purpose countermeasures.

A refuge island, for example, makes the road narrower thus slowing the traffic. It also helps drivers to realize that pedestrians are crossing the road. Pedestrians may also stop on a refuge island and cross the road in two stages, increasing the attention paid at the traffic in both directions. Refuge islands are widely self-explaining, and they immediately give the idea of a not fast traffic road (Leden, Gårder, & Johansson, 2006; Sanca, 2002). Literature shows evidence of a significant speed reduction of vehicles in the presence of a refuge island (Fildes, Fletcher, & Corrigan, 1987; Kolsrud, 1985; Vey & Ferreri, 1968; Yagar & Van Aerde, 1983). Mako (2015) has shown that implementation of refuge islands at pedestrian crossings has reduced the number of fatalities for pedestrians by 64%. Without a refuge island the drivers' movement is 4% more irregular than in presence of a refuge island. As for pedestrians, without a refuge island they tend to cross irregularly instead of waiting for a vehicle to stop giving them the priority.

Curb extensions may also help vehicles to slow down while approaching a pedestrian crossing. Extensions of a sidewalk edge are commonly present along roads with parking areas on the lane side. These extensions increase the visibility of pedestrians and reduce the drivers' speed behaviour inducing prompt yielding (Hawley, Henson, Hulse, & Brindle, 1992; Huang & Cynecki, 2001; Macbeth, 1995; Replogle, 1992). Bella and Silvestri (2015) have proved that more than 80% of the drivers they tested clearly perceived the effectiveness of curb extensions. This means that, in presence of curb extensions, the drivers were much more prompt to yield since pedestrian crossings were better seen.

Prompt yielding is often the response to "Yield here to pedestrians" vertical signs. These are mounted on poles on the right side at crosswalks or on supporting arms over the traffic lanes (Beeber, 2011). To improve their visibility, LED flashes with an irregular flash pattern can be mounted, too. Van Houten, Ellis, and Marmolejo (2008) showed that LED flashers installed on simple pedestrian signs, increased the drivers' yielding and reduced evasive manoeuvres as well as the number of pedestrians trapped in crosswalks at the centre of the road without a refuge island. Sherbutt, Van Houten, Turner, and Huitema (2009) carried out three different experiments on the effects of flashing pedestrian vertical signs on drivers' behaviour. The results showed an increase of yielding from 18.2% to 81.2%. Bram De Brabander Lode Vereeck have shown that the number of accidents with serious injuries involving vulnerable road users increased at intersections with no signalization before the roundabout.

A further countermeasure may be guardrails at roundabouts. These direct pedestrians to safe crossing areas and prevent bursting into the road (Retting, Ferguson, & McCartt, 2003). The main benefits of installing guardrails are channeling pedestrians to the crossing (Stewart, 2007) and making footpaths safer. Cohen et al. (2013) have shown that the number of pedestrians jaywalking with no guardrails at a roundabout exceeds 20–30% the number of pedestrians committing the same violation when guardrails are installed.

Although any countermeasures aiming at increasing safety of pedestrian crossings are very important, the drivers' behaviour should also be taken into consideration. Getting closer to a roundabout, drivers are often distracted and do not pay attention to the road environment, including crosswalks. Inattention of drivers causes most of the accidents (Xu et al., 2018). Electronic and radio devices present inside the vehicle and used while driving, in addition to other distractors including the road environment, are the main causes of the drivers' inattention and carelessness (Oviedo-Trespalacios, Haque, King, & Washington, 2017). High speed of vehicles approaching a roundabout along with drivers' lack of attention represent the main problems for the safety of pedestrians crossing at roundabouts (Fortuijn, 2003; Gross et al., 2013; Vijayawargiya & Rokade, 2017). Speed reduction of vehicles is one of the key elements to reduce the probability of death of pedestrians involved in an accident (Gonzalo-Orden, Pérez-Acebo, Unamunzaga, & Arce, 2018; Guo, Liu, Liang, & Wang, 2016; Hakkert, Gitelman, & Ben-Shabat, 2002; Haleem, Alluri, & Gan, 2015; Kröyer, Jonsson, & Várhelyi, 2014; Rosén & Sander, 2009; Rosén, Stigson, & Sander, 2011; Tefft, 2013; Zeeger & Bushell, 2012).

However, the present traffic safety laws (road safety measures) are not to be the only instrument capable of reducing the number of accidents and fatalities (Ward, Linkenbach, Keller, & Otto, 2010). In fact, a road safety culture should be estab-

lished, both for drivers and pedestrians (Chu et al., 2019; Obeng-Atuah, Poku-Boansi, & Cobbinah, 2017). A road safety culture, deep-rooted in society, sounds like a long-term project not easy to be achieved, anyway. On the contrary, road infrastructure, especially at crosswalks near roundabouts, might be immediately improved in order to increase pedestrian safety and drivers' perception of the risk. Many studies with positive results have been taken into account aiming at improving road safety while reducing drivers' speed in proximity of pedestrian crossings (Bella & Silvestri, 2015; Gonzalo-Orden et al., 2018). These studies usually rely on motion parameters, such as the operating speed or the stopping distance. They do not consider the drivers' behaviour in terms of detection and perception of crosswalk elements at the roundabout, whereas these parameters are very important to assess the drivers' attention level and hazard anticipation. An eye-movement recording tool can be very useful for this purpose since it allows a quantitative assessment of the drivers' risk anticipation when approaching a roundabout (Costa et al., 2017; Ghasemi, Acerra, Vignali, Lantieri, Simone, & Imine, 2019; Kapitaniak, Walczak, Kosobudzki, Jozwiak, & Bortkiewicz, 2015; Taylor et al., 2013; Topolšek, Areh, & Cvahte, 2016).

Assessing the driver's vision may be useful to point out safe or unsafe behaviours on roads. Eye tracking is used to evaluate the drivers' perception and acknowledgments of the road elements as well as to develop driving strategies and prevent crashes. According to several studies, the drivers' visual inattention is responsible for a large amount of traffic accidents (Bongiorno, Bosurgi, Pellegrino, & Sollazzo, 2017; Costa, Bichicchi, et al., 2019; Costa, Boneti, et al., 2019; Costa et al., 2014; Costa, Bonetti, Vignali, Lantieri, & Simone, 2018; Costa, Simone, Vignali, Lantieri, & Palena, 2018; Di Flumeri et al., 2018; Inman, 2012; Kapitaniak et al., 2015; Lantieri et al., 2015; Mantuano, Bernardi, & Rupi, 2017; Vignali, Cuppi, et al., 2019; Vignali, Bichicchi, et al., 2019). In order to prevent those accidents, some studies have been carried out about the driverpedestrian interaction. Only a few studies have applied this method by now (Trefzger, Blascheck, Raschke, Hausmann, & Schlegel, 2018) most of which take only the pedestrian behaviour into consideration (Biassoni, Confalonieri, & Ciceri, 2018; Bock, Brustio, & Borisova, 2015; Davoudian & Raynham, 2012; Fotios, Uttley, & Hara, 2013; Trefzger et al., 2018; Zito et al., 2015). An exam of the drivers' behaviour when approaching a crosswalk was carried out by Ciceri, Ruscio, Confalonieri, Vangi, and Virga (2013). They set different road situations and the outcome was that a complex street environment, with a lot of road signs, resulted into a lack of attention from the driver towards the pedestrian. The driver, in fact, realized the movement of pedestrians on the crosswalks quite late.

Moreover, using the eye tracking measurements <u>Grüner and Ansorge</u> (2017) studied the difference between the driver's behaviour in urban and rural roads. The results showed a higher number of driver's eye movements in residential areas compared to city roads. This means that the less the traffic is, the higher the driver's expectation of a careless behaviour of pedestrians when crossing roads will be.

In addition to this, according to the studies carried out by Dukic, Ahlstrom, Patten, Kettwich, and Kircher (2013) and Maxera, Kledus, and Semela (2015), eye tracking measurement proved that drivers always detected pedestrians late when driving at night. Increasing size and visibility of an object, making it more illuminated and salient for example, proved to be useful to avoid the problem. This can be applied both to objects and pedestrians by using different marking patterns (Crescenzo et al., 2019; Muttart, Dinakar, Vandenberg, & Yosko, 2016).

Using a simulator, Fisher and Garay-Vega (2012) compared the drivers' behaviour at crosswalks signalized by mid-blocks, advanced yield markings and "Yield here to pedestrians" vertical signs to crosswalks showing just standard markings. In the former situations the drivers' behaviour consistently changed reducing pedestrian-vehicle crashes and increasing the drivers' attention towards pedestrians. The distance at which a pedestrian was first seen increased and the drivers performed a prompt yielding. Gómez, Siby, Romoser, Gerardino, Knodler, Collura, and Fisher (2013) confirmed the above issues. With advance yielding markings fewer accidents occurred and drivers payed a higher attention to pedestrians. Most of these studies, anyway, used eye-movement tracking with simulators but not in real traffic environments. Moreover, while using the same methodology, these research studies have analysed the detection of pedestrians by drivers but only few of them focused the attention on factors improving the real crosswalk conspicuity.

The aim of the present study, on the contrary, was a before-after evaluation of a combined intervention on pedestrian crossings near roundabouts in a real road context, assessing both vehicle speed and eye-movements approaching a sequence of crosswalks before and after the intervention.

Four crosswalks were included in the study. Specifically, the crosswalks were moved further before the intersection, median islands were added, and a "Yield here to pedestrians" vertical sign was added. This intervention at roundabouts is of simple installation and it may be of high effectiveness on the drivers' behaviour.

#### 2. Materials and methods

#### 2.1. The experimental protocol

Ten drivers, 3 males ( $M_{age}$  = 28.87 years, range: 23–39, SD = 8.96) and 7 females ( $M_{age}$  = 35.86 years, range: 25–52, SD = 10.79), were recruited and involved on a voluntary basis in this study. They had normal vision and none of them wore eyeglasses or lenses, to avoid artefacts in eye-movement monitoring. All participants had a Category-B driving license (for cars) and no prior driving experience on the road segment object of study, in order to control the effect of familiarization with the road environment.

The experiment was conducted following the principles outlined in the Declaration of Helsinki of 1975, as revised in 2000. Informed consent and authorization to use the video graphical material were obtained from each subject on paper, after the explanation of the study. One car was used for the experiment, with diesel engine and manual transmission. The subjects had to drive the car along a circuit designed to include the four pedestrian crossings object of study placed along the routes via Testi and via Fornarina, a single carriageway-two lanes road, located in Faenza in the north of Italy, in the Emilia Romagna region. These two roads connect the centre of the town to its suburbs. The circuit was 1.52 km long, with a width of about 9.00 m (two 3.00 m wide lanes and one 1.50 m wide sidewalk) and the speed limit was fixed at 50 km/h (Fig. 1). The route also included two mini roundabouts, spaced at 340 m, the first one located between via Testi and via Cesarolo and the second one between via Fornarina and via Saviotti. The pedestrian crossings were placed on straight sections before and after the two roundabouts, at an average mutual distance of about 22 m.

The route was characterized by the highest number of accidents in the Province of Faenza in the years 2009–2011, with 12 injured, number which involved very high social costs. The main accident causes were the drivers' distraction and high-speed driving which increased both vulnerability of weak users and car-pedestrian crashes. To solve this problem, different safety countermeasures had been installed in order to slow down vehicles approaching the four pedestrian crossings object of study.

Before the works, all crosswalks had white zebra markings, with stripes which were 1.50 m long, 0.50 m wide and spaced 0.50 m from each other according to the Italian Highway Code (Ministry of Infrastructures and Transports (1992) (1992), 1992). These zebra markings were positioned after the roundabout stop line. Only two of them had standard vertical "Yield here to pedestrians" signs, one for each side, placed on the sidewalk of the road in proximity of the markings (Fig. 2). After the works, all crosswalks were characterized by (Fig. 3):

- median refuge island, allowing a safer and easier two-stage crossing for pedestrians. According to the Italian Highway Code (Ministry of Infrastructures and Transports (1992) (1992), 1992), it was 4 m long and it had a continuous boundary marking and a 0.10 m high curb. A yellow reflective obstacle delineator, coupled with the sign "passage allowed to the right", was installed on the curb nose;
- white zebra markings, which were moved in advance of the intersection and positioned 10 m before the roundabout stop line, in order to increase pedestrian safety with vehicles approaching the intersection;
- kerb ramps, improving mobility of people with disability, on both sides of the road;
- "Yield here to pedestrians" vertical signs, on the right side of the road, one on each side.

Apart from the introduction of median refuge island, zebra markings displacement in advance of the intersection, and the improvement of "Yield here to pedestrians" vertical sign, the design of pedestrian crossings was the same as before. Each subject had to repeat the driving task two times on different days, before and after the works (Fig. 4).

Data collection started at 9 a.m. and finished at 1 p.m. on two different days, always in summer, in a period with low traffic and good meteorological conditions. The two driving tasks were conducted in the same conditions in terms of weather, visibility conditions and traffic driving scenario. In this study the pedestrian presence near the crosswalk was not considered.

Participants didn't know the route in advance. At the beginning of the "after" study, participants were asked whether they remembered of the "before" task and nobody identified any elements of the route.

During the whole experimentation, an ET device recorded the eye gazes while a professional device mounted on the car (a Video VBOX Pro) detected data about the drivers' behavior. Eye movements of participants were recorded through an ASL Mobile Eye-XG device (ET), a system based on lightweight eyeglasses equipped with two digital high-resolution cameras, one recording the right eye movements, and the second one recording the visual scene. Not to obscure the normal field of view of the drivers, a mirror capable of reflecting the infrared light was installed in the eye camera recording the activity



**Fig. 1.** Outline of the experimental route. In red the mini roundabouts object of study. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)



Fig. 2. Pedestrian crossing design before the works.

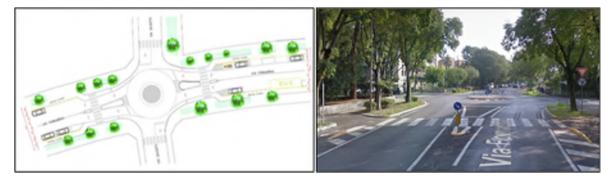


Fig. 3. Pedestrian crossing design after the works.

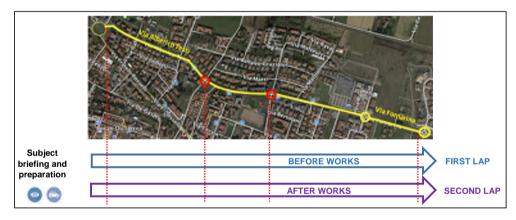


Fig. 4. Overview of the experimental protocol, consisting of two driving tasks, 1.5 km from via Testi to the end of via Fornarina, performed before and after the works.

of the right eye. As already tested in Costa et al. (2014), the sampling rate for the eye-movement recording was 30 Hz (33 ms time resolution) with an accuracy of 0.5–1° (approximating the angular width of the fovea).

A preliminary calibration procedure was carried out for each subject inside the car before starting driving, asking them to fix their gaze on thirty fixed visual points spread across the whole scene, in order to get a good accuracy of the eye movement recorder. A video for each participant was created using the ASL software with a cross superimposed to the scene showing the eye fixations. This allowed researchers to detect the sequence of points of the scene fixed by the driver. The car was equipped with a Video VBOX Pro (Racelogic Ltd), a system able to continuously monitor the cinematic parameters of the car, integrated with GPS data and videos from four high-resolution cameras. The system was fixed inside the car, in the center of the back floor, in order to put it as close as possible to the car barycentre, while two cameras were fixed over the top of the car. The system recorded speed (accuracy: 0.1 km/h), acceleration (1% accuracy), and distance with a 20 Hz sample rate.

The ET and the Video VBOX Pro devices were installed on the back seats of the car, monitored by one of the researchers, who was asked not to talk to the driver except for giving instructions about the direction or assistance in case of necessity.

#### 2.2. Performed analysis

The performed analysis aimed to evaluate the effect on safety and visibility of the studied pedestrian crossings produced by the introduction of median refuge island, the displacement of zebra markings in advance of the intersection, and the improvement of "Yield here to pedestrians" vertical sign. To this end, both vehicle speed and drivers' eye-movements approaching crosswalks were analysed and compared before and after the works.

The recording of driver's eye-movement allowed an assessment of the more salient visual elements along the road and near the pedestrian crossing as well as an evaluation of the driver's visual behaviour related to the vehicle speed. The experimental route was a back-and-forth trip, so each of the four crosswalks was crossed twice and the average value between the two directions for each crosswalk was taken into consideration.

A before-after operating speed comparison is commonly used to evaluate the safety of a road modification (World Road Association (PIARC), 2003 (PIARC), 2003, 2003). Therefore, in the present study, the Video VBOX Pro output video was analysed for each participant before and after the works in order to evaluate the operating speed. The ET video, on the contrary, was analysed frame-by-frame, in order to verify the target fixed by each participant. The targets under analysis were "Yield here to pedestrians" vertical sign, zebra markings and median refuge island (only in the after-intervention condition). For each target the number of fixations and the duration of fixation were computed, multiplying by 33 ms the number of frames in which a single target object was fixated.

An object was considered as fixated when it was fixed for a minimum duration of two frames (66 ms), as defined by the intersection area of the cross on the video (Fig. 5). The threshold of 66 ms, which is lower in comparison to a common filtering of 100 ms or higher as usually found in eye-tracking studies (Holmqvist et al., 2015), was dictated by the specific setting of this study that involved the recording of eye movements while driving. Although lower values are shown in literature (Velichkovsky, Domhoefer, Pannasch, & Unema, 2000; Domhoefer et al., 2000; Sodhi, Reimer, Cohen, Vastenburg, Kaars, & Kirschenbaum, 2002), Lantieri et al. (2015), Costa, Bonetti, et al. (2018) and Costa, Simone, et al. (2018) reported that in real traffic situations, that are highly dynamic driving contexts, fixation duration is much lower than in other contexts or in experimental settings. In a real driving setting with a dynamic visual scene, as in the case of the present study, rapid fixations may occur. Since the distribution of fixation duration is positively skewed and not normal, medians are reported instead of means (Costa, Bonetti, et al., 2018; Costa, Simone, et al., 2018). For each studied pedestrian crossing target the distance of first fixation was computed, considering any element of the crosswalk (zebra markings, "Yield here to pedestrians" vertical sign, or median refuge island). The first fixation for each crosswalk was assessed thanks to the synchronization of the speed data and the ET data, obtained by the methodology used in Costa, Bonetti, et al. (2018) and in Costa, Simone, et al. (2018) (Fig. 5). The obtained values were compared to the operative stopping distance which was computed using a mathematical equation in accordance with the Italian regulations (Ministry of Infrastructures and Transports (2001) (2001), 2001). The operative stopping distance depended on the travelling speed (the vehicle speed at the first-fixation position), on coefficient of available friction, and on road average longitudinal slope (4%).

In order to avoid conflicts between vehicles and pedestrians entering the road area from any side of it, the first fixation distance should be longer than the operative stopping distance so that the driver has enough space for a prompt yielding. The comparison between the distance of first fixation and the operative stopping distance allows a correct evaluation of the yielding space under safe conditions (Jurecki & Stanczyk, 2014; World Road Association (PIARC), 2003 (PIARC), 2003, 2003). When the distance of first fixation was shorter than the stopping distance, the driver's behaviour was classified as



Fig. 5. Synchronization of the ASL eye-tracking mobile video output with the VBOX PRO video output.

"unsafe", while when the distance of first fixation of the crosswalk was longer than the operative stopping distance the driver's behaviour was considered as "safe".

To assess the behaviour of drivers in the two situations before and after the combined intervention of pedestrian crossings near the roundabouts, univariate ANOVA was used. The parameters that were evaluated with the univariate ANOVA are the difference in median fixation duration of each pedestrian crossing element, the distance of first fixation of crosswalks and the operating stopping distance at each single crosswalk and for each participant.

#### 3. Results

The Video VBOX Pro results showed that the drivers' average speed when approaching the crosswalk (0 m distance condition) was 32.64 km/h (SD = 6.35, N = 74) before and 27.04 km/h (SD = 9.19, N = 48) after the intervention, with a reduction of 5.6 km/h. An ANOVA tested a significant difference: F (1, 138) = 2.97, p = .04,  $n^2 = 0.02$ .

Fig. 6 shows the results of the comparison between the percentage of drivers that looked at zebra markings, at "Yield here to pedestrians" vertical sign and at median refuge island, before and after the works.

The results were determined by 80 observations (10 participants  $\times$  4 crosswalks  $\times$  2 sides).

The performed statistical analysis revealed a significant increasing of drivers that looked at zebra markings (+31.25%,  $\chi^2$  = 7.11, p = .002) and at "Yield here to pedestrians" vertical sign (+8.75%,  $\chi^2$  = 6.32, p = .002). After the intervention 56.25% of drivers glanced at median refuge island which was not part of the crosswalk design before the works.

Univariate ANOVAs were applied in order to test the difference in median fixation duration of each pedestrian crossing element before and after the works (Fig. 7). The difference was significant for "Yield here to pedestrians" vertical sign: F(1, 27) = 4.02, p = .02,  $\eta^2 = 0.12$ . The average fixation time was 150 ms (SD = 46) before and 300 ms (SD = 200) after the works. The difference was also significant for zebra markings: F(1, 62) = 9.17, p = .002,  $\eta^2 = 0.12$ . Before the median fixation was

The average fixation time at the median refuge island was 700 ms (SD = 62).

267 ms (SD = 122), after the works it increased to 700 ms (SD = 317).

Univariate ANOVAs were also applied in order to test and compare distance of first fixation of the crosswalks in before and after conditions. The mean distance increased from 21.98 m (SD = 16.76, N = 48) to 40.69 m (SD = 19.66, N = 73), showing a significant difference: F (1, 85) = 108.19, p < .001,  $\eta^2$  = 0.37.

The operative stopping distance at each single crosswalk and for each participant was tested using ANOVA. The average operative stopping distance before was 39.30 m (SD = 17.22), while after the works it was 34.42 m (SD = 13.97), with a significant difference: F(1, 73) = 3.59, P(1, 73) = 0.04.

Obtained values showed that before the intervention 78.1% of the cases were "unsafe", with operative stopping distances far exceeding the distance of first-fixation. After the intervention the "unsafe" cases decreased to 30.1%, with a significant reduction of 48.0%. The difference was tested by a Chi-square test as follows:  $\chi^2$  = 18.02, p < .001. After the zebra markings displacement and the installation of the median refuge island and of the "Yield here to pedestrians" vertical sign the crosswalk conspicuity and visibility increased and the drivers' first-fixation was at a distance that allowed a safe stop in case of pedestrians entering the crossing area.

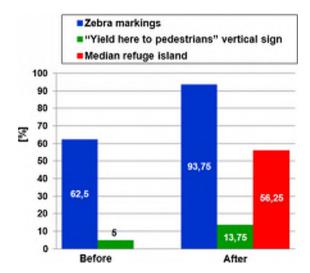


Fig. 6. Percentage of drivers that looked at zebra markings, at "Yield here to pedestrians" vertical sign and at median refuge island, before and after the works, N = 80 observations (10 participants × 4 crosswalks × 2 sides).

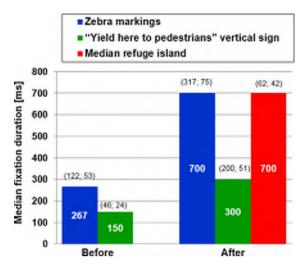


Fig. 7. Before-after analysis of median fixation duration at the pedestrian crossing elements (standard deviation and number of observations are reported between parentheses).

At the moment of first fixation of the crosswalk, the drivers' mean speed changed was 37.94 km/h (SD = 10.91, N = 74) before and 31.03 km/h (SD = 11.25, N = 48) after the works, with a reduction of 7 km/h. The difference was significant: F (1, 85) = 4.73, p = .02,  $\eta^2$  = 0.04.

The effect of driving speed on first-fixation distance was tested with a linear regression considering operating speed as independent variable and distance as dependent variable. The regression value was significant: t = 2.004, p < 0.001,  $R^2 = 0.067$ . The standardized coefficient between the two variables amounted to  $\beta = 0.21$ , showing that the less speed was, the longer the distance at which the drivers saw the crosswalk was.

#### 4. Discussion

In the present study different engineering countermeasures, aimed to increase conspicuity and visibility of pedestrian crossings at roundabouts, have been tested in order to assess their impact on road safety. These countermeasures included installation of a median refuge island, displacement of zebra markings in advance of the intersection, and placement of "Yield here to pedestrians" vertical signs. The safety evaluation was performed by a before–after analysis of both speed and drivers' visual behaviour approaching the crosswalks in a real road experimental setting. All obtained results confirmed that adopted countermeasures increased conspicuity and safety at pedestrian crosswalks, because drivers' attention to the road increased and the speed decreased accordingly. The analysis of the drivers' eye movements was very useful to assess the visibility of pedestrian crossings as well as to study the drivers' behaviour and the data obtained may help to improve the crosswalk design in order to prevent accidents.

Statistical analysis of the number and duration of fixations confirmed that they were significantly higher after the new elements had been installed near the crosswalks. The drivers' attention focused on the roadway with a decrease of distraction caused by the surrounding road environment. According to Bichicchi et al. (2017), zebra markings and median refuge island were the best perceived elements by all drivers, with a median fixation duration respectively of 700 ms, followed by "Yield here to pedestrians" vertical sign (300 ms).

The elements near the centre of the road were fixated longer than the vertical sign, probably because of their position and their angular distance from the line straight ahead the driver. This was also confirmed by Costa et al. (2014), Costa, Bonetti, et al. (2018), Costa, Simone, et al. (2018) and by Yuan, Fu, Ma, and Guo (2011), who found that vertical signs, falling outside the foveal visual field of the driver, required specific saccadic movements or peripheral vision to be seen. The more the angular distance increased, the poorer the visibility was, since the sign was seen at a shorter distance. On the contrary, zebra markings and median refuge island were placed on the road, directly in front of the drivers, and so they had a higher effectiveness in influencing the drivers' behaviour.

These data are more significant considering that participants had never driven along the study route before. Previous studies, in fact, have shown that novice drivers have a longer eye-fixation duration than expert drivers, but the fixation location is differed between novice and expert drivers. Novice drivers tend to focus on roadside longer than expert drivers, to determine the position of their vehicles (Laya, 1992; Mourant & Rockwell, 1972; Satoh, 1993; Shinohara and Nishizaki, 2017a, 2017b). Drivers who are familiar with the route spend more time looking ahead and can better detect events that may lead to situations that affect traffic flow or cause collisions. The results lend support to the hypothesis that the peripheral area of the eye is used to monitor other vehicles and the road lane markers in order to direct the fovea for closer examinations when the situation demands it (Shinohara and Nishizaki, 2017a, 2017b).

After the intervention all the drivers detected the crosswalks in advance, since the mean distance of first fixation of crosswalk increased accordingly. They were seen at a longer distance increasing hazard anticipation and detection. Before the works, drivers saw the crosswalk at a very shorter distance (21.98 m), which didn't allow them to adjust speed and slow down their velocity. After the countermeasures, drivers perceived the pedestrian crossings from a longer distance (40.69 m), and they continued to glance at the crosswalks while approaching them, enhancing their visual attention. This was due also to the average speed reduction approaching the crosswalk. After the works, in fact, the drivers perceived in advance the crosswalk presence and therefore they decelerated earlier reducing the probability of fatal accidents. The drivers' average speed reduction was of 5.6 km/h after the intervention.

The lower the speed, the longer the distance of crosswalks detection was. At a low speed the driver may tend to look at and monitor the road more carefully than at a high speed, better perceiving any critical element placed ahead. The longer the distance of first fixation of crosswalk, the longer the operative stopping distance of the drivers was. After the works, a reduction of 48.0% of the "unsafe" cases were obtained.

As said above, these data are very interesting considering that participants had never driven the study route before.

Several previous studies, in fact, have found that familiarity with the driving situation has a great influence on the driving speed. Expert drivers tend to drive faster than the novice drivers and, under increased speed conditions, subject tended to fixate relevant items near the centre of the road with increased frequency (Spijkers, 1992). Drivers detect fewer elements in the central visual field when driving slowly and they detect fewer elements in peripheral vision when driving fast (Kayser & Hess, 1991; Miura, 1985, 1987; Rogé et al., 2004).

A relatively small sample of drivers and situations was considered in this study and future studies will test the effects of a similar intervention on a larger sample. Nevertheless, the significant variations in the drivers' behaviour recorded after the works were particularly remarkable in terms of crosswalk visibility and conspicuity. Future researches might evaluate drivers' behaviour in the presence of a pedestrian on the crosswalk area.

#### **CRediT authorship contribution statement**

**Valeria Vignali:** Conceptualization, Methodology, Investigation. **Margherita Pazzini:** Investigation, Writing - original draft. **Navid Ghasemi:** Investigation, Data curation. **Claudio Lantieri:** Writing - original draft. **Andrea Simone:** Data curation, Writing - original draft. **Giulio Dondi:** Writing - review & editing.

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TO: Chessa Walker, P.E. WalkerCh@chesterfield.gov
FROM: Elizabeth Geiger esgeiger@comcast.net

WalkerCh@chesterfield.gov
esgeiger@comcast.net

Elizabeth Geiger: included with online comment

Resident: The Terraces at Swift Creek condominium community

DATE: Saturday, November 6, 2020

#### **SUBJECT: "Bailey Bridge Connector Virtual Location Public Hearing Comments"**

STREAMLINE 360/288 IMPROVEMENTS

Streamline 360/288 Improvements Plan is defined as "a multi-year, phased plan of multiple roadway projects to ensure safer, faster and more efficient travel along Route 360 and Route 288."

*The Bailey Bridge Connector's* purpose is "to provide an alternate route for areas along Bailey Bridge Road to Route 288 and to amenities along Route 360 (Hull Street)."

Comment 1: First, during this time of global, national and local crisis, this Project should be put on hold.

- a. The goal of improving a heavy traffic flow along the major routes of 360 and 288 with alternate routes seem unnecessary and **obsolete during these pandemic times.** For reasons too numerous to list here, there is much less traffic on roads everywhere now than in 2011, when this Project was initially defined.
- b. The goal of doing massive highway construction now, to make Route 360 "drawing card" amenities like restaurants and shops more available also **seems an unrealistic goal during these pandemic times**. Considering looming safety concerns which now limit crowd size, prefer outdoor venues, encourage online shopping and other safety protocols, who knows when this will end?
- c. Allocating almost \$23 million dollars of current funds to push this project forward <u>now</u> with break-neck speed, seems fiscally irresponsible.

Q: Can this highway project be put on hold? If not, why not? Are there reasons beyond traffic flow that are motivating its break-neck speed to date of launch? If so, what are these motivating factors, of which the public may not be aware?

Comment 2: Secondly, this stated Plan to make traffic flow more safe seems to be ...

- a. ... forgetting about the well-being of Brad McNeer Parkway, altogether.
- b. ... charting options at the expense of Brad McNeer Parkway in many ways.
- c. ... overlooking stated concerns for the safety and efficiency of travel on Brad McNeer Parkway as it currently exists.
- d. ... <u>dubbing Brad McNeer Parkway as the panacea (or "dump diversion route")</u> for all *safety, speed,* and *efficiency* traffic problems on Hull Street, Route 288, and Bailey Bridge Road.
- e. ... <u>dubbing Brad McNeer Parkway as a "convenient shortcut" for Hull Street, Rt 288, and Bailey Bridge Road's through-traffickers</u> <u>at the expense of its local citizens.</u>
- e. ... <u>ignoring the importance of Brad McNeer Parkway</u> as the major currently efficient two-lane road on which its many local residents and businesses depend as their lifeline to the outside world.
- f. ... offering drastic construction proposals (with its *multiple roadway projects*) which may negatively impact all Brad McNeer Parkway residents and businesses in areas of traffic safety and efficiency:
  - -- by destroying the road in front of our homes in order to reconstruct it (perhaps unnecessarily). The massive road destruction this Plan requires will, for undefined periods of time, inevitably force destruction and construction equipment blockages at the only entrance and exit routes to and from our homes (*The Terraces at Swift Creek*) via Brad McNeer Parkway.
  - --by the eventual imposition of confusing roundabouts, a flyover, and a bridge at the front door of our condominium community, *The Terraces at Swift Creek*, a residential community with many senior citizens.
- g. ... proposing Mandated Intersection Changes which sound more like Chaotic Safety Hazards:
  - -- Mandated Re-routes:
  - -- No Left Turns;
  - -- Enforcing Right Turns Only, followed by U-Turns at crucial and currently familiar Intersections.
- Q: How can these additions possibly ensure "safer, more efficient travel" for residents and businesses on Brad McNeer Parkway? Or on Hull Street Road?
- Q: How can abolishing Left Turns at the following familiar intersections possibly ensure "safer, more efficient travel"
- --from The Terraces going Left onto Brad McNeer Parkway? or
- --from Brad McNeer going Left onto Commonwealth Center Parkway? or
- -- from Brad McNeer going Left onto Hull Street Road? or
- --from Commonwealth Center Parkway going straight across to Old Hundred and Charter Colony Roads? or
- -- from Commonwealth Center Parkway going Left onto Hull Street Road? or
- -- from Old Hundred Road going Left onto Hull Street Road?

Q: Why do we feel that these County plans address the convenience of Bailey Bridge Road residents' access to Hull Street Road via Brad McNeer Parkway at the expense of Brad McNeer Parkway's local citizens' access to areas beyond our living quarters?

**Comment 1:** Brad McNeer Parkway's two-lane road provides the most direct major entrance and exit from homes to the outside world for residents of *The Terraces at Swift Creek Condo Community*, residents of the *Swift Creek Commons Apartments*, and multiple essential businesses (with employees, customers and suppliers) that line Brad McNeer Parkway from its intersection with Hull Street Road to its intersection with Commonwealth Center Parkway. Keep in mind, too, that many residents in both the condo and apartment communities are senior citizens.

## **Comment 2:** The following aspects of your *Streamline Plan* seem to be **invasive interruptions** and **intrusive inconveniences** to our daily lives:

- 1. ...The tearing up of a perfectly good existing road at our front doors, in order to re-construct disruptive connectors, multiple confusing round-abouts (are there 3?), fly-overs and illogical Intersection mandates.
- 2. ...The proposed increase of *heavy traffic* re-directed away from Route 360 and Route 288 onto Brad McNeer. This inevitable increase in traffic is not guaranteed to be *slow traffic*. This heavier traffic may not necessarily be slowed down by roundabouts, altho' that is the roundabouts' intention. Unintended accidents from roundabouts may be as prevalent or more so than leaving the road as it is. Roundabouts will, unquestionably make it more difficult for condo residents to exit and enter their home community via the Parkway.
- 3. ...Re-defining "safety rules" at crucial intersections, abolishing Left Turns and mandating Right Turns+U-Turns in order to travel to left turn destinations in our area seems to force "going around your elbow to get to your thumb" routes, which will also create highway confusion, chaos, and risk of unnecessary accidents on Brad McNeer Parkway, at the same time the Plan strives to make Hull Street, Route 288, and Bailey Bridge Road more safe.
  - 4. ...Disturbances from increased noise levels produced by heavier traffic directed onto Brad McNeer Parkway.
- Q: How are you going to address the noise issue with The Terraces community? This can be a serious issue for condos in the rows directly parallel to Brad McNeer Parkway. If this goes forward, what kind of natural sound walls are options?
- Q: Re: the right-of-way's impact on the property: How would the current natural barrier of trees be compromised, if they have to be removed? What can the County offer in terms of replacements? The shared-use path is not a viable option!
  - 5. ... Since destruction is the first phase of re-construction, the entrance/exit streets into our condo community could be compromised for months or years by construction itself and the construction machinery required for the job. Once Brad McNeer Parkway is torn up to accommodate Hull Street Road, Route 288 and Bailey Bridge Road, condo residents, apartment residents, and businesses on Brad McNeer will be handicapped in multiple ways, and more particularly if the County encounters long-term delays.
- Q: How will our two entrances and exits to *The Terraces at Swift Creek Condominium Community* be impacted when the project begins? Will one or both of our entrances/exits be blocked at any time?

#### Q: Once begun, what are your construction plans if you encounter long-term delays because of

- Qa. inclement weather (flash floods, heavy rains, heavy winds, tornadoes, hurricanes, sleets/snows)?
- Qb. power outages?
- Qc. more dependence than ever on "virtual communication" for undefined periods of time?
- Qd. local, state, or federal influences regarding covid-19 quarantines, isolations, lockdowns, shutdowns, deaths?
- Qe. the need to admit that the timeline you anticipated may be temporarily impossible to meet?
- Qf: the need to maintain and park bulldozers and other heavy construction equipment at the site of our entrances/exits?

**Comment 3:** Considering adjustments the Terraces community may have to make for this Project to go forward, the shared-use path seems less like a "perk" and more like an "appeasement" to the community for all the upheaval and inconvenience the Project will bring our way. The path should just be forgotten! It serves no practical or pleasurable purpose! A sidewalk to nowhere....

#### **Craig Krupp**

To: Walker, Chessa

**Subject:** RE: 360/288 Streamline Project - Feedback from a concerned citizen

----Original Message-----

From: irrationaljingo@comcast.net <irrationaljingo@comcast.net>

Sent: Sunday, November 8, 2020 6:04 PM

To: Walker, Chessa < WalkerCh@chesterfield.gov>

Subject: 360/288 Streamline Project - Feedback from a concerned citizen

**CAUTION: External Email** 

Why, in the wake of a global pandemic, would this community want our streets torn up and rerouted? I don't believe the issues that were perceived back in 2011, when these proposals originated, even exist anymore. At best, what we have here, is a bad idea at the wrong time. If you take the outdated Streamline project and break it into color-coded parts, then you still have multiple "bad" ideas, just piled up, each worse than the next. If you have to add 3 round-a-bouts to a single block, just to "make it work", perhaps the planners are trying too hard and need to take a step back. Let us take a good look at where we are, right now, and re-approach the drawing board. For each individual part, let's consider an alternative. That alternative being "do nothing". I believe in 100% of these, you will find that "the way it is now" is way better than the so called "improvements" that are suggested. By the time you are adding multiple intersections, forcing traffic to turn right, and then u-turn to travel in the direction they used to simply turn left for, you are introducing the most arcane and dangerous traffic pattern I've ever heard of. I don't believe this level of chaos is a good idea for any community, especially at this point in history. The best proposal so far, is to leave it alone. Problem solved. Money saved. And a community retaining logical, intuitive traffic patterns that are safe and effective. So yes, while 3 rights do make a left, 2 wrongs do not make a right. Do the right thing, give this county a break and put this outdated, unnecessary Streamline project to rest. Thank you, Mike

#### **Craig Krupp**

To: Walker, Chessa

Subject: RE: Bailey Bridge Connector Virtual Location Public Hearing Comments

----Original Message-----

From: kaseywilkins20@gmail.com <kaseywilkins20@gmail.com>

Sent: Wednesday, October 21, 2020 11:29 AM To: Walker, Chessa < WalkerCh@chesterfield.gov>

Subject: Bailey Bridge Connector Virtual Location Public Hearing Comments

**CAUTION: External Email** 

To whom this may concern,

I'm not really sure what I need to say but I do know this project needs to happen if at all possible. We live in deer run off of Bailey bridge and spring run road and it is such a cut through for traffic. So bad our kids can't go on the road. I can't walk my dogs. People fly. They cut through to hull st and Bailey bridge. I actually know this because I did it before I moved here. Now I know how frustrating it is. Hopefully this project would cut down on a lot of the cut through traffic and avoid some of these issues. Thanks for reading!

Kasey

Sent from my iPhone

#### **Craig Krupp**

To: Walker, Chessa

Subject: RE: Comments+Questions: Bailey Bridge Connector Virtual Location Public Hearing

From: ELIZABET GEIGER < <a href="mailto:esseciet">esseciet</a> <a href="mailto:sent:saturday">esseciet</a> <a href="mailto:saturday">esseciet</a> <a href="mailto:saturday">sent: Saturday</a>, November 7, 2020 6:08 PM

To: Walker, Chessa <a href="mailto:walkerCh@chesterfield.gov">walkerCh@chesterfield.gov</a> <a href="mailto:saturday">walkerCh@chesterfield.gov</a> <a href="mailto:saturday">walkerCh@chesterfield.gov</a> <a href="mailto:saturday">esseciet</a> <a href="mailto:saturday">saturday</a>, November 7, 2020 6:08 PM

Subject: Comments+Questions: Bailey Bridge Connector Virtual Location Public Hearing

**CAUTION:** External Email

#### Chessa.

I am currently a resident of *The Terraces at Swift Creek* condominium community on Brad McNeer Parkway. I have been a resident of Chesterfield County all of my life. I am a senior citizen, who has witnessed multiple changes in the county's landscape, changes that have been inevitable signs of progress and growth. These changes have included

- -- the transformation of land where my grandfather's poultry farm stood into the area where Commonwealth Center's Target and Kohl's now stand; and
- -- the transformation of my family's front yard, back yard and home into the plots now occupied by Aldi's, Addison Apartments, the gas station and current development on Hull Street Road. I am saying this to communicate that I am not opposed to progress. But, I do have grave concerns about the impact these traffic plans will likely have on Brad McNeer Parkway and its residents and businesses.

I have already submitted my comments and questions as an attached document to the Timmons group who is collecting the surveys. But, I decided to send the attached document to you as well, since you offered that as an option on the Bailey Bridge Connector website. Please see the attachment. And, please take the time to read it in its entirety. I would have preferred to have a conversation with you over coffee, but these times don't encourage that.

In the Survey, I did vote for an in-person meeting for the Design Phase. Thanks for taking the time to read my concerns.

Sincerely,

Libbie Geiger (Elizabeth Schools Geiger) 5400 Creek Heights Drive

Midlothian, VA 23112 Phone: 804-608-0538

## Richmond Times-Dispatch

**Advertising Affidavit** 

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October 16, 2020

CHESTERFIELD CO TRANSPORTATION Attn JESSE W. SMITH 9800 GOVERNMENT CENTER PARKWAY CHESTERFIELD, VA 23832

Date	Category	Description Ad Size Total	Cost
10/23/2020	Meetings and Events	Bailey Bridge Connector Project (Brad McNeer Parkway to Bail 2 x 84 L	819.00
		Publisher of the	
		Richmond Times-Dispatch	
		This is to certify that the attached Bailey Bridge Connector P was published by the Richmond Times-Dispatch, Inc. in the City of Richmond, State of Virginia, on the following dates:	
		09/30, 10/14/2020	
		The First insertion being given 09/30/2020	
		Newspaper reference: 0001138680	
		Sworn to and subscribed before me this Friday, October 16, 2020	
		Sund Auto Milling Representative	<u>DV</u>
		Sharon R Carsten State of Virginia NOTARY PUBLIC County of Hanover Commonwealth of Virginia My Commission expires Segistration Number 329549	



#### Bailey Bridge Connector Project (Brad McNeer Parkway to Bailey Bridge Road) Chesterfield County

Virtual Location Public Hearing Thursday, October 29, 2020

https://bailey-bridge-connector-timmons-group.hub.arcgis.com/

Find out about plans to construct a connector road from Brad McNeer Parkway to Balley Bridge Road. This notice is intended to inform you of the virtual/online resources available at this time for you to review and provide feedback. A project website has been established to share details, exhibits and other project information, as well as to collect comments:

The Location Public Hearing will be held as a virtual event only. No formal presentation will be made on October 29, 2020. However, all materials that would typically be provided at an in-person meeting will be posted on the project website at https://bailey-bridge-connector-timmons-group.hub.arcgis.com/ and remain on the website through November 8, 2020. Those materials include, but are not limited to, a handout providing project details, a survey to provide feedback, the Localty Preferred Alignment, a video flythrough of the project corridor, and a before/after rendering.

Review project information, including environmental documents, on the website listed above or contact the Chesterfield Department of Transportation to schedule a time to review the information at 9800 Government Center Parkway, Chesterfield, VA 23832. The project team is available to discuss your property with you in detail at your request. Please call ahead to ensure the availability of personnel to answer your questions (804) 748-1037.

Written comments from the public regarding the proposed project are requested and may be submitted by visiting the website above and clicking on the "Provide Input" tab. Written comments may also be submitted by email to Walker Chiechesterfield.gov or by mail to Chessa Walker, P.E., Chesterfield Department of Transportation, 9800 Government Center Parkway, P.O. Box 40, Chesterfield, VA 23832-0040. All comments must be received on or before November 8, 2020. Please reference "Bailey Bridge Connector Virtual Location Public Hearing Comments" in the subject line.

Chesterfield County ensures nondiscrimination and equal employment in all programs and activities in accordance with Title VI and Title VI of the Civil Rights Act of 1964. If you need special assistance for persons with disabilities or limited English proficiency, contact the project manager above or TDD/TTY 711.

State Project: 0000-020-020, P401, R201, C501; UPC 111713 Federal Project: STP-5A27(616) Description

Road)

Bailey Bridge Connector Project

(Brad McNeer Parkway to Bailey Bridge

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SEE ATTACHED	This is to certify that the attached legal notice was published by Chesterfield Observer in the county of Chesterfield, state of Virginia, on the following date(s): 09/30/20 and 10/14/20.
	Sworn to and subscribed before me this day of day of 2020.
	Mary Manus Suttle James Sydnor Mitchell, Jr. Novary Public
	My commission expires: November 30, 2023  Commission I.D # 7353919  NOTARY PUBLIC REG # 7353919 MY COMMISSION EXPIRES 11/10903



#### Balley Bridge Connector Project (Brad McNeer Parkway to Balley Bridge Road) Chesterfield County

Virtual Location Public Hearing Thursday, October 29, 2020

https://bailey-bridge-connector-timmons-group.hub.arcgis.com/

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Stale Project: 0000-020-820, P101, R201, C501; UPC 111713

Federal Project: STP-5A27(616)