

Final Report

Simons Run

Corridor Study

Campbell County & City of Lynchburg, Virginia



Prepared on:

September 30, 2014

Prepared for:

Central Virginia Metropolitan Planning Organization



SIMONS RUN CORRIDOR STUDY FINAL REPORT

**FINAL REPORT
September 30, 2014**

**Prepared for:
Central Virginia
Metropolitan Planning Organization**

Lynchburg, Virginia

**Prepared by:
URS CORPORATION
Virginia Beach, Virginia**

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EXECUTIVE SUMMARY

The Region 2000 Local Government Council has engaged URS Corporation to conduct a corridor analysis along Simons Run in Campbell County, Virginia. The purpose of this report is to document a study of the alternatives for extending Simons Run to the west to intersect with Airport Road and to identify the appropriate pavement section for all of Simons Run, including the existing pavement section. The study will evaluate the costs, benefits, and impacts of the proposed extension

Simons Run was built by a consortium of owners of land the Simons Run alignment. Simons Run is not incorporated to VDOT's roadway system. The alignment of Simons Run is within Campbell County right-of-way. *Future Land Use*

Two alternative scenarios for future development along the corridor were evaluated. Both Build Alternative scenarios propose development of eight of the vacant parcels along Simons Run. For Scenario 1, land use is a mix of residential and commercial uses, while Scenario 2 shifts exclusively towards office and medical land use. The residential land use in Scenario 1 provides for 300 apartment/condo units.

Transportation Capacity

Traffic from the future development along the corridor can be accommodated with either the existing configuration of Simons Run or with the proposed extension to Airport Road. With the existing configuration, improvements will be needed at the Leesville Road intersection in the event traffic signal warrants are met. If warrants are not met, service levels will be low (LOS F) for motorists attempting to exist to the south on Leesville Road during the PM peak hour. With the extension to Airport Road, service at Leesville Road will improve to LOS D during the PM peak hour. Service at the intersection of the Simons Run extension with Airport Road (Assuming a partial intersection) is forecast at D or better.

Pavement Section

With the added traffic from planned development, the existing pavement section on Simons Run, the existing two-lane pavement section will present issues in providing access to adjacent parcels. To address potential deficiencies, two pavement sections were evaluated: one that can be accommodated within the existing 60 foot wide right-of-way and a second that would require a 68 foot wide right-of-way. The narrower section provides wide outside lanes to accommodate bicyclists and a sidewalk; the wider section provides a separate 10 foot wide multi-purpose trail for bicyclists and pedestrian. Both sections include a two-way center left turn lane and curb and gutter drainage.

Simons Run Extension

The extension of Simons Run to Airport Road cannot be installed in compliance with VDOT's access management guidelines. The configuration that would most closely comply includes a Partial access intersection at Airport Road, which would provide for left turning movements into Simons Run from eastbound Airport Road but prohibit left turning movements from southbound Simons Run to eastbound Airport Road. Partial access would also allow for right-in/right-out turning movements at the intersection of Simons Run and Airport Road.

Cost Estimates

- | | |
|---|-------------|
| 1. Simons Run Extension to Airport Road | |
| a. 60 foot wide ROW Pavement Sections | \$2,730,000 |
| b. 68 foot wide ROW Pavement Section | \$2,421,000 |
| 2. Upgrading Existing Simons Run Pavement Section | |
| a. 60 foot wide ROW Pavement Sections | \$6,530,000 |
| b. 68 foot wide ROW Pavement Section | \$6,599,000 |

All costs are forecasted year 2015 dollars.

Travel Time Impacts

Travel time cost savings were calculated to determine the benefits to motorists from the installation of the Simons Run Extension. Two destinations were considered: the intersection of Greenview Drive/Airport Road with Leesville Road, and the US Route 460 interchange with Airport Road

To calculate travel time, the number of vehicles on a given roadway segment were multiplied by the length of that segment, and then divided by the speed limit of that segment. Next, the delay encountered at any intersections between the origin and destination was added to arrive at an estimated overall travel time from origin to destination. Time savings was monetized by applying an hourly rate of \$18.08 for each hour of travel time saved.

Cost Benefit Analysis

Comparing the annualized costs through the design year 2037 for construction of the extension of Simons Run to the monetized benefits of travel time savings through the same period, the total benefits exceeded the total costs by a factor of 1.58, or approximately \$2.8 million.

Recommendations

1. **Extend Simons Run to a Partial Intersection with Airport Road:** The benefits of time savings for motorists more than offsets construction costs. Moreover, while the assessed property values may not be increased, the likelihood of development is increased with the enhanced access to the corridor from Route 460.
2. **Install the Simons Run Extension as the 60 foot wide ROW pavement section:** This section will adequately accommodate limited expected number of bicyclists and pedestrians. It will also accommodate and be consistent with future upgrades to the existing pavement section.
3. **Add Bus Stops:** As detailed in Chapter IV, it is recommended that bus stops be added on Simons Run between Parcels 9A and 9B to serve as a central stopping point on the corridor.
4. Add directional guidance signage as shown in Figure 17 (page 28) to the northbound Simons Run approach to the intersections with Wards Ferry Road.

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I. INTRODUCTION

The Region 2000 Local Government Council (Region 2000) has engaged URS Corporation (URS) to conduct a corridor analysis along Simons Run in Campbell County, Virginia. The Simons Run corridor connects to Wards Ferry Road in the east and to Leesville Road in the west. It is located to the west of Richmond Highway (US Route 29/460) and north of Airport Road (Route 678) – see **Figure 1**.

The purpose of this report is to document a study of the alternatives for extending Simons Run to the west to intersect with Airport Road. Additionally, this study evaluates the ideal typical section (for all modes of transportation) for Simons Run in order to support future development. The study will evaluate the costs, benefits, and impacts of the proposed extension. In this effort, the study will detail traffic impacts of the proposed land development on the surrounding roadway network.

After this introduction, traffic data collection and existing conditions will be documented. Next, forecasts of traffic from the proposed development will be developed. Then, existing pavement sections will be evaluated. Next, a cost-benefit evaluation of a possible extension of Simons Run to Airport Road will be conducted. Finally, recommended improvements to the Simons Run roadway section will be developed.



II. EXISTING CONDITIONS

Daily directional traffic counts on Simons Run were conducted from September 13, 2013 through September 15, 2013 approximately 0.13 miles west of the A.C. Moore commercial driveway; these counts were conducted by VDOT and provided to URS by Region 2000. Peak period turning movement counts at the intersection of Wards Ferry Road with Simons Run were conducted on February 21, 2013 by Peggy Malone & Associates, Inc. as part of the *Wards Ferry Road Corridor Study*, dated June 2013. Lastly, peak period turning movement counts at the intersections of Greenview Drive/Airport Road (Route 678) with Leesville Road, and Simons Run with Leesville Road were conducted on August 4, 2014 and August 5, 2014 by URS. The results of the traffic counts are documented in the Technical Appendix. The Existing Conditions lane geometry and peak hour (7:00 – 8:00 AM and 4:30 – 5:30 PM) traffic volumes can be found in **Figure 2**.

Existing land use data was compiled with the use of Campbell County and City of Lynchburg GIS resources. **Figure 3** depicts land use characteristics in the study area, including roadways, land parcels, and hydrographic features, in addition to other noteworthy items. **Figure 4** portrays zoning districts in both localities, and **Figure 5** shows future planned land uses as recommended in the respective comprehensive plans.

Simons Run was built by a consortium of land owners along the Simons Run alignment. Simons Run is not incorporated into VDOT's roadway system. The alignment of Simons Run is within Campbell County right-of-way.

The pavement section along the majority of the Simons Run corridor, from immediately west of Wards Crossing West to Leesville Road, is a two-lane road with 24 feet of asphalt pavement with earthen shoulders in an open drainage system (ditches). In front of Wards Crossing West shopping center drainage is managed by curb and gutter. Nearly all of the right-of-way along the existing alignment is 60 feet in width. Simons Run is approximately 1.3 miles in length with approximately 0.90 miles having open drainage. There are presently no bicycle or pedestrian accommodations provided on Simons Run.

With two stops on the corridor, Simons Run is currently serviced by Bus Route #6 of the Greater Lynchburg Transit Company. The first stop is on the eastern end of the corridor, just west of Wards Ferry Road. The second stop is on the western end of the corridor, on Leesville Road. The bus operates on an hourly schedule Monday through Friday, from 6:15 AM to 7:10 PM; it also operates on a two-hour schedule on Saturday, from 7:15 AM to 6:10 PM; it does not operate on Sunday.

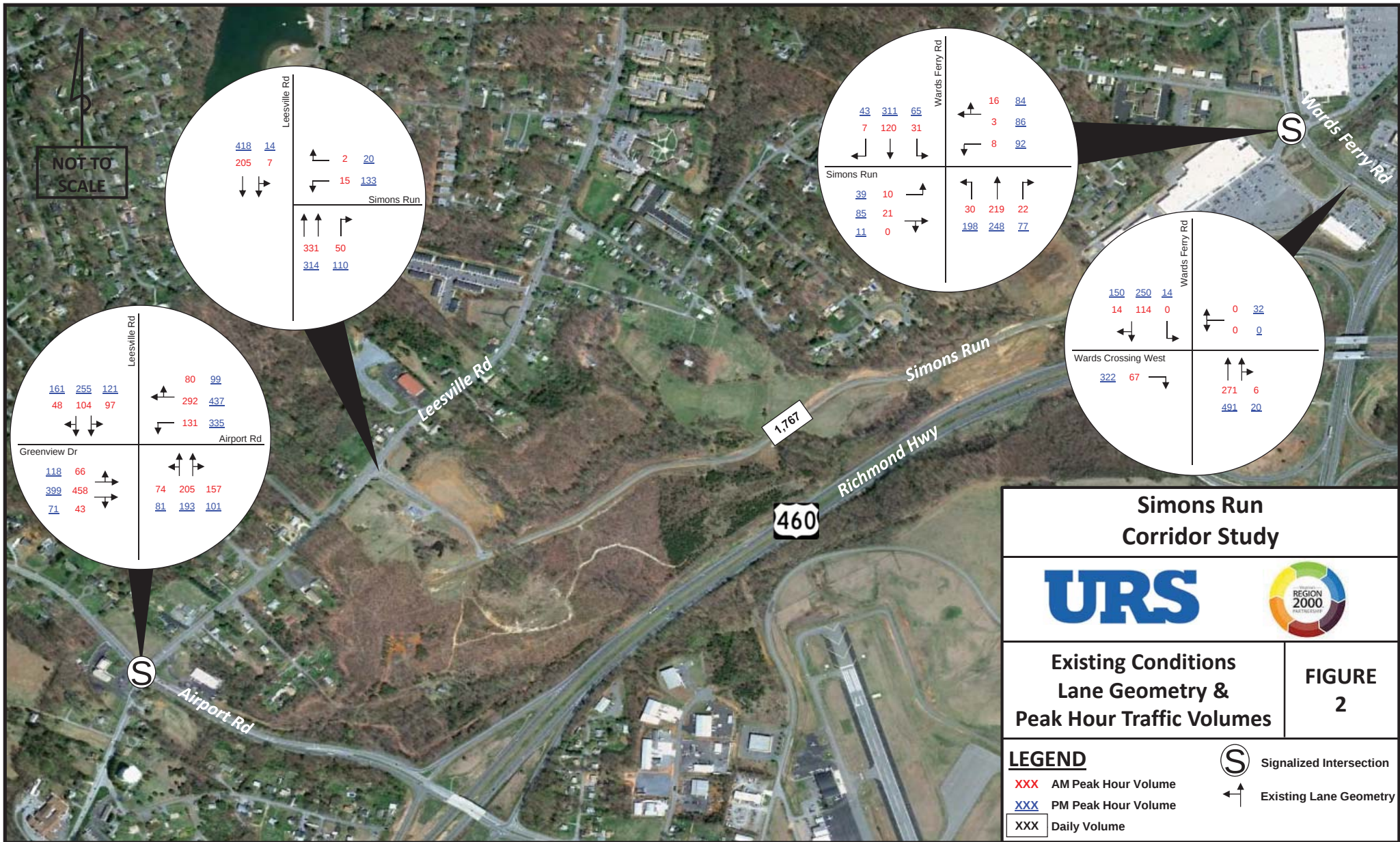
Capacity Analysis

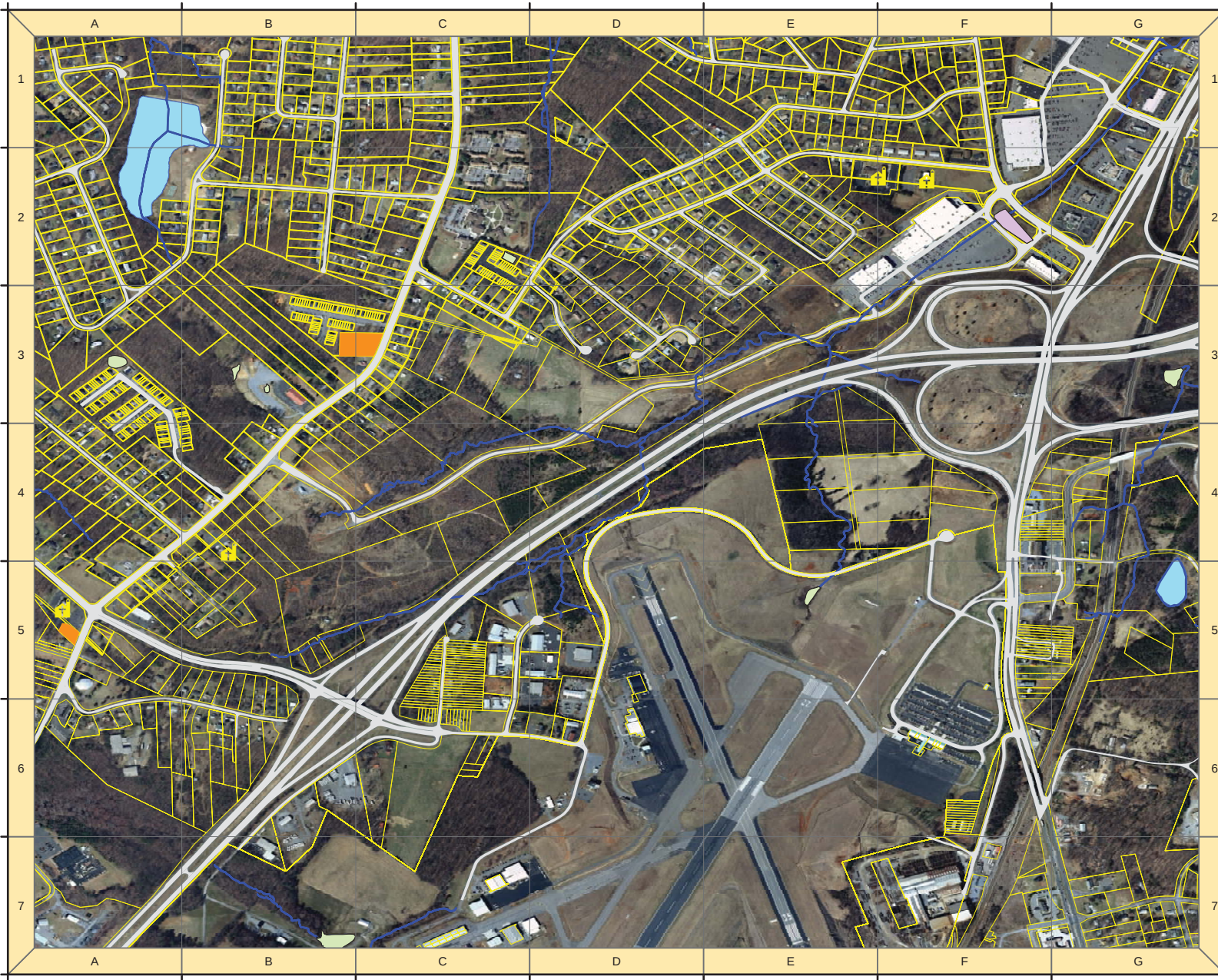
Using the peak hour traffic volumes shown in **Figure 2**, capacity analysis was conducted. Synchro 8 software was used for the analysis using *2010 Highway Capacity Manual* procedures. **Tables 1** and **2** summarize the results of the Existing Conditions capacity analysis.

The signalized intersection of Greenview Drive/Airport Road with Leesville Road exhibits inadequate overall intersection service levels with level of service (LOS) D and E conditions in the AM and PM peak hours, respectively. Several individual movements operate with LOS F conditions in the PM peak hour. This intersection accommodates a large traffic volume and the signal timing plan consists entirely of split phasing (each individual approach is provided a separate green phase). While appropriate for current volumes and approach patterns, split phasing produces an inefficient allocation of green time, resulting in excessive delay on all approaches.

In contrast, the signalized intersection of Simons Run with Wards Ferry Road operates with good overall intersection service level conditions with LOS B conditions in both peak hours. The unsignalized intersection of Leesville Road with Simons Run operates with good service level conditions, with most movements operating at LOS A. The most noteworthy movement is the westbound left movement, which operates at LOS B and C in the AM and PM peak hours, respectively.

Lastly, the unsignalized intersection of the Wards Crossing West driveway with Wards Ferry Road operates with excellent service level conditions, with most movements operating at LOS A. In the PM peak hour, the side streets operate at LOS B.





Simons Run Corridor Study

Figure 3 - Key Land Use Features

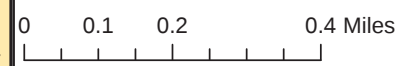
Region 2000 Local Government Council
Campbell County, Virginia

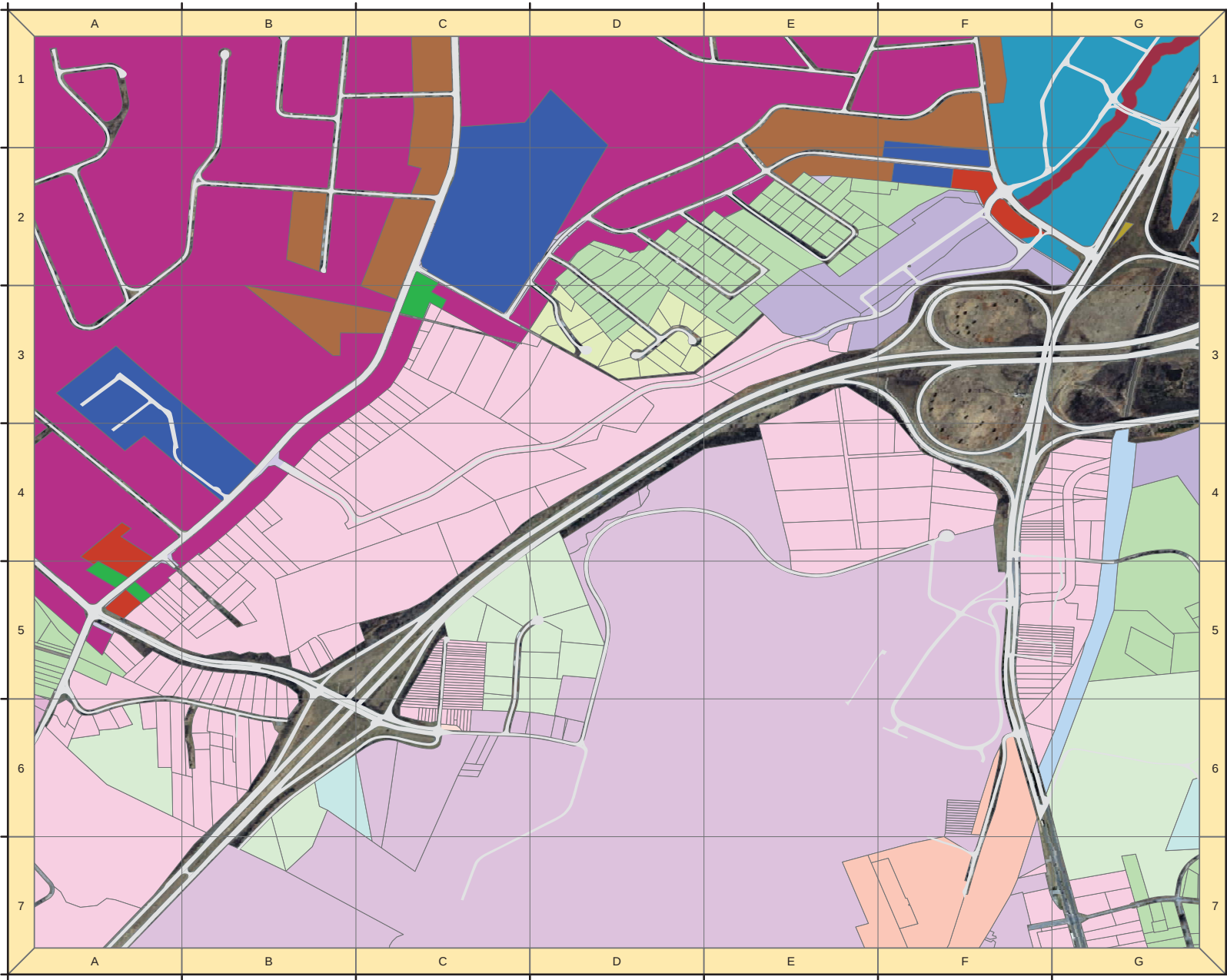
Legend

Point of Interest

-  House of Worship
-  Cemetery
-  Stream Area
-  Floodzone
-  Roadway
-  Stream Centerline
-  Lake

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Simons Run Corridor Study

Figure 4 - Zoning Districts

Region 2000 Local Government Council
Campbell County, Virginia

Legend

Lynchburg Zoning Districts

Zone

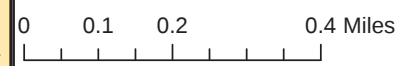
- B1
- B2
- B3
- B5
- I2
- R1
- R2
- R3
- R4
- RC

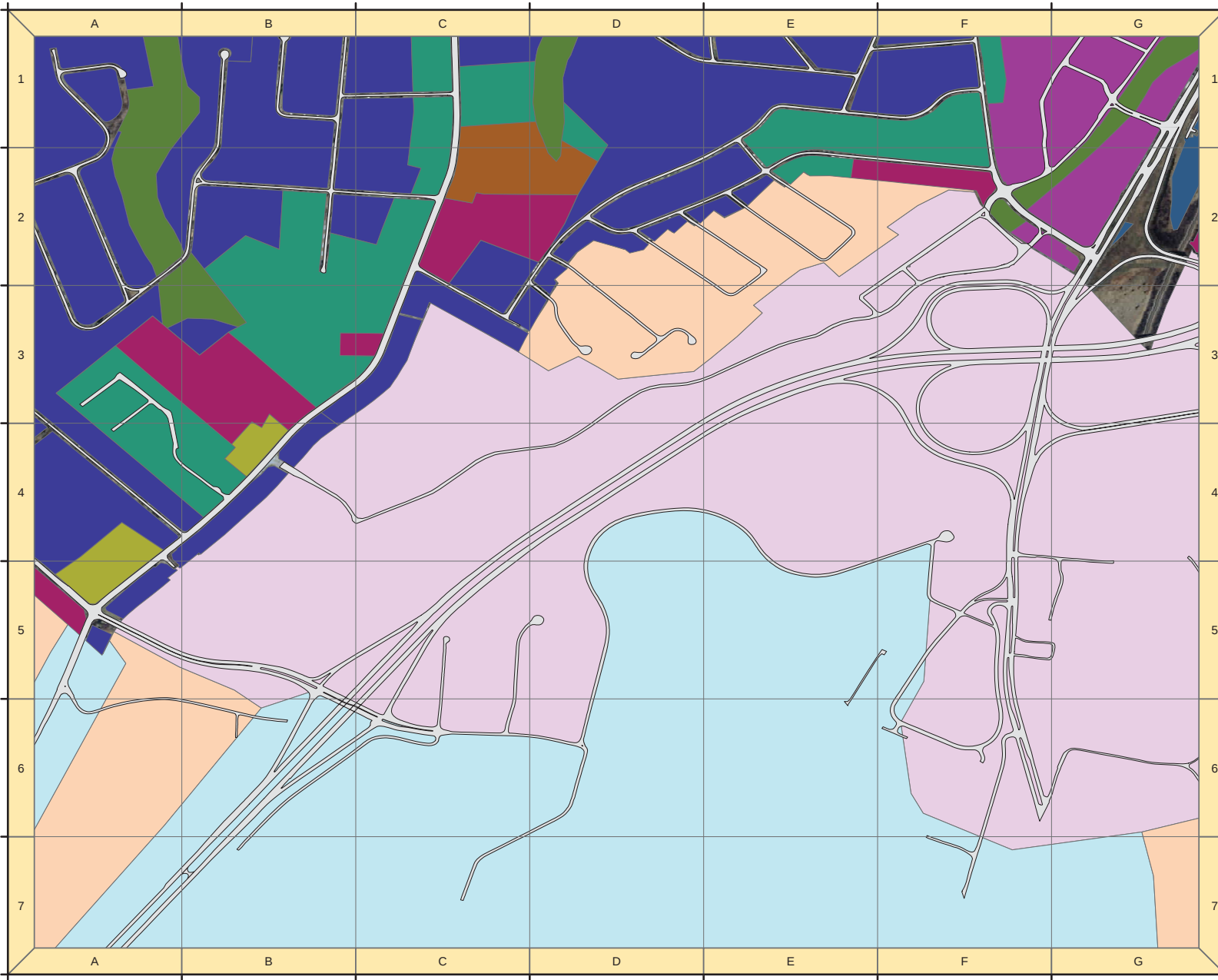
Campbell County Zoning Districts

Zone

- Agricultural
- Agricultural, Conditional
- Business - General Commercial
- Business - General Commercial, Conditional
- Business - Heavy Commercial
- Business - Heavy Commercial, Conditional
- Industrial - General
- Industrial - General, Conditional
- Industrial - Heavy
- N/A
- Residential - Multi Family
- Residential - Multi Family, Conditional
- Residential - Single Family
- Right-of-Way
- Roadway

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Simons Run Corridor Study Figure 5 - Future Planned Land Use

Region 2000 Local Government Council
Campbell County, Virginia

Legend

Lynchburg Future Land Use

Land Use

- Community Commercial
- Employment 2
- High Density Residential
- Institution
- Low Density Residential
- Medium Density Residential
- Neighborhood Commercial
- Office
- Public Use
- Regional Commercial
- Resource Conservation

Campbell County Future Land Use

Land Use

- Medium to High Density Commercial
- Medium to High Density Residential
- Urban Development Area Commercial
- Urban Development Area Residential
- Roadway

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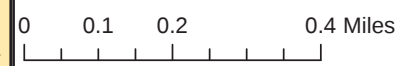


Table 1 Existing Conditions Average Signalized Vehicle Delay and Service Levels HCM 2010 Methodology				
Approach	AM Peak Hour		PM Peak Hour	
	Delay (sec.)	LOS	Delay (sec.)	LOS
Greenview Drive / Airport Road @ Leesville Road				
EB Left/Through	45.3	D	85.1	F
EB Through/Right	38.8	D	67.3	E
WB Left	25.2	C	34.1	C
WB Through/Right	43.6	D	70.5	E
NB Left/Through	50.0	D	74.3	E
NB Through/Right	45.5	D	66.6	E
SB Left/Through	50.8	D	102.1	F
SB Through/Right	45.9	D	83.4	F
Overall Intersection	43.6	D	72.1	E
Simons Run @ Wards Ferry Road				
EB Left	14.5	B	18.6	B
EB Through/Right	15.6	B	23.1	C
WB Left	14.6	B	17.5	B
WB Through/Right	15.8	B	23.3	C
NB Left	8.1	A	12.6	B
NB Through	11.1	B	15.4	B
NB Right	9.4	A	13.5	B
SB Left	8.2	A	11.8	B
SB Through	10.1	B	18.7	B
SB Right	9.2	A	14.7	B
Overall Intersection	10.9	B	17.2	B

Table 2 Existing Conditions Average Unsignalized Vehicle Delay and Service Levels HCM 2010 Methodology				
Approach	AM Peak Hour		PM Peak Hour	
	Delay (sec.)	LOS	Delay (sec.)	LOS
Simons Run @ Leesville Road				
WB Left	12.4	B	17.7	C
WB Right	9.3	A	9.4	A
NB Through/Right	0.0	A	0.0	A
SB Left	8.0	A	8.0	A
SB Through	0.0	A	0.1	A
Wards Crossing West @ Wards Ferry Road				
EB Right	9.2	A	13.6	B
WB Left/Right	0.0	A	10.3	B
NB Through/Right	0.0	A	0.0	A
SB Left	0.0	A	8.6	A
SB Through/Right	0.0	A	0.5	A

III. FORECASTS OF FUTURE TRAFFIC VOLUMES

Two alternative scenarios for future development of currently undeveloped land along the corridor were provided to URS by Campbell County. Both Build Alternative scenarios propose development of eight of the vacant parcels along Simons Run. The two scenarios are shown in **Figures 6** and **7**. For Scenario 1, land use is a mix of residential and commercial uses, while Scenario 2 shifts exclusively towards office and medical land use.

Trip Generation 9th Edition (published by the Institute of Transportation Engineers) was used to compute estimates trip volumes. Trip generation values for the two development scenarios are summarized in **Tables 3** and **4**.

Table 3 Trip Generation Build Alternative – Scenario 1									
Parcel	Land Use	Size	Daily Trips	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Pass-By	Enter	Exit	Pass-By
1	Home Improvement Superstore	100,000 sq. ft.	3,074	80	69	72	115	118	112
4A	Shopping Center	10,000 sq. ft.	427	5	4	3	18	19	13
4B	Shopping Center	20,000 sq. ft.	854	11	8	7	36	38	25
4C1	Shopping Center	10,000 sq. ft.	427	5	4	3	18	19	13
9A	Condo/ Townhouse	300 Dwelling Units	1,743	22	110	0	105	51	0
9B	Hotel	100 Rooms	817	31	22	0	31	29	0
42	Quality Restaurant	5,000 sq. ft.	450	2	2	2	22	15	16
49B	New Car Sales	20,724 sq. ft.	669	30	10	0	22	33	0
Total	–	–	8,461	186	229	87	367	322	179

Figure 6: Simons Run Build Alternative Scenario 1 2014

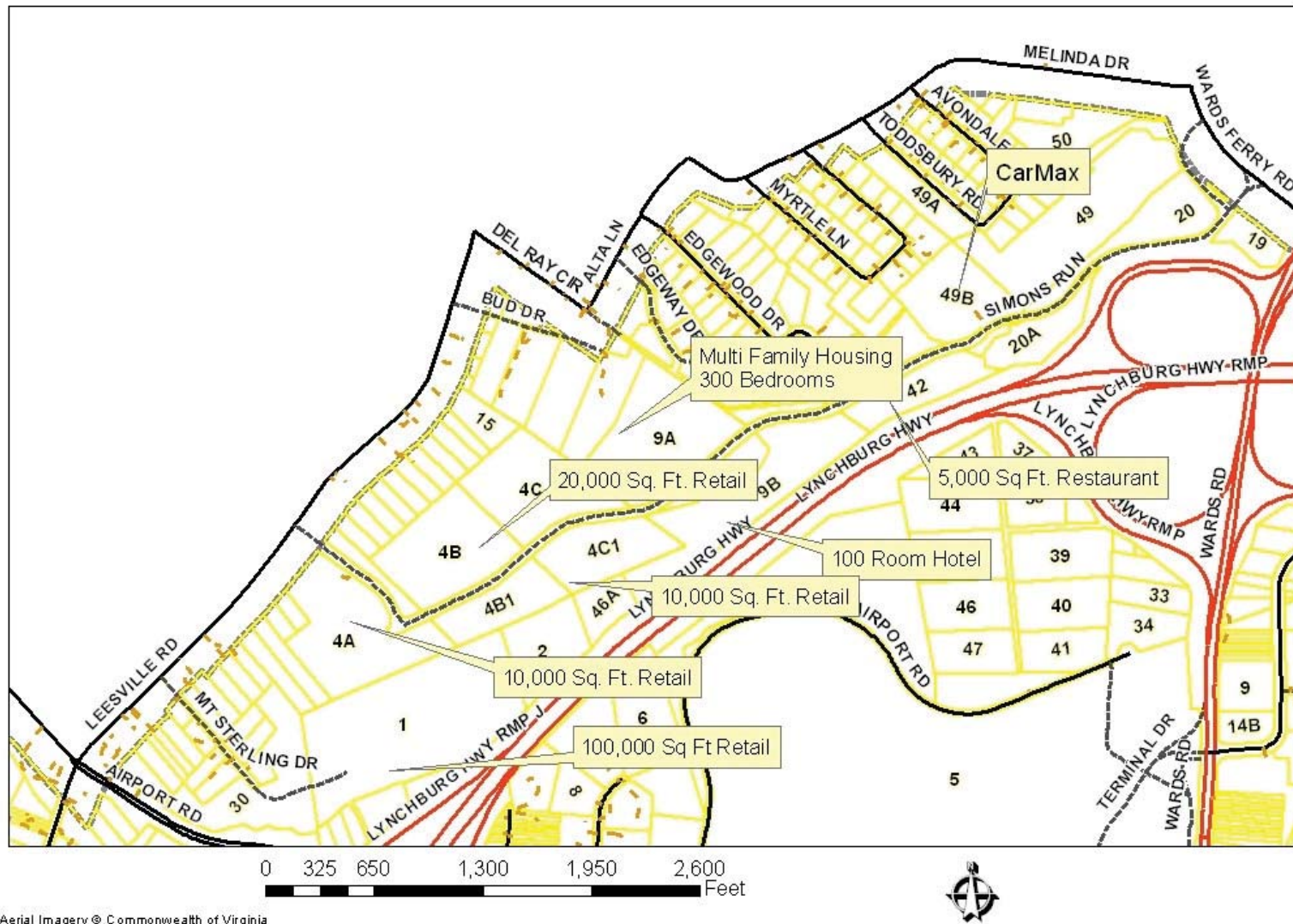
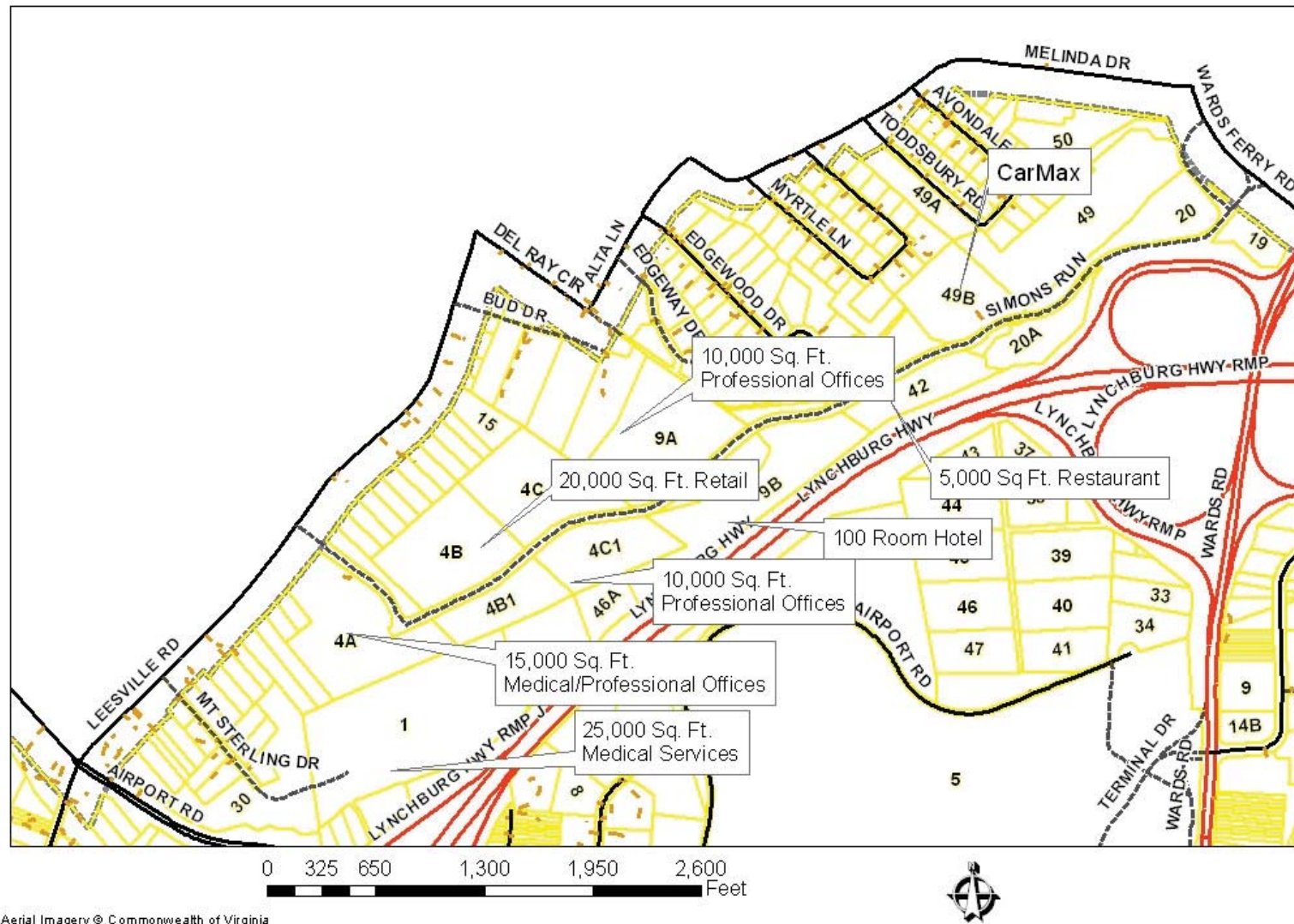


Figure 7: Simons Run Build Alternative Scenario 2 2014



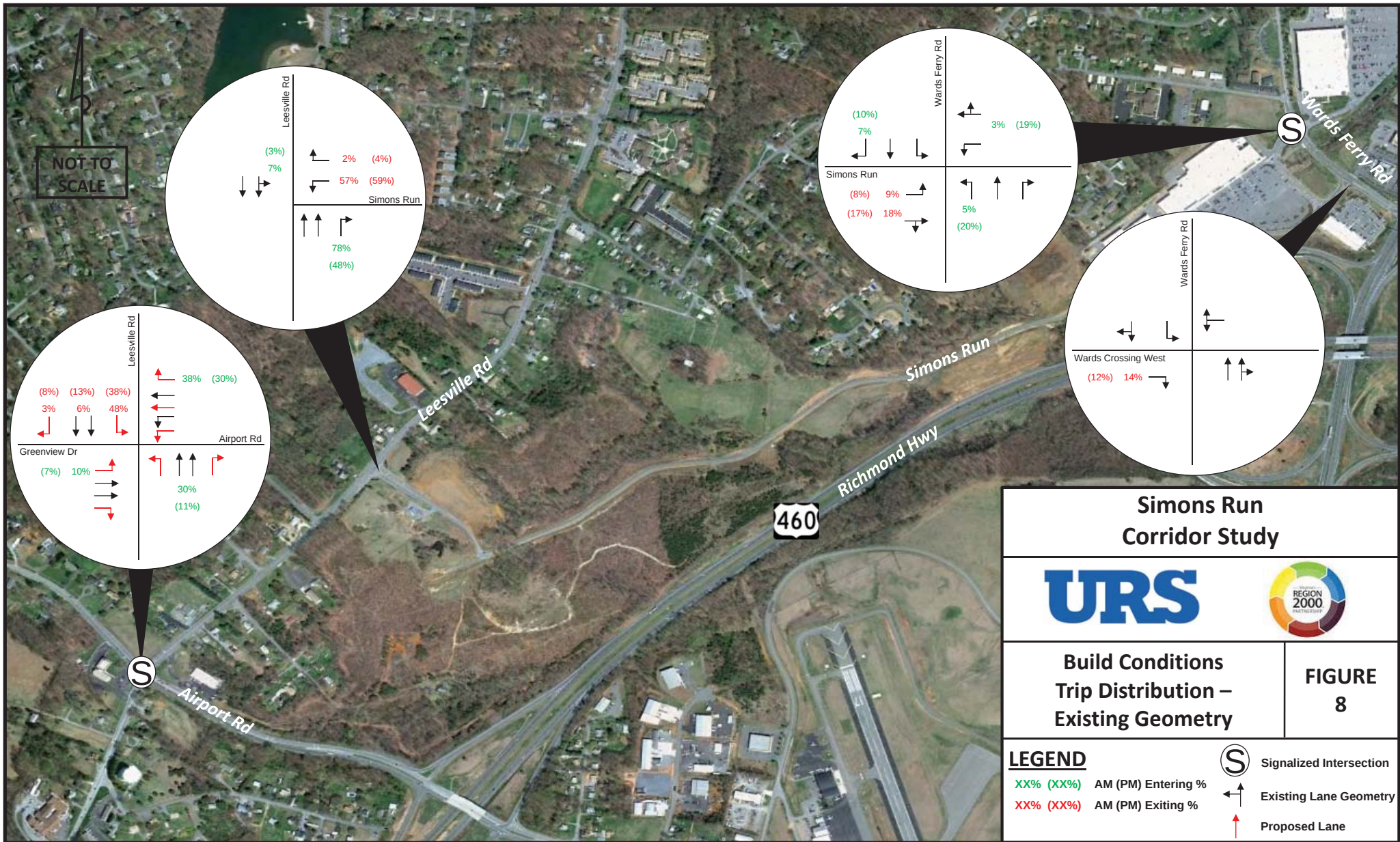
**Table 4
Trip Generation
Build Alternative – Scenario 2**

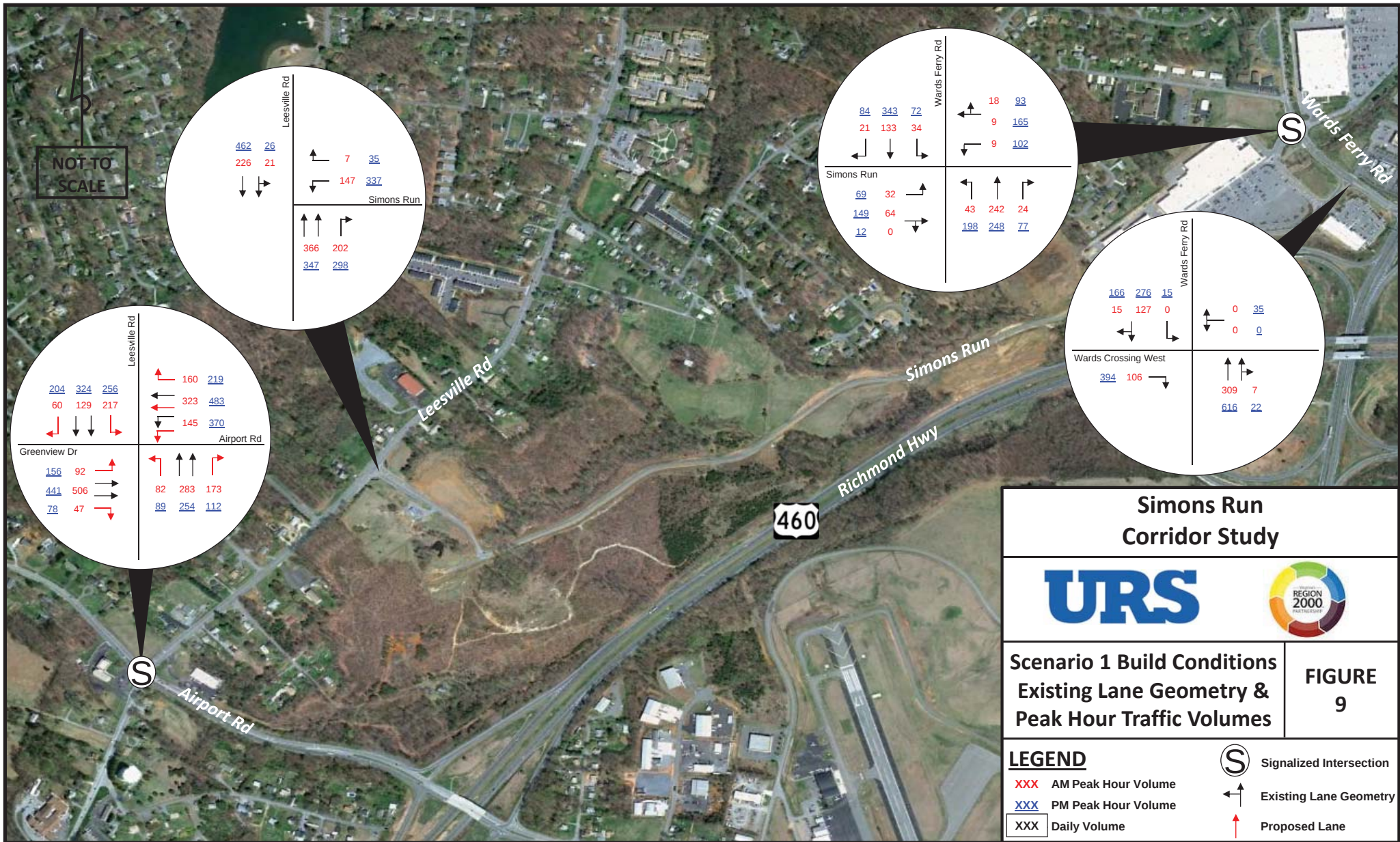
Parcel	Land Use	Size	Daily Trips	AM Peak Hour			PM Peak Hour		
				Enter	Exit	Pass-By	Enter	Exit	Pass-By
1	Medical-Dental Office Building	25,000 sq. ft.	903	47	13	0	25	64	0
4A	Pharmacy w/ Drive-Thru	15,000 sq. ft.	1,454	14	13	25	38	38	73
4B	Shopping Center	20,000 sq. ft.	854	11	8	7	36	38	25
4C1	General Office	10,000 sq. ft.	110	14	2	0	3	12	0
9A	General Office	10,000 sq. ft.	110	14	2	0	3	12	0
9B	Hotel	100 Rooms	817	31	22	0	31	29	0
42	Quality Restaurant	5,000 sq. ft.	450	2	2	2	22	15	16
49B	New Car Sales	20,724 sq. ft.	669	30	10	0	22	3	0
Total	–	–	5,367	163	72	34	180	211	114

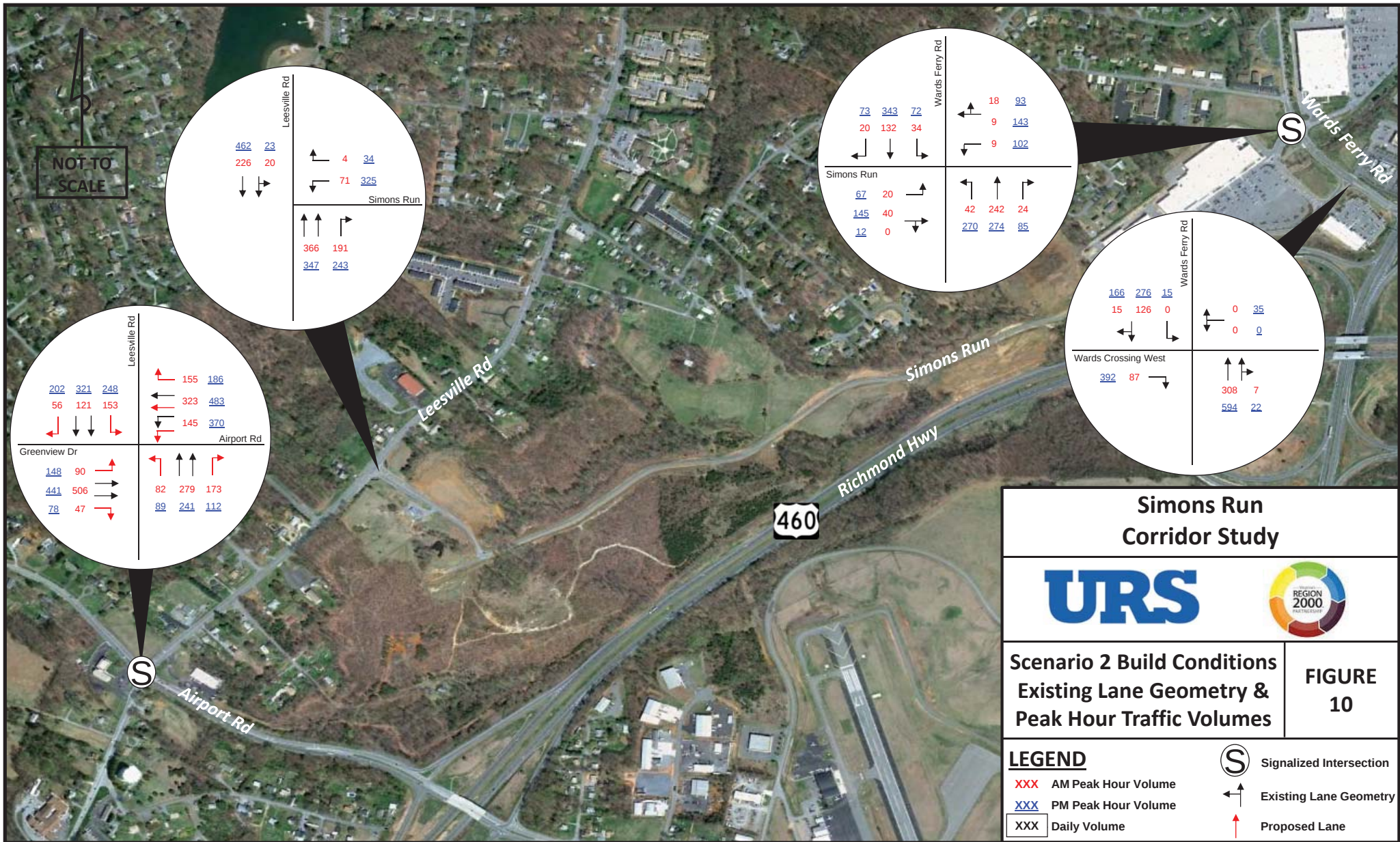
Forecasted trip distribution patterns for traffic from the two Build Alternative scenarios using the existing roadway geometry (without the extension to Airport Road) are displayed in **Figure 8**. The trip distribution pattern has been based on the existing traffic patterns and surrounding land uses. Applying distribution patterns to forecasted volumes, **Figures 9 and 10** display peak period turning movement counts for both Build Alternative scenarios using the existing roadway geometry.

Background traffic volume growth on all study area roads has been accounted for by applying a 1% annual growth rate to the existing conditions volumes for a period of ten years. The 1% annual growth rate is consistent with that used and documented in the *Wards Ferry Road Corridor Study*, which was conducted in 2013.

The design year for this project was chosen to be 2024, ten years beyond the existing conditions, in order to provide sufficient time for build-out of the proposed land uses. It should be noted that the intersection of Greenview Drive/Airport Road with Leesville Road is programmed to be improved from its current geometry to include separate left and right turn lanes on all four approaches. This improvement is scheduled separately from this project, and is to be completed by the time the development on Simons Run is fully developed.







This study also included an alternate scenario to provide for an extension of Simons Run to the south to create a new partial-access intersection with Airport Road. **Figure 11** displays the adjusted trip distribution utilizing this new connection. **Figures 12 and 13** display peak period turning movement volumes for both Build Alternative scenarios using the modified roadway geometry.

Capacity Analysis

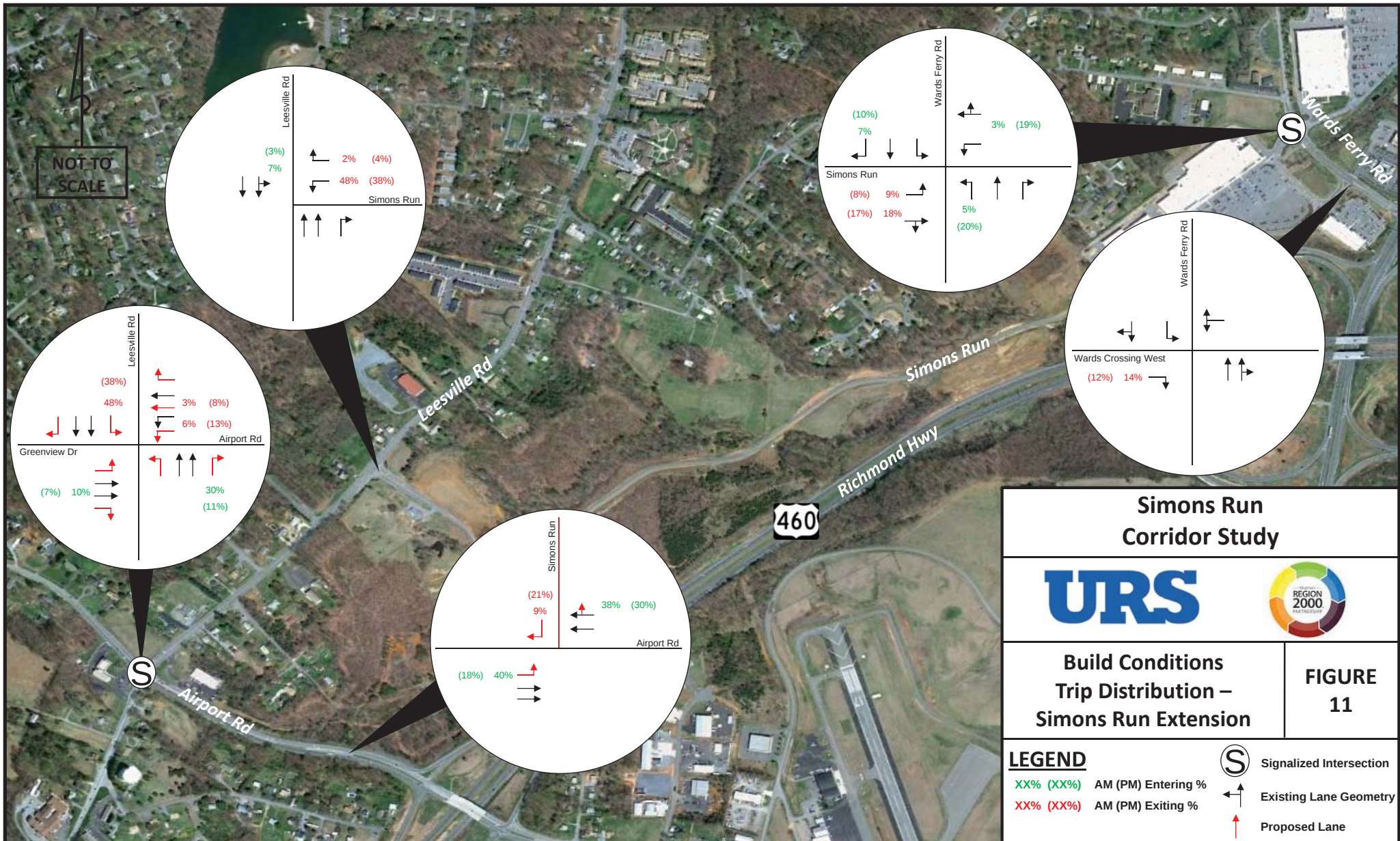
Using the peak hour traffic volumes found in **Figures 9, 10, 12, and 13**, Build Alternative conditions capacity analysis was conducted for both land use scenarios, using both the existing geometry and the Simons Run extension modification. Synchro 8 software was used for the analysis using *2010 Highway Capacity Manual* procedures. **Table 5** summarizes the results of the various Build Alternative analyses. For the signalized intersections, the overall intersection delay and LOS were reported; for the unsignalized intersections, the single worst movement delay and LOS were reported.

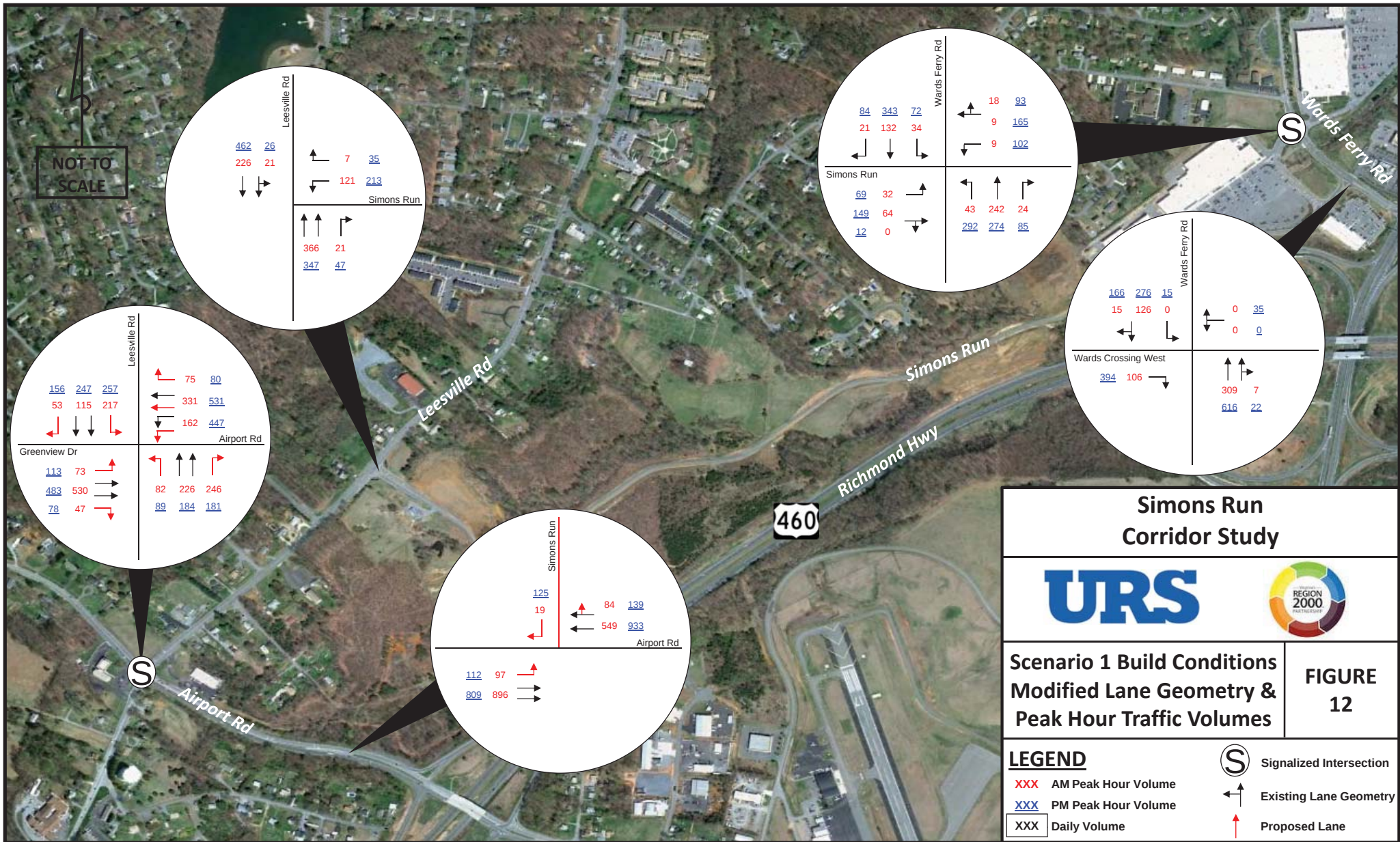
The signalized intersection of Greenview Drive/Airport Road with Leesville Road exhibits marked improvement in performance, coinciding with its scheduled reconstruction; it operates with adequate (LOS C or better) overall intersection service level conditions in all Build Alternative conditions. The signalized intersection of Simons Run with Wards Ferry Road is forecasted to operate with adequate (LOS C or better) overall intersection service levels for all Build Alternative conditions.

With the existing geometry, the unsignalized intersection of Leesville Road with Simons Run is forecasted to operate with poor (LOS F) service levels. Specifically, the PM peak hour analysis results exhibit LOS F conditions. However, with the extension of Simons Run to Airport Road, the results are forecasted to improve to LOS D and C in the PM peak hour for Scenarios 1 and 2, respectively. In contrast, without the extension of Simons Run, the intersection of Leesville Road and Simons Run will likely meet warrants for a traffic signal.

The unsignalized intersection of Wards Crossing West with Wards Ferry Road is forecasted to operate with adequate (LOS C or better) service levels, with LOS A and C conditions in the AM and PM peak hours, respectively, for all Build Alternative conditions.

Lastly, the proposed new unsignalized intersection of Simons Run with Airport Road is forecasted to operate with adequate (LOS C or better) service levels, with LOS B and C conditions in the AM and PM peak hours, respectively.





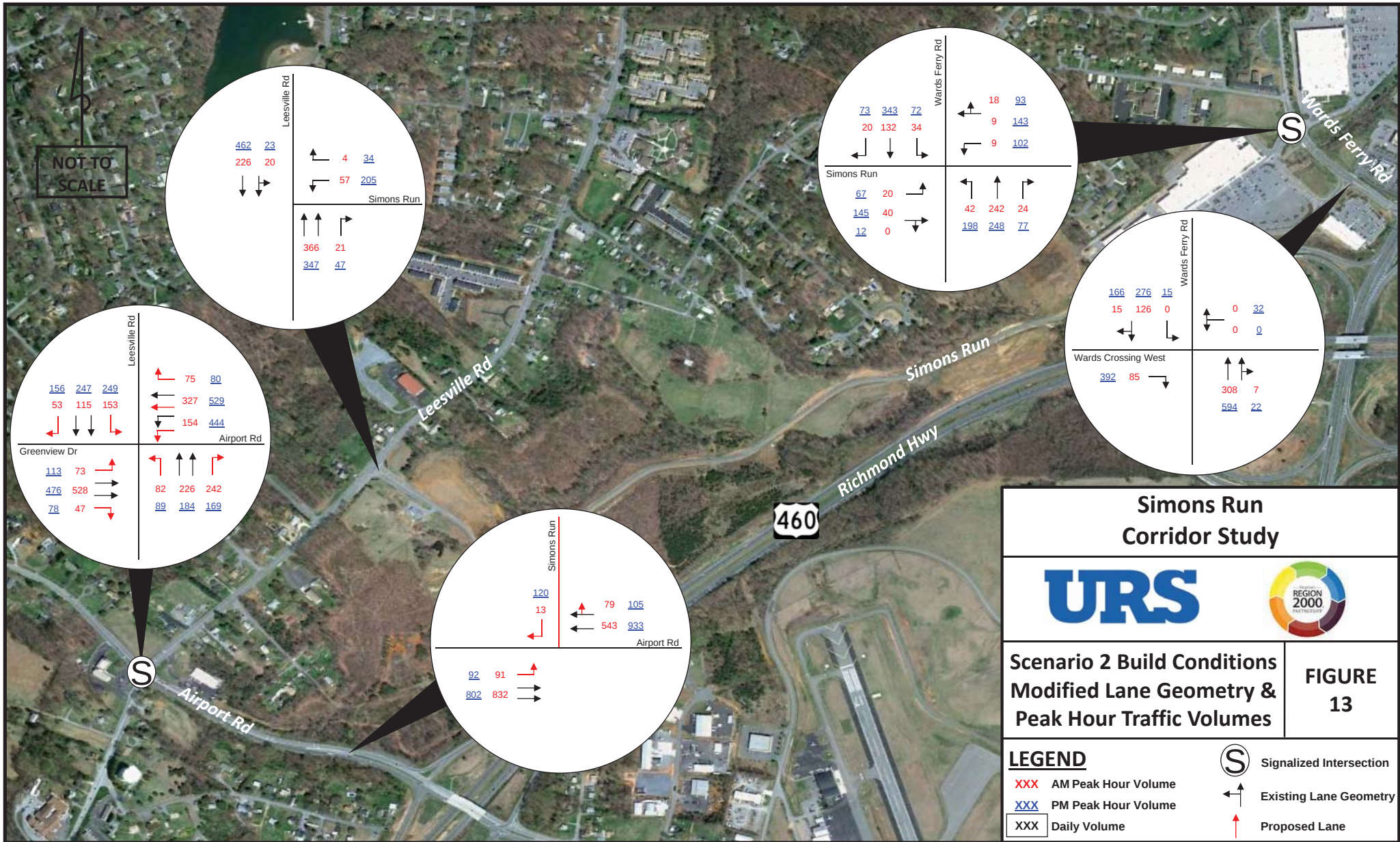


Table 5 Build Conditions – Year 2024 Vehicle Delay and Service Levels HCM 2010 Methodology																
Intersection	Existing Geometry								Simons Run Extension							
	Scenario 1				Scenario 2				Scenario 1				Scenario 2			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS
Greenview Drive/Airport Road @ Leesville Road	25.9	C	26.9	C	23.9	C	26.3	C	29.5	C	30.6	C	26.3	C	30.1	C
Simons Run @ Wards Ferry Road	13.1	B	22.4	C	12.2	B	21.0	C	13.1	B	22.4	C	12.2	B	21.0	C
Simons Run @ Leesville Road*	17.6	C	79.1	F	14.8	B	66.7	F	16.5	C	29.8	D	14.4	B	27.7	D
Wards Crossing West @ Wards Ferry Road*	9.5	A	16.4	C	9.4	A	16.3	C	9.5	A	16.4	C	9.4	A	16.3	C
Simons Run @ Airport Road*	–	–	–	–	–	–	–	–	10.7	B	16.2	C	10.6	B	15.6	C

*Unsignalized intersection

IV. PAVEMENT SECTION EVALUATION

In the analysis of the Build Alternative Scenarios, eight currently undeveloped parcels have been assumed to be developed: one with a mix of residential and commercial uses and the other with exclusively commercial uses. With the added traffic volumes from either of these development scenarios, determining the appropriate pavement section is a key component for developing forecasts of costs estimates.

The design speed for the existing Simons Run alignment is 40 MPH, and there are no major design deficiencies on the current corridor. However, added traffic volumes from future planned development will likely present challenges to maintaining an adequate pavement configuration. For example, considering that several parcels have relatively narrow frontage, it is not likely that a driveway to each parcel could be installed while – at the same time – complying with access management driveway spacing guidelines along the overall roadway. As a result, considering the forecasted volumes and parcel layout, the typical section should include a travel lane in each direction with a shared center left turn lane.

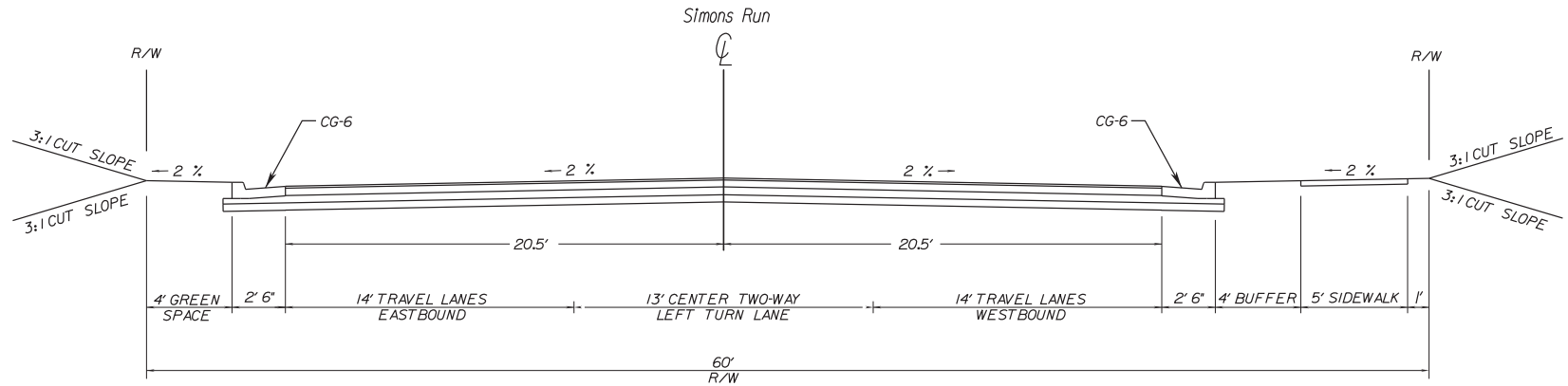
Currently, the typical section on Simons Run is comprised of a single 12-foot travel lane in each direction, with an additional 5-foot earthen shoulder. The existing Campbell County right-of-way (ROW) width spans 60 feet.

Two possible typical sections for the corridor were developed and are shown in **Figure 14**. Both of the typical sections were developed to meet VDOT design standards. Based on the type and amount of development being proposed the VDOT standard chosen for developing alternatives was the urban collector street with curb and gutter drainage (GS-7) with a design speed of 40 MPH.

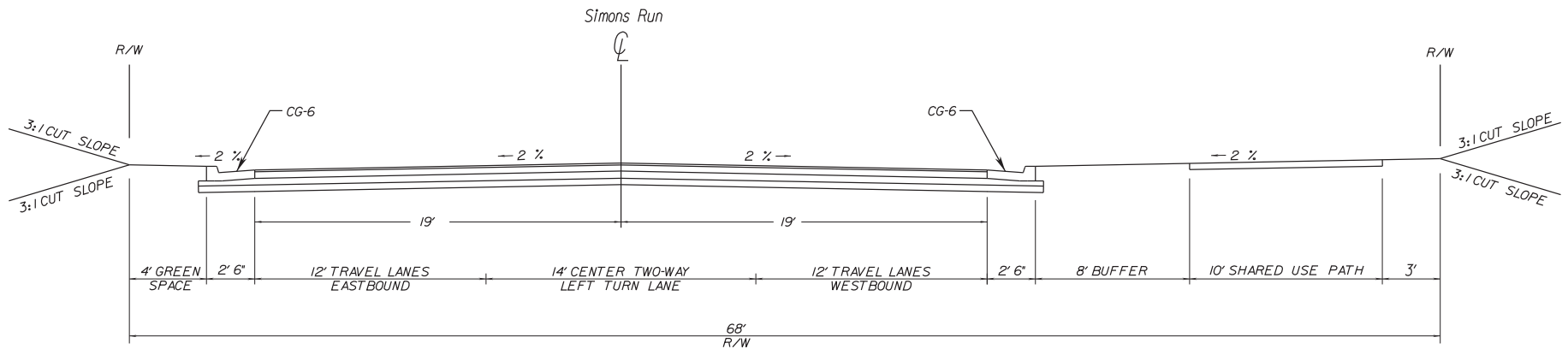
The first typical section can be installed within the available 60-foot ROW. It uses a center left turn lane, as well as two 14-foot travel lanes. The wider travel lanes (wide outside travel lanes) will adequately allow bicyclists to share the road with automobiles without separate bicycle lanes. Furthermore, this typical section includes a 5-foot wide sidewalk to accommodate pedestrian traffic.

The year 2015 planning level cost estimate to install this typical section from the northern end of the corridor in front of the proposed car dealership to the 90 degree curve in the road south of the intersection with Leesville Road is \$6,530,000 (a distance of 0.76 miles). This cost estimate includes extending the sidewalk through to Leesville Road. Conceptual plans for this typical section are displayed in **Figure 15**.

TYPICAL SECTION WITH WIDE LANE



TYPICAL SECTION WITH SHARED USE PATH





An alternative typical section was also developed to provide separate accommodation of bicycle and pedestrian traffic. The travel lanes revert to the typical 12-foot width, and the center left turn lane expands to 14 feet. Instead of a 5-foot sidewalk, a 10-foot shared use path has been included. However, this wider shared-use path also necessitates a wider buffer between the road and the path. Consequently, the required ROW expands from 60 feet to 68 feet.

The year 2015 planning level cost estimate to install this typical section from the northern end of the corridor (in front of the proposed car dealership) to the 90 degree curve in the road south of the intersection with Leesville Road (a distance of 0.76 miles) is \$6,599,000. This cost estimate includes extending the shared-use path through to Leesville Road. Conceptual plans for this typical section are displayed in **Figure 16**.

It should be noted that the planning level cost estimates do not include ROW acquisition costs, utility relocation costs, or loss of property taxes.

Multi-Modal

Build Alternative Scenario 1 provides for a 300-bedroom townhouse/apartment complex in addition to mixed commercial uses. It is estimated that this scenario would generate 2 bicycle trips and 5 pedestrian trips in each peak hour. In contrast, Build Alternative Scenario 2 is exclusively oriented for development of commercial uses. The result is that Scenario 2 is estimated to generate 1 bicycle trip and 2 pedestrian trips in each peak hour.

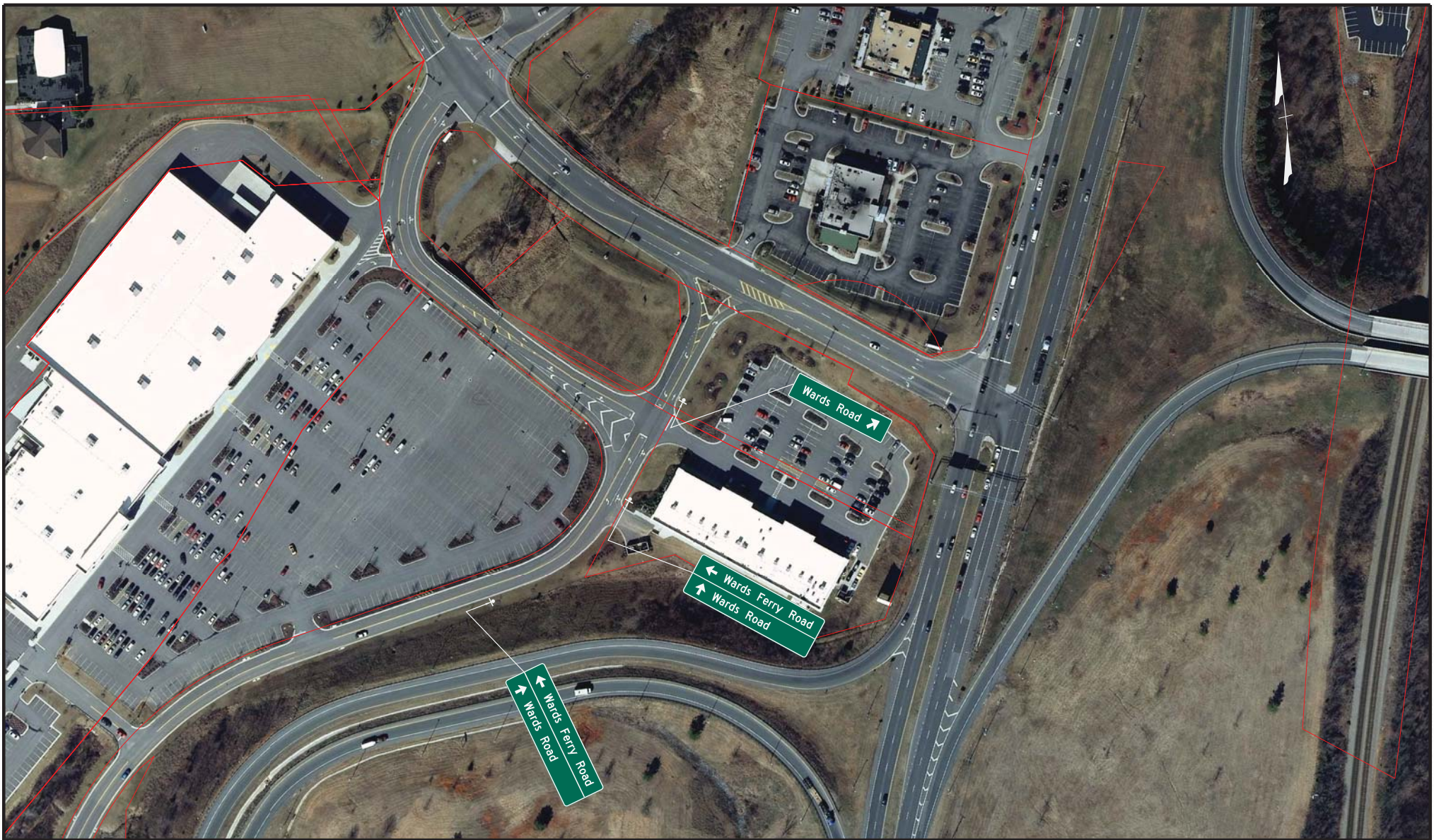
Bus stops are currently located at each end of Simons Run as part of the Greater Lynchburg Transit Company's network. It is recommended that an additional bus stop be located between Parcels 9A and 9B; this location will serve as a central stop between the bus stops on either end of the corridor, and will directly serve both the residential complex on Parcel 9A in Scenario 1, and the hotel on Parcel 9B in both Scenarios.

Signing

The geometry of Simons Run at its eastern end near Wards Ferry Road is not intuitive as motorists travel eastbound: the roadway itself continues straight to an unsignalized directional intersection with Wards Ferry Road, whereas Simons Run officially turns left and snakes around the Wards Crossing West parking lot just before it intersects Wards Ferry Road to the north of the aforementioned unsignalized directional intersection. Unfamiliar motorists traveling eastbound on Simons Run may not know that they need

to turn left at the unsignalized four-way intersection in front of the small strip shopping center to the southeast in order to continue to Wards Ferry Road northbound. Traveling straight through this intersection forces motorists to make a right turn onto southbound Wards Ferry Road which then immediately intersects with Wards Road. The project management team brought up this issue and requested that additional signage be developed to help alleviate the confusion caused by the non-intuitive geometry and restricted access. URS developed proposed signing to help inform motorists which direction to take in order to reach their destination. URS followed MUTCD standards when developing the proposed signage. **Figure 17** displays the recommended guide signage to assist eastbound Simons Run motorists in making destination decisions when the approach Wards Ferry Road.





V. COST-BENEFIT EVALUATION OF EXTENSION OF SIMONS RUN TO AIRPORT ROAD

The proposed extension of Simons Run south would create a new intersection with Airport Road (Route 678). The original intent of this extension was to provide a full-access intersection to Airport Road using the existing median crossover located approximately 95 feet west of the westbound US Route 460 off-ramp. However, according to the *VDOT Road Design Manual*, a full-access intersection next to an interchange requires a minimum spacing of 1,320 feet – nearly the distance from the Route 460 interchange to the Leesville Road intersection.

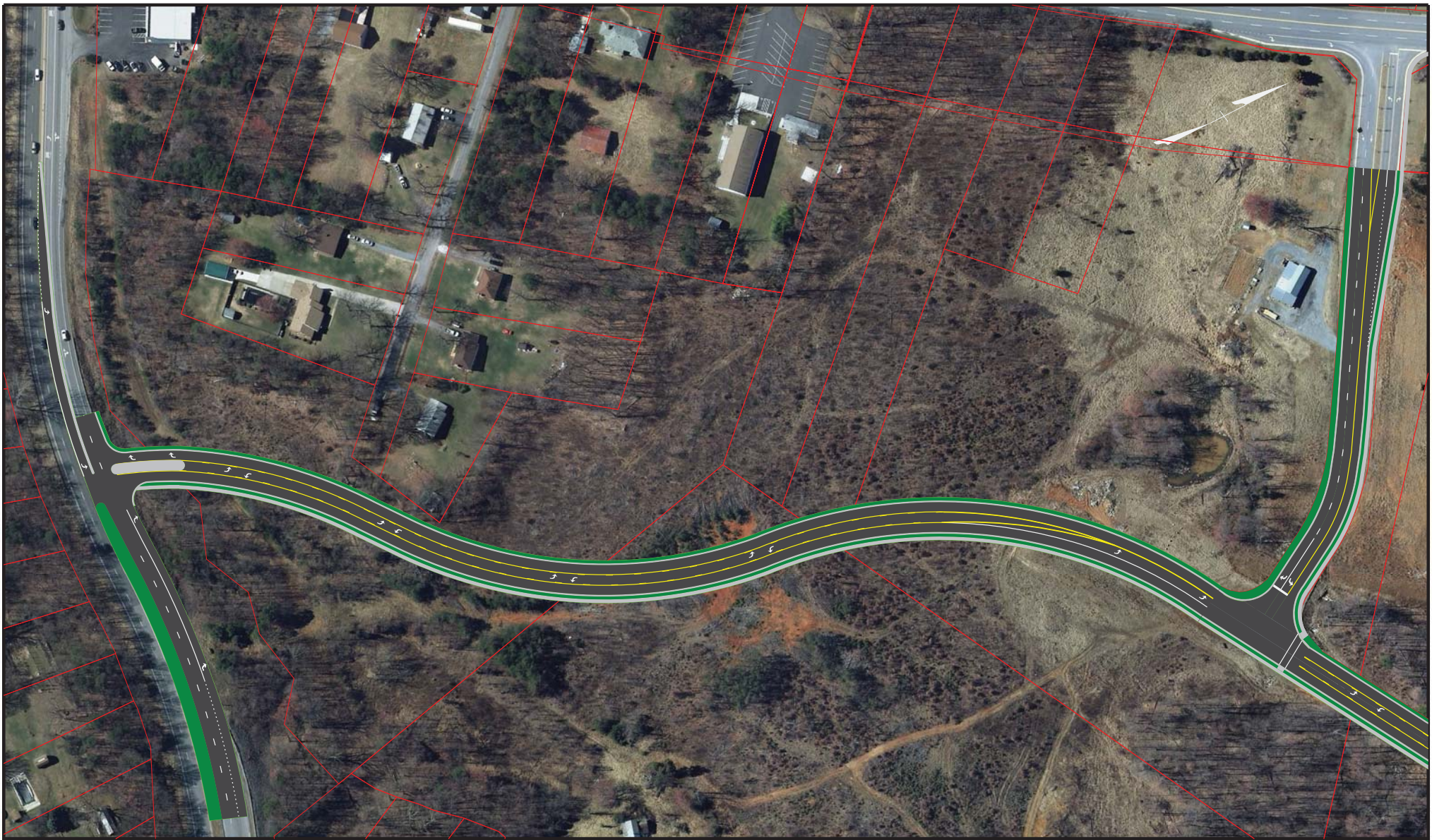
An alternative design would provide a partial-access intersection, which requires spacing of 750 feet. Partial access would provide for left turning movements into Simons Run from eastbound Airport Road but prohibit left turning movements from southbound Simons Run to eastbound Airport Road. Partial access would also allow for right-in/right-out turning movements at the intersection of Simons Run and Airport Road. Consequently, for the proposed extension of Simons Run, the design provides for a partial access intersection located farther west on Airport Road, closer to the intersection of Greenview Drive/Airport Road with Leesville Road.

However, due to the intersection improvements previously discussed at that location, as well as the residential parcels located on the north side of Airport Road, separation of only 395 feet from the US Route 460 interchange was attainable. Therefore, an access management exemption will have to be requested from VDOT to allow for substandard spacing of the intersection to the interchange. **Figure 18** displays the horizontal distances from the proposed intersection of the Simons Run extension with Airport Road to the US Route 460 interchange, and the intersection of Greenview Drive/Airport Road with Leesville Road, as well as the horizontal distance from the existing median break on Airport Road to the US Route 460 interchange.

Both of the two typical sections previously displayed in **Figure 14** were evaluated for use as the extension of Simons Run. **Figure 19** displays the conceptual plans for an extended segment of Simons Run with the 60-foot ROW typical section, and **Figure 20** displays both the modified internal Simons Run intersection, and the new intersection of Simons Run with Airport Road.

In both layouts, the westbound US Route 460 off-ramp onto westbound Airport Road is extended as a right turn onto the intersection with the proposed Simons Run extension.





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Figure 19: Modified Geometry 60' ROW Extents



Figure 20: Modified Geometry 60' ROW Simons Run Intersections

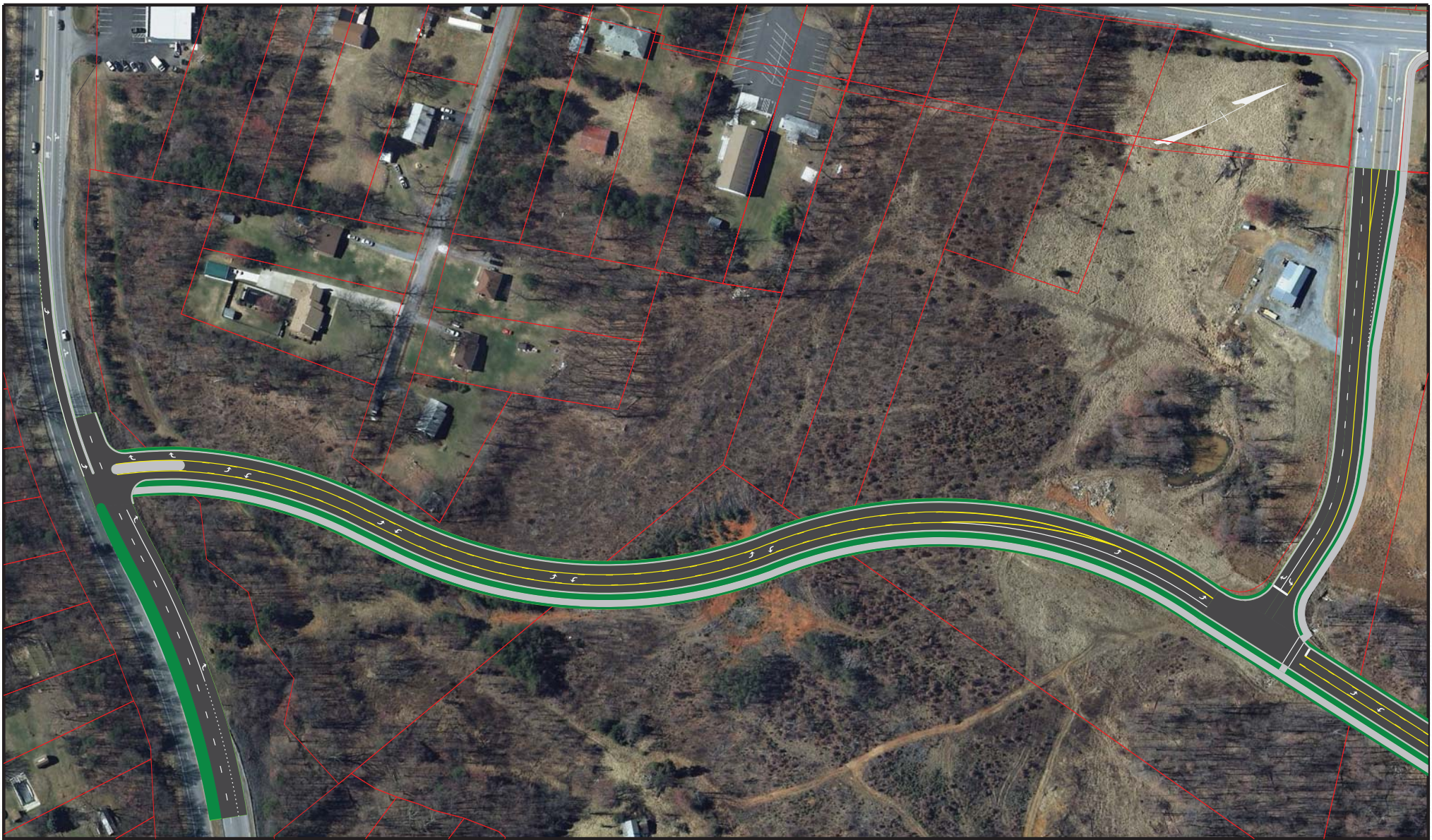
The planning level cost estimate for the 60-foot-wide ROW extension of Simons Run is \$2,730,000 in year 2015 dollars.

Figure 21 displays the conceptual plans for an extended segment of Simons Run with the 68-foot ROW typical section, and **Figure 22** displays both the modified internal Simons Run intersection, and the new intersection of Simons Run with Airport Road.

The planning level cost estimate for the 68-foot-wide ROW extension of Simons Run is \$2,721,000 in year 2015 dollars.

Here also, it should be noted that these planning level cost estimates do not include ROW acquisition costs nor do they include utility relocation costs. Furthermore, costs for the proposed extension may be mitigated by installing the extension concurrent with development activity as parcels are developed.

All planning level construction cost estimates may be found in the Technical Appendix.



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Figure 21: Modified Geometry 68' ROW Extents



Figure 22: Modified Geometry 68' ROW Simons Run Intersections

Travel Time Impacts

Travel time cost savings were calculated to determine the benefits to motorists from the installation of the Simons Run Extension. Two destinations were considered: the intersection of Greenview Drive/Airport Road with Leesville Road, and the US Route 460 interchange with Airport Road. A centroid point was used to approximate the center of the development, based on the size and location of the various parcels to be developed. This centroid was placed on Simons Run between Parcels 9A and 9B, at a distance of 0.58 mile from the intersection of Simons Run with Leesville Road. Daily volumes were then applied from the centroid to the two aforementioned destinations, and vice versa.

To estimate daily volumes, AM peak hour volumes were used. AM peak hour volumes generally comprise 7% of the total daily volumes at any given intersection; specifically, AM peak hour volumes for both the existing geometry and the Simons Run extension geometry were extrapolated to give an estimate of the daily volumes. Once daily volumes were calculated, they were applied to the roadway network given the trip distribution patterns previously shown in **Figures 8 and 11**.

To calculate travel time, the number of vehicles on a given roadway segment were multiplied by the length of that segment, and then divided by the speed limit of that segment. Next, the delay encountered at any intersections between the origin and destination was added to arrive at an estimated overall travel time from origin to destination.

According to the Bureau of Labor Statistics, the mean hourly wage for the Lynchburg Metropolitan Statistical Area (MSA) is \$18.08. By multiplying the overall travel time by the mean hourly wage, an estimate of daily travel cost savings was calculated.

To create a more accurate picture of the full cost-benefit analysis, it was assumed that the extra cost of the Simons Run extension would be financed, rather than paid in full up front. Assuming a 22-year loan – beginning payments in 2016 at a 5% annual interest rate, annual payments were calculated for both the 60-foot-wide and 68-foot-wide ROW options. The calculations assumed that the extension would be completed in 2017, and any travel cost benefits would gradually increase over the next several years, coming to the maximum level upon the full development of the parcels on Simons Run in 2024. Travel costs were annually increased at an inflation rate of 3% through the design year – and loan payoff year – of 2037. **Table 6** displays a summary of the cost-benefit analysis of the proposed extension of Simons Run to Airport Road.

According to the Campbell County Assessor, any extension of the Simons Run corridor will not have any measurable impact on assessed property values on the undeveloped

parcels along the Simons Run corridor. Consequently, no additional annual property tax revenues are anticipated to be realized by installation of the extension.

Table 6 Simons Run Extension Cost-Benefit Analysis				
Year	60-Foot ROW		68-Foot ROW	
	Annual Costs	Annual Benefits	Annual Costs	Annual Benefits
2016	\$220,035	\$0	\$219,267	\$0
2017	\$220,035	\$38,292	\$219,267	\$38,292
2018	\$220,035	\$78,881	\$219,267	\$78,881
2019	\$220,035	\$121,871	\$219,267	\$121,871
2020	\$220,035	\$167,369	\$219,267	\$167,369
2021	\$220,035	\$215,488	\$219,267	\$215,488
2022	\$220,035	\$266,343	\$219,267	\$266,343
2023	\$220,035	\$320,055	\$219,267	\$320,055
2024	\$220,035	\$376,751	\$219,267	\$376,751
2025	\$220,035	\$388,053	\$219,267	\$388,053
2026	\$220,035	\$399,695	\$219,267	\$399,695
2027	\$220,035	\$411,686	\$219,267	\$411,686
2028	\$220,035	\$424,036	\$219,267	\$424,036
2029	\$220,035	\$436,758	\$219,267	\$436,758
2030	\$220,035	\$449,860	\$219,267	\$449,860
2031	\$220,035	\$463,356	\$219,267	\$463,356
2032	\$220,035	\$477,257	\$219,267	\$477,257
2033	\$220,035	\$491,574	\$219,267	\$491,574
2034	\$220,035	\$506,322	\$219,267	\$506,322
2035	\$220,035	\$521,511	\$219,267	\$521,511
2036	\$220,035	\$537,157	\$219,267	\$537,157
2037	\$220,035	\$553,271	\$219,267	\$553,271
Totals	\$4,840,780	\$7,645,586	\$4,823,869	\$7,645,586
Benefit/ Cost Ratio	1.58		1.58	

VI. FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

Findings & Conclusions

Both alternative typical sections provide a three-lane typical section with a two-way center left turn lane, which will provide for better vehicular service to Simons Run as development along the corridor proceeds. Additionally, both alternatives provide facilities for pedestrians and bicycles as well as for vehicular transportation. The respective costs for both alternatives are nearly identical. **Table 7** displays a summary of the planning level cost estimates for the two typical sections.

Table 7 Summary of Planning Level Cost Estimates Year 2015 Dollars					
Alternative	Description	Existing Alignment Improvements		Simons Run Extension	
		Length (mi.)	Costs	Length (mi.)	Costs
60-Foot ROW	3-Lane Urban Section (41-foot pavement width)	0.76	\$6,266,000	0.32	\$2,638,000
	5-foot Sidewalk	0.92	\$264,000	0.32	\$92,000
	Total	0.92	\$6,530,000	0.32	\$2,730,000
68-Foot ROW	3-Lane Urban Section (38-foot pavement width)	0.76	\$5,808,000	0.32	\$2,445,000
	10-foot Shared-use Path	0.92	\$791,000	0.32	\$275,000
	Total	0.92	\$6,599,000	0.32	\$2,721,000

However, the 68-foot-wide typical section would require the acquisition of land from the land owners because the existing right-of-way is only 60 feet wide. The major difference in the two typical sections is how multi-modal facilities are provided. The 60-foot-wide typical section provides wide outside lanes (14 feet wide) that provide for on-road bike accommodations, and it also provides a 5-foot sidewalk for pedestrians. The 68-foot-wide typical section provides accommodations for bikes and pedestrians in the form of a 10-foot-wide shared-use trail on one side of the road. The recommended posted speed limit on the corridor is to be 35 MPH in both alternatives. **Figure 14** displays the typical section, while **Figures 16, 21, and 22** displays the conceptual plans throughout the study area.

While there is an existing break in the median on Airport Road, according to the *VDOT Road Design Manual* a partial-access intersection adjacent to an interchange requires a minimum of 750 feet of horizontal spacing. The existing break is only 95 feet from the interchange, and therefore installing an access driveway at the existing median crossover would not comply with the intersection spacing standards.

If the alignment of the extension of Simons Run were to be moved so that the intersection with Airport Road could be located as far west as possible, a maximum horizontal separation of only 395 feet from the interchange would result – still not in compliance with the 750 feet of separation provided in the VDOT guidelines.

Consequently, regardless of the location of the extension intersection with Airport Road, an access management exemption will be required from VDOT as part of the access permit application process.

Ultimately both typical section alternatives provide a benefit/cost ratio that exceeds one: both alternatives provide a benefit/cost ratio of 1.58 over the design life (20 years) of the road. The decision in choosing a particular typical-section is primarily differentiated by the right-of-way impacts (no right-of-way acquisition or 8 feet of right-of-way acquisition) and type of bicycle and pedestrian facilities that are desired (on road bike facilities and a sidewalk versus a shared-use path).

Recommendations

- 1. Extend Simons Run to a Partial Intersection with Airport Road:** The benefits of time savings for motorists more than offset construction costs. Moreover, while the assessed property values may not be increased, the likelihood of development is increased with the enhanced access to the corridor from Route 460.

The improvements to Simons Run should be designed to meet current VDOT standards for an urban collector street standard (GS-7) with curb and gutter drainage and a 40 MPH design speed.

- 2. Install the Simons Run Extension as the 60-foot-wide ROW pavement section:** This section will adequately accommodate limited expected number of bicyclists and pedestrians. It will also accommodate and be consistent with future upgrades to the existing pavement section.
- 3. Add Bus Stops:** As detailed in Chapter IV, it is recommended that bus stops be added on Simons Run between Parcels 9A and 9B to serve as a central stopping point on the corridor.

4. Add directional guidance signage as shown in **Figure 17** (page 28) to the northbound Simons Run approach to the intersections with Wards Ferry Road.