
Summit Orchards North
Traffic Impact Study
Lee's Summit, Missouri

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Prepared by:



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INTRODUCTION

The purpose of this traffic impact study is to assess the potential impact on traffic with the Summit Orchards North development on the northeast corner of the intersection of Ward Road and Blue Parkway in Lee’s Summit, Missouri. The location of the development in relation to the street network is shown in Figure 1. The site plan for the development is shown in Figure 2.



Figure 1 – Development Location



Not to Scale

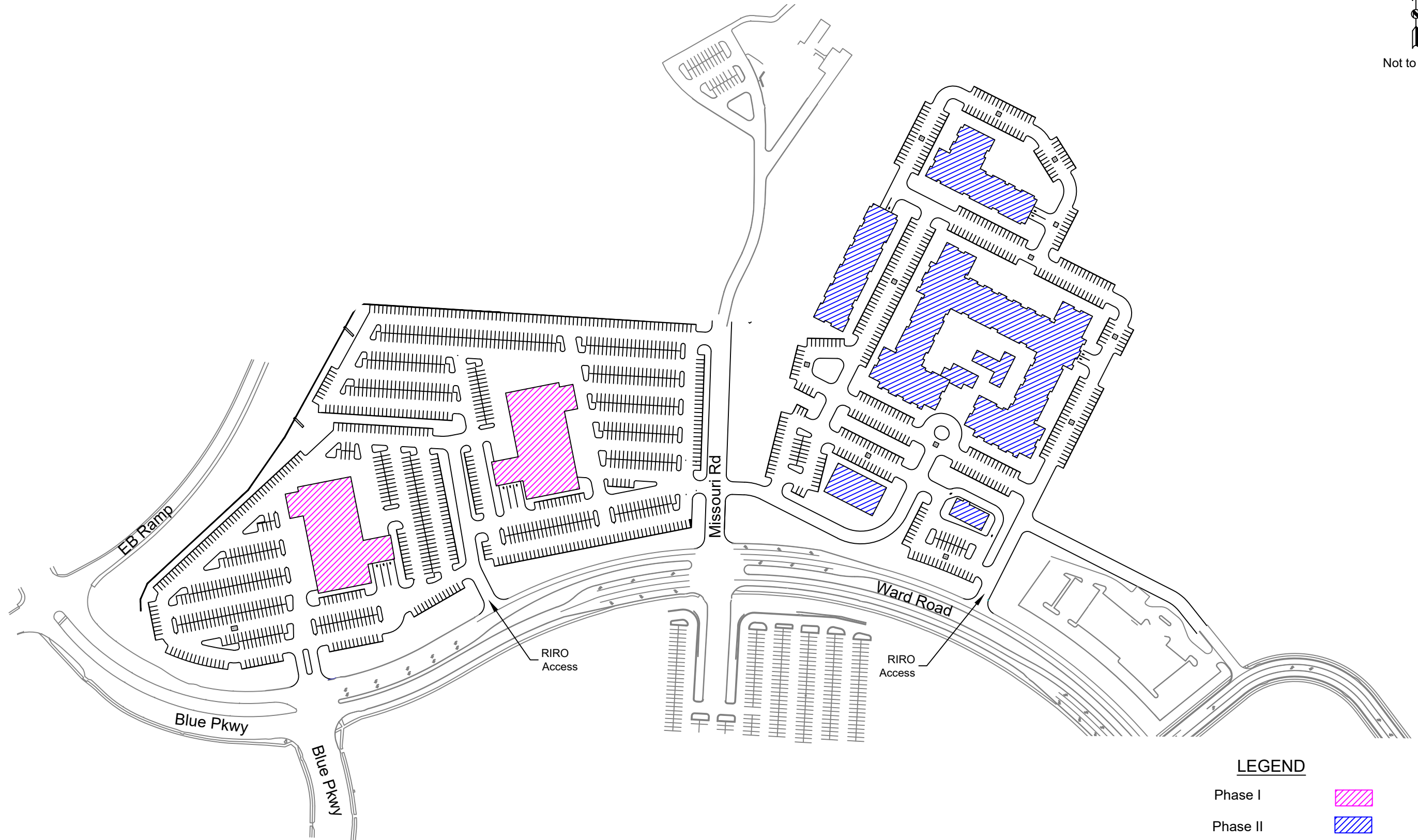


Figure 2 - Site Plan

EXISTING CONDITIONS

The site is in Lee's Summit, Missouri, in the northeast quadrant of the intersection of Blue Parkway and Ward Road. The current land use of the planned development is undeveloped. The land use of the surrounding areas is undeveloped to the north with the exception of a utility facility, commercial/retail/light industrial to the south, highway right-of-way to the west, and undeveloped to the east.

Street Network and Traffic Control

The development is bordered on the south by Ward Road and on the west by the eastbound I-470 ramp.

Blue Parkway is a four-lane north-south median divided major arterial with a posted speed limit of 35 miles per hour (mph) that becomes Ward Road at the signalized intersection southwest of the eastbound I-470 ramp. The roadway continues as Ward Road to the east and south. The south leg of the signalized intersection is Blue Parkway and is also a four-lane median divided roadway.

The I-470 westbound and eastbound ramps provide access to Pryor Road to the west and to I-470. The intersections of the ramps with Blue Parkway are signalized with right and left-turn lanes in all directions.

Missouri Road is located within the development site and is a north-south local roadway north of Ward Road and provides access to the former Cerner building south of Ward Road. The intersection of Missouri Road with Ward Road is stop-controlled with Missouri Road stopping. There are existing east and westbound right and left-turn lanes at the intersection.

Outerview Road is located south of the development site and is a two-lane unmarked north-south private drive with no posted speed limit. The intersection of Outerview Road and Ward Road is stop-controlled, with Outerview Road stopping and aligning with Innovation Parkway on the east side of Ward Road.

Tudor Road is a four-lane east-west median divided minor arterial roadway. There is a posted speed limit of 35 mph. The intersection of Tudor Road and Ward Road is a signalized T-intersection with a proposed west leg of the intersection expected with construction of the Summit Orchard West development.

North, Midway, and South Access along Blue Parkway provide access to the Summit Fair shopping center to the west of Blue Parkway and the former Cerner buildings to the east. All three intersections are signalized.

Traffic Volumes

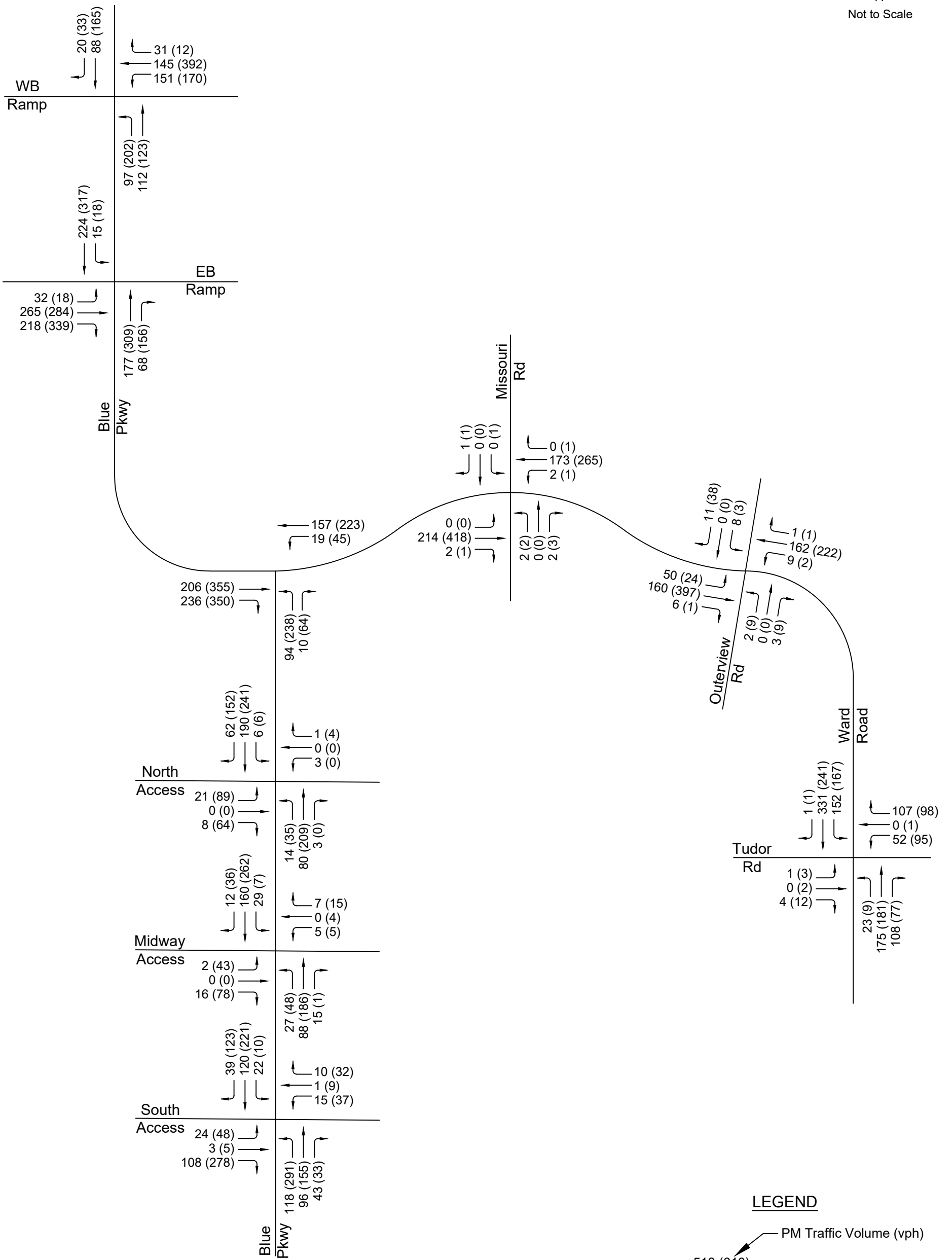
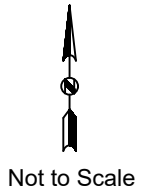
Intersections counted for analysis in this study were:

- Blue Parkway and WB I-470 Ramp
- Blue Parkway and EB I-470 Ramp
- Blue Parkway and Ward Road
- Blue Parkway and North Access
- Blue Parkway and Center/Midway Access
- Blue Parkway and South Access
- Ward Road and Missouri Road
- Ward Road and Outerview Road
- Ward Road and Tudor Road

The turning movement traffic counts were completed on Wednesday, August 23rd, 2023, Tuesday, August 29th, 2023, and Wednesday, August 30th, 2023, for the peak volume time periods. Morning traffic counts were conducted from 7:00 AM until 9:00 AM and afternoon traffic counts were from 4:00 PM until 6:00 PM. The morning peak period was determined to be from 8:00 AM until 9:00 AM and the afternoon peak period was determined to be from 5:00 PM until 6:00 PM.

For both the Ward Road and Outerview Road intersection and the Ward Road and Tudor Road intersection, traffic volumes were used from the *Summit Orchard West* traffic impact study (McCurdy Engineers, *Summit Orchards West Traffic Impact Study*, September 2022). These volumes included traffic generated from adjacent developments as part of the 2016 McClure and 2018 Olsson traffic impact studies (McClure Engineering Co, *Summit Orchards Traffic Impact Study*, March 2016 and Olsson Engineers, *Tudor Road Development Traffic Impact Study*, July 2021).

The generated existing traffic volumes are shown on Figure 3. The July 2022 counts and the previous study traffic/trip generation volumes are included in the Appendix.



LEGEND

- 518 (610) — PM Traffic Volume (vph)
- AM Traffic Volume (vph)
- Vehicle Movement

Figure 3 - Existing Volumes

PROPOSED CONDITIONS

Summit Orchards North is expected to be constructed in two phases. The first phase will be west of Missouri Road and will include two car dealerships. The second phase will be on the east side of Missouri Road and will include a fast-food restaurant with drive-through window, a sit-down restaurant, and a residential multi-family housing complex with 350 units.

Access Plan

The site will be accessed from the south from Ward Road) via four accesses and from the east via one access from Outerview Road. Missouri Road will provide interconnectivity between the sites.

The three westmost accesses from Ward Road will be constructed during Phase I of the development. These will consist of a north leg of the existing Ward Road and Blue Parkway signalized intersection, a reconstruction of the north leg of Missouri Road, and a right-in/right-out (RIRO) access point centered between Blue Parkway and Missouri Road.

Access for Phase II of the development will consist of an additional RIRO centered between Missouri Road and Outerview Road and an extension of the Holiday Inn access from Outerview Road.

Sight Distance

Sight distance was measured at the proposed accesses using the methodology recommending by the American Association of State Highway and Transportation Engineers (AASHTO) for the 35 mph speed limits on Ward Road and 25 mph on Outerview Road as City code states that a speed limit of 25 mph governs areas with no posted speed limit.

For 35 mph, AASHTO requires a minimum intersection sight distance of 390 feet and a stopping sight distance of 250 feet. The AASHTO required intersection site distance at 25 mph is 280 feet and 155 feet for stopping sight distance.

Ward Road and Blue Parkway/West Car Dealership Access

No sight distance was measured as this is an existing intersection.

Ward Road and Car Dealership RIRO Access

Based on field measurements, the available sight distance is approximately 420 feet and is adequate for the speed limit.

Ward Road and Missouri Road

No sight distance was measured as this is an existing intersection.

Ward Road and Commercial RIRO Access

The available sight distance, based on field measurements, is greater than 400 feet and is adequate for the 35 mph speed limit.

Outerview Road and Holiday Inn Access

No sight distance was measured as this is an existing signalized intersection.

Crash Analysis

Crashes at the study intersections were analyzed over a three-year period (September 2020 to September 2023) from City of Lee's Summit Police Department data to identify existing crash patterns. There were a total of 71 crashes reported during the crash study time period, and no fatal crashes within the study area.

The Ward Road and Missouri Road intersection had no crashes reported during the study period.

Blue Parkway and WB I-470 Ramp

There were 14 reported crashes at the intersection during the study period—averaging approximately five crashes a year.

Based on the analysis of the crashes, a majority were angle crashes (10) and the remaining were rear-end crashes. The crashes were almost evenly divided between injury (6) and property damage only (PDO). Primarily, the cause for the crashes were red light running and inattentive drivers.

Blue Parkway and EB I-470 Ramp

There were 15 reported crashes at the intersection which averages to five crashes a year.

The crashes varied between angle, rear-end, sideswipe, and fixed object with the crashes caused by inattentive drivers and red light running. Six of the crashes resulted in injuries and nine were PDO.

Ward Road and Blue Parkway

There were 11 reported crashes at the intersection during the study period—averaging almost four crashes a year.

Based on the analysis of the 11 crashes, there were two rear-end, three sideswipe, four angle, and two fixed object crashes. The crashes were all PDO crashes and were the result of weather conditions, inattentive driving, red light running, DWI, and reckless driving.

Blue Parkway and North Access

There were six reported crashes at the intersection during the study period which averages to two crashes per study year.

A majority of the crashes (5) were angle crashes and one was a rear end crash—only one crash resulted in injuries. The cause of a majority of the crashes was attributed to inattentive driving and red light running.

Blue Parkway and Center/Midway Access

There were four reported crashes at Midway Access and Blue Parkway during the crash study period.

The crashes were equally divided between rear-end and angle crashes with inattentive drivers being the primary cause of the crashes.

Blue Parkway and South Access

There were 15 reported crashes at the intersection during the study period—five crashes a year.

Based on the analysis of the crashes, there were four angle, eight rear-end, two rear-end, three sideswipe, and one fixed object crashes. There were no reported injury crashes during the study period.

Ward Road and Outerview Road

The through movements of Ward Road are not stop-controlled and are therefore operating in a free-flow condition. The through and turning movements on Outerview Road operate at LOS B or better and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Tudor Road

There were five reported crashes at the intersection during the study period—four fixed object crashes and two angle crashes with one injury.

Crashes at the study intersections could be reduced by:

- I-470 Ramps and Blue Parkway - Switch the existing 5-section signal heads with flashing yellow signal heads to reduce confusion when the turning movement is protected versus permitted.
- Blue Parkway and Ward Road – Install white skip lane pavement markings for the dual right turns to guide vehicles within their lanes.
- At all signalized intersections – Increase yellow change interval to allow vehicles more time to travel through intersection.

Detailed crash summaries are included in the Appendix.

Throat Length Analysis

The throat lengths for the proposed entrances into the site from Ward Road were compared to City of Lee’s Summit *Access Management Code*, March 2018 requirements for drives adjacent to arterial roadways based on vehicles per hour. As Outerview Road is a private roadway, there is no specific guidance provided for throat lengths. However, this drive will have at least a 50-foot throat which exceeds the expected queue.

Throat lengths for entrances from Ward Road are provided in Table 1.

Table 1 – Ward Road Driveway Throat Lengths		
Intersection	Recommended Throat Length (feet)	Site Plan Measured Throat Length (feet)
Ward Road and Blue Parkway/West Car Dealership Access	125	80
Ward Road and Car Dealership RIRO	125	75
Ward Road and Missouri Road	125	115
Ward Road and Commercial RIRO	125	75

While the accesses onto Ward Road are less than the required length, the longest expected queue length for southbound traffic is 30 feet, which is less than the storage provided by a minimum 75-foot throat and will be sufficient to prevent vehicles interfering with circulation or parking areas within the site.

Trip Generation

The expected trip generation for the development was estimated using the 11th Edition of the Trip Generation Handbook published by the Institute of Transportation Engineers. The trip generation was based on Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 AM along with Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 PM criteria.

Estimates for the expected trips generated by the development are provided in Table 2.

Table 2 – Trip Generation					
ITE Land Use Code	Units	A.M.		P.M.	
		Trips In (vph)	Trips Out (vph)	Trips In (vph)	Trips Out (vph)
840 – Automobile Sales (New)	70,000 sq ft	95	35	59	89
Phase I Total		95	35	59	89
840 - Multifamily Housing (Low-Rise)	350 dwelling units	31	100	108	63
932- High-Turnover (Sit-Down) Restaurant	8,400 sq ft	44	36	46	30
934- Fast-Food Restaurant with Drive-Through Window	3,300 sq ft	75	72	57	52
Phase II Total		150	208	211	145
Full Build Out Total		245	243	270	234

Trip Distribution

The trip distribution pattern was determined for the site based on the existing directional traffic pattern of the peak period and based on a general analysis of the surrounding area. The detailed distribution patterns can be found in the appendix. Based on the existing traffic patterns, the type of development, location of nearby schools, and the metropolitan population centers, the new trips were assigned onto the roadway network, as shown below for the morning and afternoon periods.

Trip distribution during the morning peak period:

- 15% to/10% from the north
- 25% to/60% from I-470
- 35% to/10% from the south (Blue Parkway)
- 15% to/10% from the south (Ward Road)
- 10% to/10% from the east (Tudor Road)

Trip distribution during the afternoon peak period:

- 10% to/10% from the north
- 40% to/55% from I-470
- 25% to/15% from the south (Blue Parkway)
- 15% to/10% from the south (Ward Road)
- 10% to/10% from the east (Tudor Road)

Existing Plus Site Traffic Volumes

The expected development site-generated traffic volumes were added to the existing plus approved traffic scenario. The volumes are shown on Figures 4, 5, 6, and 7.

Future Traffic Volumes

Future traffic volumes were generated at a rate of 2% annual growth over a twenty-year period. The calculated traffic volumes were added to the existing plus site traffic. The volumes for the future morning and afternoon peak hours are shown on Figure 8.

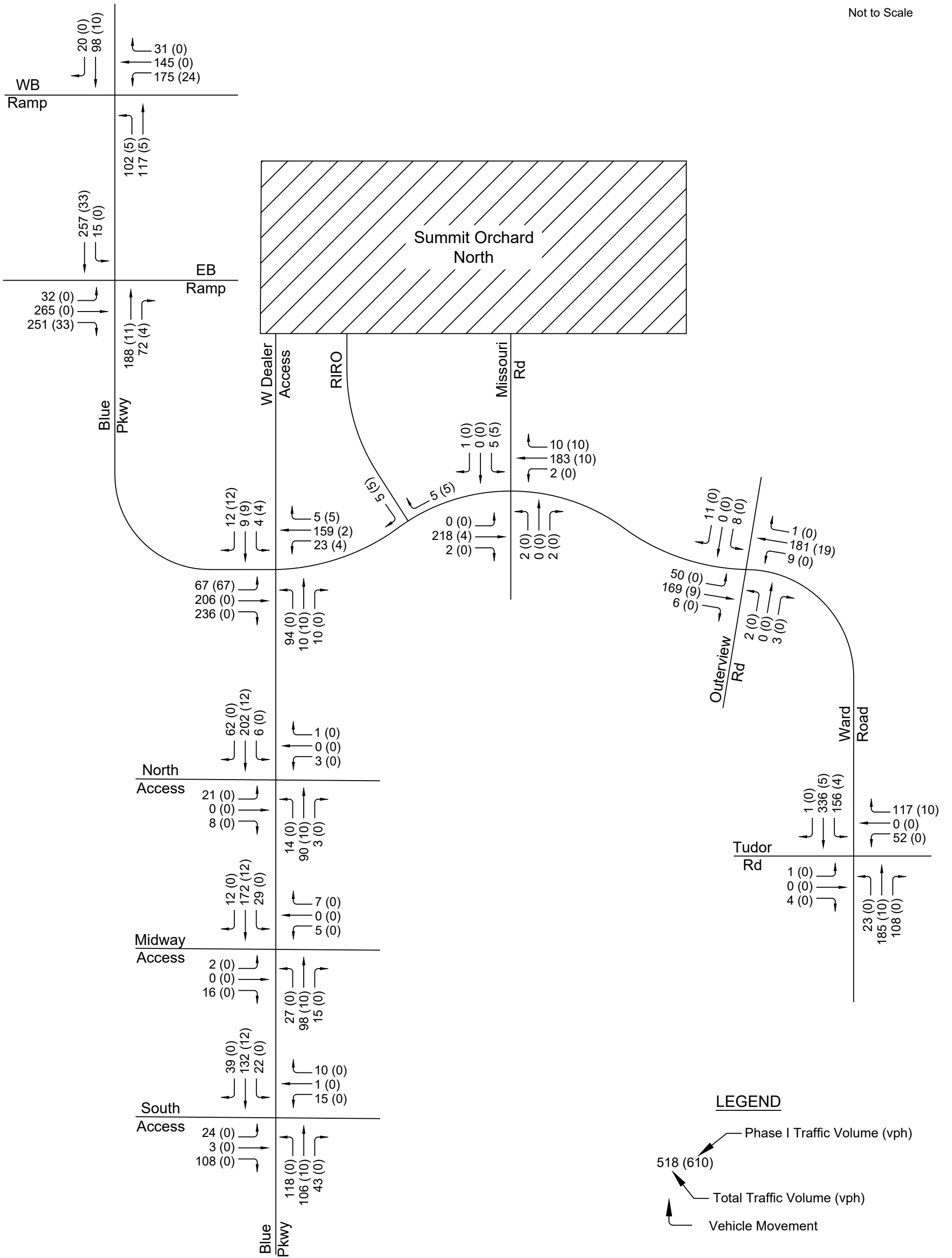
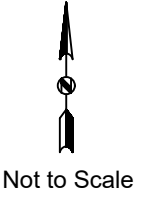


Figure 4 - Existing plus Site AM (Phase I) Volumes

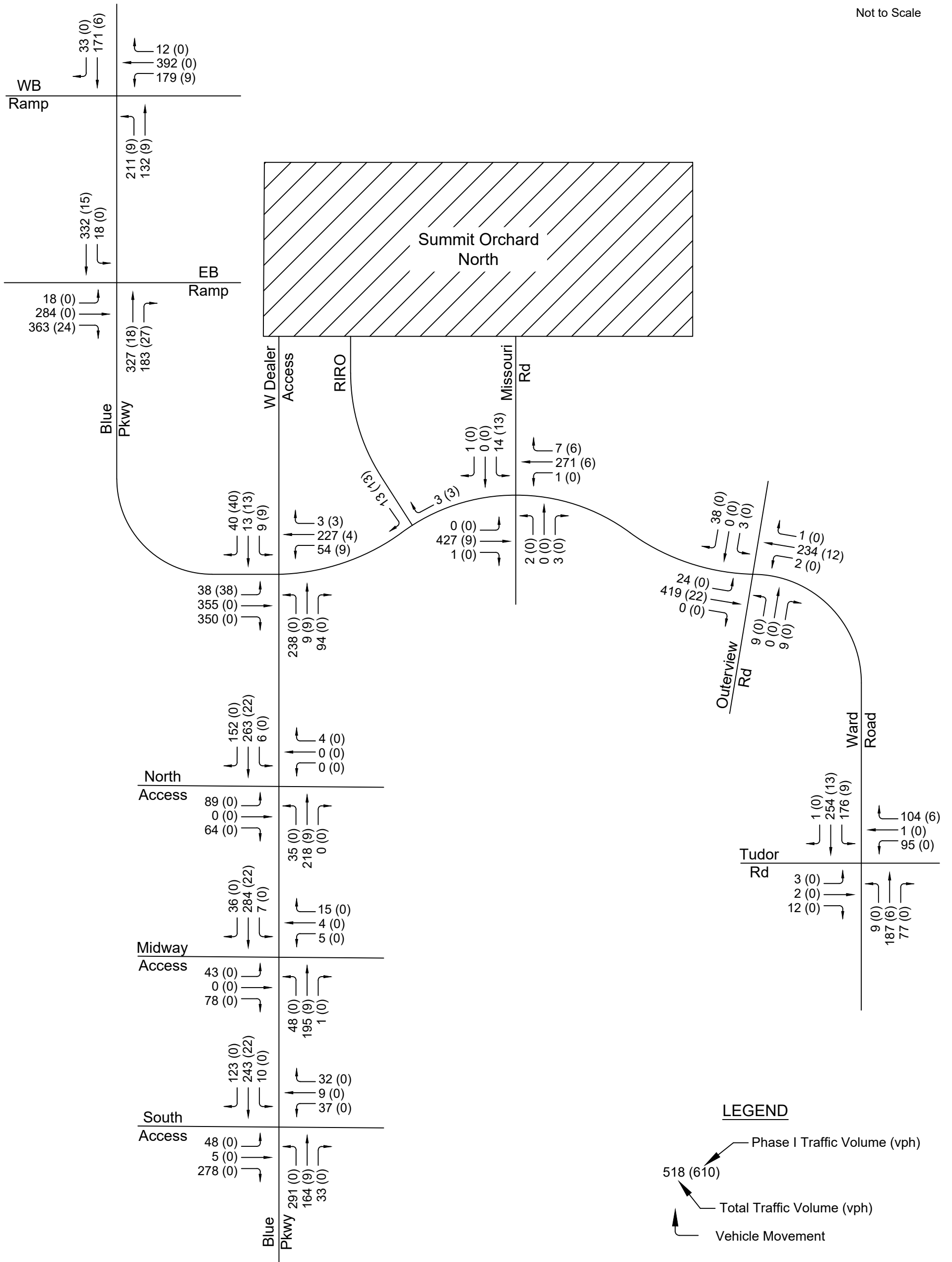
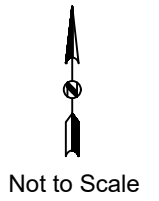


Figure 5 - Existing plus Site PM (Phase I) Volumes

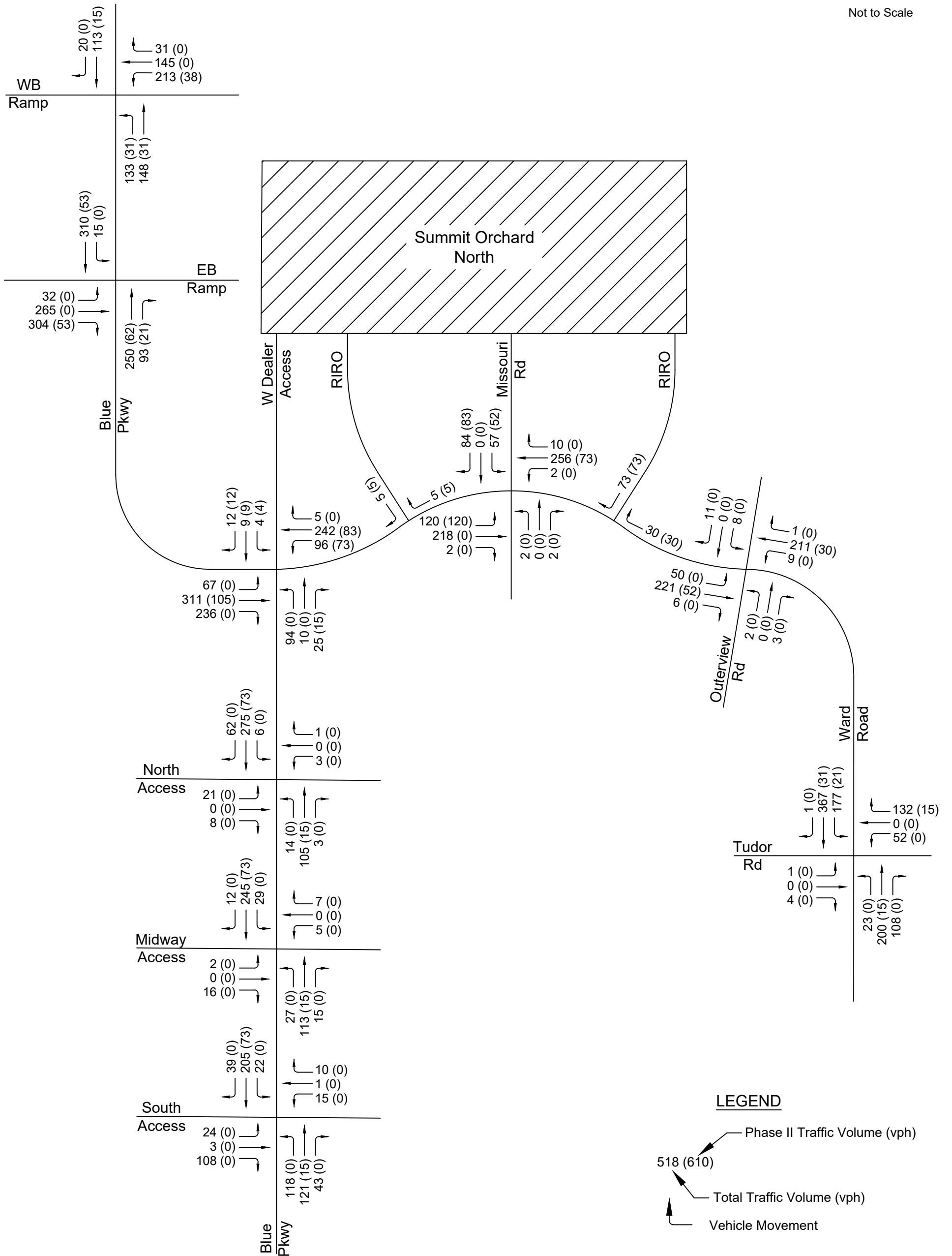
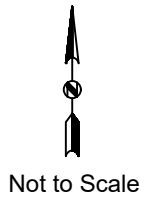


Figure 6 - Existing plus Site AM (Phase I & II) Volumes

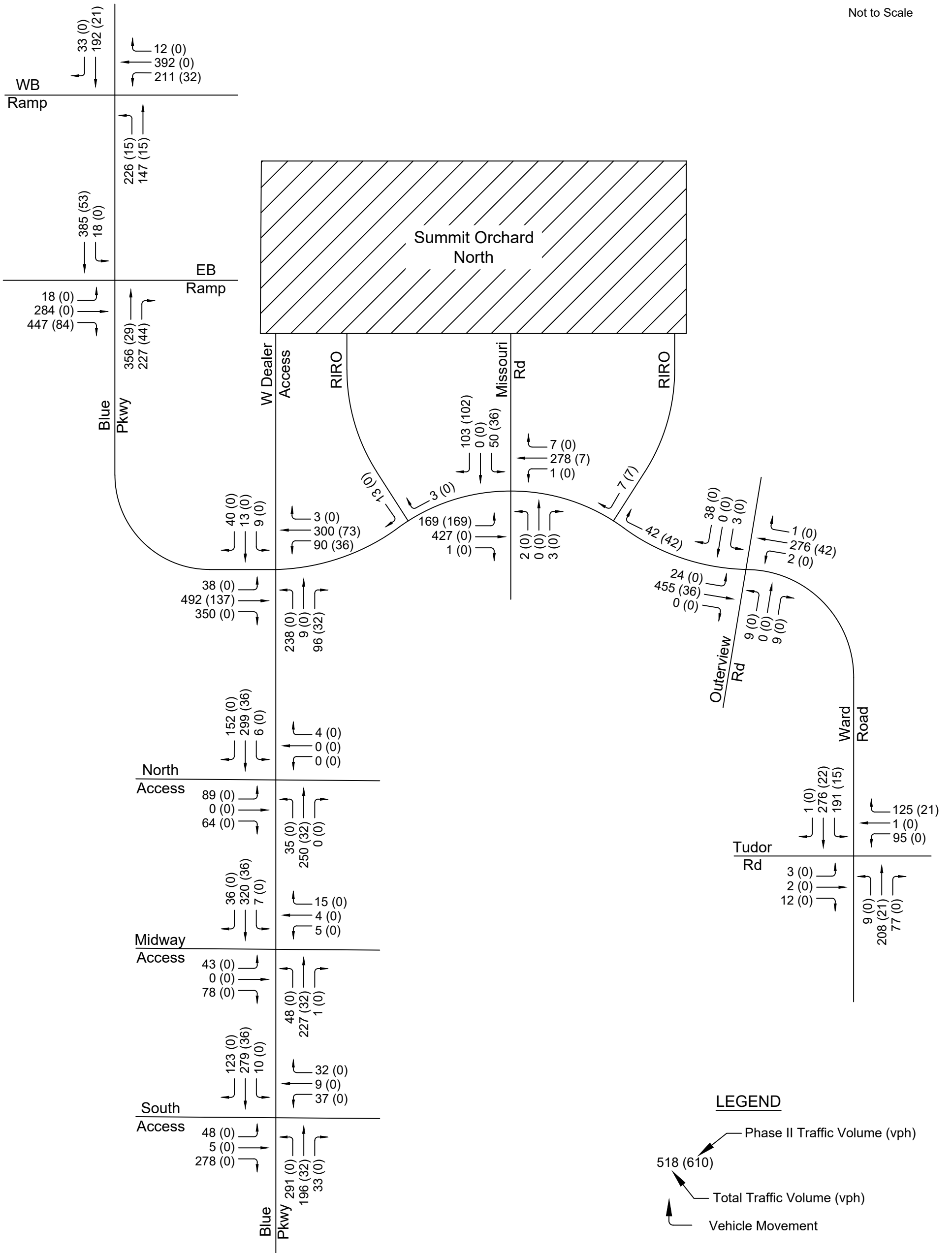
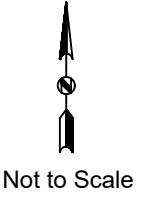


Figure 7 - Existing plus Site PM (Phase I & II) Volumes

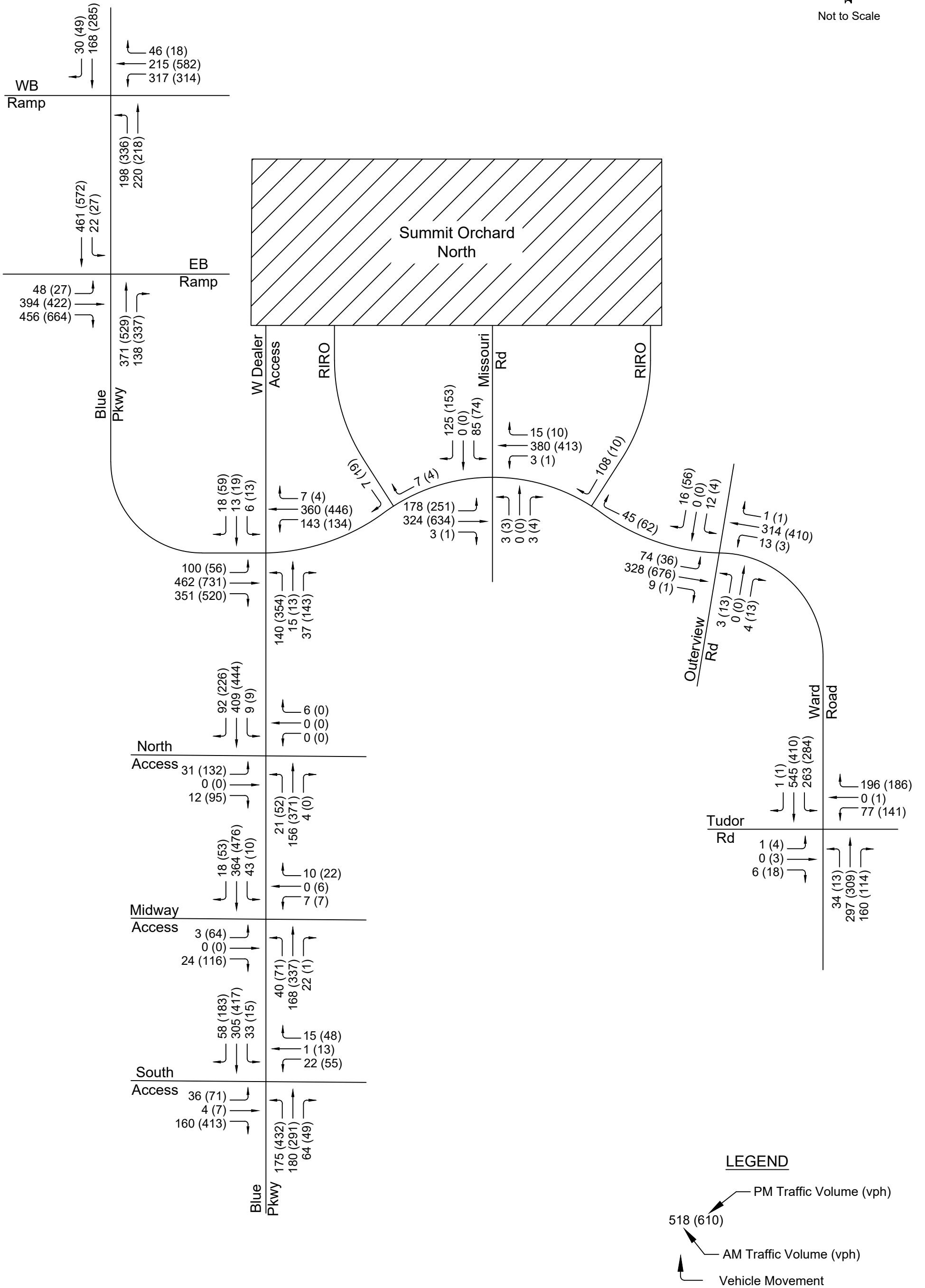
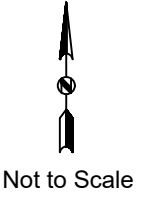


Figure 8 - Future Peak Hour Volumes

Signal Warrant Study

It may be considered justified to install a traffic signal at a location if one or more of the traffic signal warrants listed in the 2009 MUTCD is met. The traffic signal warrants are:

- Warrant 1: Eight-Hour Vehicular Volume
- Warrant 2: Four-Hour Vehicular Volume
- Warrant 3: Peak Hour
- Warrant 4: Pedestrian Volume
- Warrant 5: School Crossing
- Warrant 6: Coordinated Signal System
- Warrant 7: Crash Experience
- Warrant 8: Roadway Network
- Warrant 9: Intersection Near at Grade Crossing

Warrant 3 was evaluated at Ward Road and Outerview Road and at Ward Road and Missouri Road as part of this study for the existing plus site (Phase I & II) and future conditions.

Warrant 3: Peak Hour

The peak hour warrant is satisfied if either of the two following conditions are met:

A: This condition is satisfied if any of the following conditions are met for a period of one hour during an average day:

1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a stop sign equals or exceeds: 4 vehicles-hours for a one-lane approach or five vehicle hours for a two-land approach and
2. The volume on the same minor-street approach (one directions only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes and
3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

(Condition A is not being examined in this study)

B: The peak hour warrant is satisfied if the vehicles per hour on both approaches of the major street and the vehicles on the higher volume approach of the minor street for one hour fall above the 2009 MUTCD Warrant 3 curve.

Warrant Analysis

The traffic volumes are not expected to warrant a traffic signal at the Ward Road and Outerview Road or at Ward Road and Missouri Road intersections for the existing plus site conditions, however, the traffic volumes approach the signal warrant criteria for the future condition at Ward Road and Missouri Road. The raw data and curves from the 2009 MUTCD are included in the Appendix.

Right-Turn and Left-Turn Lane Warrants

The need for right and left-turn lanes at the site entrances was evaluated using the City of Lee's Summit *Access Management Code*, March 2018 turning lane guidelines as part of this study for the existing plus site (Phase I & II) condition.

Left-Turn Warrant

Left-turn lane guidelines per City of Lee's Summit *Access Management Code*:

16.1.E. Left-turn lanes shall be provided at all median openings on roadways with medians.

16.1.H. The minimum length of left-turn lane should be 250 feet plus taper on an arterial street intersecting another arterial street and 200 feet plus taper on an arterial street at other locations. The minimum length of left-turn lane on collectors should be 150 feet plus taper. The minimum length of left-turn lane on connectors should meet the driveway throat length requirements.

Left-turn lanes will be required eastbound on Ward Road and Blue Parkway as Ward Road is a median divided arterial roadway. A left-turn lane for the eastbound movement at Ward Road and Missouri Road has already been constructed.

Right-Turn Warrant

Right-turn lane guidelines per City of Lee's Summit *Access Management Code*:

16.2.A. Required on arterial streets at each intersecting street or driveway where the right-turn volume on the major arterial street is or is projected to be at least 30 vehicles in any hour, or the right-turn volume on the minor arterial street is or is projected to be at least 60 vehicles in any hour. Minimum length should be 250 feet plus the taper on a major arterial at the intersection of another arterial street or 200 feet plus the taper on a minor arterial at the intersection with another arterial street or on a major arterial at the intersection of a collector and 150 feet plus the taper at other locations along arterial streets.

The traffic volumes are expected to meet the right-turning volume criteria at the Commercial Access (east RIRO) and Ward Road.

The raw analysis data is included in the Appendix.

CAPACITY

The capacity analysis for the study intersections was completed using the methodology outlined in the Highway Capacity Manual, 6th Edition. The volume and capacity analysis was completed using Trafficware SYNCHRO software (latest version). The criteria for determining Level of Service (LOS) for signalized and unsignalized study intersections and access points are based on the average vehicle delay and is outlined in Table 3 below. Level of Service is defined as the measure of the quality of traffic flow and is graded from “A” to “F”—with “A” being the best situation and “F” being the worst.

Table 3 – Intersection Level of Service		
Level of Service (LOS)	Average Control Delay (sec/veh)	
	Unsignalized	Signalized
A	< 10	< 10
B	< 15	< 20
C	< 25	< 35
D	< 35	< 55
E	< 50	< 80
F	≥ 50	≥ 80

Existing Conditions

Blue Parkway and WB I-470 Ramp

All approaches operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS C during the morning and afternoon peak periods.

Blue Parkway and EB I-470 Ramp

All approaches operate at a LOS C or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS B during the morning and afternoon peak periods.

Ward Road and Blue Parkway

All approaches operate at a LOS C or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS B during the morning and afternoon peak periods.

Blue Parkway and North Access

All approaches operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS A during the morning and a LOS B during the afternoon peak period.

Blue Parkway and Center/Midway Access

All approaches operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS B during the morning and afternoon peak periods.

Blue Parkway and South Access

All approaches operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS B during the morning and a LOS C during the afternoon peak period.

Ward Road and Missouri Road

The through movements of Ward Road are not stop-controlled and are therefore operating in a free-flow condition. The northbound and southbound movements operate at a LOS B and have sufficient capacity for queuing vehicles.

Outerview Road and Holiday Inn Access

No detailed analysis of this intersection is included in the study as traffic volumes are expected to be low.

Ward Road and Outerview Road

The through movements of Ward Road are not stop-controlled and are therefore operating in a free-flow condition. The through and turning movements on Outerview Road operate at LOS B or better and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Tudor Road

All approaches operate at a LOS C or above for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS B during the morning and afternoon peak periods.

The results of the capacity analysis for the existing morning and afternoon peak hour conditions along with lane configuration and queue lengths are shown on Figures 9 and 10.

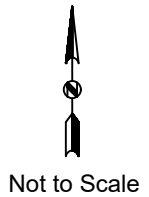
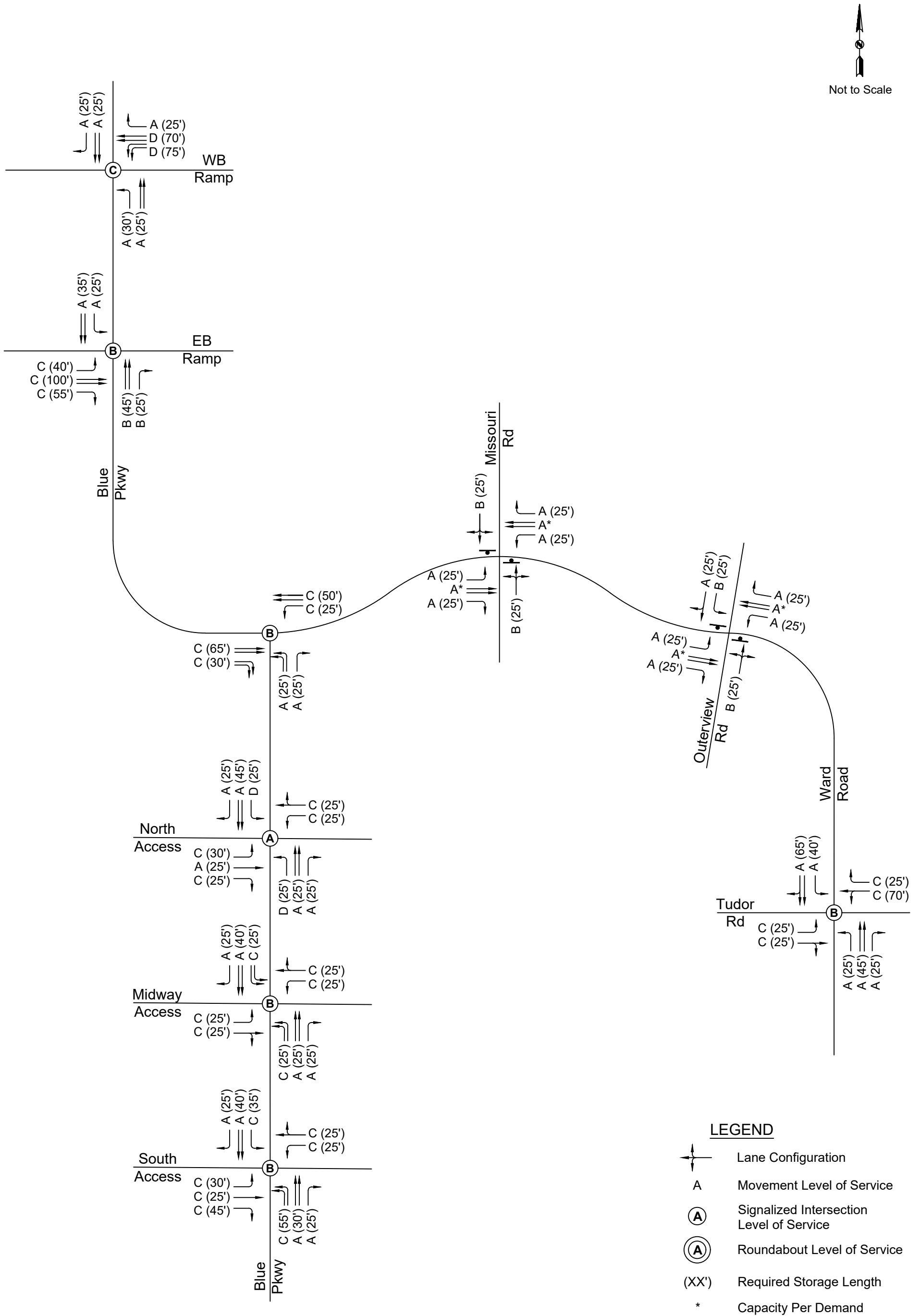
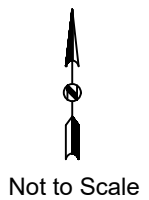
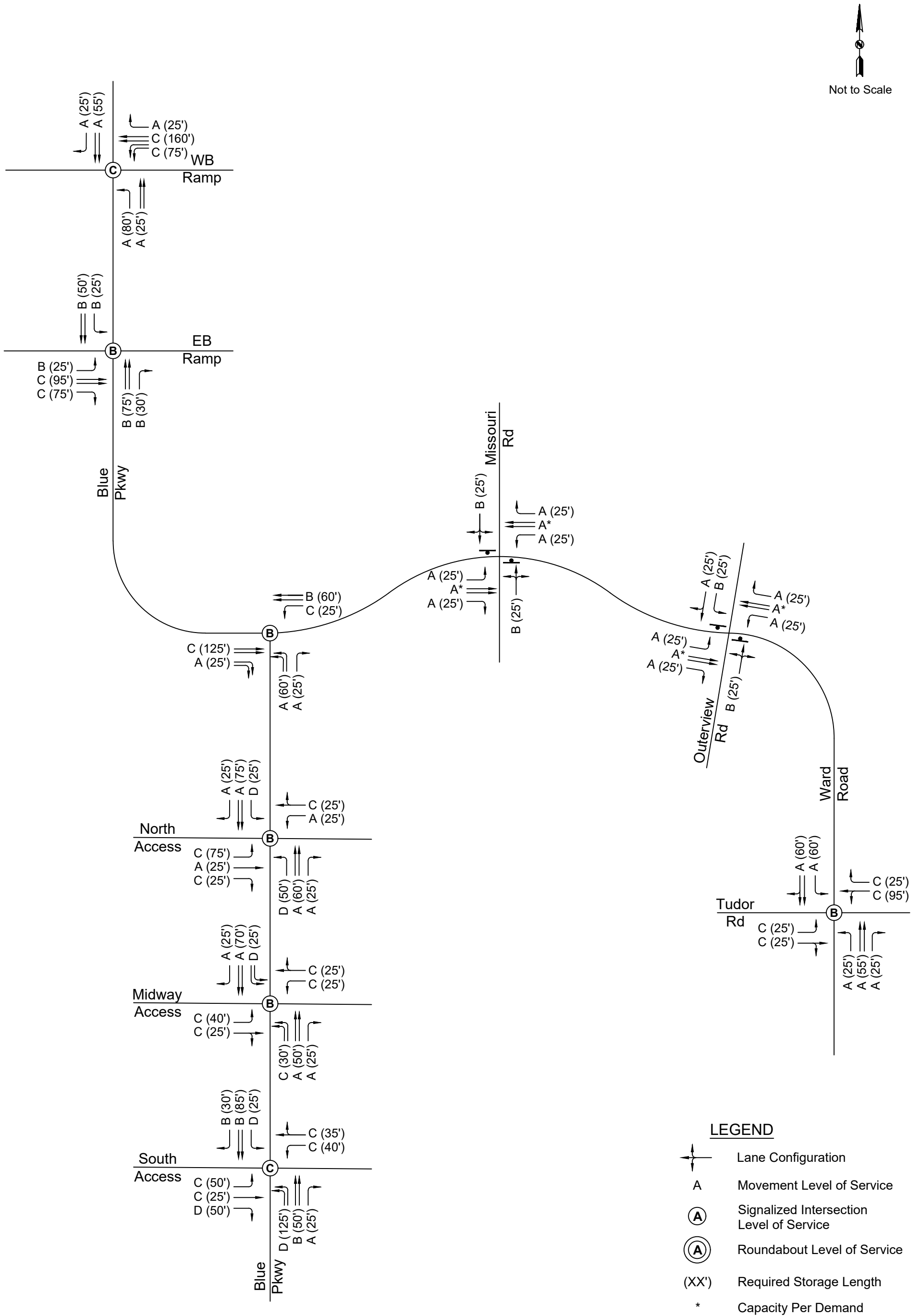


Figure 9 - Existing AM Level of Service



LEGEND

- Lane Configuration
- A Movement Level of Service
- Signalized Intersection Level of Service
- Roundabout Level of Service
- (XX') Required Storage Length
- * Capacity Per Demand

Figure 10 - Existing PM Level of Service

Existing Plus Phase I Site Conditions

Signal timings were optimized to account for the additional traffic.

Blue Parkway and WB I-470 Ramp

There is no significant change in the operations of this intersection from the existing conditions. All approaches continue to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and EB I-470 Ramp

There is no significant change in the operations of this intersection from the existing conditions. All approaches continue to operate at a LOS C or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Blue Parkway/West Car Dealership Access

The intersection was analyzed with a southbound lane configuration of shared/right and a left-turn lane, an eastbound left-turn lane, and restriping the northbound dual left-turn lanes to a left-turn lane and a through lane.

The additional traffic causes the eastbound left-turn, westbound left-turn, and eastbound dual right-turns to operate at a LOS D for the afternoon peak period. All other approaches operate at a LOS C or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles. The overall LOS for the signal is a LOS C during the morning and afternoon peak periods.

Blue Parkway and North Access

There is no significant change in the operations of this intersection from the existing conditions. All approaches continue to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and Center/Midway Access

There is no significant change in the operations of this intersection from the existing conditions. All approaches continue to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and South Access

There is no significant change in the operations of this intersection from the existing conditions. All approaches continue to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Car Dealership RIRO Access

The through movements of Ward Road are not stop-controlled and are therefore operating in a free-flow condition. The southbound right-turn lane operates at a LOS A and has sufficient capacity for queuing vehicles.

Ward Road and Missouri Road

There is no significant change in the operations of this intersection from the existing conditions. All approaches continue to operate at a LOS B or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Outerview Road and Holiday Inn Access

No detailed analysis of this intersection is included in the study as traffic volumes are expected to be low.

Ward Road and Outerview Road

There is no significant change in the operations of this intersection from the existing conditions. All approaches continue to operate at a LOS B or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Tudor Road

There is no significant change in the operations of this intersection from the existing conditions. All approaches continue to operate at a LOS C or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

The results of the capacity analysis for the existing plus phase I morning and afternoon peak hour conditions along with lane configuration and queue lengths are shown on Figures 11 and 12.

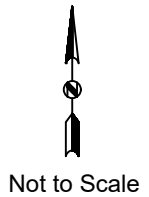
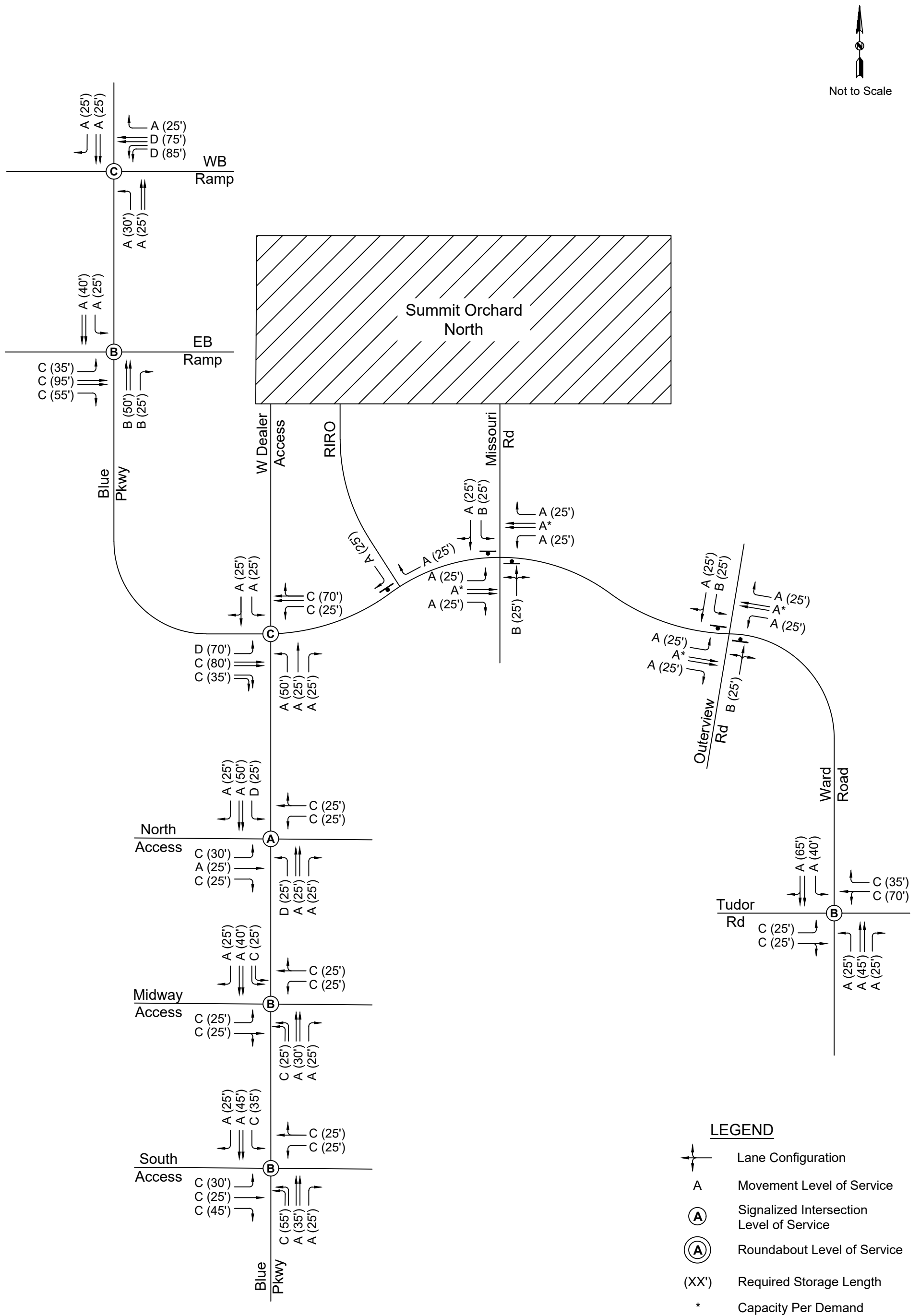


Figure 11 - Existing plus Site AM (Phase I) Level of Service

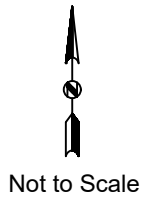
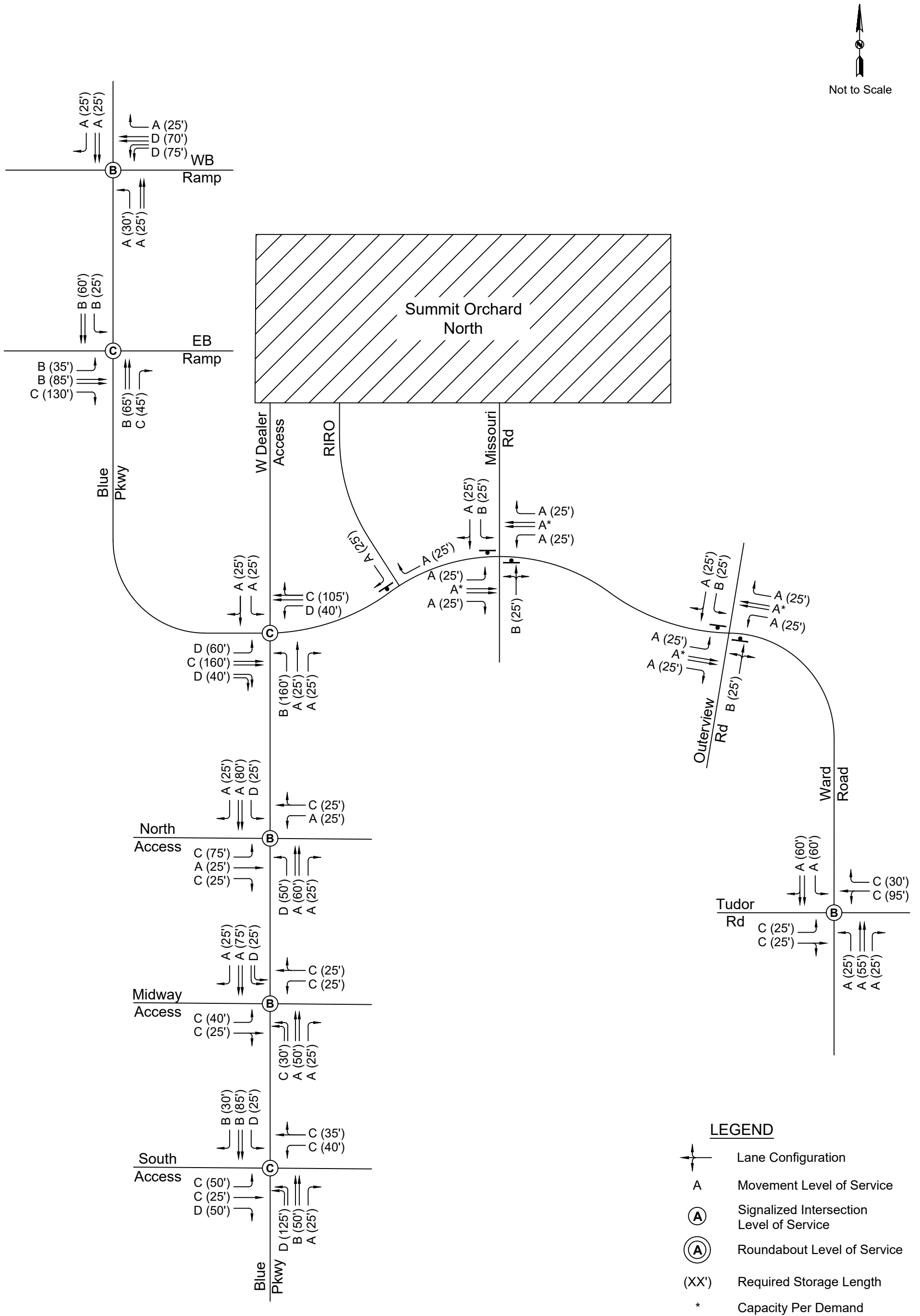


Figure 12 - Existing plus Site PM (Phase I) Level of Service

Existing Plus Phase I & II Site Conditions

Signal timings were optimized to account for the additional traffic.

Blue Parkway and WB I-470 Ramp

There is no significant change in the operations of this intersection from the existing or existing plus phase I conditions. All approaches continue to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and EB I-470 Ramp

There is no significant change in the operations of this intersection from the existing or existing plus phase I conditions. All approaches continue to operate at a LOS C or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Blue Parkway/West Car Dealership Access

There is no significant change in the operations of this intersection from the existing or existing plus phase I conditions. All approaches continue to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and North Access

There is no significant change in the operations of this intersection from the existing or existing plus phase I conditions. All approaches continue to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and Center/Midway Access

There is no significant change in the operations of this intersection from the existing or existing plus phase I conditions. All approaches continue to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and South Access

There is no significant change in the operations of this intersection from the existing or existing plus phase I conditions. All approaches continue to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Car Dealership RIRO Access

The southbound right-turn lane continues to operate at a LOS A during the morning peak period and drops to a LOS B during the afternoon peak period. The intersection has sufficient capacity for queuing vehicles.

Ward Road and Missouri Road

The southbound and northbound movements drop to a LOS C or better for the morning peak period and a LOS D or better for the afternoon peak period with the additional traffic. The intersection has sufficient capacity for queuing vehicles.

Ward Road and Commercial RIRO Access

The through movements of Ward Road are not stop-controlled and are therefore operating in a free-flow condition. The southbound right-turn lane operates at a LOS A and has sufficient capacity for queuing vehicles.

Outerview Road and Holiday Inn Access

No detailed analysis of this intersection is included in the study as traffic volumes are expected to be low.

Ward Road and Outerview Road

There is no significant change in the operations of this intersection from the existing or existing plus phase I conditions. All approaches continue to operate at a LOS B or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Tudor Road

There is no significant change in the operations of this intersection from the existing or existing plus phase I conditions. All approaches continue to operate at a LOS C or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

The results of the capacity analysis for the existing plus phase I & II morning and afternoon peak hour conditions along with lane configuration and queue lengths are shown on Figures 13 and 14.

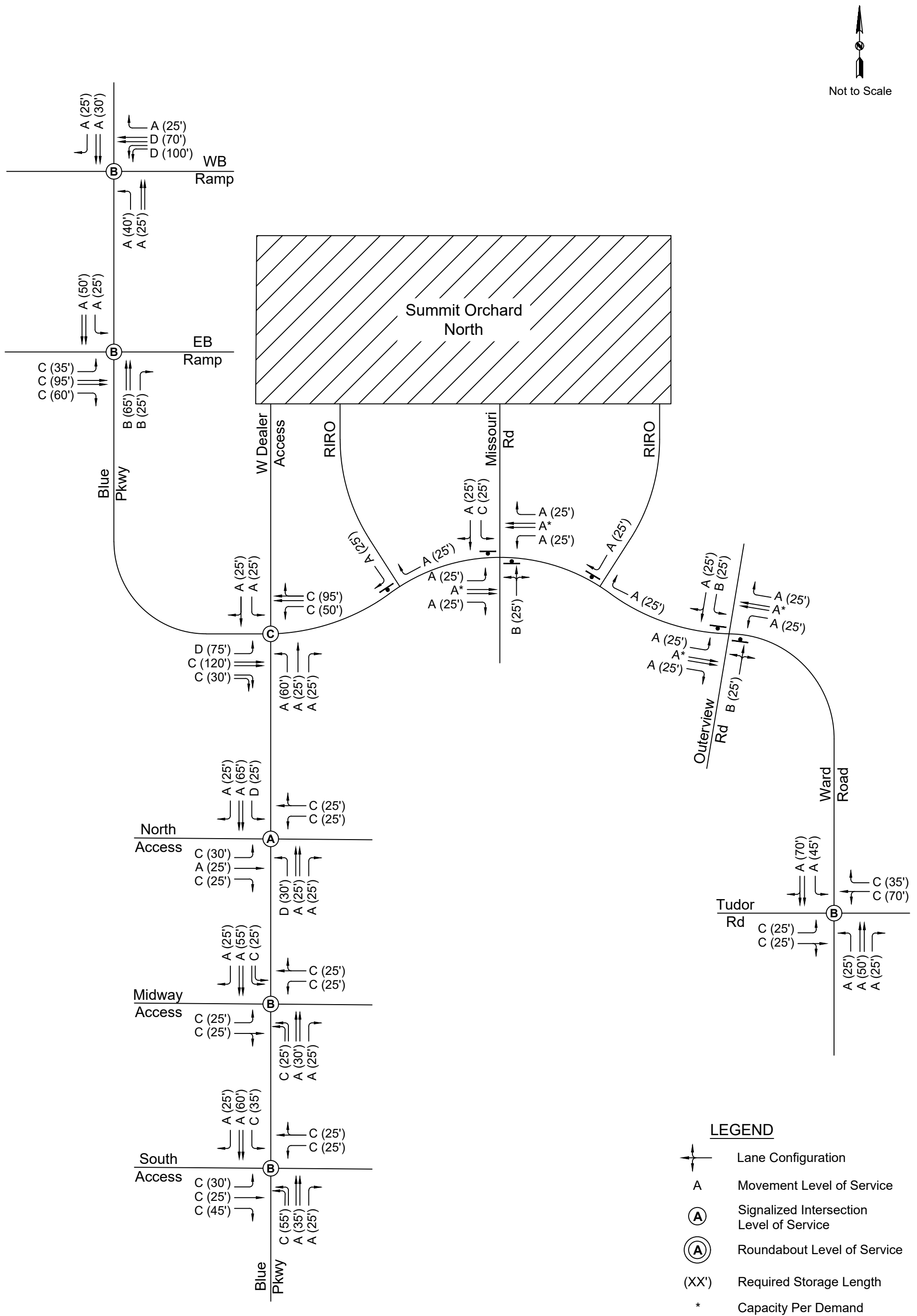


Figure 13 - Existing plus Site AM (Phase I & II) Level of Service

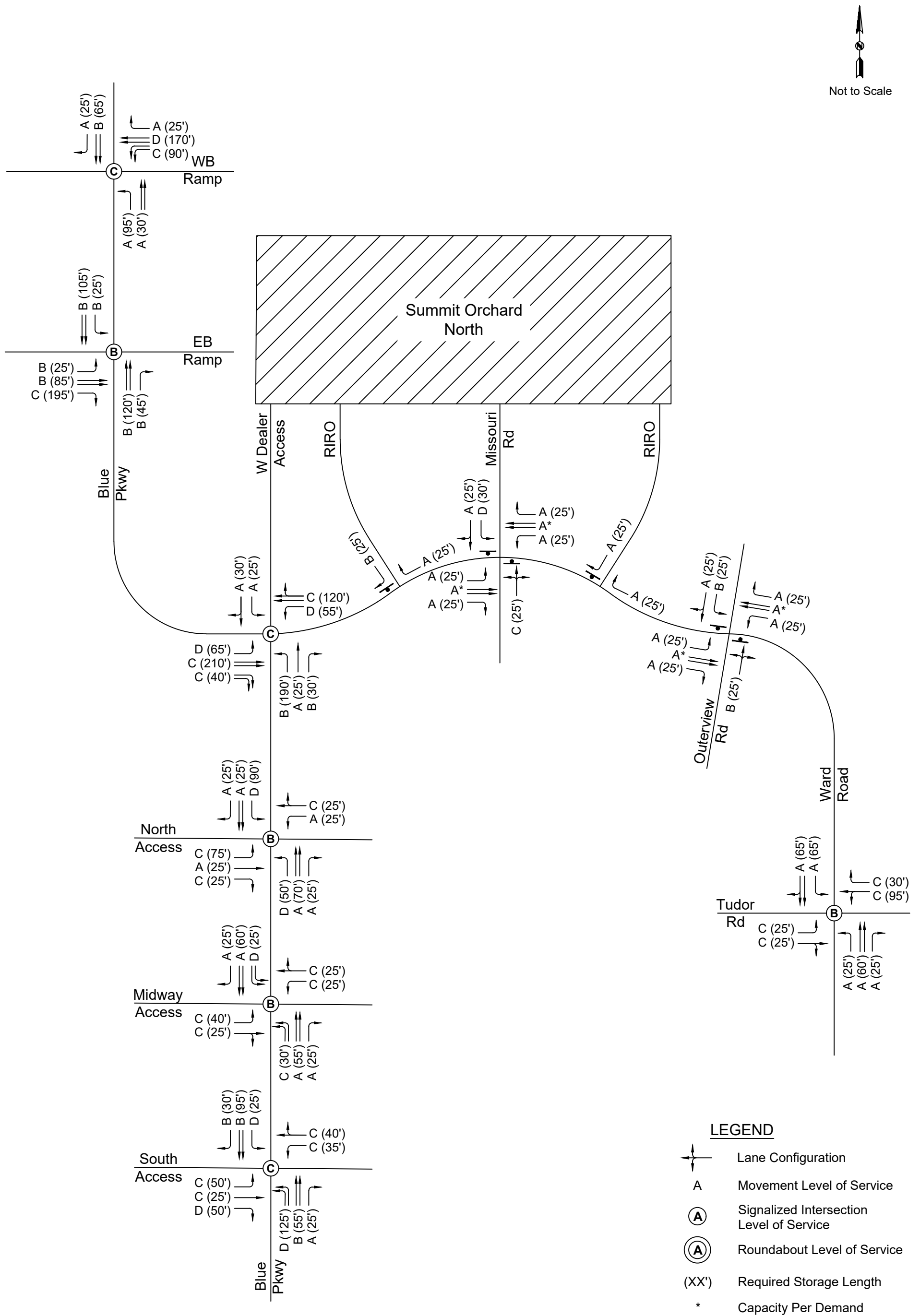


Figure 14 - Existing plus Site PM (Phase I & II) Level of Service

Future Conditions

Future analysis is intended to provide a high-level overview of increases in trips as other development occurs and to provide recommendations for reserving right-of-way for future expansion. Signal timings of intersection movements were optimized to account for the additional traffic.

Blue Parkway and WB I-470 Ramp

All approaches are expected to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and EB I-470 Ramp

All approaches are expected to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Blue Parkway/West Car Dealership Access

All approaches are expected to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and North Access

All approaches are expected to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and Center/Midway Access

All approaches are expected to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Blue Parkway and South Access

All approaches are expected to operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Car Dealership RIRO Access

The southbound right-turn lane is expected to operate at a LOS B during the morning and afternoon peak period. The intersection has sufficient capacity for queuing vehicles.

Ward Road and Missouri Road

As a stop-controlled intersection: The southbound left-turn movement operates at a LOS F and the northbound movement a LOS E.

As a signalized intersection: All approaches operate at a LOS D or better, and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Commercial RIRO Access

The southbound right-turn lane operates at a LOS B and has sufficient capacity for queuing vehicles.

Outerview Road and Holiday Inn Access

No detailed analysis of this intersection is included in the study as traffic volumes are expected to be low.

Ward Road and Outerview Road

All approaches operate at a LOS C or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

Ward Road and Tudor Road

All approaches operate at a LOS D or better for the morning and afternoon peak periods and the intersection has sufficient capacity for queuing vehicles.

The results of the capacity analysis for the future morning and afternoon peak hour conditions along with lane configuration and queue lengths are shown on Figures 15 and 16.

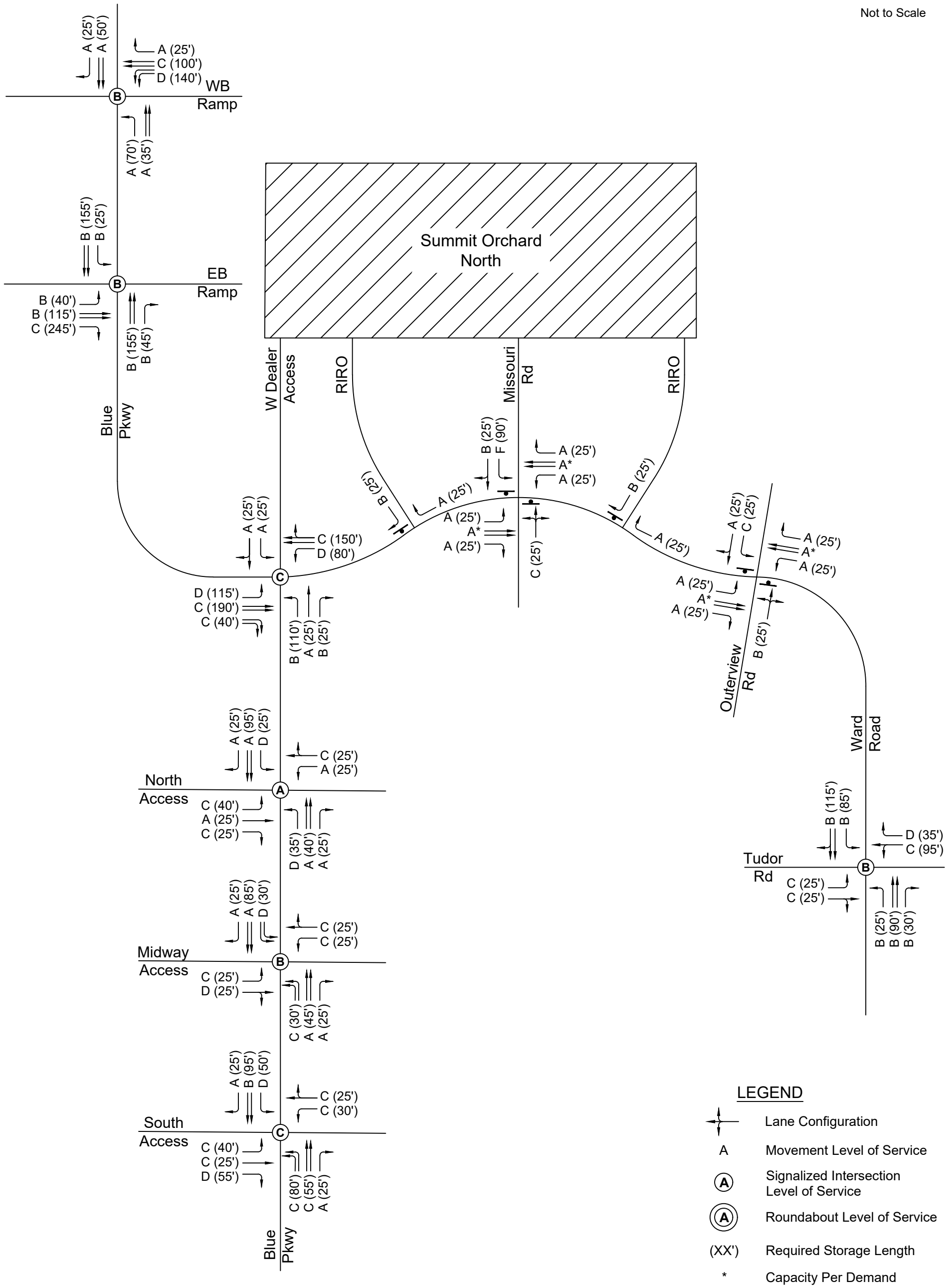
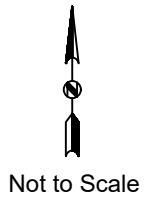


Figure 15 - Future AM Level of Service

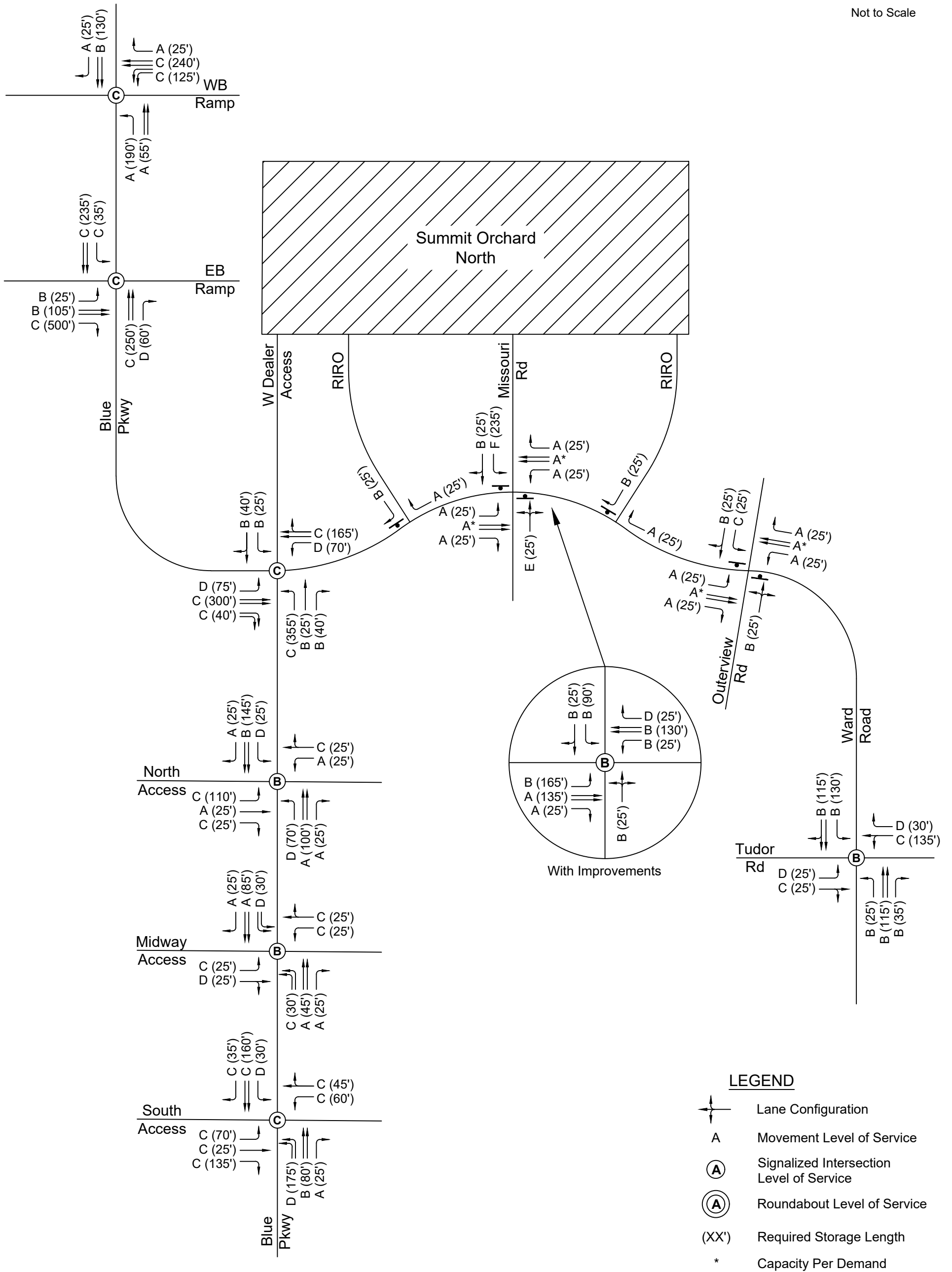
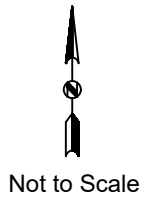


Figure 16 - Future PM Level of Service

RECOMMENDATIONS

This study documents the findings of the traffic analysis of the expected traffic for the Summit Orchards North development in Lee's Summit, Missouri. The study includes an analysis of the existing, existing plus Phase I site, existing plus Phase I & II site, and future conditions.

Based on the results of the SYNCHRO analysis, observations from the field, and engineering judgment, the following recommendations are made:

- Discuss signal and pavement marking improvements related to crash history with City and MoDOT staff.

When the Phase I development is constructed:

- Construct an eastbound left-turn lane (200 feet plus taper) at the intersection of Ward Road and Blue Parkway.
- Install the southbound signal mast arm and pole with pedestrian equipment and optimize/adjust signal timings as necessary at Ward Road and Blue Parkway. Reconfigure northbound leg of intersection to a left-turn, through, and right-turn lane configuration. The southbound leg of the intersection should be a left-turn lane (150 feet plus taper) and a shared through/right-turn lane.
- Optimize signal timings at all study intersections.
- Reconstruct the southbound Missouri Road and Ward Road intersection to consist of a left-turn lane and a shared through/right-turn lane.

When the Phase II development is constructed:

- Construct a westbound right-turn lane (200 feet plus taper) at the intersection of Commercial Access and Ward Road.
- The need for future roadway improvements should be reevaluated as additional development occurs.