

RSTP Candidate Project Application

1. **Project Title:** Route 419/U.S. 220 Diverging Diamond Interchange Preliminary Engineering
2. **Total RSTP Funding Request:** \$750,000
3. **Project Sponsor:** Roanoke County
4. **Implementing Agency:** VDOT
5. **Project Description and Detailed Scope of Work:** At the interchange, reconstruct Route 419 (Electric Road) and associated ramps to U.S. 220 to a Diverging Diamond Interchange (DDI) (see Attachment 1). Include sidewalk to fill in the gap between funded sidewalk under design along Tanglewood Mall's frontage (see Attachment 2) to funded sidewalk along the north side of U.S. 220 Business (Franklin Road) in Roanoke City (see Attachment 3). Include bicycle lanes through the DDI to connect funded and planned bicycle lanes on Route 419 (see Attachment 2) to existing bicycle lanes on U.S. 220 Business. Attachment 4 shows the proximity of all three projects.

The DDI concept was presented to the public during development of the draft 419 Town Center Plan. As the DDI concept gained traction, Roanoke County amended its contract with Stantec, consultants for the Plan, to analyze and estimate the proposed DDI reconstruction in preparation for a 2018 SMART SCALE grant application. In the spring of 2017, the CTB decided not to fund a proposed 220 Expressway Acceleration Lane Improvement project in the vicinity of the DDI project in anticipation of a future SMART SCALE DDI application that would eliminate the need for the Acceleration Lane project.

Funding for Preliminary Engineering through RSTP serves two purposes: (1) Begins the process of analysis and design for the project, resulting in a more accurate project estimate; and (2) Reduces the overall cost of the future SMART SCALE application through other committed funding.

6. **Proposed Cost Estimate and Schedule** (see Attachment 5):

Phase	Project Schedule	Project Cost Estimate	Other Committed Funding	RSTP Funding Request
Preliminary Engineering	FY 2020	\$750,000	\$0	\$750,000
Right of Way			(Requesting Smart Scale funding)	
Construction				
TOTAL:		\$750,000	\$0	\$750,000

7. **Relation to Other Projects or Project Phases:**

- Route 419 Widening, Safety and Multimodal Improvements (UPC 107061: PE Underway; Construction FY 2021) (Attachment 2)
- Franklin Road Sidewalk Improvements, U.S. 220 Business (UPC 111360: PE to begin soon) (Attachment 3)
- Franklin Road Bicycle Lanes, U.S. 220 Business, completed 2016
- U.S. 220 Communications and Adaptive System Project (UPC 108908: Construction Underway) (Attachment 4 shows northern project extent)

- Implements the draft 419 Town Center Plan (adoption anticipated 2017/2018) (Attachment 6)
- 8. Project Status:** Roanoke County's consultant for the 419 Town Center Plan, Stantec, has been retained to prepare a traffic study analyzing (1) Existing, (2) Design Year (2030) No Build including the Route 419 Widening, Safety and Multimodal Improvements project underway, and (3) Design Year (2030) Build conditions, including both the Route 419 Widening, Safety and Multimodal Improvements project in design (Attachment 2) and the DDI. Stantec and VDOT are communicating as the analysis is developed and the draft traffic study should be ready in early October. The final study will be used by Roanoke County for the 2018 SMART SCALE application cycle. Stantec provided the Preliminary Engineering estimate for this application (Attachment 5).
- 9. Functional Classification:** Route 419 – Urban Other Principal Arterial; U.S. 220 South – Urban Other Principal Arterial; U.S. 220 North – Urban Freeway and Expressway; U.S. 220 Business, Franklin Road – Urban Minor Arterial
- 10. Existing Traffic Volume and Level of Service with Improvement:** According to 2016 VDOT Annual Average Daily Traffic (AADT) data, the U.S. 220/Route 419 intersection has the third highest traffic count in the Roanoke Valley:
- #1: U.S. 220 from Elm Avenue/I-581 to Wonju Street (65,000 AADT)
 - #2: U.S. 220 from Wonju Street to U.S. 220 Business/Route 419 (50,000 AADT)
 - #3: Route 419 from U.S. 220 to Starkey Road (42,000 AADT)
- Other traffic counts in the vicinity of the proposed project include:
- U.S. 220 from U.S. 220 Bus/Route 419 to Roanoke City Line (33,000 AADT)
 - U.S. 220 Bus/Franklin Road: U.S. 220/Route 419 to Penarth Road (22,000 AADT)
- For additional detail, see Attachment 7 which maps the 2016 AADT data and Attachment 8 which includes traffic counts and turning movement volumes collected by VDOT in February 2017.
- 11. Existing Volume/Capacity:** The tables included in Attachment 8 show delay, level of service and queue length information for the Route 419/U.S. 220 signals. This information originated from a September 26, 2017 VDOT *Route Improvement Traffic Analysis Memorandum* conducted for the approved SMART SCALE project to add a third lane on Route 419 Eastbound towards U.S. 220 (see Attachment 2). Analysis from the study (note that EB, Eastbound, is referred to as Southbound everywhere else in this application) states, “Most signals operate at lower LOS during the PM peak hour due to higher traffic demand. Unbalanced lane usage on Route 419 EB is observed in the simulation during both AM and PM peaks – the majority of the travelers on Route 419 EB are going to Route 220 SB or NB on-ramps and they stay in the outside lane on Route 419 EB, resulting in a long queue on the outside lane backing up from the Route 220 SB on-ramp intersection all the way to Ogden Rd intersection.”
- 12. Future Traffic Volume or Projected Ridership with Service Implementation:** Unknown
- 13. Future Volume/Capacity and Level of Service:** Unknown

14. RSTP Candidate Project Rating Factors:

- A. Regional Project Consideration** Reconstruction of the Route 419/U.S. 220 interchange to a DDI is an ideal candidate for RSTP funds as it is a collaborative regional project. Roanoke County and VDOT would partner as sponsoring and implementing agency, respectively. Roanoke City Staff have reviewed, commented on and supported the DDI concept since its inception in January 2017 (see Attachment 9). Roanoke County and Roanoke City citizens and merchants as well as Valley Metro and CORTTRAN riders would benefit from improved traffic flow and safety. Residents of both jurisdictions and visitors to the area could more safely walk and ride between destinations with improved pedestrian and bicycle infrastructure connecting Route 419 in the County to U.S. 220 Business in the City. This project also implements the 2016 Roanoke County Community Strategic Plan (see Attachment 10) in that the project “Supports Improvements to the Regional Transportation Network”, which falls under the Strategic Initiative to “Connect Roanoke County to the World”. The project is also referenced in the RVTPO’s Vision 2040: Roanoke Valley Transportation document (see Attachment 11).
- B. Support the Economic Vitality of the Metropolitan Area** This project serves the U.S. 220 Business and Route 419 commercial corridors by reconstructing a critical Roanoke Valley interchange connecting Roanoke County and Roanoke City. Traffic counts at this intersection are currently the highest in all of Roanoke County and the third highest in the Roanoke Valley. Constant congestion on Route 419 was one reason the Board of Supervisors chose to initiate the draft 419 Town Center Plan. Improving the transportation network will help facilitate and enable mixed-use redevelopment of the Route 419 corridor. The DDI project is a key implementation strategy of the Plan (see Attachment 6) and was well-received during the public planning process. Additionally, a market analysis conducted with the Plan found opportunities for as much as 150,000 square feet of new retail and entertainment businesses. The analysis also indicated strong demand for rental housing, stating the market could absorb up to 1,000 units per year over the next five years. These growth indicators stress the importance of increasing the transportation capacity of the Route 419/U.S. 220 interchange.
- C. Increase the Safety and Security of the Transportation System** The project will increase safety at one of the most congested intersections in the Roanoke Valley and on the Route 419 corridor. Attachment 12 illustrates the hazardous conditions created by high traffic volumes and inefficient traffic flow through the Route 419 corridor to the U.S. 220 interchange. The hot spot map shows how many crashes happened within one-tenth of a mile between 2011 and 2016. In that time period, nearly 300 vehicular accidents occurred within the proposed project area. This year alone, between January 1 and August 30, 34 crashes with 14 reporting Personal Injuries, were reported on Route 419 between Starkey Road and U.S. 220 Business.
- Specific proposed DDI improvements that will increase safety (see Attachment 1) include:

- Removing the northbound U.S. 220 entrance ramp from southbound Route 419, thus reducing conflict points on Route 419 and on U.S. 220 Northbound;
- Removing left turns against oncoming traffic from northbound Route 419 onto the southbound U.S. 220 entrance ramp which will reduce another conflict point; and
- Eliminating several signal phases which will allow traffic to move more efficiently.

The existing intersection also experiences significant bicycle and pedestrian use within the roadway and shoulder areas. Providing dedicated facilities for both pedestrians and bicyclists will also improve safety for these alternative modes of transportation.

D. Increase the Accessibility and Mobility Options Available to People and/or Freight The proposed project will expand multimodal options in the area, implementing the Roanoke County Community Strategic Plan “Promote Neighborhood Connections” Strategic Initiative (see Attachment 10). The project will connect existing bicycle lanes on Franklin Road in Roanoke City to funded and planned bicycle lanes along Route 419 (see Attachment 2) and will implement the Bikeway Plan for the RVAMPO (see Attachment 13). Proposed pedestrian improvements will implement the Regional Pedestrian Vision Plan (see Attachment 14). The project will fill a sidewalk gap, creating a connection between funded and planned sidewalk in Roanoke City to funded and planned sidewalk along Route 419 (see Attachments 2 and 3). The current sketch (see Attachment 1) shows a pedestrian sidewalk through the center of the DDI. This location may change during design so that all sidewalk is located on the north side of Route 419 and U.S. 220 Business. All sidewalk will be constructed to ADA standards. Safe accessibility to retail, service and work destinations will be provided with this project.

E. Protect and Enhance the Environment, Promote Energy Conservation, and Improve Quality of Life When the DDI is in place, the reduction of traffic signal phases and increased throughput of vehicles will reduce fuel consumption by stopped vehicles and will conserve energy. Quality of life will be enhanced as drivers will spend less time navigating the interchange, pedestrians will utilize new sidewalks where there currently are none to walk more safely through the area and bicyclists can travel in dedicated bicycle lanes.

F. Enhance the Integration and Connectivity of the Transportation System, Across and Between Modes, for People and/or Freight The proposed project will expand multimodal options in the area. The project will connect existing bicycle lanes on Franklin Road in Roanoke City to funded and planned bicycle lanes along Route 419 (see Attachment 2). The project will also fill a sidewalk gap, creating a connection between funded and planned sidewalk in Roanoke City to funded and planned sidewalk along Route 419 (see Attachments 2 and 3). The Roanoke Valley Transit Vision Plan includes recommendations to expand transit service in the project area (see Attachment 15). When complete, the DDI project will reduce congestion, in turn improving existing and future transit service as well as improving freight movement through the intersection.

G. Promote Efficient System Management and Operation The new traffic signals will be incorporated into a rapidly growing adaptive signal system in the area (see Attachment 16). The interchange signals are currently and will continue to be a part of an In-Sync adaptive signal system. According to VDOT, “The cycle lengths, phasing sequences and timing splits vary based on traffic demand to achieve optimal operation along Route 419 mainline. Based on historical timing data, In-Sync gives high priority to Route 419 mainline traffic while skipping / limiting green time on side street phases.” This system is currently in place in both Roanoke County and Roanoke City along Route 419 from Colonial Avenue to Penarth Road and will be expanded along Route 419 in Roanoke County to Valley Drive/Hidden Valley Middle School Road in FY 2020 (UPC 111407). Another signalization coordination project is under construction on U.S. 220 to connect the Valley Avenue/Southern Hills Drive, Crossbow Circle/Pheasant Ridge Road, Old Rocky Mount Road, Buck Mountain Road/Stable Road and Clearbrook Village Lane/Indian Grave Road signals in an effort to relieve congestion and improve traffic flow through the Southern Hills and Clearbrook areas. When the signals on U.S. 220, Route 419 and Route 221 are coordinated, the result will be a more efficient transportation network.

H. Emphasize the Preservation of Existing Transportation System The proposed DDI is a cost effective alternative to earlier ideas. The 2010 Route 419 Corridor Plan recommended a total redesign of the interchange (see Attachment 17) and the 2005 Roanoke County Comprehensive Plan recommended widening Route 419 to eight lanes and focusing on the U.S. 220 interchange (see Attachment 18). Alternatively, the proposed project will keep the existing U.S. 220 overpass in place with improved functionality and reduced conflict points (see Attachment 1). In particular, evening U.S. 220 Southbound rush hour backups on the Route 419 off-ramp will be reduced as traffic will more easily flow onto Route 419. Similarly, evening Route 419 Southbound rush hour backups heading to both U.S. 220 on-ramps will also decrease with better traffic flow through the interchange. Overall, congestion in the area will be reduced and safety will be improved.

I. Projects included in previous plans that had a public input process

- Draft 419 Town Center Plan (adoption anticipated late 2017-early 2018) (Attachment 6)
- Roanoke County Community Strategic Plan (2016) (Attachment 10)
- RVTPO Vision 2040: Roanoke Valley Transportation (2017) (Attachment 11)
- Bikeway Plan for the RVAMPO (2012) (Attachment 13)
- Regional Pedestrian Vision Plan (2015) (Attachment 14)
- Roanoke Valley Transit Vision Plan (2016) (Attachment 15)
- Route 419 Corridor Plan (2010) (Attachment 17)
- Roanoke County Comprehensive Plan (2005) (Attachment 18)

Supporting Material Attachment File Names (not included in the 5 page maximum):

Aerial map showing proposed project location:

- Attachment 1: Stantec Preliminary Plans, 1/2017
- Attachment 4: Funded and Proposed Transportation Projects map, 9/28/17

Detailed budget with project cost by phase:

- Attachment 5: Route 419/U.S. 220 Diverging Diamond Interchange PE Estimate, 9/18/17

(optional) Letters of Support and/or Resolutions of Support from project sponsors

- Attachment 19: Resolution from the Roanoke County Board of Supervisors, 9/26/17
- Attachment 9: Letter of Support from the City of Roanoke, 9/26/17

(optional) Previous studies or other supporting materials

- Attachment 2: Electric Road Widening, Safety and Multimodal Improvements Concept Plan (FY 17 HB2/SMART SCALE Application), 9/16/15
- Attachment 3: Streetscape Project Option – Franklin Road (Roanoke City FY 18 TA/HSIP Application)
- Attachment 6: Draft 419 Town Center Plan excerpts, 3/23/17
- Attachment 7: 419/220 DDI Annual Average Daily Traffic Counts, 2016, 9/28/17
- Attachment 8: Excerpts from a VDOT Route Improvement Traffic Analysis Memorandum, 9/26/17
- Attachment 10: Roanoke County Community Strategic Plan excerpts, 2016
- Attachment 11: RVTPO Vision 2040: Roanoke Valley Transportation excerpts, 9/7/17
- Attachment 12: Vehicle Crashes in the Vicinity of the Proposed 419/220 DDI, 2011-2016 map, 9/28/17
- Attachment 13: Bikeway Plan for the RVAMPO 2012 Update excerpts, 3/22/12
- Attachment 14: RVTPO Regional Pedestrian Vision Plan excerpts, 1/2015
- Attachment 15: Roanoke Valley Transit Vision Plan excerpts, 9/22/2016
- Attachment 16: Adaptive Traffic Signal System Overview map, 9/29/17
- Attachment 17: Route 419 Corridor Plan excerpts, 3/2010
- Attachment 18: Roanoke County Comprehensive Plan excerpts, 2005
- Attachment 20: Images of the Route 419/U.S. 220 Interchange, 2015-2017