HYDRAULIC SMALL AREA PLAN

Transportation Element

Albemarle County, VA & City of Charlottesville, VA

07/12/2018

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Introduction & Outline

The Hydraulic Small Area Plan was commissioned to provide a comprehensive strategy for the landuse redevelopment and transportation elements within the study area. This area is bounded by Greenbrier Dr. to the north, US 250 Bypass to the south, Meadow Creek to the east and N. Berkshire Rd. to the west. Within these limits, the transportation planning element of the Hydraulic Small Area Plan determined transportation measures necessary to serve the land use detailed in the Small Area Plan. The main body of the Hydraulic Small Area Plan contains additional information regarding the study and land use information.

The multimodal study area for the transportation planning element is shown in Figure 1 and was limited to the roadways, intersections and modes shown. A quantitative analysis was conducted for the roadway links highlighted in blue while a qualitative discussion was provided for the roadways indicated with green highlighting. The limitations on the study area were placed to ensure a concise area plan for the roadways and intersections that service the study area.

The transportation element went through an iterative process of reviewing the land use, travel demand generation, evaluating transportation needs and incorporating input from the Hydraulic Planning Advisory Panel. These were important given the complexity of the area, the development of a revised land use scenario and the already present need for transportation solutions. The process yielded three separate transportation scenarios whose difference was solely the solution for the intersection between US 29 and Hydraulic Rd. With that exception, the other transportation elements were the same across all the scenarios.
Figure 1
Study Area

Hydraulic Planning Advisory Panel & Public Outreach

The Hydraulic Planning Advisory Panel (the Panel) was a collection of elected officials and staff from the City and County as well as representatives of local businesses and the environmental community. The Panel has been supported by the Technical Team that includes VDOT and consultant staff. Kimley-Horn and Associates helped advise the staff concerning land use development while Michael Baker International led the transportation component. With the information from the Technical Team, the Panel agreed upon future land use and then worked to develop transportation recommendations for the area. Additional discussion about the Panel and its members is included in the main body of the Hydraulic Small Area Plan.
The work with the Panel was an extensive and collaborative effort through numerous meetings and public outreach that ultimately resulted in a consensus on the recommendation for the area. Through the process, the Panel took into consideration many factors, both quantitative and qualitative, including travel time along US 29, potential Right-of-Way impacts, business impacts, land use interaction, safety, and bicycle and pedestrian accommodations. Prior to formalizing a recommendation, a series of public engagement efforts were conducted. This feedback was a vital component to the Panel’s final decision.

**Existing Conditions**

**Overview**

The US 29 corridor is designated as a Corridor of Statewide Significance. As it bisects the state from Danville to Washington, D.C., it serves as a major economic thoroughfare for Virginia. For the Charlottesville area, it serves as a major connection for rural areas to the north and south to the city and a connection to major retail, recreation, and employment areas. The combination of growth in the Charlottesville and Albemarle County region and along the US 29 corridor has placed increased stress on the roadway within the study area. At the center of the study area is the US 29 and Hydraulic Road intersection. The intersection serves as a hub for movement with a mix of traffic traveling on a regional and local basis. Hydraulic Road provides an additional connection from the US 250 bypass to US 29 and accommodates people from north and west of the study area as well. The US 29 & Hydraulic Road intersection has become very congested, but there are additional locations along both US 29 and Hydraulic Road that need improvement to alleviate existing traffic congestion and/or support the redevelopment outlined in the land use plan.

**Analysis**

A combination of vehicle counts and location based travel pattern data were acquired and analyzed to understand the intensity and distribution of traffic within and through the study area. The vehicle count information was used to create AM and PM peak microsimulation software traffic models (VISSIM) to analyze the roadway network highlighted in Figure 1. The location based data was used to analyze the larger travel patterns and determine percentages of traffic with an origin or destination within and beyond the study area.
All of this existing condition information was shared with the Panel to solicit feedback on the model’s ability to replicate existing conditions. Using the Panel’s feedback and observations from the vehicle simulation video, the existing conditions VISSIM models were calibrated to reflect the in-field environment.

Figures 2 and 3 display the vehicle count and location-based travel zones used in the existing conditions analysis. The vehicle turning movement count information is displayed for the AM and PM peaks. The location-based data represent the travel patterns of vehicles over an average weekday from January 2017 to April 2017.

Figures 4 and 5 show the delay and level of service (LOS) results of the existing conditions VISSIM analyses for the AM and PM peak hours. Figure 6 shows the travel time results from the VISSIM modeling. Vehicle trip origins and destinations were analyzed to determine travel patterns in, around, and through the study area. This provides insight into potential solutions by identifying frequent travel patterns within and through the study area. The origin and destination locations used to determine travel patterns are also shown in Figure 6. The analyses were conducted using the vehicle counts shown in Figure 2 and calibrated from review of the vehicle county videos and feedback from the Panel following their review of output video from the VISSIM modeling.
Figure 2

Legend

Approach Travel Lane

AM Peak Hour Volume

PM Peak Hour Volume
## Existing Condition Origin-Destination Matrix

<table>
<thead>
<tr>
<th></th>
<th>I1</th>
<th>I2</th>
<th>I3</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>Tot</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1</td>
<td>0.3%</td>
<td>0.5%</td>
<td>0.4%</td>
<td>3.6%</td>
<td>1.0%</td>
<td>1.8%</td>
<td>7.5%</td>
<td>15%</td>
</tr>
<tr>
<td>I2</td>
<td>0.6%</td>
<td>0.3%</td>
<td>0.3%</td>
<td>3.1%</td>
<td>0.5%</td>
<td>1.3%</td>
<td>5.8%</td>
<td>12%</td>
</tr>
<tr>
<td>I3</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.2%</td>
<td>1.1%</td>
<td>0.4%</td>
<td>0.9%</td>
<td>2.6%</td>
<td>6%</td>
</tr>
<tr>
<td>X1</td>
<td>3.9%</td>
<td>2.1%</td>
<td>1.8%</td>
<td>0.0%</td>
<td>0.3%</td>
<td>4.7%</td>
<td>12.6%</td>
<td>25%</td>
</tr>
<tr>
<td>X2</td>
<td>0.7%</td>
<td>0.3%</td>
<td>0.5%</td>
<td>0.3%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.8%</td>
<td>3%</td>
</tr>
<tr>
<td>X3</td>
<td>1.0%</td>
<td>1.3%</td>
<td>0.9%</td>
<td>4.9%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.2%</td>
<td>8%</td>
</tr>
<tr>
<td>X4</td>
<td>5.3%</td>
<td>8.5%</td>
<td>4.2%</td>
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<td>0.9%</td>
<td>0.2%</td>
<td>0.0%</td>
<td>31%</td>
</tr>
<tr>
<td>Tot</td>
<td>12%</td>
<td>13%</td>
<td>8%</td>
<td>25%</td>
<td>3%</td>
<td>9%</td>
<td>29%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Results expressed as a percentage of total.

X to X travel only reflects trips that traverse study area.
Figure 4

Legend

- Approach Travel Lane
- # - AM Peak Hour Delay (sec)
- X - AM Peak Hour LOS

Delay results based on link outputs from VISSIM modeling. LOS calculated using HCM Criteria.
The data presented from the existing conditions analyses allowed the Panel and Technical Team to identify areas of need and begin developing project ideas for the transportation scenarios. It was anticipated from the beginning and became evident in the data that the intersection of US 29 and Hydraulic Road is highly congested and causes a lot of other travel issues within the area. In particular, the PM peak hour experiences considerable delays at the intersection, functioning at a LOS E. This deficiency results in congestion throughout the rest of the area. Queueing from the Hydraulic Road westbound approach disrupts operations at the intersection of Hydraulic Road and Hillsdale Drive. This in turn causes congestion along Hydraulic Road toward US 250. In the eastbound direction between US 250 and the US 29, congestion causes vehicles to queue back into the intersection of US 29 and Hydraulic Rd.
Further south on the US 29 corridor, the intersection with Angus Road and including the US 250 WB off-ramp experiences its own set of problems. Currently the US 29 northbound movement is interrupted with the incoming traffic from the US 250 WB off-ramp. The off-ramp is currently signalized and is in coordination with the main traffic signal at US 29 and Angus Road. Due to the side street, left-turn traffic and off-ramp traffic, this intersection regularly queues vehicles south toward the Earhart Street signal on the other side of the US 250 interchange and north up the hill toward Hydraulic Road. The queueing and signal operations at this intersection can cause problems with the interchange during the PM peak period.

Along Hydraulic Road there are some additional concerns that need attention. The intersection of Hydraulic Road and Hillsdale Drive experiences significant congestion during the PM peak hour. It operates at LOS D during the PM peak hour and it is anticipated that the Hillsdale Drive project completed in 2018 will only put more pressure on this intersection. To help alleviate issues along Hydraulic Road, improvements are needed at this intersection.

Finally, the intersection of Hydraulic Road and Georgetown Road sees significant queueing and delay during the PM peak hour. This is due in part to people avoiding the US 29 and Hydraulic Road intersection and using Georgetown Road to and from the Barracks Road area.

**Future Traffic Forecasting**

The future analysis year for the transportation improvements was established as 2045. Traffic forecasting for the future conditions was based on two components. As the study area is bisected by US 29 and connects to US 250, the area experiences a considerable number of pass-through trips to and from outside geographic areas. Through the use of location-based trip analyses, these pass-through trips were isolated during the existing conditions analysis and grown at an annual rate of 1% to the analysis year of 2045.

The existing trips from the existing land use were removed from the modeling because the new small area land use plan to be implemented in the study area will supersede existing land use. Those trips were replaced with new trips that were calculated using the land use characteristics from the new land use plan. This was to approximate the specific travel demands of the new land use since the characteristic were vastly different than the what exists today.

Using the updated land use, trip generation for the AM and PM peak hours was developed using the ITE Trip Generation Manual. The format of the land use in the Small Area Plan did not fit directly with the specific development types included in the ITE Trip Generation Manual. Therefore, the Technical Team reviewed the revised land use plan and category definitions to develop blended equations that would reflect the intended uses of the Small Area Plan. For example, the area along Inglewood Drive north of Hydraulic Road is
designated as “Mixed-Use Residential.” To generate trips without detailed specifics, the team combined and weighted the equations for “Low-, Medium-, and High-Turnover Commercial” and “High- and Low-Density Residential” to create a blended land use trip calculation.

A primary focus for the redeveloped land use was to create areas where people would stop once in the area for multiple needs, often referred to as internal capture. As shown in the existing conditions analysis using the location based data, there is currently minimal internal capture. To approximate the increased internal capture and movement between the sub-areas within the study area, the estimation tool for internal capture for mixed-uses based on the National Cooperative Highway Research Program Report 684 was used. The trips generated from the future land use were then combined with the pass-through trips to create the total traffic input into the traffic modeling. With consideration for planning, growth and the 2045 horizon year, an estimate of 75% of the total land use development build out was used. Depending on the future scenario (i.e. No-Build, Scenario 1, etc.) traffic movements were distributed based on available movements, amount of traffic, and logical routing.

**Transportation No-Build Conditions & Deficiencies (Year 2045)**

The No-Build condition was based on the existing conditions transportation network, with limited modifications, and the traffic forecasting for the year 2045 as discussed above. Anticipated projects such as the removal of the traffic signal at US 29 and Lenox Ave. were considered as being in place since this planning exercise is intended to look several decades into the future. It was also assumed that improvements at the intersection of US 29 and Seminole Court would be in place as they would if the property on the west side of the intersection redeveloped. These assumed improvements included a second left-turn lane for US 29 northbound and a re-configured eastbound approach to include additional left- and right-turn lanes.
The No-Build condition includes the travel demand based on the redeveloped land use as previously mentioned. A scenario in which redevelopment is not occurring was not analyzed for the transportation element of this study. Traffic signal timings for the analysis were optimized for the updated travel demand. The No-Build scenario was analyzed using the AM and PM peak periods in VISSIM. The No-Build condition, rather than the existing condition, was the primary basis of comparison when evaluating the different transportation scenarios presented to the Panel. Results from the 2045 No-Build analyses are shown in Figures 7 and 8. Figure 7 contains the intersection delay information and Figure 8 contains the travel time information. The travel times shown for the No-Build analyses were based on the same origins and destinations as the 2017 Existing Conditions analyses.

**Deficiencies**

The No-Build conditions did not reveal any additional problems outside of the previously mentioned existing issues being exacerbated. The delay and travel time figures detail a roadway network that would be on the verge of gridlock under the revised travel demand. This is observed not just in the significant increase in intersection delays, but most notably in the travel time numbers, many of which double in comparison with the existing travel times. While the Existing Conditions analysis indicates the need for improvement to alleviate current congestion, the No-Build scenario reveals that the current transportation network is inadequate to accommodate the increased travel demand from the redeveloped land use.
Alternative Development

At the onset of the study, the goal was to present multiple options to the Panel for consideration. Ultimately three scenarios were developed and analyzed in VISSIM using the same 2045 travel demand (using the redeveloped land use) on which in the No-Build condition was based. Just as in the No-Build condition, the analysis for the three scenarios were based on the AM and PM peak hours. While the overall transportation plan includes recommended improvements at numerous locations, the differentiator between the three scenarios was the improvements at the intersection of US 29 and Hydraulic Road. This intersection became the focal point as the modeling results indicated the impacts it has on the entire network.

<table>
<thead>
<tr>
<th>Route</th>
<th>AM Peak 2045 No-Build Travel Time (min)</th>
<th>PM Peak 2045 No-Build Travel Time (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A to C</td>
<td>9.3</td>
<td>16.8</td>
</tr>
<tr>
<td>A to E</td>
<td>9.1</td>
<td>17.2</td>
</tr>
<tr>
<td>B to C</td>
<td>10.4</td>
<td>12.8</td>
</tr>
<tr>
<td>B to E</td>
<td>11.5</td>
<td>14.0</td>
</tr>
<tr>
<td>C to A</td>
<td>6.0</td>
<td>7.3</td>
</tr>
<tr>
<td>C to B</td>
<td>8.1</td>
<td>10.2</td>
</tr>
<tr>
<td>C to D</td>
<td>5.2</td>
<td>6.2</td>
</tr>
<tr>
<td>D to C</td>
<td>5.8</td>
<td>6.5</td>
</tr>
<tr>
<td>D to E</td>
<td>2.3</td>
<td>6.8</td>
</tr>
</tbody>
</table>

Avg. Travel Time of ALL Trips | 4.7 | 5.4

The VISSIM models account for all paths between origin and destinations when calculating travel times.
Below are the three separate concepts that were presented to the Panel for the US 29/Hydraulic Road intersection:

- Scenario 1 – Grade Separated Intersection (US 29 over Hydraulic Road)
- Scenario 2 – Continuous Flow Intersection
- Scenario 3 – Grade Separated Roundabout (US 29 under Hydraulic Road)

As mentioned above, the deficiencies shown within the transportation network in the existing and No-Build conditions also led to multiple project ideas that became common elements for all three scenarios. The project ideas listed below are the same for each of the three scenarios listed above.

- Hydraulic Road & District Avenue – Replace the existing traffic signal with a roundabout
- Hydraulic Road & Hillsdale Avenue – Replace the existing traffic signal with a roundabout
- Zan Road Area – Provide a grade-separated pedestrian / bicycle / vehicle connection over US 29
- Angus Road – Provide a grade-separated intersection connection Angus Road and Holiday Drive and a southbound US 29 U-turn (no left turns to / from Angus Road)
- Extend Hilldale Drive from Hydraulic Road to Holiday Drive
- Relocate the westbound US 29 on- / off- ramps to the Hilldale Drive extension
- US 250 & Hydraulic Road – Extend eastbound US 250 left-turn lane

It remains possible that additional projects or modifications may occur when developing the preferred alternative in more detail.
Project Screening & Selection

As with the land use component, public outreach was a key factor for the Panel. In response to this, the Technical Team and TJPDC engaged in three events to inform the public and receive comment. Two neighborhood meetings were held in venues near the study area on February 21st and 22nd, 2018. Included in these meetings was a brief overview presentation, information boards and open forum discussion on the three transportation scenarios. On March 8th, 2018 the Technical Team organized a Citizen Information Meeting at Charlottesville High School. This meeting included a 15-minute overview video on the study process and each scenario, information boards, and open forum discussion with the Technical Team and Panel members. Attendees were asked to fill out a comment sheet created by VDOT or provide feedback to the Technical Team later.

While public outreach was a primary factor for the Panel, there were other factors involved in selecting the preferred alternative. The Technical Team presented multiple iterations of evaluation criteria and with the Panel’s input, settled on the criteria below. Travel time along US 29 through the study area

- Potential Right-of-Way impacts
- High-level construction cost
- Business access impacts
- Vehicle safety benefit
- Initial driver familiarity
- Pedestrian and bicycle accommodations
- Land use interaction

The evaluation criteria scores for each scenario were based on technical data or panel discussion and consensus. Weighting of the categories was not performed in the initial evaluation and ultimately was not needed. The criteria evaluation and discussion of public input led to the selection of a preferred alternative via Panel consensus.
Preferred Alternative Analysis and Benefits

Analysis

Based on the aforementioned quantitative and qualitative criteria and review of public input, the Panel endorsed Scenario 1 – Grade Separated Intersection (in addition to the other improvements common to all scenarios) as the preferred transportation alternative. This scenario performed well in all measures evaluated in the Smart Scale process and received the most support publicly. The operational improvements achieved by Scenario 1 are shown in Figures 9 and 10. Figure 9 shows the delay calculation comparison for the 2045 No-Build against the 2045 Scenario 1. Figure 10 shows the travel time comparison for the same two conditions.

Figure 9

2045 No-Build vs. 2045 Scenario 1 Intersection Delay Comparison

<table>
<thead>
<tr>
<th>Intersection</th>
<th>AM 2045 No-Build</th>
<th>AM 2045 Scenario 1 - Grade Separated Intersection</th>
<th>PM 2045 No-Build</th>
<th>PM 2045 Scenario 1 - Grade Separated Intersection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delay (sec)</td>
<td>LOS</td>
<td>Delay (sec)</td>
<td>LOS</td>
</tr>
<tr>
<td>US 29 &amp; Greenbrier Dr.</td>
<td>24.9</td>
<td>C</td>
<td>25.2</td>
<td>C</td>
</tr>
<tr>
<td>US 29 &amp; Lenox Ave.</td>
<td>4.0</td>
<td>A</td>
<td>0.8</td>
<td>A</td>
</tr>
<tr>
<td>US 29 &amp; Seminole Ct.</td>
<td>74.7</td>
<td>E</td>
<td>19.8</td>
<td>B</td>
</tr>
<tr>
<td>US 29 &amp; Hydraulic Rd.*</td>
<td>139.2</td>
<td>F</td>
<td>11.7</td>
<td>B</td>
</tr>
<tr>
<td>US 29 &amp; Angus Rd.</td>
<td>47.6</td>
<td>D</td>
<td>4.6</td>
<td>A</td>
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<td>55.4</td>
<td>E</td>
<td>27.0</td>
<td>C</td>
</tr>
<tr>
<td>Hydraulic Rd. &amp; Hillsdale Dr.**</td>
<td>89.2</td>
<td>F</td>
<td>29.3</td>
<td>D</td>
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<tr>
<td>Hydraulic Rd. &amp; District Ave.**</td>
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<td>9.6</td>
<td>A</td>
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<td>B</td>
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<tr>
<td>Commonwealth Dr. &amp; Greenbrier Dr.</td>
<td>9.8</td>
<td>A</td>
<td>10.3</td>
<td>B</td>
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<tr>
<td>Average Vehicle Delay Through Network ***</td>
<td>184.3</td>
<td></td>
<td>55.9</td>
<td></td>
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</table>

* Delay value for US 29 & Hydraulic Rd. "Build" condition includes all vehicles passing through the intersection include vehicles on the US 29 mainline not utilizing the signalized intersection.

** The LOS values for the Hydraulic Rd. & Hillsdale Dr. and Hydraulic Rd. & District Ave. intersections under the "Build" condition are based on HCM roundabout criteria.

*** Average Vehicle Delay Through Network is defined as the average delay experienced from all trips that are computed within the VISSIM model from origin to destination.
### 2045 No-Build vs. 2045 Scenario 1 Intersection Travel Time Comparison

The VISSIM models account for all paths between origin and destinations when calculating travel times.

<table>
<thead>
<tr>
<th>Route</th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2045 No-Build</td>
<td>2045 Scenario 1 Variant 1</td>
</tr>
<tr>
<td>A to C</td>
<td>9.3</td>
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<tr>
<td>A to E</td>
<td>9.1</td>
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</tr>
<tr>
<td>B to C</td>
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<tr>
<td>B to E</td>
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<tr>
<td>C to A</td>
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<td>C to D</td>
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<td>D to E</td>
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<td>2.9</td>
</tr>
<tr>
<td>Avg. Travel Time of ALL Trips</td>
<td>4.7</td>
<td>2.7</td>
</tr>
</tbody>
</table>
A conceptual representation of the intersection improvement at US 29 and Hydraulic Road is shown in Figure 11. A conceptual representation of the transportation network for the study area is shown in Figure 12. This may not be the ultimate configuration of this alternative as final project development may alter aspects and right-size solutions in response to the Smart Scale process, funding, and public input.

**Benefits**

The distributed operational benefits of Scenario 1 were an important distinction in the alternative selection process. Grade separating the intersections of US 29/Hydraulic Road and US 29/Angus Road allowed for a dramatic decrease in the travel time along US 29 in comparison to the No-Build condition. Additionally, replacing the existing traffic signals at the intersections of Hydraulic Road/Hillsdale Drive and Hydraulic Road/District Avenue with roundabouts helps alleviate congestion along Hydraulic Road. The roundabouts also help facilitate left turns for vehicles that previously made left turns onto US 29 from Hydraulic Road. Under this alternative, only through movements and right turns are permitted at this location from Hydraulic Road.

In conjunction with grade separating the intersection of US 29 and Angus Road, the off-ramp from US 250 westbound will be reconfigured. This was facilitated by a previously planned project. As a part of the 29 Solutions program, it had been planned to extend Hillsdale Drive from Hydraulic Road to Holiday Drive. This extension created an opportunity to relocate the off-ramp from US 250 westbound further to the east and connect it with the Hillsdale Drive extension. An on-ramp from the Hillsdale Drive extension onto US 250 westbound was also provided to reduce the burden on the US 250 and Hydraulic Road intersection and US 250 and US 29 interchange. This ramp relocation also aims to reduce cut-through traffic from US 250 westbound along Hydraulic Road onto US 29 by providing a more efficient access to a free moving US 29. This will allow Hydraulic Road to become more of a local connector for the redeveloping areas.

There were two other issues addressed by this study, the intersection US 250 and Hydraulic Road and connectivity of the redeveloping areas on either side US 29 north of the Hydraulic Road intersection. The intersection US 250 and Hydraulic Road has been widely studied and presents many challenges. Many of the projects included in this plan aim to alleviate some of the congestion at that intersection. A long-term solution to the signalized intersection was not indentified in this study; however, a shorter term solution to help operations and safety was indentified. Included in the recommendation is the extension of the US 250 eastbound left-turn lane. This will help reduce occurrences of left-turning traffic blocking the through lanes and thus improve operations and safety.
Figure 11
US 29 & Hydraulic Rd. Intersection Improvement Conceptual Drawing
Figure 12
Hydraulic Small Area Plan Transportation Improvements Summary

A. US 29 & Hydraulic Rd. Grade Separated Intersection

B. Hydraulic Rd. & District Ave. Roundabout

C. Hydraulic Rd. & Hillsdale Ave. Roundabout

D. Zan Rd. Grade-Separated Pedestrian/Bike/Vehicle Connection Over US 29

E. Angus Rd. Grade-Separated Intersection and Signalized US 29 SB U-Turn

F. Hillsdale Dr. Connection to Holiday Dr.

G. Relocation of WB US 250 Ramps to Hillsdale Extension

H. Extend EB US 250 left-turn lane at Hydraulic Rd.
Connectivity across US 29 was a focal point for the Panel as the corridor creates a restrictive barrier for vehicles, bikes, and pedestrians. Dedicated bicycle and pedestrian facilities are include for the intersection improvement at US 29 and Hydraulic Road. These include bike/pedestrian underpasses below the Hydraulic Road westbound right-turn lane and the US 29 southbound right-turn lane. These connect to improved shared-use facilities and sidewalks along Hydraulic Road and US 29. This provides bike and pedestrian access on all four quadrants of the intersection.

The solution to connect the areas north of the US 29 and Hydraulic Road intersection was to provide a grade separated connection over US 29 in the vicinity of Zan Road. This connection would go from District Avenue on the west to Hillsdale Drive to the east. This connection would help facilitate movement across US 29 for passenger and transit vehicles, and provide dedicated user-friendly bicycle and pedestrian accommodations. Providing this additional connection will provide a safer alternative for bikes and pedestrians to cross US 29 while taking some traffic burden off of Hydraulic Road and US 29 by providing an alternate and more direct way to go from one side of US 29 to the other.

The benefits of the grade separations of the US 29 intersections with Hydraulic Road and Angus Road can be seen in the travel times along US 29. Even with the increase in travel demand regionally and from the redevelopment, there is a considerable improvement compared to the No-Build condition. Hydraulic Road also sees a benefit from the improvements at the intersection with US 29 with more free-flowing movement. The roundabouts along Hydraulic Road also help promote continuous movement along Hydraulic Road. Ultimately, these projects help restructure the flow of traffic in the area and help promote the connectivity laid out in the land use ideals.

In coordination with CAT and JAUNT, the transportation solutions will include transit improvements such as new or relocated stops, bus shelters, and/or route modifications. These improvements will be identified through input from CAT and JAUNT staff. The transit system is an important component to this growing community and transit improvements to the network will help improve accessibility and connectivity in the study area.

**Smart Scale**

The final component of this process was to review the recommended transportation elements and coordinate those in a single or multiple funding applications. In contrast to the previous project at US 29 and Rio Road, the projects identified in this study will need to compete with other projects in the Culpeper District and across the Commonwealth in the Smart Scale transportation funding process.
This process evaluates projects on six factors, Congestion Mitigation, Economic Development, Accessibility, Safety, Environmental Quality, and Land Use. The scoring for projects is a comparison of the weighted beneficial factors shown by a project and the cost of the project. Therefore, it is important to try to maximize benefit in a cost effective manor. (More information on the Smart Scale process is available at www.vasmartscale.org)

The Technical Team initially developed a strategy of phasing in the recommended transportation components over a series of years. However, through detailed discussions with the Panel, it was decided that all of the recommended projects will be submitted in the 2018 round of Smart Scale funding. A strategy was developed with the goal of getting all of the elements funded in the 2018 round while also having an opportunity to have some elements and not others funded. The Technical Team and Panel decided on submitting three applications encompassing the recommended elements. Additionally, the City of Charlottesville volunteered to submit the westbound left-turn lane extension at US 250 & Hydraulic Road as a separate application. The three packages that were developed for submission were:

I. All projects
   a. US 29 & Hydraulic Rd. – Grade separated intersection
   b. Hydraulic Rd. & District Ave. – Replace the existing traffic signal with a roundabout
   c. Hydraulic Rd. & Hillsdale Ave. – Replace the existing traffic signal with a roundabout
   d. Zan Rd. Area – Provide a grade-separated pedestrian / bicycle / vehicle connection over US 29
   e. Angus Rd. – Provide a grade-separated intersection connection Angus Rd. and Holiday Dr. and a southbound US 29 U-turn (no left turns to / from Angus Rd.)
   f. Extend Hilldale Dr. from Hydraulic Rd. to Holiday Dr.
   g. Relocate the westbound US 29 on- / off- ramps to the Hillsdale Dr. extension

II. US 29 & Hydraulic Intersection Projects
   a. US 29 & Hydraulic Rd. – Grade separated intersection
b. Hydraulic Rd. & District Ave. – Replace the existing traffic signal with a roundabout

c. Hydraulic Rd. & Hillsdale Ave. – Replace the existing traffic signal with a roundabout

III. Outer Area Projects

d. Zan Rd. Area – Provide a grade-separated pedestrian / bicycle / vehicle connection over US 29

e. Angus Rd. – Provide a grade-separated intersection connection Angus Rd. and Holiday Dr. and a southbound US 29 U-turn (no left turns to / from Angus Rd.)

f. Extend Hilldale Dr. from Hydraulic Rd. to Holiday Dr.

g. Relocate the westbound US 29 on- / off- ramps to the Hillsdale Dr. extension

The deadline for the completion of these applications is August 1st, 2018. The Technical Team and the TJPDC staff have coordinated throughout the process to include all the required information in support of the project applications. It is anticipated that the scoring from the Smart Scale process will be complete in February 2019. Once the scoring is complete the Commonwealth Transportation Board will review the results and finalize the projects to receive funding under this round of Smart Scale.