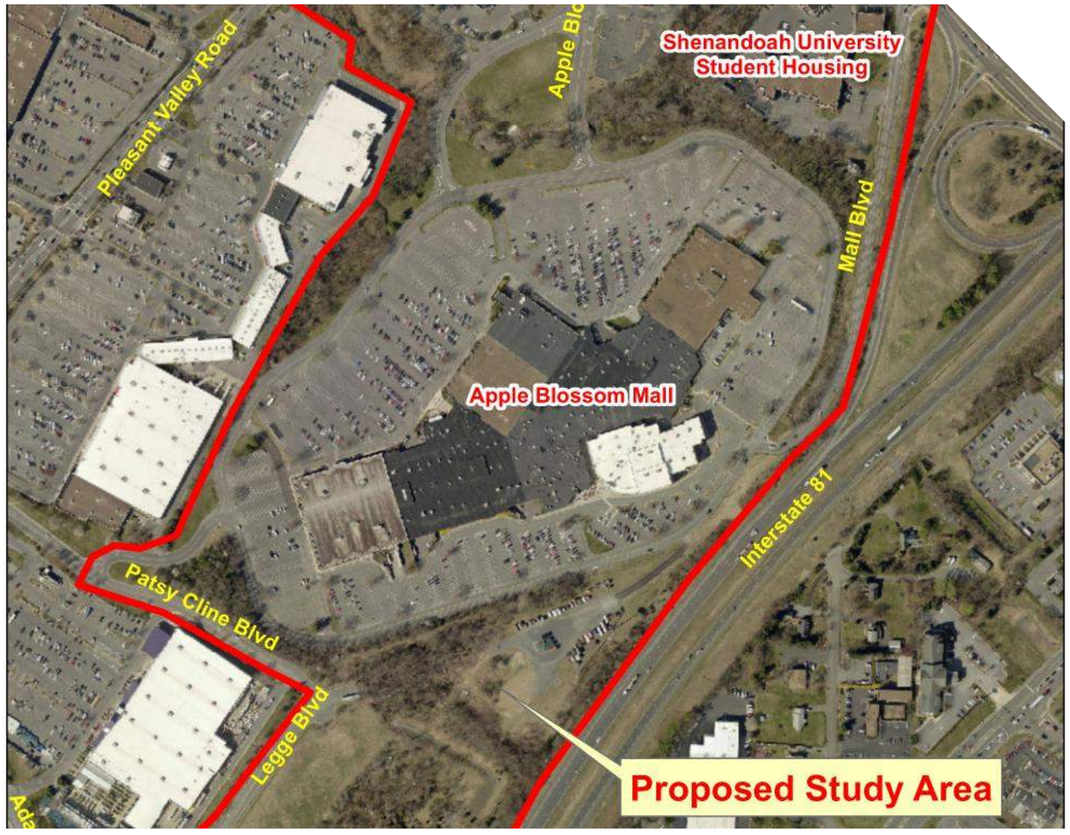
Apple Blossom Mall Street Study
Summary Graphics
Winchester, VA

Submitted To:
City of Winchester Dept of Public Works and Northern Shenandoah Valley Regional Commission



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Summary Graphics
NSVRX24001
June 27, 2025

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Summary

The proposed infrastructure improvements for the study area are summarized in **Table 1** and further detailed throughout this summary report. The recommendations were developed based on a comprehensive evaluation of the City's Comprehensive Plan, planned and programmed improvements, existing and projected traffic conditions - including 2050 peak hour operations - and input from stakeholder outreach and the public information meeting to provide multi-modal improvement options for future implementation.

Proposed Apple Blossom Mall Steet Study Improvements		
(Location)		(Figure Detail)
Apple Blossom Drive	Add **Northbound (NB)** turn lane on Apple Blossom Drive at Route 50 with new sidewalk adjacent to Ollies.	Figure 8, pg. 14
Apple Blossom Drive	Add a **Southbound (SB)** left-turn lane to Ollies and adjust median and light poles.	Figure 8, pg. 14
Apple Blossom Drive	Square off the intersection at Shopping Center Drive to improve alignment and reduce crosswalk distances for Green Circle Trail	Figure 8, pg. 14
Apple Blossom Drive	**Restripe** the Apple Blossom Drive intersection at Shopping Center Drive for **two through Southbound (SB)** lanes.	Figure 8, pg. 14
Millwood Avenue	Add **signage** for U-turns at Apple Blossom Mall to discourage U-turns at Apple Blossom Dr signal WB on 50 at signal.	Figure 8, pg. 14
Millwood Avenue	**Re-route** local traffic to the Mills from WB 50 left turn lanes to Apple Blossom Drive through Ollies.	Figure 8, pg. 14
Apple Blossom Drive	Add a **median** on Apple Blossom Drive to connect to the Mall Ring Road.	Figure 9, pg. 15
Apple Blossom Drive	Upgrade ring road with raised median and left turn lanes with sidewalk, shared use path and enhanced streetscapes	Figure 15, pg. 21
Apple Blossom Drive	Consider **gateway feature** at the Mall ring road as an option with a **roundabout** for redevelopment in the Mall parking lot.	Figure 25, pg. 27
Patsy Cline Blvd.	**Extend northeast of Legge Boulevard** adjacent to Winchester Commons planned apartments and connect to Apple Blossom Drive (ring road) as two-lane major street with median.	Figure 12, pg. 18
Mall Boulevard	**Maintain access as right in/out to Millwood Avenue**. Provide wayfinding to route traffic to Apple Blossom Drive.	Figure 7, pg. 13
Shopping Center Drive	Implement 'road diet' and **restripe pavement** for 3-lane undivided section with on-street bike lanes east of Pleasant Valley Drive to supplement Green Circle Trail off-street route.	Figure 8, pg. 14
Green Circle Trail	Provide linkage adjacent to Abram's Creek with redevelopment of Apple Blossom Mall and Vaden Campus Commons for direct connection to Millwood Avenue pedestrian signal.	Figure 24, pg. 26

Table 1: Apple Blossom Mall Area Improvement Recommendations

The recommendations reflect coordination with the City of Winchester, the Northern Shenandoah Valley Regional Commission (NSVRC), the WinFred Metropolitan Planning Organization (MPO), and VDOT. Input was also gathered through engagement with local stakeholders and the public information meeting held in Match 2025. Throughout the study, key findings and interim analyses were reviewed in collaboration City staff to ensure alignment with local priorities and planning efforts.

Study Area Context

The study area is centered around Apple Blossom Mall and includes several major roadways such as Millwood Avenue, South Pleasant Valley Road, and Jubal Early Drive, as well as local and private roads including Mall Blvd and the Mall Ring Road (formally Apple Blossom Drive). The network primarily serves a mix of commercial and retail developments, and accommodates both local and regional traffic.

At the request of the Northern Shenandoah Valley Regional Commission (NSVRC) a street connectivity and multi-modal planning study was conducted for the Apple Blossom Mall area within the City of Winchester. The study focused on the following key components:

- Assessment of existing conditions
- Stakeholder engagement
- Analysis of proposed development opportunities
- Development of traffic forecasts
- Evaluation of potential improvements to enhance traffic circulation and connectivity, safety, and multi-modal access
- Public outreach and presentation of findings

The study supports potential updates to the City's Comprehensive Plan by documenting the characteristics of this subarea and identifying opportunities to enhance the local economy, environmental quality, land use patterns, and transportation infrastructure. The City's vision for this area, as reflected in its Comprehensive Plan (shown below), includes potential redevelopment of the Mall parking areas and improvements to open space/circulation around Shenandoah University's Vaden Campus Commons, located adjacent to Abrams Creek.

With the programmed infrastructure improvements already underway at Millwood Avenue and I-81 Exit 313 by the City and VDOT, this study also provided an opportunity to update the long-term traffic conditions and assess future infrastructure needs. The study area boundaries are shown in ***Figure 1*** (page 2).

APPLE BLOSSOM MALL STREET STUDY

CITY OF WINCHESTER
6/27/2025

NSVRC NORTHERN SHENANDOAH VALLEY REGIONAL COMMISSION

Winchester Virginia

Pennoni

LEGEND

- EXISTING ROADWAYS
- FUTURE ROADWAYS
- 100 YEAR FLOODPLAIN
- WATERMAIN
- SANITARY SEWER
- EXISTING SIDEWALK
- STUDY AREA
- FUTURE TRAIL
- FUTURE ELEVATED BOARDWALK
- FUTURE SIDEWALK
- U — UNSIGNALIZED INTERSECTION
- SIGNALIZED INTERSECTION
- * — PRIVATE STREETS

4

2

FIGURE 1.0
STUDY AREA

0 200' 400'

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Existing Conditions

The existing conditions analysis focuses on understanding the current state of the transportation network within the study area. This section evaluates the performance of key intersections, roadways, pedestrian and bicycle facilities, and overall traffic operations based on field observations, traffic counts, and capacity analyses. An engineer's field visit was conducted on April 25, 2024. The findings were summarized in the Technical Report from September 2024, with excerpts include below.

The study area is centered around Apple Blossom Mall and includes several major roadways such as Millwood Avenue, South Pleasant Valley Road, and Jubal Early Drive, as well as local and private roads like Mall Blvd and the Mall Ring Road (formally Apple Blossom Drive). The network primarily serves a mix of commercial establishments, retail centers, and regional traffic.

Table 2 summarizes the key characteristics of the roadways within the study area:

Roadway	Route No.	Classification	No. of Lanes	Speed Limit	Raised Median?
Jubal Early Dr	Secondary Rte. 7	Principal Arterial	4	35	Yes
Millwood Ave (east of Jubal Early Dr)	US Rte. 17/50/522	Principal Arterial	4	35	Yes
Millwood Ave (north of Jubal Early Dr)	US Rte. 17/50/522	Minor Arterial	4	35	Yes
Apple Blossom Dr (north of mall ring road)	None	Local (Private)	4	Not posted	Yes
Mall Blvd	None	Frontage Road	2	Not posted	No
Legge Blvd	None	Local	2	35	No
S Pleasant Valley Rd (North of Featherbed Ln)	Secondary Rte. 5213	Minor Arterial	4	35	Yes
S Pleasant Valley Rd (South of Featherbed Ln)	Secondary Rte. 5213	Minor Arterial	4	35	No
Shopping Center Dr	None	Local (Private)	4	Not posted	No
Patsy Cline Blvd (west of S Mall Rd)	None	Local	2	35	No
Patsy Cline Blvd (east of S Mall Rd)	None	Local (Private)	2	35	No
Adams Dr	None	Local	4	35	Yes
N Mall Rd	None	Local (Private)	2	Not posted	No
S Mall Rd	None	Local (Private)	2	Not posted	No
Mall Ring Rd (formally Apple Blossom Dr)	None	Local (Private)	3	Not posted	No

Table 2: Roadway Characteristics for the Study Area

Traffic Counts and Volume Analysis

Intersection counts were conducted on Tuesday, April 23, 2024, with major intersections observed for 12 hours from 6:00 AM to 6:00 PM and minor intersections observed during the AM and PM peak periods from 6:00-9:00 AM and 3:00-6:00 PM. Additionally, 48-hour tube counts were conducted at three key locations on Tuesday, April 23, 2024, and Wednesday, April 24, 2024, to capture vehicle speeds and average daily traffic volumes.

Daily Traffic Volumes and Speed Data:

- Daily traffic counts were analyzed to assess the overall usage of the roadway network. Corridors such as South Pleasant Valley Road and Millwood Avenue carry the majority of the traffic, reflecting their roles as major arterials. In contrast, interior local and private roads, including Mall Blvd and the Mall Ring Road (formally Apple Blossom Drive), primarily manage local circulation within the commercial area.
- The analysis also considers total hourly volumes for all 12-hour count locations, as shown in **Table 3.** This chart highlights the total intersection volumes at the major intersections throughout the day, offering insight into overall traffic trends and demand fluctuations during the observation period.

Peak Hour Selection and Traffic Volume Distribution:

- The AM, mid-day, and PM peak hours for the network were determined to be 8:00 AM, 12:00 PM, and 4:45 PM, respectively. The PM peak hour exhibited the highest traffic volumes, followed by the mid-day peak hour, and then the AM peak hour. This pattern highlights the significant demand during evening commutes and lunchtime periods within the study area. Based on the traffic trends, the PM peak period was the focus of the future conditions analysis, as volumes for the AM peak period are reduced by approximately 35-40 percent from the PM peak volumes.

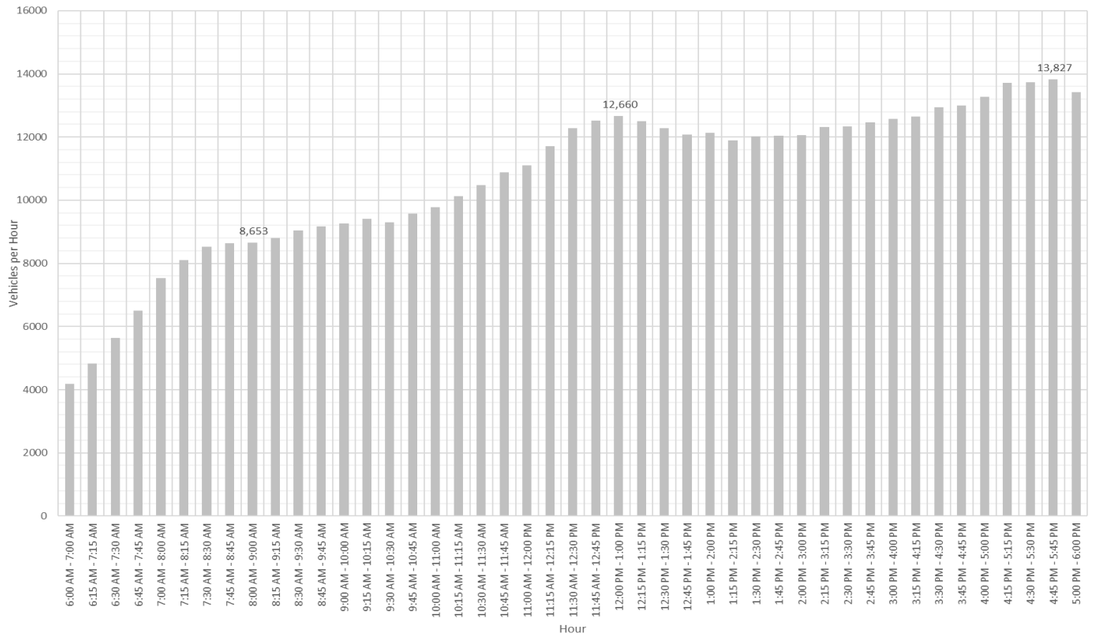

Table 3: Study Area Volumes by Hour

Capacity Analysis Results

The existing conditions analysis includes results from both SimTraffic simulations for the major corridors and Synchro-based HCM unsignalized capacity analysis for the interior intersections. The results provide a comprehensive overview of intersection performance during the PM peak hour, highlighting key areas of concern and overall operational efficiency. Intersection performance is summarized in ***Figure 2*** (next page). The average speeds from simulation for the Jubal Early Drive-Millwood Ave and S Pleasant Valley Road corridors are shown in **Table 4.**

Arterial	Direction	Average Speed (mph)
Jubal Early Dr-Millwood Ave	EB	9
	WB	12
S Pleasant Valley Rd	NB	19
	SB	19

Table 4: PM Peak Hour SimTraffic Speed Analysis Results

The existing conditions analysis indicates that the study area's transportation network generally operates efficiently under current traffic demand. However, there are a few specific locations on the surrounding arterial network experiencing notable spillovers. The southbound Millwood Avenue approach to Jubal Early Drive and the eastbound Millwood Avenue approach to the Mall Boulevard signal are particularly affected, with significant queuing observed at these intersections. While most major arterials and local roads maintain acceptable operations, improvements in these areas are needed to manage traffic spillovers effectively. Additionally, the primary challenges related to pedestrian connectivity and bicycle infrastructure remain areas for enhancement to improve overall safety and accessibility.

APPLE BLOSSOM MALL STREET STUDY

CITY OF WINCHESTER
6/27/2025

NSVRC NORTHERN SHENANDOAH VALLEY REGIONAL COMMISSION

Winchester Virginia

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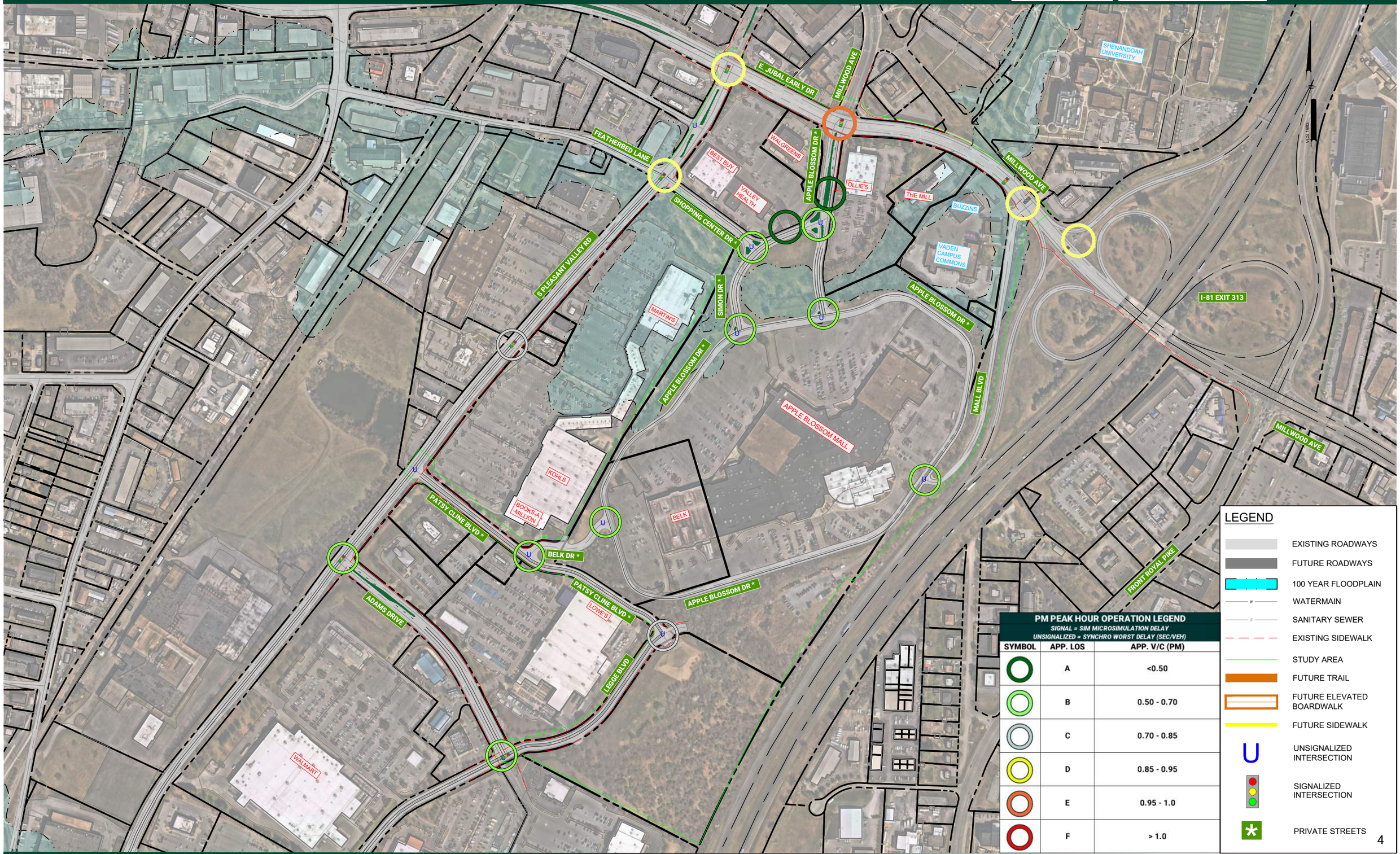

PM PEAK HOUR OPERATION LEGEND

SIGNAL = SIM MICROSIMULATION DELAY
UNSIGNALIZED = SYNCHRO WORST DELAY (SEC/VEH)

SYMBOL	APP. LOS	APP. V/C (PM)
	A	<0.50
	B	0.50 - 0.70
	C	0.70 - 0.85
	D	0.85 - 0.95
	E	0.95 - 1.0
	F	> 1.0

LEGEND

- EXISTING ROADWAYS
- FUTURE ROADWAYS
- 100 YEAR FLOODPLAIN
- WATERMAIN
- SANITARY SEWER
- EXISTING SIDEWALK
- STUDY AREA
- FUTURE TRAIL
- FUTURE ELEVATED BOARDWALK
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FIGURE 2.0
EXISTING CONDITIONS

0 200' 400'

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Planned Improvements

The future conditions analysis reviewed the changes in roadway and non-vehicular circulation enhancements that are programmed for implementation in the short term. Improvements in the study area are noted below, and are shown in **Figure 3** (next page) to include:

Roadway Projects

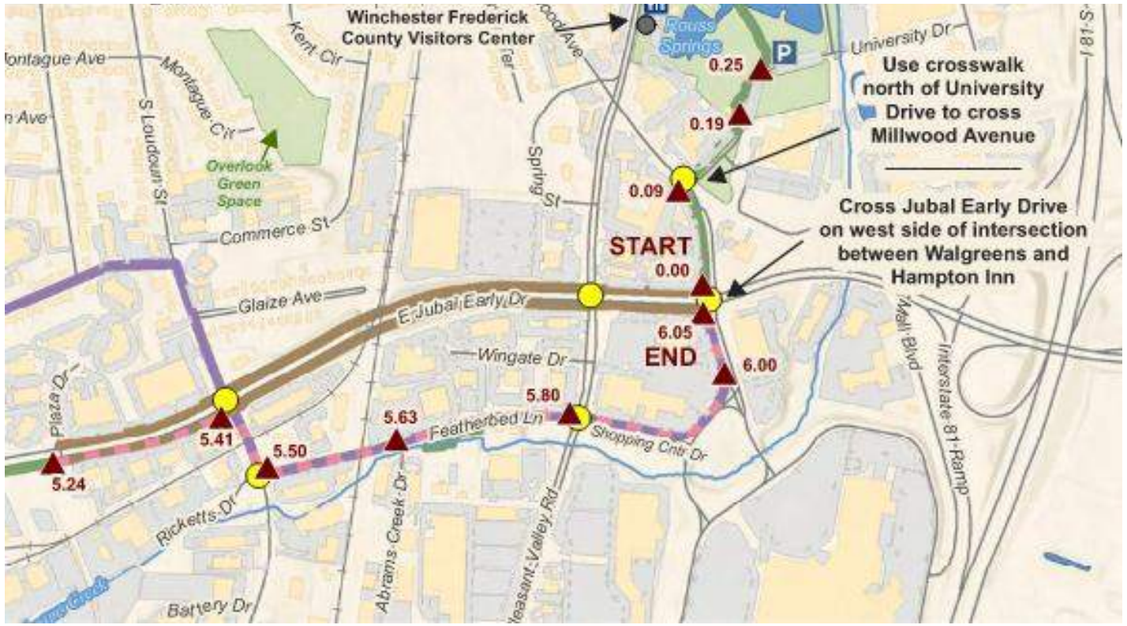
- I-81 Exit 313 Interchange Upgrade
- Millwood Avenue Widening Project
- Jubal Early Drive Turn Lane Additions
- Closure of center median north of Featherbed Lane

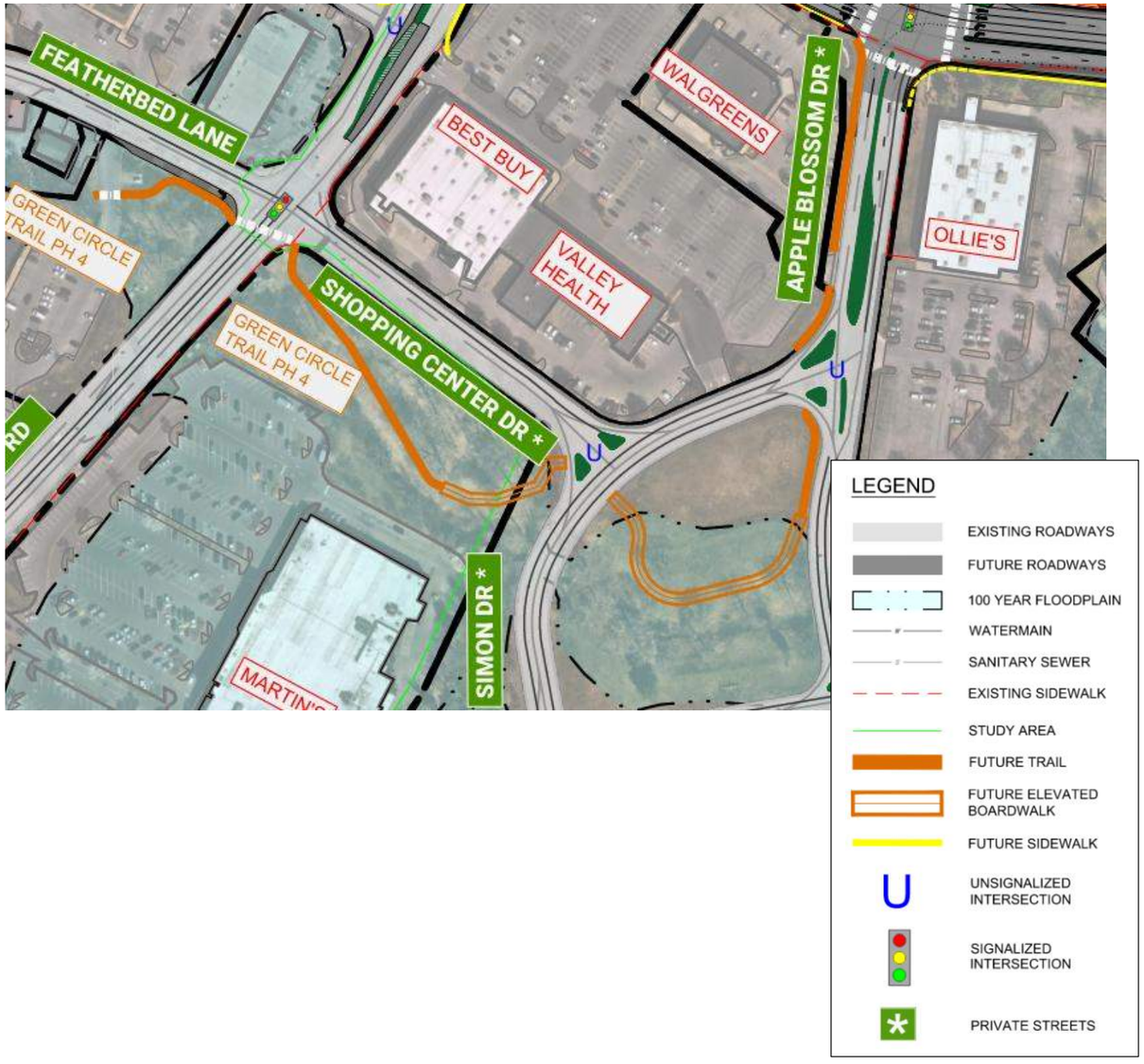
The projects are in design or pending construction with public resources and were assumed for the baseline assessment of the future conditions.

Multi-Modal Enhancements

- Green Circle Trail Phase 4 Expansion from west of Featherbed Lane to Rt. 50.
- Right turn lane on Featherbed Lane at Pleasant Valley Rd. with Green Circle Trail
- Millwood Avenue pedestrian signal crossing installation at Vaden Campus Commons

The multimodal elements associated with the implementation of Phase 4 of the Green Circle Trail would provide an off-street linkage south and east of Featherbed Lane. This new segment will connect back to the beginning of the Green Circle Trail at the Millwood Avenue/Jubal Early Drive traffic signal. The existing context of the Green Circle Trail is shown below, with the future trail extension within the study area highlighted in orange in the second exhibit (to the right).





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APPLE BLOSSOM MALL STREET STUDY

CITY OF WINCHESTER
6/27/2025

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FIGURE 3.0
PROGRAMMED IMPROVEMENTS

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Future Conditions

The existing traffic conditions were evaluated to project changes in the next 25 years. Traffic forecasts were developed by combining regional growth trends with layered assumptions for potential redevelopment at key land use nodes within the study area. These forecasts were reviewed in coordination with staff from the City of Winchester and VDOT Staunton District Transportation Planning.

The land use assumptions included illustrative redevelopment scenarios intended to evaluate long-term traffic and mobility needs. While these development assumptions are conceptual, they help establish a planning framework for infrastructure improvements. Future land development would be subject to refinement through the City's Comprehensive Plan update process, land entitlement reviews, and site plan approvals.

The primary purpose for this study was to evaluate how future land use scenarios could impact transportation infrastructure in the study area. The methodology for deriving future traffic volumes included:

- Applying a 1% annual growth rate to 2024 peak hour volumes, based on long-term VDOT trends;
- Generating and assigning PM peak hour trips for potential redevelopment using the ITE Trip Generation Manual (11th Ed.) and existing VDOT StreetLight Data zone distributions for residential and commercial uses;
- Adjusting link volumes to reflect diversions resulting from local access changes associated with programed infrastructure improvements; and
- Refining roadway improvements to mitigate long-term operational impacts in a manner consistent with the City's Comprehensive Plan goals.

Proposed Land Use Plan

In coordination with the City's Comprehensive Plan and informed by input from City staff and key stakeholders, a set of future development assumptions was established for the study area. These are illustrated in in ***Figure 4*** (next page) and summarized in **Table 5**. The land use plan reflects potential redevelopment opportunities, including both commercial and residential uses, to support long-range traffic forecasting and infrastructure planning.

Future Land Uses Assumed For Long Term Traffic Forcasts

General Location	Available Land Size	Existing Size	Proposed Size	Use	ITE Land Use Code	Zoning Ordinance Parking Spaces Req'd
Apple Blossom Mall property opposite Apple Blossom Drive in ex. Parking	138,700 SF	0 SF	**17,000 SF**	Retail	822	**57**
Apple Blossom Mall property north of the Abrams Creek floodplain	32,860 SF	0 SF	**3,500 SF**	Fast Food Restaurant with drive-thru	934	**18**
Existing Sears in Apple Blossom Mall *		71,800 SF	**71,800 SF**	Retail	820	**N/A**
Vaden Campus increase in students **	22,423 SF (ex. bldg area)	250 stu	**400 stu**	University	550	**200**
Winchester Commons		0 units	**246 units**	Residential Multifamily Housing	220	**492**
Winchester Commons Ancillary Pad Site		0 SF	**18,000 SF**	Retail	822	**60**
Apple Blossom Mall property north of Winchester Commons and east of ex. mall ring road	5 AC	0 units	**80 units**	Residential Multifamily Housing	220	**160**
Apple Blossom Mall property west of mall in ex. parking	4 SF	0 units	**300 units**	Residential Multifamily Housing	220	**600**

** Assuming redevelopment of existing commercial space, included in future year traffic forecast for roadway check.*
*** Incremental parking requirements for additional students are not included in the master plan.*

Table 5: Study Area Future Land Use Assumptions

Notably, the former Sears anchor space at Apple Blossom Mall – vacant during the Spring 2024 traffic counts – is assumed to be reused for retail purposes in the forecast. Additionally, housing growth associated with Shenandoah University is reflected in an assumed increase in housing demand and increased student activities at the Vaden Campus Commons, despite no specific projects currently programmed by the University. To the south of the Mall, the Winchester Commons apartments are assumed to proceed consistent with previously approved site plans for multi-family housing east of Legge Boulevard.

Proposed Mall Parking Impacts

As part of the infrastructure recommendations, changes to the function and operations of Apple Blossom Drive - the Mall's internal ring road – was evaluated. The road is currently private and maintained by Apple Blossom Mall and the Belk Companies. However, proposed alternatives would upgrade the corridor to accommodate multi modal access and improved connectivity, either as a redesigned private drive or as a public street.

These upgrades may involve adjustments to the existing street footprint, including the addition of raised medians, improved access management, and new pedestrian and bicycle facilities. As shown in **Table 6**, such changes could displace existing parking spaces. However, preliminary analysis indicates that, even with potential displacement and driveway consolidation, the estimated remaining parking supply would remain generally consistent with the City zoning requirements for the existing retail square footage. These conceptual adjustments also present opportunities to introduce additional greenspace and improve pedestrian circulation throughout the Mall site.

APPLE BLOSSOM MALL

ZONING	B2				
PARCEL #	**253/ 01 A/ 1/ / AND 273/ 01 / 2/ /**				
ACREAGE	63.17 AC				
TOTAL BUILDING GFA:	535,941 SF				
from Winchester open data GIS. Parcel 253/ 01 A/ 1// recorded as 462,500 SF and Parcel 273/ 01/ 2// at 73,411 SF					
CINEMA GFA/SIZE:	50,256 SF		2,328 SEATS		
MALL PARKING (INCLUDING BELK) WITH 4 FT BUFFER AS SHOWN IN CONCEPT W/O R-O-W DEDICATION					
(1 FOR EVERY 300 SQ. FT OF GFA) (CINEMA IS 1/5 SEATS)					
ZONING ORDINANCE PARKING REQUIREMENTS	**EXISTING CONDITIONS**	**EXISTING DISPLACED SPACES ***	**ADDED PARKING SPACES ***	**ESTIMATED TOTAL PROPOSED**	**SURPLUS**
2085	2277	688	496	**2085**	**0**
MALL INCLUDING BELK PARKING WITH MAX 9 FT UTILITY SETBACK/BUFFER W/ R-O-W DEDICATION **					
ZONING ORDINANCE PARKING REQUIREMENTS	**EXISTING CONDITIONS**	**EXISTING DISPLACED SPACES ***	**ADDED PARKING SPACES ***	**ESTIMATED TOTAL PROPOSED**	**SURPLUS**
2085	2277	732	496	**2041**	**-44**

**** with access management and 20 ft pedestrian corridor***
***** assuming 10 ft setback is not modified with site zoning amended by others (worst case for planning)***
Note:
1. Refer to the appendix for the tabulation of individual parcels 253/01A/1// and 273/01/2//.
2. Refer to the appendix for details on proposed future uses.
3. Disclaimer: The provided information is preliminary and intended solely for planning purposes. It remains subject to final engineering design and subsequent revisions.
4. As per the Winchester Zoning Ordinance, a curbed landscape median with a minimum width of 10 feet is required to separate every sixth row of parking. This requirement has not yet been incorporated into the current planning phase.

Table 6: Apple Blossom Mall Parking Calculations with Road Improvements

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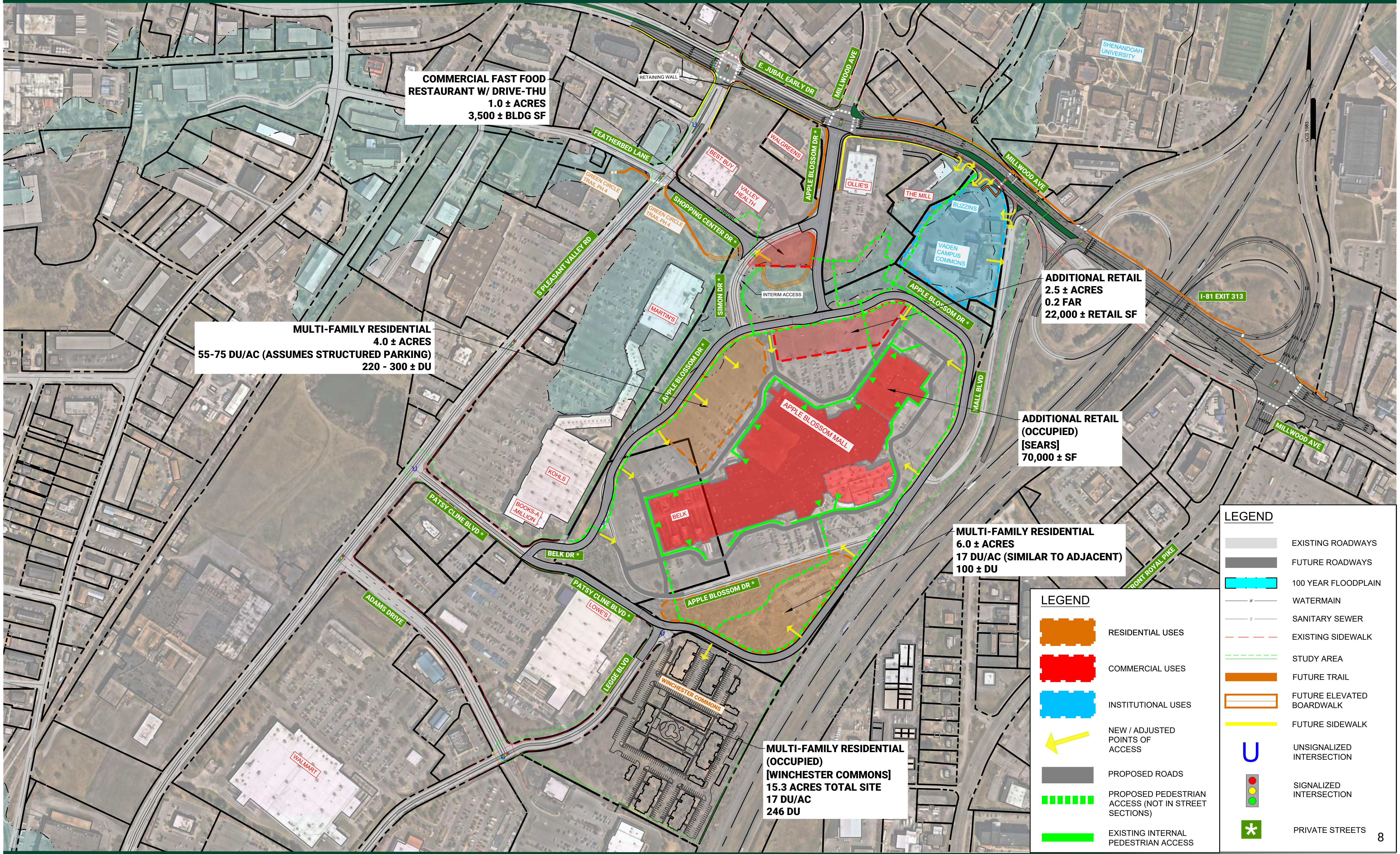

FIGURE 4
PROPOSED LAND USE PLAN

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Future Traffic Volumes

To evaluate future traffic operations, 2050 PM peak hour traffic conditions were analyzed for the key study area intersections and compared to existing conditions. Daily traffic volumes for each scenario are illustrated graphically in ***Figure 5*** (Page 9) and include the following:

- Existing 2024 Conditions.
- Background 2050 Conditions (with growth and full occupancy of the Mall but without other local development).
- Total 2050 Conditions with the Proposed Roadway Network with Mall Boulevard access to Milwood Avenue.
- Total 2050 Conditions with the Proposed Roadway Network without Mall Boulevard access to Millwood Avenue

PM peak hour traffic volumes associated with each scenario are provided in Attachments B through D. The Attachment B volumes represent the future "background" condition, incorporating regional growth and full occupancy of Apple Blossom Mall, including the Sears site but excluding the Comprehensive Plan buildout, additional University housing and approved Winchester Commons residential development.

The Daily traffic scenarios were used as an initial screening tool to evaluate operational impacts on Mall Boulevard under 2050 conditions. The proposed VDOT Millwood Avenue widening includes a right in/out access point at Mall Boulevard, as part of the Exit 313 interchange improvements. However, due to the limited spacing between Mall Boulevard and the adjacent ramps - less than VDOT's desirable minimum spacing - a sensitivity scenario was developed to evaluate future conditions without Mall Boulevard access.

The analysis compared these alternatives to assess long-term impacts on both the Mall Ring Road and the Millwood Avenue corridor. The findings are summarized in the following sections.

APPLE BLOSSOM MALL STREET STUDY

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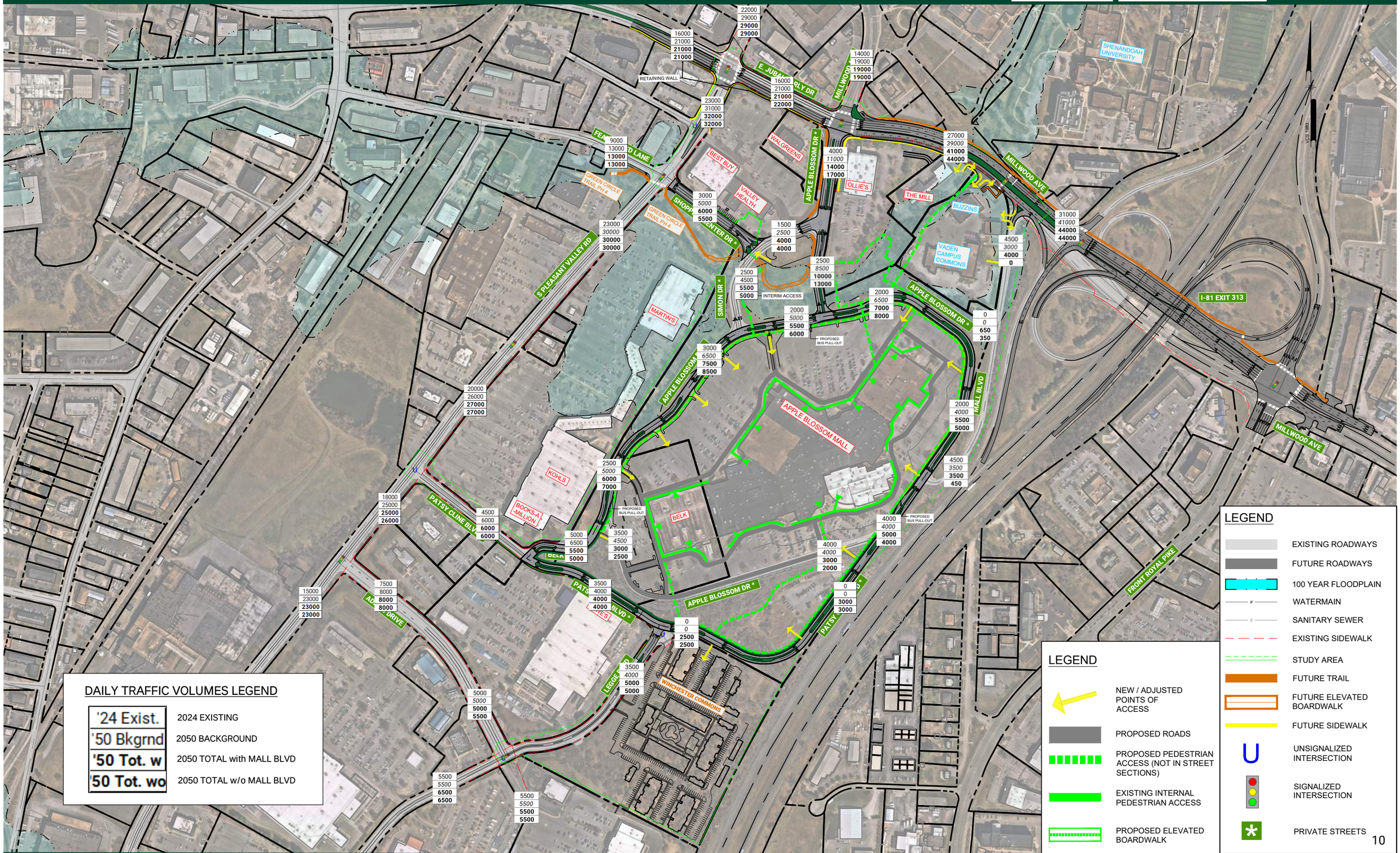

FIGURE 5
TRAFFIC VOLUME LINK COMPARISONS

0 200' 400'

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Concept Access Improvements

Long-term traffic volumes were evaluated to identify capacity constraints and circulation chanllenges within the study area. In coordination with City staff, a series of conceptual improvements were developed to address congestion hotspots, enhance roadway connectivity, and support multi-modal access.Key focus areas included assessing streetscape alternatives and analyzing route options and travel times for north/south trips between Legge Boulevard and Millwood Avenue - with and without a Mall Boulevard connection at Millwood Avenue.

Proposed Circulation Plan

The proposed circulation improvements are illustrated in ***Figure 6*** (next page). The plan envisions upgrading Apple Blossom Drive from a three-lane private ring road into a multi-modal major street featuring a raised median, sidewalks, and a shared use path. Detailed layouts for various segments are provided in ***Figures 7*** through ***11*****.**

A central objective of the assessment was to identify the preferred alignment for extending Legge Boulevard from its current terminus at Patsy Cline Boulevard, south of Belk. Several alignment options were considered to connect Legge Boulevard to the Mall. The preferred alignment, shown in ***Figure 12,*** follows an adjusted route parallel to I-81, extending Patsy Cline Boulevard as. The alignment was evaluated based on topography, grade changes, and integration with the proposed ring road section.

An alternative alignment was also assessed, which would extend the existing three-lane Legge Boulevard directly to Apple Blossom Drive just south of Mall Boulevard intersection. This more direct route, shown in ***Figure 13,*** bisects the undeveloped property east of the current ring road, which is owned by Apple Blossom Mall.

Figure 14 shows the northern section of Apple Blossom Drive adjacent to the Mall, highlighting new pedestrian linkages to future redevelopment areas, the Green Circle Trail, and the Vaden Campus Commons. These improvements aim to strengthen multi-modal connectivity.

The proposed ring road concept is detailed in ***Figure 15,*** which illustrates a raised median along Apple Blossom Drive, as well as the extension of Patsy Cline Boulevard east of Legge Boulevard. Driveway access points along the ring road would be consolidated, and approximately 40 percent of its total length would be converted to raised median, offering opportunities for enhanced streetscape treatments within the existing pavement limits.

APPLE BLOSSOM MALL STREET STUDY

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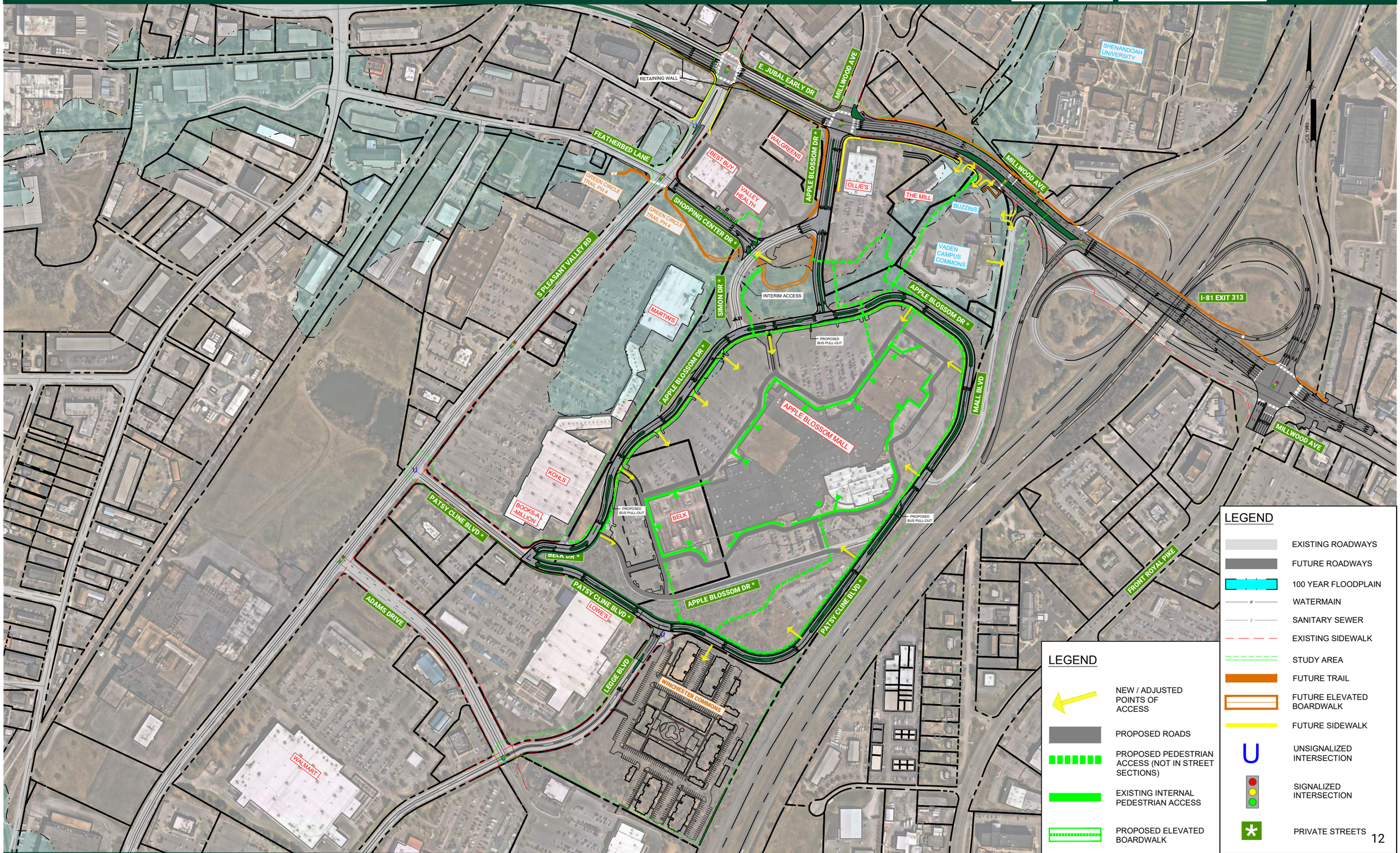

LEGEND

- NEW / ADJUSTED POINTS OF ACCESS
- PROPOSED ROADS
- PROPOSED PEDESTRIAN ACCESS (NOT IN STREET SECTIONS)
- EXISTING INTERNAL PEDESTRIAN ACCESS
- PROPOSED ELEVATED BOARDWALK

LEGEND

- EXISTING ROADWAYS
- FUTURE ROADWAYS
- 100 YEAR FLOODPLAIN *
- WATERMAIN
- SANITARY SEWER
- EXISTING SIDEWALK
- STUDY AREA
- FUTURE TRAIL
- FUTURE ELEVATED BOARDWALK
- FUTURE SIDEWALK
- UNSIGNALIZED INTERSECTION
- SIGNALIZED INTERSECTION
- PRIVATE STREETS

FIGURE 6
OVERALL CIRCULATION PLAN

0 200' 400'

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APPLE BLOSSOM MALL STREET STUDY

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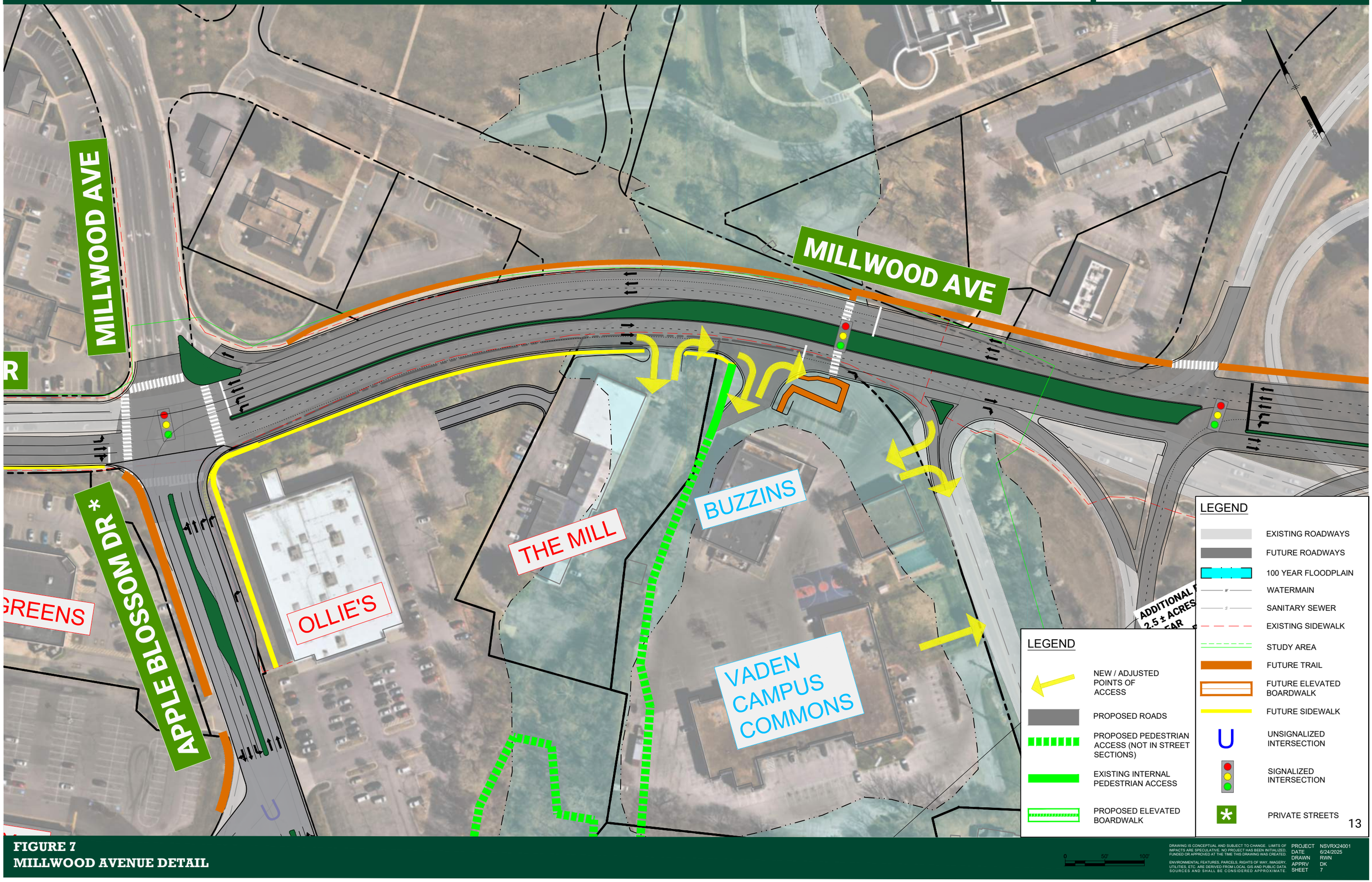

FIGURE 7
MILLWOOD AVENUE DETAIL

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E. JUBAL EARLY DR

MILLW

APPLE BLOSSOM DR *

RETAINING WALL

WALGREENS

OLLIE'S

THE MILL

BUZ

BEST BUY

VALLEY HEALTH

THERBED LANE

SHOPPING CENTER DR *

GREEN CIRCLE TRAIL PH 4

GREEN CIRCLE TRAIL PH 4

U

LEGEND

- EXISTING ROADWAYS
- FUTURE ROADWAYS
- 100 YEAR FLOODPLAIN
- WATERMAIN
- SANITARY SEWER
- EXISTING SIDEWALK
- STUDY AREA
- FUTURE TRAIL
- FUTURE ELEVATED BOARDWALK
- FUTURE SIDEWALK
- UNSIGNALIZED INTERSECTION
- SIGNALIZED INTERSECTION
- PRIVATE STREETS

LEGEND

- NEW / ADJUSTED POINTS OF ACCESS
- PROPOSED ROADS
- PROPOSED PEDESTRIAN ACCESS (NOT IN STREET SECTIONS)
- EXISTING INTERNAL PEDESTRIAN ACCESS
- PROPOSED ELEVATED BOARDWALK

FIGURE 8
APPLE BLOSSOM DR NORTH DETAIL

0 50' 100'

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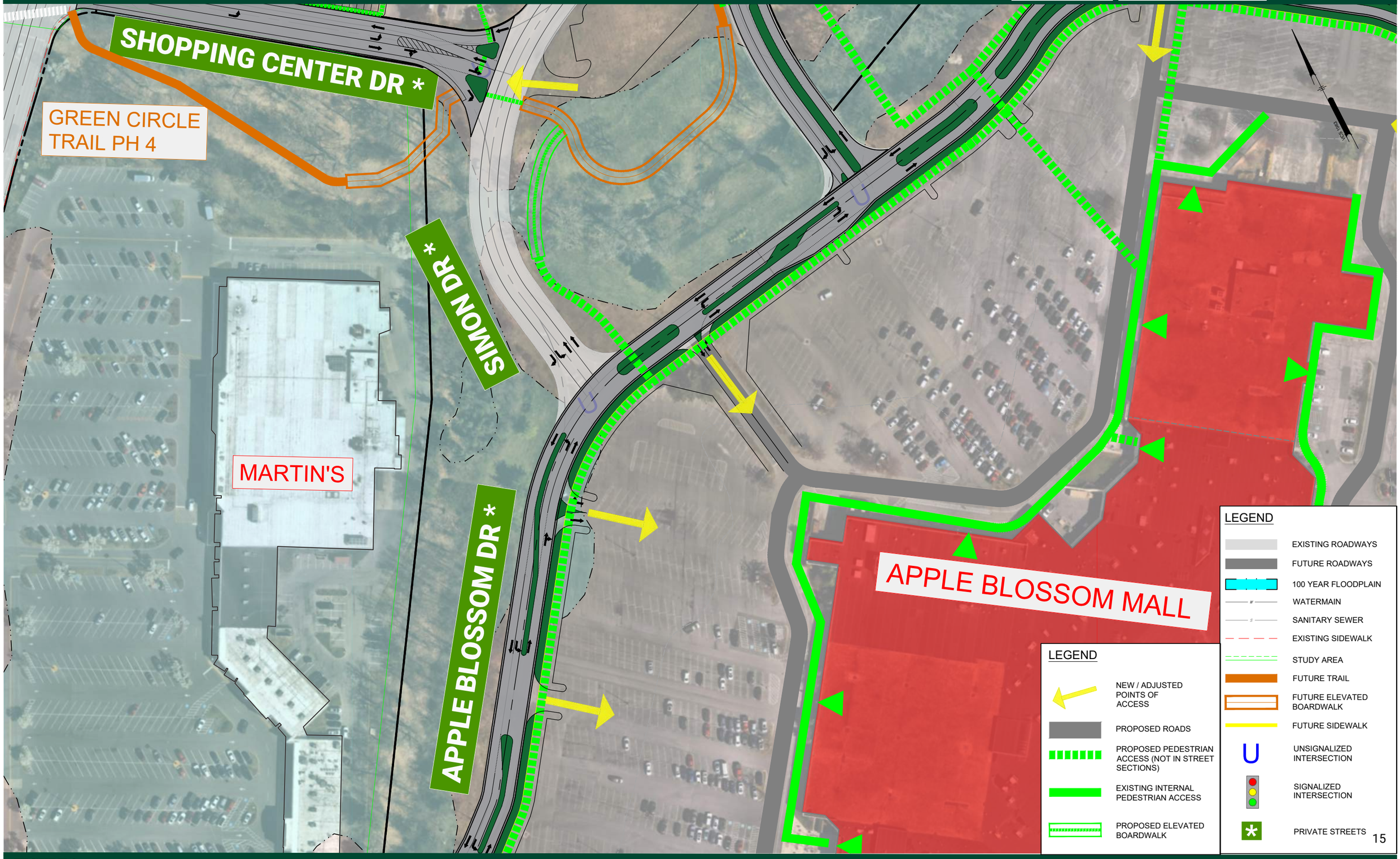

FIGURE 9
APPLE BLOSSOM MALL NORTHWEST DETAIL

0 50' 100'

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APPLE BLOSSOM MALL STREET STUDY

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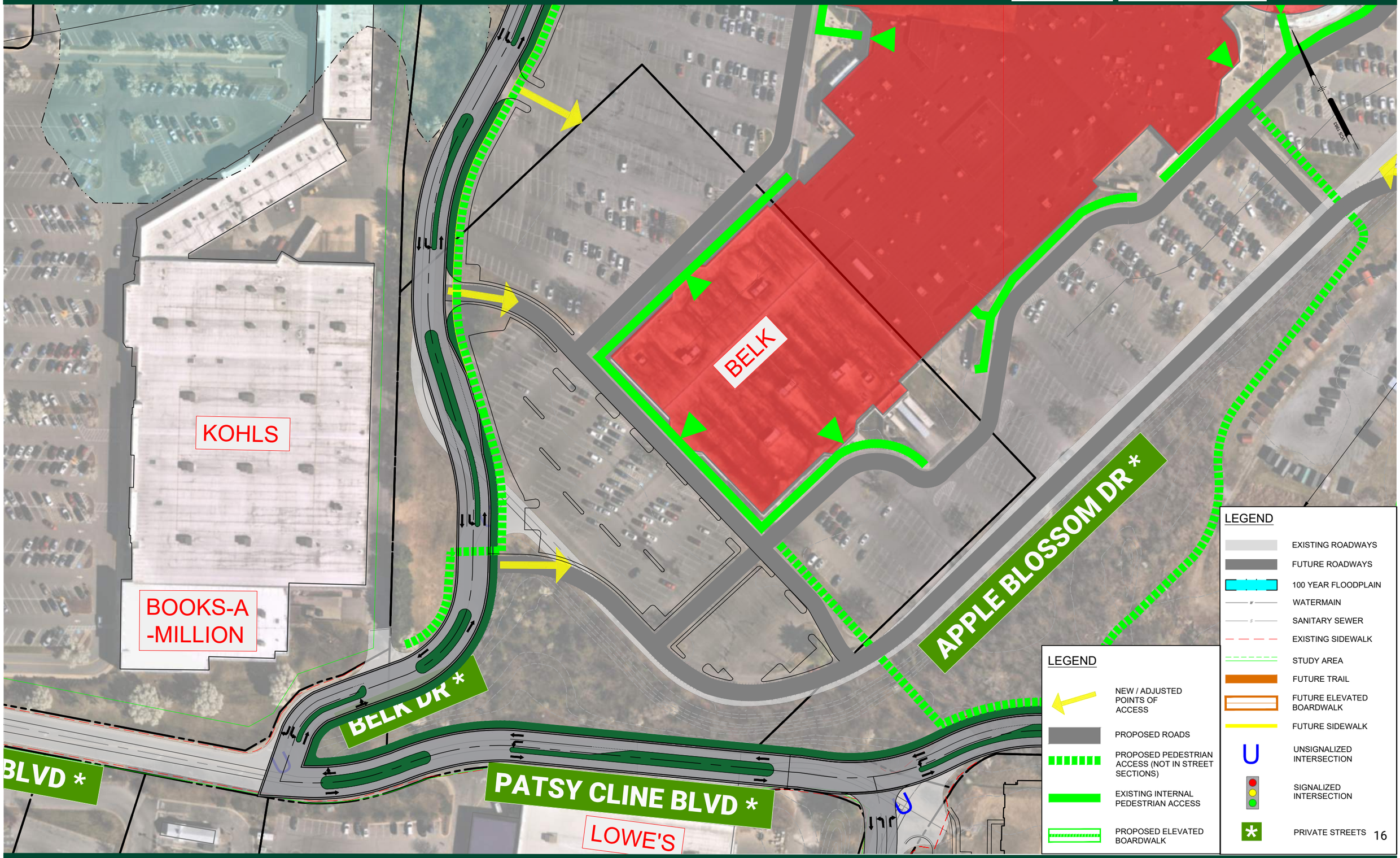

FIGURE 10
APPLE BLOSSOM MALL SOUTH DETAIL

0 50' 100'

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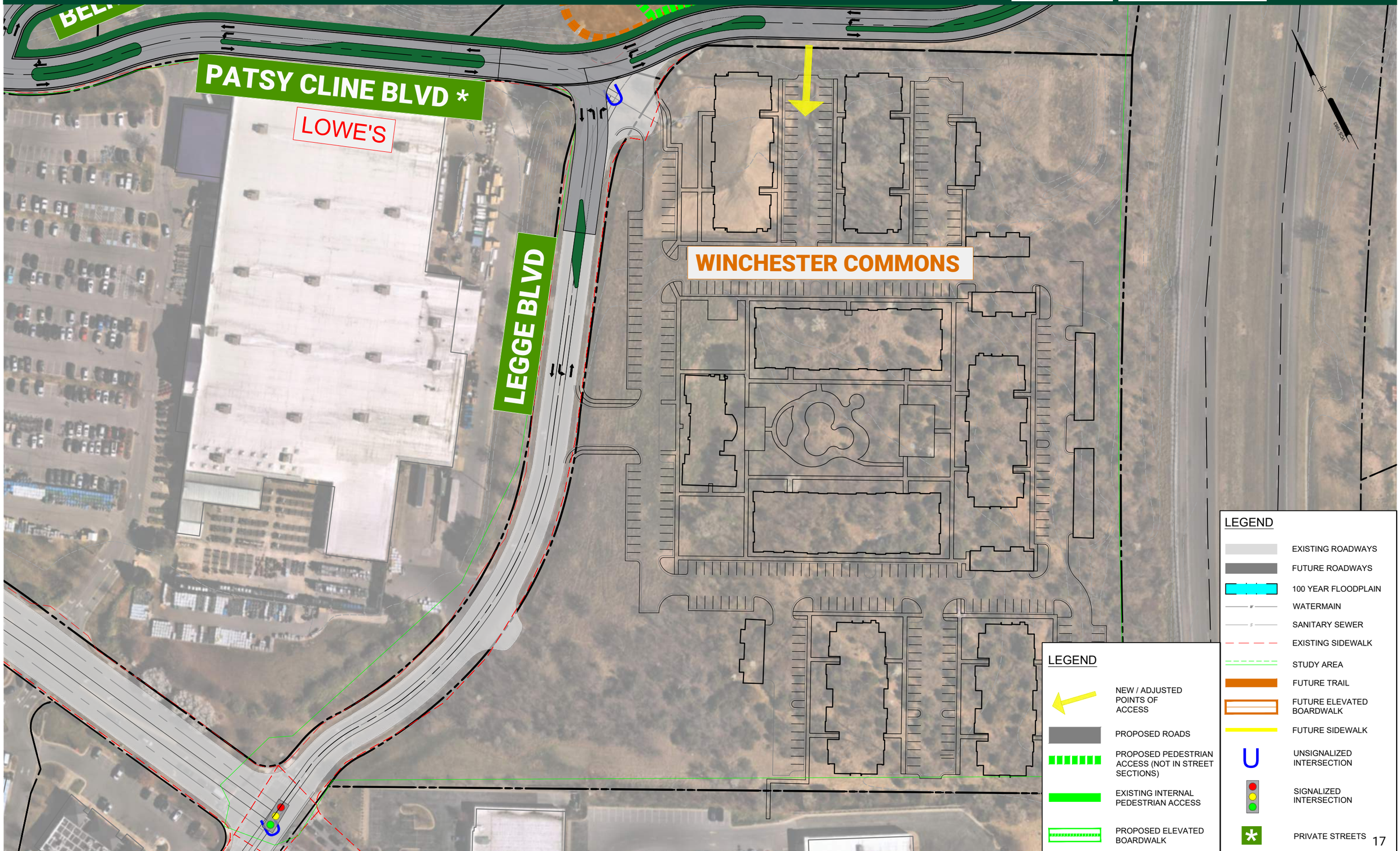

FIGURE 11
LEGGE BLVD. SOUTH DETAIL

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APPLE BLOSSOM MALL STREET STUDY

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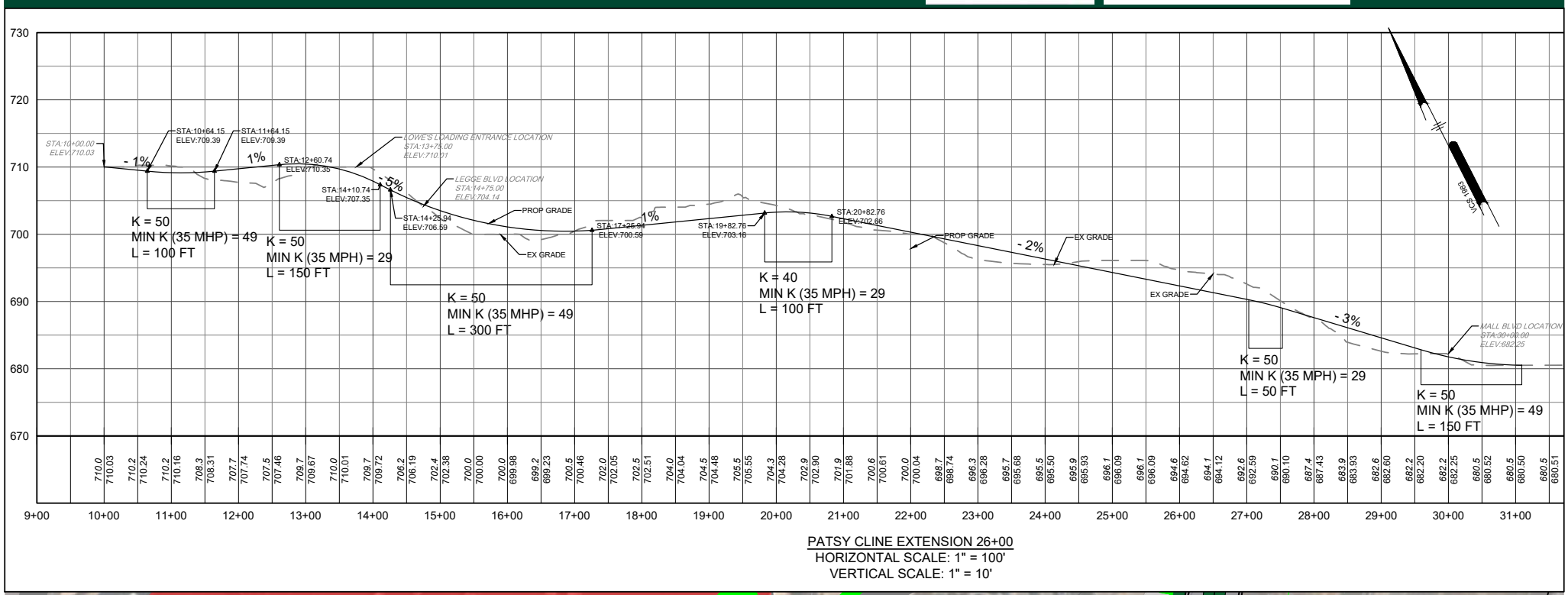

PATSY CLINE EXTENSION 26+00
HORIZONTAL SCALE: 1" = 100'
VERTICAL SCALE: 1" = 10'

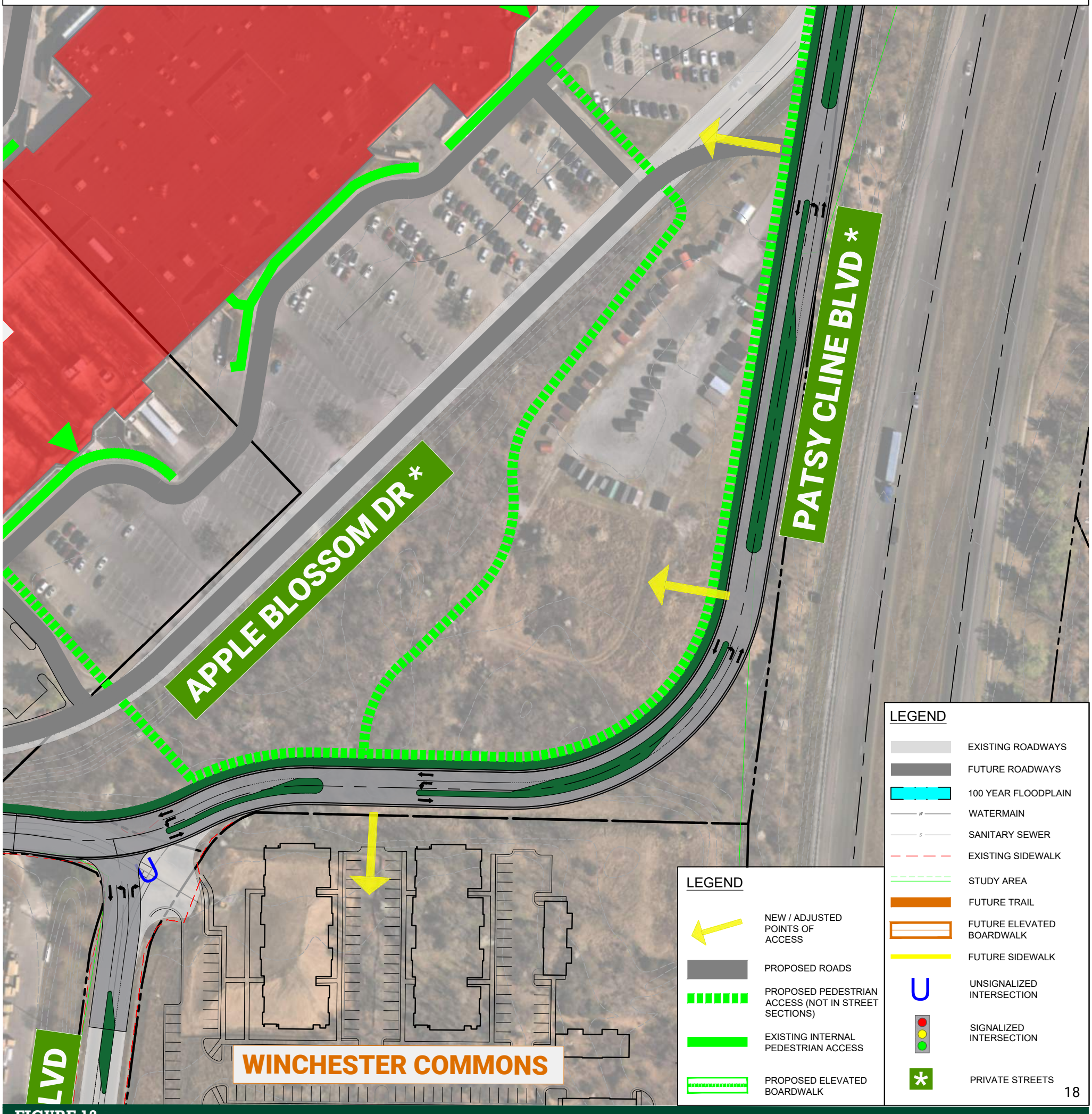

FIGURE 12
PATSY CLINE BLVD EXTENSIION (MALL RING ROAD OPTION DETAIL)

0 50' 100'

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ENVIRONMENTAL FEATURES, PARCELS, RIGHTS OF WAY, IMAGERY, UTILITIES, ETC. ARE DERIVED FROM LOCAL GIS AND PUBLIC DATA SOURCES AND SHALL BE CONSIDERED APPROXIMATE.

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APPLE BLOSSOM MALL STREET STUDY

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ROAD OPTION 2
HORIZONTAL SCALE: 1" = 100'
VERTICAL SCALE: 1" = 10'

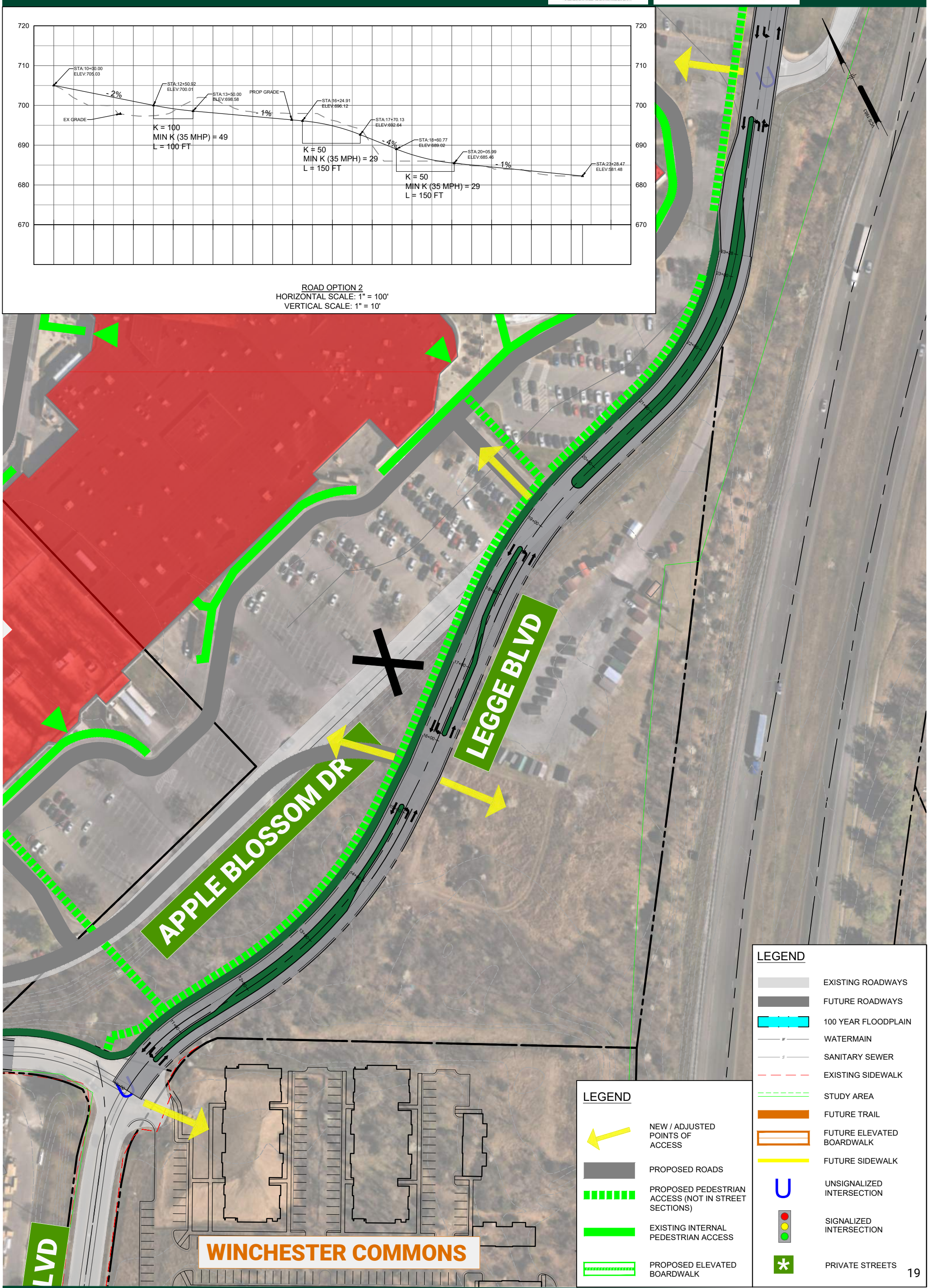

FIGURE 13
LEGGE BLVD EXTENSION (MALL RING ROAD OPTION DETAIL)

0 50' 100'

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APPLE BLOSSOM MALL STREET STUDY

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APPLE BLOSSOM DR *

MALL BLVD

APPLE BLOSSOM MALL

LEGEND

- NEW / ADJUSTED POINTS OF ACCESS
- PROPOSED ROADS
- PROPOSED PEDESTRIAN ACCESS (NOT IN STREET SECTIONS)
- EXISTING INTERNAL PEDESTRIAN ACCESS
- PROPOSED ELEVATED BOARDWALK

LEGEND

- EXISTING ROADWAYS
- FUTURE ROADWAYS
- 100 YEAR FLOODPLAIN
- WATERMAIN
- SANITARY SEWER
- EXISTING SIDEWALK
- STUDY AREA
- FUTURE TRAIL
- FUTURE ELEVATED BOARDWALK
- FUTURE SIDEWALK
- U — UNSIGNALIZED INTERSECTION
- SIGNALIZED INTERSECTION
- * — PRIVATE STREETS

20

FIGURE 14
APPLE BLOSSOM DR NORTHEAST DETAIL

0 50' 100'

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APPLE BLOSSOM MALL STREET STUDY

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S PLEASANT

MARTIN'S

SIMON DR *

APPLE BLOSSOM DR *

APPLE BLOSSOM DR *

MALL BLVD

APPLE BLOSSOM MALL

KOHLS

BOOKS-A-MILLION

BELK

SY CLINE BLVD *

BELK DR *

PATSY CLINE BLVD *

LOWE'S

APPLE BLOSSOM DR *

PATSY CLINE BLVD *

LEGGE BLVD

WINCHES

VICS 1983

LEGEND

- NEW / ADJUSTED POINTS OF ACCESS
- PROPOSED ROADS
- PROPOSED PEDESTRIAN ACCESS (NOT IN STREET SECTIONS)
- EXISTING INTERNAL PEDESTRIAN ACCESS
- PROPOSED ELEVATED BOARDWALK

LEGEND

- EXISTING ROADWAYS
- FUTURE ROADWAYS
- 100 YEAR FLOODPLAIN
- WATERMAIN
- SANITARY SEWER
- EXISTING SIDEWALK
- STUDY AREA
- FUTURE TRAIL
- FUTURE ELEVATED BOARDWALK
- FUTURE SIDEWALK
- U — UNSIGNALIZED INTERSECTION
- SIGNALIZED INTERSECTION
- * — PRIVATE STREETS

0 100' 200'

DRAWING IS CONCEPTUAL AND SUBJECT TO CHANGE. LIMITS OF IMPACTS ARE SPECULATIVE. NO PROJECT HAS BEEN INITIALIZED, FUNDED OR APPROVED AT THE TIME THIS DRAWING WAS CREATED.

ENVIRONMENTAL FEATURES, PARCELS, RIGHTS OF WAY, IMAGERY, UTILITIES, ETC. ARE DERIVED FROM LOCAL GIS AND PUBLIC DATA SOURCES AND SHALL BE CONSIDERED APPROXIMATE.

PROJECT NO.
DRAWN BY
APPROVED BY
STATUS

FIGURE 15
PROPOSED APPLE BLOSSOM DRIVE — PATSY CLINE BLVD EXTENSION

Apple Blossom Drive (Ring Road)

As outlined in the concept plan, the Mall ring road cross sections were evaluated to assess the impacts if the existing suburban street section could be upgraded to provide a more balanced multi-modal road link. The following paragraphs outline the concepts with the street section examples. The purpose of the alternative sections is to improve pedestrian circulation while also maintaining vehicular maneuvers to the existing commercial and long-term planned Comprehensive Plan activities. As shown in ***Figure 16***, the three-lane road section has no pedestrian accommodation. One upgrade option would be to maintain the existing pavement and restripe the middle lane as a center turn lane and consolidate parking access locations. This alternative would provide additional traffic calming and allow potential access management strategies to be implemented, which improves road safety, by reducing conflict points to 240-300 foot spacing, instead of the existing parking lanes with angled aisleway at approximately 60 feet spacing along Apple Blossom Drive.

Figure 16: Apple Blossom Drive (Ring Road) Sections

The proposed road section would increase the center turn lane width to provide a raised median width to allow left turn pockets of 100 ft. storage and 100 ft. taper. The section could maintain either of the existing curbs and widen the pavement width by 3 feet total. The greatest change in road section from existing with the proposed option is associated with the enhanced streetscape activities, to promote redevelopment flexibility by removing parking adjacent to the ring road. The 'outside' section includes a landscape buffer and a 6-foot sidewalk, while the 'inside' of the Apple Blossom Drive section would include a landscape buffer and a 10-foot-wide shared use path. The proposed section is derived from the City's Major Avenue street section elements. Options to include in-road bike lanes were considered by the team, but the extra pavement width and bike buffers were considered as more appropriately served I a suburban transition area with the shared pedestrian section on the inside of Apple Blossom Drive, This section is a transition from the auto-oriented road design as existing to encourage locally fronting commercial and residential use as envisioned in the City's Comprehensive Plan.

The road sections also show alternatives to maintain the street section multi-modal element by reducing the middle lane width without a raised median, and maintain the center turn concept to promote access management consolidation of the existing parking lot access. The streetscape section can be modified, as shown below to allow for micro-transit and bus pull-outs along Apple Blossom Drive.

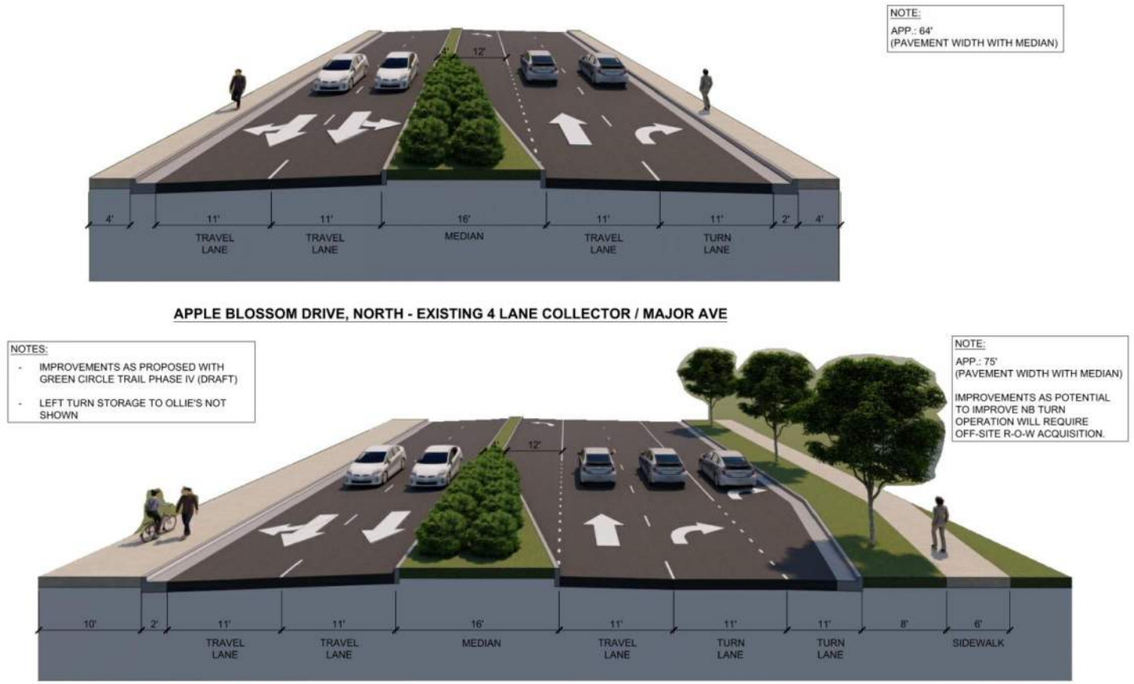
The turnouts are shown at three locations along the ring road and are intended for short-term drop-offs and bus areas.

Apple Blossom Drive (North Access)

For the Apple Blossom Drive section from Milwood Avenue to the Mall the team considered enhancements to the road section to promote the corridor and enhance capacity. The City's Green Circle Trail Phase 4 improvements would replace the existing 4-foot-wide sidewalk along the west side of the road with a 10 ft wide path adjacent to the commercial center and connect to the proposed Trail south of Simon Drive. As shown in ***Figure 17***, the Green Circle Trail upgrade on the west side adjacent to the Walgreens and Valley Health frontage is supplemented with an added turn lane and pedestrian streetscape on the east side adjacent to the Ollies retail. The added northbound right turn lane improves traffic operations at the Millwood Avenue signal at Jubal Early Drive by allowing dual right turns to eastbound Millwood Avenue. The pedestrian improvements would require additional R-O-W along the existing Olli's green-scape buffer but would not impact parking circulation.

The proposed Apple Blossom Drive section south of Millwood Avenue also maintains the two 'inbound' lanes heading south to the Mall and the Simon Drive intersection. Access to the Walgrens and to Simon Drive are maintained to allow turns from Millwood Avenue to utilize both left turn lanes at the Route 50 signal. South of the signal, a separate left turn lane in the median is shown on the concept plan (Figure 7, page 13) to avoid southbound through/left turn conflicts into the Ollies parking area. Alternatives were considered to restrict left turns at the Simon Drive/Ollies entrance, but the alternatives were not improving site circulation. Restricting left turns also negatively impacted the Millwood Avenue signal by introducing additional U-turns at the signal. With existing U-turns creating conflicts to the Millwood Avenue westbound left turn signal efficiency, additional restrictions for turns in/out of the Ollies were not considered. The plan also encourages the interparcel connection between the Ollies site and the Mill building, to provide an alternative route to reduce U-turns for the existing commercial area, which is impacted by the Millwood Avenue widening project shown only a right in/out to the Mill property.

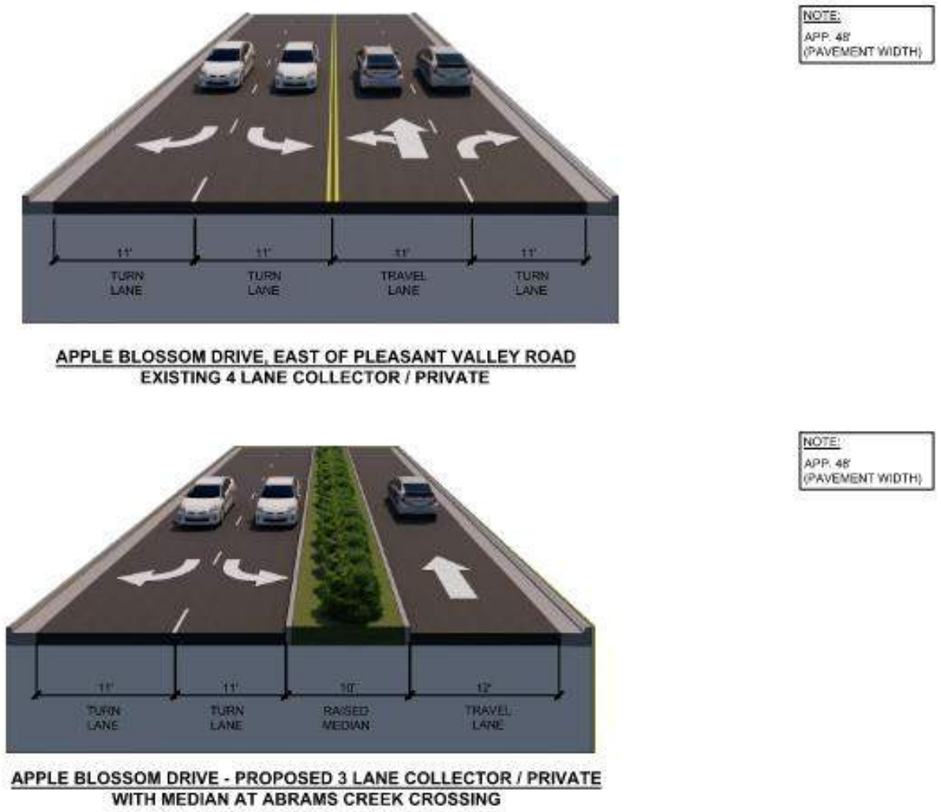
Figure 17: Apple Blossom Drive (North) Sections at Milwood Avenue



The proposed cross-section for Apple Blossom Drive, located south of Simon Drive and north of the Mall ring road, includes streetscape enhancements and multi-modal improvements. As shown in Figure 17, the segment near Millwood Drive is proposed to be widened from a four-lane collector to a five-lane roadway with a raised median, sidewalks, and upgraded multi-modal features, consistent with the planned Green Circle Trail Phase 4 improvements.

The existing bridge crossing over Abrams Creek bridge currently lacks pedestrian accommodations. Therefore, the proposed improvements were designed to support multi-modal alternatives without requiring modifications to the existing floodplain crossing. To improve circulation, the outbound lanes from the Mall are reduced from two to one, and a raised median is proposed, as shown in ***Figure 18***.

Figure 18: Apple Blossom Drive (North) Sections at Abrams Creek

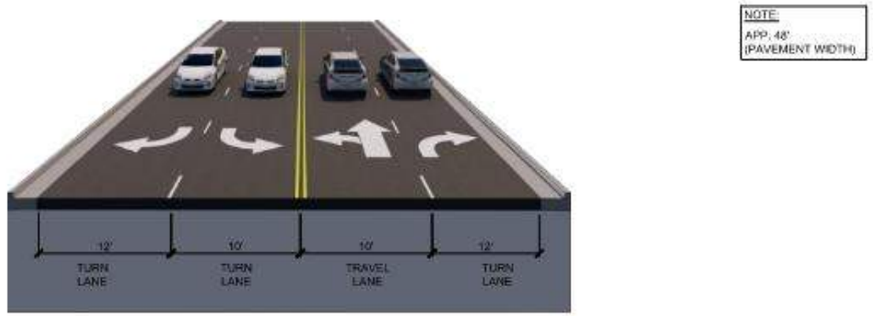


Shopping Center Drive

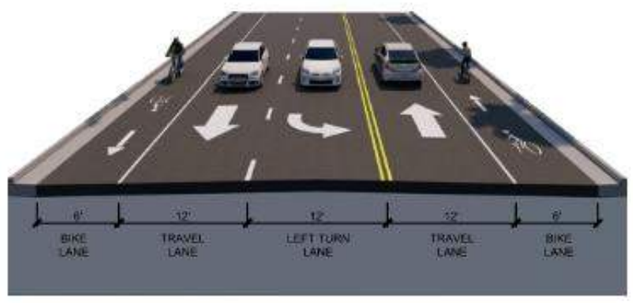
As proposed, Apple Blossom Mall access to the west via South Pleasant Valley Road at the Featherbed Lane traffic signal – referred to as Shopping Center Drive - can be upgraded with a road diet. The current 4-lane undivided roadway exceeds capacity needs and is primarily serves turns at the signal,. The proposed concept restripes this section into a three-lane section with a center left-turn lane and on-street bike lanes. This configuration maintains access to Valley Health's emergency facilities and adjacent parking areas, while also offering an alternative on-street route to the Green Circle Trail.

The existing and proposed road configurations are illustrated in ***Figure 19*** (next page).

Figure 19: Shopping Center Drive Sections



SHOPPING CENTER DRIVE, EAST OF PLEASANT VALLEY ROAD
EXISTING 4 LANE COLLECTOR / PRIVATE



SHOPPING CENTER DRIVE - PROPOSED 3 LANE COLLECTOR / PRIVATE
WITH ADDED BIKE LANES IN ADDITION TO GREEN CIRCLE TRAIL

Legge Boulevard Extension

As shown in Figures 13 and 14, two alternative alignments were evaluated for the extension of Legge Boulevard toward the Mall Boulevard area. Both alignments are feasible for construction as a major avenue; however, they differ based on their interaction with adjacent properties and redevelopment opportunities near the I-81 limited access area.

One alternative extends Patsy Cline Boulevard eastward from Legge Boulevard, running parallel to the I-81 limited access line R-O-W. This alternative maximizes the potential for mixed use redevelopment adjacent to the Mall by preserving larger development parcels. However, it would require a realignment of the intersection at Legge Blvd, affecting the current Winchester Commons site plan. Specifically, the existing east leg of the intersection - approved as the primary entrance to the planned Winchester Commons apartments would be shifted eastward along Patsy Cline Boulevard Extended.

The second alternative extends Legge Boulevard north of Patsy Cline Boulevard, creating a more direct connection to Mall Boulevard. This option minimizes new roadway construction but physically separates the redevelopment area adjacent to I-81 from the Mall. Given the existing topography north of Patsy Cline Boulevard, a direct connection between Legge Boulevard and Apple Blossom Drive near the Belk anchor is not considered feasible.

Both alternatives incorporate pedestrian connectivity improvements. A shared use path is included on the west (Mall-facing) side of the proposed roadway, consistent with the typical section of a major street featuring a raised median.

Proposed Multi-Modal Enhancements

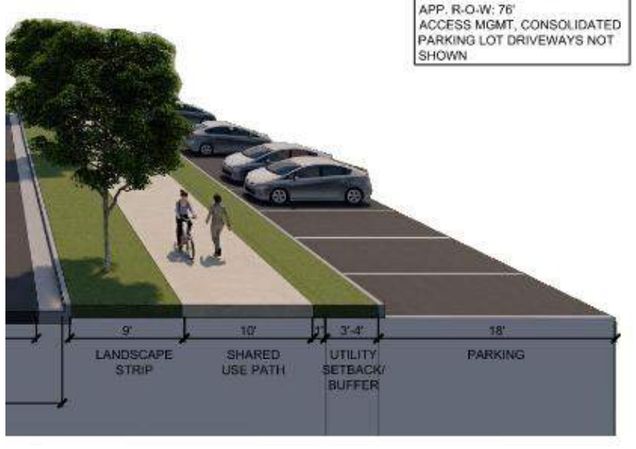
The proposed concept plans illustrate a network of improved pedestrian elements within the study area including enhancements to

- Connect to Rte. 50 and University
- Connect Green Circle Trail to Mall
- Connect Valley Health to Green Circle Trail
- Connect Vaden Campus Commons to the Mall

The following Figures outline these improvements in the context of the overall circulation framework for the study area. Along Apple Blossom Drive,, the inclusion of a shared use path within the roadway section (previously shown in Figure 6) enhances pedestrian and bicycle connectivity. At new intersections serving the Apple Blossom Mall and Belk parking areas, the existing angled parking would be reconfigured to perpendicular parking adjacent to the path. A revised internal parking circulation pattern would connect to the reoriented lots to the ring road, improving flow and reducing conflicts.

This configuration reduces both the number of vehicle-pedestrian conflict points and the frequency of curb cuts across the pedestrian path. The proposed layout is detailed in ***Figure 20,*** which illustrates the placement of the shared use path, landscape buffer, and realigned parking configuration.

Figure 20: Parking Area Setback Detail



In addition, the extensions of Apple Blossom Drive and Patsy Cline Boulevard/Legge Boulevard include proposed enhancements to promote micro-transit and bus access. As shown in ***Figure 21,*** these include designated curbside pull-out areas to accommodate passenger drop-offs and loading activities. While not intended for long-term parking, these pull-outs offer staging areas that support future evolution of transit service, as envisioned by the City. Three potential locations are identified along the ring road for these future transit-oriented elements.

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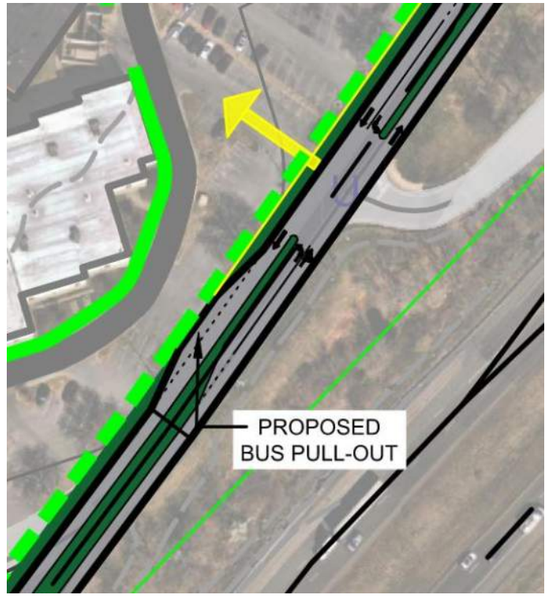
Figure 21: Bus Pull-Out Detail



Pedestrian circulation improvements adjacent to the Mall are intended to support redevelopment opportunities and enhance walkability throughout the site. As shown in ***Figure 22,*** a new pedestrian connection is proposed near Belk, and an additional access route is illustrated in ***Figure 23,*** adjacent to the former Sears anchor. These pedestrian linkages introduce green space and multi-modal connectivity by breaking up the expansive paved areas and providing direct access between planned residential and commercial outparcels and the Mall.

Beyond the reimagined ring road, the pedestrian plan for the long-term redevelopment includes enhancement to the programmed Green Circle Trail Phase 4 improvements. As shown in ***Figure 24*** (next page), the trail extension – highlighted in green – runs along the Abrams Creek floodplain and continues along Simon Drive and east of Apple Blossom Drive. This alignment strengthens pedestrian and bicycle access between Millwood Avenue and the Mall.

At the Vaden Campus Commons, a shared use path is proposed along the west side of University facilities, connecting the area east of The Mill to Millwood Avenue.. This provides a more direct route to the programmed pedestrian signal crossing at Millwood Avenue, further improving university-related circulation.

Along Shopping Center Drive, multi-modal improvements include new on-street bike lanes and enhanced pedestrian connections between the parking areas and rear access to the Valley Health facility. As redevelopment occurs, the rear parking layout and traffic islands at Simon Drive may be reconfigured with the restriping to better support pedestrian connectivity and complement the Green Circle Trail Phase 4 extension.

Future sidewalk installations programmed as part of the Milwood Avenue and Jubal Early Drive widening projects are supplemented by added turn lanes and pedestrian features, such as those proposed near Ollies.

Circulation Enhancements

As part of the overall circulation strategy, and as discussed at the public information meeting, an option was considered for a gateway feature at the terminus of Apple Blossom Drive. This feature would act as a visual anchor and reinforce a sense of place, potentially supporting street-oriented retail and pedestrian oriented design. An alternative concept envisions a 'monument' style roundabout to serve as both a gateway and local circulation element..

As shown in ***Figure 25*** (page 26), a single lane roundabout with an offset alignment is proposed to minimize impacts to the Abrams Creek floodplain. The configuration would maintain two inbound lanes and include a bypass lane to the ring road, ensuring efficient access to the west side of the Mall. The roundabout would also help define the entry to the redeveloped area while improving local traffic flow..

Figure 22: Belk Pedestrian Access Detail

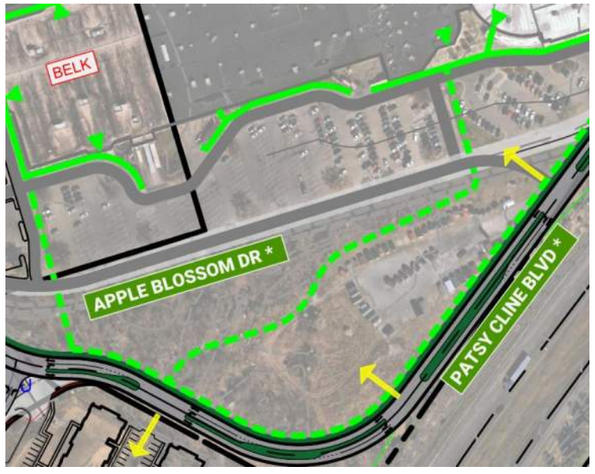
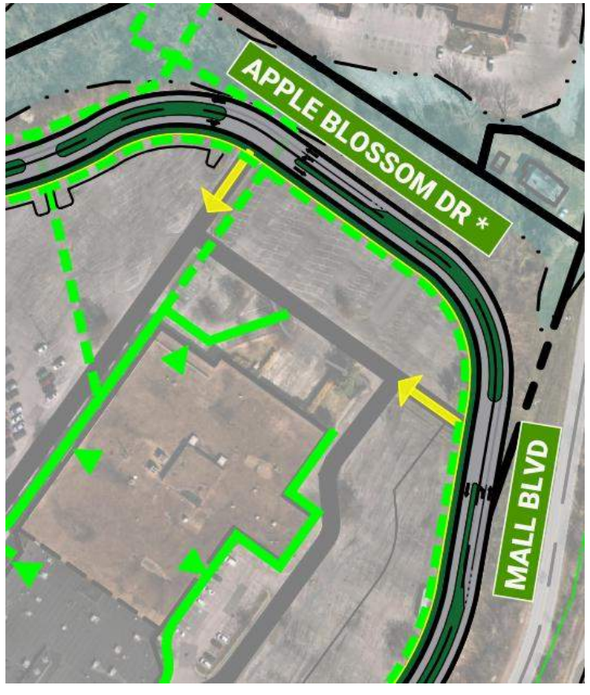


Figure 23: Sears Pedestrian Access Detail



APPLE BLOSSOM MALL STREET STUDY

CITY OF WINCHESTER

6/27/2025

NSVRC NORTHERN SHENANDOAH VALLEY REGIONAL COMMISSION

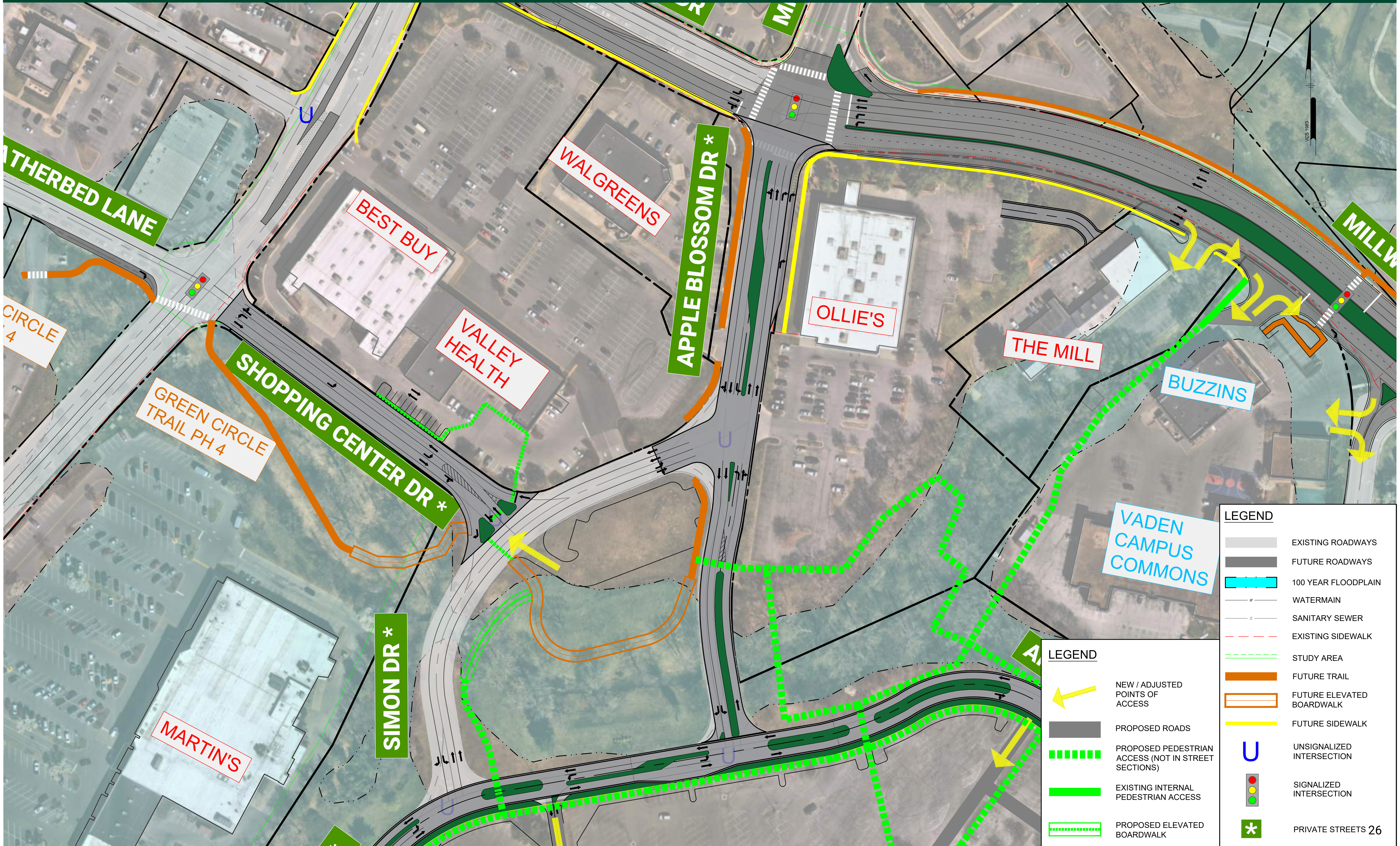


FIGURE 24
NORTH PEDESSTRIAN ACCESS DETAIL

0 100' 200'

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PROJECT NSVRX24001
DATE 6/24/2025
DRAWN RWN
APPRV DRK
SHEET 24

U:\Accounts\NSVRX\NSVRX24001 - Apple Blossom Mall Street Study\DESIGN\L\NSVRX24001-L-SK2.dwg PLOTTED: 7/17/2024 9:38 AM, BY: Rula Nassrat PLOTSTYLE: Pennoni NCS.stb

SHOPPING CENTER DR *

GREEN CIRCLE TRAIL PH 4

SIMON DR *

MARTIN'S

APPLE BLOSSOM DR *

APPLE BLOSSOM MALL

LEGEND

- NEW / ADJUSTED POINTS OF ACCESS
- PROPOSED ROADS
- PROPOSED PEDESTRIAN ACCESS (NOT IN STREET SECTIONS)
- EXISTING INTERNAL PEDESTRIAN ACCESS
- PROPOSED ELEVATED BOARDWALK

LEGEND

- EXISTING ROADWAYS
- FUTURE ROADWAYS
- 100 YEAR FLOODPLAIN
- WATERMAIN
- SANITARY SEWER
- EXISTING SIDEWALK
- STUDY AREA
- FUTURE TRAIL
- FUTURE ELEVATED BOARDWALK
- FUTURE SIDEWALK
- UNSIGNALIZED INTERSECTION
- SIGNALIZED INTERSECTION
- PRIVATE STREETS

FIGURE 25
APPLE BLOSSOM MALL GATEWAY ALT. DETAIL

0 50' 100'

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PROJECT	NSVRX24001
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APPRV	DK
SHEET	25 OF 7B

Comparisons

Proposed Improvements

The study assessed two future access options for the long-term to quantify changes in operations for Millwood Avenue, Jubal Early Drive, and S. Pleasant Valley Road:

- Total 2050 Conditions with the Proposed Roadway Network with Mall Boulevard access to Millwood Avenue.
- Total 2050 Conditions with the Proposed Roadway Network without Mall Boulevard access to Millwood Avenue

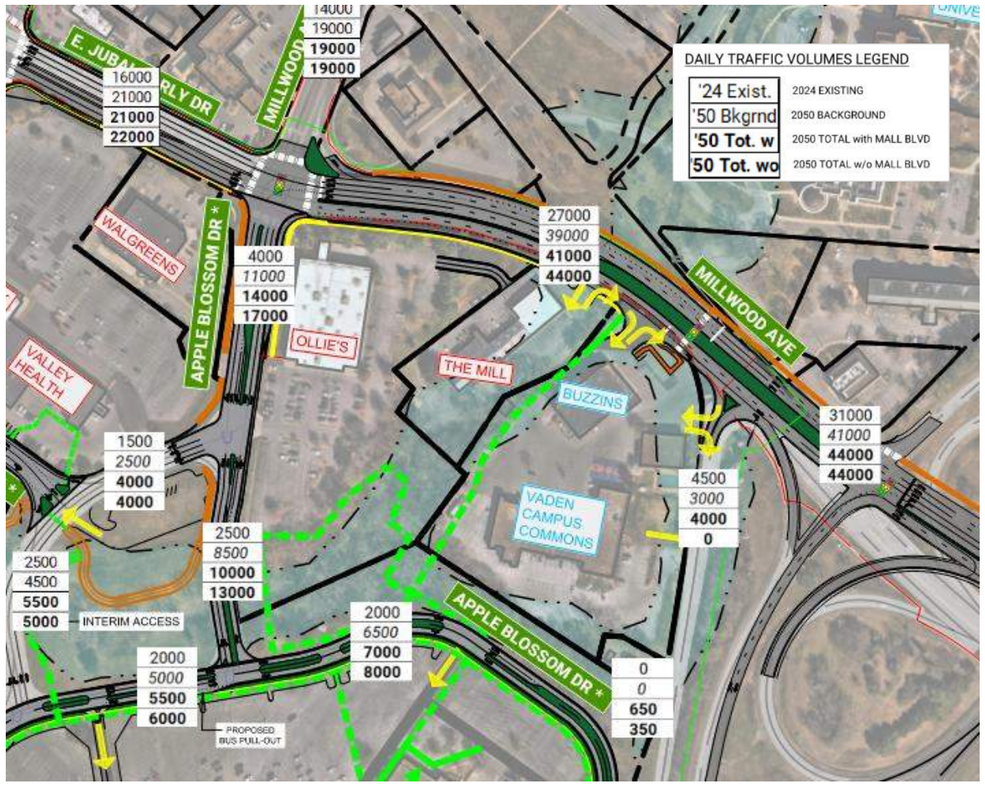
PM peak and Daily traffic volume were assessed. SimTraffic software was used to assess corridor speeds and arterial back of queues. The PM operations analyses focused on comparing Milwood Avenue operational performance with and without Mall Boulevard access. In both scenarios, the pedestrian crosswalk signal as proposed as part of the Route 50 widening project – intended to connect Shenandoah University's main campus to the Vaden Campus Commons – was assumed to remain in place.

The roadway network improvements were tested iteratively with the future land uses as developed in the concept plan.

Traffic Operations without Mall Blvd Access

Figure 26 presents a portion of the Daily traffic volumes from the northern area of the study network, excerpted from Figure 5, to highlight the changes in traffic volumes with and without the Mall Boulevard connection. The first two sets of volumes represent existing and background traffic (excluding the planned land uses), providing context for how the roadway network operates under current and "Background' conditions.

Figure 26: Millwood Avenue Daily Traffic Comparisons



If the right in/out access at Mall Boulevard is removed, the Daily traffic volumes on Apple Blossom Drive south of the Millwood Avenue signal are expected to increase. Although the increase in Daily traffic is approximately 4000 VPD, the change in peak hour volumes has a more pronounced impact on turn movements at Apple Blossom Drive. Northbound delays on Apple Blossom Drive increase noticeably, even with the proposed dual right turn lanes at the Millwood Avenue/Jubal Early Drive/Apple Blossom Drive signal, due to the absence of the Mall Boulevard connection.

Furthermore, vehicular circulation to/from the Vaden Campus Commons facilities would be restricted. Without the northern access, all traffic would be required to use the southern segment of Mall Boulevard to reach I-81 or to travel east on Route 50/17/522 into Frederick County.

Arterial Queue Changes

SimTraffic outputs for the 2050 PM peak period were reviewed to assess back of queue and speeds along the study arterials. ***Figure 27*** presents the average maximum queues from the SimTraffic simulation for 3 scenarios. The background condition represents baseline traffic with general growth and the Mall fully occupied, but without the development activities associated with the proposed Comprehensive Plan assumptions.

Queue lengths and the percentage of time with upstream blockage are shown by direction to highlight congestion levels during the PM peak. SimTraffic defines upstream blockage time as the percentage of time during which a queue extends upstream and blocks vehicles from entering an intersection or link, thereby preventing progression and contributing to gridlock conditions. This metric helps quantify the severity of queueing by identifying both the maximum extent of queue spillback and the frequency with which it occurs.

While both Total development scenarios show significant queueing on both the mainline and side streets, the average maximum queues and upstream blockage percentages are generally equal to or lower when Mall Boulevard is open to traffic compared to when turning movements at Mall Boulevard are restricted.

Arterial Speed Changes

As shown in ***Figure 28***, the SimTraffic model reports average PM peak hour speeds along Millwood Pike /Jubal Early Drive and S. Pleasant Valley Road in both directions. **Table 7** summarizes the changes in vehicle speeds for scenarios with and without the Mall Boulevard connection at Millwood Avenue.

Under 2050 PM peak conditions, corridor travel speeds are generally low; however, operations improve when Mall Boulevard is open as a right in/out access. While average speeds remain below posted limits, the reported values represent overall corridor performance rather than free-flow conditions.

Along South Pleasant Valley Road, average speeds are generally comparable or slightly improved when the Mall Boulevard connection is maintained, indicating operational benefits with the additional access point.

Arterial	Direction	Average Speed (mph)			
		2024 Existing	2050 Back-ground	2050 Total	2050 Total w/o Mall Blvd
Jubal Early Dr-Millwood Ave	EB	9	10	9	7
	WB	12	6	9	7
S Pleasant Valley Rd	NB	19	14	17	15
	SB	19	12	11	11

Table 7: Long-Term PM Peak Hour SimTraffic Speed Analysis Results

Infrastructure Changes

Comparisons of the overall circulation plan are quantified in the conclusions.

Pennoni

APPLE BLOSSOM MALL STREET STUDY

CITY OF WINCHESTER
6/27/2025

NSVRC NORTHERN SHENANDOAH VALLEY REGIONAL COMMISSION

Winchester Virginia

Pennoni

0%
<1%
3%

578 ft
1000 ft
1166 ft

383 ft [67%]
378 ft [65%]
379 ft [62%]

494 ft [<1%]
488 ft [1%]
468 ft [1%]

3%
2%
15%

1178 ft
667 ft
1498 ft

1021 ft [43%]
1072 ft [68%]
1072 ft [74%]

282 ft
273 ft
250 ft

2%
<1%
0%

630 ft
483 ft
520 ft

492 ft
518 ft

732 ft
436 ft
959 ft

1%
<1%
4%

1%
<1%
3%

0%
1%

RETAINING WALL
E. JUBAL EARLY DR
MILLWOOD AVE
SHENANDOAH UNIVERSITY
VCS 1985
FEATHERBED LANE
WALGREENS
BEST BUY
VALLEY HEALTH
APPLE BLOSSOM DR *
GREEN CIRCLE TRAIL PH 4
SHOPPING CENTER DR *
THE MILL
BUZZINS
VADEN CAMPUS COMMONS
S PLEASANT VALLEY RD
SIMON DR *
INTERIM ACCESS
MARTIN'S
APPLE BLOSSOM DR *
PROPOSED BUS PULL-OUT
I-81 EXIT 313
MALL BLVD
APPLE BLOSSOM MALL
KOHLS
BOOKS-A-MILLION
BELK
PROPOSED BUS PULL-OUT
PROPOSED BUS PULL-OUT
PATSY CLINE BLVD *
BELK DR *
APPLE BLOSSOM DR *
PATSY CLINE BLVD *
MILLWOOD AVE
FRONT ROYAL PIKE
ADAMS DRIVE
LOWE'S
LEGGE BLVD
WINCHESTER COMMONS
WALMART

LEGEND

- EXISTING ROADWAYS
- FUTURE ROADWAYS
- 100 YEAR FLOODPLAIN
- WATERMAIN
- SANITARY SEWER
- EXISTING SIDEWALK
- STUDY AREA
- FUTURE TRAIL
- FUTURE ELEVATED BOARDWALK
- FUTURE SIDEWALK
- UNSIGNALIZED INTERSECTION
- SIGNALIZED INTERSECTION
- PRIVATE STREETS

LEGEND

- NEW / ADJUSTED POINTS OF ACCESS
- PROPOSED ROADS
- PROPOSED PEDESTRIAN ACCESS (NOT IN STREET SECTIONS)
- EXISTING INTERNAL PEDESTRIAN ACCESS
- PROPOSED ELEVATED BOARDWALK

2050 Background
2050 Total with Mall Blvd
2050 Total w/o Mall Blvd

(Solid line shows longest Avg. Max Queue among scenarios)

Upstream Block Time shown as percentage (%)
Brackets [ ] indicate Avg. Max Queue ≥ Available Storage
indicate Avg. Max Queue < Available Storage

FIGURE 27
2050 PM PEAK HOUR TRAFFIC ARTERIAL QUEUE COMPARSISON

0 200' 400'

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SHEET	6

APPLE BLOSSOM MALL STREET STUDY

CITY OF WINCHESTER
6/27/2025

NSVRC NORTHERN SHENANDOAH VALLEY REGIONAL COMMISSION

Winchester Virginia

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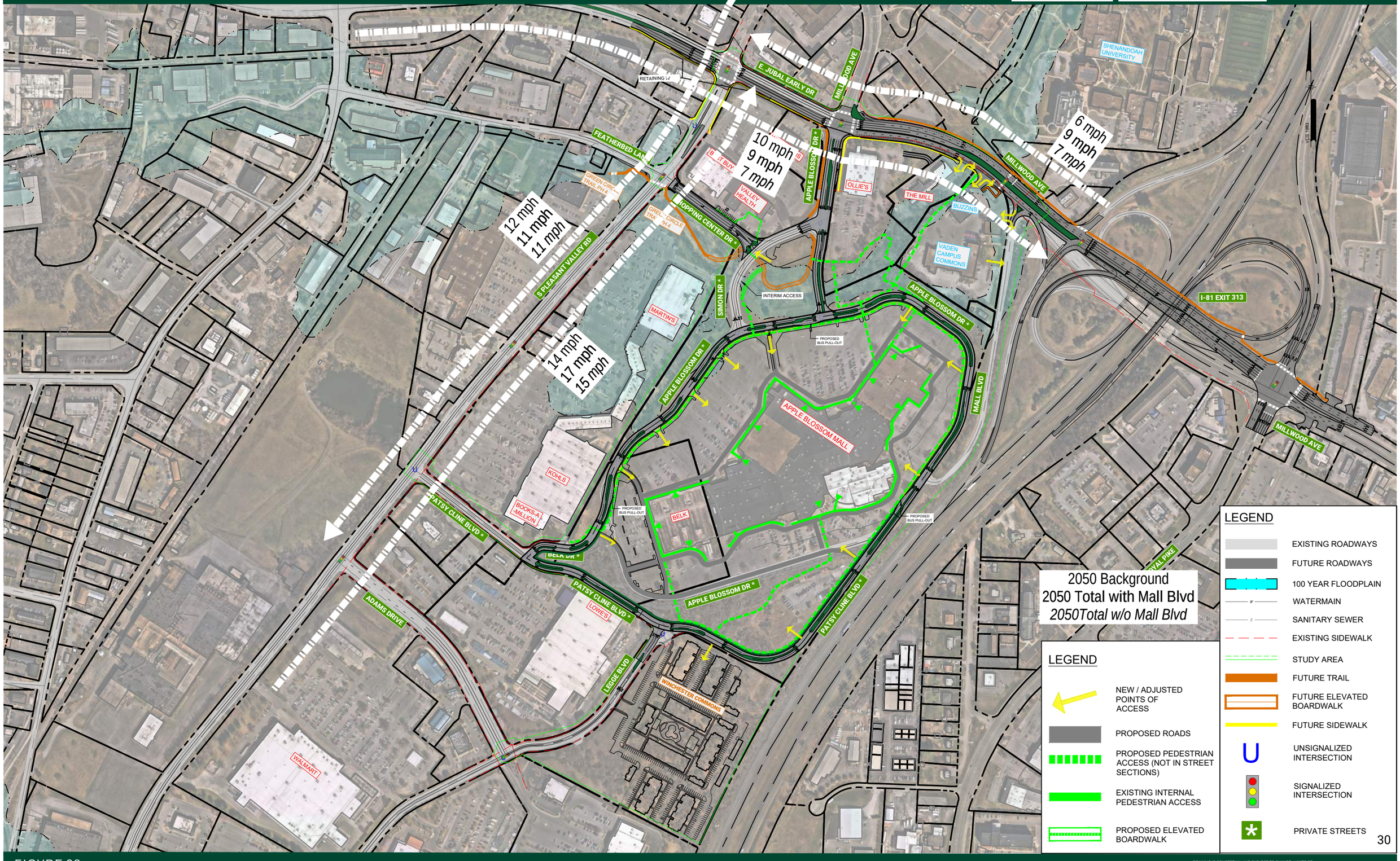

2050 Background
2050 Total with Mall Blvd
2050Total w/o Mall Blvd

LEGEND

- NEW / ADJUSTED POINTS OF ACCESS
- PROPOSED ROADS
- PROPOSED PEDESTRIAN ACCESS (NOT IN STREET SECTIONS)
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LEGEND

- EXISTING ROADWAYS
- FUTURE ROADWAYS
- 100 YEAR FLOODPLAIN
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- STUDY AREA
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- FUTURE ELEVATED BOARDWALK
- FUTURE SIDEWALK
- U — UNSIGNALIZED INTERSECTION
- SIGNALIZED INTERSECTION
- * — PRIVATE STREETS

30

FIGURE 28
2050 PM PEAK HOUR TRAFFIC ARTERIAL SPEED COMPARISON

0 200' 400'

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Conclusions

The proposed concept improvements and enhancements summarized in this study evaluate future land use scenarios, peak hour operations, and Daily traffic forecasts near Apple Blossom Mall. Changes in transportation infrastructure - both existing and proposed - are reflected in **Table 8** which summarizes roadway and multi-modal elements.

The study highlights how the transportation network and pedestrian connectivity will evolve with implementation of the proposed improvements by the City with arterial lane miles increasing with the Millwood Avenue widening.

	Vehicle Lane Miles		Turn Lanes		Signals		Innovative Inters.	
	Arterial (miles)	Local (miles)	Arterial (LF)	Local (LF)	Arterial (ea)	Local (ea)	Arterial (ea)	Local (ea)
Existing Conditions	5.4	7.2	4,410	2,730	8	0	0	0
Programmed Improvements	6.9	7.2	5,600	2,730	8	0	1	0
Proposed Apple Blossom Mall Street Study	6.9	6.4	5600	4,540	8	0	1	0
Increment	0	-0.8	0	1,810	0	0	0	0

	Sidewalks		Shared Use Paths		Trails		Bike Lanes	
	Arterial (LF)	Local (LF)	Arterial (LF)	Local (LF)	Arterial (LF)	Local (LF)	Arterial (miles)	Local (miles)
Existing Conditions	8,850	5,850	0	0	0	0	0	0
Programmed Improvements	5,976	5,850	2580	560	125	1030	0	0
Proposed Apple Blossom Mall Street Study	5,976	5850	2,580	5,920	125	3,690	0	0.2
Increment	0	0	0	5360	0	2660	0	0.2

Table 8: Study Area Multi-Modal Comparisons

General findings for the comparison with the proposed concept improvements are

- Regional Road Improvements as programmed on US Route 50 increase arterial Vehicle Lane Miles (VLM) above existing conditions.
- The proposed concept plan does not recommend corridor improvements for the arterials.
- Local Vehicle Lane Miles (VLM) are decreased with the Apple Blossom Drive raised median treatment with access management implementation at the Mall, as proposed. The local street length includes the Patsy Cline Boulevard extension to the east along I-81.
- Added local turn lanes and streetscape with Apple Blossom Drive/Patsy Cline Boulevard and added turns at Apple Blossom Drive/Milwood Avenue.
- Proposed Increase in local multi-modal paths on-street and off-street trails as increment are approximately 1 mile of new shared use paths and 1/2 mile of new sidewalk facilities.

Future Opportunities

The study not only quantifies future land use, traffic volumes but also provides a forward-looking framework to guide future infrastructure investments, multimodal connections, and redevelopment initiatives. Feedback from stakeholders and the public was incorporated to shape a set of long-term planning strategies.

Implementation of both City-led and VDOT-led improvements will yield long-term benefits, offering flexibility to respond to development trends and mobility needs. Opportunities to extend and connect key corridors - such as Legge Boulevard, Patsy Cline Boulevard to the ring road, Apple Blossom Drive, and Mall Boulevard adjacent to Shenandoah University – will improve local circulation and access to surrounding destinations.

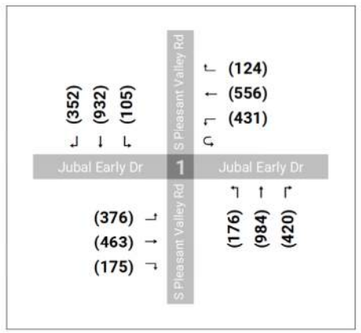
The following 'next steps' for the City consideration is encouraged to be pursued to further detail road, multi-modal, and redevelopment opportunities:

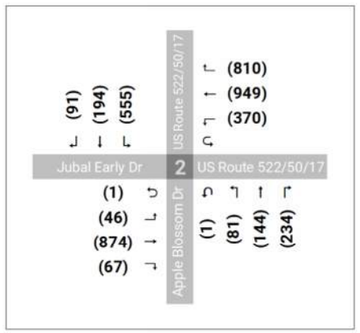
- Support private redevelopment opportunities through phased infrastructure improvements,
- Initiate Comprehensive Plan/Sector Plan updates to provide streetscape and land use impacts and refinements,
- Pursue grant applications and funding opportunities to support multi-modal and infrastructure investments,
- Encourage public-private partnerships to reduce redevelopment costs and maximize economic return with flexibility for future mixed-use activities and transform the area from suburban activity.
- Continue to coordinate with Shenandoah University to improve access west of I-81 as gateway to the City
- Enhance connectivity between Vaden Campus Commons and the Mall through new trail and pedestrian facilities,
- Retrofit existing street sections and implement new linkages after construction of Green Circle Trail Phase 4 to encourage multi-modal access adjacent to Abrams Creek,
- Connect Legge Boulevard more directly to Apple Blossom Drive to support alternative north/south access to Pleasant Valley Road. The linkage provides an enhanced alternative encourage access to the E. Tevis Road/ Crossover Boulevard corridor to the south.

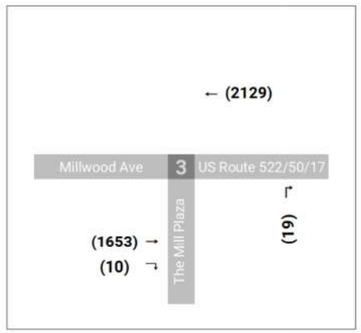
Attachment B:
2050 Background Volumes with Mall at Full Capacity

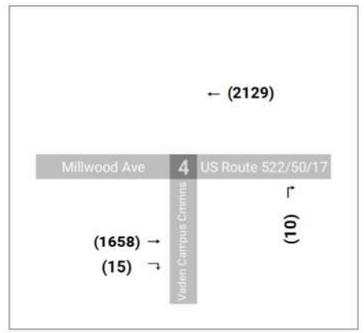
Apple Blossom Mall Street Study

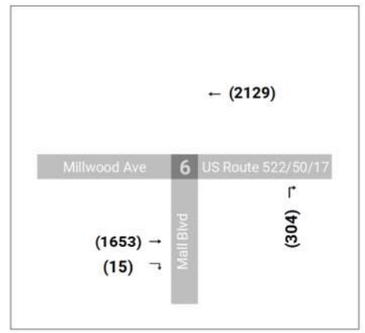
2050 Background with Mall at Full Capacity | FIGURE B

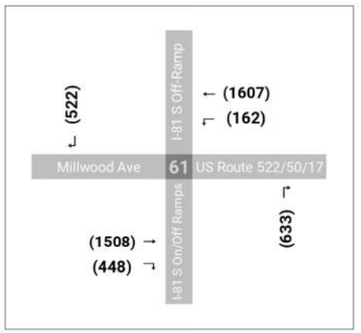


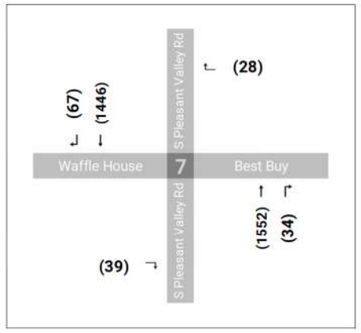


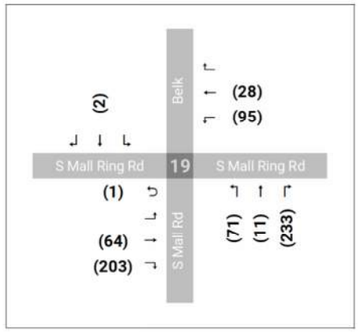


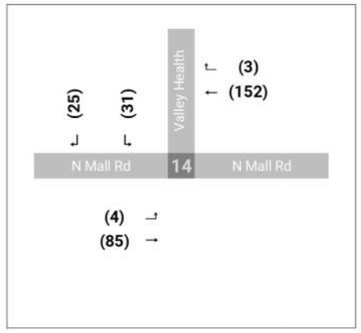


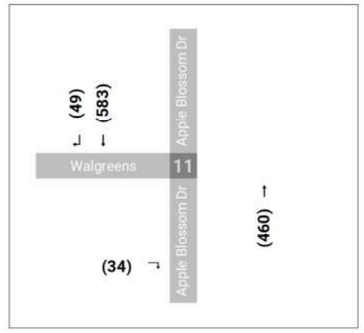


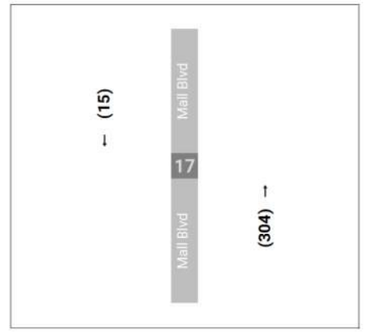


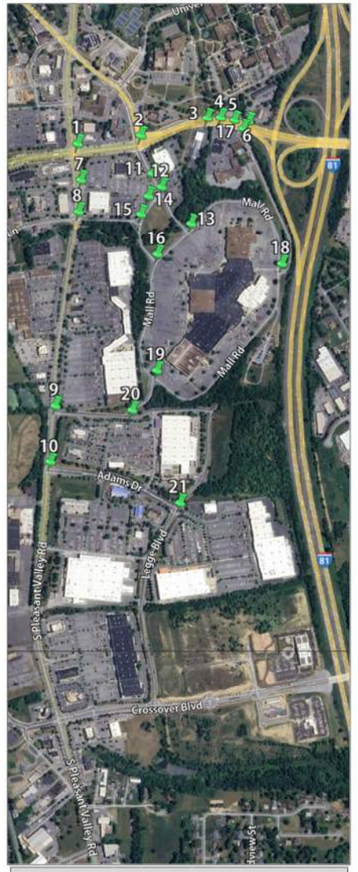


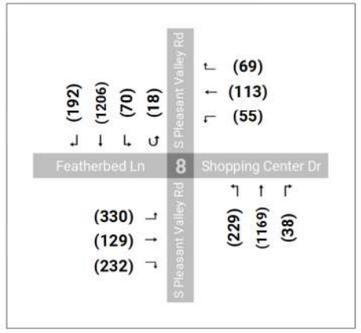


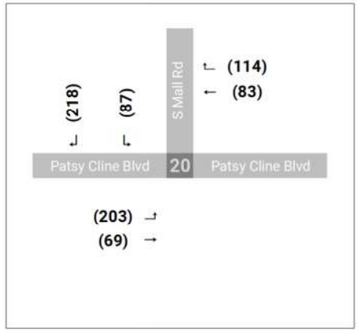


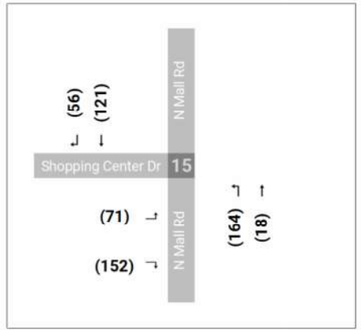


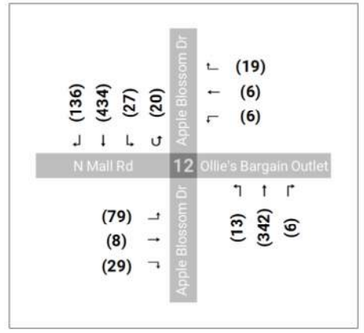


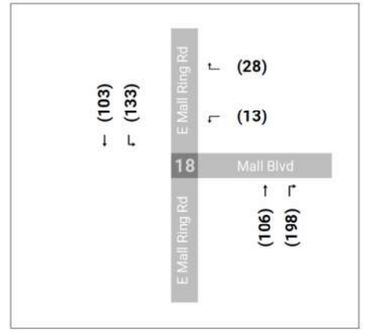


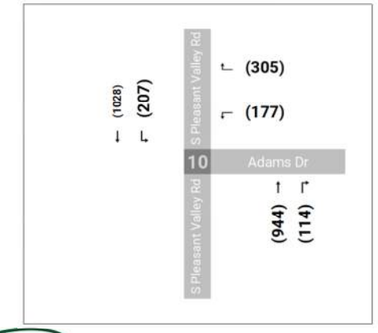


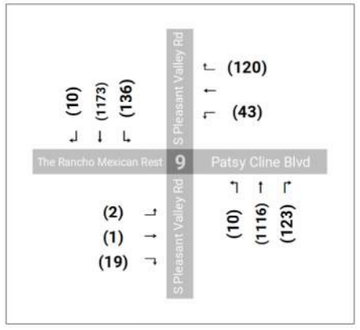


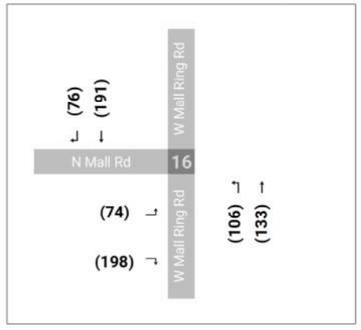


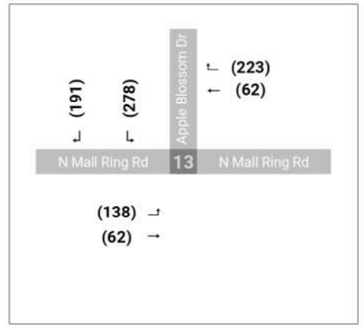


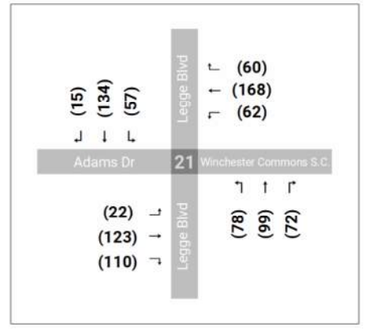












Legend

Study Intersection:

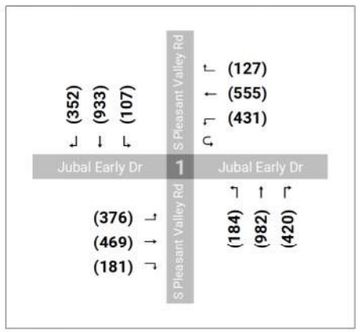
Peak Hour Volumes: **(PM)**

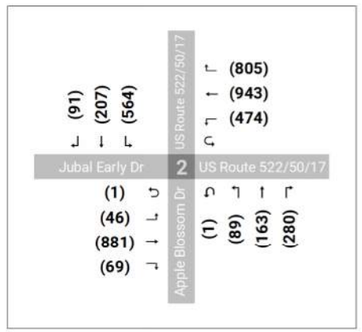
Pennoni

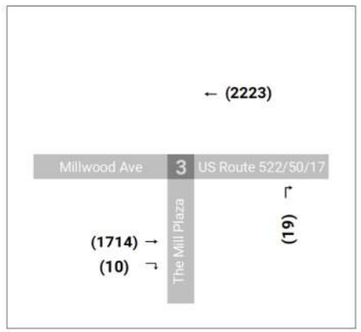
Attachment C:
2050 Total Volumes with Mall Blvd Access

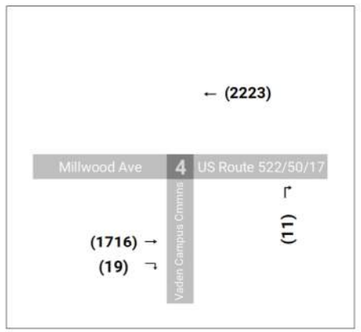
Apple Blossom Mall Street Study

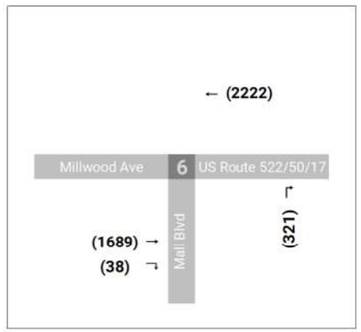
2050 Total | **FIGURE C**

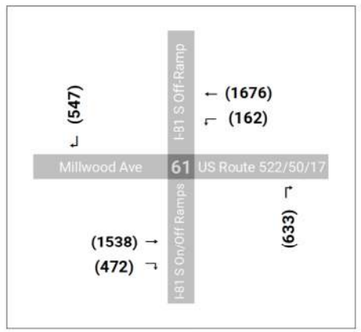


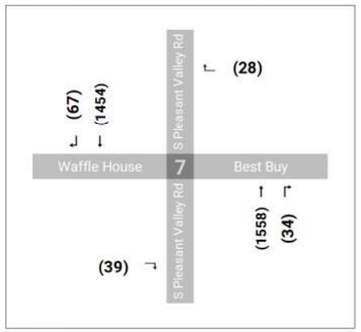


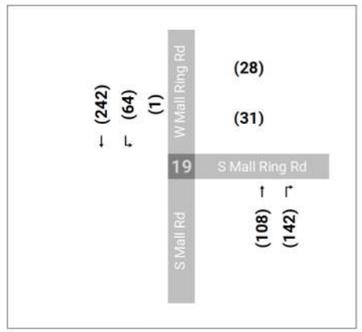


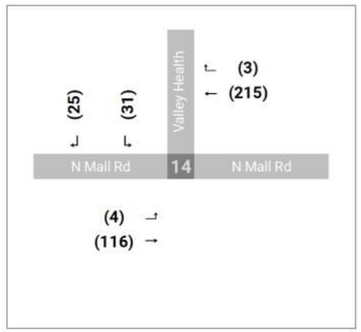


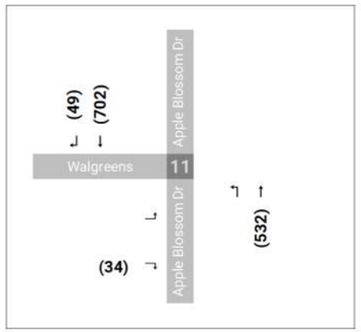


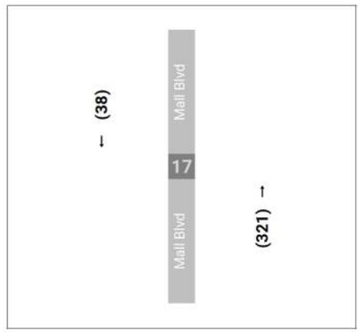


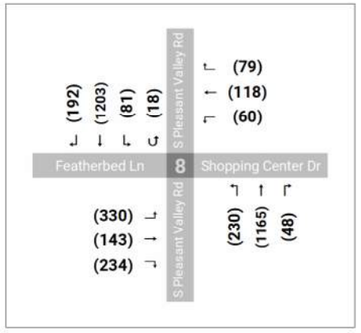


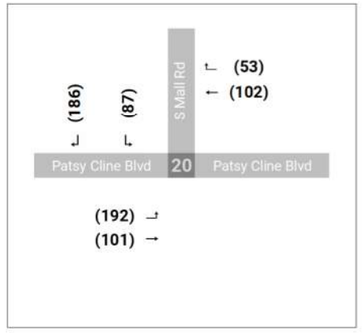


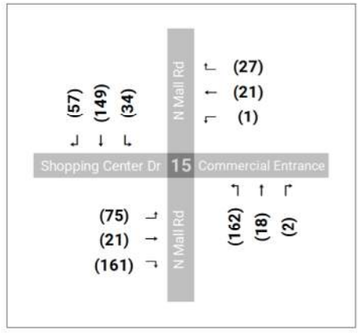


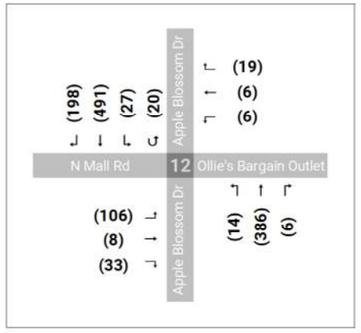


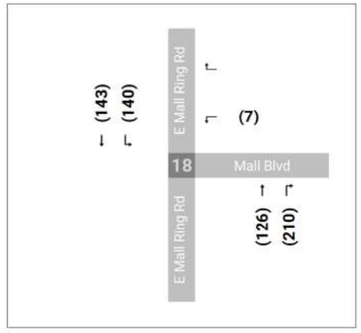


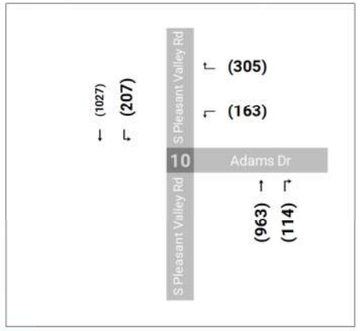


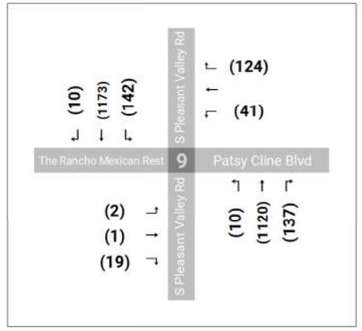


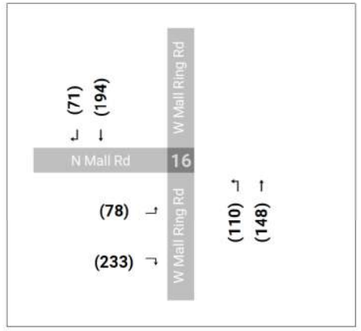


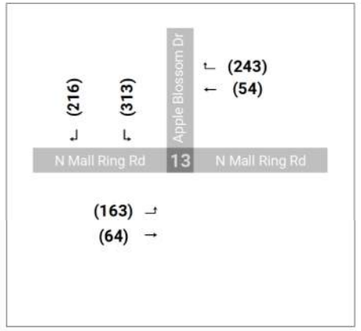


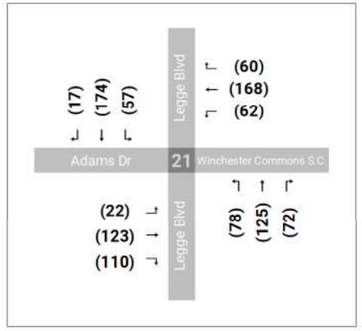












Legend

Study Intersection:

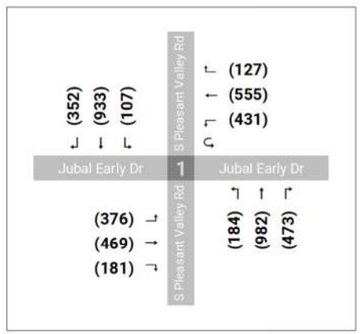
Peak Hour Volumes: **(PM)**

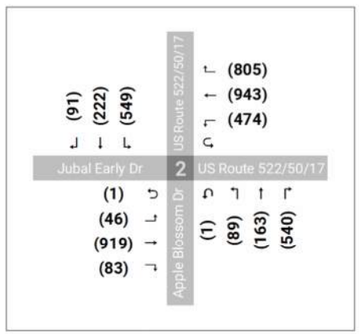
Pennoni

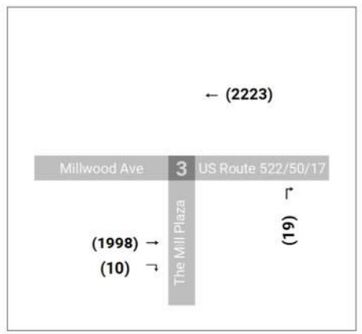
Attachment D:
2050 Total Volumes without Mall Blvd Access

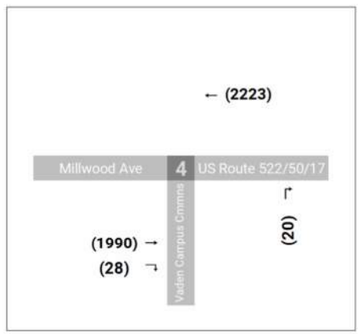
Apple Blossom Mall Street Study

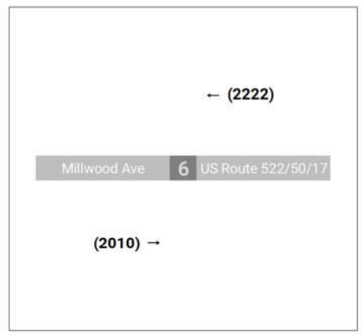
2050 Total wo Mall Blvd | **FIGURE D**

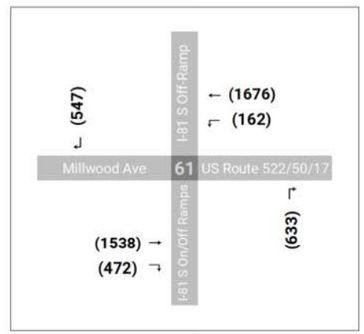


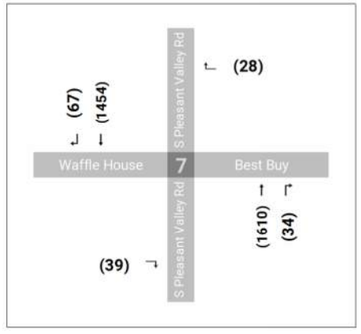


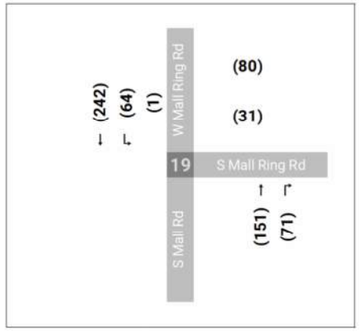


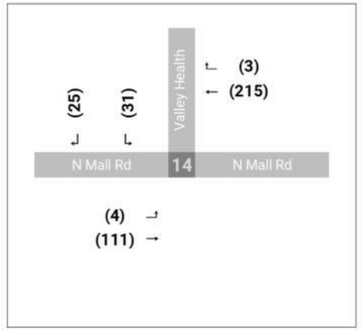


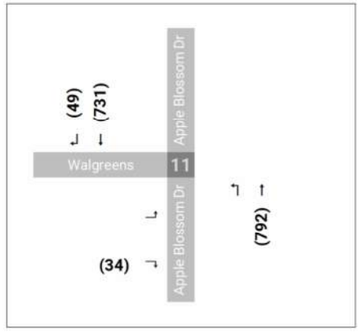


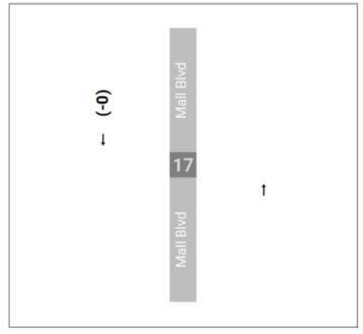


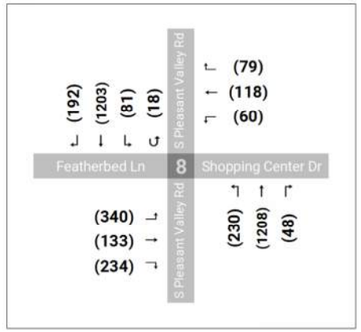


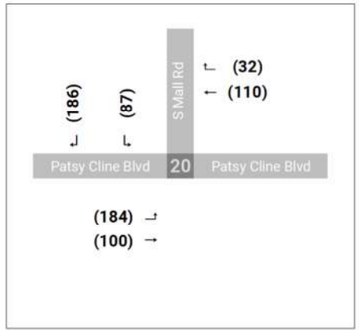


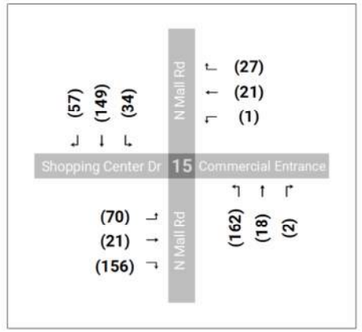


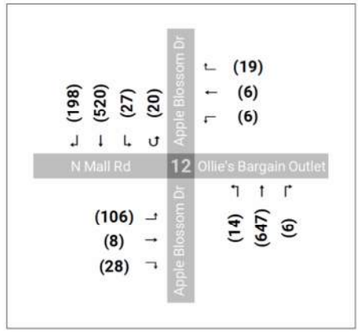


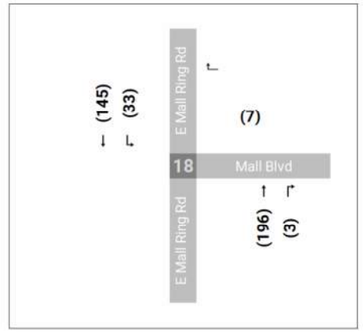


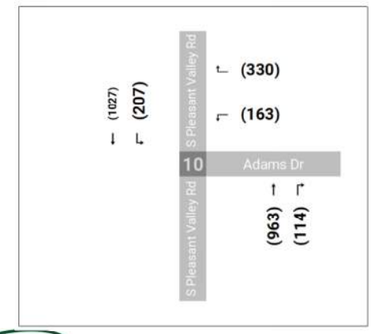


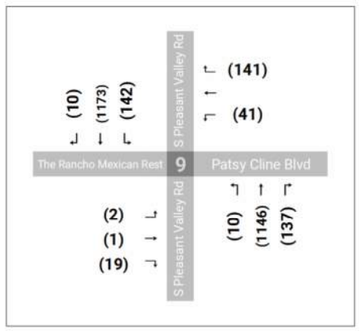


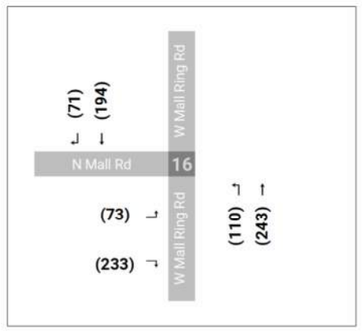


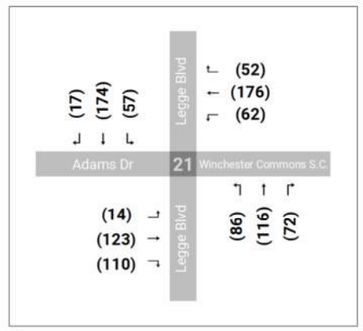












Legend

Study Intersection:

Peak Hour Volumes: **(PM)**

Pennoni

Attachment E:
SimTraffic/Synchro Outputs 2050 PM peak hour without Mall Blvd Access

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Adams Dr	100	18.1	55.3	0.1	15	17	15.1
Patsy Cline Blvd	90	7.0	18.7	0.1	21	24	4.4
Apple Blossom Corner	83	13.2	28.7	0.1	19	25	6.9
Shopping Center Dr	80	35.3	57.2	0.2	14	16	27.9
Best Buy	70	5.4	11.9	0.1	16	19	3.9
Jubal Early Dr #1	10	25.5	31.4	0.1	8	9	21.9
Total		104.5	203.2	0.7	15	17	80.1

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Adams Dr	18	13.4	1	333.2	19	12.7	17
Patsy Cline Blvd	24	4.1	1	260.5	24	4.1	23
Apple Blossom Corner	24	8.1	1	452.3	23	8.6	22
Shopping Center Dr	17	25.0	1	613.9	15	31.2	16
Best Buy	17	4.6	2	112.7	18	4.3	17
Jubal Early Dr #1	8	24.9	10	19.3	8	24.2	8
Total	17	80.0	1	1791.9	16	85.0	16

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 5 Delay	Run 6 Speed	Run 6 Delay	Run 7 Speed	Run 7 Delay	Run 8 Speed	Run 8 Delay
Adams Dr	15.7	17	14.7	17	15.5	19	12.4
Patsy Cline Blvd	4.6	25	3.7	24	4.3	24	4.0
Apple Blossom Corner	10.0	24	8.5	22	9.8	24	8.4
Shopping Center Dr	26.0	15	30.8	15	30.2	14	35.7
Best Buy	4.9	18	4.5	18	4.3	17	5.3
Jubal Early Dr #1	25.0	8	23.7	8	24.6	8	25.8
Total	86.1	16	86.0	16	88.6	16	91.5

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 9 Speed	Run 9 Delay	Run 10 Speed	Run 10 Delay	Run 11 Speed	Run 11 Delay	Run 12 Speed
Adams Dr	18	13.3	19	12.9	17	14.9	18
Patsy Cline Blvd	24	4.2	25	3.8	24	4.3	24
Apple Blossom Corner	24	8.0	21	11.4	23	8.6	22
Shopping Center Dr	14	32.5	15	30.0	15	31.0	13
Best Buy	17	4.7	18	4.3	18	4.4	15
Jubal Early Dr #1	8	25.4	8	25.5	8	25.3	7
Total	16	88.1	16	87.9	16	88.5	15

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 12 Delay	Run 13 Speed	Run 13 Delay	Run 14 Speed	Run 14 Delay	Run 15 Speed	Run 15 Delay
Adams Dr	14.4	18	14.4	17	14.6	17	14.5
Patsy Cline Blvd	4.0	24	4.2	24	4.4	24	4.4
Apple Blossom Corner	9.7	23	8.5	22	9.6	22	10.5
Shopping Center Dr	37.4	15	28.3	16	27.9	15	29.1
Best Buy	6.7	18	4.3	19	3.7	19	4.0
Jubal Early Dr #1	28.8	8	24.6	8	23.9	8	25.5
Total	101.1	17	84.4	17	84.2	16	88.0

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 16 Speed	Run 16 Delay	Run 17 Speed	Run 17 Delay	Run 18 Speed	Run 18 Delay	Run 19 Speed
Adams Dr	20	10.9	18	14.5	18	14.3	17
Patsy Cline Blvd	25	3.7	24	4.5	24	4.1	24
Apple Blossom Corner	24	7.8	24	8.2	22	9.5	21
Shopping Center Dr	14	31.7	15	28.3	13	36.8	14
Best Buy	19	3.7	19	4.0	16	6.0	17
Jubal Early Dr #1	8	23.4	8	22.6	7	28.0	7
Total	17	81.3	17	82.1	15	98.7	15

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 19 Delay	Run 20 Speed	Run 20 Delay	Run 21 Speed	Run 21 Delay	Run 22 Speed	Run 22 Delay
Adams Dr	14.6	17	15.2	19	12.4	17	14.8
Patsy Cline Blvd	4.0	24	4.5	24	4.1	24	4.3
Apple Blossom Corner	10.7	24	8.4	23	9.0	22	10.3
Shopping Center Dr	34.0	13	36.4	14	35.5	14	33.7
Best Buy	4.8	16	5.4	17	5.1	17	5.2
Jubal Early Dr #1	27.4	7	29.2	7	26.3	7	26.7
Total	95.4	15	99.1	16	92.3	16	95.0

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 23 Speed	Run 23 Delay	Run 24 Speed	Run 24 Delay	Run 25 Speed	Run 25 Delay	Run 26 Speed
Adams Dr	18	13.8	17	15.6	17	14.6	18
Patsy Cline Blvd	24	4.2	24	4.5	24	4.1	24
Apple Blossom Corner	23	8.6	23	9.3	22	9.6	22
Shopping Center Dr	16	25.7	16	26.2	15	30.1	16
Best Buy	18	4.6	17	4.7	16	5.7	17
Jubal Early Dr #1	8	25.7	8	25.9	7	27.5	8
Total	17	82.7	16	86.1	16	91.7	16

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 26 Delay	Run 27 Speed	Run 27 Delay	Run 28 Speed	Run 28 Delay	Run 29 Speed	Run 29 Delay
Adams Dr	14.3	17	15.6	16	16.7	17	14.9
Patsy Cline Blvd	4.0	24	4.4	24	4.6	24	4.1
Apple Blossom Corner	9.8	23	9.4	23	9.2	22	9.8
Shopping Center Dr	26.8	15	31.4	15	29.0	15	28.4
Best Buy	4.6	18	4.4	18	4.2	17	4.7
Jubal Early Dr #1	25.6	8	25.2	8	25.2	7	26.3
Total	85.1	16	90.3	16	88.9	16	88.2

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 30 Speed	Run 30 Delay
Adams Dr	19	12.2
Patsy Cline Blvd	25	3.8
Apple Blossom Corner	24	8.3
Shopping Center Dr	16	25.5
Best Buy	18	4.2
Jubal Early Dr #1	8	24.9
Total	17	78.9

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Jubal Early Dr #1	10	92.5	359.6	0.1	3	3	103.1
Waffle House	70	12.8	21.0	0.1	11	12	12.8
Featherbed Ln	80	34.4	39.6	0.1	5	5	36.3
Pleasant Valley Mktp	83	5.0	26.1	0.2	29	29	5.0
The Rancho Mexican R	90	1.5	17.1	0.1	32	32	1.4
Adams Dr	100	6.6	16.8	0.1	23	23	6.3
Total		152.9	480.1	0.7	11	10	164.8

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Jubal Early Dr #1	3	86.2	2	126.7	3	97.7	3
Waffle House	12	12.5	16	6.7	12	12.3	12
Featherbed Ln	5	34.9	9	17.5	5	34.6	5
Pleasant Valley Mktp	29	5.1	31	3.3	29	4.8	29
The Rancho Mexican R	32	1.5	32	1.2	32	1.4	31
Adams Dr	22	7.1	24	5.5	24	6.0	23
Total	11	147.3	11	161.0	11	156.8	11

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 5 Delay	Run 6 Speed	Run 6 Delay	Run 7 Speed	Run 7 Delay	Run 8 Speed	Run 8 Delay
Jubal Early Dr #1	88.6	3	94.2	3	90.4	3	106.0
Waffle House	12.5	11	13.7	12	12.4	11	13.2
Featherbed Ln	35.4	5	36.0	5	33.4	5	36.8
Pleasant Valley Mktp	5.1	29	5.6	29	4.8	29	5.3
The Rancho Mexican R	1.5	32	1.5	32	1.5	31	1.6
Adams Dr	6.6	22	7.2	22	7.2	23	6.4
Total	149.7	11	158.3	11	149.7	10	169.2

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 9 Speed	Run 9 Delay	Run 10 Speed	Run 10 Delay	Run 11 Speed	Run 11 Delay	Run 12 Speed
Jubal Early Dr #1	3	96.8	3	93.7	3	81.7	2
Waffle House	11	13.3	12	11.7	11	13.0	11
Featherbed Ln	5	34.7	5	32.8	5	34.7	5
Pleasant Valley Mktp	29	4.8	30	4.8	29	5.0	29
The Rancho Mexican R	32	1.4	32	1.4	31	1.7	31
Adams Dr	23	6.8	24	5.9	23	6.7	23
Total	11	157.8	11	150.3	12	142.7	10

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 12 Delay	Run 13 Speed	Run 13 Delay	Run 14 Speed	Run 14 Delay	Run 15 Speed	Run 15 Delay
Jubal Early Dr #1	115.6	3	83.0	3	99.7	3	97.4
Waffle House	14.2	12	12.3	12	12.5	12	11.9
Featherbed Ln	36.3	5	34.3	5	32.6	5	34.1
Pleasant Valley Mktp	4.8	29	5.3	29	5.2	29	5.0
The Rancho Mexican R	1.5	32	1.4	32	1.4	32	1.5
Adams Dr	6.7	23	6.5	23	6.6	23	6.6
Total	179.2	12	142.8	11	158.0	11	156.5

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 16 Speed	Run 16 Delay	Run 17 Speed	Run 17 Delay	Run 18 Speed	Run 18 Delay	Run 19 Speed
Jubal Early Dr #1	3	90.3	3	89.2	3	94.1	3
Waffle House	11	14.1	11	13.0	11	12.9	11
Featherbed Ln	5	35.5	5	34.7	5	33.1	5
Pleasant Valley Mktp	30	4.8	29	5.0	29	5.0	29
The Rancho Mexican R	31	1.6	31	1.6	31	1.5	32
Adams Dr	23	6.8	22	6.9	24	6.0	22
Total	11	153.1	11	150.4	11	152.6	11

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 19 Delay	Run 20 Speed	Run 20 Delay	Run 21 Speed	Run 21 Delay	Run 22 Speed	Run 22 Delay
Jubal Early Dr #1	92.5	3	106.9	3	85.4	3	105.9
Waffle House	14.3	11	13.3	12	12.6	11	14.6
Featherbed Ln	34.5	5	36.3	5	35.1	5	37.2
Pleasant Valley Mktp	5.2	28	5.7	29	5.0	29	5.0
The Rancho Mexican R	1.6	32	1.6	31	1.5	32	1.5
Adams Dr	7.3	22	6.9	22	7.0	23	6.1
Total	155.3	10	170.8	11	146.6	10	170.2

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 23 Speed	Run 23 Delay	Run 24 Speed	Run 24 Delay	Run 25 Speed	Run 25 Delay	Run 26 Speed
Jubal Early Dr #1	4	78.2	3	85.2	3	83.2	3
Waffle House	11	13.0	11	13.0	11	13.6	12
Featherbed Ln	5	31.9	5	30.8	5	34.9	5
Pleasant Valley Mktp	29	5.0	29	5.2	29	4.9	29
The Rancho Mexican R	31	1.7	32	1.5	32	1.5	31
Adams Dr	23	6.4	23	6.2	23	6.6	23
Total	12	136.1	12	141.9	11	144.8	11

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 26 Delay	Run 27 Speed	Run 27 Delay	Run 28 Speed	Run 28 Delay	Run 29 Speed	Run 29 Delay
Jubal Early Dr #1	93.6	3	107.8	4	69.0	3	89.3
Waffle House	11.7	11	13.9	13	9.9	11	13.9
Featherbed Ln	34.6	5	36.3	5	32.2	5	36.1
Pleasant Valley Mktp	5.2	29	4.8	29	4.8	29	4.8
The Rancho Mexican R	1.6	31	1.5	31	1.6	31	1.6
Adams Dr	6.7	23	6.1	22	7.0	23	6.8
Total	153.4	10	170.5	13	124.6	11	152.5

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 30 Speed	Run 30 Delay
Jubal Early Dr #1	3	84.0
Waffle House	12	11.8
Featherbed Ln	5	32.8
Pleasant Valley Mktp	30	4.4
The Rancho Mexican R	32	1.4
Adams Dr	23	6.4
Total	12	140.9

Arterial Level of Service: EB #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
S Pleasant Valley Rd	10	180.9	250.0	0.4	6	9	120.2
Apple Blossom Dr	20	81.3	93.5	0.1	5	4	86.4
The Mill Plaza	30	5.8	19.9	0.1	24	28	3.0
Vaden Campus Commons	40	6.8	10.7	0.0	13	12	8.0
I-81 SB On-Ramp	61	16.6	30.7	0.1	13	10	22.0
Total		291.5	404.8	0.7	7	9	239.6

Arterial Level of Service: EB #1

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
S Pleasant Valley Rd	8	121.4	1	2256.1	5	212.1	5
Apple Blossom Dr	5	72.7	0	1744.6	5	68.2	4
The Mill Plaza	26	4.2	1	709.9	25	4.4	26
Vaden Campus Commons	10	9.6	0	313.3	11	8.3	10
I-81 SB On-Ramp	11	21.2	6	46.6	10	22.4	9
Total	9	229.1	1	5070.6	7	315.5	6

Arterial Level of Service: EB #1

Cross Street	Run 5 Delay	Run 6 Speed	Run 6 Delay	Run 7 Speed	Run 7 Delay	Run 8 Speed	Run 8 Delay
S Pleasant Valley Rd	213.3	7	145.8	4	269.1	12	76.4
Apple Blossom Dr	103.7	4	91.1	4	86.5	6	55.7
The Mill Plaza	4.0	28	3.1	28	3.0	28	2.8
Vaden Campus Commons	9.4	15	5.3	13	6.5	18	3.7
I-81 SB On-Ramp	27.3	12	17.6	15	12.2	15	13.3
Total	357.6	8	262.9	6	377.3	12	152.0

Arterial Level of Service: EB #1

Cross Street	Run 9 Speed	Run 9 Delay	Run 10 Speed	Run 10 Delay	Run 11 Speed	Run 11 Delay	Run 12 Speed
S Pleasant Valley Rd	3	471.8	12	71.4	5	223.9	12
Apple Blossom Dr	4	97.5	6	55.1	4	85.3	6
The Mill Plaza	27	3.4	28	2.7	28	2.8	28
Vaden Campus Commons	13	7.0	17	4.5	16	4.7	13
I-81 SB On-Ramp	12	18.3	15	12.3	15	12.9	15
Total	4	598.1	12	146.0	7	329.7	12

Arterial Level of Service: EB #1

Cross Street	Run 12 Delay	Run 13 Speed	Run 13 Delay	Run 14 Speed	Run 14 Delay	Run 15 Speed	Run 15 Delay
S Pleasant Valley Rd	72.7	13	65.8	11	83.5	6	190.8
Apple Blossom Dr	54.6	5	65.6	5	72.9	4	86.9
The Mill Plaza	2.8	28	2.9	28	3.0	28	2.9
Vaden Campus Commons	6.5	16	4.7	17	4.4	17	4.2
I-81 SB On-Ramp	12.9	16	11.8	15	12.3	15	12.7
Total	149.5	12	150.8	11	176.0	7	297.6

Arterial Level of Service: EB #1

Cross Street	Run 16 Speed	Run 16 Delay	Run 17 Speed	Run 17 Delay	Run 18 Speed	Run 18 Delay	Run 19 Speed
S Pleasant Valley Rd	14	55.2	8	123.8	9	108.7	11
Apple Blossom Dr	7	51.4	4	82.9	6	59.2	6
The Mill Plaza	28	3.0	28	3.1	28	3.1	27
Vaden Campus Commons	14	6.1	15	5.3	13	6.7	11
I-81 SB On-Ramp	11	21.4	16	11.8	10	22.6	11
Total	13	137.1	9	227.0	10	200.2	11

Arterial Level of Service: EB #1

Cross Street	Run 19 Delay	Run 20 Speed	Run 20 Delay	Run 21 Speed	Run 21 Delay	Run 22 Speed	Run 22 Delay
S Pleasant Valley Rd	81.8	10	90.8	3	351.9	8	137.1
Apple Blossom Dr	61.0	5	66.0	4	94.2	4	84.1
The Mill Plaza	3.7	28	2.9	28	3.3	28	3.0
Vaden Campus Commons	8.2	18	4.0	11	8.9	17	4.5
I-81 SB On-Ramp	20.0	15	13.3	11	19.8	15	12.9
Total	174.8	11	177.0	5	478.0	8	241.6

Arterial Level of Service: EB #1

Cross Street	Run 23 Speed	Run 23 Delay	Run 24 Speed	Run 24 Delay	Run 25 Speed	Run 25 Delay	Run 26 Speed
S Pleasant Valley Rd	5	227.1	8	135.5	5	252.5	6
Apple Blossom Dr	4	84.6	5	74.3	6	62.4	4
The Mill Plaza	24	6.2	21	8.6	28	2.9	28
Vaden Campus Commons	9	11.9	9	11.4	16	5.0	16
I-81 SB On-Ramp	10	23.4	9	28.7	15	12.0	16
Total	6	353.1	8	258.4	7	334.8	7

Arterial Level of Service: EB #1

Cross Street	Run 26 Delay	Run 27 Speed	Run 27 Delay	Run 28 Speed	Run 28 Delay	Run 29 Speed	Run 29 Delay
S Pleasant Valley Rd	181.3	11	84.0	7	157.3	5	233.1
Apple Blossom Dr	87.1	5	72.9	5	68.0	4	82.9
The Mill Plaza	2.8	28	2.9	28	2.9	28	2.8
Vaden Campus Commons	4.6	15	5.5	16	4.6	15	5.7
I-81 SB On-Ramp	11.8	14	14.0	15	13.4	14	13.6
Total	287.6	11	179.3	8	246.1	6	338.1

Arterial Level of Service: EB #1

Cross Street	Run 30 Speed	Run 30 Delay
S Pleasant Valley Rd	9	103.7
Apple Blossom Dr	5	66.5
The Mill Plaza	28	2.8
Vaden Campus Commons	17	4.2
I-81 SB On-Ramp	15	13.3
Total	10	190.6

Arterial Level of Service: WB #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Vaden Campus Commons	40	28.5	101.8	0.1	9	10	24.6
The Mill Plaza	30	8.3	12.8	0.0	11	12	6.8
Millwood Ave	20	72.4	86.1	0.1	5	6	62.6
S Pleasant Valley Rd	10	35.1	47.2	0.1	9	9	36.9
Total		144.3	248.0	0.4	7	8	131.0

Arterial Level of Service: WB #1

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Vaden Campus Commons	9	28.9	10	26.1	17	11.0	9
The Mill Plaza	11	8.4	6	17.3	15	4.6	10
Millwood Ave	6	64.4	4	98.1	7	51.5	7
S Pleasant Valley Rd	11	27.6	17	12.7	11	27.5	10
Total	8	129.3	7	154.3	10	94.7	9

Arterial Level of Service: WB #1

Cross Street	Run 5 Delay	Run 6 Speed	Run 6 Delay	Run 7 Speed	Run 7 Delay	Run 8 Speed	Run 8 Delay
Vaden Campus Commons	26.4	9	26.9	7	36.0	9	28.4
The Mill Plaza	9.0	11	7.7	10	9.5	11	8.3
Millwood Ave	53.5	5	76.4	7	50.9	6	67.2
S Pleasant Valley Rd	28.4	9	34.5	11	25.9	10	29.1
Total	117.3	7	145.6	8	122.4	8	133.1

Arterial Level of Service: WB #1

Cross Street	Run 9 Speed	Run 9 Delay	Run 10 Speed	Run 10 Delay	Run 11 Speed	Run 11 Delay	Run 12 Speed
Vaden Campus Commons	10	25.1	13	15.7	7	40.1	9
The Mill Plaza	12	6.9	15	4.9	10	9.8	11
Millwood Ave	6	67.7	6	68.2	6	70.4	4
S Pleasant Valley Rd	12	22.7	6	54.8	8	40.1	6
Total	8	122.3	7	143.5	7	160.4	6

Arterial Level of Service: WB #1

Cross Street	Run 12 Delay	Run 13 Speed	Run 13 Delay	Run 14 Speed	Run 14 Delay	Run 15 Speed	Run 15 Delay
Vaden Campus Commons	28.8	8	29.4	7	35.3	7	37.5
The Mill Plaza	7.8	10	8.9	9	10.1	9	10.7
Millwood Ave	101.5	4	91.3	4	98.3	6	63.8
S Pleasant Valley Rd	57.4	7	50.6	7	51.3	11	26.7
Total	195.6	6	180.3	6	195.0	8	138.7

Arterial Level of Service: WB #1

Cross Street	Run 16 Speed	Run 16 Delay	Run 17 Speed	Run 17 Delay	Run 18 Speed	Run 18 Delay	Run 19 Speed
Vaden Campus Commons	6	46.6	8	29.9	7	39.2	11
The Mill Plaza	8	12.0	11	7.9	9	10.8	13
Millwood Ave	6	66.0	5	77.2	4	91.1	5
S Pleasant Valley Rd	12	24.2	12	23.2	11	25.4	8
Total	7	148.8	8	138.1	7	166.5	7

Arterial Level of Service: WB #1

Cross Street	Run 19 Delay	Run 20 Speed	Run 20 Delay	Run 21 Speed	Run 21 Delay	Run 22 Speed	Run 22 Delay
Vaden Campus Commons	22.1	15	14.0	9	29.2	9	26.6
The Mill Plaza	6.3	14	5.5	11	8.6	10	8.7
Millwood Ave	73.7	5	73.4	7	55.0	4	91.0
S Pleasant Valley Rd	42.7	9	36.4	10	31.3	7	45.0
Total	144.9	8	129.3	8	124.0	6	171.3

Arterial Level of Service: WB #1

Cross Street	Run 23 Speed	Run 23 Delay	Run 24 Speed	Run 24 Delay	Run 25 Speed	Run 25 Delay	Run 26 Speed
Vaden Campus Commons	7	40.3	11	20.2	10	22.5	11
The Mill Plaza	9	10.4	13	5.8	13	6.0	13
Millwood Ave	4	93.3	8	44.8	6	65.1	8
S Pleasant Valley Rd	9	34.1	10	29.1	8	41.3	13
Total	6	178.2	10	99.9	8	134.8	10

Arterial Level of Service: WB #1

Cross Street	Run 26 Delay	Run 27 Speed	Run 27 Delay	Run 28 Speed	Run 28 Delay	Run 29 Speed	Run 29 Delay
Vaden Campus Commons	21.5	8	33.9	7	37.9	8	31.9
The Mill Plaza	6.0	10	9.5	9	10.3	11	7.7
Millwood Ave	45.8	5	76.6	6	69.2	5	78.7
S Pleasant Valley Rd	20.6	7	45.6	9	34.4	9	36.4
Total	93.9	7	165.7	7	151.8	7	154.7

Arterial Level of Service: WB #1

Cross Street	Run 30 Speed	Run 30 Delay
Vaden Campus Commons	9	27.7
The Mill Plaza	10	9.5
Millwood Ave	4	101.9
S Pleasant Valley Rd	8	41.7
Total	6	180.7

Intersection: 4: Bend

Movement	SW	SW
Directions Served	T	
Maximum Queue (ft)	101	25
Average Queue (ft)	21	20
95th Queue (ft)	158	200
Link Distance (ft)	452	452
Upstream Blk Time (%)	3	3
Queuing Penalty (veh)	10	11
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: S Pleasant Valley Rd & Jubal Early Dr #1

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	TR	L	T	T
Maximum Queue (ft)	323	339	1166	1121	195	297	474	507	441	221	256	264
Average Queue (ft)	224	272	585	563	149	216	300	275	212	121	175	183
95th Queue (ft)	375	415	1425	1371	261	370	570	569	393	210	267	275
Link Distance (ft)			1893	1893			491	491	491	235	235	235
Upstream Blk Time (%)			3	0			6	6	0	1	2	3
Queuing Penalty (veh)			0	0			22	23	1	5	10	13
Storage Bay Dist (ft)	340	340			195	300						
Storage Blk Time (%)	1	11	27	43	3	4	21					
Queuing Penalty (veh)	2	26	100	77	7	8	46					

Intersection: 10: S Pleasant Valley Rd & Jubal Early Dr #1

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	T	T	R
Maximum Queue (ft)	242	200	379	368	350
Average Queue (ft)	139	148	350	334	227
95th Queue (ft)	235	259	383	439	425
Link Distance (ft)	235		338	338	338
Upstream Blk Time (%)	4		62	47	13
Queuing Penalty (veh)	16		0	0	0
Storage Bay Dist (ft)		200			
Storage Blk Time (%)		4	67		
Queuing Penalty (veh)		18	72		

Intersection: 20: Apple Blossom Dr/Millwood Ave & Jubal Early Dr #1/Millwood Ave #1

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	UL	T	TR	L	L	T	T	R	UL	T	R	R
Maximum Queue (ft)	200	512	510	518	525	658	581	237	182	244	205	188
Average Queue (ft)	69	372	403	417	478	574	266	17	66	112	125	92
95th Queue (ft)	184	561	571	590	622	793	539	177	138	206	205	155
Link Distance (ft)		491	491			552	552	552		244	244	
Upstream Blk Time (%)		4	5			47	1	1		1	3	
Queuing Penalty (veh)		21	28			347	10	5		2	12	
Storage Bay Dist (ft)	200			525	525				205			225
Storage Blk Time (%)	0	50		2	16	41			0	1	3	0
Queuing Penalty (veh)	0	23		10	74	193			0	1	9	0

Intersection: 20: Apple Blossom Dr/Millwood Ave & Jubal Early Dr #1/Millwood Ave #1

Movement	SB	SB	SB
Directions Served	L	L	TR
Maximum Queue (ft)	374	468	402
Average Queue (ft)	225	283	208
95th Queue (ft)	351	436	380
Link Distance (ft)		524	524
Upstream Blk Time (%)		1	3
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)	380		
Storage Blk Time (%)	0	5	
Queuing Penalty (veh)	0	14	

Intersection: 30: The Mill Plaza & Millwood Ave #1

Movement	EB	EB	EB	WB	WB	WB	NB
Directions Served	T	T	TR	T	T	T	R
Maximum Queue (ft)	158	160	94	224	204	92	62
Average Queue (ft)	18	34	23	129	37	5	21
95th Queue (ft)	113	219	196	254	146	49	71
Link Distance (ft)	552	552	552	133	133	133	202
Upstream Blk Time (%)	0	3	3	36	4	0	2
Queuing Penalty (veh)	0	22	22	266	26	3	0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 40: Vaden Campus Commons/Buzzins & Millwood Ave #1

Movement	EB	EB	EB	WB	WB	WB	NB
Directions Served	T	T	TR	T	T	T	R
Maximum Queue (ft)	223	211	202	415	491	485	57
Average Queue (ft)	105	103	72	329	357	265	15
95th Queue (ft)	245	242	185	528	652	559	51
Link Distance (ft)	133	133	133	366	366	366	154
Upstream Blk Time (%)	8	8	6	34	28	6	0
Queuing Penalty (veh)	56	54	42	254	209	46	0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 61: I-81 SB On-Ramp/I-81 SB Off-Ramp & Millwood Ave #1/Millwood Ave

Movement	EB	EB	EB	WB	WB	WB	WB	WB	SB	SB
Directions Served	T	T	R	L	L	T	T	T	R	R
Maximum Queue (ft)	373	373	12	232	194	333	314	312	1498	455
Average Queue (ft)	217	198	12	131	80	193	139	129	731	320
95th Queue (ft)	415	402	120	237	199	399	335	308	1730	560
Link Distance (ft)	366	366	366	213	213	213	213	213	1750	
Upstream Blk Time (%)	3	2	3	7	3	38	14	7	15	
Queuing Penalty (veh)	21	13	22	24	13	140	53	27	0	
Storage Bay Dist (ft)										470
Storage Blk Time (%)									30	3
Queuing Penalty (veh)									80	7

Intersection: 62: I-81 SB Off-Ramp & Millwood Pike/Millwood Ave

Movement	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	T	T	T	T	T	T	T	T	R
Maximum Queue (ft)	198	161	7	181	626	587	496	411	28
Average Queue (ft)	64	21	2	58	210	177	128	89	1
95th Queue (ft)	235	122	20	204	662	585	474	415	22
Link Distance (ft)	213	213			735	735	735	735	1084
Upstream Blk Time (%)	4	0			4	2	2	2	
Queuing Penalty (veh)	34	3			18	10	10	11	
Storage Bay Dist (ft)			200	200					
Storage Blk Time (%)				0	24				
Queuing Penalty (veh)				1	148				

Intersection: 63: Front Royal Pike/I-81 NB Ramps & Millwood Pike

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	UL	L	T	T	R	UL	T	T	T	R	L	L
Maximum Queue (ft)	533	539	815	781	765	288	590	744	800	76	375	573
Average Queue (ft)	430	445	441	278	91	124	315	475	748	54	336	483
95th Queue (ft)	664	676	1016	708	486	283	560	822	902	73	443	664
Link Distance (ft)			735	735	735		740	740	740			523
Upstream Blk Time (%)			13	1	1		3	0	72			45
Queuing Penalty (veh)			92	7	5		0	0	0			0
Storage Bay Dist (ft)	550	550				290				50	375	
Storage Blk Time (%)	1	11	10			0	20		62	60	5	46
Queuing Penalty (veh)	6	46	62			0	19		369	164	14	138

Intersection: 63: Front Royal Pike/I-81 NB Ramps & Millwood Pike

Movement	NB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	R
Maximum Queue (ft)	567	545	300	187	192	291	76
Average Queue (ft)	471	401	129	117	56	126	10
95th Queue (ft)	647	615	337	191	174	268	92
Link Distance (ft)	523	523				543	
Upstream Blk Time (%)	32	7				2	
Queuing Penalty (veh)	0	0				0	
Storage Bay Dist (ft)			300	200	200		350
Storage Blk Time (%)		30	1	1	1	1	2
Queuing Penalty (veh)		27	1	4	5	5	4

Intersection: 70: S Pleasant Valley Rd & Waffle House/Best Buy

Movement	EB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	T	T	TR	T	TR
Maximum Queue (ft)	355	65	60	158	171	272	280
Average Queue (ft)	238	25	5	23	33	223	234
95th Queue (ft)	450	79	35	105	134	334	342
Link Distance (ft)	379	246		190	190	235	235
Upstream Blk Time (%)	25	1		0	3	14	17
Queuing Penalty (veh)	0	0		2	27	109	132
Storage Bay Dist (ft)			70				
Storage Blk Time (%)			0	1			
Queuing Penalty (veh)			1	7			

Intersection: 80: S Pleasant Valley Rd & Featherbed Ln/Shopping Center Dr

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	UL	T	TR
Maximum Queue (ft)	385	1072	175	147	296	300	511	520	110	222	228
Average Queue (ft)	383	1011	71	52	160	195	276	312	72	194	194
95th Queue (ft)	394	1265	148	170	291	327	526	545	127	248	248
Link Distance (ft)		1034		490	490		978	978		190	190
Upstream Blk Time (%)		74		2	1		2	3		46	47
Queuing Penalty (veh)		0		2	1		18	19		344	349
Storage Bay Dist (ft)	385		195			305			110		
Storage Blk Time (%)	70	1	1			2	7		4	53	
Queuing Penalty (veh)	256	5	3			14	15		22	53	

Intersection: 83: S Pleasant Valley Rd & Pleasant Valley Mktplace/Apple Blossom Corners SC

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	59	167	61	332	62	101	302	319	136	117	105
Average Queue (ft)	42	39	34	155	53	20	135	150	56	33	32
95th Queue (ft)	69	150	76	316	64	64	321	331	110	87	82
Link Distance (ft)		398		510			685	685		978	978
Upstream Blk Time (%)		2		2			2	2			
Queuing Penalty (veh)		0		0			15	15			
Storage Bay Dist (ft)	60		65		55	165			235		
Storage Blk Time (%)	14	2	0	32	28	0	5				
Queuing Penalty (veh)	6	2	0	52	20	0	1				

Intersection: 90: S Pleasant Valley Rd & The Rancho Mexican Rest/Patsy Cline Blvd

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	59	86	173	32	40	59	135	8	12
Average Queue (ft)	21	39	63	4	12	17	55	0	0
95th Queue (ft)	63	82	192	22	128	133	108	5	7
Link Distance (ft)	440		632		463	463		685	685
Upstream Blk Time (%)			1		2	2			
Queuing Penalty (veh)			3		15	15			
Storage Bay Dist (ft)		90		80			265		
Storage Blk Time (%)		4	4		2				
Queuing Penalty (veh)		6	2		0				

Intersection: 100: S Pleasant Valley Rd & Adams Dr

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	R	T	TR	L	T	T
Maximum Queue (ft)	109	168	200	282	292	154	169	178
Average Queue (ft)	10	91	109	158	156	73	91	93
95th Queue (ft)	57	194	212	296	303	128	156	161
Link Distance (ft)		439	439	603	603		463	463
Upstream Blk Time (%)		2	2	2	2			
Queuing Penalty (veh)		0	0	0	0			
Storage Bay Dist (ft)	150					326		
Storage Blk Time (%)	0	1						
Queuing Penalty (veh)	0	0						

Intersection: 110: Apple Blossom Dr & Walgreens

Movement	EB	NB	NB	SB	SB
Directions Served	R	T	T	T	TR
Maximum Queue (ft)	50	6	13	34	83
Average Queue (ft)	22	0	3	8	11
95th Queue (ft)	83	8	26	77	94
Link Distance (ft)	270	76	76	244	244
Upstream Blk Time (%)	2	0	3	2	2
Queuing Penalty (veh)	0	0	12	9	9
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 120: Apple Blossom Dr & N Mall Rd/Ollie's Bargain Outlet

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	L	TR	UL	T	TR
Maximum Queue (ft)	123	51	66	17	22	54	62	46
Average Queue (ft)	56	21	24	3	12	20	10	5
95th Queue (ft)	113	46	63	13	122	48	67	44
Link Distance (ft)	122	122	119		386		76	76
Upstream Blk Time (%)	5		3		3	0	4	1
Queuing Penalty (veh)	4		0		20	0	16	3
Storage Bay Dist (ft)				125		125		
Storage Blk Time (%)					3	0	4	
Queuing Penalty (veh)					0	0	2	

Intersection: 130: N Mall Ring Rd & Apple Blossom Dr

Movement	EB	EB	B5	WB	WB	B19	SB	SB
Directions Served	L	T	T	T	R	T	L	R
Maximum Queue (ft)	121	35	5	22	61	11	373	243
Average Queue (ft)	65	7	4	14	21	8	184	33
95th Queue (ft)	114	70	43	147	87	92	362	192
Link Distance (ft)		154	142	425		312	386	386
Upstream Blk Time (%)	3	3	3	3		3	3	1
Queuing Penalty (veh)	0	9	9	10		9	9	3
Storage Bay Dist (ft)	150				250			
Storage Blk Time (%)	3	3		3				
Queuing Penalty (veh)	1	9		11				

Intersection: 140: N Mall Rd & Valley Health

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (ft)	41	67
Average Queue (ft)	4	32
95th Queue (ft)	29	74
Link Distance (ft)	92	170
Upstream Blk Time (%)	0	2
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 150: N Mall Rd & Shopping Center Dr

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	LTR	LTR	LT	TR	LT	TR
Maximum Queue (ft)	60	63	63	55	1	16	1
Average Queue (ft)	24	22	28	14	0	1	0
95th Queue (ft)	51	53	66	43	1	7	1
Link Distance (ft)	490	490	176	378	378	92	92
Upstream Blk Time (%)			2				
Queuing Penalty (veh)			0				
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 160: W Mall Ring Rd & N Mall Rd

Movement	EB	EB	NB	NB	B18	B29
Directions Served	L	R	L	T	T	T
Maximum Queue (ft)	68	17	49	14	18	8
Average Queue (ft)	31	1	14	11	12	3
95th Queue (ft)	57	13	42	117	138	48
Link Distance (ft)	378	378		342	484	234
Upstream Blk Time (%)				2	2	1
Queuing Penalty (veh)				6	4	3
Storage Bay Dist (ft)			100			
Storage Blk Time (%)				3		
Queuing Penalty (veh)				3		

Intersection: 175: Mall Blvd

Movement	SB
Directions Served	TR
Maximum Queue (ft)	9
Average Queue (ft)	5
95th Queue (ft)	59
Link Distance (ft)	265
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 180: E Mall Ring Rd & Mall Blvd

Movement	WB	NB	SB
Directions Served	LR	T	L
Maximum Queue (ft)	31	14	38
Average Queue (ft)	6	8	6
95th Queue (ft)	25	100	27
Link Distance (ft)	895	425	
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		3	
Storage Bay Dist (ft)			150
Storage Blk Time (%)		2	
Queuing Penalty (veh)		0	

Intersection: 182: N Mall Ring Rd

Movement	WB	NB	B43
Directions Served	LR	T	T
Maximum Queue (ft)	56	15	7
Average Queue (ft)	24	11	5
95th Queue (ft)	70	126	56
Link Distance (ft)	166	371	204
Upstream Blk Time (%)	2	2	2
Queuing Penalty (veh)	1	5	4
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 190: S Mall Rd & S Mall Ring Rd

Movement	WB	NB	NB	SB
Directions Served	LR	T	R	UL
Maximum Queue (ft)	32	71	50	6
Average Queue (ft)	4	40	28	0
95th Queue (ft)	32	62	48	4
Link Distance (ft)	268	98	98	
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				150
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 197: E Mall Ring Rd

Movement	EB	NB	B7
Directions Served	LR	LT	T
Maximum Queue (ft)	74	39	11
Average Queue (ft)	36	9	1
95th Queue (ft)	64	135	29
Link Distance (ft)	496	728	437
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		1	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 200: Patsy Cline Blvd & S Mall Rd

Movement	EB	WB	SB	SB
Directions Served	L	TR	L	R
Maximum Queue (ft)	61	23	59	60
Average Queue (ft)	21	4	24	26
95th Queue (ft)	53	78	48	51
Link Distance (ft)		650		205
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	175		100	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 206: Legge Blvd & Patsy Cline Blvd

Movement	EB	WB	NB	NB
Directions Served	R	L	L	R
Maximum Queue (ft)	24	54	63	48
Average Queue (ft)	2	15	28	18
95th Queue (ft)	12	45	52	34
Link Distance (ft)				612
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	250	250	250	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 210: Legge Blvd & Adams Dr

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	LT	TR	L	TR	L	TR
Maximum Queue (ft)	39	94	71	150	97	94	136	90	142
Average Queue (ft)	9	41	30	79	31	38	59	25	67
95th Queue (ft)	31	80	58	129	69	74	107	62	119
Link Distance (ft)		339	339	340	340		454		301
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	135					160		130	
Storage Blk Time (%)		0					0	0	0
Queuing Penalty (veh)		0					0	0	0

Network Summary

Network wide Queuing Penalty: 5523

Attachment F:
SimTraffic/Synchro Outputs 2050 PM peak hour without Mall Blvd Access

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Adams Dr	100	13.7	25.9	0.1	18	18	13.2
Patsy Cline Blvd	90	4.0	15.6	0.1	25	25	3.7
Apple Blossom Corner	83	8.2	22.7	0.1	24	26	6.5
Shopping Center Dr	80	28.9	50.1	0.2	15	16	27.2
Best Buy	70	4.4	10.9	0.1	18	19	4.0
Jubal Early Dr #1	10	25.4	31.3	0.1	8	8	24.5
Total		84.6	156.5	0.7	17	17	79.2

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Adams Dr	17	15.1	19	12.2	18	14.1	18
Patsy Cline Blvd	24	4.2	25	3.6	24	4.1	24
Apple Blossom Corner	24	7.8	25	7.4	23	8.9	26
Shopping Center Dr	16	26.1	16	26.5	15	28.3	15
Best Buy	17	4.7	19	3.5	17	4.9	19
Jubal Early Dr #1	8	25.9	9	21.4	8	25.3	8
Total	17	83.7	18	74.6	16	85.6	17

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 5 Delay	Run 6 Speed	Run 6 Delay	Run 7 Speed	Run 7 Delay	Run 8 Speed	Run 8 Delay
Adams Dr	13.4	18	14.0	17	15.4	17	15.5
Patsy Cline Blvd	3.9	25	4.0	24	4.3	24	4.1
Apple Blossom Corner	6.4	22	9.9	22	9.8	23	8.7
Shopping Center Dr	30.0	15	28.6	16	26.8	14	31.5
Best Buy	4.0	18	4.3	17	4.8	17	4.9
Jubal Early Dr #1	24.0	7	26.9	7	27.9	7	27.9
Total	81.6	16	87.7	16	89.0	16	92.6

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 9 Speed	Run 9 Delay	Run 10 Speed	Run 10 Delay	Run 11 Speed	Run 11 Delay	Run 12 Speed
Adams Dr	18	13.0	18	13.0	17	14.4	19
Patsy Cline Blvd	25	3.9	25	3.8	25	3.8	24
Apple Blossom Corner	24	7.9	24	8.2	26	6.7	24
Shopping Center Dr	15	30.2	14	33.9	17	23.8	15
Best Buy	18	4.2	18	4.6	18	4.0	18
Jubal Early Dr #1	8	25.5	7	26.6	8	22.7	7
Total	16	84.8	16	90.0	18	75.4	16

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 12 Delay	Run 13 Speed	Run 13 Delay	Run 14 Speed	Run 14 Delay	Run 15 Speed	Run 15 Delay
Adams Dr	12.5	19	12.0	17	14.8	17	15.6
Patsy Cline Blvd	4.0	25	3.5	25	3.8	24	4.1
Apple Blossom Corner	8.3	23	8.8	24	7.9	22	10.1
Shopping Center Dr	30.6	15	29.6	16	27.5	15	29.4
Best Buy	4.5	18	4.5	18	4.2	18	4.3
Jubal Early Dr #1	26.6	8	26.1	8	24.8	7	27.5
Total	86.4	17	84.5	17	83.1	16	91.0

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 16 Speed	Run 16 Delay	Run 17 Speed	Run 17 Delay	Run 18 Speed	Run 18 Delay	Run 19 Speed
Adams Dr	19	12.2	19	12.5	18	13.5	17
Patsy Cline Blvd	25	3.8	25	3.9	24	4.0	24
Apple Blossom Corner	24	8.3	24	7.6	24	8.2	22
Shopping Center Dr	15	29.1	16	26.8	16	26.2	15
Best Buy	17	5.0	18	4.2	18	4.4	17
Jubal Early Dr #1	8	24.3	8	24.3	8	24.0	7
Total	17	82.6	17	79.3	17	80.3	16

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 19 Delay	Run 20 Speed	Run 20 Delay	Run 21 Speed	Run 21 Delay	Run 22 Speed	Run 22 Delay
Adams Dr	15.4	17	15.0	18	13.9	19	12.6
Patsy Cline Blvd	4.2	24	4.3	24	4.2	25	3.8
Apple Blossom Corner	10.1	24	7.8	22	10.4	25	7.0
Shopping Center Dr	30.4	16	27.5	15	30.8	15	29.3
Best Buy	5.0	18	4.0	18	4.3	19	3.7
Jubal Early Dr #1	28.9	8	24.6	8	25.8	8	22.9
Total	93.9	17	83.2	16	89.5	17	79.2

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 23 Speed	Run 23 Delay	Run 24 Speed	Run 24 Delay	Run 25 Speed	Run 25 Delay	Run 26 Speed
Adams Dr	19	12.2	17	15.2	18	13.7	19
Patsy Cline Blvd	25	3.6	24	4.0	25	3.9	25
Apple Blossom Corner	25	7.2	25	7.2	25	7.0	24
Shopping Center Dr	16	27.0	15	28.9	14	31.7	16
Best Buy	19	3.6	18	4.1	16	5.8	18
Jubal Early Dr #1	9	20.7	8	24.6	7	28.1	8
Total	18	74.5	17	84.1	16	90.2	17

Arterial Level of Service: NB S Pleasant Valley Rd

Cross Street	Run 26 Delay	Run 27 Speed	Run 27 Delay
Adams Dr	12.5	18	13.7
Patsy Cline Blvd	3.9	24	4.0
Apple Blossom Corner	7.6	23	8.5
Shopping Center Dr	25.7	13	37.2
Best Buy	4.1	17	5.2
Jubal Early Dr #1	26.0	8	26.1
Total	79.9	16	94.7

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Jubal Early Dr #1	10	97.6	359.7	0.1	3	3	99.9
Waffle House	70	10.4	18.5	0.1	13	12	11.3
Featherbed Ln	80	33.4	38.6	0.1	5	5	36.6
Pleasant Valley Mktp	83	4.9	25.7	0.2	30	29	5.0
The Rancho Mexican R	90	1.5	17.0	0.1	32	32	1.6
Adams Dr	100	6.4	16.6	0.1	23	23	6.5
Total		154.3	476.1	0.7	11	11	160.9

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Jubal Early Dr #1	3	94.4	3	98.7	3	110.6	3
Waffle House	14	9.5	13	10.2	13	10.7	14
Featherbed Ln	5	30.8	5	33.0	5	34.4	5
Pleasant Valley Mktp	30	4.8	30	4.9	29	5.1	30
The Rancho Mexican R	32	1.5	32	1.5	32	1.6	32
Adams Dr	23	6.5	23	6.2	23	6.6	23
Total	11	147.5	11	154.5	10	169.0	11

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 5 Delay	Run 6 Speed	Run 6 Delay	Run 7 Speed	Run 7 Delay	Run 8 Speed	Run 8 Delay
Jubal Early Dr #1	95.4	3	103.1	3	108.5	3	105.9
Waffle House	9.2	13	10.2	12	11.2	12	12.3
Featherbed Ln	31.8	5	36.0	5	35.9	5	35.0
Pleasant Valley Mktp	4.8	30	4.8	29	5.1	30	4.9
The Rancho Mexican R	1.5	32	1.5	32	1.6	32	1.5
Adams Dr	6.4	23	6.8	22	7.1	24	5.6
Total	149.1	11	162.3	10	169.4	10	165.3

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 9 Speed	Run 9 Delay	Run 10 Speed	Run 10 Delay	Run 11 Speed	Run 11 Delay	Run 12 Speed
Jubal Early Dr #1	3	93.7	3	109.7	3	93.2	3
Waffle House	13	10.6	11	13.6	13	10.0	13
Featherbed Ln	5	34.1	5	33.2	5	32.4	5
Pleasant Valley Mktp	30	5.1	30	4.8	30	4.9	30
The Rancho Mexican R	32	1.3	32	1.4	32	1.5	32
Adams Dr	23	6.2	23	6.2	23	6.3	23
Total	11	150.9	10	168.8	11	148.3	11

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 12 Delay	Run 13 Speed	Run 13 Delay	Run 14 Speed	Run 14 Delay	Run 15 Speed	Run 15 Delay
Jubal Early Dr #1	99.1	3	97.4	3	90.9	3	84.9
Waffle House	10.6	13	10.4	14	9.2	13	10.3
Featherbed Ln	35.0	5	34.1	5	31.1	5	34.0
Pleasant Valley Mktp	4.9	29	5.1	30	4.8	30	4.9
The Rancho Mexican R	1.5	31	1.6	32	1.4	32	1.6
Adams Dr	6.3	23	6.3	23	6.1	22	7.1
Total	157.4	11	154.8	12	143.7	12	142.8

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 16 Speed	Run 16 Delay	Run 17 Speed	Run 17 Delay	Run 18 Speed	Run 18 Delay	Run 19 Speed
Jubal Early Dr #1	3	94.5	3	82.0	3	95.0	3
Waffle House	14	8.9	14	9.6	13	10.1	12
Featherbed Ln	5	33.1	6	28.6	5	34.0	5
Pleasant Valley Mktp	29	5.1	30	4.8	30	4.9	29
The Rancho Mexican R	32	1.4	32	1.6	32	1.5	32
Adams Dr	24	5.8	24	5.8	23	6.3	23
Total	11	148.9	12	132.4	11	151.8	11

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 19 Delay	Run 20 Speed	Run 20 Delay	Run 21 Speed	Run 21 Delay	Run 22 Speed	Run 22 Delay
Jubal Early Dr #1	92.8	3	94.7	3	95.1	3	94.5
Waffle House	11.5	13	10.6	14	9.7	14	9.1
Featherbed Ln	32.0	5	31.4	5	33.3	5	31.9
Pleasant Valley Mktp	5.0	30	4.7	29	5.1	30	4.7
The Rancho Mexican R	1.5	32	1.6	32	1.5	32	1.3
Adams Dr	6.2	23	6.4	23	6.3	23	6.7
Total	149.0	11	149.4	11	151.0	11	148.2

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 23 Speed	Run 23 Delay	Run 24 Speed	Run 24 Delay	Run 25 Speed	Run 25 Delay	Run 26 Speed
Jubal Early Dr #1	3	90.5	3	103.8	3	109.9	3
Waffle House	14	9.4	13	10.4	12	11.8	13
Featherbed Ln	5	34.0	5	33.7	5	34.0	5
Pleasant Valley Mktp	30	5.0	30	4.8	30	4.8	30
The Rancho Mexican R	32	1.5	32	1.5	32	1.6	32
Adams Dr	23	6.3	22	7.1	23	6.5	23
Total	11	146.8	11	161.3	10	168.6	11

Arterial Level of Service: SB S Pleasant Valley Rd

Cross Street	Run 26 Delay	Run 27 Speed	Run 27 Delay
Jubal Early Dr #1	99.2	3	105.5
Waffle House	10.2	12	11.4
Featherbed Ln	33.7	5	36.4
Pleasant Valley Mktp	4.6	30	4.8
The Rancho Mexican R	1.4	32	1.6
Adams Dr	6.4	24	6.1
Total	155.5	10	165.7

Arterial Level of Service: EB #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
S Pleasant Valley Rd	10	143.4	179.4	0.4	7	11	90.4
Apple Blossom Dr	20	53.8	65.6	0.1	6	8	38.5
The Mill Plaza	30	4.3	17.8	0.1	26	28	3.2
Vaden Campus Commons	40	8.2	12.1	0.0	11	12	7.4
Mall Blvd	60	2.3	4.9	0.0	24	23	2.5
I-81 SB On-Ramp	61	18.2	28.6	0.1	8	7	21.8
Total		230.2	308.3	0.7	9	11	163.8

Arterial Level of Service: EB #1

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
S Pleasant Valley Rd	10	95.6	11	82.9	14	59.1	4
Apple Blossom Dr	7	49.4	7	52.4	9	34.6	6
The Mill Plaza	16	15.4	27	3.2	28	2.9	27
Vaden Campus Commons	6	19.6	12	7.8	15	5.3	14
Mall Blvd	17	4.5	23	2.6	28	1.6	23
I-81 SB On-Ramp	5	33.3	7	20.7	11	11.8	7
Total	9	217.9	11	169.6	14	115.3	6

Arterial Level of Service: EB #1

Cross Street	Run 5 Delay	Run 6 Speed	Run 6 Delay	Run 7 Speed	Run 7 Delay	Run 8 Speed	Run 8 Delay
S Pleasant Valley Rd	277.1	6	178.3	12	79.0	5	260.6
Apple Blossom Dr	57.4	7	52.6	6	55.1	5	66.4
The Mill Plaza	3.1	28	3.0	28	2.9	28	2.9
Vaden Campus Commons	5.7	14	6.3	15	5.3	15	5.7
Mall Blvd	2.6	27	1.8	28	1.6	27	1.8
I-81 SB On-Ramp	22.4	10	14.9	11	12.3	10	14.6
Total	368.4	8	256.8	12	156.1	6	352.0

Arterial Level of Service: EB #1

Cross Street	Run 9 Speed	Run 9 Delay	Run 10 Speed	Run 10 Delay	Run 11 Speed	Run 11 Delay	Run 12 Speed
S Pleasant Valley Rd	8	128.3	11	84.9	5	238.4	10
Apple Blossom Dr	6	56.2	8	40.0	5	70.2	7
The Mill Plaza	28	3.0	25	4.9	28	2.9	28
Vaden Campus Commons	15	5.1	9	12.3	17	4.3	13
Mall Blvd	29	1.4	20	3.4	26	2.0	25
I-81 SB On-Ramp	11	12.7	6	26.2	8	19.2	8
Total	10	206.7	11	171.8	7	337.0	11

Arterial Level of Service: EB #1

Cross Street	Run 12 Delay	Run 13 Speed	Run 13 Delay	Run 14 Speed	Run 14 Delay	Run 15 Speed	Run 15 Delay
S Pleasant Valley Rd	94.5	8	121.9	5	224.2	6	181.0
Apple Blossom Dr	49.8	7	49.5	6	58.5	5	73.7
The Mill Plaza	2.9	28	2.9	27	3.2	28	3.0
Vaden Campus Commons	7.0	14	6.3	12	7.4	13	7.1
Mall Blvd	2.2	27	1.8	24	2.3	27	1.8
I-81 SB On-Ramp	17.8	11	13.1	8	19.6	12	11.3
Total	174.2	10	195.6	7	315.2	8	277.9

Arterial Level of Service: EB #1

Cross Street	Run 16 Speed	Run 16 Delay	Run 17 Speed	Run 17 Delay	Run 18 Speed	Run 18 Delay	Run 19 Speed
S Pleasant Valley Rd	10	95.5	5	228.6	12	74.5	5
Apple Blossom Dr	7	51.0	5	80.2	10	32.1	6
The Mill Plaza	16	14.5	27	3.3	28	3.0	27
Vaden Campus Commons	5	21.5	12	7.7	14	5.8	14
Mall Blvd	18	4.0	26	2.0	29	1.4	25
I-81 SB On-Ramp	6	27.4	10	15.0	12	10.2	8
Total	9	213.9	7	336.9	13	127.0	7

Arterial Level of Service: EB #1

Cross Street	Run 19 Delay	Run 20 Speed	Run 20 Delay	Run 21 Speed	Run 21 Delay	Run 22 Speed	Run 22 Delay
S Pleasant Valley Rd	236.6	10	96.3	5	227.7	6	186.0
Apple Blossom Dr	59.2	7	45.7	5	70.7	5	66.6
The Mill Plaza	3.3	28	2.8	28	2.8	24	5.7
Vaden Campus Commons	6.2	16	4.8	16	4.9	8	12.7
Mall Blvd	2.2	28	1.7	30	1.4	20	3.5
I-81 SB On-Ramp	18.9	10	14.6	11	12.0	7	24.5
Total	326.3	11	165.8	7	319.5	7	298.9

Arterial Level of Service: EB #1

Cross Street	Run 23 Speed	Run 23 Delay	Run 24 Speed	Run 24 Delay	Run 25 Speed	Run 25 Delay	Run 26 Speed
S Pleasant Valley Rd	8	123.1	10	98.9	11	81.7	8
Apple Blossom Dr	6	62.4	8	40.6	8	41.6	5
The Mill Plaza	27	3.1	28	3.0	25	4.9	27
Vaden Campus Commons	13	6.9	12	7.7	9	11.7	15
Mall Blvd	27	1.8	27	1.7	21	3.0	25
I-81 SB On-Ramp	10	14.3	10	13.3	7	23.5	8
Total	9	211.6	11	165.2	11	166.4	9

Arterial Level of Service: EB #1

Cross Street	Run 26 Delay	Run 27 Speed	Run 27 Delay
S Pleasant Valley Rd	124.3	12	79.7
Apple Blossom Dr	65.4	8	39.1
The Mill Plaza	3.0	23	6.6
Vaden Campus Commons	5.1	8	14.2
Mall Blvd	2.1	19	3.7
I-81 SB On-Ramp	19.5	6	25.1
Total	219.6	11	168.3

Arterial Level of Service: WB #1

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 1 Speed	Run 1 Delay
Mall Blvd	60	4.4	13.9	0.1	20	27	1.7
Vaden Campus Commons	40	5.3	8.2	0.0	15	19	3.7
The Mill Plaza	30	3.0	7.4	0.0	19	24	1.4
Millwood Ave	20	51.8	63.9	0.1	7	9	38.4
S Pleasant Valley Rd	10	42.5	54.6	0.1	8	10	30.0
Total		106.8	148.1	0.4	9	12	75.2

Arterial Level of Service: WB #1

Cross Street	Run 2 Speed	Run 2 Delay	Run 3 Speed	Run 3 Delay	Run 4 Speed	Run 4 Delay	Run 5 Speed
Mall Blvd	26	2.0	9	17.2	26	1.8	24
Vaden Campus Commons	19	3.6	8	12.4	18	4.0	17
The Mill Plaza	24	1.3	10	9.8	23	1.6	17
Millwood Ave	10	32.4	5	75.9	9	38.6	6
S Pleasant Valley Rd	10	31.9	11	27.7	9	33.0	8
Total	12	71.2	7	143.0	11	79.0	8

Arterial Level of Service: WB #1

Cross Street	Run 5 Delay	Run 6 Speed	Run 6 Delay	Run 7 Speed	Run 7 Delay	Run 8 Speed	Run 8 Delay
Mall Blvd	2.5	11	12.4	24	2.5	12	10.4
Vaden Campus Commons	4.1	10	9.0	17	4.2	11	8.5
The Mill Plaza	3.7	13	6.5	20	2.4	13	6.1
Millwood Ave	68.6	5	86.3	10	32.2	4	92.2
S Pleasant Valley Rd	42.0	5	64.6	9	35.5	6	62.6
Total	120.9	6	178.9	12	76.7	6	179.9

Arterial Level of Service: WB #1

Cross Street	Run 9 Speed	Run 9 Delay	Run 10 Speed	Run 10 Delay	Run 11 Speed	Run 11 Delay	Run 12 Speed
Mall Blvd	21	3.7	26	2.0	19	4.9	20
Vaden Campus Commons	15	5.4	16	4.6	17	4.5	13
The Mill Plaza	19	2.9	23	1.4	16	4.0	17
Millwood Ave	7	53.8	8	43.4	7	57.2	6
S Pleasant Valley Rd	8	43.4	6	56.3	8	37.6	7
Total	9	109.1	9	107.7	9	108.2	8

Arterial Level of Service: WB #1

Cross Street	Run 12 Delay	Run 13 Speed	Run 13 Delay	Run 14 Speed	Run 14 Delay	Run 15 Speed	Run 15 Delay
Mall Blvd	4.4	26	2.0	17	6.1	21	3.7
Vaden Campus Commons	6.7	17	4.5	14	6.1	14	6.1
The Mill Plaza	3.9	23	1.5	15	4.5	19	2.9
Millwood Ave	63.1	8	43.8	6	62.4	6	65.1
S Pleasant Valley Rd	46.7	6	63.2	9	35.8	5	65.3
Total	124.7	9	115.1	9	114.9	7	143.1

Arterial Level of Service: WB #1

Cross Street	Run 16 Speed	Run 16 Delay	Run 17 Speed	Run 17 Delay	Run 18 Speed	Run 18 Delay	Run 19 Speed
Mall Blvd	26	1.8	22	3.3	27	1.7	10
Vaden Campus Commons	18	4.0	15	5.4	18	3.9	11
The Mill Plaza	25	1.1	20	2.3	24	1.2	12
Millwood Ave	12	26.1	9	40.8	10	33.9	5
S Pleasant Valley Rd	9	33.1	8	42.4	9	34.2	8
Total	13	66.2	10	94.2	12	74.9	7

Arterial Level of Service: WB #1

Cross Street	Run 19 Delay	Run 20 Speed	Run 20 Delay	Run 21 Speed	Run 21 Delay	Run 22 Speed	Run 22 Delay
Mall Blvd	14.0	28	1.4	20	4.1	18	5.3
Vaden Campus Commons	8.5	22	2.8	16	4.7	14	5.6
The Mill Plaza	7.2	26	1.0	18	3.2	16	4.0
Millwood Ave	86.7	9	38.5	7	52.2	7	56.8
S Pleasant Valley Rd	40.4	8	43.0	10	30.9	7	44.6
Total	156.9	11	86.6	10	95.1	9	116.4

Arterial Level of Service: WB #1

Cross Street	Run 23 Speed	Run 23 Delay	Run 24 Speed	Run 24 Delay	Run 25 Speed	Run 25 Delay	Run 26 Speed
Mall Blvd	25	2.1	26	1.9	26	2.0	26
Vaden Campus Commons	17	4.3	16	4.8	16	4.6	20
The Mill Plaza	24	1.4	23	1.5	24	1.3	23
Millwood Ave	10	35.8	9	39.2	8	44.7	7
S Pleasant Valley Rd	9	33.2	8	41.9	7	48.4	9
Total	12	76.8	11	89.3	10	101.0	10

Arterial Level of Service: WB #1

Cross Street	Run 26 Delay	Run 27 Speed	Run 27 Delay
Mall Blvd	2.1	25	2.4
Vaden Campus Commons	3.1	18	3.9
The Mill Plaza	1.6	23	1.5
Millwood Ave	52.5	8	44.9
S Pleasant Valley Rd	34.7	8	40.7
Total	94.0	10	93.4

Intersection: 4: Bend

Movement	SW	SW
Directions Served	T	
Maximum Queue (ft)	104	8
Average Queue (ft)	8	0
95th Queue (ft)	54	8
Link Distance (ft)	452	452
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: S Pleasant Valley Rd & Jubal Early Dr #1

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	TR	L	T	T
Maximum Queue (ft)	324	340	1011	1000	195	298	486	538	480	229	259	261
Average Queue (ft)	219	266	474	486	163	230	328	322	270	129	182	190
95th Queue (ft)	350	395	1101	1075	257	366	582	590	452	216	264	268
Link Distance (ft)			1896	1896			491	491	491	235	235	235
Upstream Blk Time (%)			0	0			6	7	0	2	2	3
Queuing Penalty (veh)			0	0			24	25	2	6	9	14
Storage Bay Dist (ft)	340	340			195	300						
Storage Blk Time (%)	1	6	20	43	4	3	22					
Queuing Penalty (veh)	1	14	75	77	9	6	47					

Intersection: 10: S Pleasant Valley Rd & Jubal Early Dr #1

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	T	T	R
Maximum Queue (ft)	232	200	378	376	354
Average Queue (ft)	119	142	353	348	242
95th Queue (ft)	213	253	377	385	426
Link Distance (ft)	235		339	339	339
Upstream Blk Time (%)	1		65	53	14
Queuing Penalty (veh)	2		0	0	0
Storage Bay Dist (ft)		200			
Storage Blk Time (%)		4	68		
Queuing Penalty (veh)		18	73		

Intersection: 20: Apple Blossom Dr/Millwood Ave & Jubal Early Dr #1/Millwood Ave #1

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	UL	T	TR	L	L	T	T	R	UL	T	R	R
Maximum Queue (ft)	200	510	508	448	509	625	524	34	197	254	139	111
Average Queue (ft)	66	376	416	290	344	393	265	1	79	123	70	49
95th Queue (ft)	172	577	583	470	571	697	490	42	155	214	118	90
Link Distance (ft)		491	491			552	552	552		244	244	
Upstream Blk Time (%)		1	2			14	1	0		1		
Queuing Penalty (veh)		7	12			101	4	0		2		
Storage Bay Dist (ft)	200			525	525				205			225
Storage Blk Time (%)	0	29		0	2	13			0	1		
Queuing Penalty (veh)	0	14		1	10	62			0	1		

Intersection: 20: Apple Blossom Dr/Millwood Ave & Jubal Early Dr #1/Millwood Ave #1

Movement	SB	SB	SB
Directions Served	L	L	TR
Maximum Queue (ft)	376	488	386
Average Queue (ft)	223	287	198
95th Queue (ft)	359	432	340
Link Distance (ft)		527	527
Upstream Blk Time (%)		1	0
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)	380		
Storage Blk Time (%)	0	2	
Queuing Penalty (veh)	1	7	

Intersection: 30: The Mill Plaza & Millwood Ave #1

Movement	EB	EB	EB	WB	WB	WB	NB
Directions Served	T	T	TR	T	T	T	R
Maximum Queue (ft)	135	124	58	166	87	15	59
Average Queue (ft)	20	21	4	43	10	1	19
95th Queue (ft)	122	126	51	166	71	11	60
Link Distance (ft)	552	552	552	133	133	133	202
Upstream Blk Time (%)				9	1		0
Queuing Penalty (veh)				63	4		0
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 40: Vaden Campus Commons/Buzzins & Millwood Ave #1

Movement	EB	EB	EB	WB	WB	WB	NB
Directions Served	T	T	TR	T	T	T	R
Maximum Queue (ft)	223	219	190	165	158	170	43
Average Queue (ft)	103	104	61	98	55	74	8
95th Queue (ft)	236	230	160	213	152	189	32
Link Distance (ft)	133	133	133	42	42	42	154
Upstream Blk Time (%)	13	12	3	23	10	12	
Queuing Penalty (veh)	73	66	17	169	75	91	
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 60: Mall Blvd & Millwood Ave #1

Movement	EB	EB	EB	WB	WB	WB	NB
Directions Served	T	T	TR	T	T	T	R
Maximum Queue (ft)	85	97	70	249	328	290	383
Average Queue (ft)	18	21	9	99	101	61	176
95th Queue (ft)	67	73	48	269	335	226	420
Link Distance (ft)	42	42	42	230	230	230	492
Upstream Blk Time (%)	4	5	2	6	6	1	8
Queuing Penalty (veh)	26	26	10	47	41	8	29
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 61: I-81 SB On-Ramp/I-81 SB Off-Ramp & Millwood Ave #1/Millwood Pike

Movement	EB	EB	EB	WB	WB	WB	WB	WB	SB	SB
Directions Served	T	T	R	L	L	T	T	T	R	R
Maximum Queue (ft)	352	348	339	238	208	207	178	193	667	435
Average Queue (ft)	264	267	127	139	86	78	45	59	353	236
95th Queue (ft)	397	404	371	239	196	214	160	161	834	426
Link Distance (ft)	230	230	230	212	212	212	212	212	1750	
Upstream Blk Time (%)	17	18	9	6	1	5	2	1	2	
Queuing Penalty (veh)	113	121	59	20	4	19	7	5	0	
Storage Bay Dist (ft)										470
Storage Blk Time (%)									5	1
Queuing Penalty (veh)									14	2

Intersection: 62: I-81 SB Off-Ramp & Millwood Pike/Millwood Ave

Movement	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	T	T	T	T	T	T	T	T	R
Maximum Queue (ft)	208	165	7	56	198	202	156	101	131
Average Queue (ft)	81	32	0	7	25	22	15	9	9
95th Queue (ft)	267	150	6	65	191	173	141	116	66
Link Distance (ft)	212	212			737	737	737	737	1086
Upstream Blk Time (%)	5	0			0	0	0	0	
Queuing Penalty (veh)	41	2			1	0	0	0	
Storage Bay Dist (ft)			200	200					
Storage Blk Time (%)				0	2				
Queuing Penalty (veh)				0	12				

Intersection: 63: Front Royal Pike/I-81 NB Ramps & Millwood Ave/Millwood Pike

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	UL	L	T	T	R	UL	T	T	T	R	L	L
Maximum Queue (ft)	527	533	792	796	733	289	514	740	799	76	375	578
Average Queue (ft)	427	445	466	317	107	130	288	456	741	56	335	483
95th Queue (ft)	647	655	1042	770	529	279	463	786	894	71	449	668
Link Distance (ft)			737	737	737		740	740	740			523
Upstream Blk Time (%)			15	1	1			0	66			45
Queuing Penalty (veh)			107	8	5			0	0			0
Storage Bay Dist (ft)	550	550				290				50	375	
Storage Blk Time (%)	2	13	10			1	13		60	59	5	44
Queuing Penalty (veh)	7	52	61			3	12		354	159	14	134

Intersection: 63: Front Royal Pike/I-81 NB Ramps & Millwood Ave/Millwood Pike

Movement	NB	NB	NB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	R
Maximum Queue (ft)	568	543	300	188	192	277	64
Average Queue (ft)	467	406	128	125	61	118	3
95th Queue (ft)	651	601	333	194	178	235	45
Link Distance (ft)	523	523				547	
Upstream Blk Time (%)	32	9				0	
Queuing Penalty (veh)	0	0				0	
Storage Bay Dist (ft)			300	200	200		350
Storage Blk Time (%)		30	1	1	2	1	
Queuing Penalty (veh)		26	1	6	7	4	

Intersection: 70: S Pleasant Valley Rd & Waffle House/Best Buy

Movement	EB	WB	NB	NB	NB	SB	SB
Directions Served	R	R	T	T	TR	T	TR
Maximum Queue (ft)	321	64	58	154	171	276	289
Average Queue (ft)	182	22	5	17	23	237	249
95th Queue (ft)	374	53	32	84	103	311	319
Link Distance (ft)	379	246		190	190	235	235
Upstream Blk Time (%)	10			0	0	16	20
Queuing Penalty (veh)	0			2	2	122	154
Storage Bay Dist (ft)			70				
Storage Blk Time (%)			0	1			
Queuing Penalty (veh)			2	5			

Intersection: 80: S Pleasant Valley Rd & Featherbed Ln/Shopping Center Dr

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	UL	T	TR
Maximum Queue (ft)	385	1072	187	135	294	304	483	499	113	220	232
Average Queue (ft)	382	1002	78	48	162	208	262	287	73	199	200
95th Queue (ft)	404	1288	163	105	264	328	441	441	128	215	217
Link Distance (ft)		1036		490	490		978	978		190	190
Upstream Blk Time (%)		68					0			45	46
Queuing Penalty (veh)		0					0			335	346
Storage Bay Dist (ft)	385		195			305			110		
Storage Blk Time (%)	66	2	1			4	4		5	54	
Queuing Penalty (veh)	247	11	4			22	9		27	54	

Intersection: 83: S Pleasant Valley Rd & Pleasant Valley Mktplace/Apple Blossom Corners SC

Movement	EB	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	60	157	62	332	62	97	295	292	135	115	111
Average Queue (ft)	43	31	37	158	53	20	110	118	56	35	35
95th Queue (ft)	68	108	77	301	64	61	228	236	109	89	88
Link Distance (ft)		398		510			685	685		978	978
Upstream Blk Time (%)				0							
Queuing Penalty (veh)				0							
Storage Bay Dist (ft)	60		65		55	165			235		
Storage Blk Time (%)	14	2	0	37	25	0	2				
Queuing Penalty (veh)	6	2	0	60	18	0	1				

Intersection: 90: S Pleasant Valley Rd & The Rancho Mexican Rest/Patsy Cline Blvd

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (ft)	56	85	140	32	18	49	135	6	4
Average Queue (ft)	18	38	50	5	1	6	57	0	0
95th Queue (ft)	48	78	118	23	11	28	108	6	3
Link Distance (ft)	440		632		463	463		685	685
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)		90		80			265		
Storage Blk Time (%)		3	1		0				
Queuing Penalty (veh)		4	1		0				

Intersection: 100: S Pleasant Valley Rd & Adams Dr

Movement	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	R	T	TR	L	T	T
Maximum Queue (ft)	112	163	206	257	272	172	172	180
Average Queue (ft)	13	88	93	142	142	80	93	96
95th Queue (ft)	65	145	166	233	243	139	155	162
Link Distance (ft)		439	439	603	603		463	463
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	150					326		
Storage Blk Time (%)	0	1						
Queuing Penalty (veh)	0	0						

Intersection: 110: Apple Blossom Dr & Walgreens

Movement	EB	NB	NB	SB	SB
Directions Served	R	T	T	T	TR
Maximum Queue (ft)	43	12	2	7	22
Average Queue (ft)	16	1	0	0	1
95th Queue (ft)	36	10	3	6	11
Link Distance (ft)	270	76	76	244	244
Upstream Blk Time (%)		0			
Queuing Penalty (veh)		0			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 120: Apple Blossom Dr & N Mall Rd/Ollie's Bargain Outlet

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	L	TR	UL	T	TR
Maximum Queue (ft)	101	49	49	19	3	50	18	32
Average Queue (ft)	39	22	18	3	0	15	1	1
95th Queue (ft)	76	45	42	14	2	41	11	14
Link Distance (ft)	122	122	119		386		76	76
Upstream Blk Time (%)	0						0	0
Queuing Penalty (veh)	0						0	0
Storage Bay Dist (ft)				125		125		
Storage Blk Time (%)							0	
Queuing Penalty (veh)							0	

Intersection: 130: N Mall Ring Rd & Apple Blossom Dr

Movement	EB	WB	WB	SB	SB
Directions Served	L	T	R	L	R
Maximum Queue (ft)	76	3	39	253	78
Average Queue (ft)	33	0	5	104	7
95th Queue (ft)	65	3	24	199	44
Link Distance (ft)		425		386	386
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)	150		250		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 140: N Mall Rd & Valley Health

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	22	1	56
Average Queue (ft)	1	0	28
95th Queue (ft)	12	0	50
Link Distance (ft)	92	122	170
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 150: N Mall Rd & Shopping Center Dr

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	LTR	LTR	LT	LT	TR
Maximum Queue (ft)	63	85	58	56	14	1
Average Queue (ft)	27	28	26	15	1	0
95th Queue (ft)	53	67	51	45	7	1
Link Distance (ft)	490	490	176	378	92	92
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 160: W Mall Ring Rd & N Mall Rd

Movement	EB	EB	NB
Directions Served	L	R	L
Maximum Queue (ft)	78	76	55
Average Queue (ft)	34	4	16
95th Queue (ft)	61	40	45
Link Distance (ft)	378	378	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			100
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 175: Mall Blvd

Movement	NB
Directions Served	T
Maximum Queue (ft)	135
Average Queue (ft)	40
95th Queue (ft)	297
Link Distance (ft)	895
Upstream Blk Time (%)	1
Queuing Penalty (veh)	3
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 180: E Mall Ring Rd & Mall Blvd

Movement	WB	NB	NB	SB	SB	B43
Directions Served	LR	T	R	L	T	T
Maximum Queue (ft)	31	2	34	82	10	1
Average Queue (ft)	5	0	4	32	1	0
95th Queue (ft)	24	2	23	71	26	2
Link Distance (ft)	895	425			204	371
Upstream Blk Time (%)					0	
Queuing Penalty (veh)					0	
Storage Bay Dist (ft)			200	150		
Storage Blk Time (%)				0	0	
Queuing Penalty (veh)				1	0	

Intersection: 182: N Mall Ring Rd

Movement	WB	NB
Directions Served	LR	T
Maximum Queue (ft)	63	1
Average Queue (ft)	30	0
95th Queue (ft)	53	1
Link Distance (ft)	166	371
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 190: S Mall Rd & S Mall Ring Rd

Movement	WB	NB	NB	SB
Directions Served	LR	T	R	UL
Maximum Queue (ft)	26	62	61	4
Average Queue (ft)	2	35	37	0
95th Queue (ft)	14	53	55	4
Link Distance (ft)	268	98	98	
Upstream Blk Time (%)		0		
Queuing Penalty (veh)		0		
Storage Bay Dist (ft)				150
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 197: Patsy Cline Blvd & E Mall Ring Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	109	18	1
Average Queue (ft)	53	1	0
95th Queue (ft)	86	9	1
Link Distance (ft)	496	728	425
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 200: Patsy Cline Blvd & S Mall Rd

Movement	EB	WB	SB	SB
Directions Served	L	TR	L	R
Maximum Queue (ft)	72	10	68	60
Average Queue (ft)	24	1	27	27
95th Queue (ft)	58	6	53	50
Link Distance (ft)		650		205
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	175		100	
Storage Blk Time (%)			0	0
Queuing Penalty (veh)			0	0

Intersection: 206: Legge Blvd & Patsy Cline Blvd

Movement	EB	EB	WB	NB	NB
Directions Served	T	R	L	L	R
Maximum Queue (ft)	1	27	56	65	47
Average Queue (ft)	0	2	16	30	19
95th Queue (ft)	1	14	47	54	35
Link Distance (ft)	650				612
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		250	250	250	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 210: Legge Blvd & Adams Dr

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	LT	TR	L	TR	L	TR
Maximum Queue (ft)	47	99	76	149	97	80	139	96	153
Average Queue (ft)	14	43	31	78	31	33	62	26	69
95th Queue (ft)	40	83	59	130	69	66	113	65	124
Link Distance (ft)		339	339	340	340		454		301
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	135					160		130	
Storage Blk Time (%)		0					0	0	1
Queuing Penalty (veh)		0					0	0	0

Network Summary

Network wide Queuing Penalty: 4192