Southgate-KXLY Shopping Center
Traffic Operations Study



City of Spokane, Washington

December 2016

Morrison Maierle

engineers • surveyors • planners • scientists

SOUTHGATE-KXLY SHOPPING CENTER
TRAFFIC OPERATIONS STUDY

SUBMITTED TO:

CITY OF SPOKANE

DECEMBER 2016

PREPARED BY:

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1 INTRODUCTION

This report summarizes the Traffic Operational Study and "analysis of adjacent intersections" required by City engineering officials for the Southgate-KXLY shopping center proposed in south Spokane. The Study is highlighted as a requirement of a developer's agreement and contract enacted between KXLY and the City as a function of Comprehensive Plan Amendment and zone change process approved by City officials in 2008/2009. The recommendations herein should adequately support site-specific transportation Growth Management Act (GMA) Concurrency and State Environmental Policy Act (SEPA) determinations, as to be provided by City planning and engineering officials upon receipt of this document and site designs.

1.1 PROJECT DESCRIPTION

The Southgate-KXLY shopping center site is located west of Regal Street approximately 0.40 miles north of 57th Avenue in south Spokane. The site is directly adjacent to and south of the Southside Sports Complex (maintain and owned by the City Parks Department), as bounded by the Sports Complex to the north, Regal Street to the east, vacant properties to the west, and a residential neighborhood to the south.

The site is comprised of two properties and parcels totaling 15.96 acres with physical addresses of 5222 S. Regal Street and 2651 E. 49th Avenue. Parcel 34041.9077 encompasses the majority of the site (14.0-acres) and is owned by Spokane Radio, Inc (known as KXLY). Parcel 34041.0038, adjacent to the Sports Complex, makes up the balance of the site (1.96-acres) and is currently owned by the City of Spokane. City property will be acquired by KXLY officials to expand parking and shopping area development, but also to secure access directly to the signalized Palouse Highway/Regal Street intersection.

1.1.1 Project Proposal

The land use proposal includes the development of 174,050 square-feet (s.f.) of commercial/retail space. At present, the only known tenant (potentially) is that of a supermarket with a building footprint of 45,000 s.f. Tenants for the remaining 129,050 s.f. of building area have yet to be resolved and were reviewed simply as "shopping center", as prescribed via definitions provided with the Institute of Transportation Engineers, Trip Generation Manual (9th Edition, 2012).

The ITE shopping center land use is intended for application when site tenants/occupants are not known and inherently has a higher trip generation rate compared with several other ITE land uses. Therefore, is anticipated a range of site occupants/tenants can be developed without surpassing the net new trip thresholds identified in Section 3.2.3. As part of the Development Agreement with the City, trip generation projections will be updated periodically for the shopping center with phased development. The traffic operational study can be updated in the future, as necessary, if periodic trip generation reviews indicate that currently anticipated thresholds may be exceeded.

Access is proposed via a modified approach to the signalized Palouse Highway/Regal Street intersection and four driveways proposed along Regal Street. From north to south, these access are described as follows:

- **Palouse Highway/Regal Street.** Currently, the west leg of the Palouse Highway/Regal Street intersection provides access to a parking lot for Southside Sports Complex. The project proposal would extend this approach by approximately 200 feet (to about 300 feet west of Regal Street) then curve south to access Southgate-KXLY properties. Existing parking would be relocated south and expanded from an existing count of 90 stalls to a 143 stalls. Parking would be shared with the shopping center, but these smaller lots are aligned to be most accessible to the Sports Complex. The parking is considered “overflow” for the shopping center, used during peak retail seasons such as Christmas.

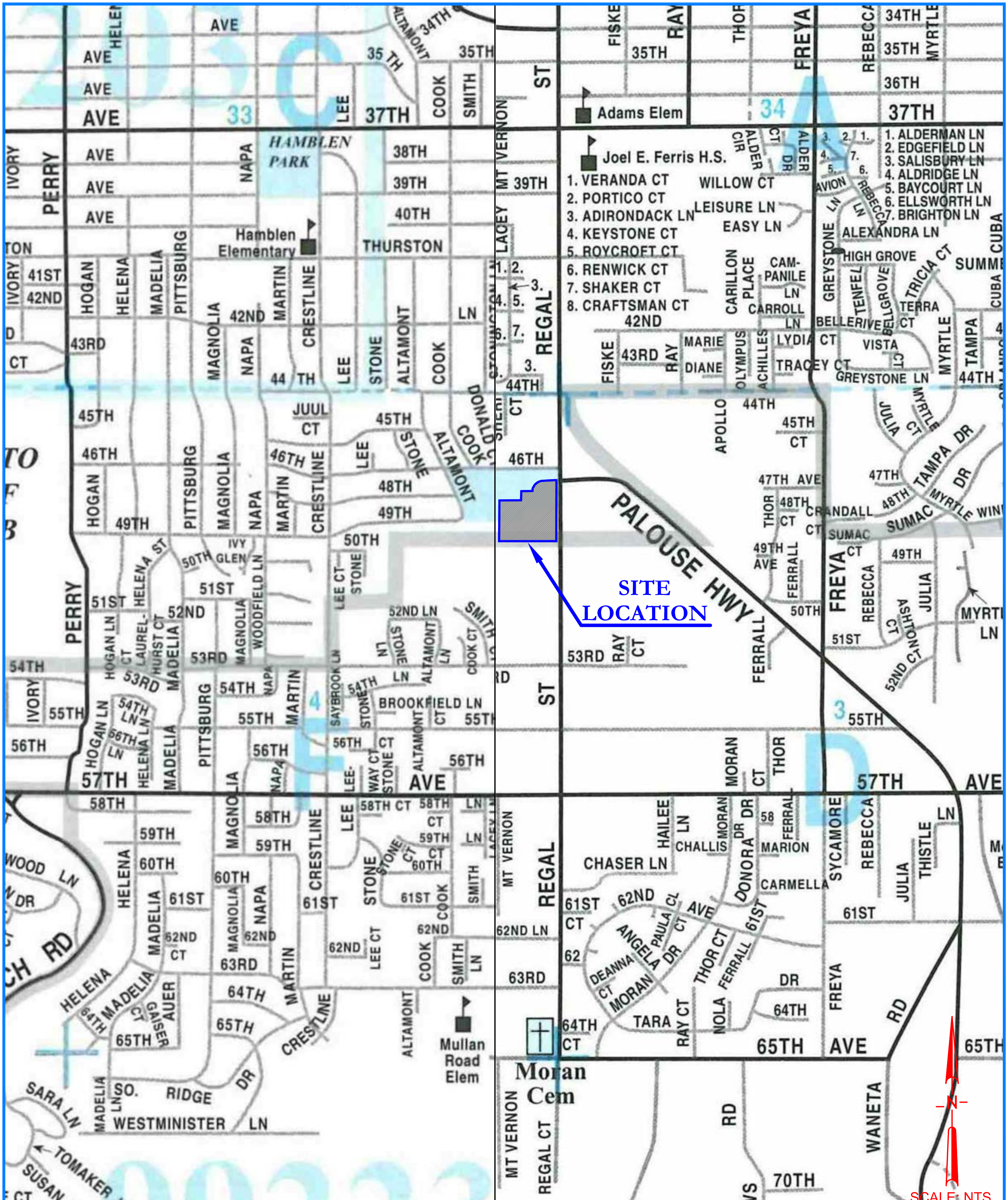
- **Boulevard Driveways.** Via a number of public meetings, citizens of the Southgate neighborhood surrounding Southgate-KXLY properties have requested a boulevard to be aligned along Regal Street adjacent to the site. This boulevard would provide for general parking needs, as no on-street parking on Regal Street is allowed, and also provide for quick access to/from pedestrian trails that are planned through the site. This boulevard would have separate inbound and outbound driveways providing access to and from a northbound to south one-way approach offset 30 feet from Regal Street. The inbound/north boulevard drive would be aligned about 60 feet south of Palouse Highway with the outbound/south boulevard drive aligned 400 feet further south, providing access to 26 parking stalls.
- **Central Shopping Driveway.** This driveway would be aligned central to the shopping center directly across from the southerly Target property driveway. The development team desires full access (i.e. turning movement) to/from the Southgate-KXLY site, if possible. This study evaluates potential full access at this location initially. This driveway provides access to the 544 parking stalls located within lots centralized to the site (separate from parking described previously).
- **South Shopping Driveway.** This driveway would be aligned along the southern boundary of the property approximately 100 feet south and opposite the Trestle Creek apartments driveway. The development team desires full access (i.e. turning movement) to/from the Southgate-KXLY site, if possible. This study evaluates potential full access at this location initially. This driveway also provides access to the 544 parking stalls located on lots centralized to the site (separate from parking described previously).

Overall about 713 parking stalls would be provided on the Southgate-KXLY shopping center site, including centralized, boulevard, and Sports Complex parking areas. Completion and occupancy should occur within a timeframe of the next 3 to 6 years (by year 2022). The project and site plan have been well vetted/coordinated with the Southgate Neighborhood Council and its constituents.

Figure 1 highlights the location of the Southgate-KXLY properties. **Figure 2** shows the most current site plan.

1.1.2 Project Background

A Comprehensive Plan amendment and zone change process was implemented by officials with KXLY (Spokane Radio, Inc.) for the 14.0-acre parcel in 2007 and 2008. The property historically held a Comprehensive Plan designation of “Residential 4-10” and zoning designation of residential single family (RSF). Following an administrative coordination/review process, Spokane City Council approved a Comprehensive Plan amendment for Centers & Corridors Core (CC Core) and zoning designation of Centers and Corridors 2 District Center (CC2-DC) in June of 2008. Subsequently, City officials have worked to establish these commercial land use designation’s (CC Core and CC2-DC) for the 1.96 acres Parks Department parcel, as approved by Council in November 2016. A conversion of ownership (for the City parcel) is anticipated to occur early in 2017, with the full property available for commercial improvement/development thereafter.



Morrison Maierle engineers • surveyors • planners • scientists	316 W. BOONE SUITE 360 Spokane WA 99201 Phone: (509) 991-8684 bwhite@m-m.net	DRAWN BY: WDW CHK'D. BY: APPR. BY: CJR DATE: 12-2016	SOUTHGATE-KXLY SHOPPING CENTER TRAFFIC OPERATIONAL STUDY SPOKANE WA SITE LOCATION	PROJECT NO. 3072013 FIGURE NUMBER 1

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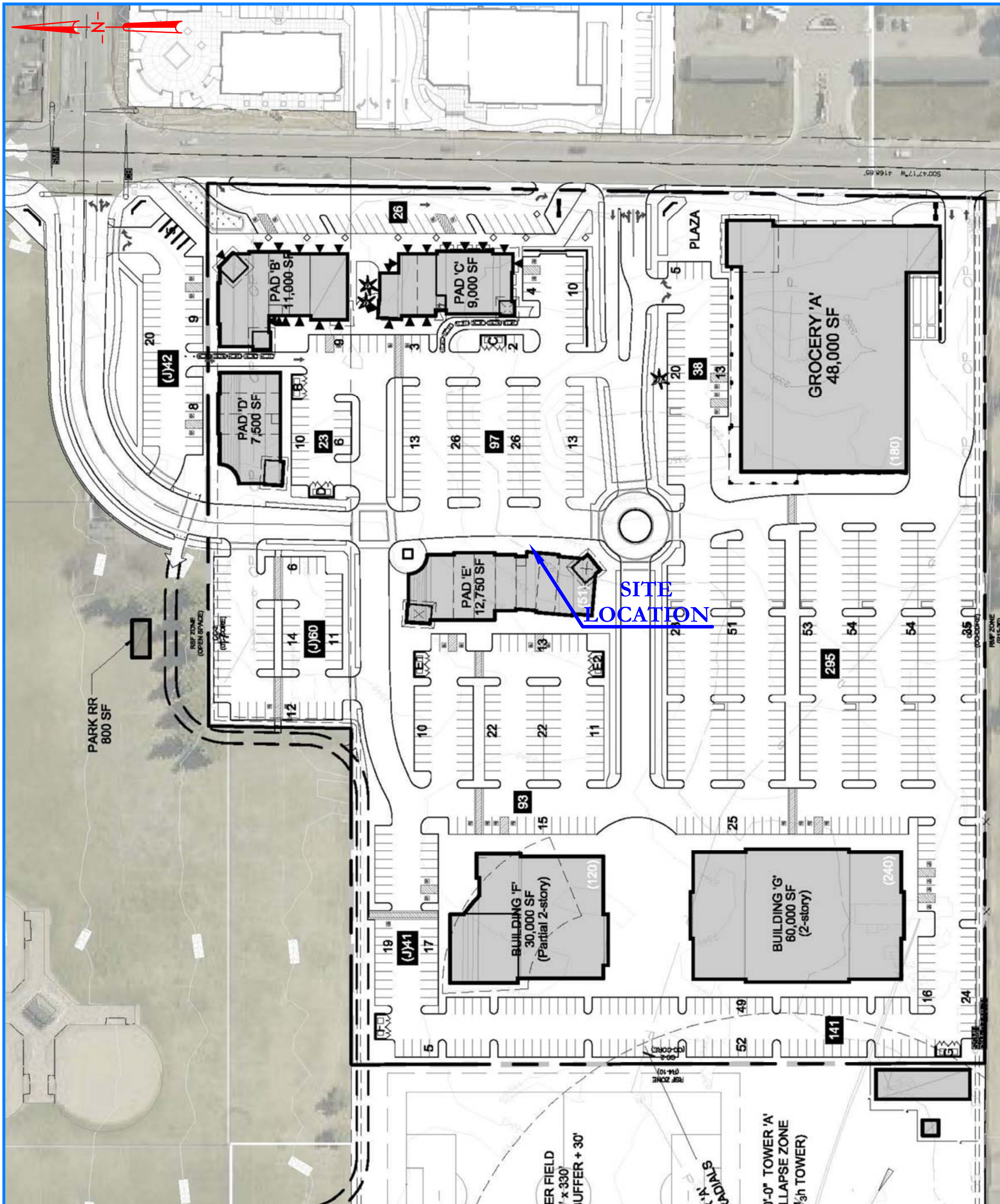

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SOUTHGATE-KXLY SHOPPING CENTER
TRAFFIC OPERATIONAL STUDY

SPOKANE WA

SITE PLAN
(SOURCE: BERNARDO-WILLS ARCHITECTS)

PROJECT NO.
3072013

FIGURE NUMBER
2

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The administrative process in support of the initial Comprehensive Plan and zone change process was extensive, resulting in a development agreement and contract between the City and KXLY (Spokane Radio, Inc.). The agreement specifies mitigating conditions for design, utilities, and roadways, as to help assure the City can provide sufficient sewer, water, and transportation infrastructure following development of the Southgate-KXLY commercial site, and also so City design standards and expectations of the Southgate Neighborhood Council are observed. The "Development Agreement KXLY" was prepared in 2008/2009, executed and notarized in 2009 (between the City and KXLY), and recorded by the City Clerk's office in 2010. The document also assures the Southgate Neighborhood Council was consulted, and largely agreed with, the resulting conditions of the development agreement as coordinated through a number of meetings.

Transportation expectations and conditions are a specific focus of the Development Agreement and are quite extensive. Conditions relevant to this Traffic Operational Study are as follows:

- The agreement would go into effect following execution of all parties (identified as 2009 above) and have a term of ten (10) years.
- Mitigating conditions are a function of a mitigated determination of non-significance (MDNS) under SEPA.
- Transportation mitigation will be addressed by a SEPA mitigation fee of $1,057.95 allocated per net new PM peak hour trip generated by the development.
    - Of this, $946.95 will be dedicated towards funded or unfunded transportation projects identified within the City Six-Year Comprehensive Street Program.
    - Of this, $111.00 would be dedicated towards "appropriate traffic mitigation projects", which could potentially include the Ray Street cross-over.
- The SEPA mitigation fee would be paid in the place of growth management act (GMA) traffic impact fees (which had not yet been finalized at the time).
- The SEPA impact fee would be required at individual stages of development prior to the issuances of a certificate of occupancy.
- The project proponent will provide net new trip generation estimates prior to occupancy so SEPA mitigation fee assessments can be determined.
- A reduction of SEPA mitigation fees or "credit" would be allowed for participation in improvements specified with the Six-Year Street Program, as occurring either via financial contribution or the direct construction of roadway improvements.
- Similarly, a reduction in SEPA mitigation fees or "credit" would be allowed for the value of any dedication of land for Six-Year Comprehensive Street Program improvements.
- The City may require an operational study and analysis of adjacent intersections to support site specific SEPA determination and building permit application.

An assessment of these conditions is as follows. This traffic operational study has been prepared to support the site specific SEPA and building determinations, as performed in accordance with current scope and methodology expectations of City officials. As discussed later, traffic forecasts were developed to address realistic development potentials of the area. However, the Southgate-KXLY development has standing/vestment to transportation capacity as of 2009, when the Agreement was executed, valid through year 2019.

Transportation mitigation has essentially been addressed per the development agreement via the SEPA mitigation fee, of which $946.95 per net new PM peak hour trip would be dedicated towards the City Street Program and $111.00 per net new PM peak hour trip would be dedicated towards unidentified mitigation. As site specific mitigation is not identified, the latter portion of the SEPA fee could go towards addressing project impacts within the City or County. It is noteworthy the agreed SEPA mitigation fee is 1.8 times higher than the GMA mitigation fee currently required by the City for new development projects, per net new PM peak hour trip.

KXLY officials have already expended $200,000 towards the construction of Regal Street/Palouse Highway signal with intersection improvements. This was an improvement listed with the City Street Program. Therefore, future SEPA mitigation should be offset by $200,000.

Trip generation will be validated with the staged/phased advancement of development, as precipitated with building permit application. An update of this traffic operational study may be needed if revised trip generation totals yield results that appear to exceed current thresholds highlighted in Section 3.2.3.

Previous Study. It should also be noted a Corridor Capacity Impact Analysis was performed initially to support the Comprehensive Plan amendment and zone change process, as prepared and finalized by USKH, Inc. in 2008. Transportation conditions for the Development Agreement were advanced largely based upon the conclusions of this Analysis.

The study reviewed the impact of Southgate-KXLY commercial development upon the arterial approach routes of 37th Avenue (Thor Street to Freya Street), Regal Street (37th Avenue to 57th Avenue), Palouse Highway (Regal Street to 57th Avenue), and Freya Street (37th Avenue to 57th Avenue). The SEPA fee of $1,057.95 per new PM peak hour trip was recommended and subsequently accepted by City officials as mitigation for project development and assurance for the provision/vestment of capacity for the development.

Other recommendations of the Corridor Capacity Impact Analysis include improvement of the Palouse Highway/Regal Street intersection with a roundabout or traffic signal, which was completed, and consideration towards widening Regal Street. Current designs show buildings set back sufficiently to accommodate potential widening of Regal Street; although City officials indicate they have no plans to widen the arterial at this time.

1.2 Scope and Methodology

This Traffic Operations Study quantifies the potential impacts of the development upon adjacent (or nearby) City and County arterials, recommends a site access strategy, and provides a SEPA mitigation fee appraisal based on the current site plan. This section describes the primary scope and methods used to evaluate traffic conditions and establish potential recommendations.

1.2.1 Project Scope

The study evaluates capacity primarily through an examination of intersection operations. Congestion and increased vehicle delays are experienced more rapidly at intersections versus road segments (between intersections) due to the number and frequency of conflicts (i.e. turning vehicles and stopping or slowing movements).

The scope for this study was established in coordination with City engineering officials. Per direction, this study quantifies traffic operations and capacity based principally on driveway and intersection level-of-service (LOS), as performed by direction for the intersections of:

- 44th Avenue/Regal Street
- Palouse Highway/Regal Street
- 57th Avenue/Regal Street
- Palouse Highway/Freya Street

Per the direction of City staff, the analysis was performed primarily for the PM peak/commute hours of the weekday, which is the highest hour of capacity demand within this area of Spokane. An existing AM peak hour analysis was also performed only for the 44th Avenue/Regal Street intersection, per the request of City officials. Overall, commercial/retail businesses tend to generate less traffic during the AM peak/commute hour, which is why this timeframe is typically not included in comparison to other land use developments (residential, office, etc.)

The forecast analysis horizon year for this study is 2022, which is the completion and final occupancy year of the proposed development. LOS analyses were also performed as a principal means for determining driveway geometrics as well.

1.2.2 Methodology, Intersection Capacity/Operations

Intersection delay, capacity, and traffic operations were evaluated using the level-of-service (LOS) procedures of the *Highway Capacity Manual* (Transportation Research Board, 2010). The *Highway Capacity Manual* (HCM) is a nationally recognized and locally accepted method of measuring traffic flow and congestion. Criteria range from LOS A, indicating free-flow conditions with minimal vehicle delay, to LOS F, indicating congestion with significant vehicle delays.

LOS for a signalized intersection is defined in terms of the average control delay experienced by all vehicles at the intersection, as measured over a specific time period (e.g., peak hour). LOS for a one or two-way stop-controlled intersection or driveway is the function of average control delays experienced by vehicles in a particular approach or approach movement over a given timeframe. Typically, the stopped approach or movement experiencing the worst LOS is reported. Finally, LOS at an all-way stop-controlled intersection is defined by the average control delays experienced by all vehicles at the intersection, as with signals, but the LOS thresholds are associated with delays for unsignalized intersections.

Table 1 outlines the LOS criteria for signalized and unsignalized intersections from the *Highway Capacity Manual*. LOS thresholds, as a function of delay, vary between signalized and unsignalized intersections. This is because driver tolerances for delay have been documented to be much higher at signalized versus unsignalized intersections.

Table 1. Intersection Level of Service Criteria

Level of Service	Signalized Control Delay (sec/veh)	Unsignalized Control Delay (sec/veh)
A	≤10	≤10
B	>10 – 20	>10 - 15
C	>20 – 35	>15 - 25
D	>35 – 55	>25 - 35
E	>55 – 80	>35 - 50
F	> 80	>50

Source: Highway Capacity Manual (TRB, 2010)

LOS were determined using Synchro Version 9.1, (Trafficware, 2015). This software tool can apply the analysis methodologies of HCM 2010 and is a standard industry software application.

LOS thresholds for the City of Spokane are highlighted by "Transportation Concurrency Level of Service Standards", which is an administrative policy and procedure document available from the City clerk's office. Section 5.2.1.3 indicates LOS E is the threshold for signalized intersections located within the established study area. Section 5.2.2 indicates LOS E is the operational threshold for movements at unsignalized intersections, which is also the standard site driveways.

1.2.3 Methodology, Vehicle Queues

Average and 95th percentile queue analyses were performed to provide guidance regarding turn pocket impacts for signalized intersections. Average queues are those most typically predicted to occur at an intersection with some frequency. 95th percentile queues represent near-maximum queue conditions predicted to occur only a few times during the peak hour. While it is not ideal to have 95th percentile queue potentials exceed turn lane/pocket storage length, it is acceptable so long as average queues can be accommodated. A turn lane/pocket issue is prevalent when average queues exceed storage length.

Queues are presented in terms of total "stacking" vehicles with the equivalent queue length provided in feet. For this study, an average length of 25-feet was used per vehicle, as recommended by the HCM, and via standard industry practices. This space includes the length of the vehicle plus spacing between vehicles. Queue determinations were provided using Synchro, which also bases evaluations on HCM methodologies.

1.2.4 Methodology, Lane Capacity

A lane capacity analysis was developed as a secondary method for evaluating traffic conditions, specifically for Regal Street. The lane capacity analysis was performed based upon peak hourly thresholds provided by the Year 2011-2035 Spokane Metropolitan Transportation Plan (SRTC, 2011). The Plan provides vehicle per hour per lane (vphpl) capacity thresholds distinguished by functional class and operating speed. According to this table, the best approximation of Regal Street is that of a 40 mph urban arterial with practical through capacity of 1,100 vphpl, or 2,200 vehicles per hour for the roadway.

Table 2.2 SRTC Regional Demand Model Street Typology

Street Type	Type Number	Capacity (vphpl)	Operating Speed
Rural Freeway	1	2000	70
Rural Local Street	9	500	25
I-90, SR 195 to Freya-NSC	10	1800	60
Urban Interstate	11	2000	60
Urban Expressway	12	2000	60
Urban Arterial	14	1100	40
Urban Arterial – CBD	15	900	30
Collector Arterial	17	900	35
Urban Arterial-CBD–One-way	18	800	30
Local Street	23	500	25
Neighborhood Collector	20	600	30
Ramps	50	1600	40
Rural Highways	52	1800	60
Urban Arterial Ramp	53	1000	50
I-90 Viaduct Ramp, SR 195-Freya	54	1200	40
Local Road	60	1000	25
Exclusive Light-rail Transit Link	66	1000	35
Fairchild AFB	99	500	25

Hourly Lane Capacity Thresholds (Source: SRTC)

Note these are capacity thresholds typically associated and used with the development of a forecast travel demand model and are not the primary means for evaluating capacities on city roadways. This secondary approach was provided only to help quantify overall road capacities given the limitations of intersection LOS analyses.

The conclusions of this operational study were derived primarily from intersection analyses and the methodologies of the HCM. Secondary conclusions were derived from lane capacity analyses and queuing conditions.

2 EXISTING CONDITIONS

This section describes existing conditions for the project study area. Described is the existing roadway network, current traffic volumes, and traffic operation and capacity conditions (LOS, queues, and road capacity).

2.1 ROADWAY NETWORK

This study considers intersection capacities in relation to four City and County arterials and one City collector. A description of these roadways is as follows:

- Regal Street is a *minor arterial* extending north-south between 29th Avenue and 65th Avenue with the City and Spokane County (City-County boundary approximately 1,000 feet south of Palouse Highway). The roadway has a three-lane cross section adjacent to the Southgate-KXLY site with sidewalk, curb, and gutter. The roadway supports about 19,300 average daily traffic (ADT) north of Palouse Highway and 15,900 ADT south, according to the 2016 City traffic flow map. The posted speed limit is 30 mph within the City and 35 mph within Spokane County.
- Palouse Highway is a *minor arterial* extending southeast from Regal Street roughly 12 miles to terminate at State Route 27. Approximately 3,200 feet of the roadway is aligned within the City with the remainder in Spokane County. The roadway predominantly has a two-lane cross section with five-foot paved shoulders within the study area; however, a three-lane section with curb, gutter, and sidewalk is aligned just east of Regal Street adjacent to shopping centers. The posted speed limit is 35 mph. The 2016 City traffic flow map indicates the roadway supports 4,200 ADT near Regal Street.
- 57th Avenue is a minor arterial that extends over two miles between Hatch Road and Glenrose Road within Spokane County. The three lane roadway is bordered with curb, gutter, and sidewalk. The posted speed limit is 35 mph. The Spokane County traffic count web portal indicates the arterial supports 13,100 ADT west and 11,200 ADT east of Regal Street.
- Freya Street is a principal arterial that extends north-south five miles between Freya Way/Greene Street and 65th Avenue. The majority of the arterial is aligned within the City with approximately ¾-mile in Spokane County. The roadway has a two lane cross-section with three-foot paved shoulders. The street has a posted speed limit of 25 mph south and 35 mph north of Palouse Highway and supports about 8,200 ADT according to the 2016 City traffic flow map.
- 44th Avenue is a City collector street that extends over a mile between Napa Street and Freya Street. The majority of the roadway is bordered with sidewalk, curb, and gutter and has a posted speed limit of 25 mph. The 2016 City traffic flow map indicates the roadway supports about 3,100 ADT east of Regal Street.

As indicated, four intersections were considered for this study per the direction of City of Spokane officials. A summary of intersection geometrics and traffic control conditions is provided on the following pages.

44th Avenue/Regal Street

A four-leg intersection controlled by a traffic signal. Left-turn lanes are aligned on all approaches with right-turns performed from shared, through lanes. There is a single northbound through lane and two-southbound through lanes at the intersection. The two southbound lanes merge within 200 feet (south) of 44th Avenue. Because of this, 85 percent of through traffic uses the inner/east through lane to travel through the intersection.

The signal operates with north-south protected-permitted phasing for left-turns and east-west movements have permitted left-turn phasing. This signal is maintained by the City of Spokane.

Palouse Highway/Regal Street

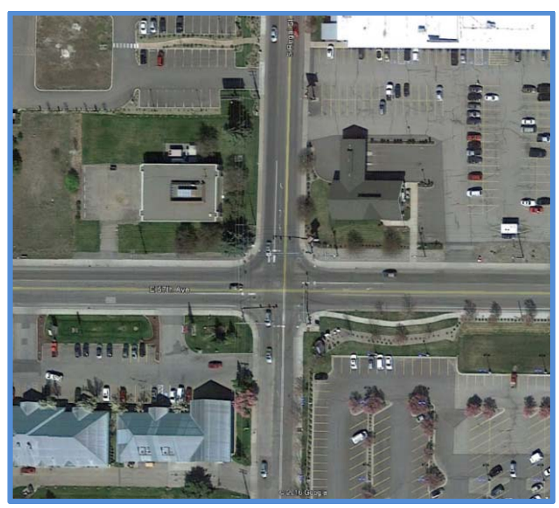
A four-leg intersection controlled by a traffic signal. Left-turn lanes are aligned on all approaches. A designated right-turn lane is aligned within the westbound approach (east leg) of the intersection. All other right-turns are performed from shared, through lanes. The west leg of the intersection would be extended and realigned to accommodate Southgate-KXLY access.

The signal operates with protected-permitted phasing on all approaches to the intersection. This signal is maintained by the City of Spokane.

57th Avenue/Regal Street

A four-leg intersection controlled by a traffic signal. Left-turn lanes are aligned on all approaches with right-turns performed from shared, through lanes.

The signal operates with north-south permitted phasing and east-west protected phasing. This signal is maintained by the Spokane County.



Palouse Highway/Freya Street

A four-leg intersection. All approaches/legs to the intersection are stop-controlled. Left, through, and right-turn movements are performed from shared lanes on all approaches.

This intersection is maintained by the City of Spokane.

2.2 Traffic Counts

The ADT counts obtained and reported for this study were obtained from City of Spokane and Spokane County via traffic flow maps and webpages. Turning movement counts were performed in year 2014 through 2016. The source of counts and month/year collected is as follows:

- 44th Avenue/Regal Street, Spokane Street Department Count 6/2015
- Palouse Highway/Regal Street, Morrison-Maierle Count 10/2016
- 57th Avenue/Regal Street, Sunburst Engineering 7/2014 (provided by City)
- Palouse Highway/Freya Street, Sunburst Engineering 8/2015 (provided by City)

Counts were performed in the evening between 4:00 PM and 6:00 PM to identify the PM peak/rush hour of commute traffic, upon which this study is based. A review of AM peak hour conditions was developed for the 44th Avenue/Regal Street intersection, per the direction of the City, with counts performed between 7:00 and 9:00 AM. The peak hour was reviewed for each intersection, as opposed to a unilateral peak, to assure a conservative analysis of capacity demands.

Figure 3 shows existing intersection traffic volumes for the study area. Turning movement count summary sheets are provided in Section B of the Technical Appendix.

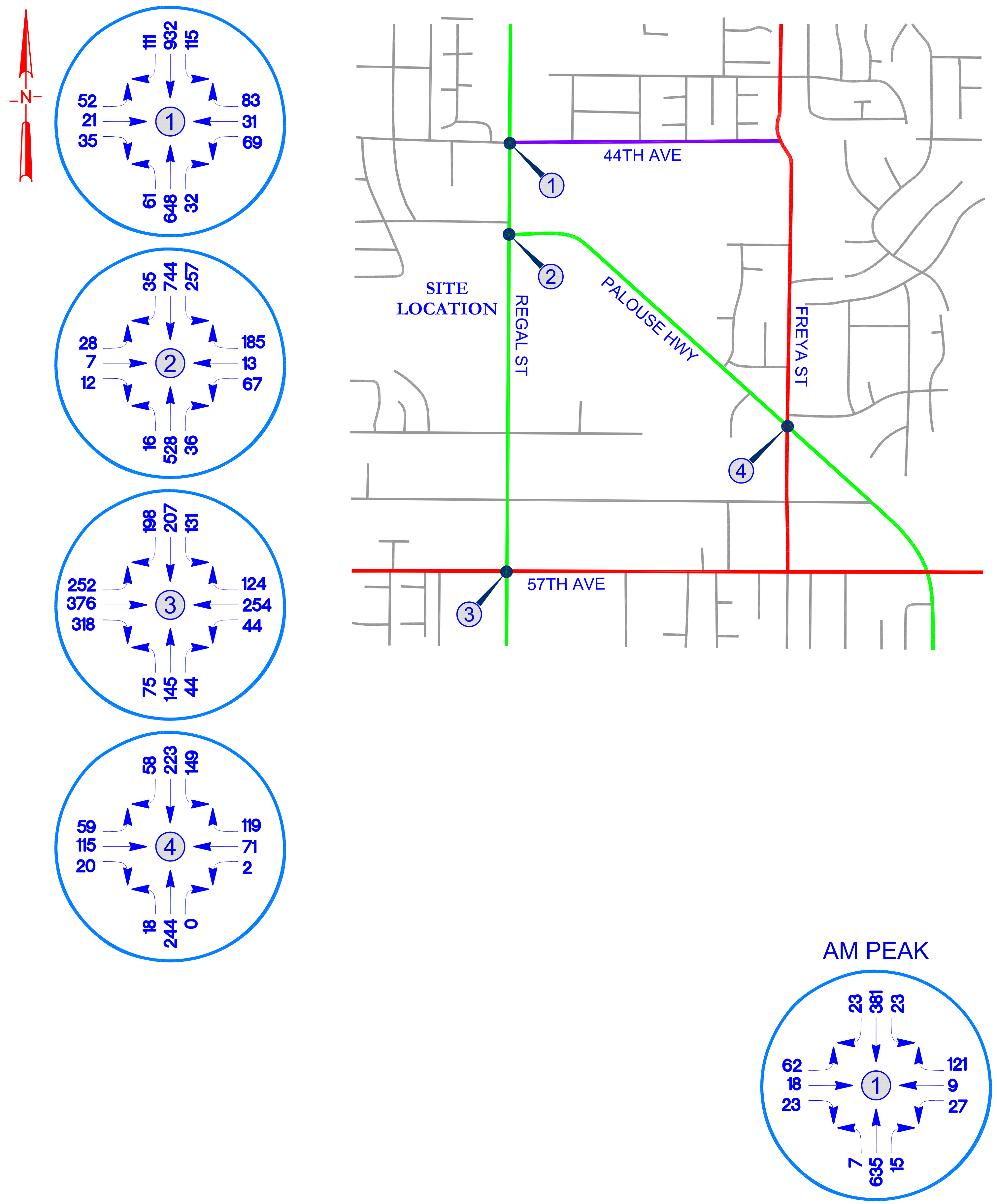
2.3 Traffic Capacity & Operations

This section summaries traffic capacities and operations for the study area. Provided are a review of existing LOS, queues, and capacity for Regal Street.

2.3.1 Intersection LOS

The LOS analysis was performed for study intersections based on a review of the traffic volumes summarized in Section 2.2 and the geometric conditions described in Section 2.1. Signal timing data was provided by City of Spokane and Spokane County staff via timing cards. City timing plan 3/3/3 was used for the PM peak hour (1/1/1 AM peak hour), per hourly and weekday time codes provided with the card. The County plan was simply one identified for the PM peak hour.

Table 2 provides summary of LOS for PM peak. Also shown are average control vehicle delays. Again, LOS and control delays are the function of all movements for a signalized intersection and all-way stop. They are the function of the worse approach/movement for a one or two-way stop.



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SOUTHGATE-KXLY SHOPPING CENTER
TRAFFIC OPERATIONAL STUDY

SPOKANE WA

PROJECT NO.
3072013

EXISTING TRAFFIC VOLUMES
PM PEAK HOUR

FIGURE NUMBER
3

C:\Users\bwhite\Documents\Projects\3072013 - BWA Southgate-KXLY\CAD\Southgate_Figures_Dec2016.dwg Plotted by bill white on Dec/23/2016

Table 2. Existing Summary LOS, PM Peak Hour		
Signalized Intersection	LOS	Delay
44th Avenue/Regal Street	B	15.2
Palouse Highway/Regal Street	C	28.0
57th Avenue/Regal Street	C	33.5
All-Way Stop	LOS	Delay
Palouse Highway/Freya Street	C	18.5

As shown, all intersections function within acceptable LOS ranges during the PM peak hour. This means study intersections have sufficient capacity to accommodate existing PM peak hour traffic. LOS summary worksheets are provided in Section C of the Technical Appendices.

44th Avenue/Regal Street, AM Peak Hour. The analysis for this intersection during the AM peak hour indicates LOS B with 14.9 seconds of average control delay. This indicates acceptable conditions with adequate intersection capacity available during the AM peak hour. As the resultant LOS and average control delay is comparable to that performed for the PM peak hour, no further LOS analysis was warranted under forecast conditions for the AM peak hour. Southgate-KXLY trip generation will be substantially reduced during this study period, as compared to the PM peak hour, thus project impacts will be diminished (even negligible).

2.3.2 Vehicle Queues

Summary queue conditions are provided in **Table 3** for the PM peak hour. Again, queues are represented in terms of vehicle demands versus vehicle storage. A sense of length impacts is determined roughly by multiplying vehicles times an industry spacing standard of 25 feet.

Table 3. Existing Summary Queues, PM Peak Hour			
Signalized Intersection	Vehicle Storage	PM peak Hour Queues	
		Average	95%
44th Avenue/Regal Street			
- Northbound Left-Turn Lane	4 vehicles[1]	1 vehicle	1 vehicle
- Southbound Left-Turn Lane	4 vehicles[1]	1 vehicle	2 vehicles
- Eastbound Left-Turn Lane	4 vehicles	1 vehicle	3 vehicles
- Westbound Left-Turn Lane	4 vehicles	2 vehicles	4 vehicles
Palouse Highway/Regal Street			
- Northbound Left-Turn Lane	3 vehicles[1]	1 vehicle	1 vehicle
- Southbound Left-Turn Lane	8 vehicles	1 vehicle	3 vehicles
- Eastbound Left-Turn Lane	2 vehicles	1 vehicle	2 vehicles
- Westbound Left-Turn Lane	6 vehicles	2 vehicles	3 vehicles
- Westbound Right-Turn Lane	10 vehicles[2]	1 vehicle	2 vehicles
57th Avenue/Regal Street			
- Northbound Left-Turn Lane	4 vehicles[1]	1 vehicle	3 vehicle3
- Southbound Left-Turn Lane	4 vehicles[1]	2 vehicles	5 vehicles
- Eastbound Left-Turn Lane	6 vehicles[1]	6 vehicles	10 vehicles
- Westbound Left-Turn Lane	4 vehicles[1]	1 vehicle	3 vehicles

1. Transitions into a two-way left-turn lane, so additional capacity available.
2. Transitions into a through lane, so additional capacity available.

As shown, average queues are accommodated within available turn lane/pocket lengths, which represent acceptable or tolerable conditions. 95th percentile queues are noted to extend beyond capacity/storage within the southbound and eastbound left-turn lanes at the 57th Avenue/Regal Street intersection.

Again, 95th percentile queue conditions only occur a few times during the peak hour. Thus, while it is not ideal to have 95th percentile queue potentials exceed lane/pocket storage, it is tolerable as average queues can be accommodated. It should also be noted both lanes transition into two-way left-turn lanes. Thus, left-turn overflow capacity is available given these center left-turn lanes.

44th Avenue/Regal Street, AM Peak Hour. No queue issues were noted during the AM peak hour as average and 95th percentile queues were accommodated within available lane/pocket storage lengths at study intersections.

2.3.3 Regal Street Lane Capacity

Lane capacities were considered along for Regal Street for three locations: 1) north of 44th Avenue, 2) north of Palouse Highway, and 3) south of Palouse Highway. Turning movements along Regal Street at 44th Avenue and Palouse Highway cause sufficient enough changes in roadway volumes to warrant review of these locations.

As indicated, a practical lane capacity is 1,100 vphpl as based on information provided by the SRTC, for a total roadway capacity of between 2,200 and 3,300 vphpl. A summary of existing approach counts versus capacity is provided in **Table 4** for the PM peak hour only.

Table 4. Existing Summary Lane Capacities, PM Peak Hour

	Available Capacity			Traffic Volumes		
Regal Street @	NB	SB	Tot	NB	SB	Tot
North of 44th Avenue	1,100	2,200	3,300	785	1,160	1,945
North of Palouse Highway	1,100	1,100	2,200	740	1,035	1,775
South of Palouse Highway	1,100	1,100	2,200	580	825	1,405

As shown, lane capacities are currently sufficient to accommodate existing PM peak hour traffic volumes. It should be noted though that available lane capacity is almost fully utilized in the southbound direction on Regal Street between 44th Avenue and Palouse Highway. The merge results in a one-lane capacity with high traffic volumes counted prior to traffic dispersing at retail shopping centers and the Palouse Highway intersection.

44th Avenue/Regal Street, AM Peak Hour. A northbound volume of 820 and southbound volume of 430 was counted north of this intersection, for a total road count of 1,230. A northbound volume of 660 and southbound volume of 430 was counted south of the intersection, for a total road count of 1,090. These demands are within the lane and roadway capacity parameters shown above, indicating adequate capacity for the AM peak hour.

Comparatively, roadway volumes are 40 percent less in the AM peak hour versus what was counted for the PM peak hour. In addition, the peak directional demands of the northbound lane during the AM peak hour versus the southbound lane in the PM peak hour are also substantially less (also reduced 40 percent or more). This comparison confirms the PM peak hour as the appropriate timeframe for future analyses, given roadway volumes and project trip generation potentials are significantly less during the AM peak hour.

2.4 TRANSIT & PEDESTRIANS ACTIVITIES

Spokane Transit Authority (STA) maintains one fixed bus route on Regal Street adjacent to the site. Route "45 Regal" circulates between 57th Avenue and downtown Spokane via Regal Street, Southeast Boulevard, Perry Street, Arthur Street, and the 2nd Avenue/3rd Avenue couplet. The route operates on a 15 to 30-minute headway between 6:00 AM to 11:00 PM throughout the majority of the weekday. The route operates on an hourly headway between 6:00 AM and 7:00 PM on weekdays and holidays. Transit stops are located at 46th Avenue and the Trestle Creek Apartments driveway within the project vicinity. Notable stops along the route include the downtown Plaza and the South Hill Park & Ride.

Sidewalk is available along both sides of Regal Street throughout the study area. A marked and controlled crossing is provided with the signalized Palouse Highway/Regal Street intersection. There is currently no bike accommodation along Regal Street with the project vicinity.

3 FORECAST CONDITIONS

This section summarizes year 2022 future traffic conditions. Described are future roadway network changes, future traffic volumes, and forecast traffic operations and capacity (LOS, queues, and road capacity). Year 2020 was selected for analysis to be consistent with the ultimate building and occupancy year of the project.

3.1 ROADWAY NETWORK

Currently programmed and funded improvement projects are highlighted for the study area via a document entitled City of Spokane 2017-2022 Six Year Comprehensive Street Program. Two funded improvement projects are identified within the project vicinity, summarized as follows:

- **37th Avenue, Regal to East City Limits.** Includes the reconstruction of the roadway to current City of Spokane design standards, including separated sidewalks, left-turn pockets, bike lanes, stormwater facilities, and a new water line. The project will positively affect existing vehicle travel at intersections as well as provide for pedestrian and bicycle travel. However, no change in vehicle travel patterns or capacity is anticipated within the project study area as a result of this improvement.
- **Havana Street, 57th Avenue to 37th Avenue.** Includes the installation of a 36-inch water main, resurfacing of roadway, and installation of water service lines. The project will enhance bicycle travel. No change in vehicle travel patterns or capacity is anticipated within the project study area as a result of this improvement.

Both projects highlighted will improve comfort and safety for existing roadway users, but should not result in a shift or change in travel or capacity conditions. The document also identifies unfunded improvement projects that would be promoted as a function of the City Transportation Impact Fee program, with projects within reasonable proximity of Southgate-KXLY as follows:

- **37th/Freya Intersection.** Construct traffic signal or roundabout.
- **37th Avenue Roadway.** Construct three lanes and upgrade to arterial standards, Regal Street to Freya Street.

Neither project would either have much of an impact upon travel conditions and traffic conditions within the study area, even if projects were funded. Given these determinations, forecast traffic operations and capacity analyses were performed assuming existing roadway and intersection geometrics and traffic control conditions.

Site Access. The central Southgate-KXLY access will be aligned opposite an existing Target Driveway, having potential for high traffic conflict. As a result, three access scenarios were reviewed to determine various impacts of different access configuration/channelization on Regal Street at this driveway location. The three access scenarios for this drive include:

1. Full Access. Right and left-turn movements allowed between the site and Regal Street.
2. Three-quarter Access. Outbound left-turns restricted, but inbound left-turns allowed.
3. RIRO Access. Driveway access would be limited to right-in and right-out turns only.

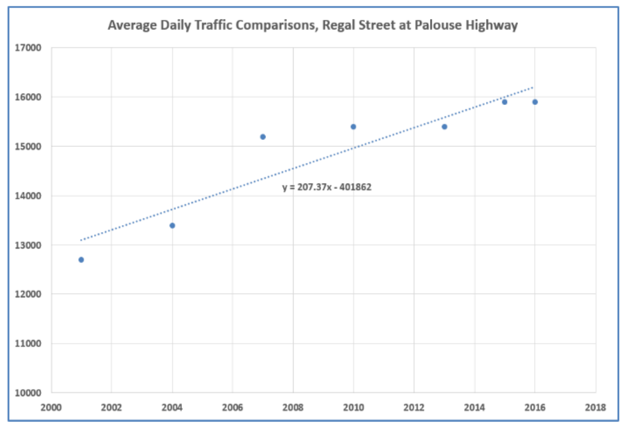
Finally, eastbound approach (west leg) of the Palouse Highway/Regal Street intersection will be extended 200 feet with the development proposal, allowance for the storage of additional queued vehicles.

3.2 Traffic Forecasts

Year 2022 traffic forecasts were comprised of baseline growth, the trips generated by other vested, but yet to be constructed developments, and trips generated by the Southgate-KXLY site.

3.2.1 Baseline Forecasts

Baseline traffic growth refers to the increase of through traffic not typically associated with development of projects within the project study area, as determined using annual traffic growth rates. These growth rates were established based on historical year 2001 to 2016 ADT counts available for Regal Street adjacent to the site, as shown via historical City of Spokane Traffic Flow maps. A trend-line analysis (shown right) indicates traffic has been increasing along the arterial at a 1.4 percent annual growth rate. This growth reflects significant residential and commercial development within the region. Thus, the goal was to develop future without project forecasts that are conservatively high, but don't significantly exceed historical growth trends. This assures capacity constraints are well vetted, but does not highlight the need for unnecessary roadway improvements.



Based on this analysis, a 0.5% annual growth rate was applied to counts to forecast 2022 baseline traffic. When combined with pipeline trips assignments (described next section), a 1.8 percent annual growth rate is achieved when counts are compared to year 2022 future without project traffic forecasts. This resultant growth rate is conservative but not excessive.

3.2.2 Pipeline Projects

Per coordination with agencies, the trips generated by six vested land use projects, known as pipeline projects, were addressed with this study. These projects have been approved by the City of Spokane, but are in the process of being developed. As such, the trips generated by these projects are not yet recorded in counts and need to be addressed in forecasts as they have rights to future capacity. A summary of pipeline projects are as follows:

- **Ben Burr Apartments.** The project includes the development of 64 apartments aligned south of 57th Avenue and east of Palouse Highway. The project would generate 44 PM peak hour trips with 50 percent anticipated along Palouse Highway to Freya Street, 10 percent onward to the Regal Street, and 15 percent along Regal Street north of Palouse Highway. Traffic data was obtained from the *Trip Generation & Distribution Letter for the Benn Burr Apartments* (DCI, 2015).
- **Commons on Regal Phase 1.** Phase 1 anticipates the development of two fast food restaurants on Regal Street between 53rd Avenue and 55th Avenue. The restaurants would generate 49 net new trips with 60 percent anticipated to/from the north and 40 percent to/from the south on Regal Street. Traffic data was resourced from the Proposed *Commons on Regal Traffic (Trip) Generation and Distribution Letter* (WCE, 2016).
- **Maverick.** A convenience store with 10 fueling positions anticipated for development northeast of the 44th Avenue/Regal Street intersection, replacing a 500 s.f. expresso stand. Using the Trip Generation Manual (ITE, 2012), there is a net gain of 71 new PM peak hour trips over the expresso stand. 85 percent of trips were assigned to 44th

Avenue/Palouse Highway with the remainder via a Regal Street drive. 50 percent of new trips are anticipated to/from the north and 50 percent to/from the south on Regal Street.

- **Palouse Trail Apartments.** The project includes the development of 114 apartments aligned south of Palouse Highway approximately ¼ mile east of Regal Street. The project was forecast to generate 71 PM peak hour trips; however, about 40 percent of apartments are constructed and occupied. Thus, about 43 trips were assigned to the street system with 60 percent of project trips distributing to/from the Palouse Highway/Regal Street intersection and 40 percent distribution to/from the Freya Street/Palouse Street intersection. Traffic data was obtained from *Threshold Traffic Study for Palouse Trail Apartments* (Sunburst Engineering, 2015).
- **Summit Ridge Apartments.** Includes the construction of 240 apartments aligned between 53rd Avenue and 55th Avenue ¼ mile east of Regal Street. The project would generate 149 PM peak hour new trips with 35 percent anticipated to/from the north and 15 percent to/from the south on Regal Street. The remaining 40 percent would approach and depart the project site via Freya Street. Traffic data was obtained from the *Summit Ridge / Pine Rock Apartments Traffic Impact Analysis* (Sunburst Engineering, 2015).
- **Swartout Retail.** This shopping center is aligned within the southwest quadrant of the 55th Avenue/Regal Street intersection. About 80 percent of the 24,500 s.f. shopping center has been developed and occupied. According to the ITE Trip Generation Manual, the remaining 20 percent of undeveloped/unoccupied facilities will generate 18 driveway and 12 new PM peak hour trips. Approximately 50 percent of new trips are anticipated to/from the north and 50 percent to/from the south on Regal Street.

Figure 4 provide a summary of total PM peak hour pipeline project trip assignments. These trips were combined with baseline forecasts to generate future without project traffic volumes, as shown on **Figure 5**. Individual pipeline trips assignments are provided in Section D of the Technical Appendices.

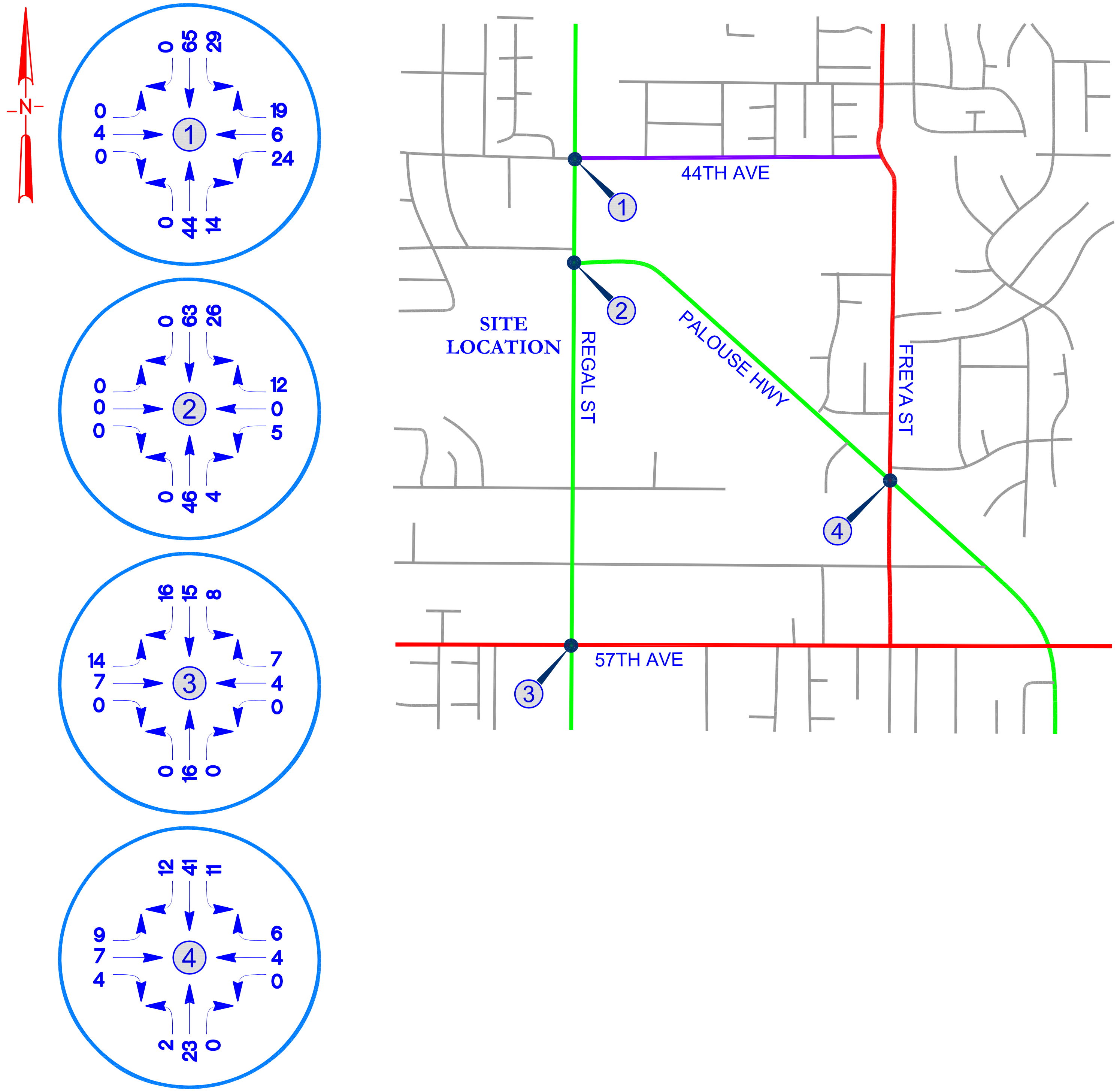
The pipeline projects highlighted above help develop accurate forecasts, upon which traffic capacities are reviewed. However, the Southgate-KXLY property predates these developments given the term conditions of the development agreement discussed in Section 1.1.2.

3.2.3 Project Trips

Trip generation was forecast using the methodologies outlined in the Institute of Transportation Engineers (ITE) *Trip Generation Manual* (9th Edition, 2012). Trip Generation is a nationally recognized and locally accepted method for forecasting traffic potentials for a range of commercial, retail, and residential land uses. The forecasting methods were developed based on the survey of other existing land use developments located throughout the United States.

Total trip generation was determined based on ITE Land Use codes 820 and 850 for a shopping center and supermarket, respectively. A description of these uses/codes is as follows:

- **Shopping Center (ITE Code 820).** An integrated group of commercial establishments that is planned, developed, owned and managed as a unit.
- **Supermarket (ITE Code 850).** Free-standing retail stores selling a complete assortment of food, food preparation and wrapping materials, and household cleaning items, and can also include bakeries, automobile supply's, floral arrangements, pharmacies, etc.



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PIIPEPLINE PROJECT TRIPS
PM PEAK HOUR

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FIGURE NUMBER
4

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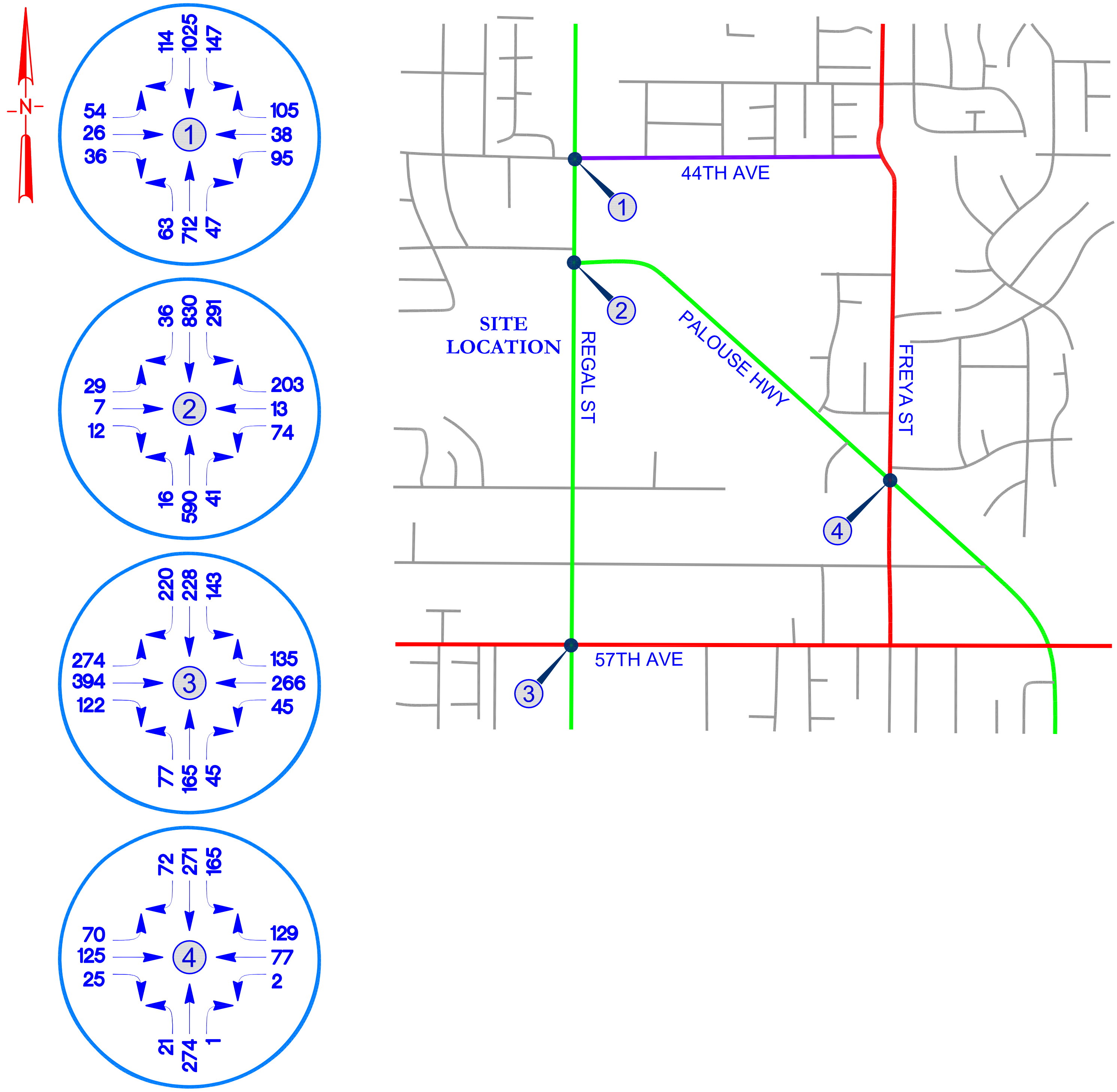

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SPOKANE WA

FUTURE WITHOUT-PROJECT
PM PEAK HOUR

PROJECT NO.
3072013

FIGURE NUMBER
5

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Trip generation was determined based on rates and equations that estimate trips according to the number of square-feet. These calculations yield total trips for the proposed development. However, not all trips generated by developments are new to the street system. Internal, diverted, and pass-by are terms used to describe trip types that make up total trips, as calculated from the rates and equations described above. A description of these trip types and applied calculations is described below as based on the ITE Trip Generation Handbook (3rd Edition 2014):

- **Internal Trip.** These trips travel between specific land uses of a multi-use development without using the principal roadway system as accomplished by local streets or through shared parking lots and internal approach ways. Internal trips are calculated according to procedures and rates provided in the ITE Handbook. Following this procedure, it was determined 10.5 percent weekday and 7.5 percent PM peak hour trips would be internal to the site. Internal trip capture is the first adjustment/step following total trip calculations.
- **Pass-By Trip.** These trips are made as a stop at the proposed land use in-route to another destination. The impacts of these trips are typically limited to turning movements at development access points as they redirect from adjacent street traffic. Pass-by trips are calculated according to rates provided within the ITE Handbook. Following this procedure, it was determined a resultant 35.1 percent of remaining weekday and PM peak hour trips would be pass-by, taken following the adjustment of internal trips.
- **Diverted Trips.** These trips are attracted from roadways (and competing land uses) beyond the adjacent street, but must divert to other roadways before approaching a project site. These trips have an impact on routes to/from the roadways from which they are diverted. Diverted trips were neglected for this study to assure a conservative analysis.
- **New Trips.** These are the trips that remain following the determination of internal, pass-by, or diverted trips. These have the highest impact to the street system because they represent a gain to both driveway and off-site traffic.

Total trip generation and various trip types were forecast for the typical weekday and PM peak hour assuming the construction a 45,000 s.f. supermarket and 129,050 s.f. of shopping center. A summary of trip forecasts are shown with **Table 5** for the weekday and peak hours.

Table 5. Proposed Trip Generation

Land Use	Units/Area	Weekday	PM Peak Hour		
			In	Out	Total
+ Supermarket (Code 850)	45,000 s.f.	4,600	218	209	427
+ Specialty Retail Center (Code 820)	129,050 s.f.	8,025	341	370	711
Total Trip Generation	174,050 s.f.	12,625	559	579	1,138
- *Internal Trip Capture*	--	*1,325*	*46*	*46*	*86*
Total Driveway Trips	--	11,300	513	533	1,052
- *Pass-By Trips*	--	*3,975*	*185*	*185*	*370*
Net New Trip Totals	--	7,325	328	348	682

Source: ITE Trip Generation Manual (9th Edition)

As shown, 12,625 total weekday trips and 1,138 PM peak hour trips are generated by the proposed Southgate-KXLY development. About 11,300 weekday and 1,052 PM peak hour trips would be generated at site driveways. Following pass-by adjustments, a total of 7,325 weekday and 682 PM peak hour trips are new and impact off-street roadways and intersections. These last trip totals are those upon which SEPA mitigation fees are determined, described Section 4.2, and are the threshold against which future trip generation scans are compared.

Note the Palouse Highway/Regal Street Commercial Centers, Corridor Capacity Impact Study (USKH, 2008), used to support the Comprehensive Plan amendment and zone change process, indicates the Southgate-KXLY development would generate 669 net new PM peak hour trips. This traffic operational study predicts net new trip totals that are within **2-percent** of projections previously anticipated by City planning and engineering officials for the property.

Trip Distribution and Assignment. The distribution of trips was estimated for the study arterials of Regal Street, Freya Street, 44th Avenue, Palouse Highway, and 57th Avenue. To forecast distributions, an imaginary cordon or screen line was assumed around study arterial approach and departure routes. Individual average daily traffic (ADT) counts, as obtained from City webpage's and County webpages, were then compared with total ADT volumes on this cordon line. Trip distributions were roughly proportioned to primary approach routes based on ADT comparisons. Finally, some manual and rounding adjustment was performed to account for knowledge of local travel patterns and travel times/distance. Trip distribution and assignment is shown with **Table 6** for the weekday and peak hours.

Table 6. Trip Distribution & Assignment

Location	ADT Comparison	Percent	Daily Assignment	PM Peak Assignment
Regal Street north of 44th Avenue	20,800	45%	3,290	307
Regal Street south of 57th Avenue	6,500	10%	735	69
Freya Street north of Palouse Highway	8,200	6%	440	40
Freya south of Palouse Highway	4,900[1]	2%	145	14
44th Avenue west of Regal Street	2,800[1]	3%	220	20
44th Avenue east of Regal Street	3,100	5%	365	33
57th Avenue west of Regal Street	13,100	15%	1,100	102
57th Avenue east of Regal Street	11,200	10%	735	69
Palouse Highway east of Freya Street	4,500	4%	295	28
Total Cordon ADT and Trips	75,100	100%	7,325	682

1. Estimated from PM Counts

Pass-by trips are diverted proportionately from adjacent street traffic. Counts indicate 60 percent of traffic is traveling southbound and 40 percent northbound on Regal Street during the PM peak hour. Pass-by were assigned to site driveways according to these directional travel distributions.

Access Scenarios. Three geometric scenarios were considered for the Southgate-KXLY central driveway. The distribution of trips to/from these driveways under these scenarios is as follows:

1. **Full Access.** About 34 percent of driveway trips were assumed at the Palouse, 45 percent central, and 20 percent south site access with the full access proposal for the central driveway. About 1 percent of site trips were assumed via the boulevard.
2. **Three-quarter Access.** About 39 percent of driveway trips assumed were assumed at Palouse, 36 percent central, and 24 percent south site access with a three-quarter access central driveway proposal. About 1 percent of site trips were assumed via the boulevard.

3. **RIRO Access.** Approximately 41 percent of driveway trips are assumed at Palouse, 30 percent central, and 28 percent south site access with a right-in, right-out only central driveway proposal. About 1 percent of site trips were assumed via the boulevard.

Project trips were assigned to study roadways based upon the distributions patterns identified throughout this section. The resulting intersection trip assignments are shown on **Figure 6** through **Figure 8** for the PM peak hour. Trip assignments and future without project traffic volumes were then combined to generate the year 2022 future with-project traffic forecasts shown on **Figure 9** through **Figure 11**.

The resultant annual growth rates well exceed historical trends. In fact, the traffic growth represented would actually take between 10 to 15 years to materialize given current historical trends. For this reason, traffic forecasts are expected to be conservative for the study area.

3.3 Traffic Capacity & Operations

This section summarizes forecast traffic capacities and operations for the study area. Provided are a review of year 2022 LOS, queues, and capacity for Regal Street.

3.3.1 Intersection LOStest

No road improvements or geometric changes were assumed for the study area. Existing signal timings were also assumed for the future analyses, although City engineering staff continuously works to optimize signal timings for a study area. **Table 7** provides summary of LOS for PM peak at study intersections. The LOS and delay results were generated for the future without-project condition and for the future-with project condition given the access scenarios stated above.

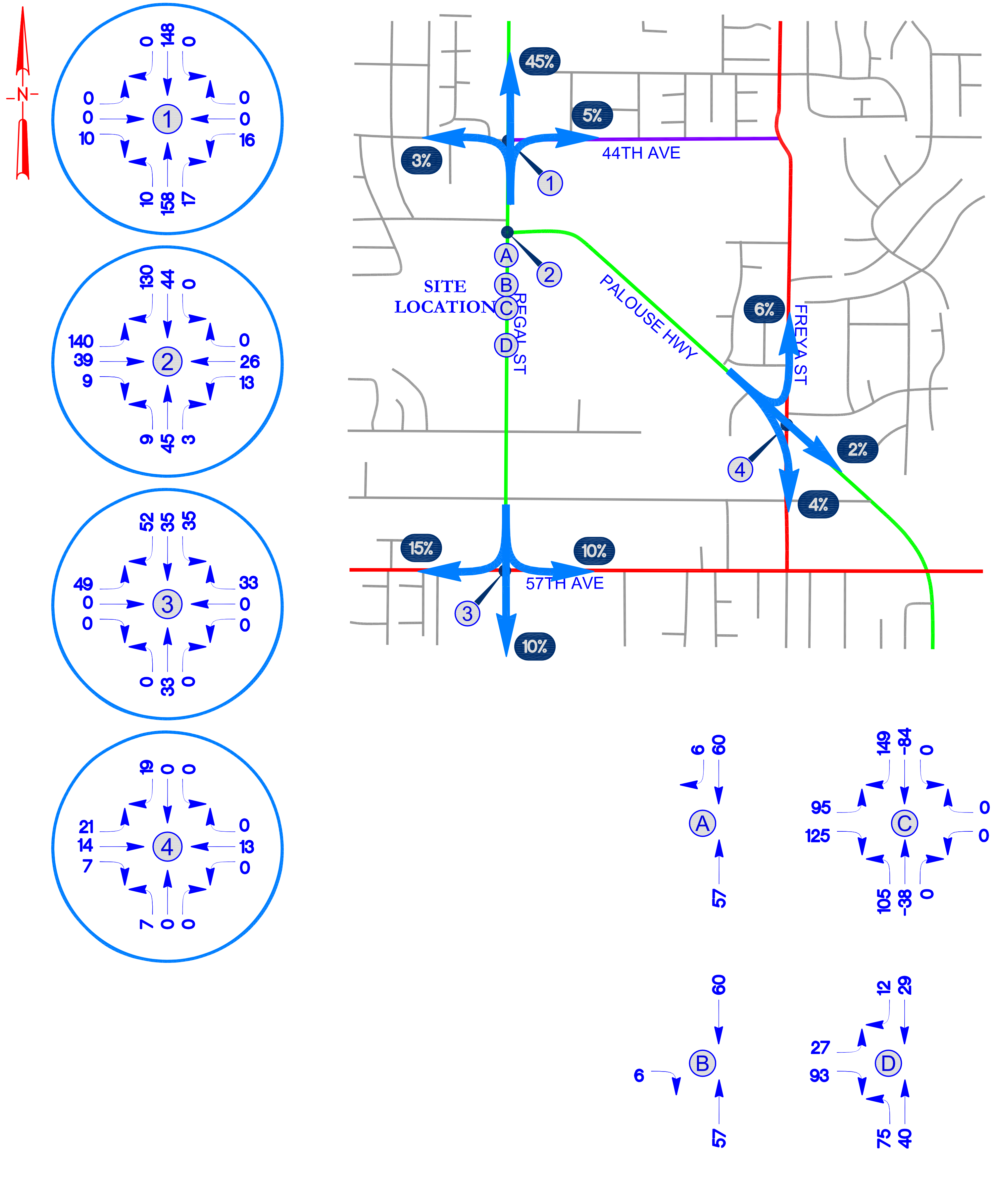
LOS and delay are also now shown for site driveways with outbound movements, as inbound movements typically have minimal control delay (and therefore inherently adequate LOS). Again, LOS and control delays are the function of all movements for a signalized intersection and all-way stop. They are the function of the worse approach/movement for a one or two-way stop.

LOS and delays for the eastbound movements for the Southgate-KXLY driveways.

Table 7. Year 2022 Summary LOS, PM Peak Hour

Condition	Without-Project		With-Project Full Access		With-Project Three-Quarter Access		With-Project RIRO Access	
Signalized Intersection	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
44th Avenue/Regal Street	B	17.8	C	21.4	C	21.4	C	21.4
Palouse Highway/Regal Street	C	29.4	D	42.6	D	43.4	D	46.4
57th Avenue/Regal Street	D	36.5	D	46.4	D	46.4	D	46.4
All-Way Stop	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Palouse Highway/Freya Street	E	35.2	E	47.4	E	47.4	E	47.4
Project Driveways	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Outbound Boulevard	--	--	C	18.8	C	18.8	C	18.8
Outbound Central Driveway	--	--	F[1]	>250[1]	D[1]	27.8[1]	D	27.0
Outbound South Driveway	--	--	D	29.9	E	40.1	E	49.7

1. Target Outbound Left Operates at LOS F



SOUTHGATE-KXLY SHOPPING CENTER
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SPOKANE WA

PROJECT TRIP ASSIGNMENTS, FULL ACCESS
PM PEAK HOUR

PROJECT NO. 3072013

FIGURE NUMBER 6

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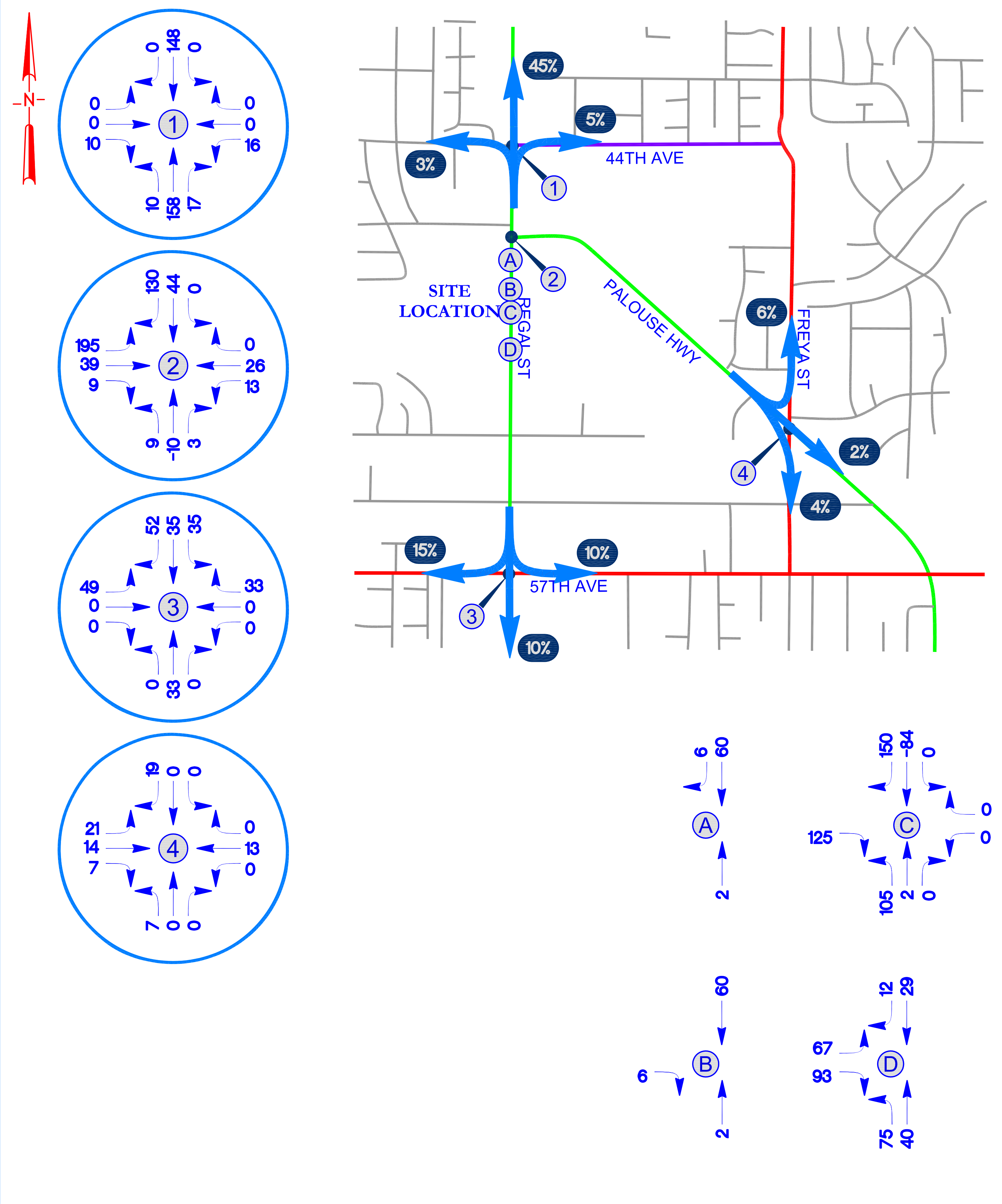

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SOUTHGATE-KXLY SHOPPING CENTER
TRAFFIC OPERATIONAL STUDY

SPOKANE WA

PROJECT TRIP ASSIGNMENTS, THREE-QUARTER PM PEAK HOUR

PROJECT NO.
3072013

FIGURE NUMBER
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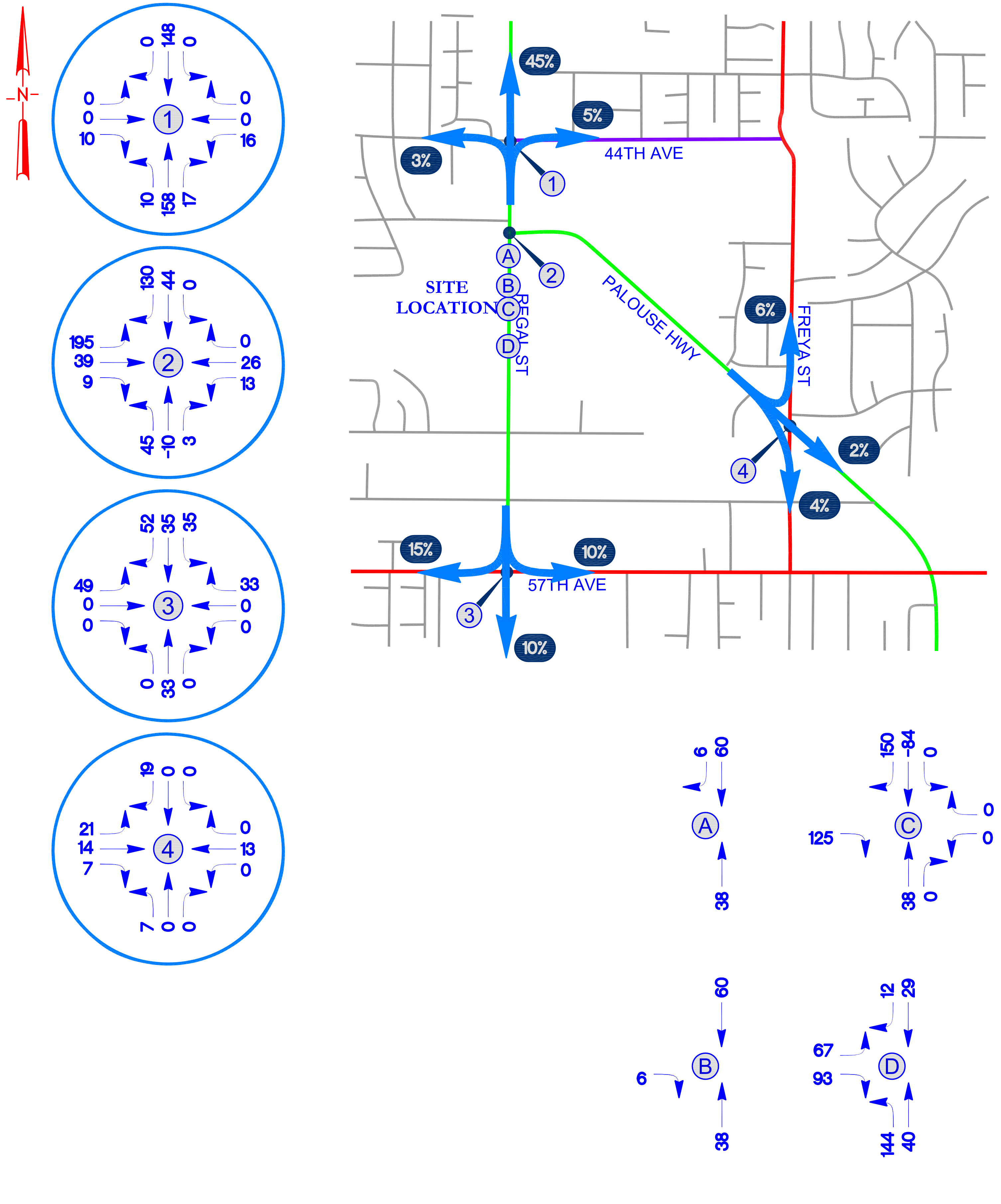

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TRAFFIC OPERATIONAL STUDY

SPOKANE WA

PROJECT TRIP ASSIGNMENTS, RIRO
PM PEAK HOUR

PROJECT NO.
3072013

FIGURE NUMBER
8

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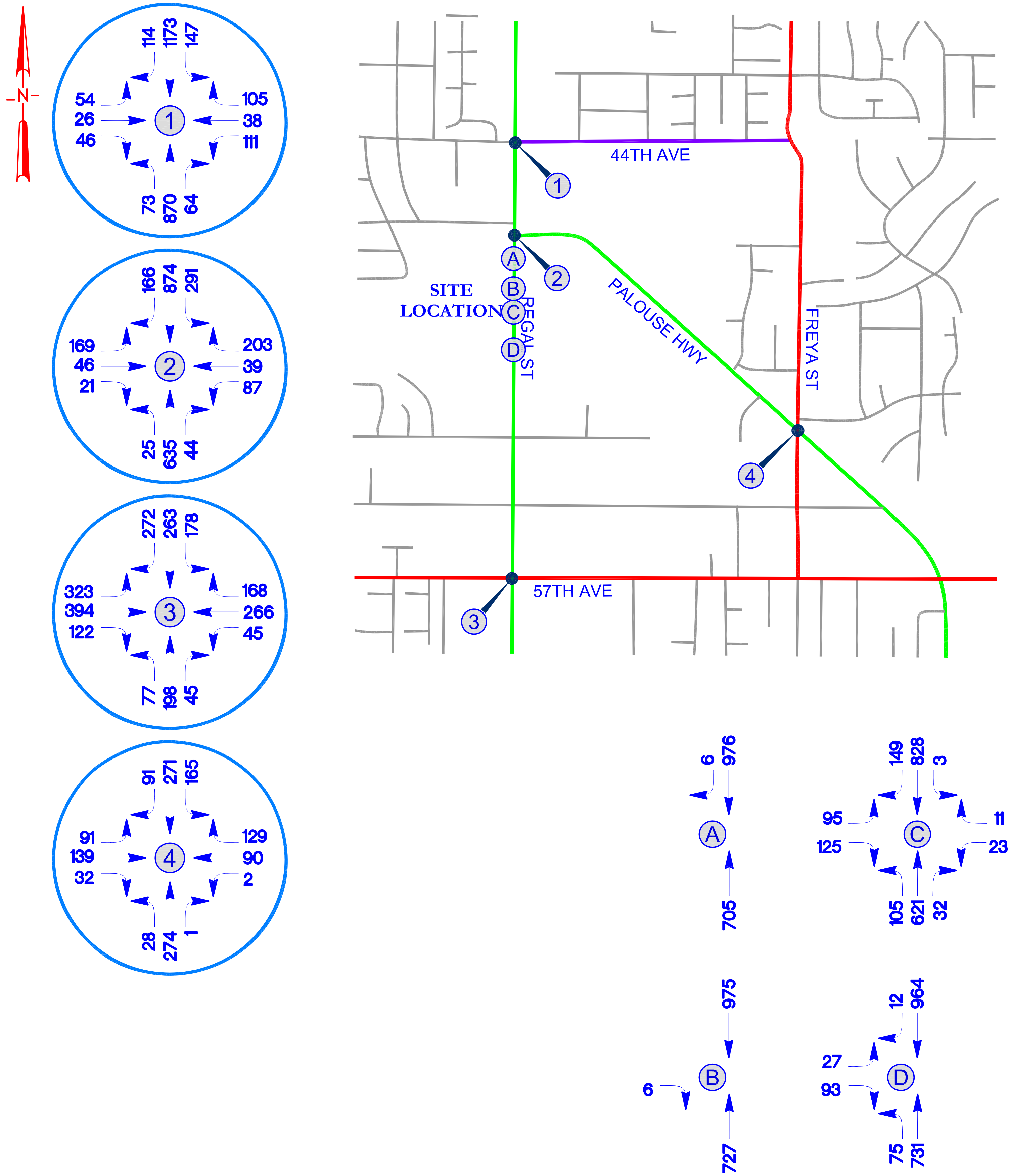

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SPOKANE WA

FUTURE WITH-PROJECT, FULL ACCESS
PM PEAK HOUR

PROJECT NO.
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FIGURE NUMBER
9

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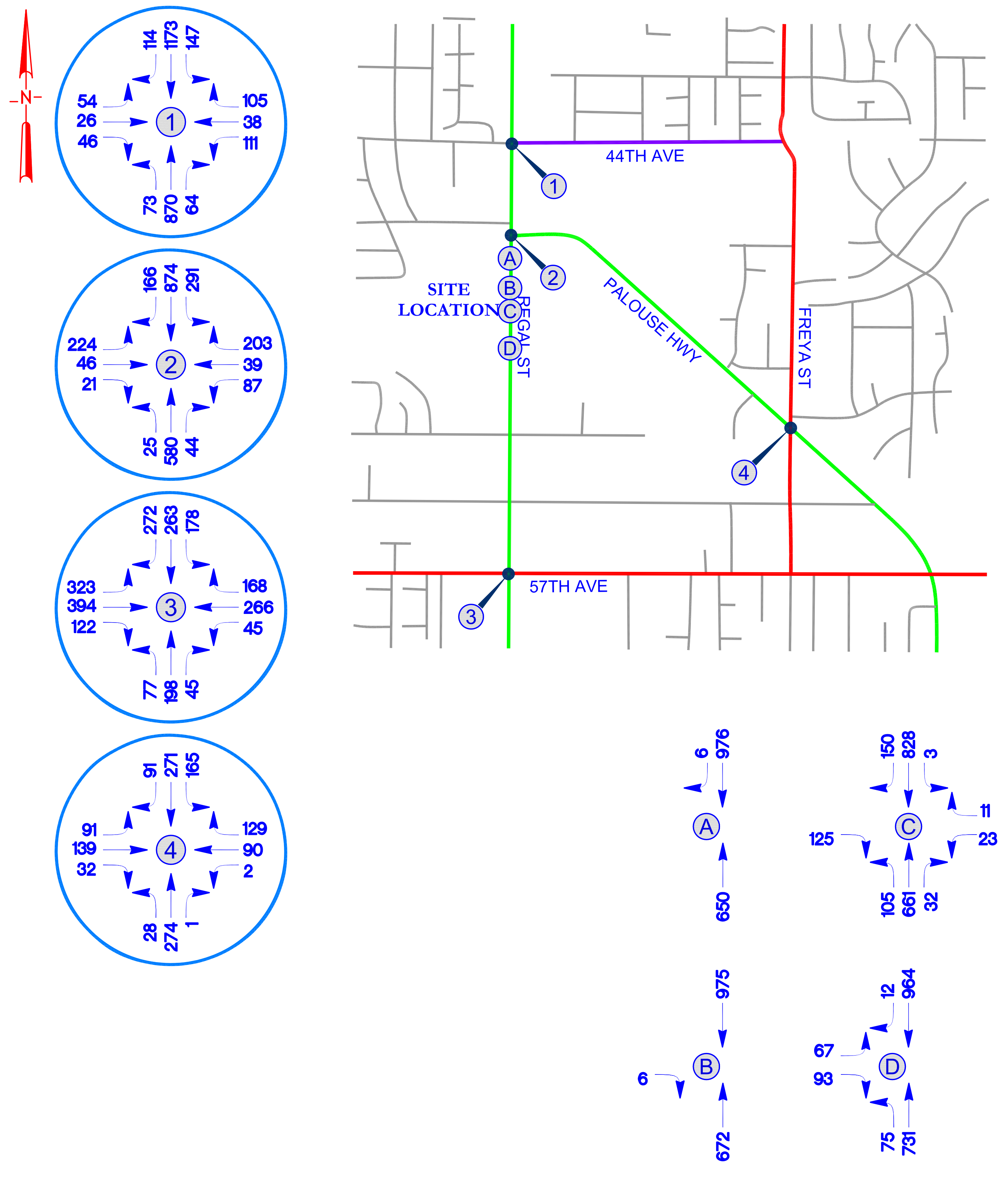

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SPOKANE WA

FUTURE WITH-PROJECT, THREE-QUARTER
PM PEAK HOUR

PROJECT NO.
3072013

FIGURE NUMBER
10

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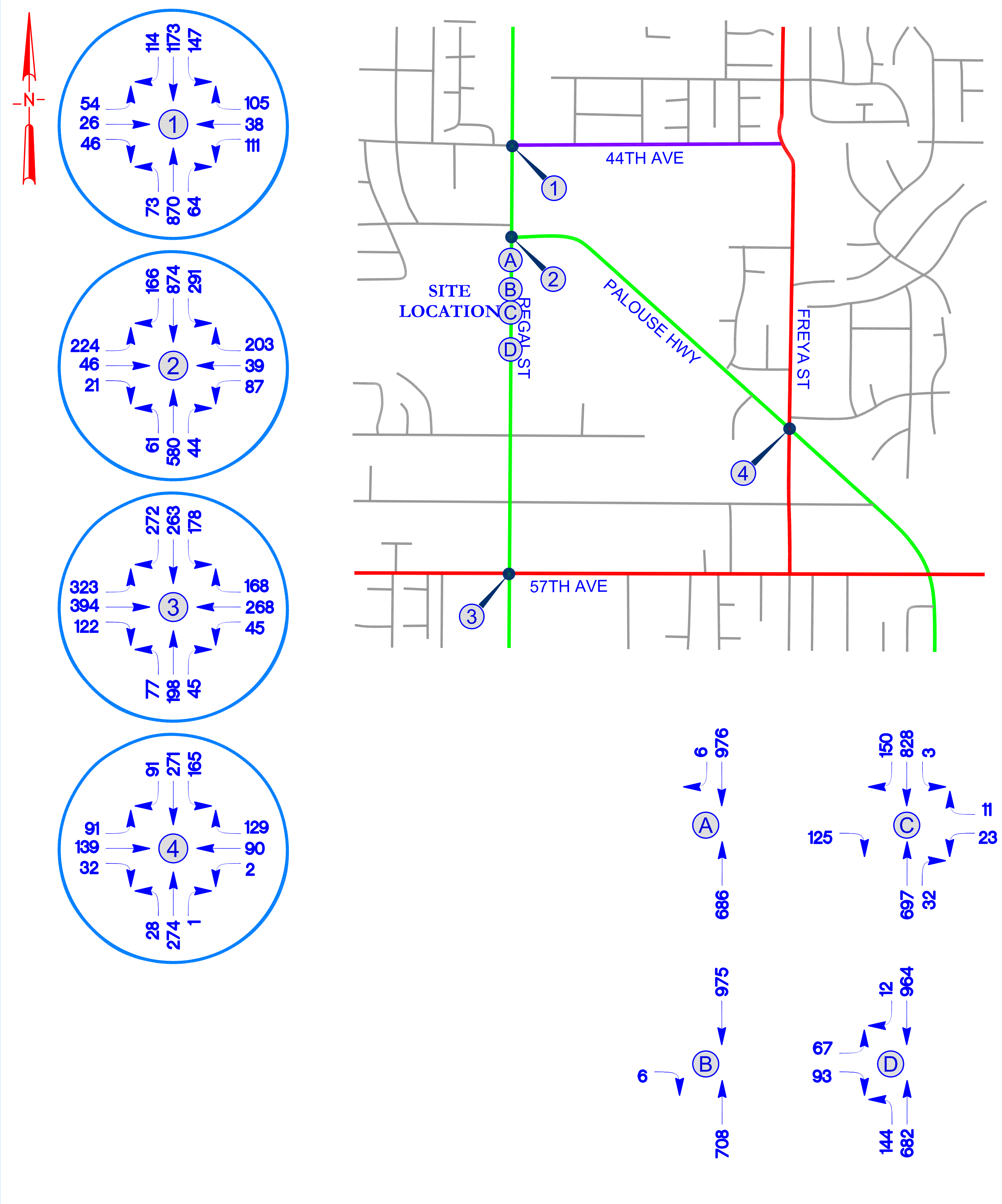

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FUTURE WITH-PROJECT, RIRO
PM PEAK HOUR

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FIGURE NUMBER
11

C:\Users\bwhite\Documents\Projects\3072013 - BWA Southgate-KXLY\CAD\Southgate_Figures_Dec2016.dwg Plotted by bill white on Dec/23/2016

As shown, all study intersections are forecast to function within acceptable LOS both without and with project development. The analysis indicates adequate intersection capacity is available to accommodate full development growth reflected by this study, which includes the Southgate-KXLY project and pipeline. No road improvements are recommended on the via LOS analyses.

The central access scenario with full access will result in LOS F conditions for the PM peak hour, which is unacceptable. Acceptable LOS are maintained with the three-quarter and RIRI access scenarios for this project driveway. The outbound movements for the boulevard and south driveway are acceptable under all three access conditions.

Note outbound movements from the Target Driveway operate at LOS F with the full and three-quarter access scenarios, and LOS E under the RIRO scenario. City engineers may ultimately need to restrict outbound left-turns at this driveway to reduce vehicle conflicts and LOS impacts.

3.3.2 Vehicle Queues

Future year 2022 with-project queues were forecast for the three access scenarios. Summary queue conditions are provided in **Table 8** for the PM peak hour. Again, queues are represented in terms of vehicle demands versus vehicle storage.

Table 8. Year 2022 Summary Queues, PM Peak Hour

Signalized Intersection	Vehicle Storage	Full Access		Three-Quarter		RIRO	
		Average	95%	Average	95%	Average	95%
44th Avenue/Regal Street							
- Northbound Left-Turn Lane	4 vehicles[1]	1 vehicle	1 vehicle	1 vehicle	1 vehicle	1 vehicle	1 vehicle
- Southbound Left-Turn Lane	4 vehicles[1]	1 vehicle	3 vehicles	1 vehicle	3 vehicles	1 vehicle	3 vehicles
- Eastbound Left-Turn Lane	4 vehicles	2 vehicles	3 vehicles	2 vehicles	3 vehicles	2 vehicles	3 vehicles
- Westbound Left-Turn Lane	4 vehicles	3 vehicles	5 vehicles	3 vehicles	5 vehicles	3 vehicles	5 vehicles
Palouse Highway/Regal Street							
- Northbound Left-Turn Lane	3 vehicles[1]	1 vehicle	1 vehicles	1 vehicle	1 vehicle	1 vehicle	2 vehicles
- Southbound Left-Turn Lane	8 vehicles	2 vehicles	3 vehicles	2 vehicles	3 vehicles	2 vehicles	3 vehicles
- Eastbound Left-Turn Lane	12 vehicles	4 vehicles	9 vehicle	6 vehicles	10 vehicle	6 vehicles	10 vehicle
- Westbound Left-Turn Lane	6 vehicles	2 vehicles	4 vehicles	2 vehicles	4 vehicles	2 vehicles	4 vehicles
- Westbound Right-Turn Lane	10 vehicles[2]	1 vehicle	4 vehicles	1 vehicle	4 vehicles	1 vehicle	4 vehicles
57th Avenue/Regal Street							
- Northbound Left-Turn Lane	4 vehicles[1]	2 vehicles	5 vehicles	2 vehicles	5 vehicles	2 vehicles	5 vehicles
- Southbound Left-Turn Lane	4 vehicles[1]	1 vehicle	3 vehicles	1 vehicle	3 vehicles	1 vehicle	3 vehicles
- Eastbound Left-Turn Lane	6 vehicles[1]	4 vehicles	14 vehicles	4 vehicles	14 vehicles	4 vehicles	14 vehicles
- Westbound Left-Turn Lane	4 vehicles[1]	1 vehicle	3 vehicles	1 vehicle	3 vehicles	1 vehicle	3 vehicles

1. Transitions into a two-way left-turn lane, so additional capacity available.
2. Transitions into a through lane, so additional capacity available.

A summary of queueing conclusions for each intersection is provided as follows:

- **44th Avenue/Regal Street**. 95th percentile queues exceed storage in the westbound left turn lane, but average queues are accommodated. There are no other average or 95th percentile queue exceptions noted.
- **Palouse Highway/Regal Street**. The eastbound left-turn lane will be extended to accommodate up to 12 queued vehicles. Given this, there are no average or 95th percentile queue exceptions noted.

- **57th Avenue/Regal Street**. 95th percentile queues extend beyond available storage in the northbound and eastbound left-turn lanes. Average queues are accommodated.

Again, 95th percentile queue conditions only occur a few times during the peak hour and it is tolerable to have this condition as long as average queues can be accommodated at an intersection. No lane improvements are warranted on the basis of this analysis.

3.3.3 Regal Street Lane Capacity

Future with-project lane capacities were reviewed for three locations along Regal Street: 1) north of 44th Avenue, 2) north of Palouse Highway, and 3) south of Palouse Highway. The resultant traffic volumes for two locations north of Palouse Highway were similar between alternatives. Traffic volumes do change moderately for the single location reviewed south of Palouse Highway, adjacent to the site, but are highest with the RIRO alternative. For the sake of simplicity, and to provide a conservative analysis of worse-case forecast volumes, only future with-project volumes that assume the RIRO access alternative was reviewed for the PM peak hour. This traffic volume and lane capacity scenario is shown and compared with **Table 9**.

Table 9. Year 2022 Summary Lane Capacities, PM Peak Hour

	Available Capacity			Future Without Project			Future With-Project		
Regal Street @	NB	SB	Tot	NB	SB	Total	NB	SB	Total
North of 44th Avenue	1,100	2,200	3,300	870	1,285	2,155	1,030	1,435	2,465
North of Palouse Highway	1,100	1,100	2,200	825	1,160	1,985	1,010	1,330	2,340
South of Palouse Highway	1,100	1,100	2,200	650	915	1,565	685	985	1,670

As shown, through lane capacities are stressed for southbound Regal Street between 44th Avenue and Palouse Highway under the without and with project conditions, as PM peak hour forecasts surpasses lane capacity thresholds. The provision of adequate intersection LOS in advance and following this roadway suggests mobility is adequate and can be maintained for Regal Street overall. No improvements are considered necessary in the immediate future. However, this does not represent an ideal condition and City engineers may want to monitor the area and plan for congestion relief in the event lane capacities and LOS deficiencies were noted due to long-term traffic (beyond levels stated in this Study).

3.4 Transit & Pedestrians Activities

The site will be developed to promote and enhance pedestrian circulation and access to the Southside Sports Complex. Specifically, the development will separate sidewalk from Regal Street adjacent to the Sports Complex (see Figure 2). Sidewalk will be extended from the Regal Street/Palouse Highway intersection into the site to access the Complex. Sidewalk and pathways will be developed between the Complex and Southgate-KXLY project. Again, parking supply will be improved with the project, which is of benefit to Southside Sports Complex as parking has been an issue in the base. The internal pedestrian network will be developed to provide safe access between new parking and the Complex.

No change in transit is recommended with the proposed project. A "pull-out" has been designed along the property frontage to better accommodate transit needs at the existing transit stop aligned at the Trestle Creek driveway (See Figure 2).

4 SUMMARY AND CONCLUSIONS

The Southgate-KXLY shopping center would be developed with a 45,000 s.f. supermarket and 129,050 s.f. of shopping center on 15.96-acres aligned west of Regal Street approximately 0.40 miles north of 57th Avenue in Spokane. The project would be accessed through the Palouse Highway/Regal Street intersection and four driveways proposed along Regal Street. Approximately 713 parking stalls would be developed for the demands of the shopping center and for activities associated with the adjacent Southside Sports Complex. The project would be developed and occupied within approximately six years (by year 2022).

The shopping center would generate 12,625 total weekday trips and 1,138 PM peak hour trips. About 11,300 weekday and 1,052 PM peak hour trips would be generated at site driveways. A total of 7,325 weekday and 682 PM peak hour trips are new and impact off-street roadways and intersections following the consideration of pass-by trips. Site traffic levels should be anticipated by City officials as net new PM peak hour trip generation as consistent with that predicted via traffic studies provided for the site via the Comprehensive Plan amendment and zone change process.

Generally, about 53 percent of new project trips are anticipated to/from the north and 35 percent to/from the south on Regal Street. Approximately 12 percent are anticipated to/from the east on Palouse Highway. Trips are anticipated to distribute from these roadways to/from 44th Avenue, 57th Avenue, and Freya Street.

Note the development plan for the project is evolving. This traffic study was developed upon the most current available site plan and tenant information available, which currently reflects the development of a supermarket. The shopping center land use is appropriate for addressing the traffic/travel impacts of a range of retail stores and restaurants, as defined by the ITE Trip Generation Manual. Thus, this study should be sufficient to address a number of tenant potentials. Further study would only be needed if net new trip generation were to ultimately surpass 682 PM peak hour trips, as accounted for on a land use by land use basis in the future.

4.1 Summary Results

This study reviews intersection LOS, intersection queues, and Regal Street lane capacities based on year 2022 traffic forecasts for the PM peak hour. Traffic volumes for the PM peak hour are approximately 40 percent higher than those noted for the AM peak hour. In addition, shopping centers tend to generate higher traffic volumes in the PM versus AM peak hour. As such, the PM peak hour was confirmed as the appropriate timeframe for analysis.

Traffic forecasts are comprised of baseline traffic growth, the Southgate-Plaza shopping center, and the development of six other study area pipeline projects. However, Southgate-KXLY predates and is vested prior to these developments given conditions outlined in Section 1.1.2. Overall, the resulting traffic forecasts are conservative as they yield annual growth rates that exceed historical trends.

Traffic capacities/operations were reviewed for four off-site intersections, site driveways, and specifically Regal Street. Three access scenarios were reviewed for the central site driveway, as it is aligned opposite the main Target shopping cent driveway/access. The results of traffic operations/capacity analyses are as follows:

1. Forecast LOS and delay analyses indicate acceptable traffic conditions as no off-site intersection is forecast to function below specified agency thresholds during the PM peak hour. This indicates capacity is available to accommodate traffic growth at intersections.
2. 95th percentile queues extend beyond left-turn pocket storage availability at two study intersections. However, average queues are accommodated in all left and right turn lanes at these and all study intersections which indicates turn lane capacity should not be an issue most of the PM peak hour (95th percentile queues only occur a few times per hour).
3. Forecast through traffic volumes do moderately exceed lane capacities for the southbound direction of Regal Street between 44th Avenue and the Palouse Highway. This is not considered an immediate concern as intersection LOS are adequate, but City engineers may want to consider additional studies to determine if some form of congestion relief for Regal Street in the long-range future.
4. The three-quarter and RIRO driveway options maintain best forecast LOS/delay for outbound movements at the center site driveway. The three quarter option would still pose some conflict with the Target drive, and City officials may want to evaluate the potential for partial left-turn restrictions at the Target driveway to assure safety.

Transit and Pedestrians. Pedestrian access and parking accommodation for the Southside Sports Complex will be improved with the development proposal. Separated sidewalk will be constructed with the project adjacent to the Complex along Regal Street. Finally, a bus pull-out will be provided along the property frontage at the existing transit stop aligned with the existing Trestle Creek driveway. No further pedestrian or transit recommendations are provided.

4.2 SEPA Mitigation Fees

Transportation mitigation has already been established for the Southgate-KXLY development via a developer's agreement and contract enacted between KXLY and the City as a function of a Comprehensive Plan Amendment and zone change processes. The agreement was developed in 2008 and 2009, executed in 2009, and recorded at City Hall in 2010. The specified mitigation was intended to support improvements highlighted in the current City of Spokane Six Year Comprehensive Street Program and also provide for specific project mitigation.

The document indicates the development would provide a SEPA mitigation fee of $1,057.95 per new PM peak hour trip. $946.95 per new PM peak hour was specified for use in supporting City Street Program projects (funded or unfunded). $111.00 per new PM peak hour was specified for mitigation projects, which could include the Ray Street cross-over.

As indicated, the Southgate-KXLY shopping center development would potentially generate up 682 PM peak hour trips. A summary of the resulting SEPA mitigation fee anticipated at this time is therefore as follows:

- Total Fee Calculation, $1,057.95 * 682 = $721,521.90
  - Allocation City Street Program, $946.95 * 682 = $645,819.9
  - Allocation Project Mitigation, $111.00 * 682 = $75,702

About $645,000 of the SEPA fee is intended for use with the City Street Program. Fees in excess of $75,000 are intended for direct project mitigation, which can be reserved to help address long-range issues noted for southbound Regal Street between 44th Avenue and the Palouse Highway and/or can be used to support projects in Spokane County, at the discretion of City engineering and planning officials.

Southgate-KXLY project proponents have already helped to finance $200,000 of the Palouse Highway/Regal Street signalization project, as listed on a previous iteration of the City Six Year Plan. Per the conditions of the development agreement, $200,000 would be applied as "credit" towards the $645,000 identified in SEPA mitigation fees for the current City Street Program.

Note as this SEPA mitigation is based on net new PM peak hour trip totals, the fees can be adjusted given trip generation validation provided in the future for subsequent land-uses/tenants on a case-by-case basis. This will assure SEPA mitigation fees are fairly being assessed as the site develops, which is of benefit to both the project proponent and the City of Spokane.

4.3 Recommendations

This Traffic Operational Study and "analysis of adjacent intersections" indicates the proposed Southgate-KLXY shopping center project can be developed without generating unanticipated impacts to the City and County arterial street system. Summary recommendations are as follows:

1. City officials should plan long-term congestion relief for Regal Street. The Ray-Street crossover is one option that has been discussed. The project would help minimize potential southbound capacity constraints noted for southbound Regal Street.
2. The developers would like the highest level of access possible for the central site driveway on Regal Street. This study supports and recommends development of a three-quarter driveway, representing acceptable traffic conditions for traffic exiting the site. Outbound left-turns from the Target site would also have to be limited to eliminate conflicting turning movements and address LOS E/F issues identified for this driveway.
3. Just over $645,000 in SEPA mitigation fees are identified for City Street Program projects, payable at the time of permit for each respective development Phase. This would be offset by a current $200,000 credit for Palouse Highway/Regal Street signalization. The project proponent should anticipate in excess of $445,000 of SEPA mitigation fees being paid to support City improvements.
4. Similarly, the project proponent should anticipate providing in excess of $75,000 to mitigate the specific impacts of the project. City officials have the ability to use this money to help mitigate evolving traffic congestion on Regal Street and/or could help address traffic impacts in Spokane County.
5. Trip generation should be validated at major development phases to assure SEPA mitigation fees are fairly being assessed during project development.

The information and recommendations provided should sufficiently support site-specific GMA Concurrency and SEPA determinations, as to be provided by City planning and engineering officials. Here ends by the Traffic Operational Study provided for the Southgate-KXLY shopping center.

Appendix A

Glossary of Terms

This section of the Technical Appendix provides a glossary of terms. The *Highway Capacity Manual* (TRB, 2010) and the *Transportation Impact Analyses for Site Development* (ITE, 2005) were used to help with the development of the following definitions:

- **Access point** – An intersection, driveway, or opening on a roadway that provides access to a land use or facility.
- **All-way stop-controlled** – An intersection with stop signs located on all approaches.
- **Arterial** – (General Definition) A signalized street that primarily serves through-traffic and secondarily provides access to abutting properties.
- **Average daily traffic (ADT)** – The average 24-hour traffic volume at a given location on a roadway.
- **Capacity** – The number of vehicles or persons that can be accommodated on a roadway, roadway section, or at an intersection over a specified period of time. Capacity is also a term used to define limits for transit, pedestrian, and bicycle facilities. Concept typically expressed as vehicles per hour, vehicles per day, or persons per hour or per day.
- **Collector street** – (General Definition) A surface street providing land access and traffic circulation within residential, commercial, and industrial areas.
- **Cycle** – A complete sequence of cycle indicators.
- **Cycle length** – The total time for a signal to complete one cycle.
- **Delay** – The additional travel time experienced by a driver, passenger, or pedestrian.
- **Demand** – The number of users desiring service on a highway system or street over a specified time period. Concept typically expressed as vehicles per hour, vehicles per day, or persons per hour or per day.
- **Departing sight distance** – The length of road required for a vehicle to turn from a stopped position at an intersection (or driveway) and accelerate to travel speed.
- **Design Hour** – The peak hour of traffic volumes/conditions; typically used in traffic studies, design analyses, and design. Typically recognized as the 85^{th} percentile hours and often one of the peak/commute hours.
- **Downstream** – The direction of traffic flow.
- **Functional class** – A transportation facility defined by the traffic service it provides.
- **Growth factor** – A percentage increase applied to current traffic demands or counts to estimate future demands/volumes.
- **Intersection Control Analysis** – An intersection control analysis (ICA) is a traffic/transportation study used to recommend geometric and traffic control improvements for an intersection or intersections.
- **Level of Service** – The standard used to evaluate traffic operating conditions of the transportation system. This is a qualitative assessment of the quantitative effect of factors such as speed, volume of traffic, geometric features, traffic interruptions, delays and freedom to maneuver. Operating conditions are categorized as LOS A through LOS "F". LOS A generally represents the most favorable driving conditions and LOS F represents the least favorable conditions.
- **Mainline** – The primary through roadway as distinct from ramps, auxiliary lanes, and collector-distributor roads.

- **Major Street** – The street not controlled by stop signs at a two-way stop-controlled intersection.
- **Minor arterial** – (General Definition) A functional category of a street allowing trips of moderate length within a relatively small geographical area.
- **Operational analysis** – A use of capacity analysis to determine the level of service on an existing or projected facility, with known projected traffic, roadway, and control conditions.
- **Peak Generator Hour** – The single hour (or hours) in a day during which trip generation for a development or land use is highest.
- **Peak hour** – Single hour (or hours) in a day during which the maximum traffic volume occurs on a given facility (roadway, intersection, etc.). Typically, the peak hour is known as the "rush" hour that occurs during the AM or PM work commutes of the typical weekday. The absolute peak hour of the day can also be referred to as the design hour.
- **Peak Generator Hour** – The peak hourly volume generated by a particular development or land use. In the context of traffic reports, the generator hour can occur in the morning and afternoon, described as AM and PM peak generator hours, respectively.
- **Peak hour factor** – The hourly volume during the maximum-volume hour of the day divided by the peak 15-minute flow rate within the peak hour; a measure of traffic demand fluctuation within the peak hour.
- **Principal Arterial** - (General Definition) A major surface street with relatively long trips between major points, and with through-trips entering, leaving, and passing through the urban area.
- **Queue** – A line of vehicles, bicycles, or persons waiting to be served by the system in which the flow rate from the front of the queue determines the average speed within the queue. Slower moving vehicles or people joining the rear of the queue are usually considered a part of the queue.
- **Roadside obstruction** – An object or barrier along a roadside or median that affects traffic flow, whether continuous (e.g., a retaining wall) or not continuous (e.g., light supports or a bridge abutment).
- **Road characteristic** – A geometric characteristic of a street or highway, including the type of facility, number and width of lanes, shoulder widths and lateral clearances, design speed, and horizontal and vertical alignment.
- **Roundabout** – An unsignalized intersection with a circulatory roadway around a central island with all entering vehicles yielding to the circulating traffic.
- **Shoulder** – A portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, emergency use, and lateral support of the subbase, base, and surface courses.
- **Stopping sight distance** – The length of road needed for a moving vehicle to come to a complete stop prior to an obstruction sighted on the road.
- **Traffic conditions** – A characteristic of traffic flow, including distribution of vehicle types in the traffic stream, directional distribution of traffic, lane use distribution of traffic, and type of driver population on a given facility.
- **Travel speed** – The average speed, in miles per hour, of a traffic computed as the length of roadway segment divided by the average travel time of the vehicles traversing the segment.

- **Travel time** – The average time spent by vehicles traversing a highway segment, including control delay, in seconds per vehicle of minutes per vehicle.
- **Trip Distribution and Assignment** – The predicted travel patterns of vehicle trips as they approach and depart a land use. Distribution refers to the travel pattern, usually defined in percentages or fractions, and assignment refers to vehicle trip ends.
- **Traffic forecast** – The predicted traffic volume of the analysis horizon year or time period. Most typically predicted for the weekday, AM peak hour, PM peak hour, or AM or PM peak generator hours of the typical weekday.
- **Traffic impact analysis** – A *traffic impact analysis* (TIA) is an engineering and planning study that forecasts the potential traffic and transportation impacts of a proposed development on an area, neighborhood, or community. Reports can also be referred to as a traffic impact study (TIS).
- **Trip generation** – The number of vehicle trips generated by a development or land use. Most typically predicted for the weekday, AM peak hour, PM peak hour, or AM or PM peak generator hours of the typical weekday.
- **Two-way left-turn lane** – A lane in the median area that extends continuously along a street or highway and is marked to provide a deceleration and storage area, out of the through-traffic stream, for vehicles traveling in either direction to use in marking left turns at intersections and driveways.
- **Two-way stop-controlled** – The type of traffic control at an intersection where drivers on the minor street or driver turning left from the major street wait for a gap in the major-street traffic to complete a maneuver. Typically, the minor approaches are stop-controlled.
- **Unsignalized intersection** – An intersection not controlled by traffic signals.
- **Upstream** – The direction from which traffic is flowing.
- **Volume** – The number of persons or vehicles passing a point on a lane, roadway, or other traffic-way during some time interval, often one hour, expressed in vehicles, bicycles, or persons per hour.
- **Volume-to-capacity ratio** – The ratio of flow rate to capacity for a transportation facility.
- **Walkway** – A facility provided for pedestrian movement and segregated from vehicle traffic by a curb, or provide for on a separate right-of-way.

Appendix B

Summary Traffic Counts

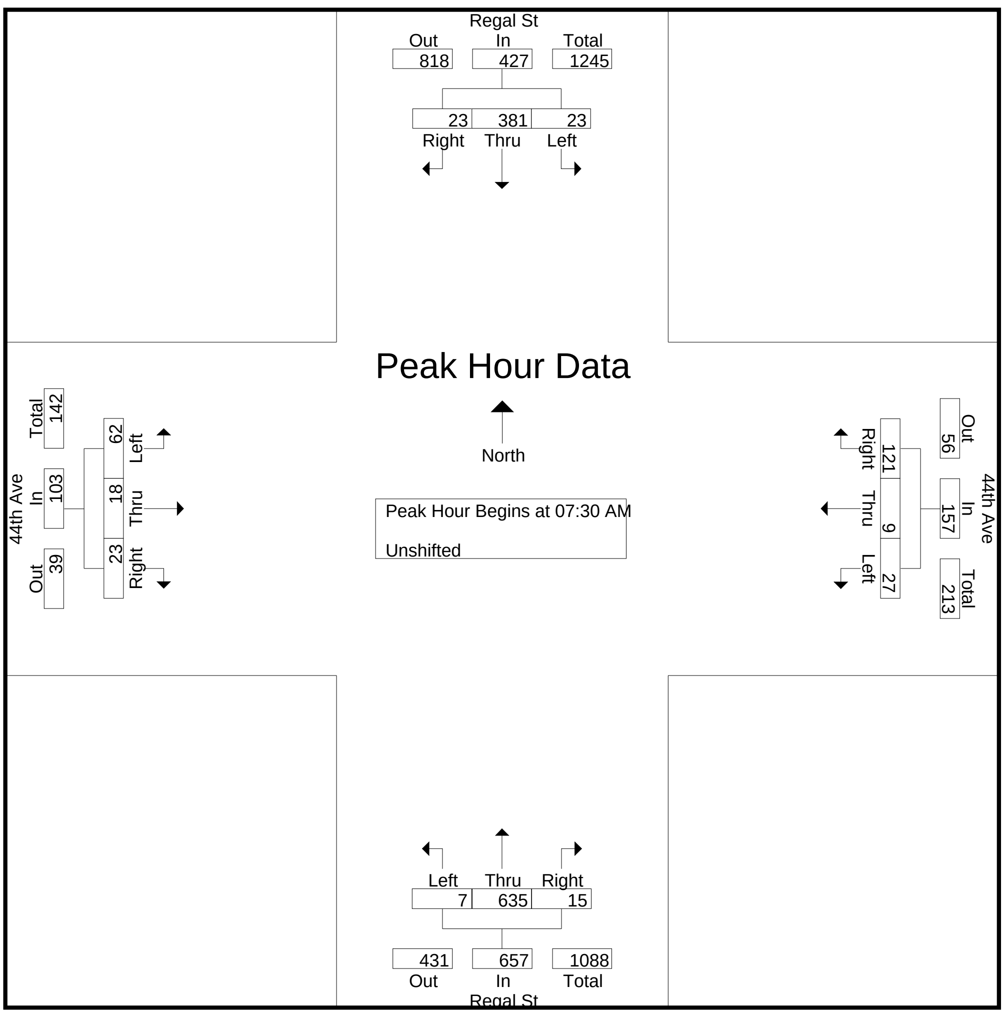
City of Spokane - Street Department
901 N. Nelson Street
Spokane, WA 99202-3769
509-232-8800

2800 E 44th Ave
4400 S Regal St

Peak Hour Data on Page 2

File Name : 44th & Regal INT188 AM
Site Code : INT188
Start Date : 6/9/2015

	Regal St From North				44th Ave From East				Regal St From South				44th Ave From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	94	6	100	**44**	1	5	**50**	**7**	**179**	2	**188**	**8**	**8**	17	**33**	**371**
07:45 AM	5	**114**	5	**124**	36	**4**	6	46	3	166	**3**	172	3	3	**20**	26	368
08:00 AM	**11**	95	**8**	114	15	2	**8**	25	2	149	1	152	4	4	9	17	308
08:15 AM	7	78	4	89	26	2	8	36	3	141	1	145	8	3	16	27	297
Total Volume	23	381	23	427	121	9	27	157	15	635	7	657	23	18	62	103	1344
% App. Total	5.4	89.2	5.4		77.1	5.7	17.2		2.3	96.7	1.1		22.3	17.5	60.2		
PHF	.523	.836	.719	.861	.688	.563	.844	.785	.536	.887	.583	.874	.719	.563	.775	.780	.906



City of Spokane - Street Department

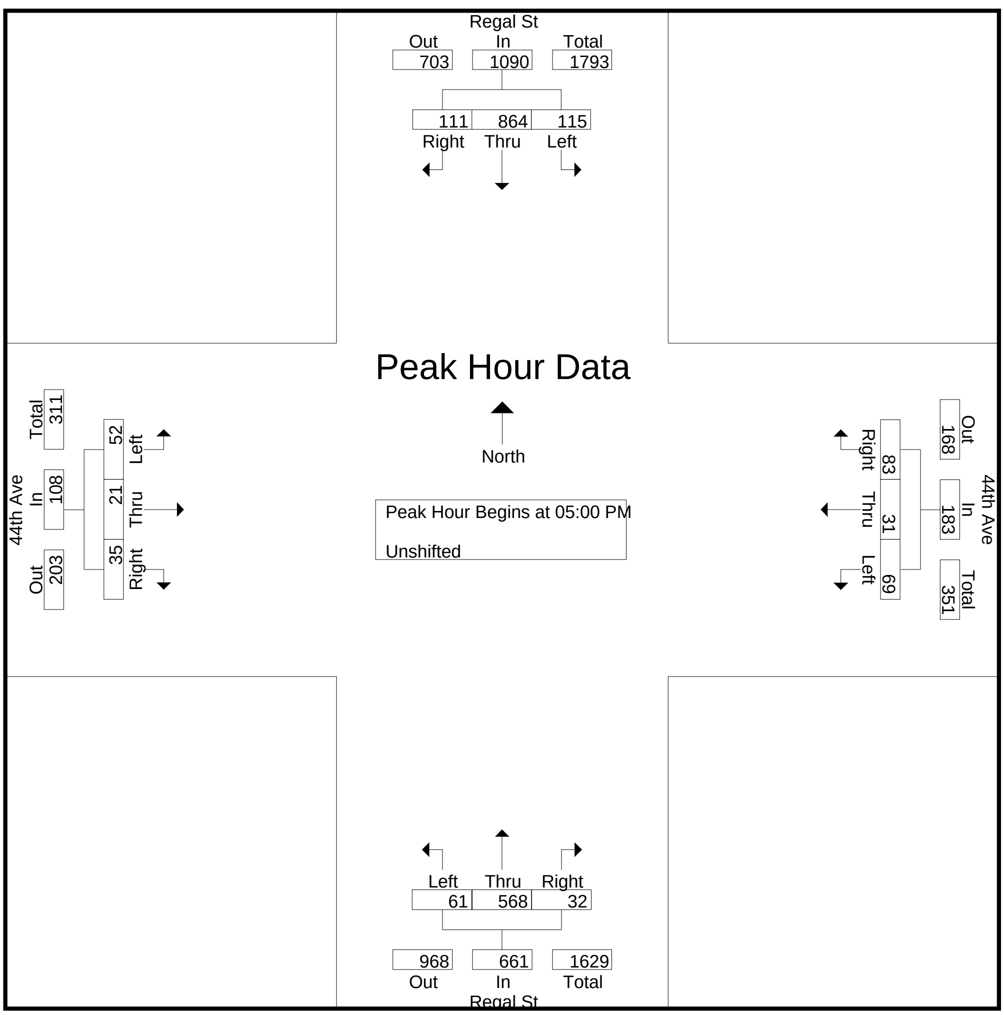
901 N. Nelson Street
Spokane, WA 99202-3769
509-232-8800

2800 E 44th Ave
4400 S Regal St

Peak Hour Data on Page 2

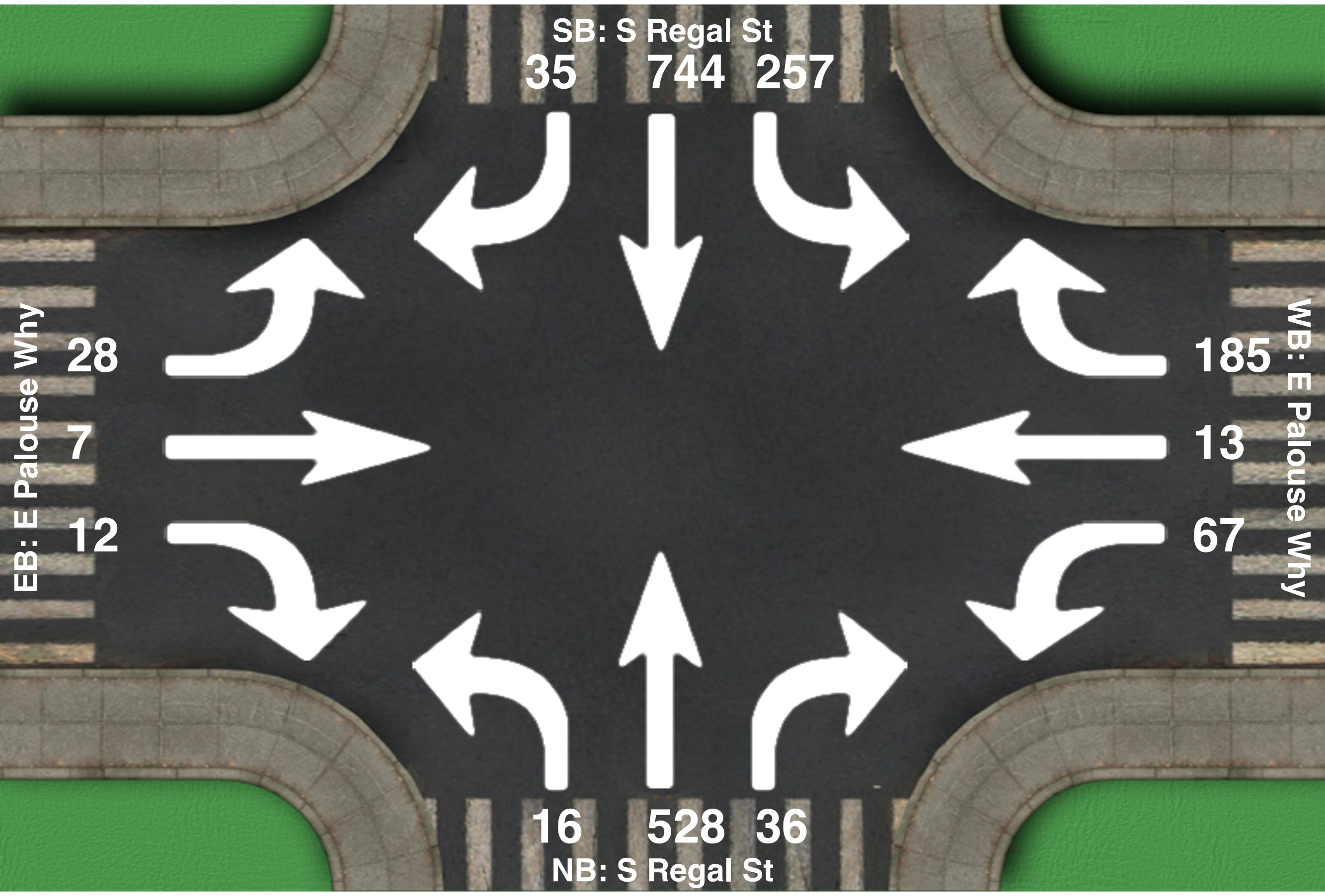
File Name : 44th & Regal INT188 PM
Site Code : INT188
Start Date : 6/9/2015
Page No : 2

	Regal St From North				44th Ave From East				Regal St From South				44th Ave From West				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	23	206	**31**	260	23	6	15	44	6	140	**18**	164	9	3	**17**	**29**	497
05:15 PM	**38**	219	23	280	**31**	6	16	**53**	**9**	**150**	10	169	6	**7**	14	27	**529**
05:30 PM	19	211	30	260	13	9	16	38	8	145	18	**171**	**10**	6	9	25	494
05:45 PM	31	**228**	31	**290**	16	**10**	**22**	48	9	133	15	157	10	5	12	27	522
Total Volume	111	864	115	1090	83	31	69	183	32	568	61	661	35	21	52	108	2042
% App. Total	10.2	79.3	10.6		45.4	16.9	37.7		4.8	85.9	9.2		32.4	19.4	48.1		
PHF	.730	.947	.927	.940	.669	.775	.784	.863	.889	.947	.847	.966	.875	.750	.765	.931	.965



Intersection Peak Hour

Location: S Regal St at E Palouse Why, Spokane, WA
GPS Coordinates:
Date: 2016-10-06
Day of week: Thursday
Weather:
Analyst: MMI



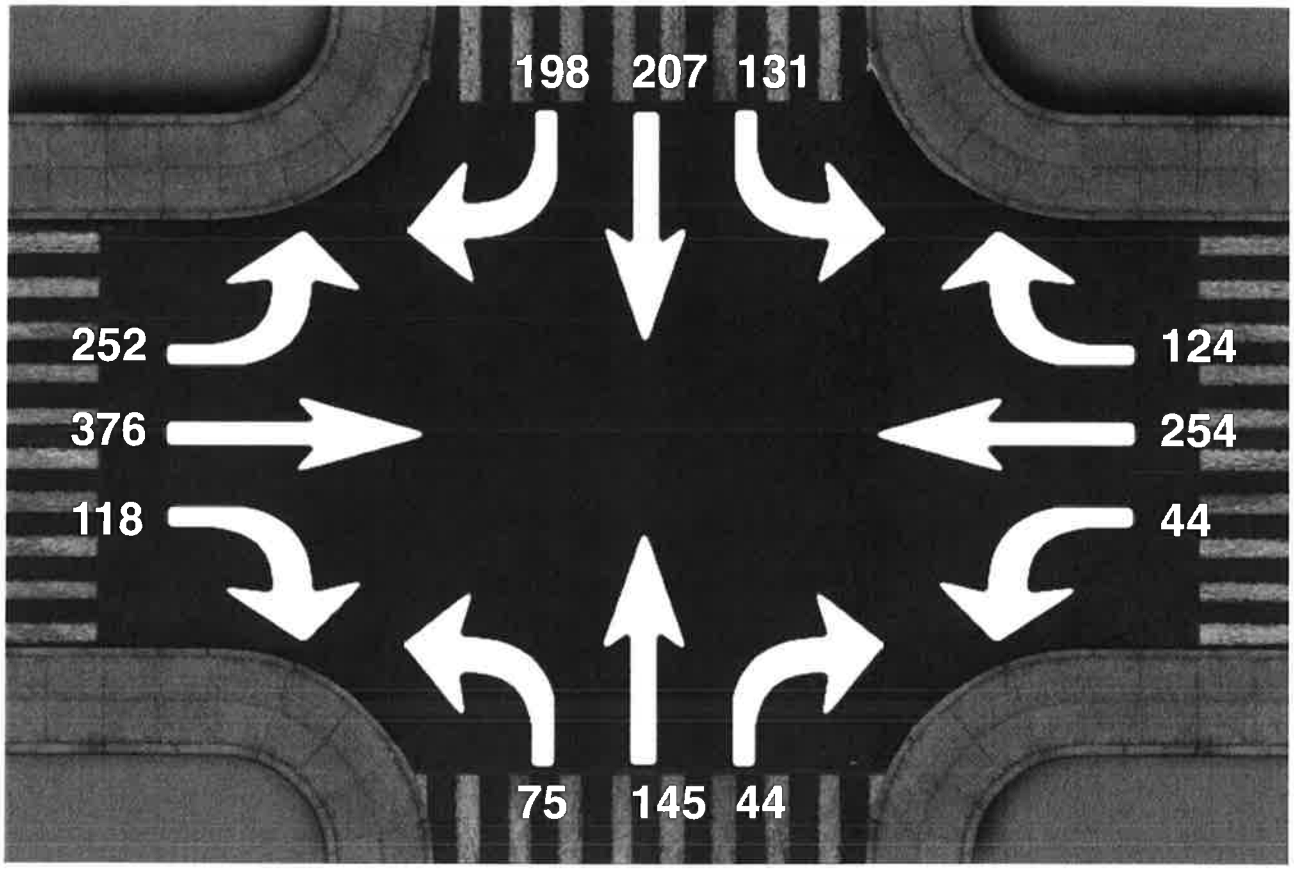
Intersection Peak Hour

16:15 - 17:15

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	257	744	35	67	13	185	16	528	36	28	7	12	1928
Factor	0.87	0.96	0.80	0.70	0.46	0.84	0.57	0.84	0.82	0.70	0.44	0.43	0.91
Approach Factor	0.98			0.77			0.82			0.62			

Intersection Peak Hour

Location: Regal at 57th, Spokane, WA
GPS Coordinates:
Date: 2014-07-10
Day of week: Thursday
Weather:
Analyst: ALW



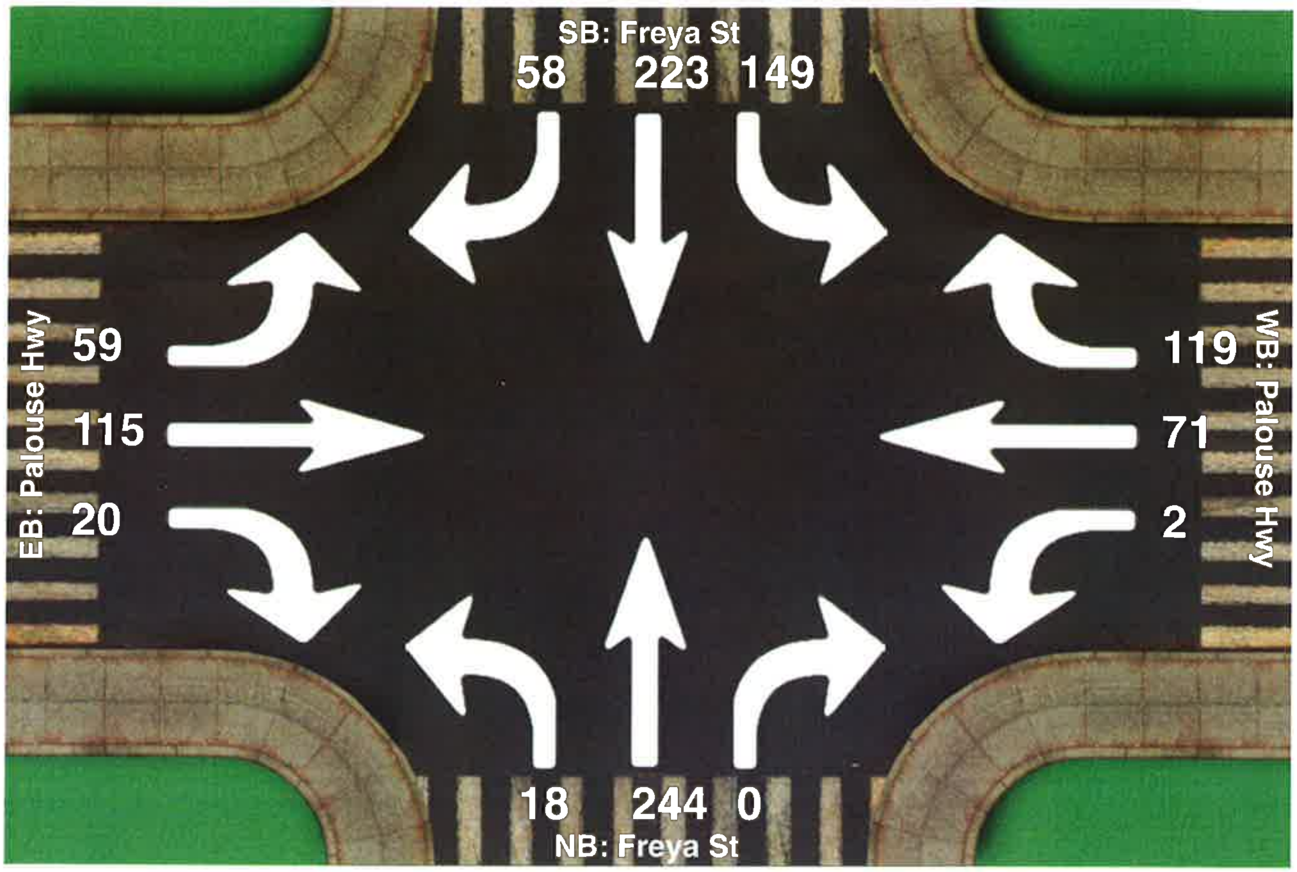
Intersection Peak Hour

16:45 - 17:45

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	131	207	198	44	254	124	75	145	44	252	376	118	1968
Factor	0.76	0.89	0.88	0.79	0.80	0.79	0.89	0.71	0.79	0.93	0.86	0.95	0.94
Approach factor	0.93			0.83			0.79			0.90			

Intersection Peak Hour

Location: Freya St at Palouse Hwy, Spokane, WA
GPS Coordinates:
Date: 2015-08-26
Day of week: Wednesday
Weather: Hot
Analyst: ALW



Intersection Peak Hour

16:30 - 17:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	149	223	58	2	71	119	18	244	0	59	115	20	1078
Factor	0.87	0.83	0.85	0.50	0.74	0.90	0.64	0.80	0.00	0.87	0.87	0.71	0.93
Approach Factor	0.88			0.86			0.79			0.87			

Appendix C

LOS Summary Worksheets

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	21	35	69	31	83	61	648	32	115	932	111
Future Volume (veh/h)	52	21	35	69	31	83	61	648	32	115	932	111
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	54	22	36	71	32	86	63	668	33	119	961	114
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	86	141	212	61	163	400	1156	57	506	1685	200
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.05	0.66	0.66	0.06	0.66	0.66
Sat Flow, veh/h	1269	637	1042	1340	448	1203	1774	1760	87	1774	2534	301
Grp Volume(v), veh/h	54	0	58	71	0	118	63	0	701	119	389	686
Grp Sat Flow(s),veh/h/ln	1269	0	1679	1340	0	1650	1774	0	1847	1774	1025	1810
Q Serve(g_s), s	4.1	0.0	3.1	5.0	0.0	6.7	1.1	0.0	21.0	2.1	20.5	20.5
Cycle Q Clear(g_c), s	10.8	0.0	3.1	8.1	0.0	6.7	1.1	0.0	21.0	2.1	20.5	20.5
Prop In Lane	1.00		0.62	1.00		0.73	1.00		0.05	1.00		0.17
Lane Grp Cap(c), veh/h	159	0	228	212	0	224	400	0	1213	506	681	1203
V/C Ratio(X)	0.34	0.00	0.25	0.33	0.00	0.53	0.16	0.00	0.58	0.24	0.57	0.57
Avail Cap(c_a), veh/h	343	0	470	406	0	462	490	0	1213	581	681	1203
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.3	0.0	38.7	42.3	0.0	40.2	6.7	0.0	9.5	7.0	9.0	9.0
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.3	0.0	0.7	0.2	0.0	2.0	0.2	3.4	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.4	1.9	0.0	3.1	0.5	0.0	11.2	1.0	6.4	10.8
LnGrp Delay(d),s/veh	45.7	0.0	38.9	42.7	0.0	41.0	6.9	0.0	11.5	7.2	12.5	11.0
LnGrp LOS	D		D	D		D	A		B	A	B	B
Approach Vol, veh/h		112			189			764			1194	
Approach Delay, s/veh		42.2			41.6			11.1			11.1	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.8	70.7		18.6	10.0	71.5		18.6
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	10.0	47.0		28.0	10.0	47.0		28.0
Max Q Clear Time (g_c+I1), s	4.1	23.0		12.8	3.1	22.5		10.1
Green Ext Time (p_c), s	0.1	14.0		0.8	0.1	14.2		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	15.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	7	12	67	13	185	16	528	36	257	744	35
Future Volume (veh/h)	28	7	12	67	13	185	16	528	36	257	744	35
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	31	8	13	74	14	203	18	580	40	282	818	38
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	190	37	60	226	149	673	126	614	42	692	1221	57
Arrive On Green	0.03	0.06	0.06	0.05	0.08	0.08	0.02	0.36	0.36	0.34	0.69	0.69
Sat Flow, veh/h	1774	640	1040	1774	1863	1583	1774	1723	119	1774	1766	82
Grp Volume(v), veh/h	31	0	21	74	14	203	18	0	620	282	0	856
Grp Sat Flow(s),veh/h/ln	1774	0	1679	1774	1863	1583	1774	0	1842	1774	0	1848
Q Serve(g_s), s	1.6	0.0	1.2	3.9	0.7	1.0	0.7	0.0	32.7	7.0	0.0	26.6
Cycle Q Clear(g_c), s	1.6	0.0	1.2	3.9	0.7	1.0	0.7	0.0	32.7	7.0	0.0	26.6
Prop In Lane	1.00		0.62	1.00		1.00	1.00		0.06	1.00		0.04
Lane Grp Cap(c), veh/h	190	0	97	226	149	673	126	0	656	692	0	1278
V/C Ratio(X)	0.16	0.00	0.22	0.33	0.09	0.30	0.14	0.00	0.94	0.41	0.00	0.67
Avail Cap(c_a), veh/h	263	0	453	259	503	974	216	0	755	692	0	1278
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.5	0.0	45.0	41.2	42.6	9.7	26.5	0.0	31.2	22.8	0.0	8.9
Incr Delay (d2), s/veh	0.4	0.0	1.1	0.8	0.3	0.2	0.5	0.0	23.9	0.4	0.0	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.6	1.9	0.4	2.6	0.3	0.0	20.9	5.7	0.0	14.3
LnGrp Delay(d),s/veh	42.9	0.0	46.1	42.1	42.9	10.0	27.0	0.0	55.2	23.1	0.0	11.7
LnGrp LOS	D		D	D	D	A	C		E	C		B
Approach Vol, veh/h		52			291			638			1138	
Approach Delay, s/veh		44.2			19.7			54.4			14.5	
Approach LOS		D			B			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.0	74.1	6.9	13.0	39.5	40.6	9.1	10.8
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	5.0	* 5	4.0	5.0
Max Green Setting (Gmax), s	7.0	41.0	7.0	27.0	7.0	* 41	7.0	27.0
Max Q Clear Time (g_c+I1), s	2.7	28.6	3.6	3.0	9.0	34.7	5.9	3.2
Green Ext Time (p_c), s	0.0	2.9	0.0	0.8	0.0	1.0	0.0	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	28.0
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	252	376	118	44	254	124	75	145	44	131	207	198
Future Volume (veh/h)	252	376	118	44	254	124	75	145	44	131	207	198
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	268	400	126	47	270	132	80	154	47	139	220	211
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	309	520	164	61	301	147	286	564	172	479	360	345
Arrive On Green	0.17	0.38	0.38	0.03	0.25	0.25	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1774	1359	428	1774	1183	578	953	1371	418	1177	875	839
Grp Volume(v), veh/h	268	0	526	47	0	402	80	0	201	139	0	431
Grp Sat Flow(s),veh/h/ln	1774	0	1787	1774	0	1761	953	0	1789	1177	0	1715
Q Serve(g_s), s	12.9	0.0	22.5	2.3	0.0	19.3	6.3	0.0	6.5	7.8	0.0	17.3
Cycle Q Clear(g_c), s	12.9	0.0	22.5	2.3	0.0	19.3	23.6	0.0	6.5	14.3	0.0	17.3
Prop In Lane	1.00		0.24	1.00		0.33	1.00		0.23	1.00		0.49
Lane Grp Cap(c), veh/h	309	0	684	61	0	447	286	0	736	479	0	706
V/C Ratio(X)	0.87	0.00	0.77	0.77	0.00	0.90	0.28	0.00	0.27	0.29	0.00	0.61
Avail Cap(c_a), veh/h	426	0	684	406	0	503	286	0	736	479	0	706
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.1	0.0	23.6	41.9	0.0	31.5	29.5	0.0	17.1	21.8	0.0	20.2
Incr Delay (d2), s/veh	13.0	0.0	5.3	24.9	0.0	18.3	2.4	0.0	0.9	0.5	0.0	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	12.1	1.5	0.0	11.7	1.9	0.0	3.4	2.6	0.0	8.5
LnGrp Delay(d),s/veh	48.2	0.0	28.9	66.8	0.0	49.9	31.9	0.0	18.0	22.3	0.0	22.1
LnGrp LOS	D		C	E		D	C		B	C		C
Approach Vol, veh/h		794			449			281			570	
Approach Delay, s/veh		35.4			51.6			21.9			22.1	
Approach LOS		D			D			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		41.0	8.0	38.5		41.0	19.2	27.2
Change Period (Y+Rc), s		* 5	5.0	* 5		5.0	4.0	5.0
Max Green Setting (Gmax), s		* 36	20.0	* 26		35.0	21.0	25.0
Max Q Clear Time (g_c+I1), s		25.6	4.3	24.5		19.3	14.9	21.3
Green Ext Time (p_c), s		4.5	0.1	0.9		5.7	0.4	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	33.5
HCM 2010 LOS	C

Notes

Intersection	
Intersection Delay, s/veh	18.5
Intersection LOS	C

Movement	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SEU	SEL	SET	SER
Lane Configurations												
Traffic Vol, veh/h	0	18	244	1	0	149	223	58	0	59	115	20
Future Vol, veh/h	0	18	244	1	0	149	223	58	0	59	115	20
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	19	262	1	0	160	240	62	0	63	124	22
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	NB	SB	SE
Opposing Approach	SB	NB	NW
Opposing Lanes	1	1	1
Conflicting Approach Left	SE	NW	SB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NW	SE	NB
Conflicting Lanes Right	1	1	1
HCM Control Delay	15.2	25	14
HCM LOS	C	C	B

Lane	NBLn1	NWLn1	SELn1	SBLn1
Vol Left, %	7%	1%	30%	35%
Vol Thru, %	93%	37%	59%	52%
Vol Right, %	0%	62%	10%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	263	192	194	430
LT Vol	18	2	59	149
Through Vol	244	71	115	223
RT Vol	1	119	20	58
Lane Flow Rate	283	206	209	462
Geometry Grp	1	1	1	1
Degree of Util (X)	0.491	0.364	0.388	0.756
Departure Headway (Hd)	6.246	6.352	6.691	5.886
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	574	564	536	615
Service Time	4.303	4.415	4.752	3.936
HCM Lane V/C Ratio	0.493	0.365	0.39	0.751
HCM Control Delay	15.2	13	14	25
HCM Lane LOS	C	B	B	C
HCM 95th-tile Q	2.7	1.7	1.8	6.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	NWU	NWL	NWT	NWR
Lane Configurations			✣	
Traffic Vol, veh/h	0	2	71	119
Future Vol, veh/h	0	2	71	119
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	76	128
Number of Lanes	0	0	1	0

Approach	NW
Opposing Approach	SE
Opposing Lanes	1
Conflicting Approach Left	NB
Conflicting Lanes Left	1
Conflicting Approach Right	SB
Conflicting Lanes Right	1
HCM Control Delay	13
HCM LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	18	23	27	9	121	7	635	15	23	381	23
Future Volume (veh/h)	62	18	23	27	9	121	7	635	15	23	381	23
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	68	20	25	30	10	133	8	698	16	25	419	25
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	2	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	184	125	156	274	19	247	659	1154	26	435	1768	105
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.01	0.64	0.64	0.03	0.66	0.66
Sat Flow, veh/h	1240	754	942	1356	112	1488	1774	1814	42	1774	2698	161
Grp Volume(v), veh/h	68	0	45	30	0	143	8	0	714	25	159	285
Grp Sat Flow(s),veh/h/ln	1240	0	1696	1356	0	1600	1774	0	1855	1774	1025	1834
Q Serve(g_s), s	4.8	0.0	2.0	1.7	0.0	7.4	0.1	0.0	20.5	0.4	5.7	5.7
Cycle Q Clear(g_c), s	12.1	0.0	2.0	3.8	0.0	7.4	0.1	0.0	20.5	0.4	5.7	5.7
Prop In Lane	1.00		0.56	1.00		0.93	1.00		0.02	1.00		0.09
Lane Grp Cap(c), veh/h	184	0	282	274	0	266	659	0	1181	435	671	1202
V/C Ratio(X)	0.37	0.00	0.16	0.11	0.00	0.54	0.01	0.00	0.60	0.06	0.24	0.24
Avail Cap(c_a), veh/h	392	0	565	501	0	533	834	0	1181	577	671	1202
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.9	0.0	32.2	33.8	0.0	34.4	5.7	0.0	9.7	7.5	6.3	6.3
Incr Delay (d2), s/veh	0.5	0.0	0.1	0.1	0.0	0.6	0.0	0.0	2.3	0.1	0.8	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	1.0	0.7	0.0	3.3	0.1	0.0	11.1	0.2	1.7	3.0
LnGrp Delay(d),s/veh	40.4	0.0	32.3	33.8	0.0	35.0	5.7	0.0	12.0	7.5	7.2	6.8
LnGrp LOS	D		C	C		D	A		B	A	A	A
Approach Vol, veh/h		113			173			722			469	
Approach Delay, s/veh		37.2			34.8			11.9			7.0	
Approach LOS		D			C			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.8	62.3		19.9	6.1	64.0		19.9
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	10.0	35.0		30.0	10.0	35.0		30.0
Max Q Clear Time (g_c+I1), s	2.4	22.5		14.1	2.1	7.7		9.4
Green Ext Time (p_c), s	0.0	6.1		0.8	0.0	9.0		0.9

Intersection Summary	
HCM 2010 Ctrl Delay	14.9
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	26	36	95	38	105	63	712	47	147	1025	114
Future Volume (veh/h)	54	26	36	95	38	105	63	712	47	147	1025	114
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	56	27	37	98	39	108	65	734	48	152	1057	118
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	162	111	152	235	68	189	348	1099	72	429	1644	183
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.05	0.64	0.64	0.06	0.64	0.64
Sat Flow, veh/h	1236	713	977	1332	437	1211	1774	1730	113	1774	2552	285
Grp Volume(v), veh/h	56	0	64	98	0	147	65	0	782	152	424	751
Grp Sat Flow(s),veh/h/ln	1236	0	1690	1332	0	1649	1774	0	1843	1774	1025	1812
Q Serve(g_s), s	4.4	0.0	3.3	7.0	0.0	8.3	1.2	0.0	26.9	2.9	25.1	25.2
Cycle Q Clear(g_c), s	12.7	0.0	3.3	10.3	0.0	8.3	1.2	0.0	26.9	2.9	25.1	25.2
Prop In Lane	1.00		0.58	1.00		0.73	1.00		0.06	1.00		0.16
Lane Grp Cap(c), veh/h	162	0	263	235	0	257	348	0	1170	429	660	1168
V/C Ratio(X)	0.35	0.00	0.24	0.42	0.00	0.57	0.19	0.00	0.67	0.35	0.64	0.64
Avail Cap(c_a), veh/h	316	0	473	401	0	462	436	0	1170	502	660	1168
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.0	0.0	37.0	41.6	0.0	39.1	8.6	0.0	11.6	9.8	10.8	10.8
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.4	0.0	0.8	0.3	0.0	3.0	0.5	4.8	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.6	2.6	0.0	3.8	0.6	0.0	14.5	1.5	7.9	13.4
LnGrp Delay(d),s/veh	45.5	0.0	37.2	42.0	0.0	39.9	8.8	0.0	14.6	10.2	15.6	13.5
LnGrp LOS	D		D	D		D	A		B	B	B	B
Approach Vol, veh/h		120			245			847			1327	
Approach Delay, s/veh		41.1			40.7			14.2			13.8	
Approach LOS		D			D			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.9	68.5		20.6	10.0	69.4		20.6
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	10.0	47.0		28.0	10.0	47.0		28.0
Max Q Clear Time (g_c+I1), s	4.9	28.9		14.7	3.2	27.2		12.3
Green Ext Time (p_c), s	0.2	12.8		0.9	0.1	13.7		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	17.8
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	7	12	74	13	203	16	590	41	291	830	36
Future Volume (veh/h)	29	7	12	74	13	203	16	590	41	291	830	36
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	32	8	13	81	14	223	18	648	45	320	912	40
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	185	34	56	229	149	615	110	675	47	623	1224	54
Arrive On Green	0.03	0.05	0.05	0.06	0.08	0.08	0.02	0.39	0.39	0.31	0.69	0.69
Sat Flow, veh/h	1774	640	1040	1774	1863	1583	1774	1722	120	1774	1771	78
Grp Volume(v), veh/h	32	0	21	81	14	223	18	0	693	320	0	952
Grp Sat Flow(s),veh/h/ln	1774	0	1679	1774	1863	1583	1774	0	1842	1774	0	1849
Q Serve(g_s), s	1.7	0.0	1.2	4.2	0.7	1.1	0.6	0.0	36.7	10.0	0.0	32.8
Cycle Q Clear(g_c), s	1.7	0.0	1.2	4.2	0.7	1.1	0.6	0.0	36.7	10.0	0.0	32.8
Prop In Lane	1.00		0.62	1.00		1.00	1.00		0.06	1.00		0.04
Lane Grp Cap(c), veh/h	185	0	90	229	149	615	110	0	722	623	0	1277
V/C Ratio(X)	0.17	0.00	0.23	0.35	0.09	0.36	0.16	0.00	0.96	0.51	0.00	0.75
Avail Cap(c_a), veh/h	257	0	453	254	503	916	199	0	755	623	0	1277
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.8	0.0	45.4	41.0	42.6	11.7	26.1	0.0	29.6	26.2	0.0	9.8
Incr Delay (d2), s/veh	0.4	0.0	1.3	0.9	0.3	0.4	0.7	0.0	24.9	0.7	0.0	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	0.6	2.1	0.4	3.2	0.3	0.0	23.5	7.1	0.0	17.8
LnGrp Delay(d),s/veh	43.2	0.0	46.7	41.9	42.9	12.0	26.8	0.0	54.6	26.9	0.0	13.8
LnGrp LOS	D		D	D	D	B	C		D	C		B
Approach Vol, veh/h		53			318			711			1272	
Approach Delay, s/veh		44.6			21.0			53.8			17.1	
Approach LOS		D			C			D			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.0	74.1	6.9	13.0	35.8	44.2	9.6	10.4
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	5.0	* 5	4.0	5.0
Max Green Setting (Gmax), s	7.0	41.0	7.0	27.0	7.0	* 41	7.0	27.0
Max Q Clear Time (g_c+I1), s	2.6	34.8	3.7	3.1	12.0	38.7	6.2	3.2
Green Ext Time (p_c), s	0.0	2.3	0.0	0.9	0.0	0.5	0.0	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	29.4
HCM 2010 LOS	C

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	274	394	122	45	266	135	77	165	45	143	228	220
Future Volume (veh/h)	274	394	122	45	266	135	77	165	45	143	228	220
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	291	419	130	48	283	144	82	176	48	152	243	234
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	330	550	171	62	307	156	229	559	153	437	346	334
Arrive On Green	0.19	0.40	0.40	0.04	0.26	0.26	0.40	0.40	0.40	0.40	0.40	0.40
Sat Flow, veh/h	1774	1365	423	1774	1165	593	914	1410	385	1152	873	841
Grp Volume(v), veh/h	291	0	549	48	0	427	82	0	224	152	0	477
Grp Sat Flow(s),veh/h/ln	1774	0	1788	1774	0	1758	914	0	1795	1152	0	1714
Q Serve(g_s), s	14.5	0.0	24.0	2.4	0.0	21.4	7.5	0.0	7.8	9.5	0.0	21.1
Cycle Q Clear(g_c), s	14.5	0.0	24.0	2.4	0.0	21.4	28.6	0.0	7.8	17.3	0.0	21.1
Prop In Lane	1.00		0.24	1.00		0.34	1.00		0.21	1.00		0.49
Lane Grp Cap(c), veh/h	330	0	720	62	0	463	229	0	712	437	0	680
V/C Ratio(X)	0.88	0.00	0.76	0.77	0.00	0.92	0.36	0.00	0.31	0.35	0.00	0.70
Avail Cap(c_a), veh/h	411	0	720	391	0	484	229	0	712	437	0	680
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.0	0.0	23.3	43.4	0.0	32.5	34.8	0.0	18.9	24.8	0.0	22.9
Incr Delay (d2), s/veh	16.9	0.0	4.8	24.1	0.0	23.3	4.3	0.0	1.2	0.7	0.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.7	0.0	12.7	1.6	0.0	13.4	2.2	0.0	4.1	3.1	0.0	10.6
LnGrp Delay(d),s/veh	52.9	0.0	28.2	67.6	0.0	55.8	39.1	0.0	20.0	25.5	0.0	26.4
LnGrp LOS	D		C	E		E	D		C	C		C
Approach Vol, veh/h		840			475			306			629	
Approach Delay, s/veh		36.7			57.0			25.1			26.2	
Approach LOS		D			E			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		41.0	8.2	41.6		41.0	20.9	28.9
Change Period (Y+Rc), s		* 5	5.0	* 5		5.0	4.0	5.0
Max Green Setting (Gmax), s		* 36	20.0	* 26		35.0	21.0	25.0
Max Q Clear Time (g_c+I1), s		30.6	4.4	26.0		23.1	16.5	23.4
Green Ext Time (p_c), s		3.0	0.1	0.0		5.4	0.4	0.4

Intersection Summary			
HCM 2010 Ctrl Delay			36.5
HCM 2010 LOS			D

Notes

Intersection	
Intersection Delay, s/veh	35.2
Intersection LOS	E

Movement	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SEU	SEL	SET	SER
Lane Configurations												
Traffic Vol, veh/h	0	21	274	1	0	165	271	72	0	70	125	25
Future Vol, veh/h	0	21	274	1	0	165	271	72	0	70	125	25
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	23	295	1	0	177	291	77	0	75	134	27
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	NB	SB	SE
Opposing Approach	SB	NB	NW
Opposing Lanes	1	1	1
Conflicting Approach Left	SE	NW	SB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NW	SE	NB
Conflicting Lanes Right	1	1	1
HCM Control Delay	20.9	58.8	17.8
HCM LOS	C	F	C

Lane	NBLn1	NWLn1	SELn1	SBLn1
Vol Left, %	7%	1%	32%	32%
Vol Thru, %	93%	37%	57%	53%
Vol Right, %	0%	62%	11%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	296	208	220	508
LT Vol	21	2	70	165
Through Vol	274	77	125	271
RT Vol	1	129	25	72
Lane Flow Rate	318	224	237	546
Geometry Grp	1	1	1	1
Degree of Util (X)	0.62	0.45	0.495	0.98
Departure Headway (Hd)	7.009	7.244	7.528	6.462
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	512	497	478	563
Service Time	5.075	5.315	5.598	4.517
HCM Lane V/C Ratio	0.621	0.451	0.496	0.97
HCM Control Delay	20.9	16.2	17.8	58.8
HCM Lane LOS	C	C	C	F
HCM 95th-tile Q	4.2	2.3	2.7	13.6

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	NWU	NWL	NWT	NWR
Lane Configurations			✣	
Traffic Vol, veh/h	0	2	77	129
Future Vol, veh/h	0	2	77	129
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	83	139
Number of Lanes	0	0	1	0

Approach	NW
Opposing Approach	SE
Opposing Lanes	1
Conflicting Approach Left	NB
Conflicting Lanes Left	1
Conflicting Approach Right	SB
Conflicting Lanes Right	1
HCM Control Delay	16.2
HCM LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↑↱	
Traffic Volume (veh/h)	54	26	46	111	38	105	73	870	64	147	1173	114
Future Volume (veh/h)	54	26	46	111	38	105	73	870	64	147	1173	114
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	56	27	47	114	39	108	75	897	66	152	1209	118
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	2	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	163	96	166	227	68	189	299	1088	80	313	1661	162
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.05	0.63	0.63	0.06	0.64	0.64
Sat Flow, veh/h	1236	611	1064	1320	437	1211	1774	1714	126	1774	2590	252
Grp Volume(v), veh/h	56	0	74	114	0	147	75	0	963	152	477	850
Grp Sat Flow(s),veh/h/ln	1236	0	1675	1320	0	1649	1774	0	1840	1774	1025	1818
Q Serve(g_s), s	4.4	0.0	3.9	8.3	0.0	8.3	1.4	0.0	40.1	2.9	31.3	31.5
Cycle Q Clear(g_c), s	12.7	0.0	3.9	12.2	0.0	8.3	1.4	0.0	40.1	2.9	31.3	31.5
Prop In Lane	1.00		0.64	1.00		0.73	1.00		0.07	1.00		0.14
Lane Grp Cap(c), veh/h	163	0	262	227	0	258	299	0	1168	313	657	1166
V/C Ratio(X)	0.34	0.00	0.28	0.50	0.00	0.57	0.25	0.00	0.82	0.49	0.73	0.73
Avail Cap(c_a), veh/h	316	0	469	390	0	462	384	0	1168	385	657	1166
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	37.2	42.6	0.0	39.1	10.9	0.0	14.0	16.0	12.1	12.1
Incr Delay (d2), s/veh	0.5	0.0	0.2	0.6	0.0	0.7	0.4	0.0	6.7	1.2	6.9	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.8	3.1	0.0	3.8	0.8	0.0	22.2	2.4	10.0	16.9
LnGrp Delay(d),s/veh	45.4	0.0	37.5	43.3	0.0	39.8	11.4	0.0	20.7	17.2	18.9	16.1
LnGrp LOS	D		D	D		D	B		C	B	B	B
Approach Vol, veh/h		130			261			1038			1479	
Approach Delay, s/veh		40.9			41.3			20.0			17.1	
Approach LOS		D			D			C			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	10.9	68.5		20.6	10.3	69.1		20.6
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0
Max Green Setting (Gmax), s	10.0	47.0		28.0	10.0	47.0		28.0
Max Q Clear Time (g_c+I1), s	4.9	42.1		14.7	3.4	33.5		14.2
Green Ext Time (p_c), s	0.2	4.5		1.0	0.1	11.5		1.0

Intersection Summary	
HCM 2010 Ctrl Delay	21.4
HCM 2010 LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	48	21	87	39	203	25	635	44	291	874	166
Future Volume (veh/h)	169	48	21	87	39	203	25	635	44	291	874	166
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	186	53	23	96	43	223	27	698	48	320	960	182
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	106	46	245	149	522	119	707	49	516	980	186
Arrive On Green	0.07	0.09	0.09	0.06	0.08	0.08	0.03	0.41	0.41	0.25	0.64	0.64
Sat Flow, veh/h	1774	1233	535	1774	1863	1583	1774	1723	119	1774	1523	289
Grp Volume(v), veh/h	186	0	76	96	43	223	27	0	746	320	0	1142
Grp Sat Flow(s),veh/h/ln	1774	0	1768	1774	1863	1583	1774	0	1842	1774	0	1812
Q Serve(g_s), s	7.0	0.0	4.1	4.9	2.2	1.8	0.9	0.0	40.2	11.6	0.0	60.8
Cycle Q Clear(g_c), s	7.0	0.0	4.1	4.9	2.2	1.8	0.9	0.0	40.2	11.6	0.0	60.8
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.06	1.00		0.16
Lane Grp Cap(c), veh/h	261	0	152	245	149	522	119	0	755	516	0	1166
V/C Ratio(X)	0.71	0.00	0.50	0.39	0.29	0.43	0.23	0.00	0.99	0.62	0.00	0.98
Avail Cap(c_a), veh/h	261	0	477	255	503	823	196	0	755	516	0	1166
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.3	0.0	43.7	38.8	43.3	13.0	25.5	0.0	29.3	31.2	0.0	17.2
Incr Delay (d2), s/veh	8.8	0.0	2.5	1.0	1.1	0.6	1.0	0.0	29.9	2.3	0.0	21.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	2.1	2.4	1.2	3.4	0.5	0.0	26.6	8.0	0.0	36.9
LnGrp Delay(d),s/veh	50.2	0.0	46.2	39.8	44.4	13.6	26.5	0.0	59.2	33.4	0.0	39.0
LnGrp LOS	D		D	D	D	B	C		E	C		D
Approach Vol, veh/h		262			362			773			1462	
Approach Delay, s/veh		49.0			24.2			58.0			37.8	
Approach LOS		D			C			E			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	69.4	11.0	13.0	30.0	46.0	10.4	13.6
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	5.0	* 5	4.0	5.0
Max Green Setting (Gmax), s	7.0	41.0	7.0	27.0	7.0	* 41	7.0	27.0
Max Q Clear Time (g_c+I1), s	2.9	62.8	9.0	4.2	13.6	42.2	6.9	6.1
Green Ext Time (p_c), s	0.0	0.0	0.0	1.4	0.0	0.0	0.0	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	42.6
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	224	46	21	87	39	203	25	580	44	291	900	140
Future Volume (veh/h)	224	46	21	87	39	203	25	580	44	291	900	140
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	246	51	23	96	43	223	27	637	48	320	989	154
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	104	47	246	149	556	119	665	50	558	1013	158
Arrive On Green	0.07	0.09	0.09	0.06	0.08	0.08	0.03	0.39	0.39	0.27	0.64	0.64
Sat Flow, veh/h	1774	1217	549	1774	1863	1583	1774	1711	129	1774	1574	245
Grp Volume(v), veh/h	246	0	74	96	43	223	27	0	685	320	0	1143
Grp Sat Flow(s),veh/h/ln	1774	0	1766	1774	1863	1583	1774	0	1840	1774	0	1819
Q Serve(g_s), s	7.0	0.0	4.0	4.9	2.2	1.8	1.0	0.0	36.3	10.8	0.0	60.2
Cycle Q Clear(g_c), s	7.0	0.0	4.0	4.9	2.2	1.8	1.0	0.0	36.3	10.8	0.0	60.2
Prop In Lane	1.00		0.31	1.00		1.00	1.00		0.07	1.00		0.13
Lane Grp Cap(c), veh/h	261	0	152	246	149	556	119	0	715	558	0	1171
V/C Ratio(X)	0.94	0.00	0.49	0.39	0.29	0.40	0.23	0.00	0.96	0.57	0.00	0.98
Avail Cap(c_a), veh/h	261	0	477	257	503	857	196	0	754	558	0	1171
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	43.6	38.8	43.3	11.9	26.1	0.0	29.8	29.2	0.0	17.1
Incr Delay (d2), s/veh	40.5	0.0	2.4	1.0	1.1	0.5	1.0	0.0	24.8	1.4	0.0	21.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	0.0	2.1	2.4	1.2	3.2	0.5	0.0	23.2	7.6	0.0	36.7
LnGrp Delay(d),s/veh	83.9	0.0	46.0	39.8	44.4	12.4	27.1	0.0	54.5	30.6	0.0	38.2
LnGrp LOS	F		D	D	D	B	C		D	C		D
Approach Vol, veh/h		320			362			712			1463	
Approach Delay, s/veh		75.1			23.4			53.5			36.6	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	69.4	11.0	13.0	32.1	43.9	10.4	13.6
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	5.0	* 5	4.0	5.0
Max Green Setting (Gmax), s	7.0	41.0	7.0	27.0	7.0	* 41	7.0	27.0
Max Q Clear Time (g_c+I1), s	3.0	62.2	9.0	4.2	12.8	38.3	6.9	6.0
Green Ext Time (p_c), s	0.0	0.0	0.0	1.4	0.0	0.6	0.0	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	43.4
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑	↱	↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	224	46	21	87	39	203	61	580	44	291	874	166
Future Volume (veh/h)	224	46	21	87	39	203	61	580	44	291	874	166
Number	3	8	18	7	4	14	1	6	16	5	2	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	246	51	23	96	43	223	67	637	48	320	960	182
Adj No. of Lanes	1	1	0	1	1	1	1	1	0	1	1	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	104	47	246	149	556	147	665	50	558	956	181
Arrive On Green	0.07	0.09	0.09	0.06	0.08	0.08	0.04	0.39	0.39	0.27	0.63	0.63
Sat Flow, veh/h	1774	1217	549	1774	1863	1583	1774	1711	129	1774	1523	289
Grp Volume(v), veh/h	246	0	74	96	43	223	67	0	685	320	0	1142
Grp Sat Flow(s),veh/h/ln	1774	0	1766	1774	1863	1583	1774	0	1840	1774	0	1812
Q Serve(g_s), s	7.0	0.0	4.0	4.9	2.2	1.8	2.5	0.0	36.3	10.8	0.0	62.8
Cycle Q Clear(g_c), s	7.0	0.0	4.0	4.9	2.2	1.8	2.5	0.0	36.3	10.8	0.0	62.8
Prop In Lane	1.00		0.31	1.00		1.00	1.00		0.07	1.00		0.16
Lane Grp Cap(c), veh/h	261	0	152	246	149	556	147	0	715	558	0	1137
V/C Ratio(X)	0.94	0.00	0.49	0.39	0.29	0.40	0.46	0.00	0.96	0.57	0.00	1.00
Avail Cap(c_a), veh/h	261	0	477	257	503	857	196	0	754	558	0	1137
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	43.6	38.8	43.3	11.9	26.0	0.0	29.8	29.2	0.0	18.6
Incr Delay (d2), s/veh	40.5	0.0	2.4	1.0	1.1	0.5	2.2	0.0	24.8	1.4	0.0	27.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.3	0.0	2.1	2.4	1.2	3.2	1.3	0.0	23.2	7.6	0.0	39.7
LnGrp Delay(d),s/veh	83.9	0.0	46.0	39.8	44.4	12.4	28.2	0.0	54.5	30.6	0.0	46.3
LnGrp LOS	F		D	D	D	B	C		D	C		F
Approach Vol, veh/h		320			362			752			1462	
Approach Delay, s/veh		75.1			23.4			52.2			42.9	
Approach LOS		E			C			D			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	67.8	11.0	13.0	32.1	43.9	10.4	13.6
Change Period (Y+Rc), s	4.0	5.0	4.0	5.0	5.0	* 5	4.0	5.0
Max Green Setting (Gmax), s	7.0	41.0	7.0	27.0	7.0	* 41	7.0	27.0
Max Q Clear Time (g_c+I1), s	4.5	64.8	9.0	4.2	12.8	38.3	6.9	6.0
Green Ext Time (p_c), s	0.0	0.0	0.0	1.4	0.0	0.6	0.0	1.4

Intersection Summary	
HCM 2010 Ctrl Delay	46.4
HCM 2010 LOS	D

Notes

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	323	394	122	45	266	168	77	198	45	178	263	272
Future Volume (veh/h)	323	394	122	45	266	168	77	198	45	178	263	272
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	344	419	130	48	283	179	82	211	48	189	280	289
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	376	585	182	62	281	177	133	556	126	381	318	328
Arrive On Green	0.21	0.43	0.43	0.04	0.26	0.26	0.38	0.38	0.38	0.38	0.38	0.38
Sat Flow, veh/h	1774	1365	423	1774	1068	676	839	1469	334	1116	841	868
Grp Volume(v), veh/h	344	0	549	48	0	462	82	0	259	189	0	569
Grp Sat Flow(s),veh/h/ln	1774	0	1788	1774	0	1744	839	0	1804	1116	0	1710
Q Serve(g_s), s	18.0	0.0	24.1	2.6	0.0	25.0	6.5	0.0	9.9	14.1	0.0	29.5
Cycle Q Clear(g_c), s	18.0	0.0	24.1	2.6	0.0	25.0	36.0	0.0	9.9	24.0	0.0	29.5
Prop In Lane	1.00		0.24	1.00		0.39	1.00		0.19	1.00		0.51
Lane Grp Cap(c), veh/h	376	0	767	62	0	458	133	0	682	381	0	647
V/C Ratio(X)	0.92	0.00	0.72	0.77	0.00	1.01	0.62	0.00	0.38	0.50	0.00	0.88
Avail Cap(c_a), veh/h	391	0	767	373	0	458	133	0	682	381	0	647
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.7	0.0	22.4	45.5	0.0	35.1	45.3	0.0	21.5	30.2	0.0	27.6
Incr Delay (d2), s/veh	25.2	0.0	3.2	24.0	0.0	44.2	19.6	0.0	1.6	1.4	0.0	13.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.4	0.0	12.6	1.7	0.0	17.6	2.9	0.0	5.2	4.5	0.0	16.3
LnGrp Delay(d),s/veh	61.9	0.0	25.6	69.5	0.0	79.3	64.9	0.0	23.1	31.6	0.0	41.1
LnGrp LOS	E		C	E		F	E		C	C		D
Approach Vol, veh/h		893			510			341			758	
Approach Delay, s/veh		39.6			78.4			33.1			38.8	
Approach LOS		D			E			C			D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4		6	7	8
Phs Duration (G+Y+Rc), s		41.0	8.4	45.8		41.0	24.2	30.0
Change Period (Y+Rc), s		* 5	5.0	* 5		5.0	4.0	5.0
Max Green Setting (Gmax), s		* 36	20.0	* 26		35.0	21.0	25.0
Max Q Clear Time (g_c+I1), s		38.0	4.6	26.1		31.5	20.0	27.0
Green Ext Time (p_c), s		0.0	0.1	0.0		2.4	0.1	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	46.4
HCM 2010 LOS	D

Notes

Intersection	
Intersection Delay, s/veh	47.4
Intersection LOS	E

Movement	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SEU	SEL	SET	SER
Lane Configurations			✣				✣				✣	
Traffic Vol, veh/h	0	28	274	1	0	165	271	92	0	92	139	32
Future Vol, veh/h	0	28	274	1	0	165	271	92	0	92	139	32
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	30	295	1	0	177	291	99	0	99	149	34
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	NB	SB	SE
Opposing Approach	SB	NB	NW
Opposing Lanes	1	1	1
Conflicting Approach Left	SE	NW	SB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NW	SE	NB
Conflicting Lanes Right	1	1	1
HCM Control Delay	24.1	85.6	22.1
HCM LOS	C	F	C

Lane	NBLn1	NWLn1	SELn1	SBLn1
Vol Left, %	9%	1%	35%	31%
Vol Thru, %	90%	41%	53%	51%
Vol Right, %	0%	58%	12%	17%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	303	221	263	528
LT Vol	28	2	92	165
Through Vol	274	90	139	271
RT Vol	1	129	32	92
Lane Flow Rate	326	238	283	568
Geometry Grp	1	1	1	1
Degree of Util (X)	0.66	0.494	0.598	1.071
Departure Headway (Hd)	7.594	7.833	7.956	6.791
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	479	463	458	534
Service Time	5.594	5.833	5.956	4.879
HCM Lane V/C Ratio	0.681	0.514	0.618	1.064
HCM Control Delay	24.1	18.2	22.1	85.6
HCM Lane LOS	C	C	C	F
HCM 95th-tile Q	4.7	2.7	3.8	17

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	NWU	NWL	NWT	NWR
Lane Configurations			✣	
Traffic Vol, veh/h	0	2	90	129
Future Vol, veh/h	0	2	90	129
Peak Hour Factor	0.92	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	2	97	139
Number of Lanes	0	0	1	0

Approach	NW
Opposing Approach	SE
Opposing Lanes	1
Conflicting Approach Left	NB
Conflicting Lanes Left	1
Conflicting Approach Right	SB
Conflicting Lanes Right	1
HCM Control Delay	18.2
HCM LOS	C

Intersection	
Int Delay, s/veh	0.1

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	0	727	975	0	0	6
Future Vol, veh/h	0	727	975	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	799	1071	0	0	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1071
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	0	0	268
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	-	268
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	NB	SB	SE
HCM Control Delay, s	0	0	18.8
HCM LOS			C

Minor Lane/Major Mvmt	NBT	SELn1	SBT
Capacity (veh/h)	-	268	-
HCM Lane V/C Ratio	-	0.025	-
HCM Control Delay (s)	-	18.8	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	0.1	-

Intersection	
Int Delay, s/veh	47.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	95	0	125	23	0	11	105	621	32	3	828	149
Future Vol, veh/h	95	0	125	23	0	11	105	621	32	3	828	149
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	0	-	-	-	75	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	104	0	137	25	0	12	115	682	35	3	910	164

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1935	-	992	1929	2011	700	1074	0	0	718	0	0
Stage 1	998	-	-	931	931	-	-	-	-	-	-	-
Stage 2	937	-	-	998	1080	-	-	-	-	-	-	-
Critical Hdwy	7.12	-	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	-	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	-	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	-	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 50	0	298	50	59	439	649	-	-	883	-	-
Stage 1	294	0	-	320	346	-	-	-	-	-	-	-
Stage 2	318	0	-	294	294	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 42	-	298	~ 23	48	439	649	-	-	883	-	-
Mov Cap-2 Maneuver	~ 42	-	-	38	120	-	-	-	-	-	-	-
Stage 1	242	-	-	263	285	-	-	-	-	-	-	-
Stage 2	254	-	-	158	293	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 395.6	162.2	1.6	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	649	-	-	42	298	54	883	-	-
HCM Lane V/C Ratio	0.178	-	-	2.486	0.461	0.692	0.004	-	-
HCM Control Delay (s)	11.7	-	-	$ 880.6	27	162.2	9.1	-	-
HCM Lane LOS	B	-	-	F	D	F	A	-	-
HCM 95th %tile Q(veh)	0.6	-	-	11.3	2.3	2.8	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	93	75	731	964	12
Future Vol, veh/h	27	93	75	731	964	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	75	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	102	82	803	1059	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2034	1066	1073	0	-	0
Stage 1	1066	-	-	-	-	-
Stage 2	968	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	63	270	650	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	55	270	650	-	-	-
Mov Cap-2 Maneuver	174	-	-	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	322	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	27	1.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	650	-	174	270	-	-
HCM Lane V/C Ratio	0.127	-	0.171	0.379	-	-
HCM Control Delay (s)	11.3	-	29.9	26.2	-	-
HCM Lane LOS	B	-	D	D	-	-
HCM 95th %tile Q(veh)	0.4	-	0.6	1.7	-	-

Intersection						
Int Delay, s/veh	0.1					

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations		↑	↑			↱
Traffic Vol, veh/h	0	672	975	0	0	6
Future Vol, veh/h	0	672	975	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	738	1071	0	0	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1071
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	0	0	268
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	-	268
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	NB	SB	SE
HCM Control Delay, s	0	0	18.8
HCM LOS			C

Minor Lane/Major Mvmt	NBT	SELn1	SBT
Capacity (veh/h)	-	268	-
HCM Lane V/C Ratio	-	0.025	-
HCM Control Delay (s)	-	18.8	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	0.1	-

Intersection	
Int Delay, s/veh	6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	125	23	0	11	105	661	32	3	828	176
Future Vol, veh/h	0	0	125	23	0	11	105	661	32	3	828	176
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	75	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	137	25	0	12	115	726	35	3	910	193

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	1007	1988	2085	744	1103	0	0	762	0	0
Stage 1	-	-	-	975	975	-	-	-	-	-	-	-
Stage 2	-	-	-	1013	1110	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	292	46	53	415	633	-	-	850	-	-
Stage 1	0	0	-	303	330	-	-	-	-	-	-	-
Stage 2	0	0	-	288	285	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	292	~ 21	43	415	633	-	-	850	-	-
Mov Cap-2 Maneuver	-	-	-	33	113	-	-	-	-	-	-	-
Stage 1	-	-	-	248	270	-	-	-	-	-	-	-
Stage 2	-	-	-	152	284	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.8	207.3	1.6	0
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	633	-	-	292	47	850	-	-
HCM Lane V/C Ratio	0.182	-	-	0.47	0.795	0.004	-	-
HCM Control Delay (s)	12	-	-	27.8	207.3	9.3	-	-
HCM Lane LOS	B	-	-	D	F	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	2.4	3.2	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	67	93	75	731	964	12
Future Vol, veh/h	67	93	75	731	964	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	75	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	102	82	803	1059	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2034	1066	1073	0	-	0
Stage 1	1066	-	-	-	-	-
Stage 2	968	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 63	270	650	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 55	270	650	-	-	-
Mov Cap-2 Maneuver	174	-	-	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	322	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	32	1.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	650	-	174	270	-	-
HCM Lane V/C Ratio	0.127	-	0.423	0.379	-	-
HCM Control Delay (s)	11.3	-	40.1	26.2	-	-
HCM Lane LOS	B	-	E	D	-	-
HCM 95th %tile Q(veh)	0.4	-	1.9	1.7	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	NBL	NBT	SBT	SBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	0	708	975	0	0	6
Future Vol, veh/h	0	708	975	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	778	1071	0	0	7

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1071
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.318
Pot Cap-1 Maneuver	0	-	-	0	0	268
Stage 1	0	-	-	0	0	-
Stage 2	0	-	-	0	0	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	-	268
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	NB	SB	SE
HCM Control Delay, s	0	0	18.8
HCM LOS			C

Minor Lane/Major Mvmt	NBT	SELn1	SBT
Capacity (veh/h)	-	268	-
HCM Lane V/C Ratio	-	0.025	-
HCM Control Delay (s)	-	18.8	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	0.1	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	125	23	0	11	0	697	32	3	828	150
Future Vol, veh/h	0	0	125	23	0	11	0	697	32	3	828	150
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	0	-	-
Veh in Median Storage, #	-	0	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	137	25	0	12	0	766	35	3	910	165

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	992	1783	1865	784	-	0	0	801	0	0
Stage 1	-	-	-	784	784	-	-	-	-	-	-	-
Stage 2	-	-	-	999	1081	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.22	7.12	6.52	6.22	-	-	-	4.12	-	-
Critical Hdwy Stg 1	-	-	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.318	3.518	4.018	3.318	-	-	-	2.218	-	-
Pot Cap-1 Maneuver	0	0	298	64	73	393	0	-	-	822	-	-
Stage 1	0	0	-	386	404	-	0	-	-	-	-	-
Stage 2	0	0	-	293	294	-	0	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	298	34	73	393	-	-	-	822	-	-
Mov Cap-2 Maneuver	-	-	-	114	187	-	-	-	-	-	-	-
Stage 1	-	-	-	386	404	-	-	-	-	-	-	-
Stage 2	-	-	-	157	293	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27	37.3	0	0
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	-	-	298	148	822	-	-
HCM Lane V/C Ratio	-	-	0.461	0.252	0.004	-	-
HCM Control Delay (s)	-	-	27	37.3	9.4	-	-
HCM Lane LOS	-	-	D	E	A	-	-
HCM 95th %tile Q(veh)	-	-	2.3	0.9	0	-	-

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	67	93	144	662	964	12
Future Vol, veh/h	67	93	144	662	964	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	75	75	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	102	158	727	1059	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2110	1066	1073	0	-	0
Stage 1	1066	-	-	-	-	-
Stage 2	1044	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 56	270	650	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 42	270	650	-	-	-
Mov Cap-2 Maneuver	151	-	-	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	257	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	36	2.2	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	650	-	151	270	-	-
HCM Lane V/C Ratio	0.243	-	0.488	0.379	-	-
HCM Control Delay (s)	12.3	-	49.7	26.2	-	-
HCM Lane LOS	B	-	E	D	-	-
HCM 95th %tile Q(veh)	1	-	2.3	1.7	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon