



King's Crown Traffic Study

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EXECUTIVE SUMMARY

This study addresses the traffic impacts associated with the proposed King's Crown development located in Park City, Utah. The proposed land use consists of a mixed type of residential development including single family homes, townhomes, condominiums and employee housing.

At full buildout, the King's Crown site is expected to generate 66 AM peak hour trips and 75 PM peak hour trips. The AM peak hour is between the hours of 8 AM and 10 AM. The PM peak hour is between the hours of 3 PM and 6 PM. These times were selected because the peak traffic days coincide with day skier traffic to Park City Mountain Resort.

This study analyzes project traffic impacts at the following intersections;

- Park Ave / Deer Valley
- Empire Ave / Shadow Ridge
- Empire Ave / Crescent Tram
- Lowell Ave / Manor Way
- Park Ave / Silver King
- Park Ave / Crescent Tram (8th Street)
- Park Ave/ Silver King
- Empire Ave / Manor Way
- Lowell Ave / Shadow Ridge
- Lowell Ave / North Star
- Park Ave / 14th Street
- Empire Ave / 14 Street

The King's Crown site will be accessed by Lowell Avenue roadway and then disperses to other roadways in the study area. For this study, it was estimated that 95% of the traffic would enter and exit from the north on Lowell Avenue and the remaining 5% to the south on Lowell Avenue.

Existing Conditions

The intersection of Empire Ave / Silver King currently operates at a LOS C in the AM peak hour and LOS F in the PM peak hour. The remaining intersections operate an acceptable LOS in both the AM and PM peak hours.

Future Conditions Without Project

For 2037, projected volumes without the proposed development, the intersections will operate at an acceptable LOS during both the AM and PM peak hours except for the Empire Ave / Silver King and the Lowell Ave / Silver King intersection during the PM peak hour. The delays experienced at the Lowell Ave / Silver King intersection are the result of vehicles queuing from the Empire Ave / Silver King intersection.

For traffic operations to improve at the Empire Ave / Silver King intersection, installation of a traffic signal or a roundabout is required. For a traffic signal to operate efficiently and safely, separate turn lanes in the northbound and southbound direction are necessary. The Lowell Ave. / Silver King intersection delays are resolved with the improvement at the Empire Ave / Silver King intersection.

Future Conditions With Project

With the implementation of the above mitigation/improvement measures, all the intersections will operate at an acceptable LOS during both the AM and PM peak hours with the King's Crown project built as proposed.



Conclusion

As reflected in this Traffic Impact Analysis the roadway network can facilitate the traffic needs for existing traffic and the traffic anticipated from the King's Crown Project. Implementing the improvements at the Empire Ave / Silver King and Park Ave / Deer Valley intersections will allow these intersections and roadways in the study area with the King's Crown development to operate at an acceptable level of service in the future.

While the intersections and roadways can operate at an acceptable level of service with the King's Crown development it is important to implement the Traffic Demand Management (TDM) strategies as well. It is important to understand that driving patterns over the next twenty years could significantly change due to public transit and smart car technologies.



INTRODUCTION

The objective of the traffic study is to determine the potential impacts to traffic conditions due to the completion of the proposed King's Crown development in Park City, Utah. The development is proposed to consist of 28 single family lots, 25 condominium units, 7 townhome units and 17 units for workforce housing dormitory style.

Figure 1 depicts the site plan and **Figure 2** a vicinity map along with the study intersections. The study intersections and analysis scenarios were determined with Park City Municipal Corporation (PCMC) staff.

This addendum will address:

- 2017 traffic conditions in the study area.
- Future 2037 traffic conditions in the study area, also known as background.
- Future 2037 traffic conditions in the study with additional traffic from the proposed King's Crown development.
- Proposed Traffic Demand Management (TDM) strategies to address the increase of traffic generated by the proposed King's Crown development.

Study Area

In collaboration with Park City Municipal Corporation (PCMC) the study area for the traffic study was determined. The following intersections were analyzed for traffic operations. The study area intersections are also highlighted in **Figure 2**.

- Park Ave / Deer Valley
- Empire Ave / Shadow Ridge
- Empire Ave / Crescent Tram
- Lowell Ave / Manor Way
- Park Ave / Silver King
- Park Ave / Crescent Tram (8th Street)
- New Street Project Access / Lowell Ave
- Park Ave/ Silver King
- Empire Ave / Manor Way
- Lowell Ave / Shadow Ridge
- Lowell Ave / North Star
- Park Ave / 14th Street
- Empire Ave / 14 Street

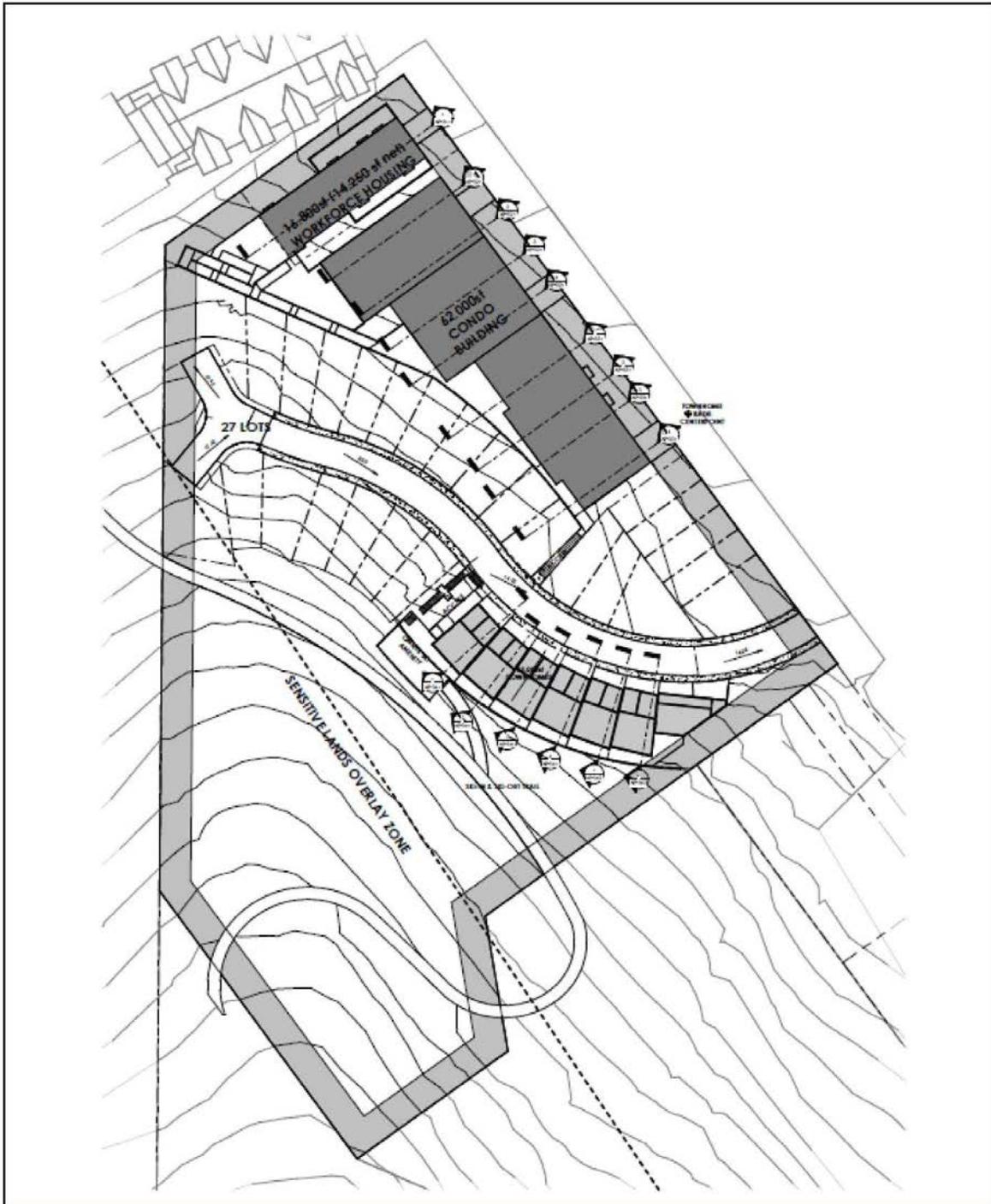


Figure 1
Project Site Plan

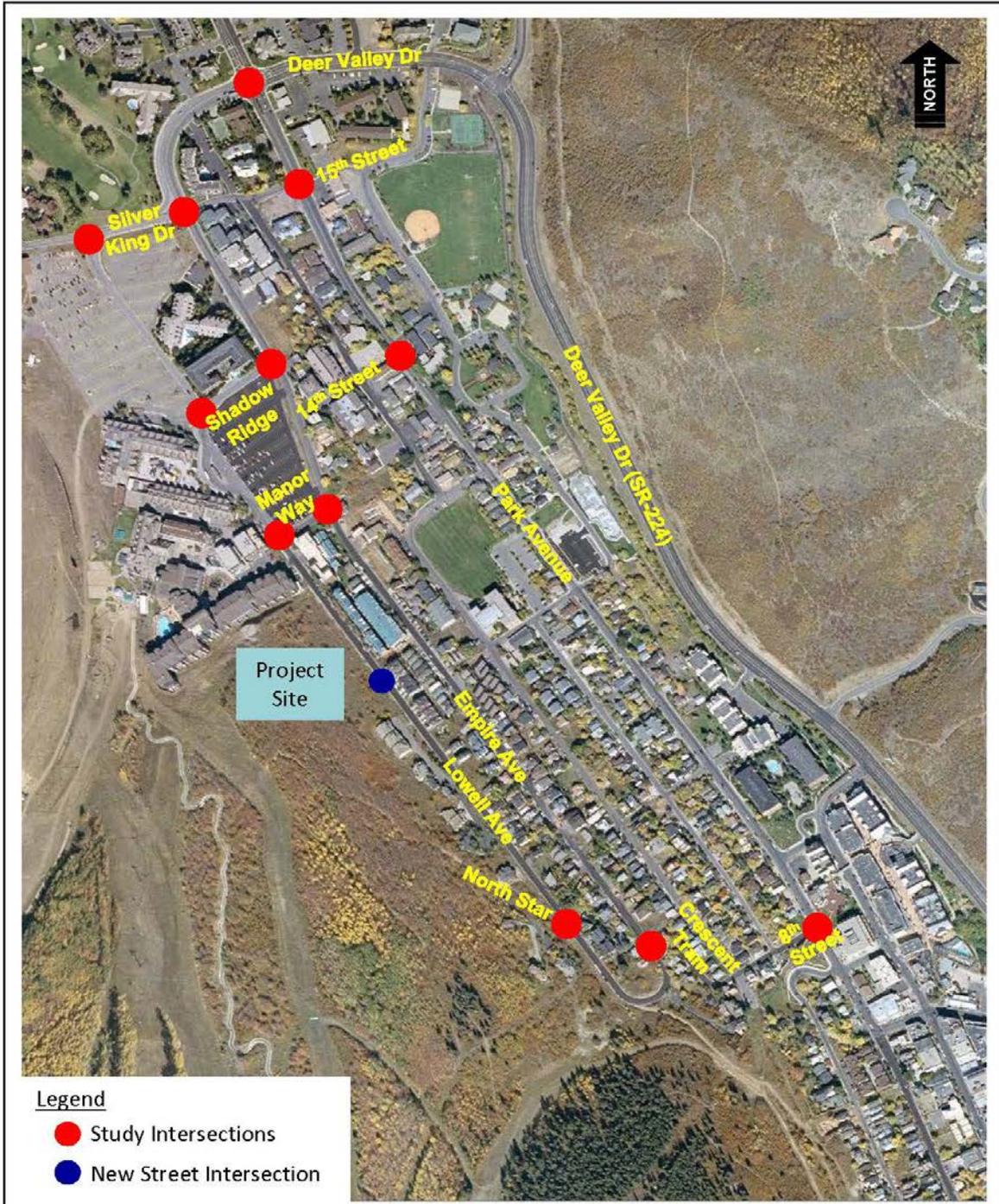


Figure 2
Project Location & Study Intersections

EXISTING (2017) TRAFFIC VOLUMES

Traffic counts at the study intersections listed above were collected to establish a baseline of existing conditions and allow for analysis of traffic operation in the area. For this addendum to reflect similar baseline conditions as the original study, the volumes were gathered on Saturday February 18, 2017, President’s Day Weekend. At the intersections, AM peak period traffic counts were recorded from 8:00 AM until 10:00 AM and PM peak period traffic counts were recorded from 3:00 PM to 6:00 PM. These hours were obtained from previous studies in the area, they reflect the peak operating hours for the proposed development, and the largest volume of traffic on the roadways. The dates were also selected because President’s Day weekend represents one of the busiest ski times and therefore high traffic volumes on the intersections and roadways in the study area.

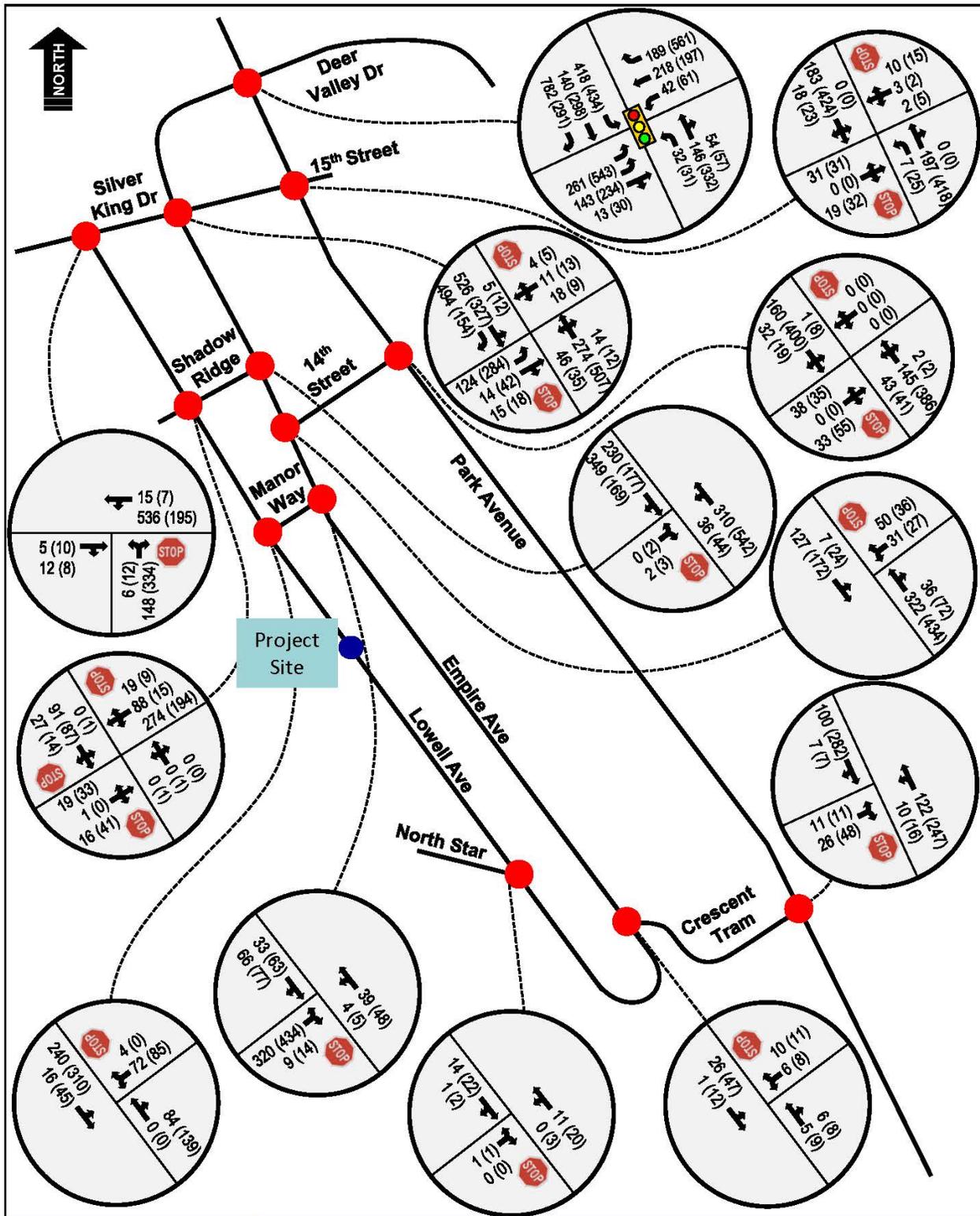
During the peak of the ski season weekdays, specifically Fridays, can often create the same amount of traffic volumes as a weekend. Therefore the traffic counts collected on a Saturday will also be applied during a typical weekday for analysis throughout the report.

Table 1 below summarizes the data gathered from President’s Day Weekend 2017. A detail of the traffic counts for February 18, 2017 can be found in the Appendix.

Table 1 Existing Traffic Count Summary

<i>Intersection</i>	<i>Actual Counts February 18th 2017</i>	
	<i>AM</i>	<i>PM</i>
Park Ave / Deer Valley	2438	3069
Empire Ave / Silver King	1545	1418
Empire Ave / Shadow Ridge	927	937
Empire Ave / Manor Way	471	641
Empire Ave / Crescent Tram	53	95
Lowell Ave / Shadow Ridge	535	396
Lowell Ave / Manor Way	416	579
Lowell Ave / North Star	27	48
Park Ave / Silver King	470	975
Park Ave / 14th Street	454	946
Park Ave / 8 th Street	276	611
Empire Ave / 14 Street	573	765
<i>Note: The numbers depict the total volume at the intersection during one peak hour.</i>		

Figure 3 depicts the existing traffic volumes, intersection geometry and the traffic control measures currently used for each of the study intersections.



FUTURE (2037) TRAFFIC VOLUMES

The purpose of the future 2037 background conditions analysis is to evaluate the study intersections during the AM and PM peak travel period under the projected 2037 traffic volumes. This analysis provides a baseline condition for the year 2037, which can be used to determine future project impacts.

Summit County, with the support of Park City and UDOT, has created a traffic model to analyze future traffic conditions throughout Summit County, including Park City. As part of that model, future traffic volumes are created based on demographics associated with land use plans approved by Park City and Summit County. The land use plans provide the best estimate of future population along with the associated traffic. **Table 2** depicts the anticipated traffic volumes for Summit County and Park City.

Table 2 Anticipated Population Growth

	2015	2037	Growth
Resident Population Summit County	41,133	60,138	46.2%
Resident Population Park City	7,309	9,197	25.8%

Along with population, vehicle miles traveled (VMT) is factored into the traffic model. Historically VMTs in Park City and Summit County are growing at a higher rate than population. However, Park City and Summit County are implementing travel demand management (TMD) strategies to reduce the number of single occupancy vehicles and reduce the VMTs throughout the City and the County. Nonetheless and to be conservative, the population growth of 25.8% expected for Park City was applied to the existing traffic volumes to determine future traffic volumes in the study area. The 25.8% reflects a growth of approximately 1.1% per year of traffic growth.

Table 3 Existing vs. Future Traffic Volume Summary

<i>Intersection</i>	<i>Actual Counts February 18th 2017</i>		<i>Future Traffic Volumes 2037</i>	
	<i>AM</i>	<i>PM</i>	<i>AM</i>	<i>PM</i>
Park Ave / Deer Valley	2438	3069	3067	3861
Empire Ave / Silver King Dr.	1545	1418	1944	1784
Empire Ave / Shadow Ridge	927	937	1166	1178
Empire Ave / Manor Way	471	641	593	806
Empire Ave / Crescent Tram	53	95	67	120
Lowell Ave / Shadow Ridge	535	396	673	498
Lowell Ave / Manor Way	416	579	523	728
Lowell Ave / North Star	27	48	34	60
Park Ave / Silver King	470	975	591	1227
Park Ave / 14th Street	454	946	571	1190
Park Ave / 8 th Street	276	611	347	768
Empire Ave / 14 Street	573	765	721	962

Note: The numbers depict the total volume at the intersection during one peak hour.

In the evaluation of future traffic volumes, it was requested by Park City staff to consider a cumulative 20-year forecast that includes entitled projects which reflect the approved Park City Master Plan. In

discussions with staff, there are two entitled developments that will have a direct effect on the roadways and intersections in the study area.

Triton Engineering recently updated the traffic study for the Treasure Hill development. The development is proposed to consist of 60,323 square feet (sq-ft) of commercial space that includes 16,127 sq-ft of meeting space. It will also have 200,000 sq-ft of hotel space (202 rooms), 45,153 sq-ft or 18 units of three story condominiums, 6,369 sq-ft or 3 units of two story condominiums, 220,164 sq-ft or 82 units of one story condominiums, and 6,669 sq. ft. of employee housing dormitory style.

While no imminent development plans are known for Park City Mountain Resort (PCMR), there is a Development Agreement between PCMC and PCMR that entitles PCMR to 491.78 maximum unit equivalents. The specific details of what is defined as a unit equivalent are set forth in the Development Agreement. The ITE Trip Generation Manual, 9th Edition was used to estimate the number of peak hour trips that are expected to be generated by the PCMR potential development. Because the exact development is unknown now for the PCMR, development variety of mixed land uses that equaled 491.78 equivalent units or less was assumed. A trip reduction factor was also applied to the PCMR trip generation as was applied for Treasure Hill due to the mixed land use and ski access opportunities.

In the same Development Agreement between PCMC and PCMR there is also the potential of 600 new parking stalls. In the same Development Agreement it was assumed 160 stalls would be occupied by employees thus creating 440 net new skier parking spaces. It is assumed that 50% of those stalls would enter or leave the parking lot during the am and pm peak hour thus creating an additional 220 vehicles in the study area during the am and pm peak hour.

The projected traffic volumes for the combination of both developments was approximately 599 during the AM Peak Hour and 574 during the PM Peak Hour. The range of trips is dependent upon the type of development that is proposed at PCMR and how much trip reduction can be applied. (Methodologies for trip generation and trip reductions are detailed in the Project Traffic Volumes). From **Table 3** on the Park Ave / Deer Valley intersection it is anticipated there will be an additional 629 vehicles in the AM Peak Hour and 800 vehicles in the PM Peak based on background growth in the area. The anticipated trips generated from the King's Crown and PCMR development fall within the anticipated range of growth. Therefor the volumes in **Table 3** and depicted in **Figure 4** will be used to evaluate the study intersections for the baseline condition 2037 without the proposed King's Crown development.

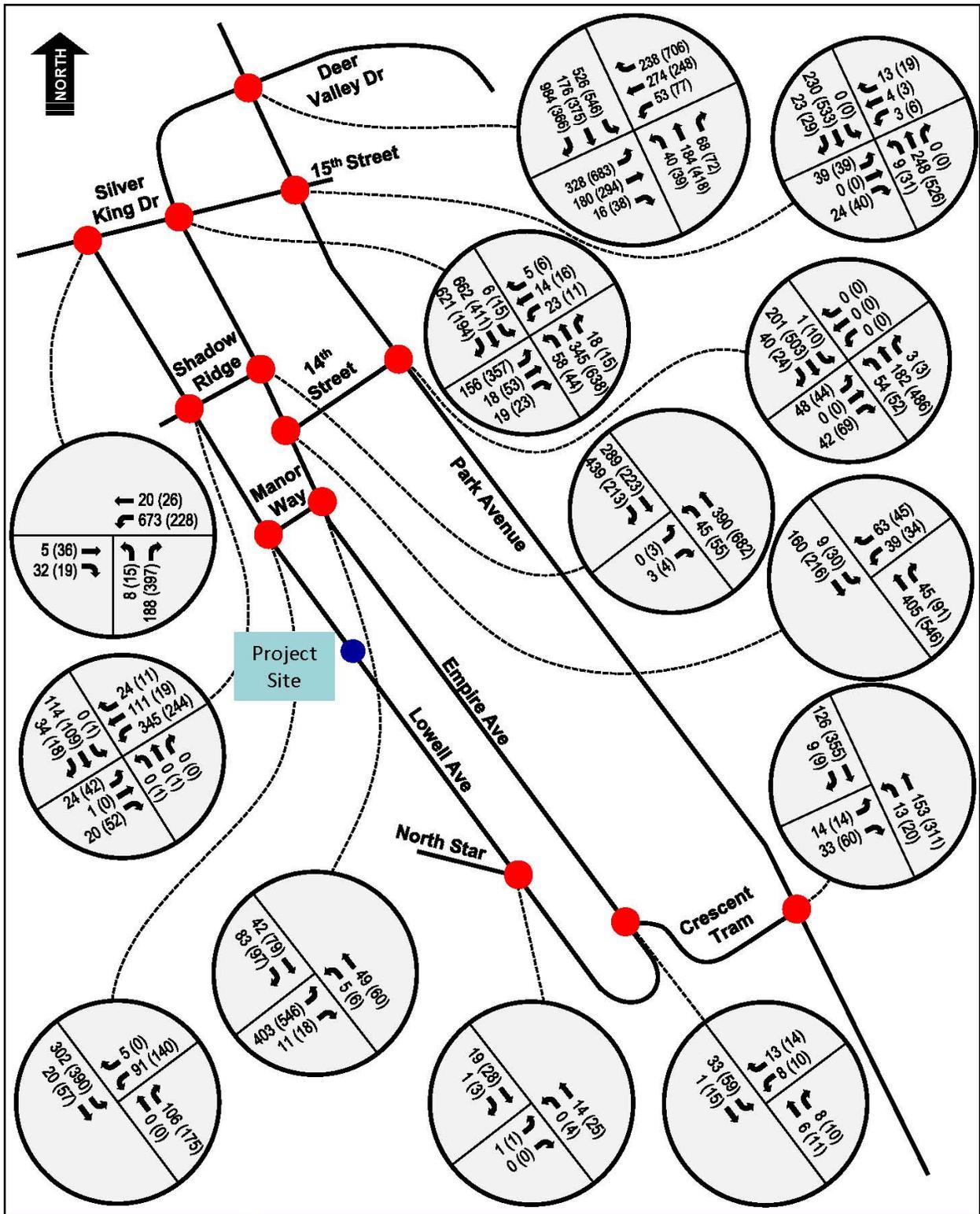


Figure 4
 Future (2037) Peak Hour Traffic Volumes

PROJECT TRAFFIC VOLUMES

The ITE Trip Generation Manual, 9th Edition, was used to estimate the number of AM and PM peak hour trips that are expected to be generated by the proposed development during a typical weekday. To calculate the anticipated trips from each element of the proposed development, the following land uses were applied;

- The proposed single-family homes, ITE Land Use 210 (Single Family Detached Housing) was used.
- The employee housing element of the proposed development is 16,800 sq-ft of dormitory type housing that results in 18 units. There is not a dormitory land use in ITE, so ITE Land Use 220, Apartments, was selected to represent this land use type/intensity.
- For the proposed condominiums/townhouses, ITE Land Use 230 dwelling unit alternative was selected. In the ITE Trip Generation manual it states, "Both condominiums and townhouses are included in this land use." It is anticipated there will be a combined 32 condominiums/townhouses.

Table 4 provides the results of the trip generation for each of the individual land uses.

Table 4 Land Use Specific Trip Generation

Land Use (ITE Reference)	Size	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single Family Homes	27 units	9	22	31	22	11	33
Employee Housing	18 units	4	9	13	16	10	26
Condominium	25 units	3	13	16	8	5	13
Townhouse	7 units	1	5	6	2	1	3
Total		17	49	66	48	27	75

Trip Reduction

Trip reduction can reduce the number of trips generated by a proposed development dependent upon the type of development and site-specific conditions.

- One potential reduction would be the employee housing element of the project. However, employee housing relating to other residential housing does not typically create a significant trip reduction. To be conservative it was assumed there was not any trip reduction for employee housing.
- Another potential for trip reduction results from individuals choosing to walk or bike to the surrounding amenities. While it is anticipated people will sometimes choose these alternative methods of travel, once again to be conservative, no trip reductions were applied.

The most significant trip reduction is only 132,000 square feet of the entitled 286,000 square feet is proposed to be constructed, a 54% reduction in density.



Trip Distribution & Assignment

Project Trip Distribution was determined by taking into consideration three elements: major traffic corridors, traffic count data, and the natural flow of traffic in the area. It was assumed that 95% of the traffic will enter and exit from the north on Lowell Avenue and the remaining 5% will enter and exit to the south using Lowell Avenue.

Figure 5 shows the project trip distribution by percentage during AM and PM peak hours for the access points and the study area intersections. **Figure 6** displays the project trip peak hour traffic volumes during the AM and PM peak hours based on the trip distribution in **Figure 5** combined with the trip generation traffic volumes from **Table 4**.

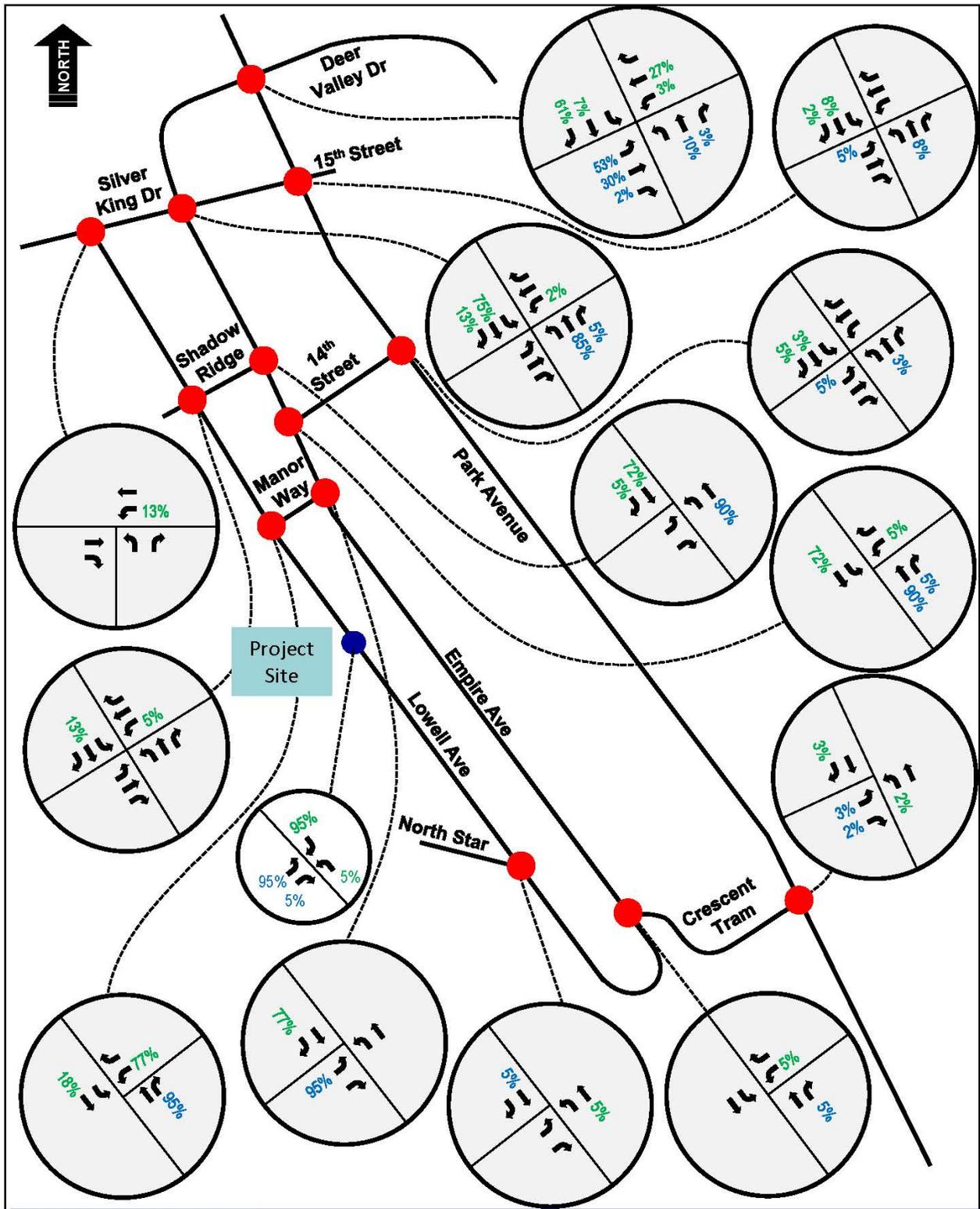
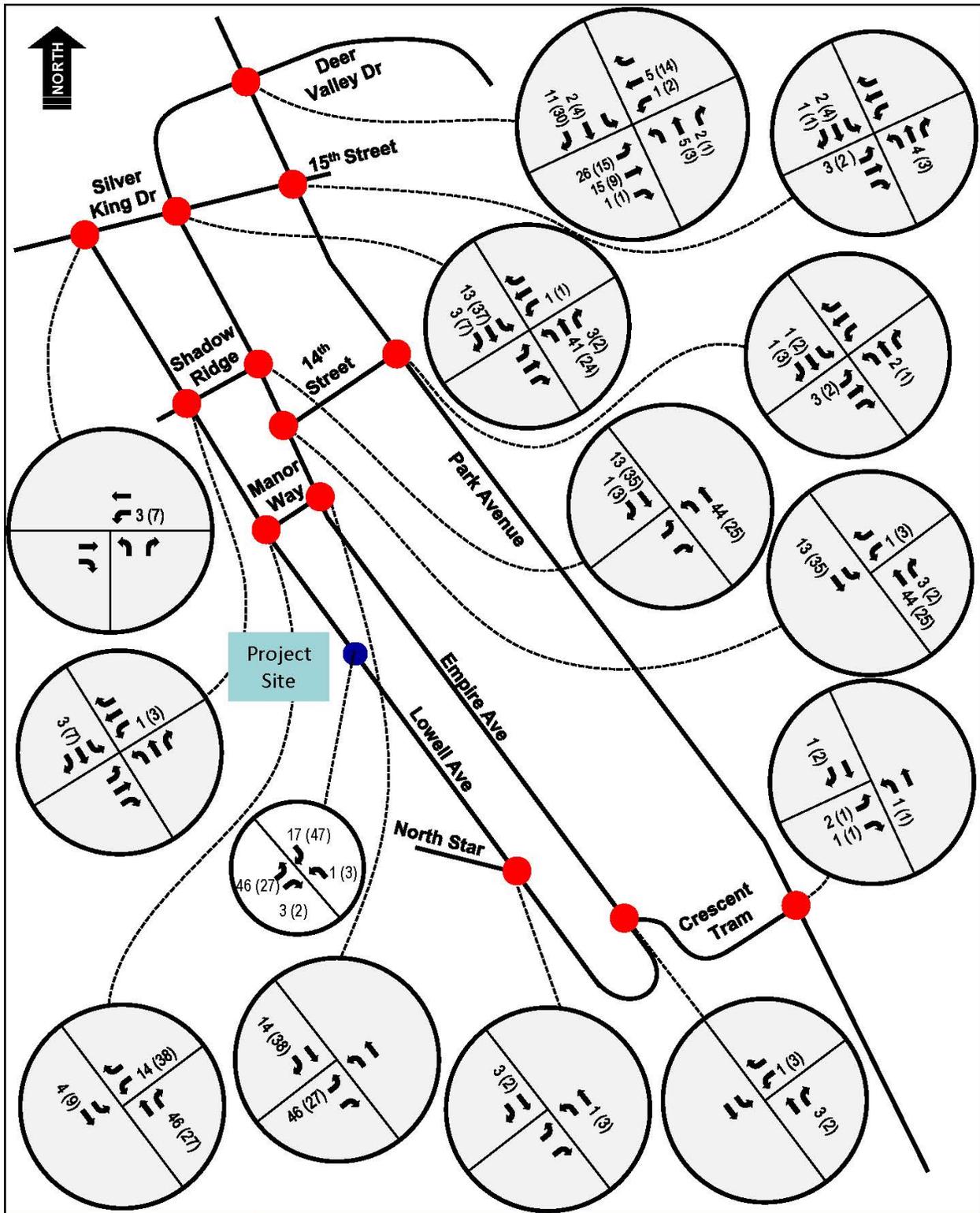


Figure 5
Project Trip Distribution by Percentage Peak Hour Traffic Volumes



Legend
 15 AM Peak Hour
 (22) PM Peak Hour

Figure 6
 Project Trip Generation Peak Hour Traffic Volumes



FUTURE (2037) PLUS PROJECT TRAFFIC VOLUMES

The projected-generated traffic was added to the future traffic volumes to obtain the future plus project traffic volumes at the site driveways and study intersections. **Figure 7** shows the future plus project traffic volumes.

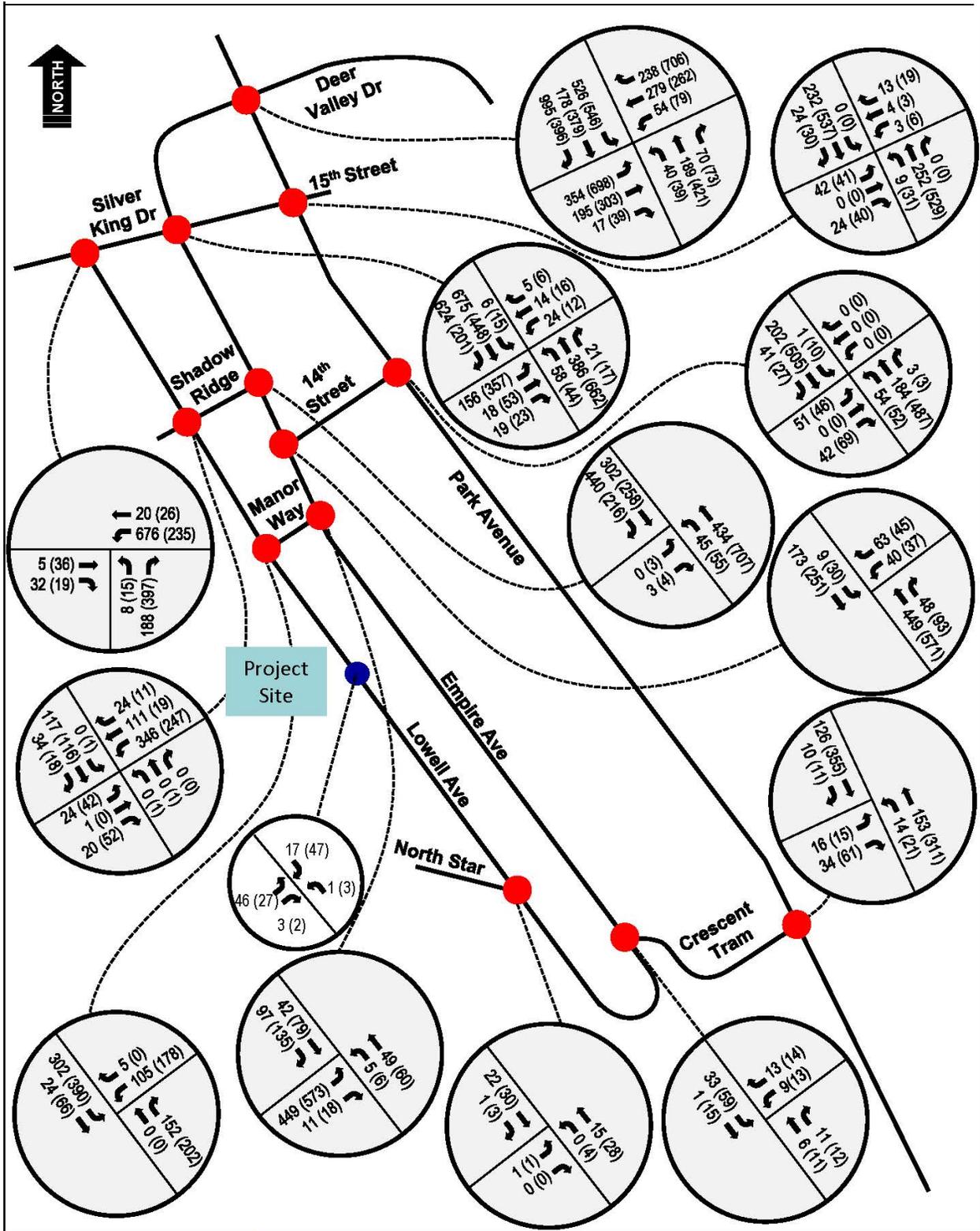


Figure 7
 Project + Future (2037) Peak Hour Traffic Volumes



TRAFFIC ANALYSIS

Methodology

Traffic operations for the study area for existing and future traffic conditions were included. The Highway Capacity Manual 2010 (HCM 2010) and Transportation Research Board methodology was applied to remain consistent with customary practice in the traffic engineering industry and professional standards. Level of Service (LOS) from HCM is a qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or pedestrians. A LOS definition generally describes these conditions in terms of factors such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. There are six levels of service describing these conditions, ranging from A to F, which have been standardized by the Transportation Research Board. LOS A represents a free-flowing traffic condition where motorists are affected very little by other motorists; a high degree of freedom to select desired speeds and the level of comfort and convenience to the motorist is excellent. LOS F is characterized by congested flow conditions with stoppages; the amount of traffic approaching a point exceeds the amount that can pass that point. Table Two provides a description of each LOS letter designation and an accompanying average delay per vehicle for unsignalized and signalized intersections.

All the traffic analysis used Synchro/SimTraffic Software, which follow the Highway Capacity Manual (HCM) 2010 methodology, to evaluate study intersections and obtain the LOS reported in **Table 5**. Multiple runs of SimTraffic were used to provide a statistical evaluation of the interaction between the intersections. These results serve as a base for the analysis. Detailed traffic operations outputs are included in the Appendix.

The traffic analysis for all of the intersections in the study area are evaluated for the AM and PM peak hour. The AM and PM peak hour is defined by a one hour period when the traffic volumes were the highest at each intersection in the study area.

Table 5 Level of Service Descriptions

LOS	Description of Delay	Unsignalized Intersections Average Delay (1)	Signalized Intersections Average Delay (2)	Graphical Representation of Delay
A	Free Flow	0 to 10	0 than 10	
B	Stable Flow (slight delays)	10 to 15	10 to 20	
C	Stable Flow (acceptable delays)	15 to 25	20 to 35	
D	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)	25 to 35	35 to 55	
E	Unstable flow (intolerable delay)	35 to 50	55 to 80	
F	Forced flow (congested and queues fail to clear)	Greater than 50	Greater than 80	
<p>Notes:</p> <p>(1) Worst approach LOS and delay measured (seconds/vehicle).</p> <p>(2) Overall intersection LOS and average delay (seconds/vehicle) for all approaches.</p>				

Existing Levels of Service

Table 6 shows the level of service and corresponding delay (sec/veh) at each of the study intersections for the existing traffic conditions.

Table 6 Existing Levels of Service

Intersection	Control	Worst Approach ¹		Overall Intersection ²
		LOS AM / PM	Approach AM / PM	LOS AM / PM
Park Ave / Deer Valley	Signal			C (22.9) / C (34.5)
Empire Ave / Silver King Dr	Stop	C (19.2) / F (56.0)	EB / EB	
Empire Ave / Shadow Ridge	Stop	A (7.4) / A (9.8)	NB / EB	
Empire Ave / Manor Way	Stop	A (5.2) / A (6.1)	EB / EB	
Empire Ave / Crescent Tram	Stop	A (4.2) / A (3.8)	WB / WB	
Empire Ave / 14 Street	Stop	A (8.5) / A (9.5)	WB / WB	
Lowell Ave / Silver King	Stop	B (13.7) / B (14.4)	NB / NB	
Lowell Ave / Manor Way	Stop	A (5.7) / A (7.0)	SB / SB	
Lowell Ave / North Star	Stop	A (4.4) / A (3.7)	EB / EB	
Lowell Ave / Shadow Ridge	Stop	A (8.9) / A (5.4)	EB / WB	
Park Ave / 15th	Stop	A (7.0) / B (12.7)	EB / EB	
Park Ave / 14th Street	Stop	A (6.3) / B (11.0)	EB / EB	
Park Ave / 8th	Stop	A (4.6) / A (6.6)	EB / EB	
Notes:				
(1) The level of service and delay for worst approach is shown for stop-controlled intersections only.				
(2) The overall intersection level of service is shown for signalized intersections only				

As shown in **Table 6**, all the intersections currently operate at an acceptable LOS during both the AM and PM peak hours except for the Empire Ave / Silver King intersection during the PM peak hour. The eastbound left turning movement at the Empire Ave / Silver King intersection experiences excessive delays during a typical winter ski day as the motorists leave the resort.

Future (2037) Levels of Service

Table 7 shows the level of service and corresponding delay (sec/veh) at each of the study intersections for the future traffic conditions without the King’s Crown development.

Table 7 Future Levels of Service

Intersection	Control	Worst Approach ¹		Overall Intersection ²
		LOS AM / PM	Approach AM / PM	LOS AM / PM
Park Ave / Deer Valley	Signal			F (100.3) / E (79.5)
Empire Ave / Silver King	Stop	F (51.9) / F (164.1)	EB / EB	
Empire Ave / Shadow Ridge	Stop	B (13.4) / D (25.6)	NB / EB	
Empire Ave / Manor Way	Stop	A (6.0) / A (8.3)	EB / EB	
Empire Ave / Crescent Tram	Stop	A (4.2) / A (4.1)	WB / WB	
Empire Ave / 14 Street	Stop	B (11.4) / C (15.4)	WB / WB	
Lowell Ave / Silver King	Stop	C (19.2) / F (205.1)	NB / NB	
Lowell Ave / Manor Way	Stop	A (6.2) / B (10.0)	SB / SB	
Lowell Ave / North Star	Stop	A (3.1) / A (1.6)	EB / SB	
Lowell Ave / Shadow Ridge	Stop	A (7.0) / A (6.7)	WB / WB	
Park Ave / 15th	Stop	B (10.1) / C (15.8)	WB / WB	
Park Ave / 14th Street	Stop	A (6.8) / B (14.4)	EB / EB	
Park Ave / Crescent Tram	Stop	A (5.6) / A (8.1)	EB / EB	
Notes:				
(1) The level of service and delay for worst approach is shown for stop-controlled intersections only.				
(2) The overall intersection level of service is shown for signalized intersections only				

As shown in **Table 7**, the intersections currently operate at an acceptable LOS during both the AM and PM peak hours except for the Empire Ave / Silver King and the Lowell Ave / Silver King intersection during the PM peak hour. The delays experienced at the Lowell Ave / Silver King intersection result from vehicles queuing from the Empire Ave / Silver King intersection.

The eastbound left turning movement in the AM peak hour and all the eastbound movements experience excessive delays at the Empire Ave / Silver King due to the volume of vehicles.

Future Levels of Service Without Project

With the intersections in the study area operating at undesirable levels of service mitigation/improvement measures were applied and analyzed. **Table 8** shows the level of service and corresponding delay (sec/veh) at specific intersections for the future traffic conditions without the King’s Crown development.

Table 8 Future Mitigated Levels of Service

Intersection	Control	Worst Approach ¹		Overall Intersection ²
		LOS AM / PM	Approach AM / PM	LOS
Park Ave / Deer Valley	Signal			D (43.8) / D (53.5)
Empire Ave / Silver King	Roundabout or Signal			A (7.1) / B (11.9)
Lowell Ave / Silver King	Stop	A (7.1) / B (10.6)	WB / NB	
Notes:				
(1) The level of service and delay for worst approach is shown for stop-controlled intersections only.				
(2) The overall intersection level of service is shown for signalized intersections only				

As shown in **Table 8**, to improve the traffic operations for the Empire Ave / Silver King intersection, installation of a traffic signal or a roundabout is required. For a traffic signal to operate efficiently and safely, separate turn lanes in the northbound and southbound direction are necessary.

The Lowell Ave / Silver King intersection delays are resolved with the improvement at the Empire Ave / Silver King intersection.

While the Park Ave / Deer Valley intersection operates at an acceptable LOS, certain traffic movements experience excessive delays. Retiming the existing traffic signal will remove excessive delays and still provide an acceptable LOS for the intersection.

Future Levels of Service With Project

Table 9 shows the level of service and corresponding delay (sec/veh) at each of the study intersections for the future traffic conditions, with the King’s Crown development applying the same mitigation/improvement measures applied in the future conditions, as applied in **Table 8**.

Table 9 Future Plus Project Levels of Service

Intersection	Control	Worst Approach ¹		Overall Intersection ²
		LOS AM / PM	Approach AM / PM	LOS AM / PM
Park Ave / Deer Valley	Signal			D (43.4) / D (52.8)
Empire Ave. / Silver King	Roundabout or Signal			A (7.1) / B (13.3)
Empire Ave / Shadow Ridge	Stop	B (14.0) / C (16.3)	NB / EB	
Empire Ave / Manor Way	Stop	A (6.3) / A (8.8)	EB / EB	
Empire Ave / Crescent Tram	Stop	A (4.1) / A (4.1)	WB / WB	
Empire Ave / 14 Street	Stop	B (11.6) / C (18.6)	WB / WB	
Lowell Ave / Silver King	Stop	C (21.2) / A (9.0)	WB / NB	
Lowell Ave / Manor Way	Stop	A (6.5) / B (10.4)	SB / SB	
Lowell Ave / North Star	Stop	A (2.5) / A (5.1)	EB / EB	
Lowell Ave / Shadow Ridge	Stop	A (7.3) / A (6.5)	WB / WB	
Park Ave / 15th	Stop	A (7.4) / D (26.2)	WB / WB	
Park Ave / 14th Street	Stop	A (7.6) / C (17.8)	EB / EB	
Park Ave / 8th	Stop	A (5.4) / A (7.8)	EB / EB	
Access 1 / Empire Ave	Stop	A (3.8) / A (2.2)	NB / NB	
Access 2 / Lowell Ave	Stop	A (3.8) / A (3.9)	EB / EB	
Notes:				
(1) The level of service and delay for worst approach is shown for stop-controlled intersections only.				
(2) The overall intersection level of service is shown for signalized intersections only				

As shown in **Table 9**, with the implementation of the mitigation/improvement measures applied in **Table 8**, in the future, all the intersections will operate at an acceptable LOS during both the AM and PM peak hours with the King’s Crown project.

TRAFFIC DEMAND MANAGEMENT (TDM)

The King’s Crown Project intends to implement various TDM strategies.

- The initial TDM strategy is the mixed use with inclusion of employee housing with the project boundary. While employee housing relating to other residential housing does not typically create a significant trip reduction there are numerous surrounding amenities including PCMR, hotels and commercial that can provide employment without the need to drive a personal vehicle.
- During the construction phase of the project, some employees will park at the Richardson Flats park and ride lot (or other park and ride lots) and be shuttled to the site or use the Park City Transit System to get to the site. Flexibility regarding this strategy is necessary to accommodate the many aspects of construction.
- The most significant TDM is only 132,000 square feet of the entitled 286,000 square feet is proposed to be constructed, a 54% reduction in density.

SUMMARY AND CONCLUSIONS

As reflected in this Traffic Impact Analysis the roadway network can facilitate the traffic needs for existing traffic and the traffic anticipated from the King's Crown Project. Implementing the improvements at the Empire Ave / Silver King and Park Ave / Deer Valley intersections will allow these intersections and roadways in the study area with the King's Crown development to operate at an acceptable level of service in the future.

While the intersections and roadways can operate at an acceptable level of service with the King's Crown development it is important to implement the Traffic Demand Management (TDM) strategies as well. It is important to understand that driving patterns over the next twenty years could significantly change due to public transit and smart car technologies.



APPENDIX

- A) AM Existing Traffic Counts
- B) PM Existing Traffic Counts
- C) Existing (2017) Traffic Analysis
- D) Future (2037) Traffic Analysis
- E) Future (2037) Mitigated Traffic Analysis
- F) Future (2037) With Project Traffic Analysis



APPENDIX - AM Existing Traffic Counts

TURNING MOVEMENT COUNT SUMMARY



INTERSECTION
 N-S STREET: *Park Ave*
 E-W STREET: *Empire Ave / Deer Valley Dr*

PROJECT NO.: *16-001*
 COUNT DATE: *February 28, 2017*
 NOTES:

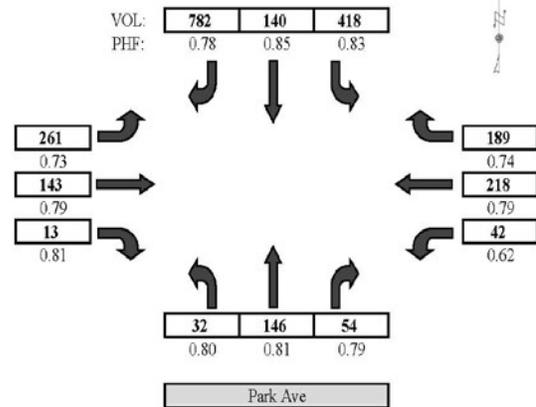
COUNT TIME
 FROM: *8:00 AM*
 TO: *10:00 AM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM **2,438**
 PHF: **0.91**
 PEAK HOUR:
 FROM: TO:
8:15 AM 9:15 AM

Empire Ave / Deer Valley Dr

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:15 AM	6	19	2	30	27	3	121	25	154	4	34	41	466
8:15 AM	8:30 AM	9	35	15	54	30	3	126	31	220	5	58	31	617
8:30 AM	8:45 AM	6	27	9	56	37	3	110	41	252	12	55	44	652
8:45 AM	9:00 AM	7	45	17	90	45	4	95	33	185	17	69	64	671
9:00 AM	9:15 AM	10	39	13	61	31	3	87	35	125	8	36	50	498
9:15 AM	9:30 AM	8	29	14	44	39	10	83	38	96	10	52	72	495
9:30 AM	9:45 AM	5	45	11	57	23	6	77	31	98	8	45	49	455
9:45 AM	10:00 AM	9	27	11	62	21	4	105	43	86	11	30	77	486

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	9:00 AM	28	126	43	230	139	13	452	130	811	38	216	180	2,406
8:15 AM	9:15 AM	32	146	54	261	143	13	418	140	782	42	218	189	2,438
8:30 AM	9:30 AM	31	140	53	251	152	20	375	147	658	47	212	230	2,316
8:45 AM	9:45 AM	30	158	55	252	138	23	342	137	504	43	202	235	2,119
9:00 AM	10:00 AM	32	140	49	224	114	23	352	147	405	37	163	248	1,934

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION
 N-S STREET: *Park Ave*
 E-W STREET: *14th Street / Private Access*

PROJECT NO.: *16-001*
 COUNT DATE: *February 28, 2017*
 NOTES:

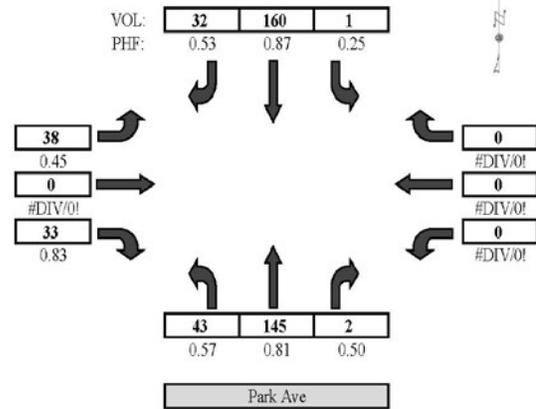
COUNT TIME
 FROM: *8:00 AM*
 TO: *10:00 AM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM **454**
 PHF: **0.83**
 PEAK HOUR:
 FROM: **8:30 AM** TO:
9:30 AM

14th Street / Private Access

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
	L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM TO: 8:15 AM	3	26	0	4	0	5	0	27	6	0	0	0	71
8:15 AM TO: 8:30 AM	11	33	0	4	0	6	0	26	2	0	0	0	82
8:30 AM TO: 8:45 AM	12	35	0	7	0	8	1	31	15	0	0	0	109
8:45 AM TO: 9:00 AM	19	36	1	21	0	9	0	41	10	0	0	0	137
9:00 AM TO: 9:15 AM	6	45	1	7	0	6	0	42	3	0	0	0	110
9:15 AM TO: 9:30 AM	6	29	0	3	0	10	0	46	4	0	0	0	98
9:30 AM TO: 9:45 AM	2	48	0	2	0	4	0	43	4	0	0	0	103
9:45 AM TO: 10:00 AM	8	45	0	6	0	12	0	47	2	0	0	0	120

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

TIME PERIOD	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
	L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM TO: 9:00 AM	45	130	1	36	0	28	1	125	33	0	0	0	399
8:15 AM TO: 9:15 AM	48	149	2	39	0	29	1	140	30	0	0	0	438
8:30 AM TO: 9:30 AM	43	145	2	38	0	33	1	160	32	0	0	0	454
8:45 AM TO: 9:45 AM	33	158	2	33	0	29	0	172	21	0	0	0	448
9:00 AM TO: 10:00 AM	22	167	1	18	0	32	0	178	13	0	0	0	431

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION
 N-S STREET: *Park Ave*
 E-W STREET: *Crescent Tram*

PROJECT NO.: *16-001*
 COUNT DATE: *February 28, 2017*
 NOTES:

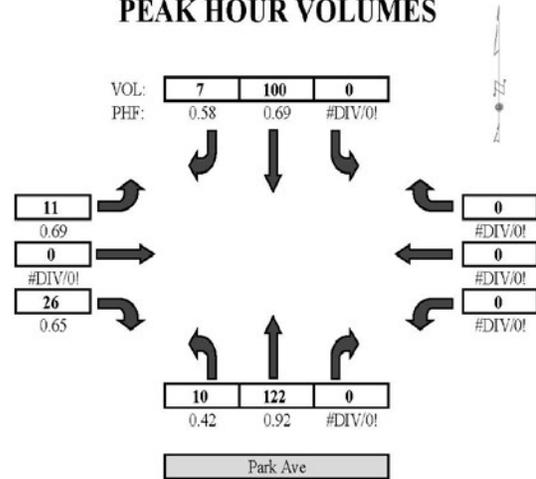
PEAK HOUR VOLUM	276
PHF:	0.87
PEAK HOUR:	
FROM: TO:	9:00 AM 10:00 AM

Crescent Tram

COUNT TIME
 FROM: *8:00 AM*
 TO: *10:00 AM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUMES



COUNT DATA INPUT:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:15 AM	8:15 AM	1	28	0	1	0	1	0	16	3	0	0	0	50
8:15 AM	8:30 AM	8:30 AM	2	24	0	2	0	1	0	20	4	0	0	0	53
8:30 AM	8:45 AM	8:45 AM	5	35	0	2	0	4	0	18	3	0	0	0	67
8:45 AM	9:00 AM	9:00 AM	2	32	0	3	0	4	0	23	1	0	0	0	65
9:00 AM	9:15 AM	9:15 AM	6	33	0	3	0	5	0	23	1	0	0	0	71
9:15 AM	9:30 AM	9:30 AM	4	26	0	4	0	10	0	26	0	0	0	0	70
9:30 AM	9:45 AM	9:45 AM	0	33	0	1	0	4	0	15	3	0	0	0	56
9:45 AM	10:00 AM	10:00 AM	0	30	0	3	0	7	0	36	3	0	0	0	79

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	9:00 AM	9:00 AM	10	119	0	8	0	10	0	77	11	0	0	0	235
8:15 AM	9:15 AM	9:15 AM	15	124	0	10	0	14	0	84	9	0	0	0	256
8:30 AM	9:30 AM	9:30 AM	17	126	0	12	0	23	0	90	5	0	0	0	273
8:45 AM	9:45 AM	9:45 AM	12	124	0	11	0	23	0	87	5	0	0	0	262
9:00 AM	10:00 AM	10:00 AM	10	122	0	11	0	26	0	100	7	0	0	0	276

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION
 N-S STREET: *Empire Ave*
 E-W STREET: *Silver King Dr / 15th Street*

PROJECT NO.: *16-001*
 COUNT DATE: *February 28, 2017*
 NOTES:

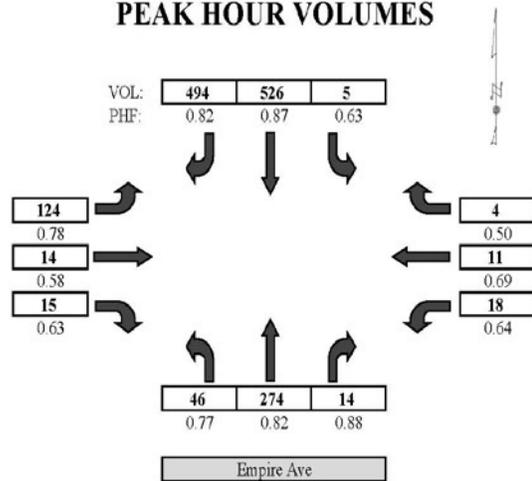
COUNT TIME
 FROM: *8:00 AM*
 TO: *10:00 AM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUME **1,545**
 PHF: **0.90**
 PEAK HOUR:
 FROM: **8:15 AM** TO: **9:15 AM**

Silver King Dr / 15th Street

PEAK HOUR VOLUMES



COUNT DATA INPUT:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:15 AM	8:15 AM	6	49	2	10	2	3	0	111	83	2	2	0	270
8:15 AM	8:30 AM	8:30 AM	9	65	4	20	2	4	2	149	135	2	4	2	398
8:30 AM	8:45 AM	8:45 AM	15	62	3	33	3	4	0	151	150	4	4	0	429
8:45 AM	9:00 AM	9:00 AM	11	84	4	40	6	6	1	140	121	7	3	0	423
9:00 AM	9:15 AM	9:15 AM	11	63	3	31	3	1	2	86	88	5	0	2	295
9:15 AM	9:30 AM	9:30 AM	11	65	4	22	4	5	1	69	84	5	3	0	273
9:30 AM	9:45 AM	9:45 AM	9	75	0	21	4	4	1	92	61	1	2	0	270
9:45 AM	10:00 AM	10:00 AM	14	56	3	26	3	4	0	74	47	1	2	0	230

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	9:00 AM	9:00 AM	41	260	13	103	13	17	3	551	489	15	13	2	1,520
8:15 AM	9:15 AM	9:15 AM	46	274	14	124	14	15	5	526	494	18	11	4	1,545
8:30 AM	9:30 AM	9:30 AM	48	274	14	126	16	16	4	446	443	21	10	2	1,420
8:45 AM	9:45 AM	9:45 AM	42	287	11	114	17	16	5	387	354	18	8	2	1,261
9:00 AM	10:00 AM	10:00 AM	45	259	10	100	14	14	4	321	280	12	7	2	1,068

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION: *Empire Ave*
 N-S STREET: *Shadow Ridge*
 E-W STREET:

PROJECT NO.: *16-001*
 COUNT DATE: *February 28, 2017*
 NOTES:

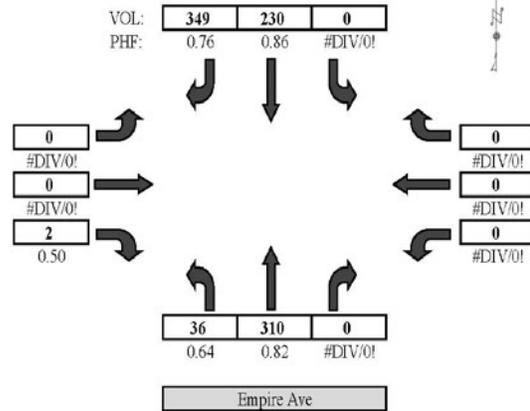
COUNT TIME
 FROM: *8:00 AM*
 TO: *10:00 AM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM	927
PHF:	0.90
PEAK HOUR:	
FROM:	TO:
8:00 AM	9:00 AM

Shadow Ridge

PEAK HOUR VOLUMES



COUNT DATA INPUT:

FROM	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:15 AM	8:15 AM	5	56	0	0	0	0	0	56	59	0	0	0	176
8:15 AM	8:30 AM	8:30 AM	8	79	0	0	0	1	0	67	81	0	0	0	236
8:30 AM	8:45 AM	8:45 AM	9	80	0	0	0	1	0	52	115	0	0	0	257
8:45 AM	9:00 AM	9:00 AM	14	95	0	0	0	0	0	55	94	0	0	0	258
9:00 AM	9:15 AM	9:15 AM	8	74	0	0	0	0	0	36	54	0	0	0	172
9:15 AM	9:30 AM	9:30 AM	8	76	0	0	0	0	0	28	43	0	0	0	155
9:30 AM	9:45 AM	9:45 AM	4	76	0	0	0	0	0	51	42	0	0	0	173
9:45 AM	10:00 AM	10:00 AM	13	74	0	0	0	0	0	29	47	0	0	0	163

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

FROM	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	9:00 AM	9:00 AM	36	310	0	0	0	2	0	230	349	0	0	0	927
8:15 AM	9:15 AM	9:15 AM	39	328	0	0	0	2	0	210	344	0	0	0	923
8:30 AM	9:30 AM	9:30 AM	39	325	0	0	0	1	0	171	306	0	0	0	842
8:45 AM	9:45 AM	9:45 AM	34	321	0	0	0	0	0	170	233	0	0	0	758
9:00 AM	10:00 AM	10:00 AM	33	300	0	0	0	0	0	144	186	0	0	0	663

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION
 N-S STREET: *Empire Ave*
 E-W STREET: *14th Street*

 PROJECT NO.: *16-001*
 COUNT DATE: *February 28, 2017*
 NOTES:

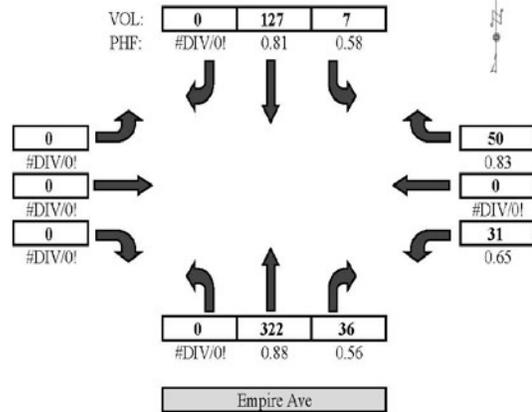
PEAK HOUR VOLUM	573
PHF:	0.86
PEAK HOUR:	
FROM: TO:	
8:15 AM 9:15 AM	

14th Street

COUNT TIME
 FROM: *8:00 AM*
 TO: *10:00 AM*

 GROWTH FACTOR: *1.00*

PEAK HOUR VOLUMES



COUNT DATA INPUT:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:15 AM	8:15 AM	0	57	4	0	0	0	2	29	0	3	0	4	99
8:15 AM	8:30 AM	8:30 AM	0	85	5	0	0	0	1	39	0	5	0	15	150
8:30 AM	8:45 AM	8:45 AM	0	73	10	0	0	0	1	27	0	10	0	13	134
8:45 AM	9:00 AM	9:00 AM	0	91	16	0	0	0	3	30	0	12	0	15	167
9:00 AM	9:15 AM	9:15 AM	0	73	5	0	0	0	2	31	0	4	0	7	122
9:15 AM	9:30 AM	9:30 AM	0	71	8	0	0	0	2	24	0	2	0	5	112
9:30 AM	9:45 AM	9:45 AM	0	73	5	0	0	0	0	47	0	6	0	2	133
9:45 AM	10:00 AM	10:00 AM	0	79	16	0	0	0	2	24	0	3	0	5	129

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	9:00 AM	9:00 AM	0	306	35	0	0	0	7	125	0	30	0	47	550
8:15 AM	9:15 AM	9:15 AM	0	322	36	0	0	0	7	127	0	31	0	50	573
8:30 AM	9:30 AM	9:30 AM	0	308	39	0	0	0	8	112	0	28	0	40	535
8:45 AM	9:45 AM	9:45 AM	0	308	34	0	0	0	7	132	0	24	0	29	534
9:00 AM	10:00 AM	10:00 AM	0	296	34	0	0	0	6	126	0	15	0	19	496

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION
 N-S STREET: *Empire Ave*
 E-W STREET: *Manor Way*

PROJECT NO.: *16-001*
 COUNT DATE: *February 28, 2017*

NOTES:

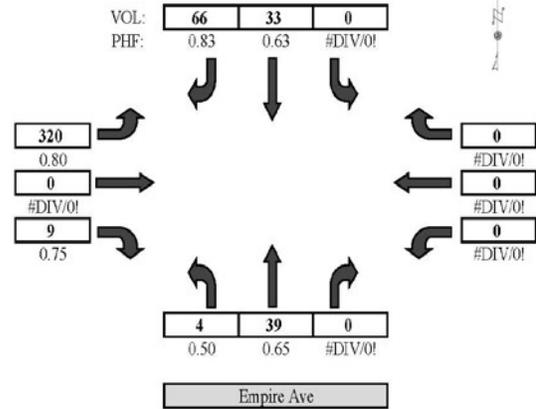
COUNT TIME
 FROM: *8:00 AM*
 TO: *10:00 AM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM	471
PHF:	0.87
PEAK HOUR:	
FROM: TO:	
8:15 AM 9:15 AM	

Manor Way

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:15 AM	0	5	0	50	0	1	0	2	14	0	0	0	72
8:15 AM	8:30 AM	0	15	0	75	0	1	0	13	17	0	0	0	121
8:30 AM	8:45 AM	0	11	0	75	0	2	0	4	19	0	0	0	111
8:45 AM	9:00 AM	2	6	0	100	0	3	0	4	20	0	0	0	135
9:00 AM	9:15 AM	2	7	0	70	0	3	0	12	10	0	0	0	104
9:15 AM	9:30 AM	1	9	0	60	0	4	0	5	13	0	0	0	92
9:30 AM	9:45 AM	0	7	0	68	0	2	0	10	25	0	0	0	112
9:45 AM	10:00 AM	0	17	0	75	0	2	0	6	10	0	0	0	110

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	9:00 AM	2	37	0	300	0	7	0	23	70	0	0	0	439
8:15 AM	9:15 AM	4	39	0	320	0	9	0	33	66	0	0	0	471
8:30 AM	9:30 AM	5	33	0	305	0	12	0	25	62	0	0	0	442
8:45 AM	9:45 AM	5	29	0	298	0	12	0	31	68	0	0	0	443
9:00 AM	10:00 AM	3	40	0	273	0	11	0	33	58	0	0	0	418

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION
 N-S STREET: *Empire Ave*
 E-W STREET: *Crescent Tram / Private Access*

PROJECT NO.: *16-001*
COUNT DATE: *February 28, 2017*
NOTES:

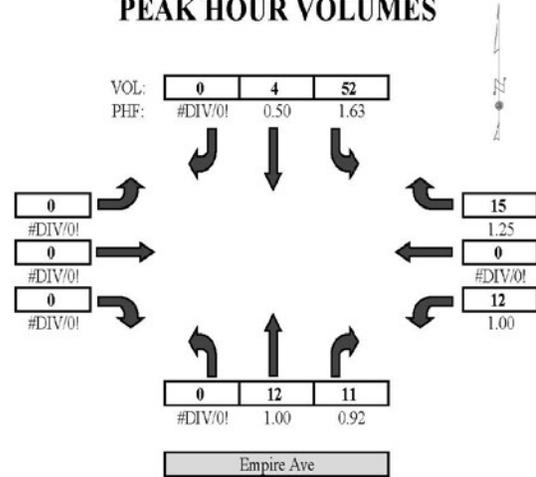
COUNT TIME
FROM: *8:00 AM*
TO: *10:00 AM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM **53**
PHF: **0.78**
PEAK HOUR:
FROM: TO:
5:45 PM 7:45 PM

Crescent Tram / Private Access

PEAK HOUR VOLUMES



COUNT DATA INPUT:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:00 AM	8:15 AM	0	1	1	0	0	0	1	0	1	0	0	2	6
8:15 AM	8:15 AM	8:30 AM	0	1	0	0	0	0	2	0	2	0	0	3	8
8:30 AM	8:30 AM	8:45 AM	0	1	0	0	0	0	2	1	0	0	0	5	9
8:45 AM	8:45 AM	9:00 AM	0	1	3	0	0	0	5	0	0	0	0	3	12
9:00 AM	9:00 AM	9:15 AM	0	0	0	0	0	0	8	0	0	2	0	2	12
9:15 AM	9:15 AM	9:30 AM	0	3	2	0	0	0	8	0	0	3	0	1	17
9:30 AM	9:30 AM	9:45 AM	0	1	1	0	0	0	5	1	0	1	0	3	12
9:45 AM	9:45 AM	10:00 AM	0	3	2	0	0	0	5	2	0	0	0	0	12

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:00 AM	9:00 AM	0	4	4	0	0	0	10	1	3	0	0	13	35
8:15 AM	8:15 AM	9:15 AM	0	3	3	0	0	0	17	1	2	2	0	13	41
8:30 AM	8:30 AM	9:30 AM	0	5	5	0	0	0	23	1	0	5	0	11	50
8:45 AM	8:45 AM	9:45 AM	0	5	6	0	0	0	26	1	0	6	0	9	53
9:00 AM	9:00 AM	10:00 AM	0	7	5	0	0	0	26	3	0	6	0	6	53

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION
 N-S STREET: *Lowell Avenue*
 E-W STREET: *Shadow Ridge*

PROJECT NO.: *16-001*
 COUNT DATE: *February 28, 2017*
 NOTES:

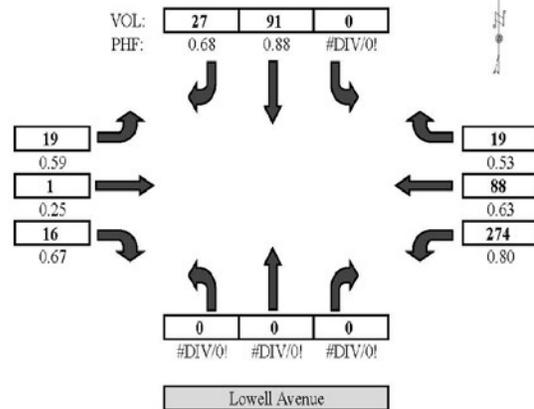
COUNT TIME
 FROM: *8:00 AM*
 TO: *10:00 AM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM **535**
 PHF: **0.79**
 PEAK HOUR:
 FROM: TO:
8:00 AM 9:00 AM

Shadow Ridge

PEAK HOUR VOLUMES



COUNT DATA INPUT:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:15 AM	8:15 AM	0	0	0	2	0	2	0	23	7	50	9	6	99
8:15 AM	8:30 AM	8:30 AM	0	0	0	3	0	3	0	26	5	66	13	3	119
8:30 AM	8:45 AM	8:45 AM	0	0	0	8	1	5	0	24	10	86	35	1	170
8:45 AM	9:00 AM	9:00 AM	0	0	0	6	0	6	0	18	5	72	31	9	147
9:00 AM	9:15 AM	9:15 AM	0	0	0	7	0	2	0	19	3	43	15	8	97
9:15 AM	9:30 AM	9:30 AM	0	0	0	1	0	4	0	18	5	36	7	6	77
9:30 AM	9:45 AM	9:45 AM	0	0	0	2	0	5	0	14	6	38	9	7	81
9:45 AM	10:00 AM	10:00 AM	0	2	0	5	2	2	0	11	1	45	11	4	83

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	9:00 AM	9:00 AM	0	0	0	19	1	16	0	91	27	274	88	19	535
8:15 AM	9:15 AM	9:15 AM	0	0	0	24	1	16	0	87	23	267	94	21	533
8:30 AM	9:30 AM	9:30 AM	0	0	0	22	1	17	0	79	23	237	88	24	491
8:45 AM	9:45 AM	9:45 AM	0	0	0	16	0	17	0	69	19	189	62	30	402
9:00 AM	10:00 AM	10:00 AM	0	2	0	15	2	13	0	62	15	162	42	25	338

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION
 N-S STREET: *Lowell Avenue*
 E-W STREET: *Manor Way*

PROJECT NO.: *16-001*
 COUNT DATE: *February 28, 2017*
 NOTES:

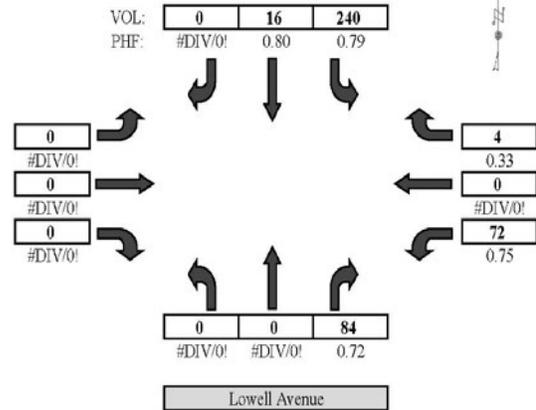
COUNT TIME
 FROM: *8:00 AM*
 TO: *10:00 AM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM	416
PHF:	0.78
PEAK HOUR:	
FROM: TO:	
8:15 AM 9:15 AM	

Manor Way

PEAK HOUR VOLUMES



COUNT DATA INPUT:

FROM:	TIME PERIOD	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
		L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:15 AM	0	0	21	0	0	0	32	6	0	11	0	1	71
8:15 AM	8:30 AM	0	0	22	0	0	0	52	4	0	20	0	3	101
8:30 AM	8:45 AM	0	0	15	0	0	0	59	3	0	16	0	0	93
8:45 AM	9:00 AM	0	0	29	0	0	0	76	5	0	24	0	0	134
9:00 AM	9:15 AM	0	0	18	0	0	0	53	4	0	12	0	1	88
9:15 AM	9:30 AM	0	0	14	0	0	0	51	5	0	11	0	0	81
9:30 AM	9:45 AM	0	0	17	0	0	0	53	6	0	18	0	1	95
9:45 AM	10:00 AM	0	0	29	0	0	0	49	8	0	13	0	0	99

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

FROM:	TIME PERIOD	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
		L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	9:00 AM	0	0	87	0	0	0	219	18	0	71	0	4	399
8:15 AM	9:15 AM	0	0	84	0	0	0	240	16	0	72	0	4	416
8:30 AM	9:30 AM	0	0	76	0	0	0	239	17	0	63	0	1	396
8:45 AM	9:45 AM	0	0	78	0	0	0	233	20	0	65	0	2	398
9:00 AM	10:00 AM	0	0	78	0	0	0	206	23	0	54	0	2	363

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION
 N-S STREET: *Lowell Avenue*
 E-W STREET: *North Star*

PROJECT NO.: *16-001*
 COUNT DATE: *February 28, 2017*
 NOTES:

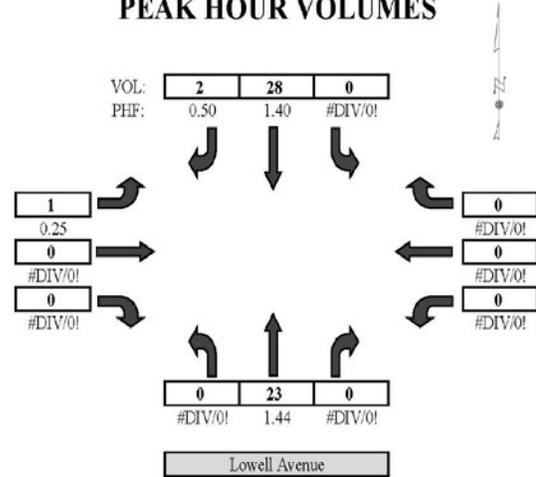
COUNT TIME
 FROM: *8:00 AM*
 TO: *10:00 AM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM **27**
 PHF: **0.75**
 PEAK HOUR:
 FROM: TO:
5:45 PM 7:45 PM

North Star

PEAK HOUR VOLUMES



COUNT DATA INPUT:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	8:15 AM	8:15 AM	1	0	0	0	0	0	0	2	0	0	0	0	3
8:15 AM	8:30 AM	8:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	1
8:30 AM	8:45 AM	8:45 AM	0	1	0	0	0	0	0	1	0	0	0	0	2
8:45 AM	9:00 AM	9:00 AM	0	1	0	1	0	0	0	3	0	0	0	0	5
9:00 AM	9:15 AM	9:15 AM	0	2	0	0	0	0	0	1	1	0	0	0	4
9:15 AM	9:30 AM	9:30 AM	0	4	0	0	0	0	0	5	0	0	0	0	9
9:30 AM	9:45 AM	9:45 AM	0	4	0	0	0	0	0	5	0	0	0	0	9
9:45 AM	10:00 AM	10:00 AM	0	2	0	0	0	0	0	3	0	0	0	0	5

Included HV (trucks + buses):

1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%

HOURLY TOTALS:

FROM:	TIME PERIOD	TO:	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
			L	T	R	L	T	R	L	T	R	L	T	R	
8:00 AM	9:00 AM	9:00 AM	1	2	0	1	0	1	0	6	0	0	0	0	11
8:15 AM	9:15 AM	9:15 AM	0	4	0	1	0	1	0	5	1	0	0	0	12
8:30 AM	9:30 AM	9:30 AM	0	8	0	1	0	0	0	10	1	0	0	0	20
8:45 AM	9:45 AM	9:45 AM	0	11	0	1	0	0	0	14	1	0	0	0	27
9:00 AM	10:00 AM	10:00 AM	0	12	0	0	0	0	0	14	1	0	0	0	27

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



APPENDIX - PM Existing Traffic Counts

TURNING MOVEMENT COUNT SUMMARY



INTERSECTION:
 N-S STREET: *Park Ave*
 E-W STREET: *Empire Ave / Deer Valley Dr*

PROJECT NO.: *16-001*
COUNT DATE: *August 20, 2013*
NOTES:

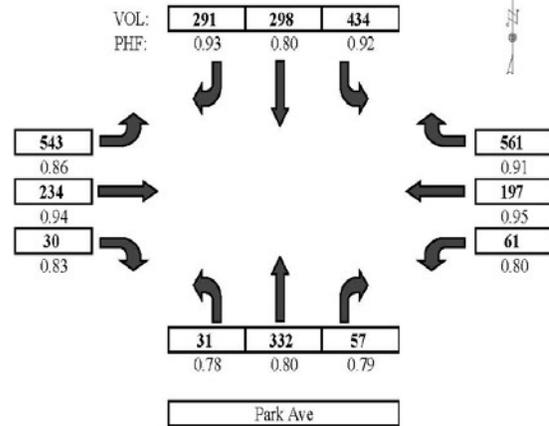
COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM	3,069
PHF:	0.98
PEAK HOUR:	
FROM: TO:	
4:00 PM 5:00 PM	

Empire Ave / Deer Valley Dr

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM	TO	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	4:15 PM	8	73	10	130	59	5	118	75	76	8	52	131	745
4:15 PM	4:30 PM	7	64	17	157	62	8	108	67	78	16	48	151	783
4:30 PM	4:45 PM	10	91	18	150	62	9	96	63	67	19	46	125	756
4:45 PM	5:00 PM	6	104	12	106	51	8	112	93	70	18	51	154	785
5:00 PM	5:15 PM	10	85	10	124	50	6	104	85	70	10	38	141	733
5:15 PM	5:30 PM	8	80	17	111	55	9	130	91	70	14	36	139	760
5:30 PM	5:45 PM	4	111	17	85	50	11	114	85	49	14	28	125	693
5:45 PM	6:00 PM	7	85	4	86	28	10	109	67	66	15	40	149	666
Included HV (trucks + buses):														5,921
		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM	TO	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	5:00 PM	31	332	57	543	234	30	434	298	291	61	197	561	3,069
4:15 PM	5:15 PM	33	344	57	537	225	31	420	308	285	63	183	571	3,057
4:30 PM	5:30 PM	34	360	57	491	218	32	442	332	277	61	171	559	3,034
4:45 PM	5:45 PM	28	380	56	426	206	34	460	354	259	56	153	559	2,971
5:00 PM	6:00 PM	29	361	48	406	183	36	457	328	255	53	142	554	2,852

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION: **Park Ave / Silver King Dr / 15th Street**
 N-S STREET: *Park Ave*
 E-W STREET: *Silver King Dr / 15th Street*

PROJECT NO.: *16-001*
 COUNT DATE: *August 20, 2013*
 NOTES:

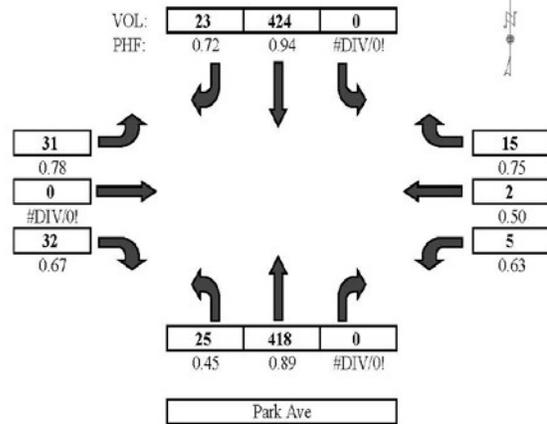
COUNT TIME:
 FROM: *4:00 PM*
 TO: *6:00 PM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM	975
PHF:	0.97
PEAK HOUR:	
FROM: TO:	
4:45 PM 5:45 PM	

Silver King Dr / 15th Street

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	4:15 PM	2	81	0	14	0	5	0	87	2	0	0	3	194
4:15 PM	4:30 PM	5	96	0	4	0	7	0	72	11	1	0	6	202
4:30 PM	4:45 PM	3	96	0	15	0	8	0	87	7	0	2	5	223
4:45 PM	5:00 PM	4	106	0	7	0	6	0	113	7	2	0	2	247
5:00 PM	5:15 PM	14	96	0	7	0	12	0	104	5	2	1	5	246
5:15 PM	5:30 PM	5	117	0	10	0	6	0	102	8	0	0	4	252
5:30 PM	5:45 PM	2	99	0	7	0	8	0	105	3	1	1	4	230
5:45 PM	6:00 PM	7	85	0	4	0	9	0	87	6	2	1	5	206
Included HV (trucks + buses):													1,800	
		0%	0%	#DIV/0!	0%	#DIV/0!	0%	#DIV/0!	0%	0%	0%	0%	0%	100%

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	5:00 PM	14	379	0	40	0	26	0	359	27	3	2	16	866
4:15 PM	5:15 PM	26	394	0	33	0	33	0	376	30	5	3	18	918
4:30 PM	5:30 PM	26	415	0	39	0	32	0	406	27	4	3	16	968
4:45 PM	5:45 PM	25	418	0	31	0	32	0	424	23	5	2	15	975
5:00 PM	6:00 PM	28	397	0	28	0	35	0	398	22	5	3	18	934

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION:
 N-S STREET: *Park Ave*
 E-W STREET: *14th Street / Private Access*

PROJECT NO.: *16-001*
COUNT DATE: *August 20, 2013*
NOTES:

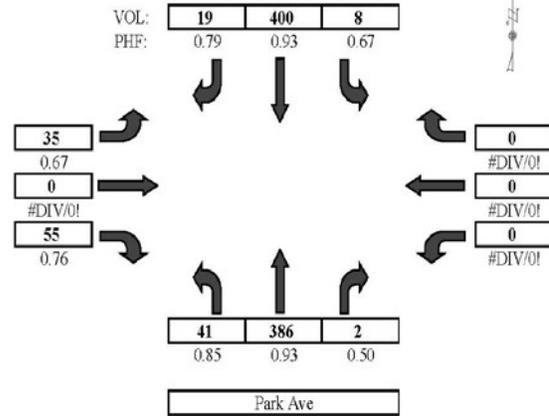
COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM	946
PHF:	0.94
PEAK HOUR:	
FROM: TO:	4:45 PM 5:45 PM

14th Street / Private Access

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM	TO	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	4:15 PM	5	77	0	2	0	10	1	84	4	0	0	0	183
4:15 PM	4:30 PM	15	90	0	8	0	22	0	66	4	0	0	0	205
4:30 PM	4:45 PM	7	81	0	10	0	14	2	82	9	0	0	0	205
4:45 PM	5:00 PM	12	99	1	6	0	18	2	108	6	0	0	0	252
5:00 PM	5:15 PM	11	94	0	9	0	14	1	98	4	0	0	0	231
5:15 PM	5:30 PM	9	104	1	13	0	14	2	86	4	0	0	0	233
5:30 PM	5:45 PM	9	89	0	7	0	9	3	108	5	0	0	0	230
5:45 PM	6:00 PM	10	82	0	5	0	10	1	91	1	0	0	0	200
Included HV (trucks + buses):													1,739	
		0%	0%	0%	0%	#DIV/0!	0%	0%	0%	0%	#DIV/0!	#DIV/0!	#DIV/0!	100%

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM	TO	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	5:00 PM	39	347	1	26	0	64	5	340	23	0	0	0	845
4:15 PM	5:15 PM	45	364	1	33	0	68	5	354	23	0	0	0	893
4:30 PM	5:30 PM	39	378	2	38	0	60	7	374	23	0	0	0	921
4:45 PM	5:45 PM	41	386	2	35	0	55	8	400	19	0	0	0	946
5:00 PM	6:00 PM	39	369	1	34	0	47	7	383	14	0	0	0	894

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION: **Park Ave**
 N-S STREET: **Crescent Tram**
 E-W STREET:

PROJECT NO.: **16-001**
 COUNT DATE: **August 20, 2013**
 NOTES:

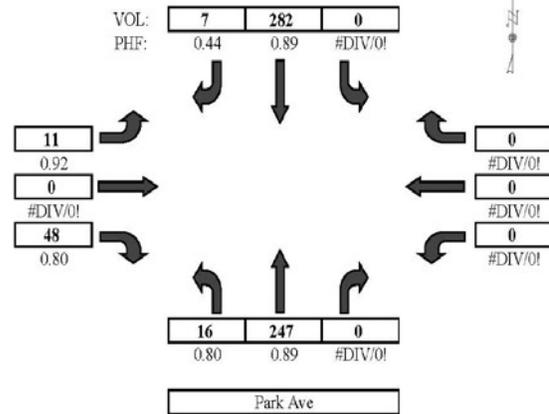
COUNT TIME:
 FROM: **4:00 PM**
 TO: **6:00 PM**

GROWTH FACTOR: **1.00**

PEAK HOUR VOLUME	611
PHF:	0.90
PEAK HOUR:	
FROM: TO:	4:45 PM 5:45 PM

Crescent Tram

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	4:15 PM	5	41	0	3	0	5	0	52	6	0	0	0	112
4:15 PM	4:30 PM	4	59	0	4	0	6	0	54	6	0	0	0	133
4:30 PM	4:45 PM	4	62	0	3	0	8	0	61	4	0	0	0	142
4:45 PM	5:00 PM	5	58	0	3	0	7	0	73	4	0	0	0	150
5:00 PM	5:15 PM	4	69	0	3	0	13	0	79	1	0	0	0	169
5:15 PM	5:30 PM	3	57	0	3	0	13	0	59	2	0	0	0	137
5:30 PM	5:45 PM	4	63	0	2	0	15	0	71	0	0	0	0	155
5:45 PM	6:00 PM	3	51	0	2	0	13	0	60	1	0	0	0	130
Included HV (trucks + buses):													1,128	
		0%	0%	#DIV/0!	0%	#DIV/0!	0%	#DIV/0!	0%	0%	#DIV/0!	#DIV/0!	#DIV/0!	100%

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	5:00 PM	18	220	0	13	0	26	0	240	20	0	0	0	537
4:15 PM	5:15 PM	17	248	0	13	0	34	0	267	15	0	0	0	594
4:30 PM	5:30 PM	16	246	0	12	0	41	0	272	11	0	0	0	598
4:45 PM	5:45 PM	16	247	0	11	0	48	0	282	7	0	0	0	611
5:00 PM	6:00 PM	14	240	0	10	0	54	0	269	4	0	0	0	591

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION:
 N-S STREET: *Empire Ave*
 E-W STREET: *Silver King Dr / 15th Street*

PROJECT NO.: *16-001*
COUNT DATE: *August 20, 2013*
NOTES:

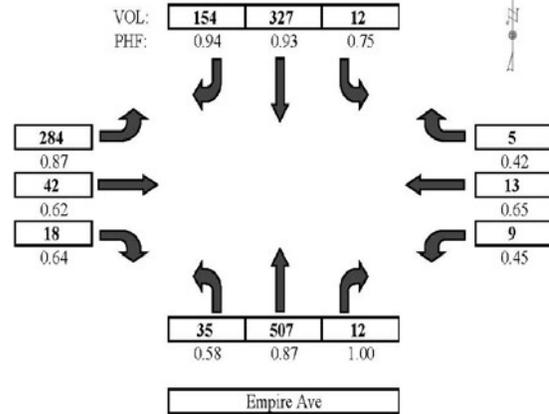
COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM	1,418
PHF:	0.94
PEAK HOUR:	
FROM:	TO:
4:00 PM	5:00 PM

Silver King Dr / 15th Street

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	4:15 PM	9	123	3	77	13	2	4	83	41	1	1	1	358
4:15 PM	4:30 PM	3	124	3	82	6	7	3	88	39	2	5	0	362
4:30 PM	4:45 PM	15	145	3	64	17	3	4	79	40	1	5	3	379
4:45 PM	5:00 PM	8	115	3	61	6	6	1	77	34	5	2	1	319
5:00 PM	5:15 PM	10	120	7	45	6	5	4	79	35	5	4	1	321
5:15 PM	5:30 PM	8	95	0	51	8	8	3	84	26	6	0	0	289
5:30 PM	5:45 PM	4	99	1	41	6	9	3	52	28	2	0	1	246
5:45 PM	6:00 PM	3	77	4	36	7	4	2	68	33	4	6	1	245
Included HV (trucks + buses):													2,519	
													0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 100%	

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	5:00 PM	35	507	12	284	42	18	12	327	154	9	13	5	1,418
4:15 PM	5:15 PM	36	504	16	252	35	21	12	323	148	13	16	5	1,381
4:30 PM	5:30 PM	41	475	13	221	37	22	12	319	135	17	11	5	1,308
4:45 PM	5:45 PM	30	429	11	198	26	28	11	292	123	18	6	3	1,175
5:00 PM	6:00 PM	25	391	12	173	27	26	12	283	122	17	10	3	1,101

*NOTE** PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION:
 N-S STREET: *Empire Ave*
 E-W STREET: *Shadow Ridge*

PROJECT NO.: *16-001*
 COUNT DATE: *August 20, 2013*
 NOTES:

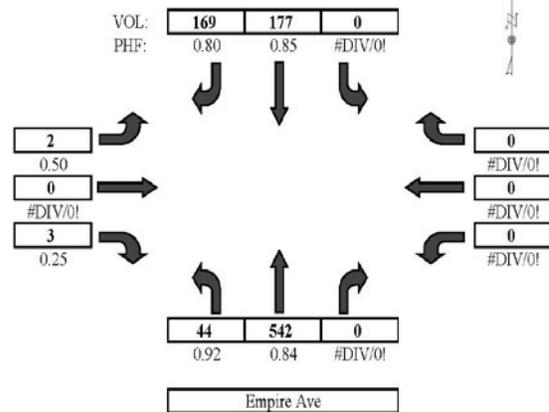
COUNT TIME:
 FROM: *4:00 PM*
 TO: *6:00 PM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM **937**
 PHF: **0.92**
 PEAK HOUR:
 FROM: TO:
4:15 PM 5:15 PM

Shadow Ridge

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES		
	FROM	TO		L	T	R	L	T	R	L	T	R			
4:00 PM	4:15 PM		8	127	0	0	0	0	0	34	48	0	0	0	217
4:15 PM	4:30 PM		9	135	0	1	0	0	0	52	53	0	0	0	250
4:30 PM	4:45 PM		11	161	0	1	0	3	0	33	47	0	0	0	256
4:45 PM	5:00 PM		12	120	0	0	0	0	0	44	31	0	0	0	207
5:00 PM	5:15 PM		12	126	0	0	0	0	0	48	38	0	0	0	224
5:15 PM	5:30 PM		6	94	0	1	0	0	0	53	45	0	0	0	199
5:30 PM	5:45 PM		8	91	0	0	0	0	0	29	32	0	0	0	160
5:45 PM	6:00 PM		10	82	0	0	0	0	0	43	32	0	0	0	167
Included HV (trucks + buses):												1,680			
												0% 0% #DIV/0! 0% #DIV/0! 0% #DIV/0! 0% 0% #DIV/0! #DIV/0! #DIV/0! 100%			

HOURLY TOTALS:

TIME PERIOD	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES		
	FROM	TO		L	T	R	L	T	R	L	T	R			
4:00 PM	5:00 PM		40	543	0	2	0	3	0	163	179	0	0	0	930
4:15 PM	5:15 PM		44	542	0	2	0	3	0	177	169	0	0	0	937
4:30 PM	5:30 PM		41	501	0	2	0	3	0	178	161	0	0	0	886
4:45 PM	5:45 PM		38	431	0	1	0	0	0	174	146	0	0	0	790
5:00 PM	6:00 PM		36	393	0	1	0	0	0	173	147	0	0	0	750

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION:
 N-S STREET: *Empire Ave*
 E-W STREET: *14th Street*

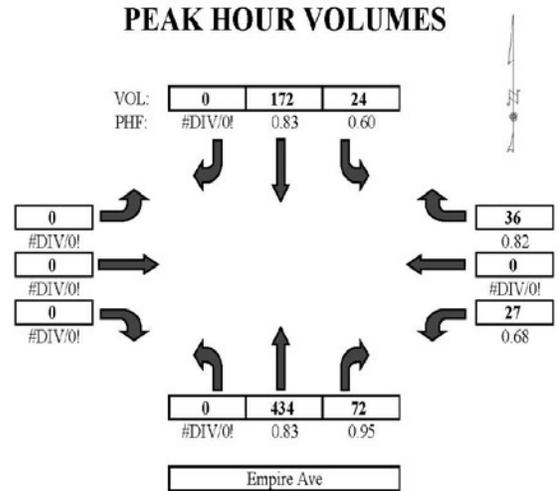
PROJECT NO.: *16-001*
COUNT DATE: *August 20, 2013*
NOTES:

PEAK HOUR VOLUME	765
PHF:	0.93
PEAK HOUR:	
FROM: TO:	4:15 PM 5:15 PM

14th Street

COUNT TIME:
 FROM: *4:00 PM*
 TO: *6:00 PM*

GROWTH FACTOR: *1.00*



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
		L	T	R	L	T	R	L	T	R	L	T	R	
FROM: 4:00 PM	TO: 4:15 PM	0	97	10	0	0	0	3	34	0	5	0	2	151
4:15 PM	4:30 PM	0	101	19	0	0	0	10	52	0	6	0	8	196
4:30 PM	4:45 PM	0	131	19	0	0	0	5	36	0	6	0	8	205
4:45 PM	5:00 PM	0	95	19	0	0	0	6	36	0	10	0	11	177
5:00 PM	5:15 PM	0	107	15	0	0	0	3	48	0	5	0	9	187
5:15 PM	5:30 PM	0	79	13	0	0	0	10	38	0	4	0	5	149
5:30 PM	5:45 PM	0	79	7	0	0	0	5	25	0	2	0	8	126
5:45 PM	6:00 PM	0	76	6	0	0	0	5	37	0	4	0	7	135
Included HV (trucks + buses):													1,326	

#DIV/0! 0% 0% #DIV/0! #DIV/0! #DIV/0! 0% 0% #DIV/0! 0% #DIV/0! 0% 100%

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
		L	T	R	L	T	R	L	T	R	L	T	R	
FROM: 4:00 PM	TO: 5:00 PM	0	424	67	0	0	0	24	158	0	27	0	29	729
4:15 PM	5:15 PM	0	434	72	0	0	0	24	172	0	27	0	36	765
4:30 PM	5:30 PM	0	412	66	0	0	0	24	158	0	25	0	33	718
4:45 PM	5:45 PM	0	360	54	0	0	0	24	147	0	21	0	33	639
5:00 PM	6:00 PM	0	341	41	0	0	0	23	148	0	15	0	29	597

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY

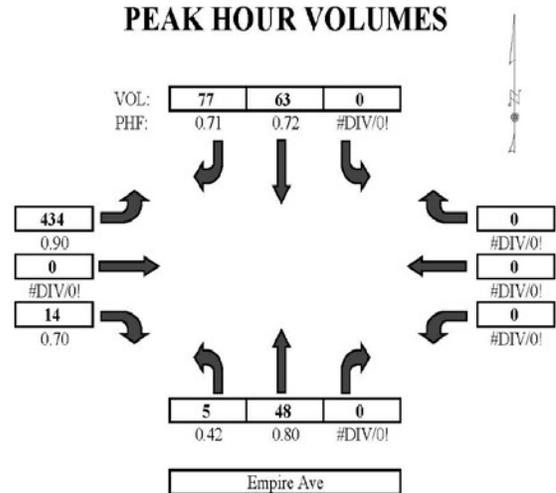


INTERSECTION: **Empire Ave
Manor Way**
 N-S STREET: **Empire Ave**
 E-W STREET: **Manor Way**
 PROJECT NO.: **16-001**
 COUNT DATE: **August 20, 2013**
 NOTES:

PEAK HOUR VOLUM	641
PHF:	0.95
PEAK HOUR:	
FROM: TO:	4:15 PM 5:15 PM

Manor Way

COUNT TIME:
 FROM: **4:00 PM**
 TO: **6:00 PM**
 GROWTH FACTOR: **1.00**



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	4:15 PM	2	13	0	90	0	4	0	8	12	0	0	0	129
4:15 PM	4:30 PM	2	9	0	115	0	3	0	13	27	0	0	0	169
4:30 PM	4:45 PM	0	15	0	121	0	2	0	13	12	0	0	0	163
4:45 PM	5:00 PM	3	9	0	97	0	4	0	15	19	0	0	0	147
5:00 PM	5:15 PM	0	15	0	101	0	5	0	22	19	0	0	0	162
5:15 PM	5:30 PM	0	10	0	84	0	7	0	21	16	0	0	0	138
5:30 PM	5:45 PM	0	14	0	64	0	4	0	16	9	0	0	0	107
5:45 PM	6:00 PM	0	16	0	65	0	5	0	17	20	0	0	0	123
Included HV (trucks + buses):														1,138
		0%	0%	#DIV/0!	0%	#DIV/0!	0%	#DIV/0!	0%	0%	#DIV/0!	#DIV/0!	#DIV/0!	100%

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	5:00 PM	7	46	0	423	0	13	0	49	70	0	0	0	608
4:15 PM	5:15 PM	5	48	0	434	0	14	0	63	77	0	0	0	641
4:30 PM	5:30 PM	3	49	0	403	0	18	0	71	66	0	0	0	610
4:45 PM	5:45 PM	3	48	0	346	0	20	0	74	63	0	0	0	554
5:00 PM	6:00 PM	0	55	0	314	0	21	0	76	64	0	0	0	530

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION: **Lowell Avenue**
 N-S STREET: **Shadow Ridge**
 E-W STREET: **Shadow Ridge**

PROJECT NO.: **16-001**
 COUNT DATE: **August 20, 2013**
 NOTES:

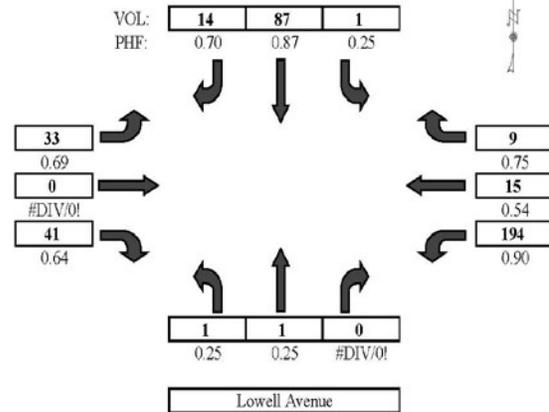
COUNT TIME:
 FROM: **4:00 PM**
 TO: **6:00 PM**

GROWTH FACTOR: **1.00**

PEAK HOUR VOLUME	396
PHF:	0.93
PEAK HOUR:	
FROM: TO:	
4:00 PM 5:00 PM	

Shadow Ridge

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	4:15 PM	0	0	0	7	0	10	0	21	4	49	7	3	101
4:15 PM	4:30 PM	0	0	0	4	0	16	1	24	5	52	3	2	107
4:30 PM	4:45 PM	1	0	0	10	0	9	0	25	2	54	3	1	105
4:45 PM	5:00 PM	0	1	0	12	0	6	0	17	3	39	2	3	83
5:00 PM	5:15 PM	0	2	2	7	0	8	0	26	0	43	3	5	96
5:15 PM	5:30 PM	0	9	1	7	0	1	1	15	2	36	7	1	80
5:30 PM	5:45 PM	0	7	0	3	0	5	0	15	2	34	3	3	72
5:45 PM	6:00 PM	1	1	1	6	0	2	1	13	4	39	1	2	71
Included HV (trucks + buses):														715
														100%

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	5:00 PM	1	1	0	33	0	41	1	87	14	194	15	9	396
4:15 PM	5:15 PM	1	3	2	33	0	39	1	92	10	188	11	11	391
4:30 PM	5:30 PM	1	12	3	36	0	24	1	83	7	172	15	10	364
4:45 PM	5:45 PM	0	19	3	29	0	20	1	73	7	152	15	12	331
5:00 PM	6:00 PM	1	19	4	23	0	16	2	69	8	152	14	11	319

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION:
 N-S STREET: *Lowell Avenue*
 E-W STREET: *Manor Way*

PROJECT NO.: *16-001*
COUNT DATE: *August 20, 2013*
NOTES:

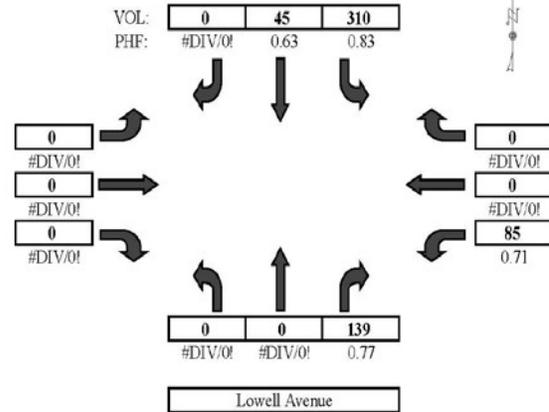
COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM	579
PHF:	0.92
PEAK HOUR:	
FROM: TO:	
4:15 PM 5:15 PM	

Manor Way

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	4:15 PM	0	0	26	0	0	0	68	9	0	12	0	0	115
4:15 PM	4:30 PM	0	0	34	0	0	0	82	11	0	30	0	0	157
4:30 PM	4:45 PM	0	0	31	0	0	0	93	5	0	12	0	0	141
4:45 PM	5:00 PM	0	0	29	0	0	0	71	11	0	24	0	0	135
5:00 PM	5:15 PM	0	0	45	0	0	0	64	18	0	19	0	0	146
5:15 PM	5:30 PM	0	0	35	0	0	0	61	9	0	15	0	1	121
5:30 PM	5:45 PM	0	0	24	0	0	0	39	13	0	8	0	0	84
5:45 PM	6:00 PM	0	0	25	0	0	0	44	5	0	19	0	0	93
Included HV (trucks + buses):													992	

#DIV/0! #DIV/0! 0% #DIV/0! #DIV/0! #DIV/0! 0% 0% #DIV/0! 0% #DIV/0! 0% 100%

HOURLY TOTALS:

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	
4:00 PM	5:00 PM	0	0	120	0	0	0	314	36	0	78	0	0	548
4:15 PM	5:15 PM	0	0	139	0	0	0	310	45	0	85	0	0	579
4:30 PM	5:30 PM	0	0	140	0	0	0	289	43	0	70	0	1	543
4:45 PM	5:45 PM	0	0	133	0	0	0	235	51	0	66	0	1	486
5:00 PM	6:00 PM	0	0	129	0	0	0	208	45	0	61	0	1	444

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



TURNING MOVEMENT COUNT SUMMARY



INTERSECTION:
 N-S STREET: *Lowell Avenue*
 E-W STREET: *North Star*

PROJECT NO.: *16-001*
COUNT DATE: *August 20, 2013*
NOTES:

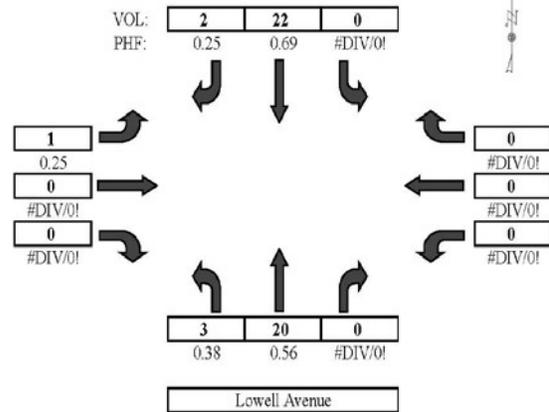
COUNT TIME:
FROM: *4:00 PM*
TO: *6:00 PM*

GROWTH FACTOR: *1.00*

PEAK HOUR VOLUM	48
PHF:	0.71
PEAK HOUR:	
FROM: TO:	
4:45 PM 5:45 PM	

North Star

PEAK HOUR VOLUMES



COUNT DATA INPUT:

TIME PERIOD	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES			
	FROM	TO		L	T	R	L	T	R	L	T	R		L	T	R
4:00 PM	4:15 PM			0	3	0	2	0	0	0	2	0	0	0	0	7
4:15 PM	4:30 PM			0	2	0	1	0	0	0	3	1	0	0	0	7
4:30 PM	4:45 PM			0	5	0	0	0	0	0	2	0	0	0	0	7
4:45 PM	5:00 PM			0	4	0	0	0	0	0	8	0	0	0	0	12
5:00 PM	5:15 PM			1	3	0	0	0	0	0	5	2	0	0	0	11
5:15 PM	5:30 PM			2	9	0	0	0	0	0	6	0	0	0	0	17
5:30 PM	5:45 PM			0	4	0	1	0	0	0	3	0	0	0	0	8
5:45 PM	6:00 PM			0	4	0	0	0	0	0	2	0	0	0	0	6
Included HV (trucks + buses):													75			
													0% 0% #DIV/0! 0% #DIV/0! #DIV/0! #DIV/0! 0% 0% #DIV/0! #DIV/0! #DIV/0! 100%			

HOURLY TOTALS:

TIME PERIOD	NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL VOLUMES			
	FROM	TO		L	T	R	L	T	R	L	T	R		L	T	R
4:00 PM	5:00 PM			0	14	0	3	0	0	0	15	1	0	0	0	33
4:15 PM	5:15 PM			1	14	0	1	0	0	0	18	3	0	0	0	37
4:30 PM	5:30 PM			3	21	0	0	0	0	0	21	2	0	0	0	47
4:45 PM	5:45 PM			3	20	0	1	0	0	0	22	2	0	0	0	48
5:00 PM	6:00 PM			3	20	0	1	0	0	0	16	2	0	0	0	42

NOTE PHF IS BASED ON 15 MIN. PEAK WITHIN THE PEAK HOUR.



APPENDIX – Existing Condition Traffic Analysis

DRAFT

3: Park Ave & 15th St Performance by movement

Movement	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.5	0.0	0.0	0.0	0.0
Total Del/Veh (s)	7.0	4.7	5.7	6.6	3.1	2.5	0.3	1.4	1.2	1.6

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.0	0.0	3.3	0.3	0.2	0.0	0.0	0.0	2.6	1.0	0.7
Total Del/Veh (s)	28.6	21.2	12.6	44.7	39.2	5.0	18.1	27.5	10.8	28.6	16.9	9.1

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	19.9

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	19.2	11.1	5.3	13.3	15.1	7.0	5.0	1.3	0.9	4.1	1.3	3.6

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	3.9

9: Empire Ave & Crescent Tram Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.2	2.4	0.0	0.1	1.7	0.5	1.6

10: Empire Ave & Manor Way Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.2	1.3	3.9	2.4	0.4	0.3	0.4	3.4

11: Lowell Ave & Northstar Dr Performance by movement

Movement	EBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.4	0.0	0.9	0.7	0.8

12: Park Ave & Osborne St Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.2	0.2	0.0	0.0	0.1
Total Del/Veh (s)	4.6	2.9	1.7	0.1	1.6	1.4	1.3

13: Lowell Ave & Manor Way Performance by movement

Movement	WBL	WBR	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	3.9	2.8	3.5	5.7	1.6	4.0

14: Park Ave & 14th St Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.3	0.2	3.2	4.3	1.8	0.9	1.6	0.6	0.3	1.7

20: Lowell Ave & Silver King Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.1	0.2	0.0
Total Del/Veh (s)	0.3	0.2	5.8	4.5	13.7	3.7	5.3

21: Empire Ave & Shadow Ridge Rd Performance by movement

Movement	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.1	7.4	1.2	2.3	1.5	1.8

22: Lowell Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.1	8.9	2.4	5.4	6.1	3.8	0.2	1.3	3.4	3.1

29: Empire Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0	0.0	0.1
Total Del/Veh (s)	8.5	5.2	1.3	0.8	3.7	0.6	1.6

Total Network Performance

Denied Del/Veh (s)	0.9
Total Del/Veh (s)	27.8

Queuing and Blocking Report
AM Peak Hour Existing

05/31/2017

Intersection: 3: Park Ave & 15th St

Movement	EB	WB	NB
Directions Served	LTR	LTR	L
Maximum Queue (ft)	59	33	16
Average Queue (ft)	26	13	1
95th Queue (ft)	49	36	10
Link Distance (ft)	388	334	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			50
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Park Ave & Empire Ave/Deer Valley Dr

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	T	TR	L	T	R
Maximum Queue (ft)	108	131	133	84	223	84	58	112	121	243	373	265
Average Queue (ft)	50	69	59	33	123	42	20	48	57	165	87	118
95th Queue (ft)	94	112	117	73	197	73	49	85	102	261	257	211
Link Distance (ft)			591		536	536	357	357	357		706	706
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	215	215		250						220		
Storage Blk Time (%)					0					6	0	
Queuing Penalty (veh)					0					8	0	

Intersection: 7: Empire Ave & Silver King Dr/15th St

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	LTR	LTR	LT
Maximum Queue (ft)	116	103	46	97	29
Average Queue (ft)	48	20	16	25	1
95th Queue (ft)	89	69	37	68	13
Link Distance (ft)		315	388	602	591
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	12	0			
Queuing Penalty (veh)	4	0			

Queuing and Blocking Report
AM Peak Hour Existing

05/31/2017

Intersection: 9: Empire Ave & Crescent Tram

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	41	29
Average Queue (ft)	16	2
95th Queue (ft)	38	14
Link Distance (ft)	185	2121
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Empire Ave & Manor Way

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	93	18
Average Queue (ft)	45	1
95th Queue (ft)	74	10
Link Distance (ft)	146	2121
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Lowell Ave & Northstar Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	19
Average Queue (ft)	1
95th Queue (ft)	11
Link Distance (ft)	247
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
AM Peak Hour Existing

05/31/2017

Intersection: 12: Park Ave & Osborne St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	49	18
Average Queue (ft)	20	1
95th Queue (ft)	47	11
Link Distance (ft)	160	288
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Lowell Ave & Manor Way

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	63	59	69
Average Queue (ft)	30	32	41
95th Queue (ft)	48	53	62
Link Distance (ft)	146	1734	505
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Park Ave & 14th St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	54	75	14
Average Queue (ft)	28	13	0
95th Queue (ft)	43	49	10
Link Distance (ft)	392	2685	312
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
 AM Peak Hour Existing

05/31/2017

Intersection: 20: Lowell Ave & Silver King Dr

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	11	67	94
Average Queue (ft)	1	12	40
95th Queue (ft)	7	44	67
Link Distance (ft)	334		738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 21: Empire Ave & Shadow Ridge Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	28	126	22
Average Queue (ft)	2	29	1
95th Queue (ft)	13	87	10
Link Distance (ft)	270	167	602
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 22: Lowell Ave & Shadow Ridge Rd

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	21	94	60
Average Queue (ft)	8	53	32
95th Queue (ft)	18	80	50
Link Distance (ft)	232	270	738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report

AM Peak Hour Existing

05/31/2017

Intersection: 29: Empire Ave

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	87	25	41
Average Queue (ft)	35	1	3
95th Queue (ft)	63	13	21
Link Distance (ft)	392	332	167
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 13

HCM 2010 Signalized Intersection Summary
6: Park Ave & Empire Ave/Deer Valley Dr

05/31/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	261	143	13	42	218	189	32	146	54	418	140	782
Future Volume (veh/h)	261	143	13	42	218	189	32	146	54	418	140	782
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	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	284	155	14	46	237	205	35	159	59	454	152	850
Adj No. of Lanes	2	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	408	398	36	67	290	484	348	961	344	732	919	969
Arrive On Green	0.12	0.24	0.24	0.04	0.16	0.16	0.03	0.38	0.38	0.15	0.49	0.49
Sat Flow, veh/h	3442	1684	152	1774	1863	1583	1774	2557	914	1774	1863	1583
Grp Volume(v), veh/h	284	0	169	46	237	205	35	108	110	454	152	850
Grp Sat Flow(s),veh/h/ln	1721	0	1836	1774	1863	1583	1774	1770	1701	1774	1863	1583
Q Serve(g_s), s	7.1	0.0	7.0	2.3	11.1	5.7	1.1	3.7	3.9	13.5	4.1	19.4
Cycle Q Clear(g_c), s	7.1	0.0	7.0	2.3	11.1	5.7	1.1	3.7	3.9	13.5	4.1	19.4
Prop In Lane	1.00		0.08	1.00		1.00	1.00		0.54	1.00		1.00
Lane Grp Cap(c), veh/h	408	0	434	67	290	484	348	665	640	732	919	969
V/C Ratio(X)	0.70	0.00	0.39	0.68	0.82	0.42	0.10	0.16	0.17	0.62	0.17	0.88
Avail Cap(c_a), veh/h	784	0	651	130	373	554	389	665	640	732	919	969
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.1	0.0	28.9	42.8	36.8	10.8	16.1	18.7	18.7	12.8	12.6	6.4
Incr Delay (d2), s/veh	2.1	0.0	0.6	11.5	10.6	0.6	0.1	0.5	0.6	1.6	0.4	11.0
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	3.5	0.0	3.6	1.3	6.6	2.5	0.5	1.9	1.9	1.6	2.2	11.2
LnGrp Delay(d),s/veh	40.2	0.0	29.5	54.3	47.4	11.4	16.2	19.2	19.3	14.4	13.0	17.5
LnGrp LOS	D		C	D	D	B	B	B	B	B	B	B
Approach Vol, veh/h		453			488			253			1456	
Approach Delay, s/veh		36.2			32.9			18.8			16.0	
Approach LOS		D			C			B			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	18.0	38.3	7.9	25.8	7.4	48.9	15.2	18.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	13.5	20.0	6.6	31.9	5.0	28.5	20.5	18.0				
Max Q Clear Time (g_c+I1), s	15.5	5.9	4.3	9.0	3.1	21.4	9.1	13.1				
Green Ext Time (p_c), s	0.0	5.3	0.0	2.0	0.0	3.5	1.5	0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			22.9									
HCM 2010 LOS			C									

3: Park Ave & 15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.0
Total Del/Veh (s)	12.7	1.2	7.2	9.5	12.5	3.7	4.5	0.7	1.9	1.4	2.0

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	2.9	0.4	0.5	0.0	0.0	0.0	2.9	0.9	0.5
Total Del/Veh (s)	32.1	24.5	17.9	46.9	39.1	17.8	18.3	27.5	21.1	29.7	17.7	3.2

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	24.3

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	56.0	25.3	17.5	14.3	6.4	9.1	3.2	1.2	0.7	6.1	1.7	3.0

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	13.6

9: Empire Ave & Crescent Tram Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.8	2.5	0.0	0.0	2.1	0.5	1.5

10: Empire Ave & Manor Way Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	6.1	1.5	4.7	2.1	0.4	0.5	0.4	4.1

11: Lowell Ave & Northstar Dr Performance by movement

Movement	EBL	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.7	1.7	0.1	1.2	1.1	1.0

12: Park Ave & Osborne St Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.3	0.2	0.0	0.0	0.1
Total Del/Veh (s)	6.6	4.0	2.5	0.2	3.4	4.2	2.5

13: Lowell Ave & Manor Way Performance by movement

Movement	WBL	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.1
Total Del/Veh (s)	4.3	4.0	6.8	7.0	5.8

14: Park Ave & 14th St Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.2	0.6	0.0	0.0	0.0	0.1
Total Del/Veh (s)	11.0	0.2	5.5	5.7	2.8	3.0	2.9	0.8	0.5	2.4

20: Lowell Ave & Silver King Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	1.1	0.6	0.4
Total Del/Veh (s)	2.6	0.1	4.7	3.0	14.4	13.6	10.3

21: Empire Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.0	0.0	0.1
Total Del/Veh (s)	9.8	4.0	3.5	0.7	1.7	1.1	1.1

22: Lowell Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0		0.1	0.0	0.0	0.0
Total Del/Veh (s)	4.0	2.5	4.9	5.4	3.5		0.0	2.7	2.9	3.7

29: Empire Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	9.5	5.2	1.1	0.8	4.2	0.7	1.6

Total Network Performance

Denied Del/Veh (s)	0.9
Total Del/Veh (s)	36.7

Queuing and Blocking Report
PM Peak Hour Existing

05/31/2017

Intersection: 3: Park Ave & 15th St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	LTR
Maximum Queue (ft)	70	43	38	8
Average Queue (ft)	27	15	8	0
95th Queue (ft)	54	42	29	4
Link Distance (ft)	382	341		357
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			50	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			1	

Intersection: 6: Park Ave & Empire Ave/Deer Valley Dr

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	T	TR	L	T	R
Maximum Queue (ft)	201	211	216	97	229	345	59	171	183	294	325	112
Average Queue (ft)	121	132	107	43	117	162	19	93	103	176	116	39
95th Queue (ft)	179	193	187	84	193	286	46	147	161	282	257	79
Link Distance (ft)			591		537	537		357	357		706	706
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	215	215		250			300			300		
Storage Blk Time (%)	0	0	0		0					2	0	
Queuing Penalty (veh)	0	0	2		0					5	0	

Intersection: 7: Empire Ave & Silver King Dr/15th St

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	LTR	LTR	LT
Maximum Queue (ft)	150	322	51	76	71
Average Queue (ft)	119	129	14	11	10
95th Queue (ft)	176	336	35	44	43
Link Distance (ft)		315	382	602	591
Upstream Blk Time (%)		7			
Queuing Penalty (veh)		24			
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	70	2			
Queuing Penalty (veh)	42	7			

Intersection: 9: Empire Ave & Crescent Tram

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	36	11
Average Queue (ft)	13	0
95th Queue (ft)	36	7
Link Distance (ft)	185	2121
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Empire Ave & Manor Way

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	123	18
Average Queue (ft)	63	1
95th Queue (ft)	99	11
Link Distance (ft)	146	2121
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Lowell Ave & Northstar Dr

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	18	6
Average Queue (ft)	1	0
95th Queue (ft)	9	4
Link Distance (ft)	247	292
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Park Ave & Osborne St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	65	37
Average Queue (ft)	30	4
95th Queue (ft)	53	23
Link Distance (ft)	160	288
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Lowell Ave & Manor Way

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	65	73	104
Average Queue (ft)	32	41	56
95th Queue (ft)	51	62	87
Link Distance (ft)	146	1734	505
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Park Ave & 14th St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	98	119	68
Average Queue (ft)	33	24	4
95th Queue (ft)	63	81	30
Link Distance (ft)	392	2685	312
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
 PM Peak Hour Existing

05/31/2017

Intersection: 20: Lowell Ave & Silver King Dr

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	23	35	235
Average Queue (ft)	2	3	84
95th Queue (ft)	13	20	211
Link Distance (ft)	334		738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 21: Empire Ave & Shadow Ridge Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	22	107	17
Average Queue (ft)	3	22	1
95th Queue (ft)	18	73	6
Link Distance (ft)	270	167	602
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 22: Lowell Ave & Shadow Ridge Rd

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	49	81	59
Average Queue (ft)	14	42	31
95th Queue (ft)	31	67	52
Link Distance (ft)	232	270	738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 29: Empire Ave

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	64	9	66
Average Queue (ft)	31	0	11
95th Queue (ft)	57	4	42
Link Distance (ft)	392	332	167
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 81

HCM 2010 Signalized Intersection Summary

6: Park Ave & Empire Ave/Deer Valley Dr

05/31/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	543	234	30	61	197	561	31	332	57	434	298	291
Future Volume (veh/h)	543	234	30	61	197	561	31	332	57	434	298	291
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	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	590	254	33	66	214	610	34	361	62	472	324	316
Adj No. of Lanes	2	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	631	532	69	85	362	633	307	657	112	550	728	909
Arrive On Green	0.18	0.33	0.33	0.05	0.19	0.19	0.03	0.22	0.22	0.21	0.39	0.39
Sat Flow, veh/h	3442	1616	210	1774	1863	1583	1774	3026	515	1774	1863	1583
Grp Volume(v), veh/h	590	0	287	66	214	610	34	210	213	472	324	316
Grp Sat Flow(s),veh/h/ln	1721	0	1826	1774	1863	1583	1774	1770	1772	1774	1863	1583
Q Serve(g_s), s	15.2	0.0	11.3	3.3	9.4	15.1	1.3	9.5	9.6	18.1	11.5	1.8
Cycle Q Clear(g_c), s	15.2	0.0	11.3	3.3	9.4	15.1	1.3	9.5	9.6	18.1	11.5	1.8
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	631	0	602	85	362	633	307	384	384	550	728	909
V/C Ratio(X)	0.94	0.00	0.48	0.78	0.59	0.96	0.11	0.55	0.55	0.86	0.45	0.35
Avail Cap(c_a), veh/h	631	0	602	175	373	642	349	384	384	550	728	909
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.2	0.0	24.0	42.4	33.0	9.2	25.9	31.3	31.4	20.4	20.2	3.7
Incr Delay (d2), s/veh	21.3	0.0	0.6	13.9	2.4	26.6	0.2	5.5	5.7	12.8	2.0	1.1
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	9.1	0.0	5.8	1.9	5.1	11.1	0.7	5.2	5.3	10.7	6.3	2.5
LnGrp Delay(d),s/veh	57.6	0.0	24.6	56.3	35.4	35.8	26.0	36.8	37.0	33.2	22.2	4.8
LnGrp LOS	E		C	E	D	D	C	D	D	C	C	A
Approach Vol, veh/h		877			890			457			1112	
Approach Delay, s/veh		46.8			37.2			36.1			21.9	
Approach LOS		D			D			D			C	
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	23.0	24.0	8.8	34.2	7.4	39.7	21.0	22.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	18.5	19.0	8.9	25.6	5.0	32.5	16.5	18.0				
Max Q Clear Time (g_c+I1), s	20.1	11.6	5.3	13.3	3.3	13.5	17.2	17.1				
Green Ext Time (p_c), s	0.0	3.3	0.0	3.3	0.0	5.5	0.0	0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			34.5									
HCM 2010 LOS			C									



APPENDIX – Future (2037) Conditions Without King’s Crown Traffic Analysis

DRAFT

3: Park Ave & 15th St Performance by movement

Movement	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.9	4.4	10.1	6.9	2.9	2.3	0.3	1.5	1.1	1.5

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.0	0.0	3.3	0.4	0.3	0.0	0.0	0.0	10.6	9.2	8.5
Total Del/Veh (s)	33.3	23.3	12.2	49.3	45.4	6.9	36.1	30.8	13.6	58.9	35.6	31.6

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	All
Denied Del/Veh (s)	5.3
Total Del/Veh (s)	35.6

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.8	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	51.9	25.1	15.4	25.0	26.3	7.0	7.0	2.5	1.9	4.3	1.5	4.5

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.1
Total Del/Veh (s)	7.7

9: Empire Ave & Crescent Tram Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.1	0.0	0.1
Total Del/Veh (s)	4.2	2.7	0.1	0.0	1.9	0.3	1.7

10: Empire Ave & Manor Way Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.0	4.8	2.7	0.4	0.4	0.4	3.8

11: Lowell Ave & Northstar Dr Performance by movement

Movement	EBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.1	0.0	1.0	0.9	0.8

12: Park Ave & Osborne St Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.1	0.2	0.2	0.0	0.0	0.1
Total Del/Veh (s)	5.6	3.1	2.1	0.2	1.4	2.0	1.3

13: Lowell Ave & Manor Way Performance by movement

Movement	WBL	WBR	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	4.1	3.0	3.8	6.2	1.6	4.4

14: Park Ave & 14th St Performance by movement

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	6.8	3.6	3.8	2.0	1.9	2.3	0.6	0.4	2.0

20: Lowell Ave & Silver King Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.3	0.2	0.0
Total Del/Veh (s)	0.5	0.3	6.8	4.5	19.2	5.9	6.4

21: Empire Ave & Shadow Ridge Rd Performance by movement

Movement	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.2	13.4	3.2	3.1	1.9	3.1

22: Lowell Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.9	5.0	2.8	6.3	7.0	4.9	0.2	1.3	3.8	3.4

29: Empire Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	11.4	7.7	1.5	1.2	4.2	0.8	2.2

Total Network Performance

Denied Del/Veh (s)	5.3
Total Del/Veh (s)	47.0

Queuing and Blocking Report
AM Peak Hour Future (2037)

05/31/2017

Intersection: 3: Park Ave & 15th St

Movement	EB	WB	NB
Directions Served	LTR	LTR	L
Maximum Queue (ft)	56	33	16
Average Queue (ft)	26	13	1
95th Queue (ft)	49	36	9
Link Distance (ft)	388	334	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			50
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Park Ave & Empire Ave/Deer Valley Dr

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	T	TR	L	T	R
Maximum Queue (ft)	146	160	156	143	305	128	74	116	142	245	700	719
Average Queue (ft)	77	92	74	42	164	52	27	56	71	227	418	430
95th Queue (ft)	134	142	138	96	265	99	57	95	121	283	838	822
Link Distance (ft)			591		536	536	357	357	357		706	706
Upstream Blk Time (%)											9	7
Queuing Penalty (veh)											0	0
Storage Bay Dist (ft)	215	215		250						220		
Storage Blk Time (%)					2					36	0	
Queuing Penalty (veh)					1					64	0	

Intersection: 7: Empire Ave & Silver King Dr/15th St

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	LTR	LTR	LT	R
Maximum Queue (ft)	149	228	72	163	55	86
Average Queue (ft)	81	50	21	45	3	7
95th Queue (ft)	144	183	51	122	24	59
Link Distance (ft)		315	388	602	591	591
Upstream Blk Time (%)		2				
Queuing Penalty (veh)		3				
Storage Bay Dist (ft)	50					
Storage Blk Time (%)	49	2				
Queuing Penalty (veh)	18	3				

Intersection: 9: Empire Ave & Crescent Tram

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	41	31
Average Queue (ft)	18	2
95th Queue (ft)	39	16
Link Distance (ft)	185	2121
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Empire Ave & Manor Way

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	114	25
Average Queue (ft)	57	1
95th Queue (ft)	94	10
Link Distance (ft)	146	2121
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	1	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Lowell Ave & Northstar Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	24
Average Queue (ft)	2
95th Queue (ft)	13
Link Distance (ft)	247
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
AM Peak Hour Future (2037)

05/31/2017

Intersection: 12: Park Ave & Osborne St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	55	46
Average Queue (ft)	26	2
95th Queue (ft)	52	18
Link Distance (ft)	160	288
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Lowell Ave & Manor Way

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	56	71	87
Average Queue (ft)	34	36	46
95th Queue (ft)	52	57	71
Link Distance (ft)	146	1734	505
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Park Ave & 14th St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	60	81	6
Average Queue (ft)	32	16	0
95th Queue (ft)	53	53	6
Link Distance (ft)	392	2685	312
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
 AM Peak Hour Future (2037)

05/31/2017

Intersection: 20: Lowell Ave & Silver King Dr

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	30	87	124
Average Queue (ft)	2	27	49
95th Queue (ft)	14	73	90
Link Distance (ft)	334		738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		1	
Queuing Penalty (veh)		0	

Intersection: 21: Empire Ave & Shadow Ridge Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	27	179	40
Average Queue (ft)	2	63	4
95th Queue (ft)	16	155	23
Link Distance (ft)	270	167	602
Upstream Blk Time (%)		2	
Queuing Penalty (veh)		9	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 22: Lowell Ave & Shadow Ridge Rd

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	30	128	67
Average Queue (ft)	10	63	34
95th Queue (ft)	22	98	55
Link Distance (ft)	232	270	738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 29: Empire Ave

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	93	94	45
Average Queue (ft)	37	9	6
95th Queue (ft)	68	62	29
Link Distance (ft)	392	332	167
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 99

HCM 2010 Signalized Intersection Summary
 6: Park Ave & Empire Ave/Deer Valley Dr

05/31/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	328	180	16	53	274	238	40	184	68	526	176	984
Future Volume (veh/h)	328	180	16	53	274	238	40	184	68	526	176	984
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	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	357	196	17	58	298	259	43	200	74	572	191	1070
Adj No. of Lanes	2	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	447	463	40	75	348	603	340	738	265	483	671	776
Arrive On Green	0.13	0.27	0.27	0.04	0.19	0.19	0.12	0.29	0.29	0.19	0.36	0.36
Sat Flow, veh/h	3442	1690	147	1774	1863	1583	1774	2555	916	1774	1863	1583
Grp Volume(v), veh/h	357	0	213	58	298	259	43	137	137	572	191	1070
Grp Sat Flow(s),veh/h/ln	1721	0	1837	1774	1863	1583	1774	1770	1701	1774	1863	1583
Q Serve(g_s), s	9.1	0.0	8.6	2.9	13.9	10.9	0.0	5.4	5.6	17.5	6.6	23.8
Cycle Q Clear(g_c), s	9.1	0.0	8.6	2.9	13.9	10.9	0.0	5.4	5.6	17.5	6.6	23.8
Prop In Lane	1.00		0.08	1.00		1.00	1.00		0.54	1.00		1.00
Lane Grp Cap(c), veh/h	447	0	503	75	348	603	340	511	492	483	671	776
V/C Ratio(X)	0.80	0.00	0.42	0.77	0.86	0.43	0.13	0.27	0.28	1.18	0.28	1.38
Avail Cap(c_a), veh/h	631	0	557	142	373	625	340	511	492	483	671	776
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.0	0.0	26.8	42.6	35.4	20.6	30.6	24.7	24.8	29.6	20.5	9.2
Incr Delay (d2), s/veh	4.8	0.0	0.6	15.0	16.9	0.5	0.2	1.3	1.4	102.0	1.1	178.8
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	4.6	0.0	4.4	1.7	8.7	4.8	0.9	2.8	2.8	17.1	3.6	48.6
LnGrp Delay(d),s/veh	42.8	0.0	27.4	57.6	52.3	21.1	30.8	25.9	26.2	131.6	21.6	188.0
LnGrp LOS	D		C	E	D	C	C	C	C	F	C	F
Approach Vol, veh/h		570			615			317			1833	
Approach Delay, s/veh		37.1			39.7			26.7			153.0	
Approach LOS		D			D			C			F	
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	22.0	30.5	8.3	29.2	15.6	36.9	16.2	21.3				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	17.5	20.0	7.2	27.3	5.1	32.4	16.5	18.0				
Max Q Clear Time (g_c+I1), s	19.5	7.6	4.9	10.6	2.0	25.8	11.1	15.9				
Green Ext Time (p_c), s	0.0	1.3	0.0	3.6	0.5	3.5	0.6	0.9				
Intersection Summary												
HCM 2010 Ctrl Delay			100.3									
HCM 2010 LOS			F									

3: Park Ave & 15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.1	0.1	0.2	0.0	0.1	0.1	0.1
Total Del/Veh (s)	13.2	1.8	8.5	15.5	15.8	4.4	5.4	0.8	1.8	1.2	2.1

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	105.2	107.9	113.1	0.0	0.0	0.0	78.0	78.0	78.2
Total Del/Veh (s)	42.2	25.0	16.9	67.2	52.3	82.0	18.9	33.4	26.9	99.4	48.0	9.0

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	All
Denied Del/Veh (s)	57.0
Total Del/Veh (s)	53.3

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	5.4	13.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	164.1	90.6	82.9	18.9	11.1	13.5	4.7	2.0	1.3	7.6	2.1	3.1

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	All
Denied Del/Veh (s)	1.1
Total Del/Veh (s)	30.2

9: Empire Ave & Crescent Tram Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.1	2.6	0.0	0.1	2.4	0.6	1.7

10: Empire Ave & Manor Way Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	8.3	2.4	6.2	2.0	0.4	0.7	0.5	5.6

11: Lowell Ave & Northstar Dr Performance by movement

Movement	EBL	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)		0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)		1.2	0.0	1.2	1.6	1.0

12: Park Ave & Osborne St Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.3	0.3	0.0	0.0	0.1
Total Del/Veh (s)	8.1	4.1	3.3	0.4	3.6	5.4	2.7

13: Lowell Ave & Manor Way Performance by movement

Movement	WBL	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.2	0.1	0.0	0.1
Total Del/Veh (s)	4.8	5.5	10.0	9.7	7.9

14: Park Ave & 14th St Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.3	0.3	0.5	0.0	0.0	0.0	0.1
Total Del/Veh (s)	14.4	0.3	8.8	6.1	3.5	5.6	3.6	0.9	0.6	3.2

20: Lowell Ave & Silver King Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	26.0	6.9	0.0	0.0	681.7	596.6	350.3
Total Del/Veh (s)	75.0	75.5	5.1	4.2	205.1	196.3	105.8

21: Empire Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.3	0.3	0.0	0.0	0.2
Total Del/Veh (s)	25.6	2.8	5.6	1.6	2.1	1.3	1.9

22: Lowell Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBR	WBL	WBT	WBR	NBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.2	0.0	0.0	0.0	0.1		0.0	0.0	0.0
Total Del/Veh (s)	4.5	2.9	5.7	6.7	3.8	0.0	2.2	3.0	3.3	4.3

29: Empire Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	15.4	7.2	1.4	1.0	5.7	1.2	2.2

Total Network Performance

Denied Del/Veh (s)	111.8
Total Del/Veh (s)	84.8

Queuing and Blocking Report
PM Peak Hour Future (2037)

05/31/2017

Intersection: 3: Park Ave & 15th St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	LTR
Maximum Queue (ft)	73	52	34	14
Average Queue (ft)	28	19	11	0
95th Queue (ft)	53	45	33	6
Link Distance (ft)	382	341		357
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			50	
Storage Blk Time (%)			0	
Queuing Penalty (veh)			0	

Intersection: 6: Park Ave & Empire Ave/Deer Valley Dr

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	T	TR	L	T	R
Maximum Queue (ft)	276	278	248	218	580	584	60	218	222	325	744	709
Average Queue (ft)	161	173	118	64	427	479	22	125	136	309	558	378
95th Queue (ft)	240	258	203	144	746	699	51	195	205	380	929	925
Link Distance (ft)			591		537	537		357	357		706	706
Upstream Blk Time (%)					38	61					33	10
Queuing Penalty (veh)					0	0					0	0
Storage Bay Dist (ft)	215	215		250			300			300		
Storage Blk Time (%)	2	4	1		2			0		49	1	
Queuing Penalty (veh)	7	15	4		2			0		185	3	

Intersection: 7: Empire Ave & Silver King Dr/15th St

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	LTR	LTR	LT
Maximum Queue (ft)	150	331	59	143	100
Average Queue (ft)	149	324	20	28	16
95th Queue (ft)	150	335	44	97	60
Link Distance (ft)		315	382	602	591
Upstream Blk Time (%)		62			
Queuing Penalty (veh)		269			
Storage Bay Dist (ft)	50				
Storage Blk Time (%)	100	2			
Queuing Penalty (veh)	76	9			

Intersection: 9: Empire Ave & Crescent Tram

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	41	29
Average Queue (ft)	16	2
95th Queue (ft)	39	16
Link Distance (ft)	185	2121
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Empire Ave & Manor Way

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	157	18
Average Queue (ft)	91	1
95th Queue (ft)	146	9
Link Distance (ft)	146	2121
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	4	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Lowell Ave & Northstar Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	6
Average Queue (ft)	0
95th Queue (ft)	4
Link Distance (ft)	247
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
PM Peak Hour Future (2037)

05/31/2017

Intersection: 12: Park Ave & Osborne St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	60	76
Average Queue (ft)	33	10
95th Queue (ft)	53	43
Link Distance (ft)	160	288
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Lowell Ave & Manor Way

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	94	102	200
Average Queue (ft)	41	51	82
95th Queue (ft)	68	81	149
Link Distance (ft)	146	1734	505
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Park Ave & 14th St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	105	128	76
Average Queue (ft)	43	31	7
95th Queue (ft)	80	92	40
Link Distance (ft)	392	2685	312
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
 PM Peak Hour Future (2037)

05/31/2017

Intersection: 20: Lowell Ave & Silver King Dr

Movement	EB	WB	WB	NB
Directions Served	TR	L	T	LR
Maximum Queue (ft)	133	53	6	484
Average Queue (ft)	49	10	0	402
95th Queue (ft)	191	37	4	487
Link Distance (ft)	334		315	738
Upstream Blk Time (%)	5			
Queuing Penalty (veh)	0			
Storage Bay Dist (ft)		50		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 21: Empire Ave & Shadow Ridge Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	28	173	17
Average Queue (ft)	6	46	1
95th Queue (ft)	23	134	9
Link Distance (ft)	270	167	602
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		2	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 22: Lowell Ave & Shadow Ridge Rd

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	42	102	59
Average Queue (ft)	16	48	33
95th Queue (ft)	34	77	54
Link Distance (ft)	232	270	738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 29: Empire Ave

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	85	89	100
Average Queue (ft)	35	4	18
95th Queue (ft)	66	34	63
Link Distance (ft)	392	332	167
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 576

HCM 2010 Signalized Intersection Summary
6: Park Ave & Empire Ave/Deer Valley Dr

05/31/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 							 				
Traffic Volume (veh/h)	683	294	38	77	248	706	39	418	72	546	375	366
Future Volume (veh/h)	683	294	38	77	248	706	39	418	72	546	375	366
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	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	742	320	41	84	270	767	42	454	78	593	408	398
Adj No. of Lanes	2	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	593	504	65	108	373	642	293	672	115	518	730	893
Arrive On Green	0.17	0.31	0.31	0.06	0.20	0.20	0.04	0.22	0.22	0.21	0.39	0.39
Sat Flow, veh/h	3442	1619	207	1774	1863	1583	1774	3025	517	1774	1863	1583
Grp Volume(v), veh/h	742	0	361	84	270	767	42	265	267	593	408	398
Grp Sat Flow(s),veh/h/ln	1721	0	1826	1774	1863	1583	1774	1770	1772	1774	1863	1583
Q Serve(g_s), s	15.5	0.0	15.3	4.2	12.2	16.7	1.6	12.3	12.4	18.5	15.4	2.6
Cycle Q Clear(g_c), s	15.5	0.0	15.3	4.2	12.2	16.7	1.6	12.3	12.4	18.5	15.4	2.6
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	593	0	569	108	373	642	293	393	394	518	730	893
V/C Ratio(X)	1.25	0.00	0.63	0.78	0.72	1.19	0.14	0.67	0.68	1.15	0.56	0.45
Avail Cap(c_a), veh/h	593	0	569	140	373	642	329	393	394	518	730	893
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	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.3	0.0	26.6	41.7	33.7	9.3	25.4	32.0	32.1	22.4	21.3	4.2
Incr Delay (d2), s/veh	126.8	0.0	2.3	18.8	6.9	102.2	0.2	8.9	9.1	86.4	3.1	1.6
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	17.8	0.0	8.1	2.6	7.0	25.5	0.8	7.0	7.1	12.4	8.4	3.6
LnGrp Delay(d),s/veh	164.1	0.0	28.9	60.4	40.5	111.6	25.6	40.9	41.2	108.8	24.4	5.8
LnGrp LOS	F		C	E	D	F	C	D	D	F	C	A
Approach Vol, veh/h		1103			1121			574			1399	
Approach Delay, s/veh		119.8			90.6			39.9			54.9	
Approach LOS		F			F			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	23.0	24.5	10.0	32.5	7.8	39.7	20.0	22.5				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	18.5	20.0	7.1	26.4	5.1	33.4	15.5	18.0				
Max Q Clear Time (g_c+I1), s	20.5	14.4	6.2	17.3	3.6	17.4	17.5	18.7				
Green Ext Time (p_c), s	0.0	3.3	0.0	3.6	0.0	6.7	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			79.5									
HCM 2010 LOS			E									



APPENDIX – Future (2037) Mitigated Traffic Analysis

DRAFT

3: Park Ave & 15th St Performance by movement

Movement	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.1	0.3	0.0	0.0	0.0	0.0
Total Del/Veh (s)	8.0	5.0	8.5	7.7	3.4	2.9	0.3	1.6	0.9	1.7

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.0	0.0	4.4	1.4	1.4	0.0	0.0	0.0	8.1	6.8	7.1
Total Del/Veh (s)	34.2	24.4	15.4	101.1	117.0	7.3	31.5	48.2	26.1	70.3	47.4	21.3

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	All
Denied Del/Veh (s)	4.4
Total Del/Veh (s)	43.8

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	16.3	10.7	5.9	11.8	11.8	3.8	17.2	5.5	3.0	11.2	6.8	4.9

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	7.1

9: Empire Ave & Crescent Tram Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.0	2.6	0.1	0.1	1.9	0.5	1.8

10: Empire Ave & Manor Way Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	5.8	4.7	2.2	0.4	0.4	0.5	3.8

11: Lowell Ave & Northstar Dr Performance by movement

Movement	EBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.7	0.0	1.0	0.9	0.8

12: Park Ave & Osborne St Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.2	0.2	0.0	0.0	0.1
Total Del/Veh (s)	6.0	3.3	1.9	0.1	2.2	2.6	1.7

13: Lowell Ave & Manor Way Performance by movement

Movement	WBL	WBR	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	4.2	2.6	3.9	6.2	1.8	4.4

14: Park Ave & 14th St Performance by movement

Movement	EBL	EBR	NBL	NBT	NBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	7.7	4.2	3.9	2.1	2.9	0.7	0.4	2.2

20: Lowell Ave & Silver King Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.2	0.2	0.0
Total Del/Veh (s)	1.2	0.3	7.3	5.6	26.9	5.7	6.8

21: Empire Ave & Shadow Ridge Rd Performance by movement

Movement	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.6	12.3	2.7	4.7	3.5	3.8

22: Lowell Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.3	6.0	2.6	6.6	6.9	4.6	0.2	1.5	3.8	3.5

29: Empire Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	10.1	6.5	1.1	0.9	3.5	1.0	2.0

Total Network Performance

Denied Del/Veh (s)	4.4
Total Del/Veh (s)	54.9

Queuing and Blocking Report
 AM Peak Hour Future (2037) Mitigated

06/13/2017

Intersection: 3: Park Ave & 15th St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	LTR
Maximum Queue (ft)	60	38	26	4
Average Queue (ft)	30	16	2	0
95th Queue (ft)	53	40	13	3
Link Distance (ft)	382	334		357
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			50	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Park Ave & Empire Ave/Deer Valley Dr

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	T	TR	L	T	R
Maximum Queue (ft)	183	190	182	275	546	273	59	149	172	245	728	732
Average Queue (ft)	82	99	77	108	319	91	25	78	92	229	457	353
95th Queue (ft)	152	166	153	270	557	316	54	130	153	292	833	722
Link Distance (ft)			591		536	536	357	357	357		706	706
Upstream Blk Time (%)					6	1					8	3
Queuing Penalty (veh)					0	0					0	0
Storage Bay Dist (ft)	215	215		250						220		
Storage Blk Time (%)	0	0	0	0	33					41	0	
Queuing Penalty (veh)	0	0	0	0	18					73	0	

Intersection: 7: Empire Ave & Silver King Dr/15th St

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	111	69	48	105	171	49	206	196
Average Queue (ft)	60	17	15	28	68	6	99	18
95th Queue (ft)	102	49	38	67	128	29	170	109
Link Distance (ft)		309	382		601		591	591
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	100			100		100		
Storage Blk Time (%)	1			0	2		4	
Queuing Penalty (veh)	0			0	1		0	

Intersection: 9: Empire Ave & Crescent Tram

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	40	19
Average Queue (ft)	18	1
95th Queue (ft)	39	10
Link Distance (ft)	185	2121
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Empire Ave & Manor Way

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	119	6
Average Queue (ft)	57	0
95th Queue (ft)	97	4
Link Distance (ft)	146	2121
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Lowell Ave & Northstar Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	19
Average Queue (ft)	1
95th Queue (ft)	11
Link Distance (ft)	247
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
AM Peak Hour Future (2037) Mitigated

06/13/2017

Intersection: 12: Park Ave & Osborne St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	60	28
Average Queue (ft)	25	2
95th Queue (ft)	53	13
Link Distance (ft)	160	288
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Lowell Ave & Manor Way

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	63	70	79
Average Queue (ft)	35	39	47
95th Queue (ft)	52	61	69
Link Distance (ft)	146	1734	505
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Park Ave & 14th St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	75	79	4
Average Queue (ft)	33	17	0
95th Queue (ft)	55	56	3
Link Distance (ft)	391	2685	312
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
 AM Peak Hour Future (2037) Mitigated

06/13/2017

Intersection: 20: Lowell Ave & Silver King Dr

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	34	114	114
Average Queue (ft)	2	29	47
95th Queue (ft)	14	84	96
Link Distance (ft)	334		738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		2	
Queuing Penalty (veh)		0	

Intersection: 21: Empire Ave & Shadow Ridge Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	28	165	17
Average Queue (ft)	3	57	1
95th Queue (ft)	16	146	9
Link Distance (ft)	265	165	601
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		3	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 22: Lowell Ave & Shadow Ridge Rd

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	26	119	69
Average Queue (ft)	10	66	36
95th Queue (ft)	21	96	58
Link Distance (ft)	232	265	738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 29: Empire Ave

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	89	59	66
Average Queue (ft)	40	3	4
95th Queue (ft)	71	30	30
Link Distance (ft)	391	332	165
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 96

HCM 2010 Signalized Intersection Summary

6: Park Ave & Empire Ave/Deer Valley Dr

06/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	328	180	16	53	274	238	40	184	68	526	176	984
Future Volume (veh/h)	328	180	16	53	274	238	40	184	68	526	176	984
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	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	357	196	17	58	298	259	43	200	74	572	191	1070
Adj No. of Lanes	2	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	466	430	37	75	299	604	260	880	316	763	997	1062
Arrive On Green	0.14	0.25	0.25	0.04	0.16	0.16	0.03	0.34	0.34	0.22	0.54	0.54
Sat Flow, veh/h	3442	1690	147	1774	1863	1583	1774	2555	916	1774	1863	1583
Grp Volume(v), veh/h	357	0	213	58	298	259	43	137	137	572	191	1070
Grp Sat Flow(s),veh/h/ln	1721	0	1837	1774	1863	1583	1774	1770	1701	1774	1863	1583
Q Serve(g_s), s	13.0	0.0	12.7	4.2	20.8	9.6	2.0	7.1	7.5	25.9	6.9	51.2
Cycle Q Clear(g_c), s	13.0	0.0	12.7	4.2	20.8	9.6	2.0	7.1	7.5	25.9	6.9	51.2
Prop In Lane	1.00		0.08	1.00		1.00	1.00		0.54	1.00		1.00
Lane Grp Cap(c), veh/h	466	0	467	75	299	604	260	610	586	763	997	1062
V/C Ratio(X)	0.77	0.00	0.46	0.78	1.00	0.43	0.17	0.22	0.23	0.75	0.19	1.01
Avail Cap(c_a), veh/h	1072	0	729	134	299	604	276	610	586	802	997	1062
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)	0.93	0.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.2	0.0	40.9	61.7	54.5	13.4	26.0	30.3	30.4	17.6	15.7	11.7
Incr Delay (d2), s/veh	2.5	0.0	0.6	15.7	50.6	0.5	0.3	0.9	0.9	3.8	0.4	29.6
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	6.4	0.0	6.5	2.4	14.9	4.3	1.0	3.6	3.7	13.3	3.7	30.6
LnGrp Delay(d),s/veh	56.7	0.0	41.6	77.4	105.1	13.9	26.3	31.1	31.3	21.3	16.1	41.2
LnGrp LOS	E		D	E	F	B	C	C	C	C	B	F
Approach Vol, veh/h		570			615			317			1833	
Approach Delay, s/veh		51.0			64.1			30.6			32.4	
Approach LOS		D			E			C			C	
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	33.2	49.3	10.0	37.5	8.4	74.1	22.1	25.4				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	31.6	19.0	9.8	51.6	5.1	45.5	40.5	20.9				
Max Q Clear Time (g_c+I1), s	27.9	9.5	6.2	14.7	4.0	53.2	15.0	22.8				
Green Ext Time (p_c), s	0.8	5.5	0.0	2.7	0.0	0.0	2.6	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			41.3									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary
 7: Empire Ave & Silver King Dr/15th St

06/13/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	18	19	23	14	5	58	345	18	6	662	621
Future Volume (veh/h)	156	18	19	23	14	5	58	345	18	6	662	621
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	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	170	20	21	25	15	5	63	375	20	7	720	0
Adj No. of Lanes	1	1	0	0	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	434	141	148	258	130	30	435	1038	55	665	1103	937
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.59	0.59	0.59	0.59	0.59	0.00
Sat Flow, veh/h	1386	833	875	649	766	177	729	1753	93	985	1863	1583
Grp Volume(v), veh/h	170	0	41	45	0	0	63	0	395	7	720	0
Grp Sat Flow(s),veh/h/ln	1386	0	1708	1592	0	0	729	0	1846	985	1863	1583
Q Serve(g_s), s	3.3	0.0	0.8	0.0	0.0	0.0	2.4	0.0	4.2	0.1	9.7	0.0
Cycle Q Clear(g_c), s	4.1	0.0	0.8	0.8	0.0	0.0	12.1	0.0	4.2	4.3	9.7	0.0
Prop In Lane	1.00		0.51	0.56		0.11	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	434	0	289	418	0	0	435	0	1093	665	1103	937
V/C Ratio(X)	0.39	0.00	0.14	0.11	0.00	0.00	0.14	0.00	0.36	0.01	0.65	0.00
Avail Cap(c_a), veh/h	861	0	816	887	0	0	642	0	1617	944	1631	1386
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	0.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.6	0.0	13.3	13.3	0.0	0.0	9.1	0.0	4.0	5.1	5.1	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.2	0.1	0.0	0.0	0.2	0.0	0.2	0.0	0.7	0.0
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	1.7	0.0	0.4	0.4	0.0	0.0	0.5	0.0	2.1	0.0	5.0	0.0
LnGrp Delay(d),s/veh	15.2	0.0	13.5	13.4	0.0	0.0	9.3	0.0	4.2	5.1	5.8	0.0
LnGrp LOS	B		B	B			A		A	A	A	
Approach Vol, veh/h		211			45			458			727	
Approach Delay, s/veh		14.9			13.4			4.9			5.8	
Approach LOS		B			B			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		26.8		10.9		26.8		10.9				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		33.0		18.0		33.0		18.0				
Max Q Clear Time (g_c+I1), s		14.1		6.1		11.7		2.8				
Green Ext Time (p_c), s		8.2		0.7		8.7		0.8				
Intersection Summary												
HCM 2010 Ctrl Delay			7.1									
HCM 2010 LOS			A									

3: Park Ave & 15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1
Total Del/Veh (s)	19.5	1.0	12.1	15.8	20.4	5.9	7.6	2.0	2.1	1.5	3.2

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	35.3	38.3	40.1	0.0	0.0	0.0	4.1	2.7	2.1
Total Del/Veh (s)	52.8	34.9	29.6	191.7	131.9	48.8	25.7	66.5	65.4	53.1	31.0	5.0

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	All
Denied Del/Veh (s)	11.3
Total Del/Veh (s)	53.5

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Del/Veh (s)	18.3	10.3	6.0	12.0	4.1	8.6	19.1	12.6	8.5	23.9	9.6	3.2

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	11.9

9: Empire Ave & Crescent Tram Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.2	2.4	0.1	0.1	2.3	0.6	1.6

10: Empire Ave & Manor Way Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	8.6	3.3	7.5	2.6	0.5	0.7	0.5	5.7

11: Lowell Ave & Northstar Dr Performance by movement

Movement	EBL	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.9	1.4	0.0	1.3	0.9	1.1

12: Park Ave & Osborne St Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.2	0.1	0.2	0.3	0.0	0.0	0.1
Total Del/Veh (s)	7.8	4.1	3.1	0.3	4.0	5.1	2.9

13: Lowell Ave & Manor Way Performance by movement

Movement	WBL	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.1
Total Del/Veh (s)	4.9	5.1	9.6	9.7	7.8

14: Park Ave & 14th St Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	21.1	0.3	9.8	8.0	3.9	2.8	4.1	1.0	0.8	3.6

20: Lowell Ave & Silver King Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.3	0.3	0.2
Total Del/Veh (s)	0.4	0.1	5.3	3.8	8.9	5.2	4.9

21: Empire Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.7	0.3	0.0	0.0	0.2
Total Del/Veh (s)	42.3	3.3	6.4	1.9	3.8	2.9	2.7

22: Lowell Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.3	2.9	5.8	6.5	4.2	0.0	0.0	3.2	3.9	4.5	

29: Empire Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	15.4	7.4	1.5	1.0	6.2	1.4	2.3

Total Network Performance

Denied Del/Veh (s)	11.0
Total Del/Veh (s)	64.7

Queuing and Blocking Report
 PM Peak Hour Future (2037) Mitigated

06/14/2017

Intersection: 3: Park Ave & 15th St

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	LTR
Maximum Queue (ft)	90	39	48	90	8
Average Queue (ft)	35	21	12	13	1
95th Queue (ft)	69	46	39	99	6
Link Distance (ft)	376	341		345	357
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				0	
Storage Bay Dist (ft)			50		
Storage Blk Time (%)			0	2	
Queuing Penalty (veh)			2	1	

Intersection: 6: Park Ave & Empire Ave/Deer Valley Dr

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	T	TR	L	T	R
Maximum Queue (ft)	304	357	407	274	533	575	124	322	332	325	743	677
Average Queue (ft)	212	237	198	164	373	400	30	202	211	288	349	134
95th Queue (ft)	314	362	385	337	661	655	111	326	326	371	729	476
Link Distance (ft)			591		537	537		357	357		706	706
Upstream Blk Time (%)			0		18	20	0	3	3		6	1
Queuing Penalty (veh)			4		0	0	0	9	8		0	0
Storage Bay Dist (ft)	215	215		250			300			300		
Storage Blk Time (%)	9	16	4	11	33		0	5		20	0	
Queuing Penalty (veh)	31	54	28	26	26		0	2		75	3	

Intersection: 7: Empire Ave & Silver King Dr/15th St

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	LTR	L	TR	L	T
Maximum Queue (ft)	194	151	46	122	310	98	255
Average Queue (ft)	120	31	11	28	160	14	109
95th Queue (ft)	177	82	32	89	267	53	202
Link Distance (ft)		309	376		601		591
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	100			100		100	
Storage Blk Time (%)	12	0		0	17		6
Queuing Penalty (veh)	9	0		1	7		1

Queuing and Blocking Report
PM Peak Hour Future (2037) Mitigated

06/14/2017

Intersection: 9: Empire Ave & Crescent Tram

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	31	24
Average Queue (ft)	15	1
95th Queue (ft)	37	12
Link Distance (ft)	185	2121
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Empire Ave & Manor Way

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	155	25
Average Queue (ft)	92	1
95th Queue (ft)	150	12
Link Distance (ft)	146	2121
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	5	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Lowell Ave & Northstar Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	24
Average Queue (ft)	1
95th Queue (ft)	11
Link Distance (ft)	247
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
PM Peak Hour Future (2037) Mitigated

06/14/2017

Intersection: 12: Park Ave & Osborne St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	60	70
Average Queue (ft)	32	7
95th Queue (ft)	53	36
Link Distance (ft)	160	288
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Lowell Ave & Manor Way

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	84	99	184
Average Queue (ft)	41	47	82
95th Queue (ft)	69	77	145
Link Distance (ft)	146	1734	505
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Park Ave & 14th St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	111	192	77
Average Queue (ft)	46	40	8
95th Queue (ft)	87	122	40
Link Distance (ft)	391	2685	312
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
 PM Peak Hour Future (2037) Mitigated

06/14/2017

Intersection: 20: Lowell Ave & Silver King Dr

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	60	119
Average Queue (ft)	11	63
95th Queue (ft)	39	97
Link Distance (ft)		738
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 21: Empire Ave & Shadow Ridge Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	28	178	13
Average Queue (ft)	5	47	1
95th Queue (ft)	23	141	8
Link Distance (ft)	265	165	601
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		5	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 22: Lowell Ave & Shadow Ridge Rd

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	58	98	76
Average Queue (ft)	17	53	39
95th Queue (ft)	37	80	64
Link Distance (ft)	232	265	738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 29: Empire Ave

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	83	61	112
Average Queue (ft)	35	4	22
95th Queue (ft)	68	31	73
Link Distance (ft)	391	332	165
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 298

HCM 2010 Signalized Intersection Summary
6: Park Ave & Empire Ave/Deer Valley Dr

06/14/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 							 				
Traffic Volume (veh/h)	683	294	38	77	248	706	39	418	72	546	375	366
Future Volume (veh/h)	683	294	38	77	248	706	39	418	72	546	375	366
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	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	742	320	41	84	270	767	42	454	78	593	408	398
Adj No. of Lanes	2	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	742	518	66	107	307	714	238	514	88	593	789	1012
Arrive On Green	0.22	0.32	0.32	0.06	0.16	0.16	0.03	0.17	0.17	0.29	0.42	0.42
Sat Flow, veh/h	3442	1619	207	1774	1863	1583	1774	3025	517	1774	1863	1583
Grp Volume(v), veh/h	742	0	361	84	270	767	42	265	267	593	408	398
Grp Sat Flow(s),veh/h/ln	1721	0	1826	1774	1863	1583	1774	1770	1772	1774	1863	1583
Q Serve(g_s), s	23.7	0.0	18.4	5.1	15.6	18.1	2.1	16.0	16.2	31.5	17.8	2.7
Cycle Q Clear(g_c), s	23.7	0.0	18.4	5.1	15.6	18.1	2.1	16.0	16.2	31.5	17.8	2.7
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	742	0	584	107	307	714	238	301	301	593	789	1012
V/C Ratio(X)	1.00	0.00	0.62	0.79	0.88	1.07	0.18	0.88	0.89	1.00	0.52	0.39
Avail Cap(c_a), veh/h	742	0	584	137	307	714	262	301	301	593	789	1012
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)	0.49	0.00	0.49	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.1	0.0	31.7	51.0	44.9	11.6	35.8	44.5	44.6	28.7	23.4	3.5
Incr Delay (d2), s/veh	23.3	0.0	1.0	20.3	24.3	55.4	0.3	28.6	29.8	37.0	2.4	1.1
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	13.6	0.0	9.5	3.1	10.1	29.3	1.1	10.2	10.4	24.0	9.7	3.5
LnGrp Delay(d),s/veh	66.5	0.0	32.7	71.3	69.2	67.0	36.1	73.1	74.4	65.7	25.8	4.7
LnGrp LOS	F		C	E	E	F	D	E	E	F	C	A
Approach Vol, veh/h		1103			1121			574			1399	
Approach Delay, s/veh		55.4			67.9			71.0			36.7	
Approach LOS		E			E			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	36.0	23.2	11.1	39.7	8.1	51.1	28.2	22.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	31.5	18.7	8.5	33.3	5.1	45.1	23.7	18.1				
Max Q Clear Time (g_c+I1), s	33.5	18.2	7.1	20.4	4.1	19.8	25.7	20.1				
Green Ext Time (p_c), s	0.0	0.3	0.0	4.4	0.0	8.1	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			54.6									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary
7: Empire Ave & Silver King Dr/15th St

06/14/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	357	53	23	11	16	6	44	638	15	15	411	194
Future Volume (veh/h)	357	53	23	11	16	6	44	638	15	15	411	194
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	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	388	58	25	12	17	7	48	693	16	16	447	0
Adj No. of Lanes	1	1	0	0	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	598	400	172	227	297	103	460	895	21	279	920	782
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.49	0.49	0.49	0.49	0.49	0.00
Sat Flow, veh/h	1381	1236	533	401	918	318	939	1813	42	737	1863	1583
Grp Volume(v), veh/h	388	0	83	36	0	0	48	0	709	16	447	0
Grp Sat Flow(s),veh/h/ln	1381	0	1769	1637	0	0	939	0	1855	737	1863	1583
Q Serve(g_s), s	12.1	0.0	1.6	0.0	0.0	0.0	1.8	0.0	15.4	0.9	7.9	0.0
Cycle Q Clear(g_c), s	12.7	0.0	1.6	0.7	0.0	0.0	9.6	0.0	15.4	16.3	7.9	0.0
Prop In Lane	1.00		0.30	0.33		0.19	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	598	0	572	627	0	0	460	0	916	279	920	782
V/C Ratio(X)	0.65	0.00	0.15	0.06	0.00	0.00	0.10	0.00	0.77	0.06	0.49	0.00
Avail Cap(c_a), veh/h	766	0	787	820	0	0	551	0	1097	351	1101	936
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	0.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.5	0.0	11.8	11.5	0.0	0.0	11.5	0.0	10.2	16.9	8.3	0.0
Incr Delay (d2), s/veh	1.2	0.0	0.1	0.0	0.0	0.0	0.1	0.0	2.9	0.1	0.4	0.0
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	5.1	0.0	0.8	0.3	0.0	0.0	0.5	0.0	8.4	0.2	4.1	0.0
LnGrp Delay(d),s/veh	16.7	0.0	11.9	11.5	0.0	0.0	11.6	0.0	13.1	17.0	8.7	0.0
LnGrp LOS	B		B	B			B		B	B	A	
Approach Vol, veh/h		471			36			757			463	
Approach Delay, s/veh		15.9			11.5			13.0			9.0	
Approach LOS		B			B			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		28.8		20.4		28.8		20.4				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		29.1		21.9		29.1		21.9				
Max Q Clear Time (g_c+I1), s		17.4		14.7		18.3		2.7				
Green Ext Time (p_c), s		6.3		1.2		6.0		1.8				
Intersection Summary												
HCM 2010 Ctrl Delay				12.7								
HCM 2010 LOS				B								



APPENDIX – Future (2037) Conditions With King’s Crown Traffic Analysis

DRAFT

3: Park Ave & 15th St Performance by movement

Movement	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.3	0.1	0.1	0.6	0.0	0.0	0.0	0.0
Total Del/Veh (s)	7.4	4.9	7.4	7.3	3.3	2.5	0.3	1.4	1.1	1.6

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	12.9	9.5	8.0	0.0	0.0	0.0	38.5	37.7	35.6
Total Del/Veh (s)	33.9	26.5	16.0	96.2	124.4	8.4	27.8	45.8	25.0	92.9	62.2	25.9

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	All
Denied Del/Veh (s)	21.3
Total Del/Veh (s)	50.1

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	17.7	10.3	6.7	11.6	13.6	6.2	18.1	5.8	4.7	10.3	7.0	4.8

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	7.5

9: Empire Ave & Crescent Tram Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.1	2.5	0.1	0.0	1.9	0.3	1.4

10: Empire Ave & Manor Way Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	6.3	4.9	2.2	0.4	0.4	0.4	4.1

11: Lowell Ave & Northstar Dr Performance by movement

Movement	EBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	2.5	0.1	1.0	0.8	0.9

12: Park Ave & 8th St. Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.2	0.2	0.0	0.0	0.1
Total Del/Veh (s)	5.4	3.4	1.8	0.1	1.8	2.5	1.4

13: Lowell Ave & Manor Way Performance by movement

Movement	WBL	WBR	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.0	0.0	0.0
Total Del/Veh (s)	4.2	3.3	4.2	6.5	2.0	4.6

14: Park Ave & 14th St Performance by movement

Movement	EBL	EBR	NBL	NBT	NBR	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	7.6	4.1	4.1	1.9	2.0	0.6	0.4	2.2

16: Access 1 & Lowell Ave/Empire Ave Performance by movement

Movement	EBT	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1	0.0
Total Del/Veh (s)	0.0	0.6	3.8	2.2	0.6

17: Lowell Ave & Access 2 Performance by movement

Movement	EBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.0	0.1	0.1	0.0	0.4

20: Lowell Ave & Silver King Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.3	0.2	0.1
Total Del/Veh (s)	0.3	0.2	7.2	5.1	21.2	5.0	6.5

21: Empire Ave & Shadow Ridge Rd Performance by movement

Movement	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.3	14.0	3.0	5.0	3.7	4.1

22: Lowell Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.1	5.1	2.8	6.9	7.3	5.2	0.2	1.6	3.8	3.8

29: Empire Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	11.6	7.0	1.3	0.9	6.0	1.0	2.1

Total Network Performance

Denied Del/Veh (s)	21.1
Total Del/Veh (s)	61.9

Queuing and Blocking Report
 AM Peak Hour Future (2037) + Project Mitigated

06/01/2017

Intersection: 3: Park Ave & 15th St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	LTR
Maximum Queue (ft)	65	33	16	4
Average Queue (ft)	31	14	2	0
95th Queue (ft)	56	37	12	3
Link Distance (ft)	382	334		357
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			50	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Park Ave & Empire Ave/Deer Valley Dr

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	T	TR	L	T	R
Maximum Queue (ft)	184	185	192	275	505	315	80	167	177	245	742	732
Average Queue (ft)	87	101	98	112	333	111	25	87	105	235	526	487
95th Queue (ft)	147	158	164	286	567	377	58	140	166	278	944	892
Link Distance (ft)			591		536	536	357	357	357		706	706
Upstream Blk Time (%)					10	4					25	7
Queuing Penalty (veh)					0	0					0	0
Storage Bay Dist (ft)	215	215		250						220		
Storage Blk Time (%)	0	0	0	0	40					50	0	
Queuing Penalty (veh)	0	0	0	0	21					89	2	

Intersection: 7: Empire Ave & Silver King Dr/15th St

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	136	57	63	89	187	53	188	181
Average Queue (ft)	68	19	16	28	77	5	100	18
95th Queue (ft)	116	46	42	64	144	28	159	101
Link Distance (ft)		309	382		601		591	591
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	100			100		100		
Storage Blk Time (%)	2	0		0	2		4	
Queuing Penalty (veh)	1	0		0	1		0	

Queuing and Blocking Report
AM Peak Hour Future (2037) + Project Mitigated

06/01/2017

Intersection: 9: Empire Ave & Crescent Tram

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	27	12
Average Queue (ft)	13	1
95th Queue (ft)	34	7
Link Distance (ft)	185	2121
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Empire Ave & Manor Way

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	126	12
Average Queue (ft)	66	0
95th Queue (ft)	105	6
Link Distance (ft)	146	2121
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Lowell Ave & Northstar Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	18
Average Queue (ft)	1
95th Queue (ft)	8
Link Distance (ft)	247
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
AM Peak Hour Future (2037) + Project Mitigated

06/01/2017

Intersection: 12: Park Ave & 8th St.

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	67	34
Average Queue (ft)	28	2
95th Queue (ft)	54	15
Link Distance (ft)	160	288
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Lowell Ave & Manor Way

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	58	71	88
Average Queue (ft)	34	43	50
95th Queue (ft)	53	66	73
Link Distance (ft)	146	1734	505
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Park Ave & 14th St

Movement	EB	NB
Directions Served	LTR	LTR
Maximum Queue (ft)	81	75
Average Queue (ft)	36	12
95th Queue (ft)	61	49
Link Distance (ft)	391	2685
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
 AM Peak Hour Future (2037) + Project Mitigated

06/01/2017

Intersection: 16: Access 1 & Lowell Ave/Empire Ave

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	4
95th Queue (ft)	22
Link Distance (ft)	126
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 17: Lowell Ave & Access 2

Movement	EB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	3
95th Queue (ft)	18
Link Distance (ft)	128
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 20: Lowell Ave & Silver King Dr

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (ft)	15	101	139
Average Queue (ft)	1	29	52
95th Queue (ft)	7	79	95
Link Distance (ft)	334		738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		1	
Queuing Penalty (veh)		0	

Queuing and Blocking Report
 AM Peak Hour Future (2037) + Project Mitigated

06/01/2017

Intersection: 21: Empire Ave & Shadow Ridge Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	28	181	38
Average Queue (ft)	3	67	3
95th Queue (ft)	17	166	18
Link Distance (ft)	265	165	601
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		6	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 22: Lowell Ave & Shadow Ridge Rd

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	32	128	76
Average Queue (ft)	10	73	38
95th Queue (ft)	22	113	61
Link Distance (ft)	232	265	738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 29: Empire Ave

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	82	82	47
Average Queue (ft)	40	6	5
95th Queue (ft)	67	38	26
Link Distance (ft)	391	332	165
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 122

HCM 2010 Signalized Intersection Summary

6: Park Ave & Empire Ave/Deer Valley Dr

06/01/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	354	195	17	54	279	238	40	189	70	526	178	995
Future Volume (veh/h)	354	195	17	54	279	238	40	189	70	526	178	995
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	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	385	212	18	59	303	259	43	205	76	572	193	1082
Adj No. of Lanes	2	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	506	452	38	76	303	607	254	816	293	734	948	1038
Arrive On Green	0.15	0.27	0.27	0.04	0.16	0.16	0.03	0.32	0.32	0.22	0.51	0.51
Sat Flow, veh/h	3442	1694	144	1774	1863	1583	1774	2553	918	1774	1863	1583
Grp Volume(v), veh/h	385	0	230	59	303	259	43	140	141	572	193	1082
Grp Sat Flow(s),veh/h/ln	1721	0	1837	1774	1863	1583	1774	1770	1701	1774	1863	1583
Q Serve(g_s), s	12.9	0.0	12.6	4.0	19.5	8.4	1.9	7.0	7.4	25.3	6.8	43.9
Cycle Q Clear(g_c), s	12.9	0.0	12.6	4.0	19.5	8.4	1.9	7.0	7.4	25.3	6.8	43.9
Prop In Lane	1.00		0.08	1.00		1.00	1.00		0.54	1.00		1.00
Lane Grp Cap(c), veh/h	506	0	490	76	303	607	254	566	544	734	948	1038
V/C Ratio(X)	0.76	0.00	0.47	0.78	1.00	0.43	0.17	0.25	0.26	0.78	0.20	1.04
Avail Cap(c_a), veh/h	1047	0	712	140	303	607	274	566	544	734	948	1038
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)	0.92	0.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.2	0.0	36.9	56.9	50.3	11.6	25.9	30.2	30.3	18.1	16.2	10.8
Incr Delay (d2), s/veh	2.2	0.0	0.6	15.4	52.0	0.5	0.3	1.0	1.2	5.4	0.5	39.5
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	6.3	0.0	6.5	2.3	14.4	3.7	1.0	3.6	3.6	13.3	3.6	30.2
LnGrp Delay(d),s/veh	51.4	0.0	37.5	72.3	102.2	12.1	26.2	31.2	31.4	23.5	16.6	50.3
LnGrp LOS	D		D	E	F	B	C	C	C	C	B	F
Approach Vol, veh/h		615			621			324			1847	
Approach Delay, s/veh		46.2			61.8			30.6			38.5	
Approach LOS		D			E			C			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	31.0	42.9	9.6	36.5	8.3	65.6	22.1	24.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	26.5	19.5	9.5	46.5	5.1	40.9	36.5	19.5				
Max Q Clear Time (g_c+I1), s	27.3	9.4	6.0	14.6	3.9	45.9	14.9	21.5				
Green Ext Time (p_c), s	0.0	5.8	0.0	2.9	0.0	0.0	2.7	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			43.4									
HCM 2010 LOS			D									

HCM 2010 Signalized Intersection Summary
 7: Empire Ave & Silver King Dr/15th St

06/01/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	18	19	24	14	5	58	386	21	6	675	624
Future Volume (veh/h)	156	18	19	24	14	5	58	386	21	6	675	624
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	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	170	20	21	26	15	5	63	420	23	7	734	0
Adj No. of Lanes	1	1	0	0	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	428	140	147	258	125	29	430	1048	57	631	1116	948
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.60	0.60	0.60	0.60	0.60	0.00
Sat Flow, veh/h	1386	833	875	668	745	172	720	1750	96	943	1863	1583
Grp Volume(v), veh/h	170	0	41	46	0	0	63	0	443	7	734	0
Grp Sat Flow(s),veh/h/ln	1386	0	1708	1586	0	0	720	0	1846	943	1863	1583
Q Serve(g_s), s	3.4	0.0	0.8	0.0	0.0	0.0	2.5	0.0	4.9	0.2	10.1	0.0
Cycle Q Clear(g_c), s	4.2	0.0	0.8	0.8	0.0	0.0	12.5	0.0	4.9	5.1	10.1	0.0
Prop In Lane	1.00		0.51	0.57		0.11	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	428	0	288	413	0	0	430	0	1106	631	1116	948
V/C Ratio(X)	0.40	0.00	0.14	0.11	0.00	0.00	0.15	0.00	0.40	0.01	0.66	0.00
Avail Cap(c_a), veh/h	839	0	795	863	0	0	612	0	1574	871	1589	1350
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	0.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	15.1	0.0	13.7	13.7	0.0	0.0	9.3	0.0	4.1	5.4	5.1	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.2	0.1	0.0	0.0	0.2	0.0	0.2	0.0	0.7	0.0
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	1.8	0.0	0.4	0.4	0.0	0.0	0.5	0.0	2.5	0.0	5.3	0.0
LnGrp Delay(d),s/veh	15.7	0.0	13.9	13.8	0.0	0.0	9.4	0.0	4.3	5.4	5.8	0.0
LnGrp LOS	B		B	B			A		A	A	A	
Approach Vol, veh/h		211			46			506			741	
Approach Delay, s/veh		15.3			13.8			5.0			5.8	
Approach LOS		B			B			A			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		27.7		11.0		27.7		11.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		33.0		18.0		33.0		18.0				
Max Q Clear Time (g_c+I1), s		14.5		6.2		12.1		2.8				
Green Ext Time (p_c), s		8.6		0.7		9.2		0.8				
Intersection Summary												
HCM 2010 Ctrl Delay				7.1								
HCM 2010 LOS				A								

3: Park Ave & 15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
Total Del/Veh (s)	26.2	1.6	15.7	18.4	21.4	5.4	7.3	2.2	2.0	1.7	3.6

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.0	0.0	18.7	15.8	16.3	0.0	0.0	0.0	5.8	4.0	4.1
Total Del/Veh (s)	50.3	37.2	29.8	107.4	118.4	50.2	26.9	76.2	75.4	56.2	33.1	5.3

6: Park Ave & Empire Ave/Deer Valley Dr Performance by movement

Movement	All
Denied Del/Veh (s)	5.9
Total Del/Veh (s)	52.8

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	18.5	12.8	6.1	12.2	5.3	8.1	16.2	12.0	9.2	29.1	9.0	3.3

7: Empire Ave & Silver King Dr/15th St Performance by movement

Movement	All
Denied Del/Veh (s)	0.0
Total Del/Veh (s)	11.5

9: Empire Ave & Crescent Tram Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	4.1	2.4	0.0	0.1	2.3	0.8	1.6

10: Empire Ave & Manor Way Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Total Del/Veh (s)	8.8	2.0	7.1	2.0	0.4	0.9	0.7	5.7

11: Lowell Ave & Northstar Dr Performance by movement

Movement	EBL	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.1	1.8	0.1	1.3	1.6	1.2

12: Park Ave & 8th St. Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.3	0.3	0.0	0.0	0.1
Total Del/Veh (s)	7.8	4.8	2.5	0.3	3.9	3.8	2.8

13: Lowell Ave & Manor Way Performance by movement

Movement	WBL	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.2	0.0	0.0	0.1
Total Del/Veh (s)	5.1	5.6	9.4	10.4	7.7

14: Park Ave & 14th St Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.3	0.3	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	17.8	0.2	9.2	7.2	3.9	3.0	3.8	1.0	0.7	3.5

16: Access 1 & Lowell Ave/Empire Ave Performance by movement

Movement	EBT	WBT	NBR	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.0
Total Del/Veh (s)	0.0	0.3	2.2	0.2

17: Lowell Ave & Access 2 Performance by movement

Movement	EBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0
Total Del/Veh (s)	3.4	0.0	0.1	0.2	0.3

20: Lowell Ave & Silver King Dr Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.5	0.3	0.2
Total Del/Veh (s)	0.4	0.1	5.4	3.7	9.0	5.3	5.0

21: Empire Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.2	0.4	0.0	0.0	0.2
Total Del/Veh (s)	16.3	3.4	6.5	1.7	3.8	2.8	2.6

22: Lowell Ave & Shadow Ridge Rd Performance by movement

Movement	EBL	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.0	0.0	0.0		0.1		0.0	0.0	0.0
Total Del/Veh (s)	4.2	2.9	5.5	6.5	4.0		0.0		3.2	3.8	4.3

29: Empire Ave Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Del/Veh (s)	18.4	8.0	1.4	1.1	6.9	1.7	2.4

Total Network Performance

Denied Del/Veh (s)	5.9
Total Del/Veh (s)	64.2

Queuing and Blocking Report
 PM Peak Hour Future (2037) + Project Mitigated

06/01/2017

Intersection: 3: Park Ave & 15th St

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	LTR
Maximum Queue (ft)	115	43	43	140	12
Average Queue (ft)	41	20	12	18	1
95th Queue (ft)	88	45	36	123	7
Link Distance (ft)	376	341		345	357
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				1	
Storage Bay Dist (ft)			50		
Storage Blk Time (%)			0	2	
Queuing Penalty (veh)			1	1	

Intersection: 6: Park Ave & Empire Ave/Deer Valley Dr

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	T	TR	L	T	R
Maximum Queue (ft)	314	386	436	275	569	572	127	358	361	325	740	698
Average Queue (ft)	215	230	195	141	383	385	28	240	247	282	380	149
95th Queue (ft)	306	334	331	304	633	641	96	370	373	378	780	520
Link Distance (ft)			591		537	537		357	357		706	706
Upstream Blk Time (%)			0		10	22	0	4	4		8	1
Queuing Penalty (veh)			0		0	0	0	11	12		0	0
Storage Bay Dist (ft)	215	215		250			300			300		
Storage Blk Time (%)	8	15	6	0	33			9		20	0	
Queuing Penalty (veh)	28	52	42	0	26			3		77	2	

Intersection: 7: Empire Ave & Silver King Dr/15th St

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	LTR	L	TR	L	T	R
Maximum Queue (ft)	195	170	47	124	344	41	220	21
Average Queue (ft)	119	38	12	31	171	11	103	1
95th Queue (ft)	185	102	33	95	282	36	186	15
Link Distance (ft)		309	376		601		591	591
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	100			100		100		
Storage Blk Time (%)	12	0		0	16		6	
Queuing Penalty (veh)	9	0		1	7		1	

Intersection: 9: Empire Ave & Crescent Tram

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	26	31
Average Queue (ft)	16	2
95th Queue (ft)	37	15
Link Distance (ft)	185	2121
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Empire Ave & Manor Way

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	160	12
Average Queue (ft)	93	0
95th Queue (ft)	149	6
Link Distance (ft)	146	2121
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	5	
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Lowell Ave & Northstar Dr

Movement	EB
Directions Served	LR
Maximum Queue (ft)	19
Average Queue (ft)	1
95th Queue (ft)	9
Link Distance (ft)	247
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
 PM Peak Hour Future (2037) + Project Mitigated

06/01/2017

Intersection: 12: Park Ave & 8th St.

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (ft)	67	53
Average Queue (ft)	32	6
95th Queue (ft)	54	31
Link Distance (ft)	160	288
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 13: Lowell Ave & Manor Way

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	90	106	192
Average Queue (ft)	46	52	79
95th Queue (ft)	76	86	141
Link Distance (ft)	146	1734	505
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 14: Park Ave & 14th St

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	113	180	89
Average Queue (ft)	44	37	7
95th Queue (ft)	82	112	42
Link Distance (ft)	391	2685	312
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
 PM Peak Hour Future (2037) + Project Mitigated

06/01/2017

Intersection: 16: Access 1 & Lowell Ave/Empire Ave

Movement	NB
Directions Served	LR
Maximum Queue (ft)	17
Average Queue (ft)	1
95th Queue (ft)	8
Link Distance (ft)	106
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 17: Lowell Ave & Access 2

Movement	EB
Directions Served	LR
Maximum Queue (ft)	30
Average Queue (ft)	4
95th Queue (ft)	20
Link Distance (ft)	140
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 20: Lowell Ave & Silver King Dr

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	59	116
Average Queue (ft)	12	65
95th Queue (ft)	43	96
Link Distance (ft)		738
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Queuing and Blocking Report
 PM Peak Hour Future (2037) + Project Mitigated

06/01/2017

Intersection: 21: Empire Ave & Shadow Ridge Rd

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (ft)	28	172	28
Average Queue (ft)	6	56	1
95th Queue (ft)	24	155	11
Link Distance (ft)	265	165	601
Upstream Blk Time (%)		1	
Queuing Penalty (veh)		4	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 22: Lowell Ave & Shadow Ridge Rd

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	52	102	68
Average Queue (ft)	16	51	38
95th Queue (ft)	35	79	61
Link Distance (ft)	232	265	738
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 29: Empire Ave

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (ft)	85	83	111
Average Queue (ft)	36	6	26
95th Queue (ft)	65	40	85
Link Distance (ft)	391	332	165
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 284

HCM 2010 Signalized Intersection Summary
6: Park Ave & Empire Ave/Deer Valley Dr

06/01/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 							 				
Traffic Volume (veh/h)	698	303	39	79	262	706	39	421	73	546	379	396
Future Volume (veh/h)	698	303	39	79	262	706	39	421	73	546	379	396
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	1863	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	759	329	42	86	285	767	42	458	79	593	412	430
Adj No. of Lanes	2	1	0	1	1	1	1	2	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	789	535	68	108	303	718	225	506	87	591	795	1039
Arrive On Green	0.23	0.33	0.33	0.06	0.16	0.16	0.03	0.17	0.17	0.29	0.43	0.43
Sat Flow, veh/h	3442	1620	207	1774	1863	1583	1774	3023	518	1774	1863	1583
Grp Volume(v), veh/h	759	0	371	86	285	767	42	267	270	593	412	430
Grp Sat Flow(s),veh/h/ln	1721	0	1826	1774	1863	1583	1774	1770	1771	1774	1863	1583
Q Serve(g_s), s	26.2	0.0	20.5	5.7	18.2	19.5	2.3	17.8	18.0	34.9	19.5	3.1
Cycle Q Clear(g_c), s	26.2	0.0	20.5	5.7	18.2	19.5	2.3	17.8	18.0	34.9	19.5	3.1
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	789	0	604	108	303	718	225	296	297	591	795	1039
V/C Ratio(X)	0.96	0.00	0.61	0.79	0.94	1.07	0.19	0.90	0.91	1.00	0.52	0.41
Avail Cap(c_a), veh/h	789	0	604	137	303	718	244	296	297	591	795	1039
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)	0.47	0.00	0.47	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.7	0.0	33.7	55.6	49.7	12.9	39.4	49.0	49.1	32.3	25.3	3.7
Incr Delay (d2), s/veh	14.0	0.0	0.9	21.5	36.5	53.4	0.4	32.1	33.5	37.7	2.4	1.2
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	14.0	0.0	10.5	3.5	12.4	31.1	1.2	11.3	11.5	25.7	10.6	4.1
LnGrp Delay(d),s/veh	59.8	0.0	34.6	77.1	86.1	66.4	39.8	81.1	82.6	70.0	27.7	4.9
LnGrp LOS	E		C	E	F	F	D	F	F	F	C	A
Approach Vol, veh/h		1130			1138			579			1435	
Approach Delay, s/veh		51.5			72.1			78.8			38.3	
Approach LOS		D			E			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	39.4	24.6	11.8	44.2	8.3	55.7	32.0	24.0				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	34.9	20.1	9.3	37.7	5.1	49.9	27.5	19.5				
Max Q Clear Time (g_c+I1), s	36.9	20.0	7.7	22.5	4.3	21.5	28.2	21.5				
Green Ext Time (p_c), s	0.0	0.1	0.0	4.9	0.0	8.7	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			56.3									
HCM 2010 LOS			E									

HCM 2010 Signalized Intersection Summary
 7: Empire Ave & Silver King Dr/15th St

06/01/2017



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	357	53	23	12	16	6	44	662	17	15	448	201
Future Volume (veh/h)	357	53	23	12	16	6	44	662	17	15	448	201
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	1900	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	388	58	25	13	17	7	48	720	18	16	487	0
Adj No. of Lanes	1	1	0	0	1	0	1	1	0	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	585	393	169	232	282	98	441	917	23	270	944	802
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.51	0.51	0.51	0.51	0.51	0.00
Sat Flow, veh/h	1381	1236	533	432	886	308	905	1810	45	717	1863	1583
Grp Volume(v), veh/h	388	0	83	37	0	0	48	0	738	16	487	0
Grp Sat Flow(s),veh/h/ln	1381	0	1769	1626	0	0	905	0	1855	717	1863	1583
Q Serve(g_s), s	12.7	0.0	1.7	0.0	0.0	0.0	1.9	0.0	16.7	1.0	9.0	0.0
Cycle Q Clear(g_c), s	13.4	0.0	1.7	0.7	0.0	0.0	10.9	0.0	16.7	17.7	9.0	0.0
Prop In Lane	1.00		0.30	0.35		0.19	1.00		0.02	1.00		1.00
Lane Grp Cap(c), veh/h	585	0	562	612	0	0	441	0	940	270	944	802
V/C Ratio(X)	0.66	0.00	0.15	0.06	0.00	0.00	0.11	0.00	0.79	0.06	0.52	0.00
Avail Cap(c_a), veh/h	697	0	706	739	0	0	520	0	1101	332	1106	940
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	0.00	1.00	0.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.4	0.0	12.5	12.2	0.0	0.0	12.1	0.0	10.4	17.6	8.5	0.0
Incr Delay (d2), s/veh	1.8	0.0	0.1	0.0	0.0	0.0	0.1	0.0	3.3	0.1	0.4	0.0
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	5.5	0.0	0.8	0.4	0.0	0.0	0.5	0.0	9.3	0.2	4.7	0.0
LnGrp Delay(d),s/veh	18.2	0.0	12.7	12.2	0.0	0.0	12.2	0.0	13.6	17.7	8.9	0.0
LnGrp LOS	B		B	B			B		B	B	A	
Approach Vol, veh/h		471			37			786			503	
Approach Delay, s/veh		17.3			12.2			13.6			9.2	
Approach LOS		B			B			B			A	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		30.5		20.8		30.5		20.8				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		30.5		20.5		30.5		20.5				
Max Q Clear Time (g_c+I1), s		18.7		15.4		19.7		2.7				
Green Ext Time (p_c), s		6.7		1.0		6.3		1.8				
Intersection Summary												
HCM 2010 Ctrl Delay				13.3								
HCM 2010 LOS				B								