FINAL REPORT

SEVEN CORNERS PHASING STUDY

Fairfax County, Virginia

June 2023

Final Report

Seven Corners Phasing Study

Fairfax, Virginia

Prepared For:
Nanditha Paradkar
Fairfax County Department of Transportation
4050 Legato Road, Suite 400
Fairfax, VA 22033-2895
703-877-5600

Prepared By:
Kittelson & Associates, Inc.
100 M Street, SE, Suite 910
Washington, DC 20003
202-450-3710

Project Manager: Jamie Henson
Project Principal: Bastian Schroeder, PhD
Project Task Leads: Burak Cesme, PhD; Sam Parsons, Amelia Martin; Andrew Duerr; Thomas Hillman (Toole Design); and Aysha Cohen (CH Planning)
Project No. 22632.004

June 2023

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF IMAGES

APPENDICES

Section 1
Executive Summary

1 Executive Summary

This report documents the results of the Seven Corners Phasing Study which follows initial transportation studies that were completed with the Seven Corners Visioning and Study in August 2013 and June 2014. The objective of this phasing study is to determine the order of implementation for the previously recommended transportation improvements. A robust, multimodal study was performed to understand the benefits of various potential phasing strategies. An overview of the study and its main findings are provided.

1.1 METHODOLOGY AND DATA

The Seven Corners Phasing Study was initiated near the beginning of the COVID-19 pandemic. The initial plan for the phasing study was to collect turning movement counts at the study intersections and tube counts at a few select locations in September 2020. However, with the early shutdowns in response to the COVID-19 pandemic and the resulting economic slowdown, the Seven Corners project team determined it was unlikely that travel patterns would be back to "normal" in September 2020 for data collection and a new approach to developing vehicle travel volumes was utilized.

The project team used historic turning-movement counts in the study area to build traffic volumes and determined that historic counts, when combined with data sources that use cell phone data to track travel patterns, could reliably estimate current turning-movement counts as the basis of the study. This new approach to develop vehicle travel volumes did not impact the ability to complete a robust multimodal travel analysis. The project team used a multiresolution modeling process with Dynamic Traffic Assignment (DTA) to evaluate travel conditions in the corridor. In addition, pedestrian, bicycle, and transit conditions were also evaluated.

1.1.1 Analysis Methodology

The project team used several tools to evaluate, simulate, or visualize conditions for multiple travel modes. Some tools and methodologies have the capability to reflect multiple travel modes, while others are more targeted at specific modes. A multi-resolution modeling approach with DTA was utilized for the traffic analysis using macroscopic, mesoscopic, and microscopic tools. Vehicle operations were analyzed with a VISSIM model for the central interchange and area intersections. Intersection-level operations were summarized using LOS and maximum queue results. As congestion was expected to be present at study intersections, overall network performance was also analyzed in VISSIM. The team conducted vehicular observations to inform and supplement VISSIM model results. Interchange travel patterns were also visualized using traffic volumes from VISSIM and StreetLight data.

The project team evaluated 2018/2019 typical transit conditions using route timetables, automated passenger count (APC) data, and transit observations. WMATA provided APC data for fall 2019 to ensure data reflected non-pandemic conditions. Bicycle conditions were analyzed using Fairfax County's bicycle Level of Traffic Stress (LTS) methodology. Pedestrian conditions were also evaluated. Pedestrian crossing times were analyzed at signalized study intersections using VISSIM. Observations were also conducted to supplement the technical analyses.

1.2 2018/2019 TYPICAL CONDITIONS FINDINGS

An analysis of typical conditions from 2018/2019 was completed. Since reliable transportation demand data could not be collected in the early part of the Seven Corners Phasing Study due to the COVID-19 related shutdowns and economic slowdown, typical conditions from 2018 / 2019 were identified and evaluated. This analysis evaluated vehicular operations, summarized major vehicle travel patterns at the Seven Corners interchange, documented transit service, assessed the comfort of bicycling facilities, and evaluated pedestrian conditions. The analysis concluded with the following major findings.

1.2.1 Bicycle and Pedestrian Conditions Are Challenging

Bicycle and pedestrian conditions are challenging across the study area. Bicycling and walking to destinations in the study area from neighborhoods is challenging. Most trips require traversing a segment along an arterial or collector street that is LTS 3 or 4. Sidewalks are often narrow and close to high-volume roadways. In addition, the major roadways in the study area serve as barriers, making crossing the street both time consuming and uncomfortable.

1.2.2 Delay Is Experienced Across All Travel Modes

The Seven Corners interchange causes delay for all travel modes. The multimodal analysis results reinforce this finding from previous planning studies, feedback from community members, and input from stakeholders. Average vehicle delay at the interchange is approximately 96 seconds during the AM peak and 142 seconds during the PM peak. Crossing times for pedestrians are also significant, at approximately 4 minutes during peak periods.

1.2.3 High-Volume Travel Movements Conflict with Each Other

There are several high-volume movements that travel through multiple nodes to traverse the Seven Corners interchange. The current interchange consists of multiple intersections. As a result, certain movements must travel through multiple nodes, making operations inefficient. Some of the most difficult movements include:

- Southbound left turn from Route 7 to Route 50.
- Northbound left turn from Route 7 to Route 50 or Hillwood Avenue.
- Westbound through from Wilson Boulevard to Route 50.
- Eastbound through from route 50 to Wilson Boulevard.
- Westbound left form Wilson Boulevard to Route 7.

1.2.4 High Travel Demand to Move South and East on Route 7

There is high travel demand from multiple streets in the Seven Corners interchange to travel south/eastbound on Route 7. The interchange travel patterns show significant demand from Broad Street, Hillwood Avenue, Wilson Boulevard, and Eastbound Route 50 to travel south/eastbound on Route 7.

1.2.5 Travel Demand to and from Route 50 on the West Is High

Travel demand to/from Route 50 on the west side of interchange is also generally higher than to/from the east side of the interchange. When comparing the volume of traffic coming to/from Route 50 on the west side of the interchange, it is notably higher than traffic coming to/from Route 50 on the east side of the interchange.

1.3 OUTREACH

The project team conducted a robust effort to gather feedback from the public and public agencies. Public outreach was conducted in three phases and included surveys for the public to provide feedback. Outreach options for the project were limited due to the nature of the COVID-19 pandemic. The project started near the beginning of the pandemic in 2020 and ended shortly after the emergency phase of the pandemic ended in late 2022. As such, outreach options focused on virtual approaches as well as outdoor pop-up meetings. Outreach events used multilingual staff to engage residents. The project team also met with various public agencies to solicit their feedback and refine the recommendations as appropriate.

1.3.1 Public Engagement

From February 2021 to November 2022, the project team conducted three rounds of public outreach in English, Spanish, and Vietnamese to solicit public input on the findings of the Seven Corners Phasing Study.

Public outreach focused on presenting analysis results to the public and asking for feedback regarding the phasing of the Seven Corners improvements. Initial outreach efforts reminded the public of the focus of the improvements, gave an overview of existing conditions, and asked what the public and stakeholders considered the most important issues to address. The next phases of the outreach focused on presenting analysis results of various phasing approaches.

The major themes across multiple rounds of outreach focused on the lack of safe pedestrian and bicycle facilities, high vehicle travel delays, confusing travel movements, and the potential for cut through traffic.

1.3.2 Responsive To Public and Agency Input

The public and various agencies expressed a variety of concerns regarding the Seven Corners transportation infrastructure improvements. FCDOT made multiple substantive changes to the planned project in response to feedback. These changes included refining the Comprehensive Plan and prioritizing facilities for bicycle and pedestrian improvements.

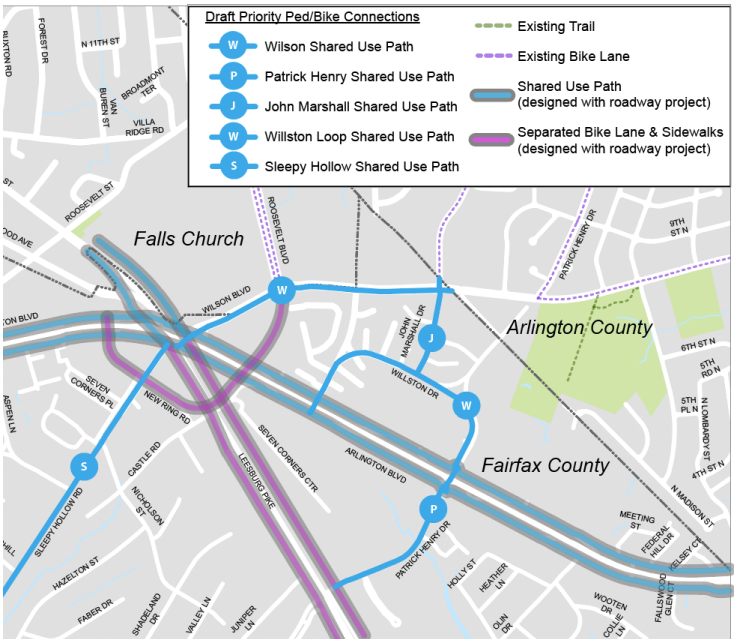
In response to the feedback, FCDOT made two refinements to the Comprehensive Plan transportation network. The first was the refinement of the Ring Road to terminate at Route 50 instead of Broad Street. The second change to the Comprehensive Plan transportation network was the realignment of the Wilson Boulevard connection such that Wilson Boulevard would align with the access roads to and from Route 50 to the west of the Central Interchange.

In addition, several stakeholders and residents expressed concern with the number of vehicle travel lanes in the proposed four-lane the Ring Road and asked that FCDOT evaluate the performance of a two-lane Ring Road. Also, a substantial portion of commenters were concerned about the safety of bicyclists and pedestrians and the lack of facilities for them. In response, FCDOT tested a two-lane configuration of the Ring Road and identified bicycle and pedestrian facility needs that should be prioritized for implementation.

1.4 BICYCLE FACILITY PRIORITIZATION

As part of the effort to implement an updated transportation network in Seven Corners, robust bicycle and pedestrian facilities are planned for new facilities noted in the Comprehensive Plan. These facilities include wide sidewalks along with cycle tracks in some locations and wide shared-use paths in other locations. The Seven Corners Phasing Study, in addition to identifying phasing for major transportation infrastructure improvements, also prioritizes the implementation of specific bicycle and pedestrian projects that complement the multimodal facilities included in the Seven Corners transportation improvements. Implementation of these facilities will create a multimodal network that serves the broader area. These facilities are noted in **Figure 1-1.**

Figure 1-1: Prioritized Bicycle and Pedestrian Facilities



Initially, Sleepy Hollow Road was considered a priority multimodal improvement. However, as the Seven Corners Phasing Study advanced, the planned facilities along Sleepy Hollow Road were funded, and construction began.

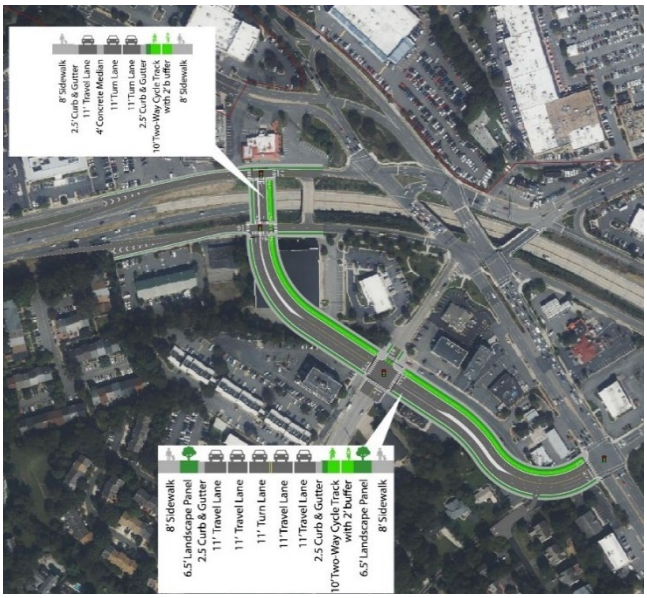
1.5 PHASING RECOMMENDATIONS

The current configuration of Seven Corners concentrates many turning movements into closely spaced intersections at the center of the main interchange of the Route 50 Service Roads, Wilson Boulevard, Broad Street, Route 7, and Sleepy Hollow Road. Therefore, a successful phasing approach needs to remove movements from that central complex in early phases to both improve operations as well as develop infrastructure to help with the maintenance of traffic for future phases of the project. Later phases could then focus on rebuilding the main interchange. Ideally, operations would improve across the system with the implementation of each phase of the project.

1.5.1 Phase 1: The Ring Road (West)

The west segment of the Ring Road is advanced for Phase 1 due to the high volume of traffic between the west leg of Route 50 and the south leg of Route 7. This segment provides a new path to separate these movements from the main interchange, which would reduce demand on the central interchange. In addition, this segment could also help with the maintenance of traffic when the main interchange is rebuilt in a later phase. Some traffic could divert over from Broad Street to this segment of the Ring Road to allow for reconstruction of the main interchange. Additionally, analysis shows the study area transportation network will experience significant improvements with the implementation of Phase 1 compared to 2030 Baseline conditions. Phase 1 is shown in **Figure 1-2**.

Figure 1-2: Phase 1



1.5.2 Phase 2: The Ring Road (South)

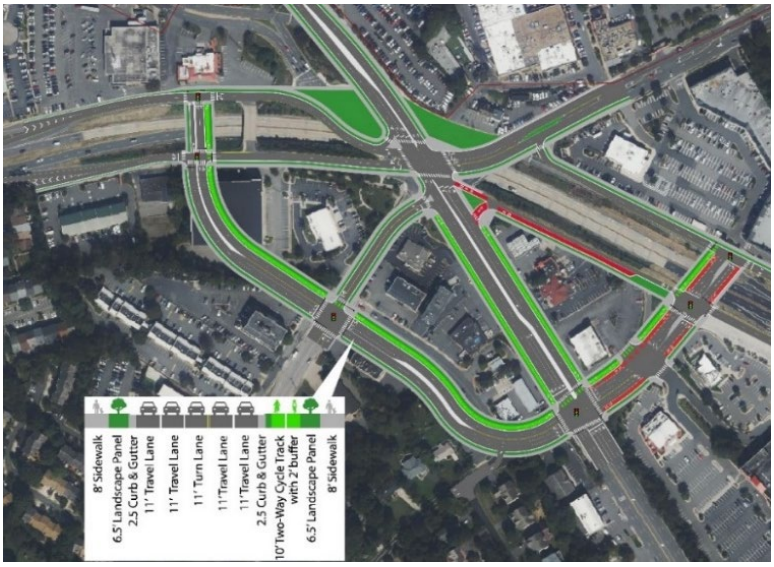
Following Phase 1, two options for Phase 2 were evaluated: the Ring Road (South) and the Central Interchange. These are the two options that are most connected to Phase 1. The Ring Road (South) is an extension of the Ring Road to the south and east from Route 7 to Route 50 on the east. The Central Interchange is the reconfiguration of the location where Route 50 service roads, Route 7, Wilson Boulevard, Broad Street, and Sleepy Hollow Road meet over Route 50, which travels under this intersection. The project team analyzed the performance of both options and compared them to determine which option should be advanced as Phase 2 and which option should be considered for Phase 3 or later.

Figure 1-3: Phase 2

Based on detailed analyses, the Ring Road (South) is expected to operate significantly better than the Central Interchange and is advanced as Phase 2. Average network delay as well as performance of the main interchange for the Ring Road (South) is significantly improved. In addition, the Ring Road (South) will create additional connections that would support future maintenance of traffic plans for the construction of the Central Interchange. Phase 2 is shown in **Figure 1-3**.

1.5.3 Phase 3: Central Interchange

Figure 1-4: Phase 3

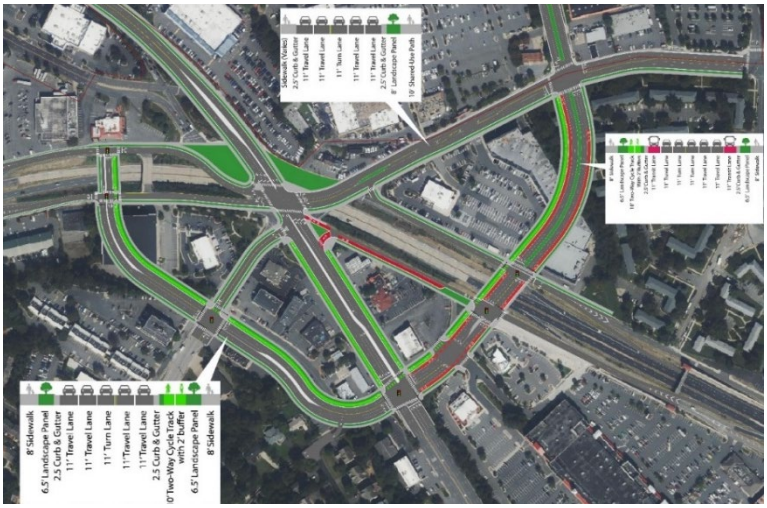


The Central Interchange is added to Phase 2 to create Phase 3, as shown in **Figure 1-4**. Phase 3 includes the Central Interchange as well as the Ring Road from Route 50 on the east to Route 50 on the west. The Central Interchange is advanced ahead of the Ring Road (East), as that segment would require acquiring residential properties and a commercial retail center. As such, the Ring Road (East) will most likely be implemented when those properties are redeveloped.

1.5.4 Phase 4: The Ring Road (East)

The remaining element in the Comprehensive Plan network is the Ring Road (East), which will extend the east end of the Ring Road from Route 50 north to the existing signalized intersection of Wilson Boulevard and Roosevelt Boulevard. **Figure 1-5** shows the Ring Road (East).

Figure 1-5: Phase 4



1.5.5 Phasing Summary

Following a detailed analysis of various phasing approaches to implement improvements in the Seven Corners area, a phasing approach that steadily improves operations and mobility through each

implemented phase is recommended. Vehicle operations are improved with the implementation of each project phase except between Phase 2 and Phase 3, where vehicle operations somewhat degrade in order to implement significant transit mobility improvements in the corridor. Based on the analysis results, improvements to Seven Corners should be built in the following order:

Phase 1: The Ring Road (West)

Phase 2: The Ring Road (South)

Phase 3: Central Interchange

Phase 4: The Ring Road (East)

Section 2
Introduction and Study Overview

2 Introduction and Study Overview

Seven Corners is a thriving commercial hub located at the eastern boundary of Fairfax County, abutting Arlington County and the City of Falls Church. A regional map showing Seven Corners is provided in Figure **2-2**. Land uses in the area are predominantly retail and office surrounded by residential, with some government and institutional uses. Fairfax County concluded a major step in the redevelopment of the Seven Corners area in 2015. The process to identify transportation improvements for Seven Corners, which took place from 2012 to 2015, included a community task force that invited residents, property and business owners, community and civic organizations, and others to participate in an open discussion about the future of Seven Corners. Initial transportation studies were completed in August 2013 and June 2014. The task force finalized its recommendations in March 2015. On July 28, 2015, the Fairfax County Board of Supervisors held a public hearing and adopted a Plan amendment for the Seven Corners Community Business Center (CBC).

As part of the Seven Corners Visioning and Study process, the team developed several conceptual street networks and evaluated them to determine their ability to better serve the area. Ultimately, an alternative that included multiple new street connections that better distribute traffic and provide opportunities for multimodal access was selected. The resulting conceptual street network that was recommended by the 2015 study is shown in **Figure 2-3**.

The 2015 study determined what infrastructure should be implemented. As a follow-up to that study, Fairfax County Department of Transportation (FCDOT) conducted a phasing study to determine the order in which the previously identified improvements should be implemented. The purpose for this phasing study is depicted in **Figure 2-1**.

Figure 2-1: Seven Corners Phasing Study Purpose

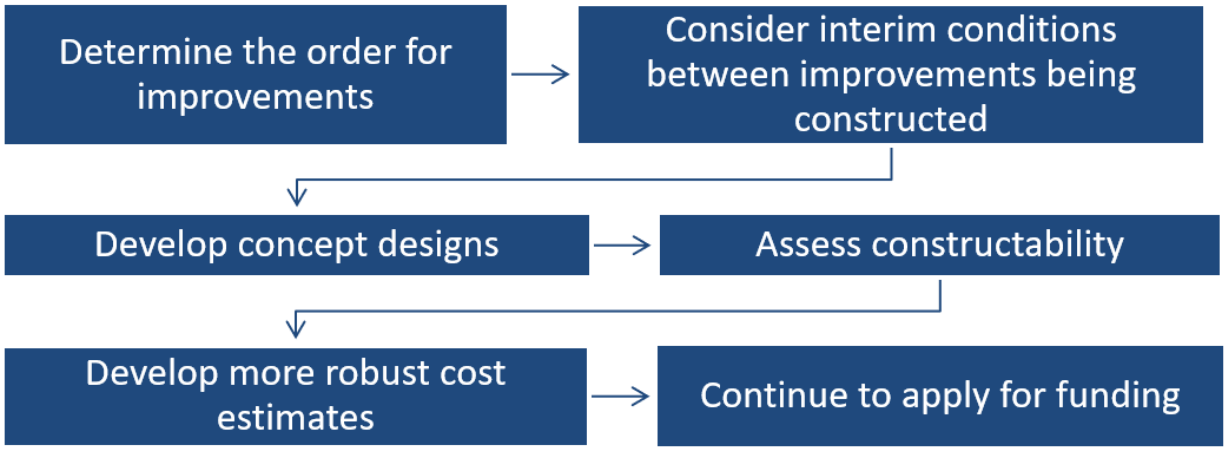


Figure 2-2: Seven Corners Regional Map

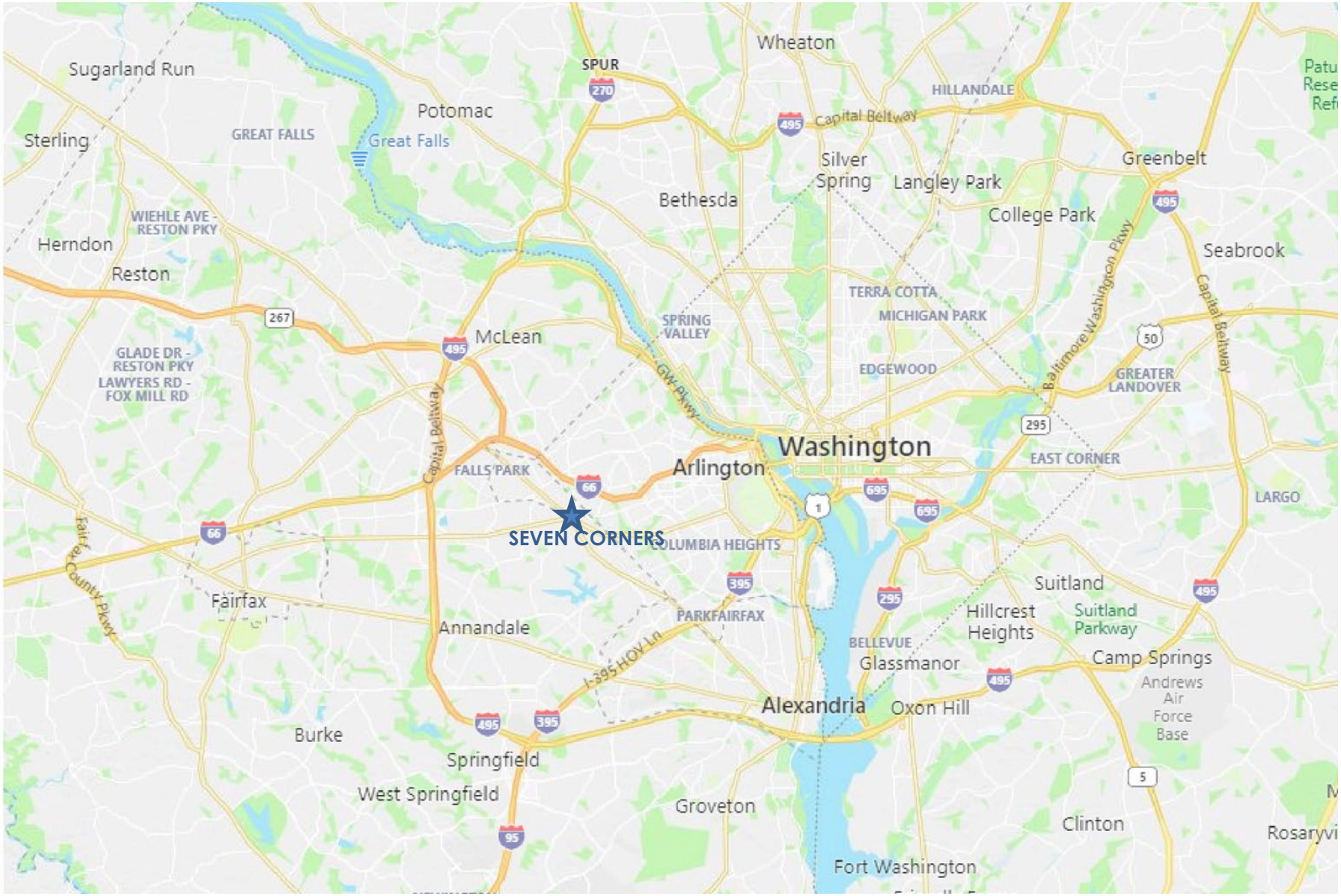
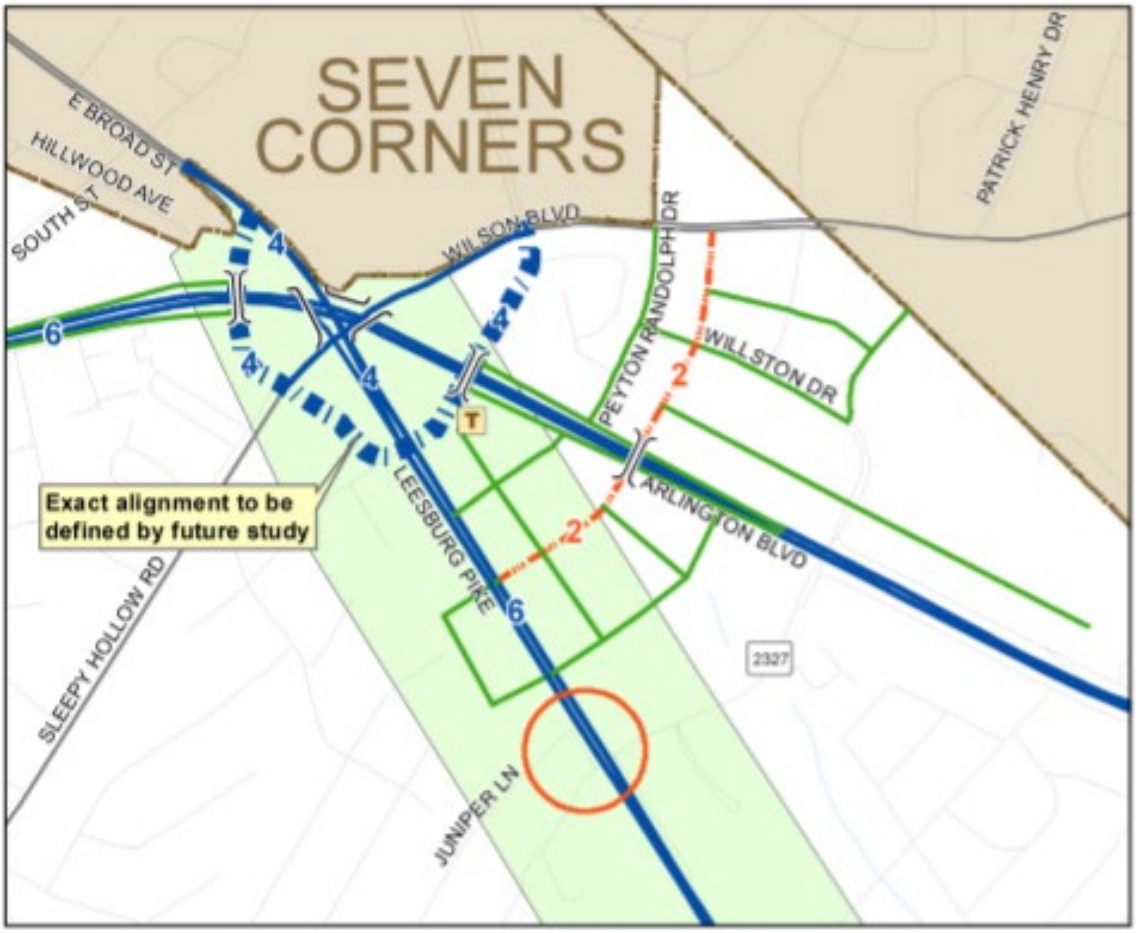


Figure 2-3: Seven Corners Conceptual Street Network as noted in the Fairfax County Comprehensive Plan



NOTE: The Seven Corners Conceptual Street network is subject to change pending results from more detailed analyses as well as development proposals.

2.1 STUDY OVERVIEW

The transportation study extends beyond the Seven Corners CBC and into the City of Falls Church and Arlington County. The general study area and intersections selected for detailed operational analysis are shown in **Figure 2-4**. The study area is roughly bounded by Cherry Street to the west, Broad Street/Roosevelt Street/Wilson Boulevard/Arlington Boulevard to the north, Patrick Henry Drive to the east, and the Sleepy Hollow and Ravenwood Park neighborhoods to the south.

The transportation study area is multi-jurisdictional and includes intersections that are within the City of Falls Church and near the border with Arlington County. Additionally, Arlington County operates some traffic signals that are within Fairfax County to optimize network coordination.

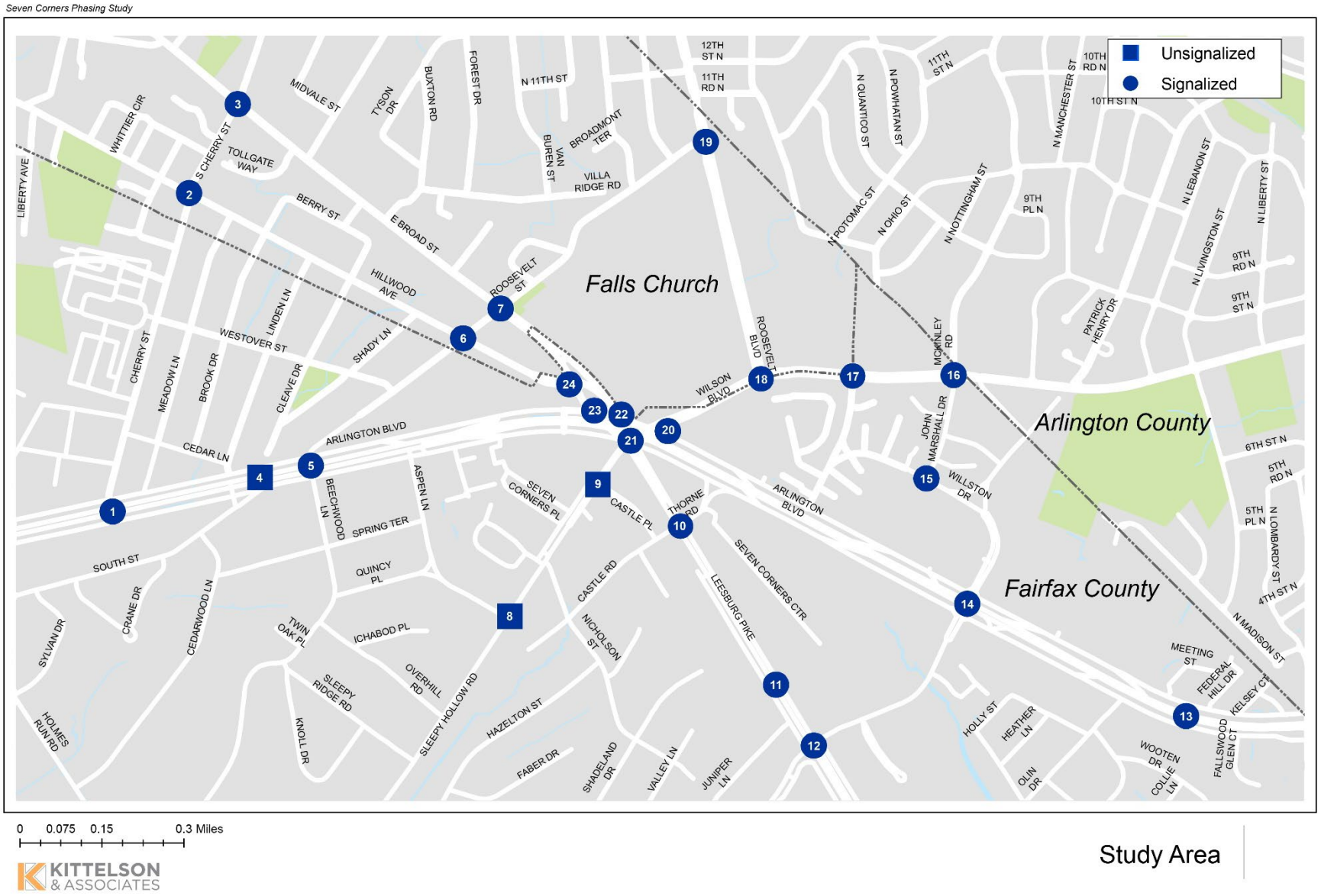
This phasing study will determine the order for transportation improvements that were previously recommended by the Seven Corners Visioning Task Force. These recommendations are depicted in **Figure 2-3**, as included in the Comprehensive Plan, and include the following components:

- Constructing a new arterial Ring Road.
- Transitioning the Seven Corners interchange into a four-way intersection.
- Widening Route 50 to six travel lanes.
- Shifting ramps to and from Route 50 to a new location.
- Constructing a new collector road from Willston/Village Center to Route 7.
- Constructing additional connecting streets.
- Implementing bicycle and pedestrian facilities.

The project team evaluated transportation conditions during the weekday AM and PM peak hours. Three years were selected for evaluation: 2018/2019 typical conditions, interim future conditions (2030), and build-out future conditions (2045). The interim and build-out future conditions included a phasing analysis to determine which transportation improvements are most critical to meet transportation goals for the area. The phasing analyses for future conditions included different scenarios for the order of constructing improvements and considered pedestrian and bicycle connectivity needs.

The phasing study also included further development of conceptual plans to evaluate the constructability of the various components. This provides County staff with information to develop more robust cost estimates. In turn, this information better prepares the County to apply for project funding.

Figure 2-4: Seven Corners Study Area and Intersections



The project team conducted stakeholder and public engagement activities throughout the phasing study. Activities aimed to gather feedback to inform the tested phasing scenarios and recommendations as well as provide updates to stakeholders and the public.

2.2 GOALS, OBJECTIVES, AND MEASURES OF EFFECTIVENESS

The primary goal of this phasing study was to identify an appropriate implementation timeline for transportation infrastructure improvements identified in the previous study. Goals and objectives for the study are consistent with this approach. **Table 2-1** shows the recommended objectives along with the selected measures of effectiveness (MOEs). In general, all MOEs are evaluated for each analysis scenario. The table also includes the associated tools/software the team used to obtain the selected measures. The objectives and their importance in the phasing analysis include:

- **Promote efficient traffic operations:** With growth expected in the area, the ability to efficiently move vehicular traffic is important and will be a major driver in selecting a phasing approach.
- **Enhance pedestrian connectivity:** Pedestrian facilities are vital to supporting multimodal travel. Appropriately sized and connected pedestrian facilities are necessary to support the vision for the area.
- **Improve bicycling connections:** Bicycle facilities are also vital to supporting multimodal travel. Bicycle networks with the appropriate types of facilities are necessary to support the vision for the area.
- **Provide efficient service for Route 7 BRT:** The Route 7 Bus Rapid Transit (BRT) project will connect Seven Corners to other regional destinations, such as the Mark Center in Alexandria and Tysons. Ensuring relatively quick transit travel times and highly reliable service is important for the surrounding community and for regional travel.
- **Design streets that promote a sense of place:** Fairfax County aims to create stronger communities in their CBCs. Central to that effort is the use of transportation rights-of-way to create public spaces that support community needs.
- **Minimize construction cost and disruption:** Concepts that minimize cost and disruption will benefit residents and businesses. Community members and the Fairfax County Board of Supervisors specifically identified the importance of cost.

These objectives may be assessed by a variety of MOEs. Most measures are quantitative. However, some of these measures were more qualitative. Qualitative measures are noted.

Table 2-1: Multimodal Goals, Objectives, and MOEs

Objectives	Measures of Effectiveness	Software/Tools
Promote efficient traffic operations.	Level of service (LOS) and delay by intersection, approach, and lane group	VISSIM
	Average and maximum queue length by movement	
	Network delay	
	Network throughput	
	Unmet (latent) demand	
Enhance pedestrian connectivity.	Pedestrian crossing times at select intersections	VISSIM
	Filling sidewalk and trail gaps	Community Feedback
Improve comfort and connectivity of bicycle routes.	Bicycle Level of Traffic Stress (LTS)	GIS
Provide efficient service for Route 7 BRT.	Efficient alignment of Route 7 BRT	Qualitative
Design streets that promote a sense of place.	Pedestrian and bicycle accommodation with street trees	Qualitative Review
Minimize construction cost and disruption.	Minimizing the number of travel lanes needed on the Ring Road	VISSIM
	Right-of-way requirements	Qualitative Review
	Maintenance of Traffic Considerations	Qualitative Review

Section 3
Data Collection, Volume Development, and Analysis Methodology

3 Data Collection, Volume Development, and Analysis Methodology

The initial data collection plan for the phasing study was to collect turning-movement counts at the study intersections and tube counts at a few select locations in September 2020. Following the COVID-19 shutdown and the resulting economic slowdown, the Seven Corners project team considered how and if travel demand would recover. In Summer 2020, there continued to be uncertainty surrounding school and work attendance in the fall. Based on these events, including Fairfax County School Board's vote to begin the 2020-2021 school year virtually, the Seven Corners project team determined it was unlikely that travel patterns would be back to "normal" in September for data collection.

To establish a current-year benchmark for future comparisons, the project team first considered what conditions to analyze as a result of the COVID-19 pandemic's effect on travel demand and patterns. The team reviewed INRIX[1] probe data to compare year-to-year vehicle speeds for certain roadway segments in the study area. In a comparison of June 2020 and June 2019 data using StreetLight[2], the project team found a 30-40% reduction in vehicle travel demand in the study area. Reduction in Washington Area Metropolitan Transit Authority (WMATA) bus route frequencies also suggested that demand for transit had decreased. The project team determined these reductions were significant and would not be an appropriate benchmark, as travel demand was artificially constrained by the pandemic. Therefore, the project team decided to use 2018/2019 vehicular, transit, bicycle, and pedestrian data for this analysis of typical conditions.

3.1 APPROACH TO DEVELOPING TRAVEL VOLUMES

Considering the likelihood that that the COVID-19 pandemic response would persist, the project team considered a new approach to develop travel volumes understanding that Fall 2020 travel volumes were considerably lower than pre-pandemic travel volumes. The project team used historic turning-movement counts in the study area to build traffic volumes and determined that historic counts, when combined with data sources that use cell phone data to track travel patterns, could reliably estimate current turning-movement counts as the basis of the study. **Appendix A** fully describes the process to develop travel volumes.

3.2 AVAILABLE TRAFFIC DATA

The project team reached out to traffic engineering staff at the Virginia Department of Transportation (VDOT), Arlington County, and the City of Falls Church to obtain any recent peak hour turning-movement counts that had been conducted in the study area. VDOT provided weekday AM, weekday PM, and Saturday data at 12 intersections.[3] Arlington County provided data for two additional study intersections. Counts from Arlington County and VDOT had been conducted in May 2018 and September 2019, respectively, which provided the project team with recent data. The City of Falls Church did not have any traffic counts available for the study area. The project team also reviewed available StreetLight traffic data for Friday and Saturday midday conditions when determining evaluation time periods. Friday and Saturday

[1] INRIX is a private transportation analytics company that can provide information on vehicle travel speeds.
[2] StreetLight is a company that collects, aggregates, and analyzes GPS data to evaluate trip patterns.

[3] Two of the intersections VDOT provided data for included only weekday AM counts. StreetLight PM data was used to supplement information for these two locations.

midday traffic levels do not generally exceed weekday PM traffic. Therefore, weekday AM and PM peak hours were selected for more detailed analysis.

The project team also revisited 2013 data from the previous Seven Corners Transportation Study. Between the May 2018/September 2019 and 2013 counts, peak hour turning-movement counts were available at all signalized intersections in the study area. A Count Location Summary is included as **Figure 3-1** and shows the study intersections with their respective data collection dates.

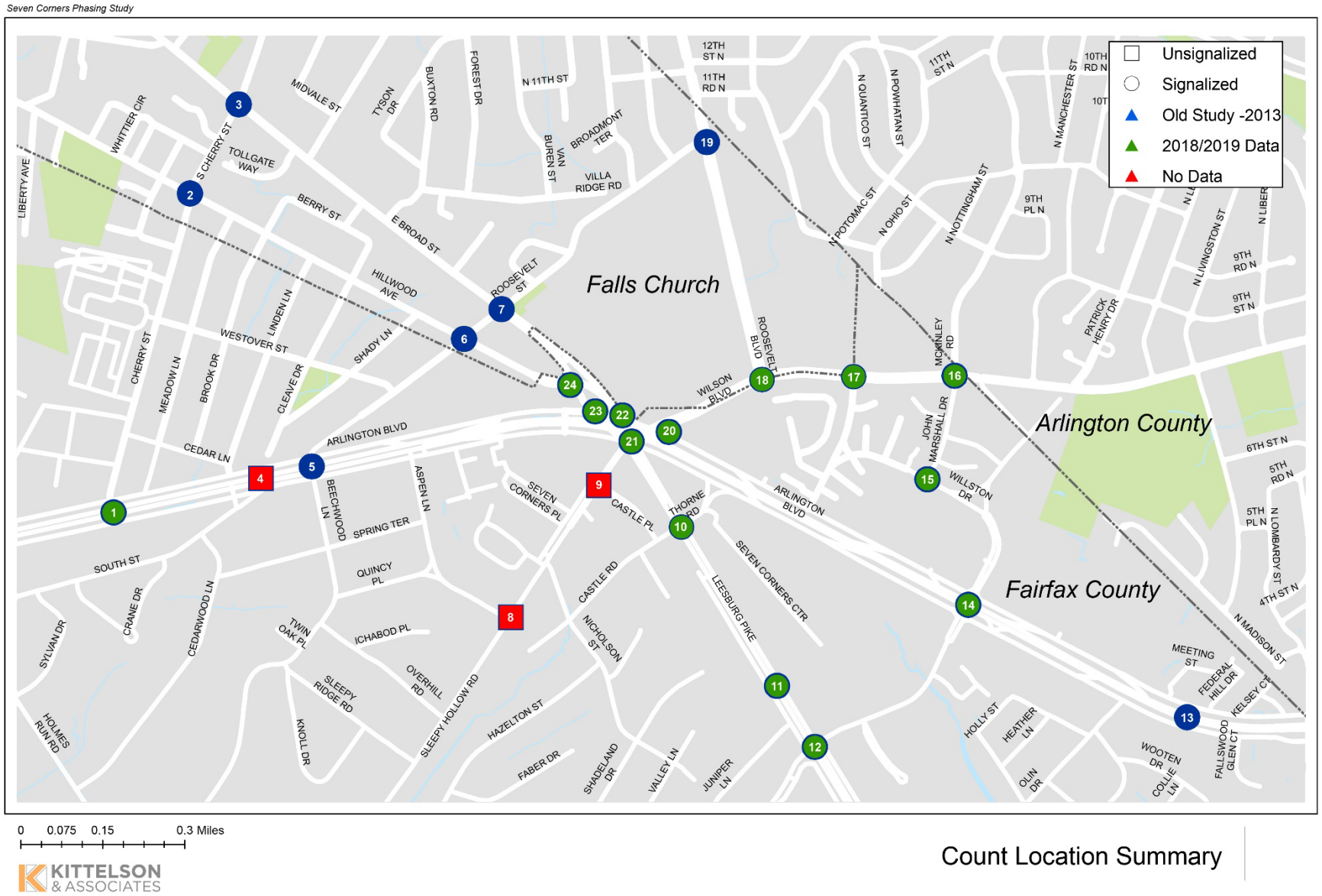
For intersections with 2018/2019 counts, the project team compared intersection volumes with the 2013 counts to understand growth patterns in the study area. The volume changes from 2013 to 2018/2019 are summarized in **Table 3-1**. Broadly speaking, the counts were relatively consistent between 2013 and 2018/2019 and align with expectations. As shown in **Figure 3-2,** most growth during the weekday AM peak hour appears to happen in the westbound direction, which is the off-peak direction. This is to be expected, given capacity is typically constrained in the peak direction.

The team also compared StreetLight data from 2019 with 2013 data. Note that these changes are presented, both in terms of number of vehicles and as a percentage. Overall, the data shows that volumes typically grew from 2013 to 2018/2019 within the study area.

Table 3-1: Intersection Volume Comparison (2013 to 2018/2019)

Int. Number	Intersection Name	Total Intersection - AM Peak Hour		Total Intersection - PMk Hour	
		Difference	% Change	Difference	% Change
1	S Cherry Street/Arlington Boulevard (US 50)	450	9%	493	11%
10	Castle Road &Thorne Road/Leesburg Pike (VA 7)	408	12%	816	23%
11	Seven Corners Center/Leesburg Pike (VA 7)	815	29%	1130	36%
12	Patrick Henry Drive/Leesburg Pike (VA 7)	892	28%	840	23%
14	Patrick Henry Drive/Arlington Boulevard (US 50)	-215	-3%	-766	-12%
15	John Marshall Drive/Patrick Henry Drive & Willston Drive	633	95%	252	20%
16	John Marshall Drive & N McKinley Road/Wilson Boulevard	124	8%	-54	-3%
17	Peyton Randolph Drive/Wilson Boulevard	650	44%	724	44%
18	Roosevelt Boulevard/Wilson Boulevard	439	18%	364	15%

Figure 3-1: Count Location Summary



Broadly speaking, the counts were relatively consistent between 2013 and 2018/2019 and align with expectations. As shown in **Figure 3-2**, most growth during the weekday AM peak hour appears to happen in the westbound direction, which is the off-peak direction. This is to be expected, given capacity is typically constrained in the peak direction.

Overall, the turning-movement counts received provided adequate support for an approach to develop turning-movement volumes for the study area.

Figure 3-2: Weekday AM Westbound Growth

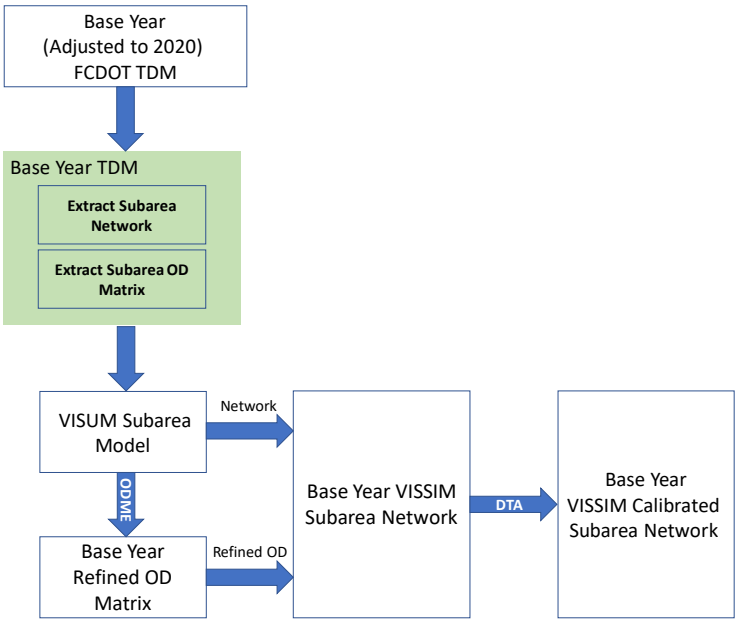
3.3 ANALYSIS METHODOLOGY

To complete the analysis, the project team used several tools to evaluate, simulate, or visualize conditions for multiple travel modes. Some tools and methodologies have the capability to reflect multiple travel modes, while others are more targeted at specific modes. An overview of the various tools and methodologies is presented in the sections below. A full description of the analysis methodology can be found in **Appendix B**.

3.3.1 Multi-Resolution Modeling and Dynamic Traffic Assignment (DTA)

The project team used a multi-resolution modeling approach with Dynamic Traffic Assignment (DTA) for the traffic analysis using macroscopic, mesoscopic, and microscopic tools. Key components of the multi-resolution modeling approach are described below and illustrated in **Figure 3-3**.

Figure 3-3: Multi-Resolution Modeling Approach Used for the Traffic Analysis



- **Macroscopic model:** The project team used the Fairfax County Travel Demand Model to develop the initial, static origin-destination (O-D) demand table for the 2018/2019 typical conditions. Since the base year for the Fairfax County Travel Demand Model is 2015, to obtain the static O-D table for the 2018/2019 typical conditions from the travel demand model, FCDOT provided the 2019 County Model trip tables, which were used for subarea extraction and development of the O-D demand table. The static O-D table along with the initial roadway network from the travel demand model (CUBE software) was imported into the VISUM model (mesoscopic) to refine the O-D table.
- **Mesoscopic model:** Once the static O-D demand table and the roadway network were imported from the Fairfax County Travel Demand Model, the roadway network in VISUM was revised to reflect roadway conditions more accurately (e.g., links, turn bays, etc.). In addition, the project team coded signals in VISUM to represent their impact on link capacities. Once the roadway network was adjusted, the Origin-Destination Matrix Estimation (ODME) was applied, and the project team used vehicle routing information from VISUM DTA for a detailed operations assessment of the study area. The ODME was calibrated to intersection turning-movements in VISUM to provide a more refined and dynamic O-D demand table that was calibrated to the 2018/2019 typical travel conditions.
- **Microscopic model:** The last step was to import the roadway network and refined O-D demand table into the VISSIM microsimulation software. During this step, the project team made final network adjustments (e.g., signal timing, car following model, reduced speed area, etc.) and used VISSIM's DTA to assign the traffic demand to the roadway network. The VISSIM model was calibrated based on VDOT's standards.

Once the VISSIM model was calibrated, the project team used it to evaluate vehicular operations, transit conditions, and pedestrian conditions. Evaluation methodologies for the various modes are described below.

3.3.2 Vehicular Analysis Methodology

The project team analyzed vehicular operations at the interchange and 19 additional intersections using VISSIM. Intersection-level operations were summarized using LOS and maximum queue results. As congestion was expected to be present at study intersections, overall network performance was also analyzed in VISSIM. The team conducted vehicular observations to inform and supplement VISSIM model

results. Interchange travel patterns were also visualized using traffic volumes from VISSIM and StreetLight data.

3.3.2.1 LEVEL OF SERVICE (LOS)

Level of service is typically used to quantify vehicular conditions during specific analysis periods. LOS is defined in terms of the average total vehicle delay of all movements through the intersection. The assigned LOS value reflects the average delay experienced per vehicle at the intersection during the analysis period (typically a one-hour AM and one-hour PM peak). LOS A can be considered free-flow or near free-flow (less than 10 seconds of average delay per vehicle), and LOS F indicates highly congested conditions, with more than 80 seconds of average delay at a signalized intersection.

It should be noted that LOS for unsignalized intersections is determined based on the critical movement that experiences the highest delay, consistent with the *Highway Capacity Manual* LOS methodology for unsignalized intersections. A summary of LOS and corresponding delay for signalized and unsignalized intersections is provided in **Table 3-2**.

Table 3-2: LOS Delay Summary (Signalized and Unsignalized Intersections)

Level of Service	Signalized Intersection Average Control Delay per Vehicle (sec)	Unsignalized Intersection Average Control Delay per Vehicle (sec)
A	<10.0	<10.0
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

3.3.2.2 MAXIMUM QUEUES

Maximum queues are also typically used to quantify vehicular conditions during specific analysis periods. Maximum queues represent how far back a line of vehicles extends from the intersection stop bar. The project team identified maximum queues, particularly at the Seven Corners interchange, as an important measure.

3.3.2.3 NETWORK PERFORMANCE

In addition to analyzing individual intersection operations, VISSIM can also evaluate overall network performance. Network performance measures are especially critical when intersections experience oversaturated conditions. The project team selected three network performance measures for analysis:

- **Average delay:** This reflects the typical delay for the vehicles that travel in the network, and therefore, generally includes delay from multiple intersections.
- **Vehicle arrivals:** This reflects the total number of vehicles that can be processed by the transportation network, making it a helpful measure for congested areas like Seven Corners.
- **Latent demand:** This represents the total number of vehicles that are unable to enter the study network because the transportation network is too congested.

3.3.2.4 INTERCHANGE TRAVEL PATTERNS

The project team also reviewed StreetLight data with the VISSIM results to summarize higher-volume movements at the Seven Corners interchange. While VISSIM volume throughputs provide some movement volume information, vehicles must pass through multiple small intersections (nodes) within the Seven Corners interchange. This makes it difficult to track the origins and final destinations for some movements. Therefore, the team used O-D data from StreetLight to supplement VISSIM volumes where appropriate.

3.3.3 Transit Analysis Methodology

The project team evaluated 2018/2019 typical transit conditions using route timetables, automated passenger count (APC) data, and transit observations. WMATA provided APC data for fall 2019 to ensure data reflected non-pandemic conditions.

The Northern Virginia Transportation Commission (NVTC) is pursuing the Envision Route 7 BRT project to connect the Mark Center in Alexandria to Tysons through the Seven Corners area. Given the potential for BRT in the area, the project team determined it was appropriate to benchmark travel times for Route 7 using results from the future year VISSIM models.

3.3.4 Bicycle Analysis Methodology

The project team analyzed bicycle conditions using Fairfax County's bicycle Level of Traffic Stress (LTS) methodology. In addition to using traditional data inputs to do the analysis, the project team coordinated with FCDOT staff to collect qualitative observations of the roadways in the study area. In instances where the LTS analysis potentially overestimated bicycling comfort, the project team manually adjusted the LTS to also reflect bicycle observations.

3.3.4.1 LEVEL OF TRAFFIC STRESS (LTS)

Level of Traffic Stress (LTS) is a methodology developed by the Mineta Transportation Institute[4] to evaluate the stress that bicyclists experience on roadway segments, intersection approaches, and unsignalized crossings. Using this approach, a street network can be classified into four stress levels, ranging from low stress (LTS 1) to high stress (LTS 4). To determine LTS, information regarding number of vehicle travel lanes, vehicle speeds, traffic volumes, presence and design of bicycle facilities, and presence of on-street parking are typically used.

The project team also noted that an LTS analysis can be informative as a proxy for pedestrian comfort. Many of the roadway and facility characteristics that make a street more or less comfortable for bicyclists also apply to pedestrians. A more comfortable pedestrian environment is typically characterized by lower-speed, lower-volume adjacent traffic and/or buffers between vehicle traffic and pedestrians. LTS accounts for some of these factors in its methodology.

FCDOT has adjusted the described LTS methodology slightly and applied it to their roadway facilities. LTS was created for contexts that are typically highly urbanized and may not be directly applicable outside the context of its intended use. The LTS methodology that FCDOT uses is described in **Image 3-1** and identifies four stress levels based on key facility and traffic factors:

- **Use Caution:** High stress; only suitable for experienced bicyclists.
- **Less Comfortable:** Moderate traffic stress for all bicyclists.
- **Somewhat Comfortable:** Low traffic stress; suitable for most adults.
- **Most Comfortable:** Requires little attention to surroundings; suitable for most children.

[4] Maaza C. Mekuria, Peter G. Furth, and Hilary Nixon. *Low-Stress Bicycling and Network Connectivity.* Mineta Transportation Institute. 2012. Accessed October 24, 2018. https://transweb.sjsu.edu/research/low-stress-bicycling-and-network-connectivity

Bicycle data was developed from a database of roadway conditions and off-street paths maintained by Fairfax County. The roadway data identifies where specific bicycle facilities exist as well as general road characteristics. The specific variables used to sort road segments into different stress levels include the number of lanes, AADT, roadway speed limit, existence of specific bike facilities, and the location of on-street parking. In addition, a database of traffic signals was used to sort crossings into higher and lower stress baskets.

Image 3-1: Bicycle Level of Traffic Stress

3.3.5 Pedestrian Analysis Methodology

The project team also analyzed pedestrian conditions more specifically. Pedestrian crossing times were analyzed at signalized study intersections using VISSIM. Observations were also conducted to supplement the technical analyses.

Section 4
Typical Conditions Analysis
2018/2019

4 Typical Conditions Analysis 2018/2019

As previously noted, the COVID-19 pandemic's effect on travel demand and patterns led the project team to use 2018/2019 vehicular, transit, bicycle, and pedestrian data to analyze typical conditions.

4.1 TRANSPORTATION CONDITIONS

The following section provides an overview of the typical conditions analysis for 2018/2019. This analysis evaluated vehicular operations, summarized major vehicle travel patterns at the Seven Corners interchange, documented transit service, assessed the comfort of bicycling facilities, and evaluated pedestrian conditions.

4.1.1 Vehicular Operations

Seven Corners is made up of a complex arrangement of arterials and local streets, including Arlington Boulevard (Route 50), Leesburg Pike/E Broad Street (Route 7), Wilson Boulevard, Hillwood Avenue, and Sleepy Hollow Road. These roadways meet at the Seven Corners interchange.

The project team analyzed vehicular operations at the interchange and 19 additional intersections using VISSIM. Intersection-level operations were summarized using LOS and maximum queue results. As congestion was observed at many study intersections, the team also analyzed overall network performance in VISSIM. The team concluded by conducting field observations to inform and supplement VISSIM model results.

4.1.1.1 VISSIM INTERSECTION LEVEL OF SERVICE AND QUEUE

Overall, intersection LOS for the 20 study intersections and interchange maximum queues is summarized in **Figure 4-1** and **Figure 4-2** for the weekday AM peak hour and weekday PM peak hour, respectively. Detailed operational results, including maximum queues, turning-movement volumes, and delay by movement and approach are included in **Appendix E**.

As shown in **Figure 4-1** and **Figure 4-2**, there are signalized and unsignalized intersections within the study area that operate at or below LOS D. For reference, LOS E typically occurs at intersections that operate close to capacity, and LOS F typically occurs at intersections that operate over capacity. Intersections that operate at or below LOS E are discussed below.

- **Seven Corners interchange:** This cluster of intersections operates at LOS F during both the AM and PM peak hours. As expected, this interchange experiences the greatest operational issues in the study area. The overall delay for the cluster of intersections is approximately 96 seconds during the AM peak and 142 seconds during the PM peak. Several individual movements at the intersection operate with high delays and queues. Interchange queues also spill back to adjacent intersections. This is particularly true along Route 7. Maximum queues are most notable for north/westbound traffic on Route 7 during both peak hours.

  The reason for generally high delays can be partially explained by the interchange design. Multiple major roads intersect at the interchange, and the current configuration does not provide direct connections for major movements. Therefore, vehicles traveling through the interchange must make complex movements, resulting in inefficient operations.
- **Patrick Henry Drive/Route 7:** This intersection operates at LOS F during both the AM and PM peak hours. During both peak hours, delay primarily occurs for north/westbound traffic on Route 7. Notable delays also occur for northbound traffic on Patrick Henry Drive during the AM peak hour, particularly if traffic is turning left. During the PM peak hour, south/eastbound traffic on Route 7 and northbound traffic on Patrick Henry Drive also experience higher delays. High delays are typically attributed to the high volumes on Route 7 along with the separate signal phase that serves the Leesburg Pike Service Road.
- **Patrick Henry Drive/Route 50:** This intersection operates at LOS F during the PM peak hour and LOS E during the AM peak hour. During the PM peak hour, delay primarily occurs for eastbound traffic on Route 50, although all approaches operate at LOS E or worse.
- **Castle Road & Thorne Road/Route 7:** This intersection operates at LOS E during the AM peak hour. This is due to the congestion that originates from the interchange, causing long queues on Route 7 and high delays. During the peak hour, delay primarily occurs for north/westbound traffic on Route 7. Notable delays also occur for southbound traffic on Thorne Road, particularly if traffic is turning left.
- **Seven Corners Center/Route 7:** This intersection operates at LOS E during the PM peak hour.
- **Roosevelt Boulevard/Wilson Boulevard:** This intersection operates at LOS E during the PM peak hour. This is due to congestion that originates from the interchange, causing long queues on Wilson Boulevard and high delays.
- **South Street/Route 50:** This unsignalized intersection operates at LOS F during both the AM and PM peak hours. It is important to note that this intersection is unsignalized, as the LOS is based on the critical movement that experiences the highest delay. In this case, stop-controlled traffic heading northbound on South Street experiences this delay due to the limited gaps that prevent side street traffic from entering the intersection. However, through traffic on Route 50, which represents most of the traffic traveling through the intersection, experiences little to no delay.

Figure 4-1: 2018/2019 AM Peak Hour Level of Service and Interchange Queues

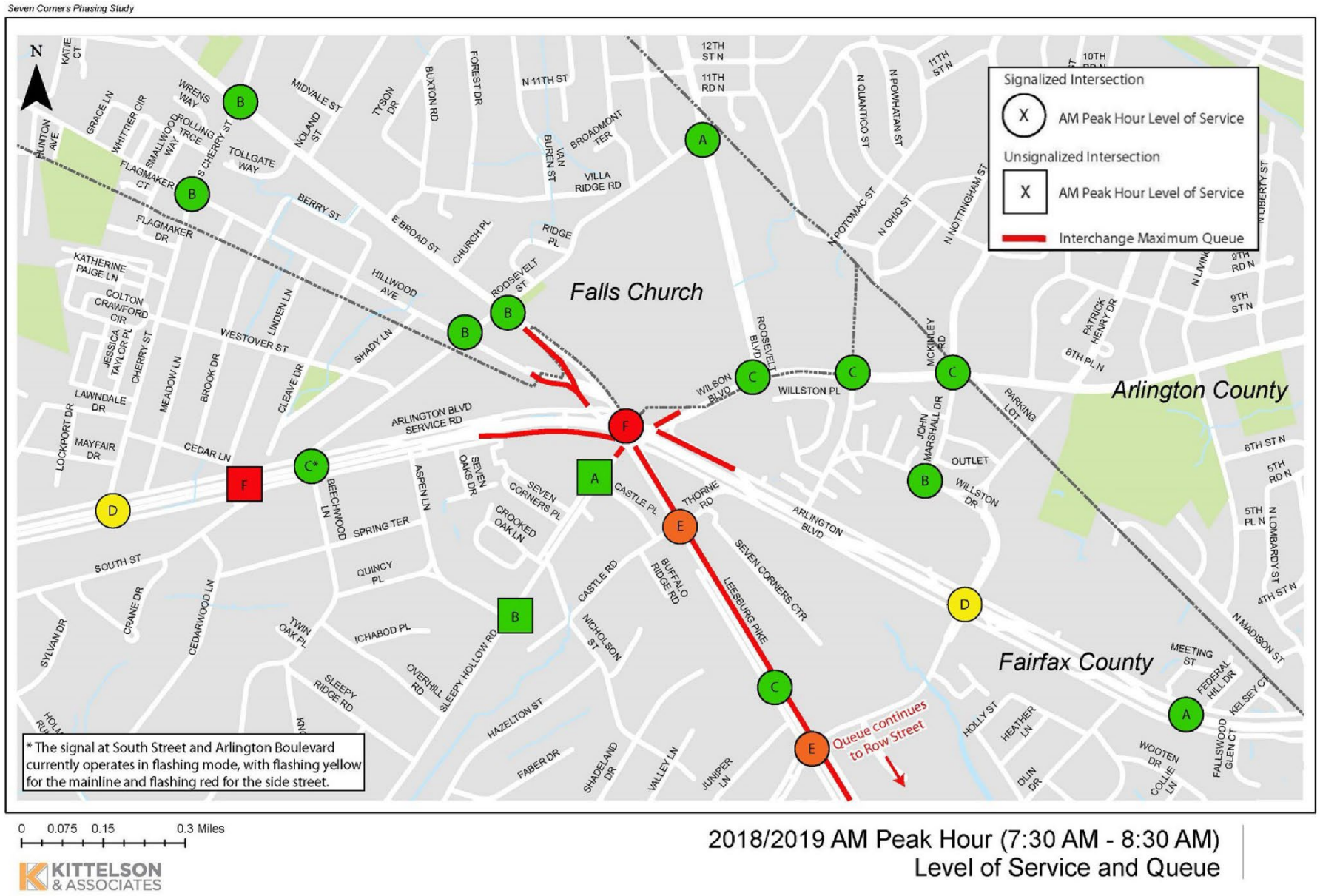
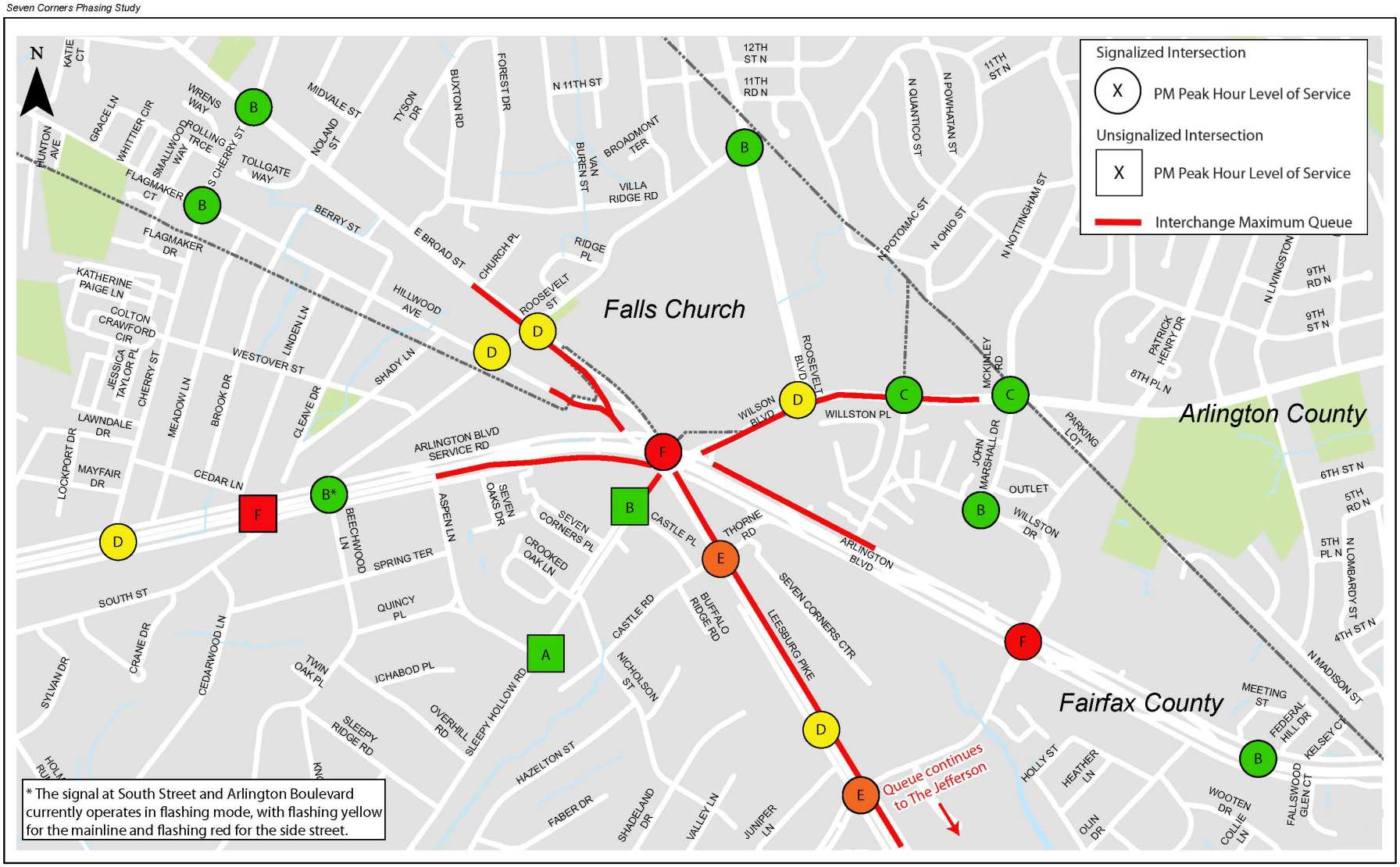


Figure 4-2 2018/2019 PM Peak Hour Level of Service and Interchange Queues



Overall intersection LOS and delays for the AM and PM peak hours are also summarized in **Table 4-1** for reference.

Table 4-1: VISSIM Intersection LOS and Delay Summary

Intersection	Traffic Control	Weekday AM		Weekday PM	
		LOS	Delay	LOS	Delay
1: S Cherry St/Route 50	Signalized	D	45.4	D	48.9
2: S Cherry St/ Hillwood Ave	Signalized	B	16.3	B	14.6
3: S Cherry St/Route 7	Signalized	B	12.8	B	13.8
4: South St/Route 50	Unsignalized	F	104.4	F	163.6
5: South St/Route 50 (north)	Signalized (flash)	C	23.3	B	12.2
6: South St & Roosevelt St/Hillwood Ave	Signalized	C	21.0	C	33.3
7: Roosevelt St/Route 7	Signalized	B	16.6	D	49.1
8: Sleepy Hollow Rd/Aspen Ln	Unsignalized	B	14.0	A	3.0
9: Sleepy Hollow Rd/Castle Pl	Unsignalized	A	6.6	B	11.5
10: Castle Rd & Thorne Rd/Route 7	Signalized	E	58.2	D	54.7
11:Seven Corners Center/Route 7	Signalized	B	18.8	E	59.6
12: Patrick Henry Dr/Route 7	Signalized	F	84.2	F	81.8
13: Route 50 Service Rd/Route 50	Signalized	A	6.1	C	29.2
14: Patrick Henry Dr/Route 50	Signalized	E	55.4	F	108.7
15: John Marshall Dr/Patrick Henry Dr & Willston Dr	Signalized	B	14.7	C	26.1
16: John Marshall Dr & McKinley Rd/Wilson Blvd	Signalized	C	25.3	D	38.3
17: Peyton Randolph Dr/Wilson Blvd	Signalized	C	20.6	C	30.4
18: Roosevelt Blvd/Wilson Blvd	Signalized	C	24.4	E	55.4
19: Roosevelt Blvd/Roosevelt St	Signalized	A	9.0	C	23.6
21b: Seven Corners Interchange	Signalized	F	95.7	F	142.4

4.1.1.2 NETWORK PERFORMANCE

In addition to analyzing individual intersection operations, VISSIM can also evaluate overall network performance. Three network performance measures are shown in **Table 4-2**: *average delay*, *vehicle arrival,*

and *latent demand*. Average delay reflects the typical delay for the entire network. Vehicle arrival reflects the number of vehicles that can be processed by the transportation network, making it a helpful measure for congested areas like Seven Corners. Lastly, latent demand represents the number of vehicles that are unable to enter the study area because the transportation network is too congested.

Results show that the network is more congested during the PM peak hour than the AM peak hour, which led to 390 vehicles that were unable to be served. Similar findings can also be observed from the average vehicle delay, where vehicles experience approximately 200 seconds of delay compared to approximately 155 seconds of delay in the AM peak hour.

Table 4-2: VISSIM Network Performance Summary

Performance Measure	Weekday AM	Weekday PM
Average Delay (seconds)	154.8	201.7
Vehicle Arrival (vehicles)	20,222	20,131
Latent Demand (vehicles)	55	390

4.1.1.3 OBSERVATIONS

Field observations were conducted in November 2020 and January 2021 to confirm lane configurations and signal phasing at the Seven Corners interchange. Notably, the northbound right turn from Sleepy Hollow Road to Route 7 typically operates with stop control. However, there is a fire station located on Sleepy Hollow Road, so an emergency signal is located on Sleepy Hollow Road at Route 7 to provide emergency vehicle preemption. While this emergency signal is not part of typical operations, it can create further delays for the Seven Corners interchange when preempted.

4.1.2 Interchange Travel Patterns

The project team also reviewed StreetLight data to summarize higher-volume movements at the Seven Corners interchange. Travel patterns differ between the AM and PM peak hours, as shown in **Figure 4-3** and **Figure 4-4**, respectively. Only movements with approximately 100 or more peak hour vehicles are shown. The relative line thickness generally corresponds with the order of magnitude of the movement volume.

As shown, higher-volume movements are generally more limited during the AM peak hour than during the PM peak hour. During the AM peak hour, more important origin-destination pairs include north/westbound on Route 7, eastbound Route 50 to Wilson Boulevard, and westbound Route 50 to E Broad Street (Route 7). During the PM peak hour, it becomes harder to distinguish a small number of important origin-destination pairs. Important pairs include north/westbound on Route 7, south/eastbound on Route 7, south/eastbound on Hillwood to Route 7, eastbound Route 50 to Wilson Boulevard, south/westbound Wilson Boulevard to westbound Route 50, and eastbound Route 50 to south/eastbound Route 7.

It is important to note that both time periods show relatively high travel demand for north/westbound traffic on Route 7 and Route 50 eastbound to Wilson Boulevard. These conflicting demands are shown in red and blue in the aforementioned figures.

Figure 4-3: 2018/2019 AM Peak Interchange Travel Patterns

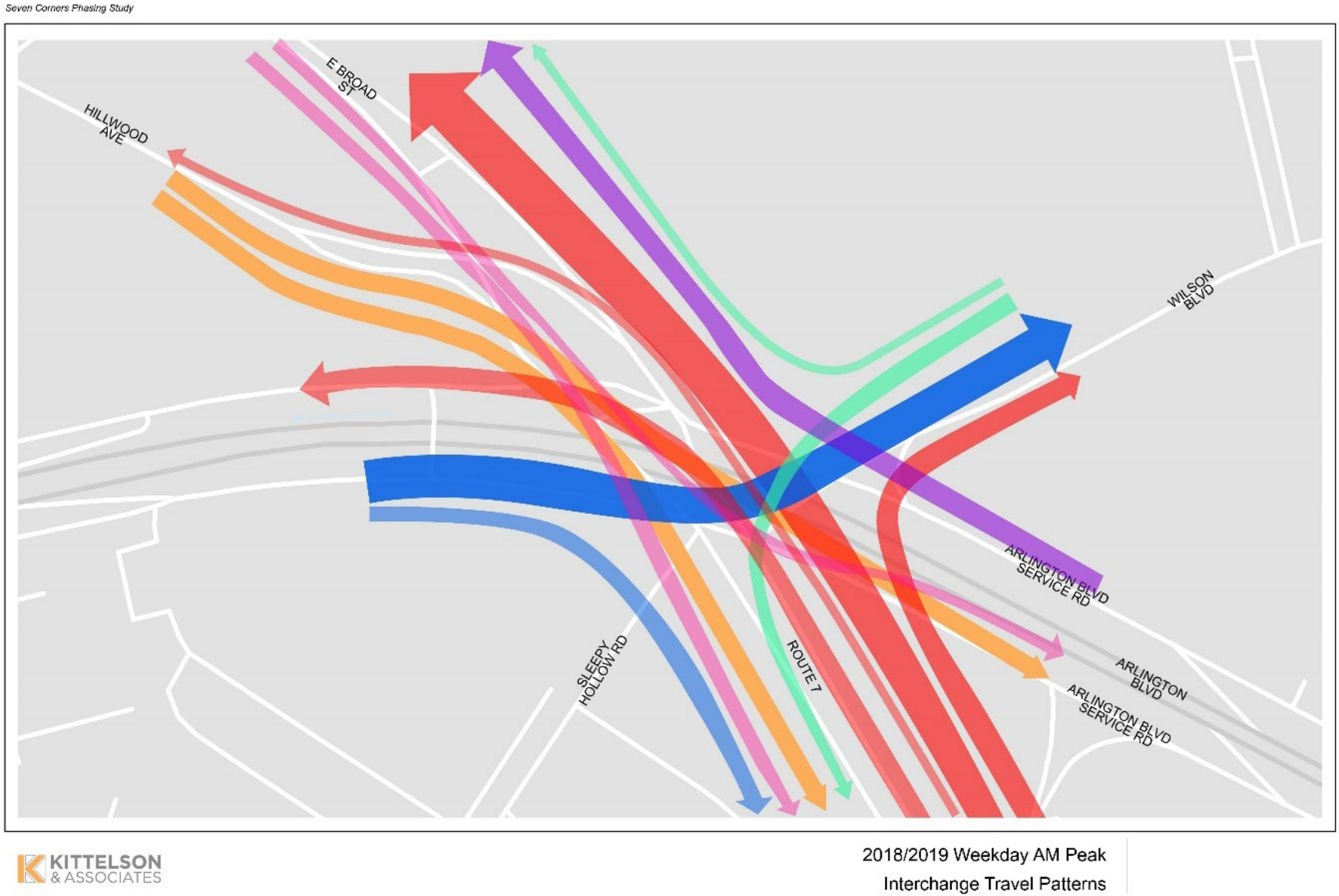


Figure 4-4: 2018/2019 PM Peak Interchange Travel Patterns

4.1.3 Transit Conditions

The project team analyzed transit conditions using route timetables and WMATA automated passenger count data. Due to the COVID-19 pandemic, the project team altered bus routes and frequencies as they conducted the analysis. Therefore, 2019 transit data was used to for non-pandemic conditions.

4.1.3.1 ROUTE FREQUENCIES

Six WMATA routes typically serve the Seven Corners area: 1A, 3A, 4A, 4B, 26A, and 28A. Each of these routes stop at the Seven Corners Transit Center within the study area. Each route provides service between the following terminal points:

- **Route 1A (Wilson Boulevard Line-Vienna Line)**: This route provides service between Ballston-MU Metrorail Station and Vienna Metrorail Station.
- **Route 3A (Annandale Road Line)**: This route provides service between Patriot Drive/Americana Drive and Seven Corners Transit Center. The 3A only operates to/from Seven Corners on weekends.
- **Route 4A (Pershing Drive-Arlington Boulevard Line)**: This route provides weekday peak hour service between Rosslyn Metrorail Station and Seven Corners Transit Center. The WMATA FY2022 budget proposed to eliminate the 4A.
- **Route 4B (Pershing Drive-Arlington Boulevard Line)**: This route provides service between Rosslyn Metrorail Station and Seven Corners Transit Center.
- **Route 26A (Annandale-East Falls Church Line)**: This route provides service between East Falls Church Metrorail Station and Northern Virginia Community College Annandale. Temporary service suspension was enacted for the 26A in August 2020 as part of the response to the COVID-19 pandemic.
- **Route 28A (Leesburg Pike Line)**: This route provides service between King Street Metrorail Station and Tysons Corner Metrorail Station.

The routes and weekday AM and PM peak period frequencies before the COVID-19 pandemic are included in **Figure 4-5**. The 28A runs along Route 7 in the study area and provides the most frequent headways, with 20-minute headways in each direction during both peak periods.

4.1.3.2 DAILY RIDERSHIP

Fall 2019 APC data from WMATA was obtained at the stop level for the study area. Weekday daily boardings and alightings for all routes and stops were mapped and are shown in **Figure 4-6** and **Figure 4-7**, respectively. Note that transit trips include a pedestrian component, as riders typically walk to and from transit stops. Therefore, this information also provides valuable insight into pedestrian demands and conditions.

Figure 4-5: 2018/2019 Weekday Peak Period Frequencies by Route

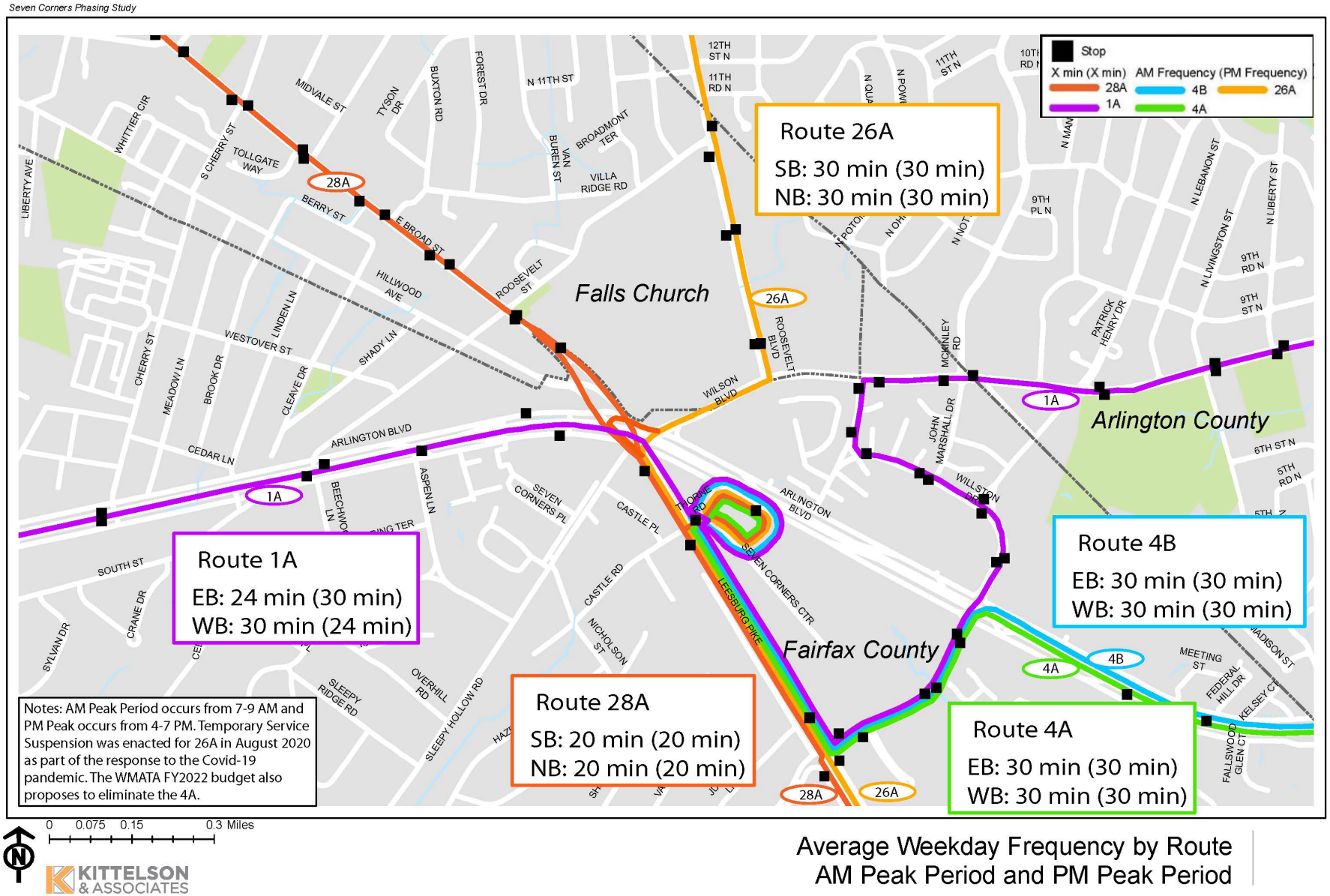


Figure 4-6: 2018/2019 Weekday Daily Bus Boardings

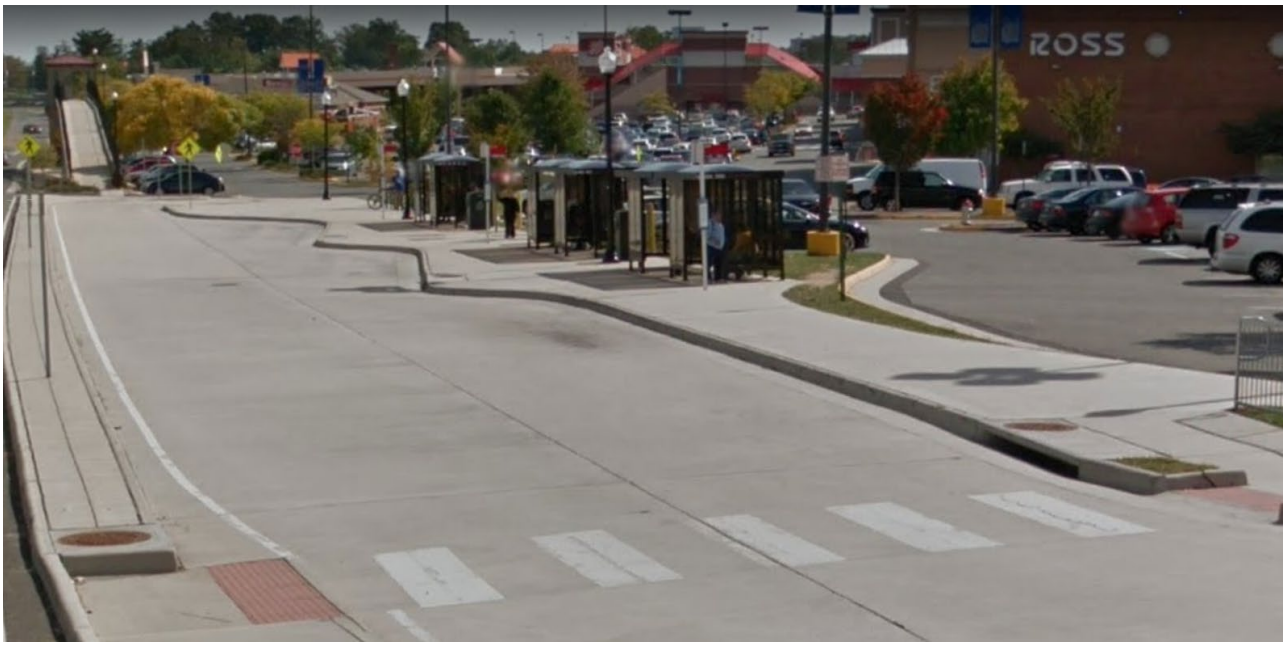
Figure 4-7: 2018/2019 Weekday Daily Bus Alightings

Most activity occurs at the Seven Corners Transit Center, with approximately 600 daily boardings and daily alightings. Higher levels of activity also occur at the Thorne Road and Castle Road intersection with Route 7. The cluster of stops at the Patrick Henry Drive intersection with Route 7 and along Patrick Henry Drive/Willston Drive more broadly also display notable ridership levels.

4.1.3.3 OBSERVATIONS

The Seven Corners Transit Center, shown in **Image 4-1**, is comprised of three sawtooth bus bays to allow passengers to be picked up and dropped off without impacting traffic flow on the Route 50 service road. The transit center is located near the pedestrian bridge over Route 50, and pedestrian curb ramps and crosswalks are provided near the bus stops.

Image 4-1: Seven Corners Transit Center



As shown in **Image 4-1**, the curb ramp on the north side of the service road leads to a narrow median that serves as a sidewalk connection. While there are reasonably accessible pedestrian and bicycle facilities in the immediate vicinity of the transit center, the Seven Corners area lacks connected and convenient bicycle and pedestrian facilities to connect to the transit center. This is discussed in more detail in the following Bicycle Conditions and Pedestrian Conditions sections.

4.1.4 Bicycle Conditions

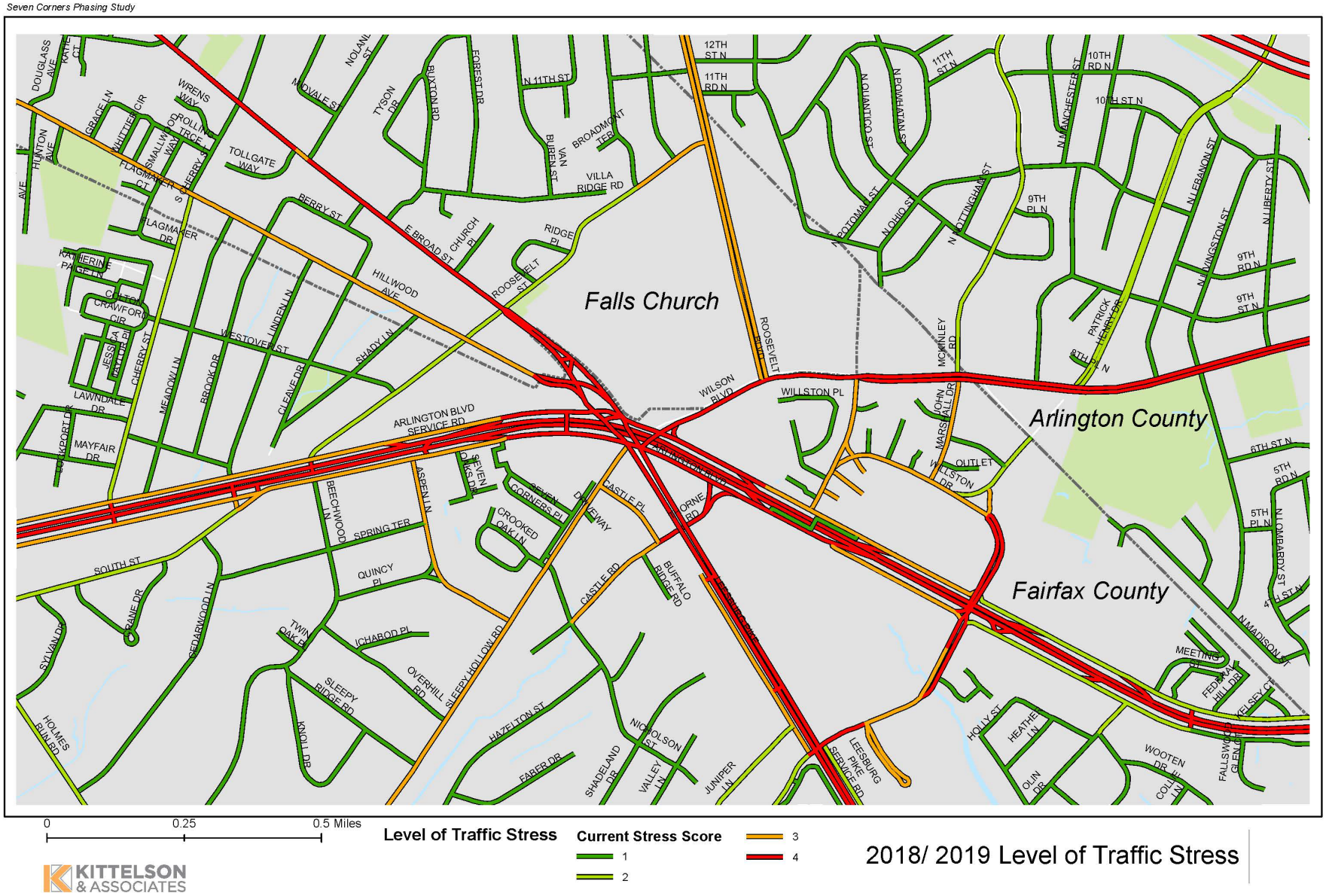
The project team analyzed bicycle conditions on streets in the study area using FCDOT's bicycle LTS methodology, which considers the travel volume and speed of adjacent traffic as well as the type of cycling facility. As part of this effort, qualitative observations are also considered.

4.1.4.1 LEVEL OF TRAFFIC STRESS (LTS)

The LTS for study area roadways is included as **Figure 4-8**. As shown in that figure, major roadways in the study area exhibit high levels of traffic stress for bicycles. While most local roads are LTS 1 or 2, as is typical for more residential streets, bicyclists do not have low-stress options to travel outside of their immediate neighborhoods, as the collector and arterial streets connecting neighborhood streets to various destinations in the area are LTS 3 or 4.

Arterial and collector streets in the area serve as barriers to bicycle and pedestrian activity. The lack of low-stress streets that connect residents to destinations leaves residents confined to their neighborhoods, unable to easily access groceries, schools, or other daily activities by foot or bicycle. This is particularly the case for the Seven Corners Transit Center near Thorne Road and the Route 50 service road, as there are limited low-stress connections between the transit center and the surrounding land uses. While there is a nearby pedestrian/bicycle bridge that provides a crossing over Route 50, there are few other connections.

Figure 4-8: 2018/2019 Bicycle Level of Traffic Stress



4.1.5 Pedestrian Conditions

The project team analyzed pedestrian conditions across the study area and considered pedestrian crossing times, reviewed the LTS analysis, and observed field conditions. Pedestrian crossing times were analyzed at signalized study intersections using VISSIM.

4.1.5.1 CROSSING TIME

Average pedestrian crossing times at several signalized intersections in the study area were calculated for the AM and PM peak hours using VISSIM. The average pedestrian crossing time is the sum of the actual crossing time and the delay waiting to walk. **Table 4-3** provides a summary of crossing times at major intersections, with crossing times presented in minutes.

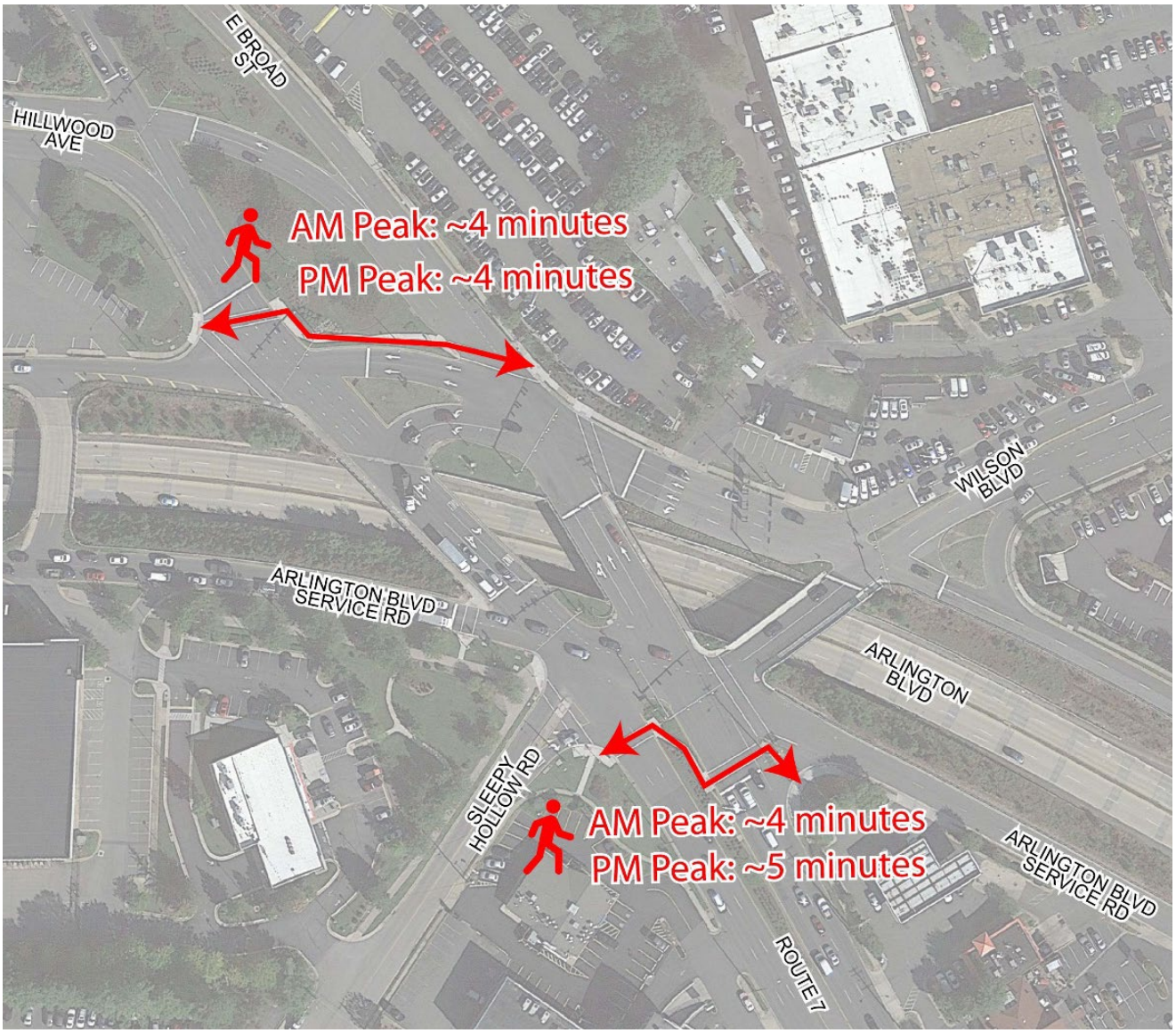
Table 4-3: VISSIM Notable Pedestrian Crossing Times

Intersection	Crossing	Weekday AM (minutes)	Weekday PM (minutes)
S Cherry St/Route 50	Route 50 (west side of intersection)	2.3	2.2
Roosevelt St/Route 7	Route 7 (east side of intersection)	1.2	1.4
	Route 7 (west side of intersection)	1.3	1.4
Patrick Henry Dr/Route 7	Route 7 (south/east side of intersection)	2.0	1.9
Patrick Henry Dr/Route 50	Route 50 (east side of intersection)	2.2	1.9
	Route 50 (west side of intersection)	2.4	2.1
Interchange	Route 7 (east side of intersection)	3.8	4.5
	Route 7 (west side of intersection)	4.2	3.9

As shown in **Table 4-3**, there are multiple locations in the study area that take pedestrians over two minutes to cross major roadways, like Route 7 and Route 50. Generally, this is attributable to longer crossing distances created by multiple vehicle travel lanes and long signal cycle lengths—notably the Route 7 crossing times for pedestrians within the Seven Corners interchange. During the peak hours, it can take pedestrians between four and five minutes to cross Route 7. These crossings and crossing times are depicted in **Figure 4-9** to further highlight these conditions.

In addition to long crossing times, these major roadway facilities also have an LTS 3 or 4, meaning that the walk to and from the intersection is not comfortable. Like bicycle conditions, the major roadways serve as barriers for pedestrians to cross.

Figure 4-9: 2018/2019 Interchange Pedestrian Crossing Times



4.1.5.2 OBSERVATIONS

In addition to pedestrian comfort and intersection crossing times, it is important to consider the design and provision of sidewalks within the study area. There are several existing limitations or challenges to providing ideal sidewalk connections. First, sidewalks in the area are not consistent in terms of width, materials, or landscape buffer. Second, driveway width and density are relatively high, which increases the potential for vehicle-pedestrian conflicts along pedestrian walking routes. Finally, ADA pedestrian ramps are either substandard or not provided. **Image 4-2** depicts several of these issues. The sidewalk in the foreground of **Image 4-2** is relatively narrow (less than VDOT's minimum standard of 5 feet) and has no landscape buffer, while the sidewalk in the background is wider and has a landscape buffer with the vehicle travel lane.

Image 4-2: Sidewalk on Route 7 Approaching Interchange

4.2 CONCLUSIONS

The project team identified five multimodal conclusions from the 2018/2019 typical conditions analysis to consider for the future phasing analysis activities:

1. Bicycle and pedestrian conditions are challenging across the study area. Bicycling and walking to destinations in the study area from neighborhoods is challenging. Most trips require traversing a segment along an arterial or collector street that is LTS 3 or 4. Sidewalks are often narrow and close to high-volume roadways. In addition, the major roadways in the study area serve as barriers, making crossing the street both time consuming and uncomfortable.

2. The Seven Corners interchange causes delay for all travel modes. The multimodal analysis results reinforce this finding from previous planning studies, feedback from community members, and input from stakeholders. Average vehicle delay at the interchange is approximately 96 seconds during the AM peak and 142 seconds during the PM peak. Crossing times for pedestrians are also significant, at approximately 4 minutes during peak periods.

3. There are several high-volume movements that travel through multiple nodes to traverse the Seven Corners interchange. The current interchange consists of multiple intersections. As a result, certain movements must travel through multiple nodes, making operations inefficient. Some of the most difficult movements include:

    - Southbound left turn from Route 7 to Route 50.
    - Northbound left turn from Route 7 to Route 50 or Hillwood Avenue.
    - Westbound through from Wilson Boulevard to Route 50.
    - Eastbound through from route 50 to Wilson Boulevard.
    - Westbound left from Wilson Boulevard to Route 7.

4. There is high travel demand from multiple streets in the Seven Corners interchange to travel south/eastbound on Route 7. The interchange travel patterns shown in **Figure 4-3** and **Figure 4-4** show significant demand from Broad Street, Hillwood Avenue, Wilson Boulevard, and Eastbound Route 50 to travel south/eastbound on Route 7.

5. Travel demand to/from Route 50 on the west side of interchange is also generally higher than to/from the east side of the interchange. When comparing the volume of traffic coming to/from Route 50 on the west side of the interchange, it is notably higher than traffic coming to/from Route 50 on the east side of the interchange.

Section 5
Outreach

5 Outreach

5.1 INTRODUCTION

The project team conducted a robust effort to gather feedback from the public and public agencies. Public outreach was conducted in three phases and included surveys for the public to provide feedback. Outreach options for the project were limited due to the nature of the COVID-19 pandemic. The project started near the beginning of the pandemic in 2020 and ended shortly after the emergency phase of the pandemic ended in late 2022. As such, outreach options focused on virtual approaches as well as outdoor pop-up meetings. Outreach events used multilingual staff to engage residents. The project team also met with various public agencies to solicit their feedback and refine the recommendations as appropriate. An overview of outreach efforts is presented here, and outreach response details can be found in **Appendix F Public Engagement**.

5.2 PUBLIC ENGAGEMENT

From February 2021 to November 2022, the project team conducted public outreach in English, Spanish, and Vietnamese to solicit public input on the findings of the Seven Corners Phasing Study. Public outreach focused on presenting analysis results to the public and asking for feedback regarding the phasing of the Seven Corners improvements. Initial outreach efforts reminded the public of the focus of the improvements, gave an overview of existing conditions, and asked what the public and stakeholders considered the most important issues to address. The next phases of the outreach focused on presenting analysis results of various phasing approaches.

5.2.1 Outreach Events

Public outreach was held in three phases. The first phase was held in February 2021, with separate virtual meetings in English (February 3, 2021) and Spanish (February 4, 2021). There was minimal attendance at the Spanish language meeting, and the project team was determined that future efforts to engage the Spanish-speaking community should occur in person. The second phase included in-person pop-up meetings (November 13, 2021) in three different locations with English-, Spanish-, and Vietnamese-speaking staff as well as two English language virtual meetings (November 16, 2021, and November 17, 2021). The third phase included three virtual meetings held in English (November 9, 2022, November 10, 2022, and November 16, 2022).

A variety of approaches informed residents and stakeholders of these meetings, including the project website, social media, email, and Fairfax Alerts. In addition, the project team created explanatory videos to answer and address common questions and concerns from the public. These videos were uploaded to YouTube as well as the project website. The team made outreach efforts to the nearly 6,000 subscribers to Fairfax Alerts, 300 home and business owners, 40 religious organizations, 12 nonprofit and social service organizations, 12 recreational centers, schools, libraries, and residents active on NextDoor and the Fairfax County Department of Transportation (FCDOT) Facebook page.

5.2.2 Survey and Comment Responses

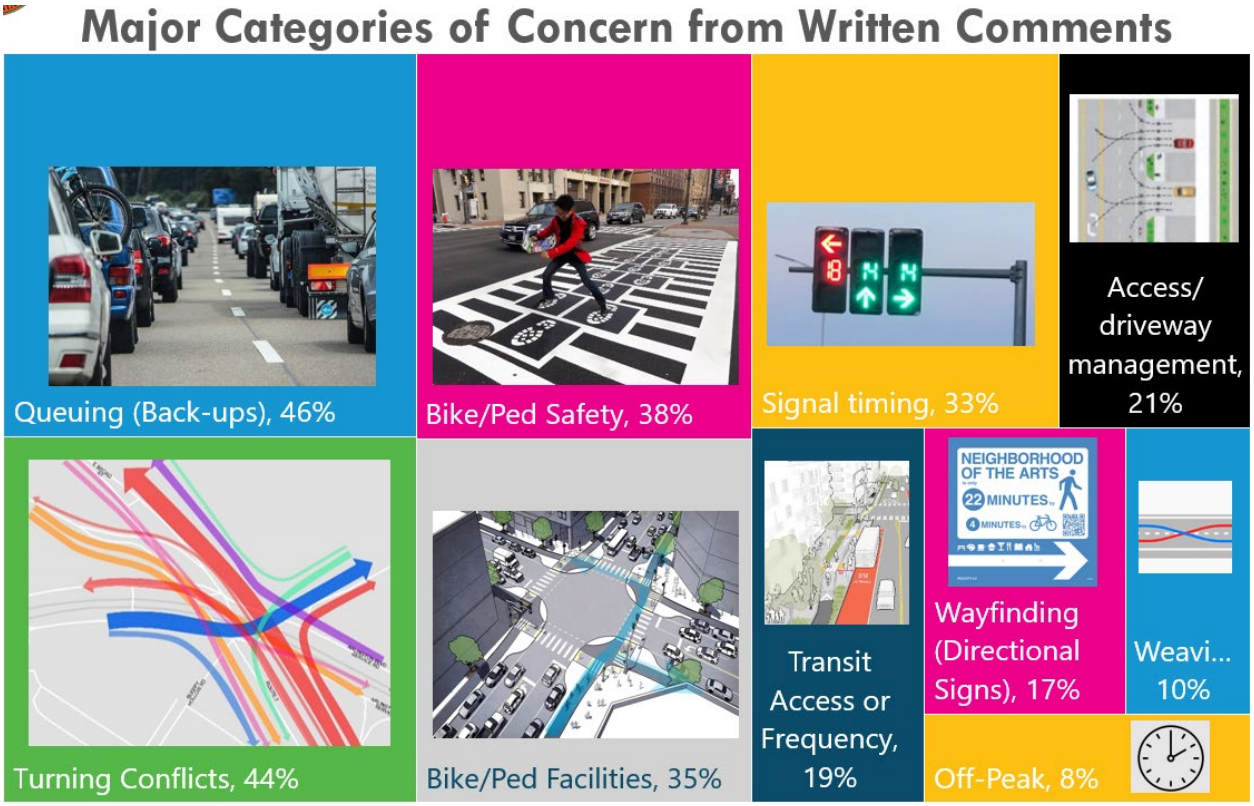
The County has requested feedback from the public and provided a variety of forums to collect this information. Two surveys gathered feedback as part of the first and second phases of public meetings. Surveys were linked from the County's website and social media accounts and included versions in both English and Spanish. The first survey was available during February 2021 and complemented the questions asked at the first phase of virtual outreach gatherings. A total of 36 responses were obtained by the first online survey. The second survey was available in November and early December 2021 and complemented the questions asked during the second phase of virtual and in-person pop-up meetings. A

total of 44 responses were obtained by the second online survey. In addition, 30 responses were obtained at the in-person pop-up meetings.

The project team gained public feedback through a variety of feedback opportunities. In addition to the questions as part of the two surveys noted, respondents could give open responses. Comments also could have been submitted directly to FCDOT staff or through the project website as well as through Facebook. Feedback was also gathered through the in-person pop-up meetings during the second phase of public meetings.

The major themes across multiple rounds of outreach focused on pedestrian and bicycle facilities and safety, vehicle travel delay, and confusing travel movements. Comments from the first round of outreach were illustrative of comments throughout the study. An overview of public comments from the first phase of public meetings is provided in **Figure 5-1.**

Figure 5-1: Summary of Major Categories of Concern



5.2.2.1 PEDESTRIAN AND BICYCLE SAFETY

One major theme of concern was the difficulty of walking and biking to recreational, commercial, educational, and public transit destinations in the Seven Corners project area. After the first public meeting, 38% of commenters expressed concerns about bicyclist and pedestrian safety, and 35% of commenters expressed concerns about pedestrian and bicyclist facilities. After the second public meeting, 50% of all comments were regarding concerns about traffic safety. When asked about priority locations for improved bicycle and pedestrian facilities using the survey during the second round of public outreach, respondents indicated that bicycle and pedestrian facilities along Patrick Henry Drive, Wilson Boulevard, and Sleepy Hollow Road were of the highest priority.

Commenters noted the difficulty of walking to the closest Metrorail station at East Falls Church. In addition, commenters noted the need for better connections to schools—in particular, using cul-de-sac greenways to make better connections. Comments also noted the difficulty of crossing Wilson Boulevard and Route 7 due to the width of the roadways, lack of crossing locations, and speed.

5.2.2.2 VEHICLE DELAY AND CONFUSING MOVEMENTS

Vehicle delay was a major theme of concern among commenters, who indicated that drivers coming from Wilson Boulevard attempting to access Route 50 westbound or Route 7 southbound experience delay and often block the intersection. It was also noted that off-ramps from Route 50 often back up during the rush. Commenters were also concerned about the left turn from Castle Road to Route 7, noting that it can take multiple signal cycles to travel north through the main interchange area. These comments were confirmed by survey responses. Specifically, Sleepy Hollow Road/Wilson Boulevard/Broad Street/Arlington Boulevard, Patrick Henry Drive/Arlington Boulevard (US 50), and Castle Road & Thorne Road/Leesburg Pike (VA 7) were the top three intersections where survey respondents indicated delays.

The need for better signage and markings in the interchange area was another reoccurring theme, with many movements at the main interchange. The commenters noted that the area is incredibly confusing to navigate.

Commenters also noted that vehicles often stop on Sleepy Hollow Road as it approaches Route 7 to wait for a green signa. But the green signal is only activated for emergency vehicles from the fire department.

5.3 AGENCY OUTREACH

The project team met multiple times with large groups of agencies and met additional times with the Virginia Department of Transportation (VDOT). Through these meetings, the project team explained the scenarios being tested and worked specifically with VDOT to review analysis methodology.

5.3.1 Interagency Meetings

An interagency group was convened to provide insight and feedback to FCDOT regarding potential phasing approaches for the Seven Corners Transportation improvements. This group included agencies with an oversight or funding responsibility along with agencies that could be affected by the project. Agencies provided technical input and oversight as well as feedback for their jurisdiction's desires for improvements. Participants included:

- Fairfax County Department of Planning and Development
- Fairfax County Land Development Services
- VDOT
- City of Falls Church
- Washington Metropolitan Area Transit Authority (WMATA)
- Arlington County

This group met six times over the course of the Phasing Study to discuss a variety of topics and offer feedback and input. The meetings were held on the following dates, addressing the topics noted:

- October 20, 2020: Project kickoff
- January 26, 2021: Impacts of the pandemic on travel patterns and typical conditions analysis
- September 14, 2021: Traffic analysis results and potential initial phasing scenarios
- January 19, 2022: Refinements to the network
- June 7, 2022: Potential phasing scenarios
- October 13, 2022: Overall study findings, and phasing recommendations

5.3.2 Coordination with VDOT

In addition to meeting with a broad set of stakeholders, the project team directly coordinated with VDOT on multiple occasions. Coordination efforts typically focused on analysis methodology, technical review of results, and opportunities for funding. The project team met with VDOT three additional times, addressing the topics noted:

- May 21, 2021: Overview of the initial 2030 phasing scenarios

- May 20, 2022: Opportunities for VDOT funding
- October 7, 2022: Overall study findings, phasing recommendations, and opportunities for VDOT funding

5.4 RESPONSES TO PUBLIC AND AGENCY INPUT

The public and various agencies expressed a variety of concerns regarding the Seven Corners Transportation Infrastructure improvements. FCDOT made multiple substantive changes to the planned project in response to feedback. These changes included refining the Comprehensive Plan, considering a narrower Ring Road, and prioritizing facilities for bicycle and pedestrian improvements.

5.4.1 Comprehensive Plan Refinements

In response to the feedback, FCDOT made two refinements to the Comprehensive Plan transportation network. The first was the refinement of the Ring Road to terminate at Route 50 instead of Broad Street, and the second was the realignment of the Wilson Boulevard connection. Both are described below.

5.4.1.1 REFINING THE ALIGNMENT OF THE CENTRAL INTERCHANGE

The Comprehensive Plan originally envisioned a simplified four-way central intersection between Route 7, Broad Street, Sleepy Hollow Road, and Wilson Boulevard. The Comprehensive Plan did not allow for connections to Route 50 at the Central Interchange. Detailed traffic analysis demonstrated that this configuration would cause severe congestion across the network due to additional turn movement required for some movements through the area (see Scenario 3 in **Appendix D**). At the same time, commenters noted concerns regarding excessive delay and confusing movements in the area. In response, FCDOT refined the Central Intersection to connect Wilson Boulevard to Route 50 in the west to minimize additional turn movements. This refinement would significantly improve traffic operations.

5.4.1.2 RING ROAD REFINEMENT

Staff and elected officials from the City of Falls Church expressed concern that the Ring Road would encourage vehicle traffic to use Hillwood Avenue. Additionally, the City of Falls Church was concerned about how the Ring Road would limit redevelopment opportunities for properties in the City of Falls Church. In response, FCDOT refined the Comprehensive Plan alignment of the Ring Road to terminate at Route 50 in the west, prior to entering the City of Falls Church.

5.4.2 Evaluation of Narrowed Ring Road

Several stakeholders and residents expressed concern with the number of vehicle travel lanes in the proposed four-lane Ring Road and asked that FCDOT evaluate the performance of a two-lane Ring Road instead. Generally, these commenters were concerned that two lanes in each direction plus a center turn lane would not be needed, making pedestrian crossings unnecessarily long and unsafe. FCDOT tested a two-lane scenario for the portion of the Ring Road between Route 50 on the west and Route 7 (see Scenario 4B in **Appendix D**) and determined that a two-lane Ring Road would be unable to process the travel demand seeking to use the facility and would lead to major delay across the network at various times of day. So, while FCDOT did test the configuration suggested, it was not advanced as part of the phasing plan.

5.4.3 Bicycle and Pedestrian Facilities

A substantial portion of commenters were concerned about the safety of bicyclists and pedestrians and the lack of facilities for them. The current network lacks dedicated bicycle crossings of Route 50. While most of the streets have sidewalks, many of the intersections have complex geometry and wide cross sections that lead to long crossing times and queueing at intersections. The Comprehensive Plan includes wide sidewalks and a cycle track on the inner loop of Ring Road. These facilities were advanced as part of the

Phasing Plan, and FCDOT also advanced robust bicycle and pedestrian facilities for the other main roadways in the area, including Wilson Boulevard, Sleepy Hollow Road, Broad Street, Route 7, and the Route 50 Service Roads.

In addition, FCDOT prioritized the implementation of robust bicycle and pedestrian facilities on additional streets in the area. Implementing these facilities will lead to a robust bicycle and pedestrian network in the area that will enable residents farther from Seven Corners to make crossing Route 50 much easier.

Section 6
Bicycle Facility Prioritization

6 Bicycle Facility Prioritization

6.1 INTRODUCTION

As part of the effort to implement an updated transportation network in Seven Corners, robust bicycle and pedestrian facilities are planned for new facilities noted in the Comprehensive Plan. These facilities include wide sidewalks along with cycle tracks in some locations and wide shared-use paths in other locations. However, roadways not planned for improvements as part of the Seven Corners transportation improvements will generally keep their existing, lower-quality multimodal facilities. There are plans to upgrade the multimodal facilities on many of these roadways, but funding has only been programmed for improvements along Sleepy Hollow Road. All other improvements remain unfunded. The Seven Corners Phasing Study, in addition to identifying phasing for major transportation infrastructure improvements, also identifies bicycle and pedestrian project implementation in the broader area that complement the multimodal facilities included in the Seven Corners transportation improvements. Implementation of these facilities will create a multimodal network that serves the broader area.

6.2 PROGRAMMED FACILITIES

Pedestrian facilities have been programmed for Sleepy Hollow Road between Route 7 and Columbia Pike. Currently, a 6-foot sidewalk that includes drainage improvements and retaining walls, where needed, is under construction. The project is anticipated to be completed by the end of 2023.

6.3 PLANNED FACILITIES

Bicycle and pedestrian facilities are planned along many of the roadways in Seven Corners. The Comprehensive Plan notes robust multimodal facilities along the Ring Road. Additional multimodal facilities are also planned for other roads, and the Active Fairfax Plan is advancing multimodal facilities for additional roadways.

6.3.1 Seven Corners Transportation Improvements

The Seven Corners transportation improvements include robust bicycle and pedestrian facilities in areas that will be reconstructed. This includes the Ring Road, the Central Interchange, and the roadways that immediately connect to these facilities. Multimodal facilities will be constructed concurrently with the roadway improvements. The extents of the improvements will be determined as the project development process advances. No substantive changes are being advanced as part of the Seven Corners transportation improvements outside this immediate area.

6.3.2 Other Planned Improvements

There are also bicycle and pedestrian facilities planned for multiple other roadways in the broader area. In general, bicycle and/or pedestrian facilities are planned for most arterial or collector streets in the area. In addition, Active Fairfax will likely identify additional multimodal facilities or suggest enhanced multimodal facilities. However, no funding has been identified for these facilities, and none of these facilities have a timeline for implementation.

6.3.2.1 NETWORK CONNECTIVITY

The multimodal facilities included in the Seven Corners transportation improvements will form the backbone of the bicycle and pedestrian network in the area; however, they will provide minimal connectivity outside the immediate project area. These facilities focus on a small area and will dramatically improve the crossing of Route 50. However, by themselves, they will not create a multimodal network for the broader

area. Additional connections to the broader network are needed to take advantage of the multimodal facilities envisioned in the Seven Corners transportation improvements. While funding for bicycle and pedestrian projects in the area has only been programmed for bicycle and pedestrian improvements on Sleepy Hollow Road, it is likely that there will be facilities advanced in the relatively near future. The Seven Corners Phasing Study identifies and prioritizes multimodal network connections that can improve multimodal connectivity across the area.

6.4 PUBLIC FEEDBACK

The public provided extensive feedback regarding the need for safe bicycle and pedestrian facilities in the area. Through the public outreach process, members of the public regularly noted the need for better bicycle and pedestrian facilities along with the need to make roads safer for bicyclists and pedestrians. The public has noted that additional roads are not the only priority in Seven corners, but there is a need to better connect the area with sidewalks and bicycle facilities. The Outreach Chapter and **Appendix F Public Engagement** provide more detail on specific concerns articulated by the public.

6.5 PRIORITIZED FACILITIES

Roadways have been identified for additional multimodal facilities that will extend the bicycle and pedestrian networks into the broader area surrounding Seven Corners. In addition, connections that facilitate crossing Route 50 have been prioritized. The prioritized roadways do not include all roadways where multimodal facilities are necessary. The prioritized facilities represent those roadways that are most important for bicycle and pedestrian facilities to connect communities to and through Seven Corners.

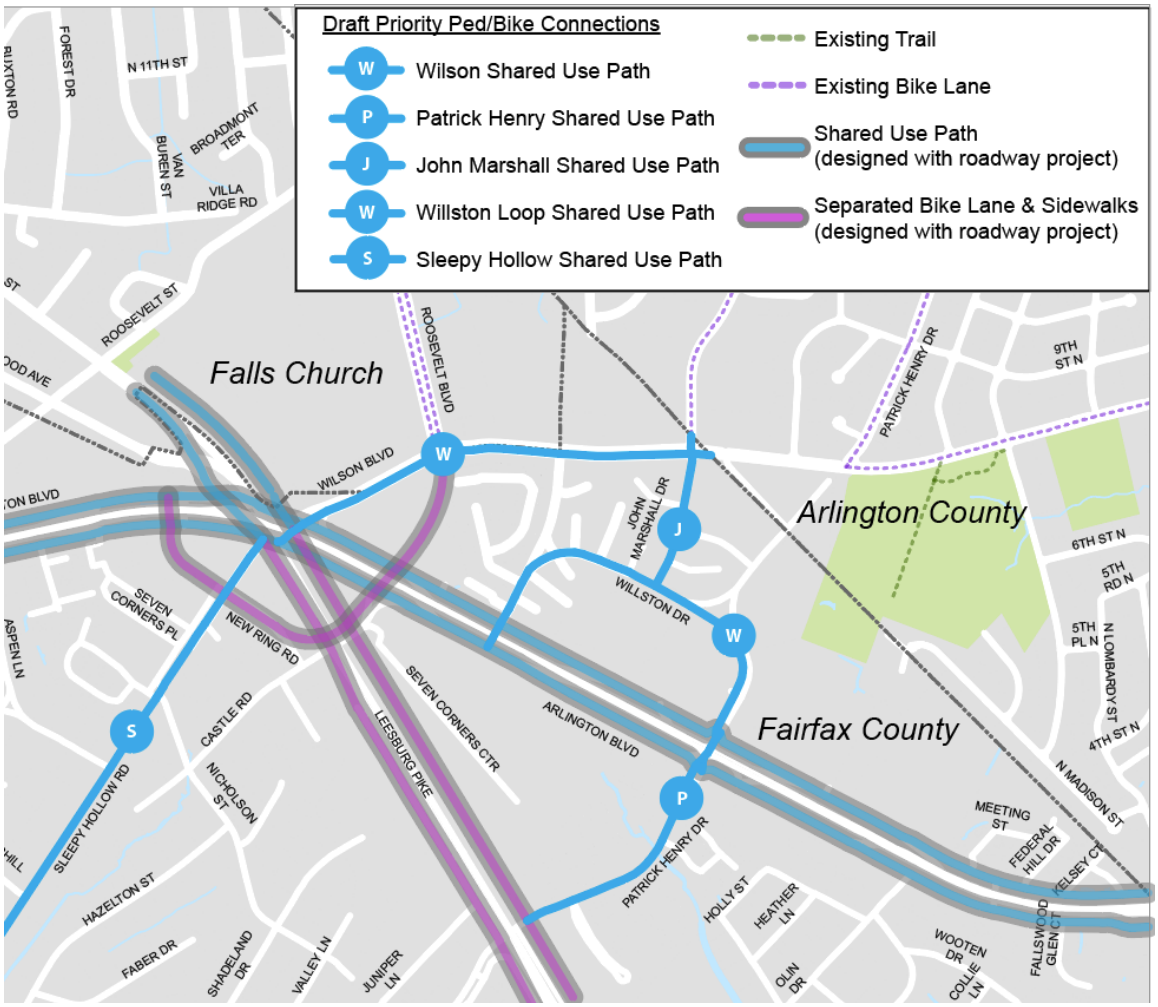
6.5.1 Facility List

Through the process of gathering public feedback and reviewing the existing and future multimodal network in the area, facilities that are critical to the broader connectivity of the multimodal network were identified along with the type of treatment planned for the facilities. These facilities are noted in **Figure 6-1** and include:

- Arlington Boulevard: Shared-use path
- Route 7: Separated bike lane and sidewalk
- Wilson Boulevard: Separated bike lane
- Willston Drive: Shared-use path
- John Marshall Drive: Shared-use path
- Patrick Henry Drive: Shared-use path

Initially, Sleepy Hollow Road was considered a priority multimodal improvement. However, as the Seven Corners Phasing Study advanced, the planned facilities along Sleepy Hollow Road were funded, and construction began. As such, this link is not included in the list of facilities being prioritized.

Figure 6-1: Prioritized Bicycle and Pedestrian Facilities



6.5.2 Implementation of Prioritized Multimodal Facilities

While the multimodal facilities along the Ring Road and immediately adjacent to the Central Interchange will be implemented as part of the Seven Corners transportation improvements, most of the prioritized improvements will not be implemented in this process. The design process for each project phase will determine exactly which portions of the prioritized links will be implemented along with the Seven Corners transportation improvements. However, most of the prioritized multimodal facilities will be implemented independently from the Seven Corners transportation improvements and each other.

Section 7
Future Conditions Analysis and Phasing Recommendations

7 Future Conditions Analysis and Phasing Recommendations

7.1 ANALYSIS OVERVIEW

The project team analyzed travel conditions for a variety of future phasing scenarios using the most advanced analytical techniques to understand the complex, interconnected transportation network in the area. The analysis tested a variety of phasing scenarios in various build years to better understand the likely operations of each.

7.1.1 Analysis Approach

The analysis considers two future build years, 2030 and 2045. In general, early potential project phases are evaluated in 2030 travel conditions, and later phases are evaluated in 2045 travel conditions. Seven Corners has a complicated transportation network that can generate outsized responses based on small changes in a separate part of the network. To evaluate conditions, the project team used multi-resolution modeling and Dynamic Traffic Assignment (DTA) analysis to evaluate vehicular operations. The multiresolution approach also included VISSIM microsimulation to report operational performance. Details of the analysis methodology can be found in **Appendix B**.

7.1.2 Scenarios Tested

Multiple scenarios of phasing the Seven Corners transportation improvements were developed and subjected to rigorous analysis to better understand their likely performance. In general, the tested scenarios include different portions of the Comprehensive Plan transportation network planned for Seven Corners. However, there is a scenario that tests the performance of a two-lane instead of a four-lane the Ring Road. This scenario is not consistent with the Comprehensive Plan but does provide a relevant comparison. Separate scenarios were evaluated for 2030 and 2045 conditions. A list of the scenarios tested along with a brief overview of each scenario is below:

- 2030 Scenarios
    - Baseline: Includes no new infrastructure in Seven Corners.
    - Scenario 1: Includes the Ring Road from Broad Street to Route 7.
    - Scenario 2: Includes the Ring Road from Broad Street to Route 50 on the east.
    - Scenario 3: Includes the Ring Road from Broad Street to Route 7 and connects Wilson Boulevard to Sleepy Hollow Road.
    - Scenario 4: Includes the Ring Road from Route 50 on the west to Route 7.
    - Scenario 4B: Includes two-lane Ring Road from Route 50 on the west to Route 7.
    - Scenario 5: Includes the Ring Road from Route 50 on the west to Route 50 on the east.
    - Scenario 6: Includes the Ring Road from Route 50 on the west to Route 7 and connects Wilson Boulevard to the Route 50 Service Roads on the west.
- 2045 Scenarios
    - Baseline: Includes the Ring Road from Route 50 on the west to Route 50 on the east and connects Wilson Boulevard to the Route 50 Service Roads on the west.
    - Scenario 1: Includes the Ring Road from Route 50 on the west to Wilson Boulevard and connects Wilson Boulevard to the Route 50 Service Roads on the west.

Detailed analysis results for each scenario are included in **Appendix D**. In addition, conditions are noted for transit, pedestrian, and bicycle modes. Additional detailed results for each vehicle movement at each study intersection can be found in **Appendix E**.

Based on the evaluation of scenarios and public outreach, selected scenarios became a specific proposed construction phase. The following section discusses an overview of results for each proposed phase of construction.

7.2 PHASING ANALYSIS AND RECOMMENDATIONS

7.2.1 Introduction

The current configuration of Seven Corners concentrates many turning movements into closely-spaced intersections at the center of the main interchange of the Route 50 Service Roads, Wilson Boulevard, Broad Street, Route 7, and Sleepy Hollow Road. Therefore, a successful phasing approach needs to remove movements from that central complex in early phases to both improve operations as well as develop infrastructure to help with the maintenance of traffic for future phases of the project. Later phases could then focus on rebuilding the main interchange. Ideally, operations would improve across the system with the implementation of each phase of the project.

7.2.2 Master Plan Adjustments

Through analysis and coordination completed as part of the study, the project team determined that the Comprehensive Plan transportation network needed two adjustments, including:

- Terminating the Ring Road at Route 50 on the west instead of Broad Street.
- Reconfiguring the main interchange to connect Wilson Boulevard to Route 50 on the west.

The adjustments, illustrated in **Figure 7-1**, will enable the City of Falls Church to provide a gateway into the City of Falls Church and will enable significantly better traffic operations in the area.

7.2.2.1 TERMINATE THE RING ROAD AT ROUTE 50 ON THE WEST

Testing Scenarios 1 and 2 during the study process, the City of Falls Church provided feedback regarding the inclusion of properties within the City limits as part of the Ring Road. In the Comprehensive Plan, the Ring Road intersects Broad Street just north of Route 50 at the southern edge of the City limits. The City would like for the property at this location to redevelop into a gateway project that could note entry into the City of Falls Church. As such, the City did not want the proposed Ring Road to use any portion of this property. In addition, residents of the City of Falls Church were concerned about the potential for additional traffic along Hillwood Avenue.

The project team considered ways to link the Ring Road to Broad Street without affecting this parcel. However, doing so would require the Ring Road to intersect Broad Street farther to the south. This shift would create operational and geometric problems for the roadways. The new intersection location would be too close to the main Seven Corners interchange, resulting in problematic traffic operations. In addition, the curve radius along the Ring Road would need to be much shorter, which would create problematic intersections with Hillwood Avenue and the westbound Route 50 service road on the north side of Route 50.

After reviewing options to adjust the alignment, it was decided to terminate the Ring Road at the westbound Route 50 service road on the north side of Route 50. This removed the short northwestern segment of the proposed Ring Road between Route 50 and Broad Street.

7.2.2.2 RECONFIGURE THE MAIN INTERCHANGE

The Comprehensive Plan features a four-leg, at-grade intersection at the center of Seven Corners. Broad Street and Route 7 would form the north and south legs of this intersection, respectively, with Sleepy Hollow Road and Wilson Boulevard forming the west and east legs, respectively. This layout would require one of the major movements in the area, carrying eastbound Route 50 traffic to Wilson Boulevard and vice versa, to use Sleepy Hollow Road and make multiple turns to accomplish the necessary movements.

The project team analyzed a future 2030 transportation network consisting of a reconfigured central interchange, where Wilson Boulevard connected directly to Sleepy Hollow Road across Route 7 and Broad Street to create a four-leg intersection, as included in Scenario 3 analysis. This network also included the Ring Road on the west side of the interchange from Broad Street across Route 50 to Route 50 on the east. The project team compared the results from this partial Comprehensive Plan network to what future conditions might be expected in 2030 without any transportation improvements.

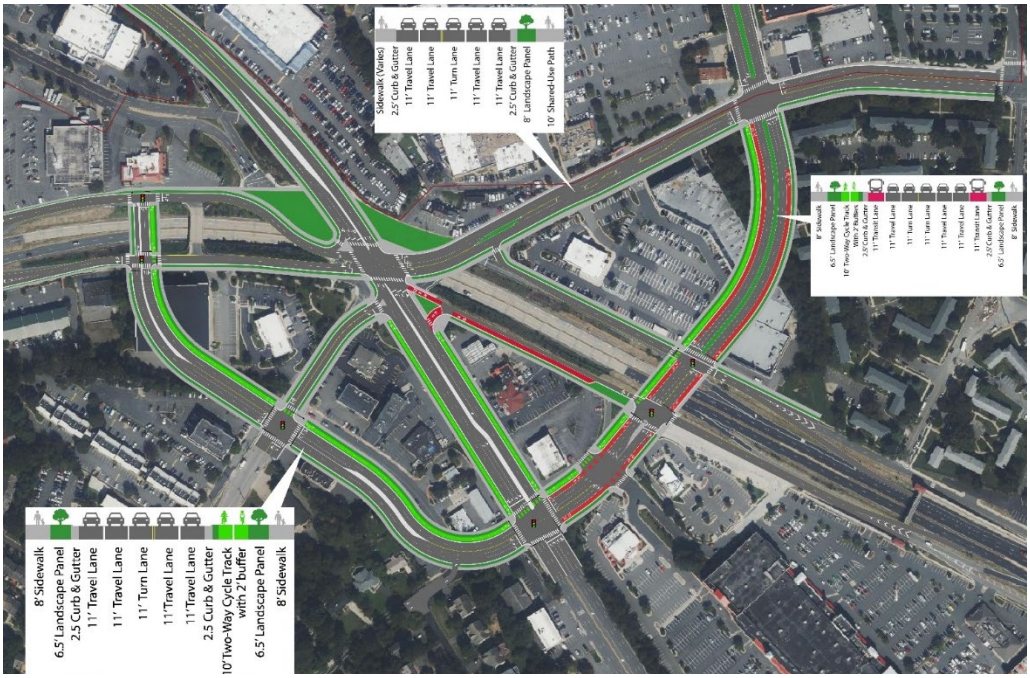
As shown in **Table 7-1**, conditions are significantly worse for the partial Comprehensive Plan network than future conditions without any transportation improvements, specifically in the PM peak period. Conditions in the AM peak period show modest improvements, with network delay decreasing while serving additional vehicles. PM conditions significantly degrade. Aggregate delay increases by more than 45 seconds per vehicle, and the number of vehicles the network can serve is reduced by about 500.

Table 7-1: Network Performance for 2030 Baseline and 2030 Partial Comprehensive Plan Network AM and PM Peak Hours

Performance Measure	2030 Baseline		2030 Partial Comprehensive Plan Network	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Average Delay (seconds)	157.1	260.2	142.7	308.6
Vehicle Arrival (vehicles)	20,455	20,727	20,546	19,765
Latent Demand (vehicles)	60	561	33	1094

With the central interchange reconfiguration, the network will experience significantly worse conditions in the PM peak period. As such, the network was adjusted to satisfy the Comprehensive Plan's intent to improve operations by directly connecting Wilson Boulevard to the Route 50 service roads to and from the west.

Figure 7-1: Master Plan Adjustments



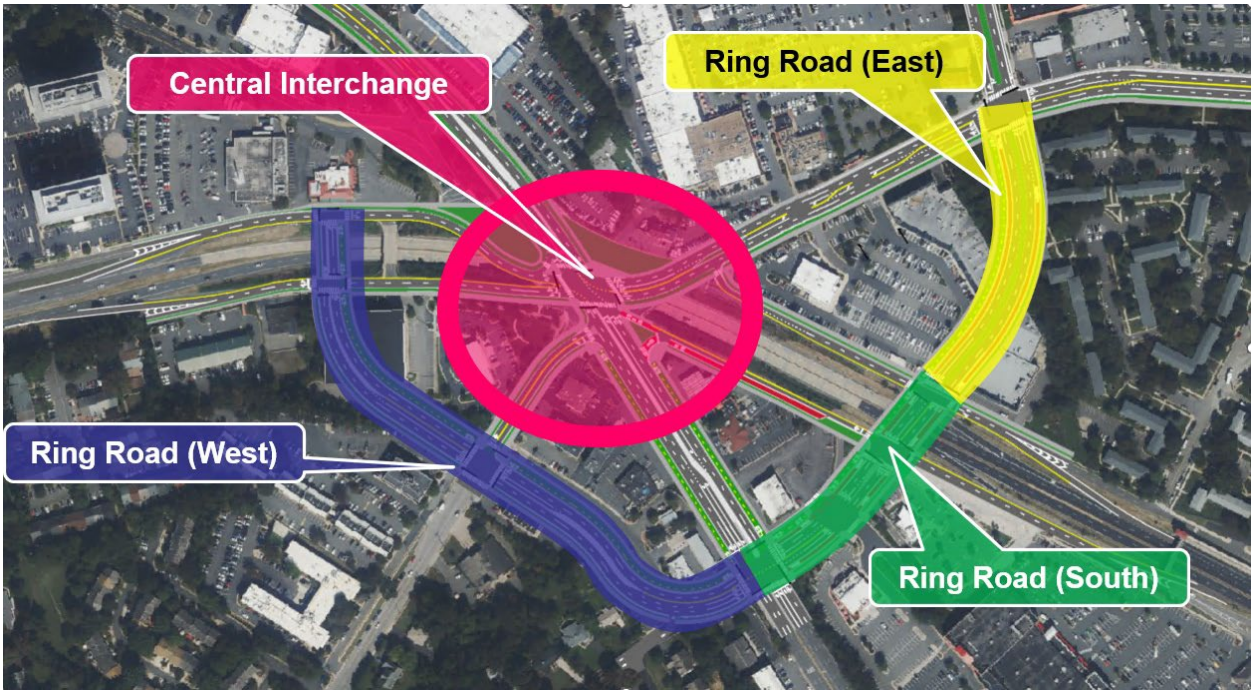
7.2.3 Identification of Project Segments

As noted previously, the primary purpose of the Seven Corners Phasing Study is to determine the order in which improvements identified in the Comprehensive Plan Amendment should be built. The larger vision identified in the Comprehensive Plan Amendment was broken into project segments that could be constructed potentially independent of each other based on the analysis, feedback, and constructability. Those improvements, shown in **Figure 7-2**, were grouped into the following four segments:

- The Ring Road (West): West leg of Route 50 to south leg of Route 7.
- The Ring Road (South): South leg of Route 7 to east leg of Route 50.
- The Ring Road (East): East leg of Route 50 to Wilson Boulevard.
- Central Interchange: The heart of Seven Corners, where Route 7, Sleepy Hollow Road, Wilson Boulevard, and the Route 50 service roads meet.

Each of these segments create logical connections that can begin to provide a new path for vehicles to make various movements that once required traveling through the main interchange area. In addition, most of these segments are discrete improvements that could be completed independent of each other to facilitate the phasing of the project.

Figure 7-2: Master Plan Segments



The project team performed detailed analysis to identify the order of improvements. In addition to this detailed analysis, the project team also evaluated the segments to determine which ones might be needed to facilitate the maintenance of traffic for the construction of other segments. Finally, the project team considered high-level impacts to current land uses. The result was a determination of the order each segment should be constructed. The proposed phasing of the improvements follows.

7.2.4 Phase 1: The Ring Road (West)

7.2.4.1 INTRODUCTION

The west segment of the Ring Road was considered for Phase 1 due to the high volumes of traffic between the west leg of Route 50 and the south leg of Route 7. This phase corresponds to 2030 Scenario 4. This segment provides a new path to separate these movements from the main interchange, which would

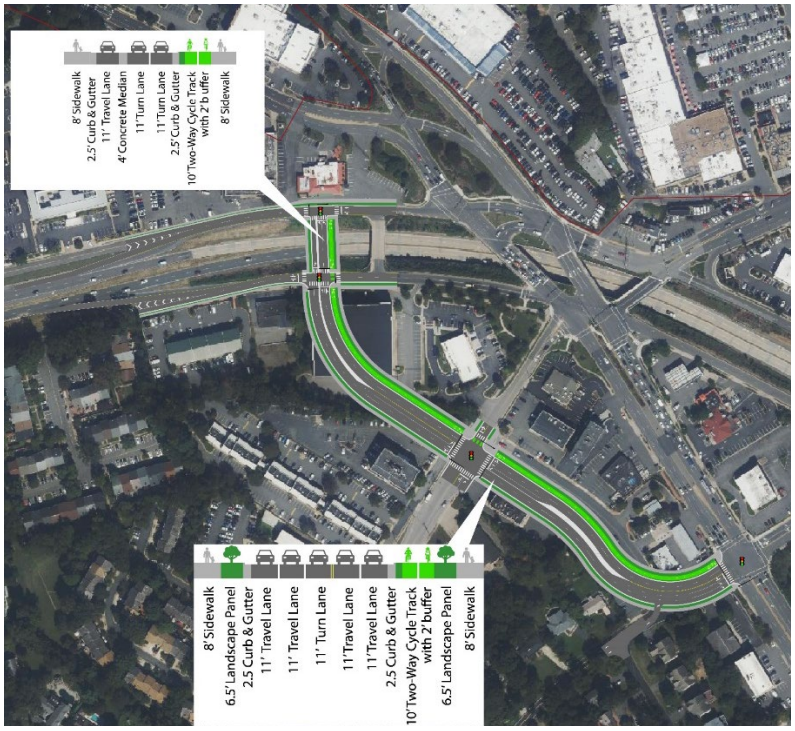
reduce demand on the central interchange. In addition, this segment could also help with the maintenance of traffic when the main interchange is rebuilt in a later phase. Some traffic could divert over from Broad Street to this segment of the Ring Road to allow for reconstruction of the main interchange. The movements between Route 50 on the west and Route 7 would not be accommodated by the south or east legs of the Ring Road, nor would these routes provide the potential to support the maintenance of traffic necessary for reconstruction of the main interchange in future phases.

As shown in **Figure 7-3**, the Ring Road (West) consists of:

- Two motor vehicle travel lanes in each direction (except for the short segment between the Route 50 service roads, where one lane would be provided in the southbound direction).
- A bridge over the west leg of Route 50.
- A left-turn lane at each signalized intersection approach.
- A two-way cycle track on the inner loop of the Ring Road, buffered from motor vehicle traffic.
- Sidewalks and landscape panels on both sides.
- Three new traffic signals at the two Route 50 service roads and at Sleepy Hollow Road.
- Incorporation of Castle Place and a portion of Castle Road into the Ring Road.
- Reconfiguration of the existing signal at Route 7 and Thorne Road to accommodate the east end of this the Ring Road segment.

The existing central intersection of Seven Corners, linking Route 7, the Route 50 service roads, Wilson Boulevard, and Sleepy Hollow Road, would remain as they are today in Phase 1.

Figure 7-3: Phase 1



7.2.4.2 VEHICULAR OPERATIONS

In 2030, the study area transportation network will experience significant improvements with the implementation of Phase 1 compared to 2030 Baseline conditions. As shown in **Figure 7-4** and **Table 7-2**, LOS and network delay considerably improve during the AM peak period and significantly improve during the PM peak period. While network delay is reduced by about 20 seconds in the AM peak period, it is reduced by almost 1 minute in the PM peak period. In addition, approximately 1,000 more vehicles are accommodated in the PM peak period for Phase 1 than in the 2030 Baseline conditions. There is significant

improvement in AM and PM peak period conditions at the main interchange, as well. This higher level of improvement in PM peak-period conditions is partly due to higher levels of congestion experienced in the 2030 Baseline scenario for the PM peak compared to the AM peak.

Figure 7-4: LOS for 2030 Baseline and Phase 1

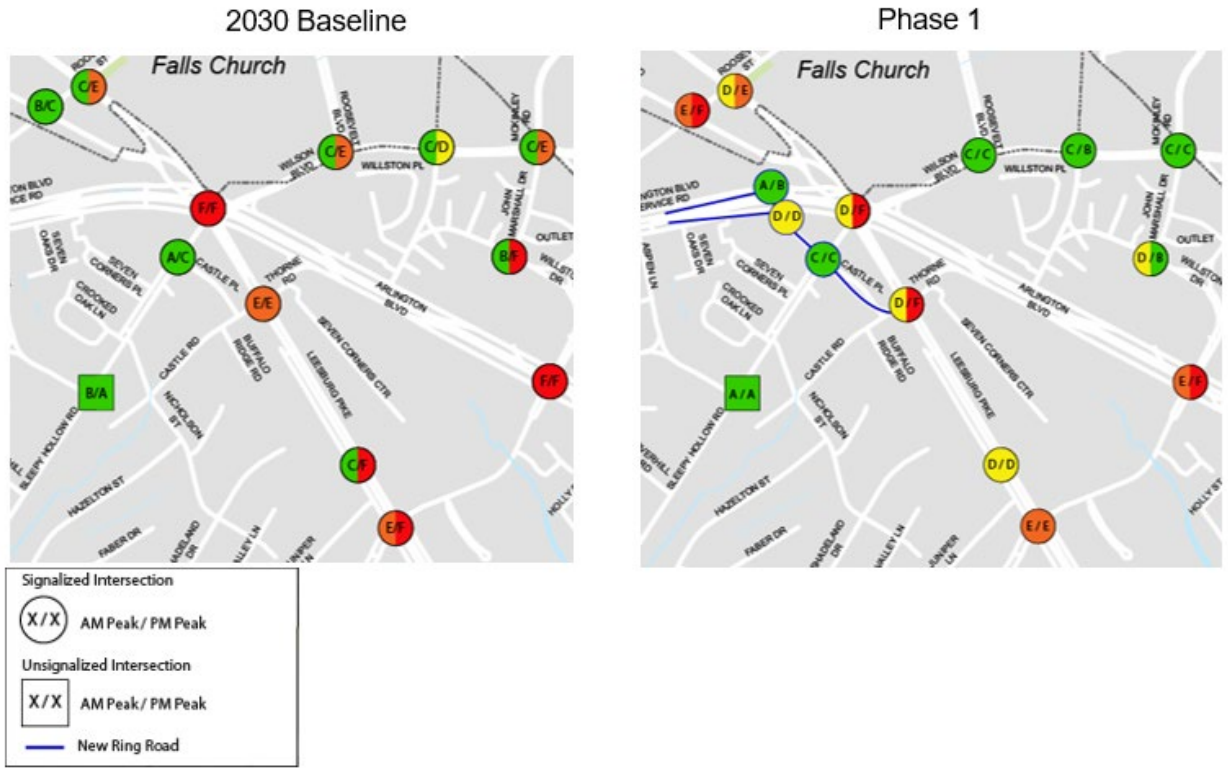


Table 7-2: VISSIM Network Performance Summary for 2030 Baseline and Phase 1

Performance Measure	2030 Baseline		Phase 1	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Average Delay (seconds)	157.1	260.2	138.9	205.2
Vehicle Arrival (vehicles)	20,455	20,727	20,435	21,624
Latent Demand (vehicles)	60	561	35	365

7.2.4.3 TRANSIT CONDITIONS

No changes to transit are expected with the implementation of Phase 1.

7.2.4.4 BICYCLE CONDITIONS

A two-way cycle track will be provided on the inner loop of this the Ring Road segment. Because there are no existing or planned bicycle facilities on the roadways that intersect the Ring Road (West), the Phase 1 design process will need to identify bicycle connections at either end of the cycle track.

7.2.4.5 PEDESTRIAN CONDITIONS

Eight-foot sidewalks with landscape panels will be provided on both sides of the Ring Road (West). These will tie into existing sidewalks along the Route 50 frontage roads, Sleepy Hollow Road, and Route 7. However, minimal changes in crossing times at other area intersections are expected.

7.2.4.6 PHASE 2 CONSIDERATIONS

With the Ring Road (West) competed in Phase 1, there are two potential options for Phase 2: the Ring Road (South) or the Central Interchange. Both options are logical follow-ups to the initial segment of the Ring Road.

7.2.5 Phase 2 Option 1: The Ring Road (South)

7.2.5.1 INTRODUCTION

Following Phase 1, two options for Phase 2 were evaluated: The Ring Road (South) and Central Interchange. These are the two options that are most connected to Phase I. The Ring Road (South) is an extension of the Ring Road to the south and east from Route 7 to Route 50 on the east. The Central Interchange is the location where Route 50 service roads, Route 7, Wilson Boulevard, Broad Street, and Sleepy Hollow Road meet over Route 50, which travels under this intersection. The project team analyzed the performance of both options and compared them to determine which option should be advanced as Phase 2 and which option should be considered for Phase 3 or later.

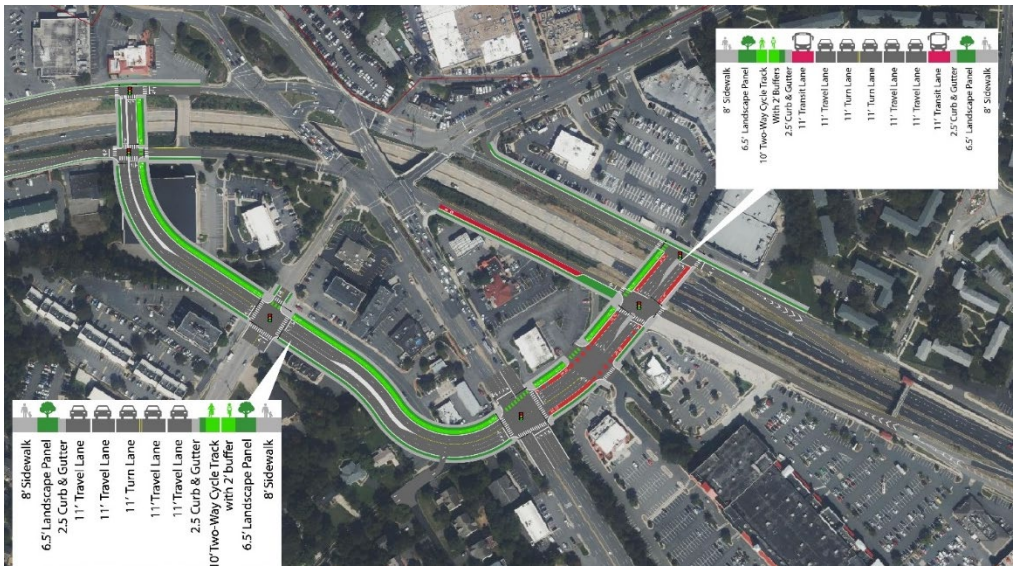
7.2.5.2 OPTION 1: THE RING ROAD (SOUTH)

The first option analyzed is the Ring Road (South), which connects the Ring Road (West) from Route 7 over to Route 50 on the east. This phase corresponds to 2030 Scenario 5. As shown in **Figure 7-5**, the Ring Road (South) consists of:

- Two motor vehicle travel lanes in each direction.
- A bridge over the east leg of Route 50 and adjusted service roads to connect to Route 50.
- Single or double left-turn lanes at major intersection approaches.
- A two-way cycle track on the inner loop of the Ring Road, buffered from motor vehicle traffic.
- Sidewalks and landscape panels on both sides.
- Two new traffic signals at each Route 50 service road.
- A new unsignalized intersection at the Ring Road (South) and Seven Corners Center.
- Exclusive transit lanes.
- Relocated Transit Center to the northwest of the Ring Road (South) along the eastbound Route 50 service road.

For this option, the Ring Road (West) is assumed to be constructed, and the existing central intersections of Seven Corners (linking Route 7, the Route 50 service roads, Wilson Boulevard, and Sleepy Hollow Road) is assumed to remain as is. The reconstructed ramps to eastbound route 50 will require relocating the Seven Corners Transit Center. While a location has not been determined, it is assumed that the relocated Transit Center will likely be constructed on the eastbound Route 50 service road to the northwest of the current location.

Figure 7-5: The Ring Road (South)



7.2.5.3 VEHICULAR OPERATIONS

In 2030, the study area network will experience substantial improvements with the implementation of the Ring Road (South) compared to Phase 1. As shown in **Figure 7-6** and **Table 7-3**, LOS and network delay modestly improve in the AM peak period and substantially improve in the PM peak period. While network delay is reduced slightly in the AM peak period, it is reduced by almost 30 seconds in the PM peak period. In addition, approximately 400 additional vehicles are accommodated in the PM peak period for the Ring Road (South) compared to Phase 1 conditions. At the main interchange, AM peak period conditions will substantially improve, while PM peak period conditions will significantly improve.

Figure 7-6: LOS for Phase 1 and the Ring Road (South)

Table 7-3: Network Performance for 2030 Baseline, Phase 1, and the Ring Road (South)

Performance Measure	2030 Baseline Conditions		Phase 1		The Ring Road (South)	
	AM	PM	AM	PM	AM	PM
Average Delay (seconds)	157.1	260.2	138.9	205.2	139.5	178.5
Vehicle Arrival (vehicles)	20,455	20,727	20,435	21,624	20,506	22,006
Latent Demand (vehicles)	60	561	35	365	45	188

7.2.5.4 TRANSIT CONDITIONS

Transit lanes will be constructed along the Ring Road (South) along with a new Seven Corners Transit Center on the eastbound Route 50 Service Road to the northwest of the current location. However, marginal transit improvements are expected as a result of these changes. The exclusive transit lanes are too short to offer any significant improvements to transit in this phase. The relocated Transit Center is unlikely to lead to major changes in transit service.

7.2.5.5 BICYCLE CONDITIONS

A two-way cycle track will be provided on the inner loop of the Ring Road (South). Because there are no existing or planned bicycle facilities on the roadways that intersect the Ring Road (South), except for the Ring Road (West) cycle track to be built during Phase 1, the design process for this segment will need to identify bicycle connections at the northeast end of the cycle track.

7.2.5.6 PEDESTRIAN CONDITIONS

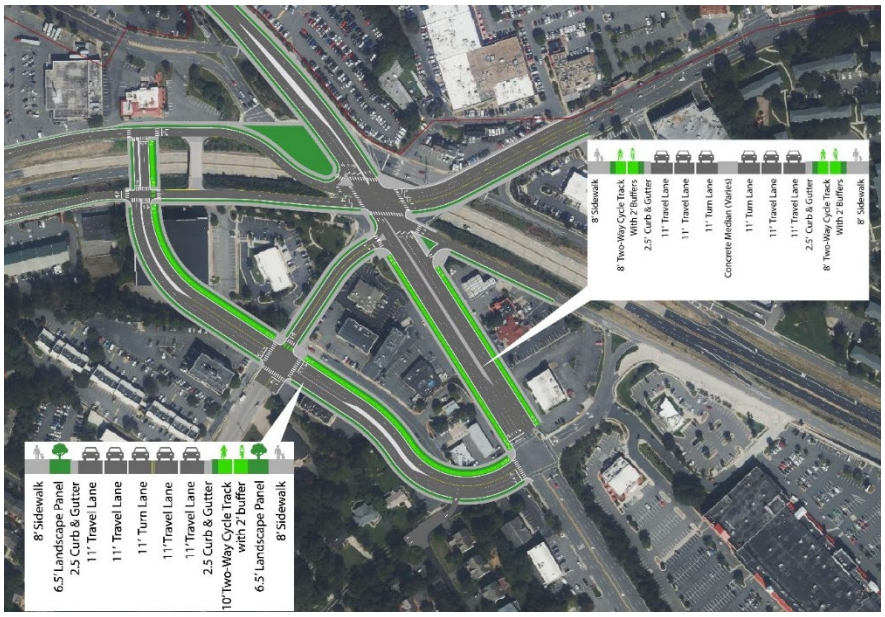
Eight-foot sidewalks with landscape panels will be provided on both sides of the Ring Road (South). These will tie into existing sidewalks along the Route 50 frontage roads, Route 7, and Seven Corners Center. However, minimal changes in crossing times at other area intersections are expected.

7.2.6 Option 2: Central Interchange

The second option considered for Phase 2 is the Central Interchange connecting Broad Street, Route 7, the Route 50 service roads, Wilson Boulevard, and Sleepy Hollow Road. This phase corresponds to 2030 Scenario 6**. Figure 7-7** shows the new configuration, which includes:

- One central signalized intersection that joins:
  - Route 7 to Broad Street, which is slightly realigned.
  - Route 50 frontage roads to the west connecting to Wilson Boulevard on the east.
- A fifth leg of the central intersection accommodating two lanes of traffic to the east leg of the eastbound Route 50 frontage road.
- A right-in, right-out intersection between Sleepy Hollow Road and southbound Route 7, similar to existing conditions.
- Two-way cycle tracks on both sides of the south leg of Route 7, buffered from motor vehicle traffic.
- Sidewalks on both sides of all roads.
- Landscape panels in selected areas.

Figure 7-7: Central Interchange



7.2.6.1 VEHICULAR OPERATIONS

In 2030, study area network operations would degrade with the implementation of the Central Interchange compared to Phase 1. As shown in **Figure 7-8** and **Table 7-4**, LOS and network delay are somewhat degraded in the AM peak period and significantly degraded in PM peak period conditions. While network delay is increased slightly in the AM peak period, it is significantly increased by almost a minute in the PM peak period. In addition, approximately 1,000 fewer vehicles are accommodated in the PM peak period for the Central Interchange compared to Phase 1 conditions. At the main interchange, AM and PM peak periods would both modestly degrade, as well.

Figure 7-8: LOS for Phase 1 and Central Interchange

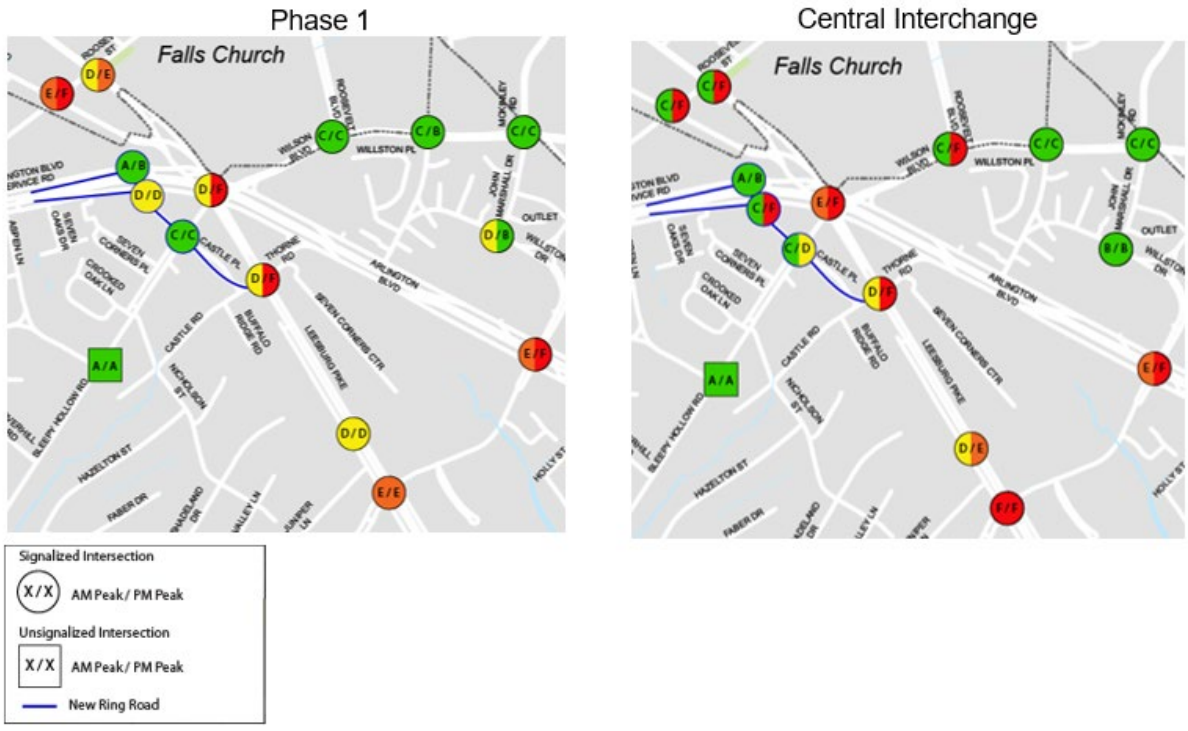


Table 7-4: Network Performance for 2030 Baseline, Phase 1, the Ring Road (South), and Central Interchange

Performance Measure	2030 Baseline Conditions		Phase 1		The Ring Road (South)		Central Interchange	
	AM	PM	AM	PM	AM	PM	AM	PM
Average Delay (seconds)	157.1	260.2	138.9	205.2	139.5	178.5	143.1	255.7
Vehicle Arrival (vehicles)	20,455	20,727	20,435	21,624	20,506	22,006	20,349	20,679
Latent Demand (vehicles)	60	561	35	365	45	188	68	661

7.2.6.2 TRANSIT CONDITIONS

There will not be significant new bus infrastructure in the study area as part of the Central Interchange improvements. However, transit operations are likely to be impacted due to the reduced vehicle operations in the area.

7.2.6.3 BICYCLE CONDITIONS

Cycle tracks will be provided on both sides of Route 7 south of the interchange. These will tie into the Ring Road (West) cycle track to be built in Phase 1. In addition, shared-use paths will be provided on Wilson Boulevard, Broad Street, and Sleepy Hollow Road. These improvements would create connections that will enable bicyclists to relatively easily move across Seven Corners in a manner that was previously not possible. Detailed design of the Central Interchange will need to identify how bicycle facilities connect with other bicycle facilities in the area.

7.2.6.4 PEDESTRIAN CONDITIONS

Sidewalks or shared-use paths will be provided on both sides of each roadway connecting to the Central Interchange. This includes Route 7, Broad Street, Wilson Boulevard, Sleepy Hollow Road, and the Route 50 service roads. While sidewalks exist along most of these links, they are typically minimal in size. These improvements would create connections that will enable pedestrians to relatively easily move across Seven Corners in a manner that was previously not possible. The improvements would also significantly reduce the time it takes to cross the Central Interchange. Crossings of Route 7 or Broad Street that often require multiple signal cycles today will only require a single signal cycle with the reconstruction of the Central Interchange.

7.2.7 Phase 2 Conclusion and Phase 3 Considerations

Based on the analyses summarized in **Table 7-5**, the Ring Road (South) is expected to operate significantly better than the Central Interchange as Phase 2. Average network delay as well as performance of the main interchange for the Ring Road (South) is significantly improved. In addition, the Ring Road (South) will create additional connections that would support future maintenance of traffic plans for the construction of the Central Interchange.

Table 7-5: Comparison of Phase 2 Options

Phase 2 Option	Time Period	Average Delay, Interchange	LOS, Central Intersection	Average Delay, Entire Network
The Ring Road (South)	AM Peak	34 seconds	C	140 seconds
	PM Peak	54 seconds	D	179 seconds
Central Interchange	AM Peak	57 seconds	E	143 seconds
	PM Peak	128 seconds	F	256 seconds

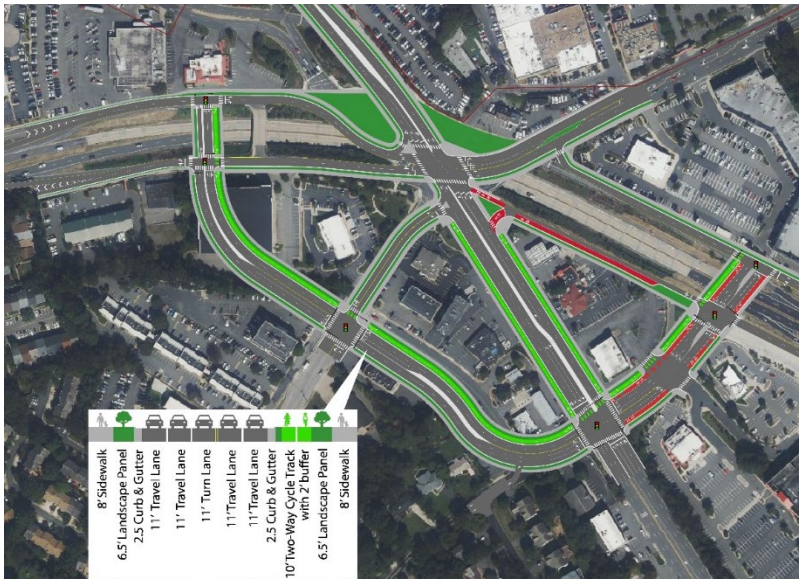
The Ring Road (South) should be built as Phase 2. Construction of the Central Interchange would follow in Phase 3.

7.2.8 Phase 3: Central Interchange

7.2.8.1 INTRODUCTION

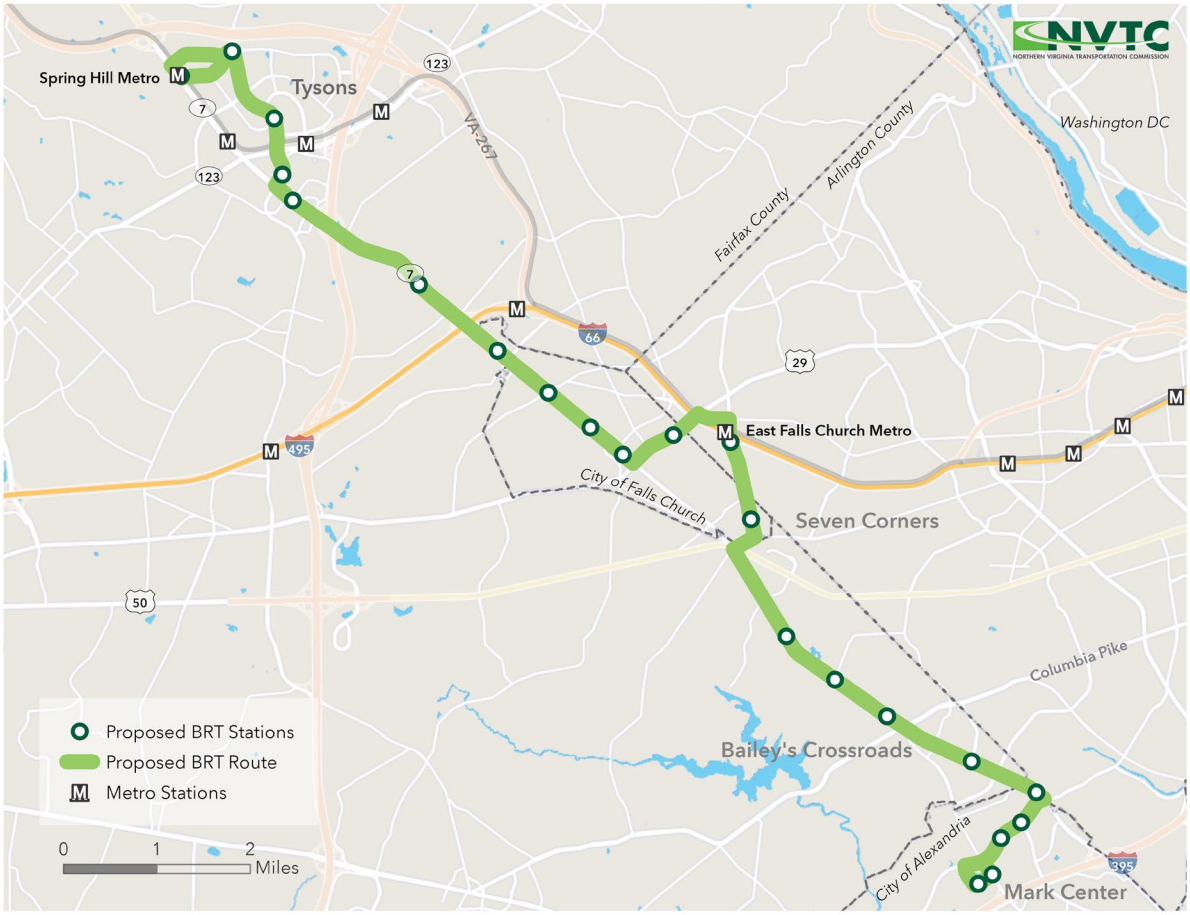
The Central Interchange (described previously) is added to Phase 2 to create Phase 3, as shown in **Figure 7-9**. Phase 3 includes the Central Interchange as well as the Ring Road from Route 50 on the east to Route 50 on the west. The Central Interchange is advanced ahead of the Ring Road (East), as that segment would require acquiring residential properties and a commercial retail center. As such, the Ring Road (East) will most likely be implemented when those properties redevelop. However, Phase 3 is not expected to be constructed for a prolonged period of time and is evaluated as the 2045 Baseline.

Figure 7-9: Phase 3



Phase 3 also includes improvement to transit as part of the Envision Route 7 BRT project, which will include dedicated road space for bus operations in the Route 7 corridor between Tysons and the Mark Center. The BRT project is planned to shift vehicle travel lanes to exclusive transit use on Route 7 south of Seven Corners and along the Ring Road South and East segments. A BRT station is proposed at the Seven Corners Transit Center. The extents of the Envision Route 7 BRT project are shown in **Figure 7-10**.

Figure 7-10: Envision Route 7 BRT



7.2.8.2 2045 BASELINE ADDITIONS

Phase 3 will be evaluated in 2045 travel conditions and is considered the 2045 Baseline conditions. The 2045 Baseline conditions include adjustments to the roadway and transit networks that are not part of the Seven Corners transportation improvements. In particular, the 2045 Baseline includes improvement to transit as part of the Envision Route 7 BRT project, which will include dedicated road space for bus operations in the Route 7 corridor between Tysons and the Mark Center.

7.2.8.3 ROADWAY NETWORK ADJUSTMENTS

The roadway network for the 2045 Baseline conditions includes all changes anticipated by MWCOG as noted in regional planning documents and included in its regional travel demand model. However, some adjustments and clarifications to roadway facilities in the study were necessary. The adjustment for Route 50 assumed in the 2030 Baseline is assumed in the 2045 Baseline as well.

7.2.8.4 TRANSIT NETWORK ADJUSTMENTS

The Envision Route 7 BRT project is anticipated in the corridor and is planned to shift vehicle travel lanes to exclusive transit use on Route 7 immediately south of Seven Corners and along the Ring Road South and East segments. A BRT station is proposed at the Seven Corners Transit Center. Regional planning documents and the MWCOG travel demand model assume that Route 7 below Seven Corners will be widened from 2 to 3 lanes in each direction. However, Fairfax County has determined that this widening shall only accommodate the BRT service and not general traffic. As such, two general purpose travel lanes in each direction are assumed on Route 7 south of Seven Corners.

Since the 2045 Baseline does not include the full Ring Road, the Envision Route 7 BRT corridor would most likely continue in an interim condition up Route 7 to Wilson Boulevard and then transition to Roosevelt Boulevard. The BRT service would then connect to the East Falls Church Metro station along Roosevelt Boulevard and Sycamore Street. At the completion of all planned improvements, the Envision Route 7 corridor would most likely shift to the Ring Road. An environmental process for the Envision Route 7 BRT effort will consider a variety of BRT alternatives and suggest adjustments as needed.

7.2.8.5 BICYCLE NETWORK ADJUSTMENTS

The project team coordinated with FCDOT to identify any bicycle connections that would be built by 2045. Through this coordination, it was determined that there are no new bicycle connections planned to be completed before 2045 except those competed in early phases of Seven Corners improvements.

7.2.8.6 PEDESTRIAN NETWORK ADJUSTMENTS

The project team coordinated with FCDOT to identify any pedestrian connections that would be built by 2045. Through this coordination, it was determined that there are no new pedestrian connections planned to be completed before 2045 except those competed in early phases of Seven Corners improvements.

7.2.8.7 VEHICULAR OPERATIONS

In 2045, study area vehicle operations would degrade. However, transit operations would likely significantly improve with the inclusion of a network of exclusive lanes for transit. As shown in **Table 7-6**, LOS and network delay for vehicle travel degrade in both the AM peak period and PM peak period conditions. This reduction in vehicle operations will accompany what will most likely be a significant improvement in transit operating conditions. The project team will perform a fuller assessment of future conditions as part of an environmental process for the Envision Route 7 BRT effort, for which a variety of BRT alternatives will be developed and tested.

Table 7-6: Network Performance for Phase 1, Phase 2, and Phase 3 AM and PM Peak Hours

Performance Measure	Phase 1		Phase 2		Phase 3	
	AM	PM	AM	PM	AM	PM
Average Delay (seconds)	138.9	205.2	139.5	178.5	184.0	237.8
Vehicle Arrival (vehicles)	20,435	21,624	20,506	22,006	20,858	21,725
Latent Demand (vehicles)	35	365	45	188	533	597

7.2.8.8 TRANSIT CONDITIONS

The Envision Route 7 BRT project will likely run additional BRT service through the study area. However, there will not be significant new bus infrastructure in the study area during Phase 3. The BRT is most likely to share lanes with vehicle travel on Route 7 and Wilson Boulevard to make the connection to Roosevelt Boulevard from Route 7 in the south until the full Ring Road is completed in Phase 4. As transit will be sharing lanes with vehicle travel, transit operations will experience similar conditions as vehicle operations in the area. It should be noted that the Envision Route 7 BRT environmental process may consider additional changes not included in the Seven Corners Phasing Study.

7.2.8.9 BICYCLE CONDITIONS

Cycle tracks will be provided on both sides of Route 7 south of the interchange. These will tie into the Ring Road (West) cycle track to be built in Phase 1. In addition, shared-use paths will be provided on Wilson Boulevard, Broad Street, and Sleepy Hollow Road. These improvements would create connections that will enable bicyclists to relatively easily move across Seven Corners in a manner that was previously not

possible. Detailed design of the Central Interchange will need to identify how bicycle facilities connect with other bicycle facilities in the area.

7.2.8.10 PEDESTRIAN CONDITIONS

Sidewalks or shared use-paths will be provided on both sides of each roadway connecting to the Central Interchange. This includes Route 7, Broad Street, Wilson Boulevard, Sleepy Hollow Road, and the Route 50 service roads. While sidewalks exist along most of these links, they are typically minimal in size. These improvements would create connections that will enable pedestrians to relatively easily move across Seven Corners in a manner that was previously not possible. The improvements would also significantly reduce the time it takes to cross the Central Interchange. Crossings of Route 7 or Broad Street that often require multiple signal cycles today will only require a single signal cycle with the reconstruction of the Central Interchange.

7.2.9 Phase 4: The Ring Road (East)

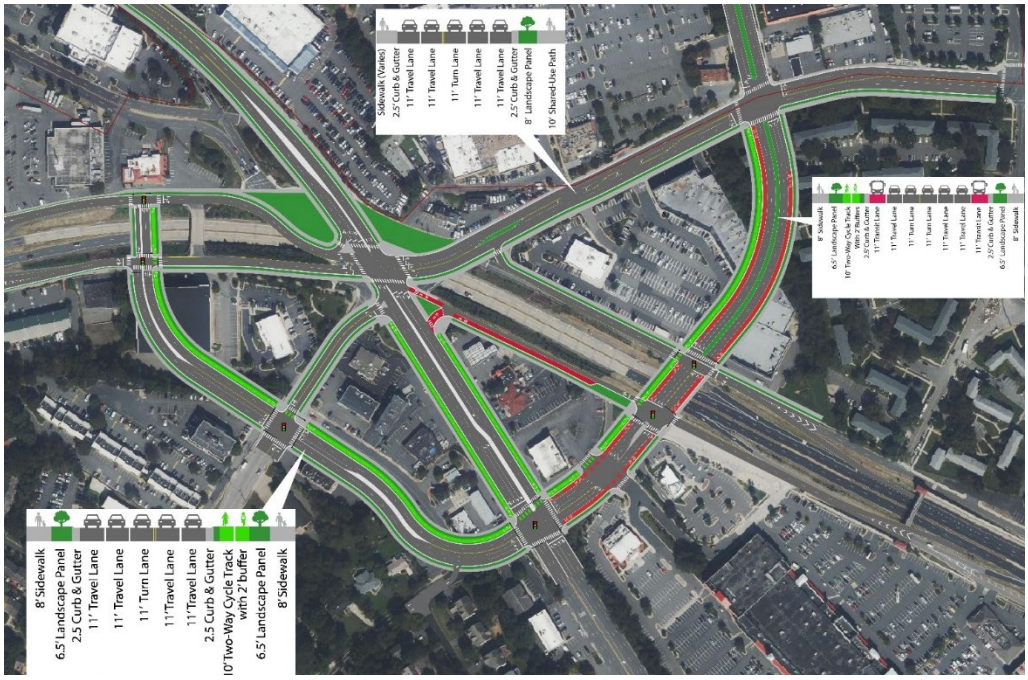
7.2.9.1 INTRODUCTION

The remaining element in the Comprehensive Plan network is the Ring Road (East), which will extend the east end of the Ring Road from Route 50 north to the existing signalized intersection of Wilson Boulevard and Roosevelt Boulevard. This phase corresponds to 2045 Scenario 1. **Figure 7-11** shows the Ring Road (East), which includes:

- Two general purpose motor vehicle travel lanes in each direction.
- One exclusive BRT lane in each direction, as described below.
- Turn lanes at major intersection approaches, as shown in **Figure 7-11**.
- A two-way cycle track on the inner loop, buffered from motor vehicle traffic.
- Sidewalks and landscape panels on both sides.

Implementation of Phase 4 is expected to take place well into the future. For that reason, the analysis year for Phase 4 analysis is 2045. Phase 4 is compared to Phase 3 in this section.

Figure 7-11: The Ring Road (East)



7.2.9.2 VEHICULAR OPERATIONS

As shown in **Figure 7-12** and **Table 7-7**, study area LOS and network delay for vehicle travel would modestly improve in both the AM and PM peak periods with the implementation of the Ring Road (East) compared to Phase 3. Most intersections in the study area will have similar operations to those noted in Phase 3. However, selected intersections, most notably the intersection of the Ring Road with the westbound Route 50 frontage road, show increased delay.

Figure 7-12: LOS for Phase 3 and Phase 4

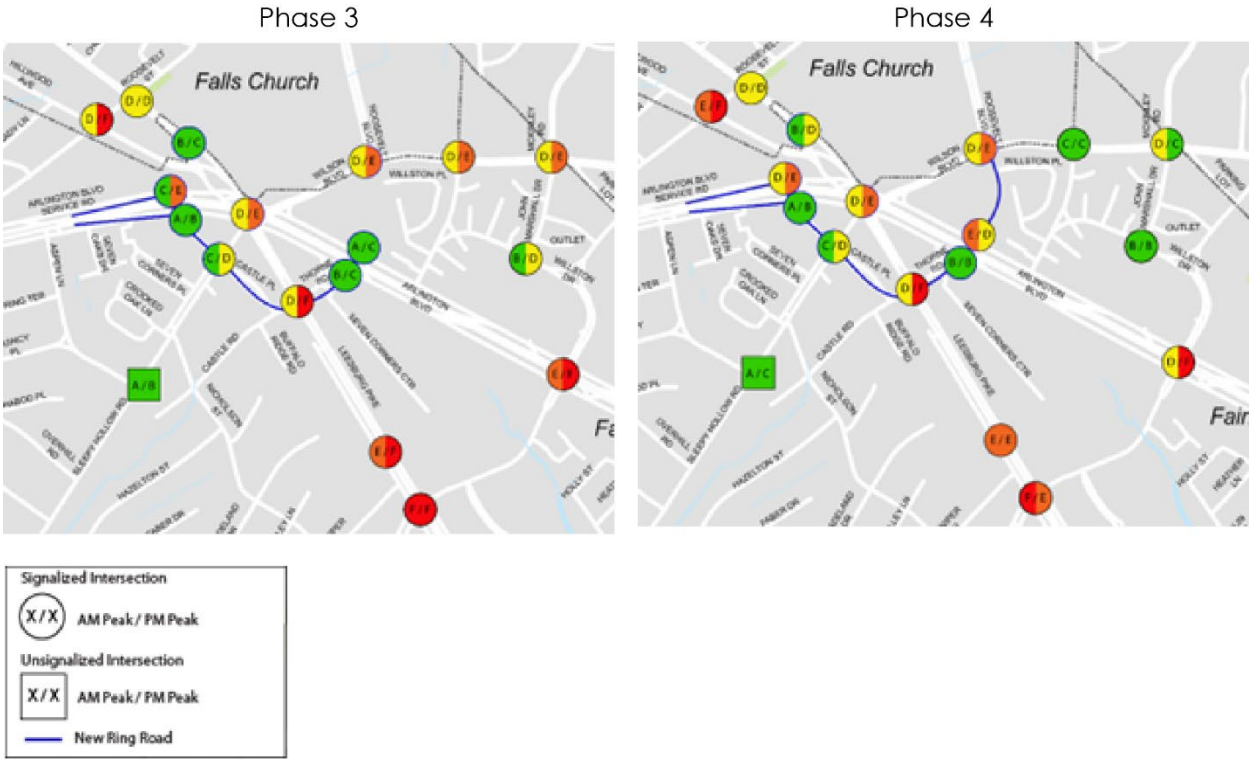


Table 7-7: Network Performance for Phase 1, Phase 2, Phase 3, and Phase 4 AM and PM Peak Hours

Performance Measure	Phase 1		Phase 2		Phase 3		Phase 4	
	AM	PM	AM	PM	AM	PM	AM	PM
Average Delay (seconds)	138.9	205.2	139.5	178.5	184.0	237.8	176.6	230.1
Vehicle Arrival (vehicles)	20,435	21,624	20,506	22,006	20,858	21,725	20,801	21,333
Latent Demand (vehicles)	35	365	45	188	533	597	426	586

7.2.9.3 TRANSIT CONDITIONS

Phase 4 will build on the transit improvements noted in Phase 3. The completion of the Ring Road would enable the Envision Route 7 BRT corridor to utilize the exclusive transit lanes planned along the Ring Road instead of general travel lanes along Route 7 and Wilson Boulevard. The exclusive transit lanes along a more direct connection will likely improve transit operations in the area. More detailed analysis will be performed as part of the Envision Route 7 BRT environmental process. As part of that process, additional changes not included in the Seven Corners Phasing Study may be advanced.

7.2.9.4 BICYCLE CONDITIONS

A two-way cycle track will be provided on the inner loop of the Ring Road (East), extending the cycle tracks that will be built on the west and south segments of the Ring Road during previous phases. At the north end of the Ring Road (East), connections would be made to existing bike lanes on Roosevelt Boulevard and a planned shared-use path along Wilson Boulevard.

7.2.9.5 PEDESTRIAN CONDITIONS

Eight-foot sidewalks with landscape panels will be provided on both sides of the Ring Road (East). These will tie into existing sidewalks along the Route 50 frontage roads and Wilson Boulevard.

7.2.10 Phasing Conclusions

Following a detailed analysis of various phasing approaches to implement improvements in the Seven Corners area, the project team recommends a phasing approach that steadily improves operations and mobility through each implemented phase. Vehicle operations are improved with the implementation of each project phase except between Phase 2 and Phase 3, where vehicle operations somewhat degrade in order to implement significant transit mobility improvements in the corridor. Based on the analysis results, improvements to Seven Corners should be built in the following order:

Phase 1: The Ring Road (West)

Phase 2: The Ring Road (South)

Phase 3: Central Interchange

Phase 4: The Ring Road (East)