FINAL

STEAMBOAT BASE AREA MASTER TRANSPORTATION STUDY

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September, 2008

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MASTER TRANSPORTATION STUDY
STEAMBOAT SPRINGS, COLORADO

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For:

City of Steamboat Springs
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EXECUTIVE SUMMARY

A. PROJECT DESCRIPTION

Fehr & Peers prepared this *Master Transportation Study* for the City of Steamboat Springs to forecast multimodal travel patterns and motor vehicle traffic conditions that are likely to occur during and after the redevelopment of the Steamboat Springs Ski Resort Base Area (base area) during the ski season. For purposes of this project, only redevelopment projects located in the Steamboat Springs Urban Renewal Authority (SSRA) boundary were analyzed. The current redevelopment plans include new lodging units, residences, retail, restaurants, and other commercial uses as vertical mixed-use buildings.

This study reduces common discrepancies that result from independent consultants preparing traffic studies for different projects. Typically, this approach results in varying numbers of trips for similar land use types, varying calculation of alternative mode share usage, and varying regional traffic distribution. In an effort to more accurately forecast travel that will result from the redevelopment of the base area, this study relies on data collected during peak and off-peak travel periods for the winter season. The data collected captured the unique trip making characteristics of a wide range of travelers near the base area.

B. MASTER TRANSPORTATION STUDY OBJECTIVES

The primary objectives of the study are to:

- Accurately forecast traffic at major intersections near the base area during the ski season;
- Evaluate the need for intersection improvements at major intersections near the base area;
- Identify circulation standards for pedestrian, bicycle, and transit, and
- Inform the Steamboat Springs Redevelopment Authority (SSRA) capital planning process.

C. CONCLUSIONS AND RECOMMENDATIONS

The Steamboat Base Area experiences travel characteristics during the ski season that are unique to the resort nature of the base and to the season. The conclusions drawn in this analysis are based upon the travel characteristics during the winter. Additional analysis may be needed to study the unique characteristics in the summer time or the off season. The summer months are likely to have more bicycle and pedestrian traffic but the vehicle traffic is typically spread more evenly throughout the day than during the winter season, hence the peak nature of the winter season was considered to provide the most conservative look at the area.

The existing conditions analysis indicated that all studied intersections operate acceptably.

The analysis completed for the 2015 scenarios assumed that the approved and pending projects would be constructed by the horizon year of 2015. It should be noted that these recommendations are due to the development and traffic generated by development as opposed to the specific year. The following improvements are recommended with the completion of the approved and pending projects:

1. The Mt. Werner Road/ Steamboat Boulevard intersection will require additional operational control as Wildhorse Meadows development comes on line. This intersection was initially analyzed as a single-lane roundabout. However, the through volumes on Mt. Werner Road were too heavy for this intersection to operate acceptably as a single-lane roundabout. The Mt. Werner Road/Steamboat Boulevard intersection will operate acceptably with the current lane configuration and a traffic signal or as a double-lane roundabout. Based on the operation of the corridor as a whole, a signal is recommended at this location. The signal is recommended to be in place upon completion of a signal warrant analysis which should take place periodically as Wildhorse Meadows is developed.

2. The Mt Werner Road/ Mt Werner Circle intersection operates acceptably with either a single lane roundabout or a traffic signal. It is recommended that this intersection be signalized based on the signal recommendation at the Mt Werner Road/ Steamboat Boulevard intersection as roundabouts operate better as consecutive treatments. The signal for this intersection is recommended to be in place upon completion of a signal warrant analysis which should take place periodically as Wildhorse Meadows is developed.
3. The intersection of Après Ski Way/ Village Drive notices significant delay as a side street stop controlled intersection. The northbound left from Village Drive onto Après Ski Way is the movement shown to notice the most significant delay. To determine the timing of improvements at this intersection analysis was conducted with 50% and 75% of the northbound left turn traffic. If 50% of the northbound left turns are removed, the intersection operates at LOS B overall with a 54 second delay for the movement. As the volume increases to 75% of the total volume, the northbound left delay increases to 120 seconds while the overall intersection operates at LOS B. It is recommended that the all-way stop be added upon completion of 75% of the Approved and Pending Development proposed along Après Ski Way. It should be noted that additional measures such as snow-melt, grading, and/or advanced signage are recommended to ensure that the intersection operates safely as an all-way stop. It is recommended that an eastbound left turn lane and northbound left turn lane are separated at the all-way stop due to queuing for the eastbound approach. The queue may effect the operation of the roundabout at Après Ski Way/Mt. Werner Circle. The same problem occurs for the northbound left turn, queues where shown to back up beyond the driveways south of the intersection with the shared movement. The correct geometric layout of the intersection as an all-way stop is important to the operations of the adjacent intersections.
4. The intersection of Mt Werner Circle/ Ski Time Square Drive will need additional intersection control as redevelopment occurs along Ski Time Square Drive. The traffic exiting Ski Time Square Drive onto Mt Werner Circle will notice significant delay. The intersection will operate acceptably as an all-way stop controlled intersection or single lane roundabout through 2015. A signal or roundabout is not expected to be warranted at this intersection in 2015.
5. The intersection of Mt Werner Circle/ Burgess Creek Road should have signage added and striping to include a separate left turn and right turn lane off of Burgess Creek Road onto Mt Werner Circle. Based on initial observations the roadway is wide enough to accommodate this change without the need to widen the roadway or acquire additional right-of-way. It is recommended this improvement be completed prior to any additional development traffic accessing Burgess Creek Road.
6. A roundabout is currently under construction at Mt. Werner Circle/ Après Ski Way. With the addition of the roundabout, this intersection will operate acceptably without additional improvements through 2015.
7. No improvements are recommended at the Mt. Werner Circle/ Eagle Ridge Drive intersection as it operate acceptably with the current side-street stop control configuration through 2015.
8. Two lanes in each direction are required on Mt Werner Road west of Mt Werner Circle, however Mt Werner Circle will operate acceptably as a single lane in each direction for the remaining portion of the roadway.

The analysis completed for the 2025 scenarios assumed that the approved and pending projects would be constructed and other anticipated projects would be in place. The following improvements are recommended with the addition of the anticipated projects:

1. All recommended improvements discussed for the 2015 scenarios are recommended to be completed plus a signal or roundabout at Mt Werner Circle/ Ski Time Square Drive. The roundabout scenario is recommended to enhance the transit village. No additional intersections improvements are necessary for 2025.
2. Upon redevelopment of the Knoll Lot and development of the Steamboat Grand Phase II, it is recommended the transit village scenario be implemented to enhance the pedestrian environment and provide for an enhanced transit village. In general, the LOS results with the limited access transit village

are comparable to the LOS results with full access along Mt. Werner Circle. Therefore, the impacts on the vehicular circulation are anticipated to be minimal.

The following improvements are recommended to enhance the bicycle, pedestrian, and transit circulation at the base area:

1. The transit village should be implemented upon redevelopment of the Knoll Lot and the Steamboat Grand Phase II on Mt. Werner Circle between the Après Ski Way and Ski Time Square Drive roundabouts. Upon implementation of the transit village, the SST stop on Ski Time Square Drive should be removed.
2. Once implemented, private and public transit should use the new transit village; however, all other base area SST stops should remain as public transit stops only.
3. The pedestrian improvements recommended in the Steamboat Base Area Master Plan, Sidewalk Master Plan, and the Mobility Charette should be implemented as development at the base continues.
4. A new on-street bicycle connection around Mt. Werner Circle is recommended. This connection would provide more experienced bicyclists with a direct connection to destinations around Mt. Werner Circle. This connection would require restriping Mt Werner Circle and removing one travel lane between the Mt. Werner Road and Burgess Creek Road and between Mt. Werner Road and Eagle Drive. Restriping both sections should allow for a 4' minimum bicycle lane in both directions of travel. According to AASHTO bicycle guidelines, a 4' bicycle lane is considered acceptable if the roadway section does not have curb and gutter. If curb and gutter exists a 5' minimum bicycle lane should be provided.
5. The new roundabout at Ski Time Square and Mt Werner Circle should be designed with sufficient deflection to slow motorists down to bicycle speeds (15 mph maximum) through the roundabout and should have pavement markings guiding bicyclists through the roundabout. A side path connection is not recommended given the anticipated high levels of pedestrians at this intersection.
6. The segment between Ski Time Square Drive and Après Ski Way should have ground markings that allow bicycles to share the travel lane with slow moving traffic. If this segment becomes limited access in the future, bicycle travel should remain and cycletracks could be striped to separate pedestrians and bicycles. In addition, ground markings along the Ski Time Square Drive and Après Ski Way corridor could be added to increase bicycle safety in the summer.

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I. INTRODUCTION

A. PROJECT DESCRIPTION

Fehr & Peers prepared this *Master Transportation Study* for the City of Steamboat Springs to forecast multimodal travel patterns and motor vehicle traffic conditions that are likely to occur during and after the redevelopment of the Steamboat Ski Resort Base Area (base area) during the ski season. For purposes of this project, only redevelopment projects located in the City of Steamboat Springs Urban Renewal Authority (SSRA) boundary were analyzed. The current redevelopment plans include new lodging units, residences, retail, restaurants, and other commercial uses as vertical mixed-use buildings. The study area and corresponding proposed projects are shown in Figure 1.

The key intersections selected for detailed analysis within the study area are:

1. Mt. Werner Road/ Steamboat Boulevard
2. Mt. Werner Road/ Mt. Werner Circle
3. Mt. Werner Circle/ Eagle Ridge Drive
4. Mt. Werner Circle/ Apres Ski Way
5. Apres Ski Way/ Village Drive
6. Mt. Werner Circle/ Ski Time Square Drive
7. Mt. Werner Circle/ Burgess Creek Road

This study reduces common discrepancies that result from independent consultants preparing traffic studies for different projects. Typically, this approach results in varying numbers of trips for similar land use types, varying calculation of alternative mode share usage, and varying regional traffic distribution. In an effort to more accurately forecast travel that will result from the redevelopment of the base area, this study relies on data collected during peak and off-peak travel periods. The data collected captured the unique trip making characteristics of a wide range of travelers near the base area.

This study analyzed the implications of development at the base area for the year 2015 which includes the approved and pending projects and the year 2025 which includes anticipated projects. Two scenarios were considered for year 2015. The scenarios include the following assumptions:

Scenario 1:

1. Mt. Werner Road/ Steamboat Boulevard – Traffic Signal
2. Mt. Werner Road/ Mt. Werner Circle – Side Street Stop Control
3. Mt. Werner Circle/ Eagle Ridge Drive - Side Street Stop Control
4. Mt. Werner Circle/ Apres Ski Way - Roundabout
5. Apres Ski Way/ Village Drive - Side Street Stop Control
6. Mt. Werner Circle/ Ski Time Square Drive – All Way Stop Control
7. Mt. Werner Circle/ Burgess Creek Road - Side Street Stop Control
8. Mt Werner Circle – 4 lanes

Scenario 2:

1. Mt. Werner Road/ Steamboat Boulevard – Traffic Signal
2. Mt. Werner Road/ Mt. Werner Circle – Traffic Signal
3. Mt. Werner Circle/ Eagle Ridge Drive - Side Street Stop Control
4. Mt. Werner Circle/ Apres Ski Way - Roundabout
5. Apres Ski Way/ Village Drive - Side Street Stop Control
6. Mt. Werner Circle/ Ski Time Square Drive – Roundabout
7. Mt. Werner Circle/ Burgess Creek Road - Side Street Stop Control
8. Mt. Werner Circle – 2 lanes

Three scenarios were considered for 2025. The scenarios include the following assumptions:

Scenario 1:

1. Mt. Werner Road/ Steamboat Boulevard – Traffic Signal
2. Mt. Werner Road/ Mt. Werner Circle – Side Street Stop Control
3. Mt. Werner Circle/ Eagle Ridge Drive - Side Street Stop Control
4. Mt. Werner Circle/ Apres Ski Way - Roundabout
5. Apres Ski Way/ Village Drive - Side Street Stop Control
6. Mt. Werner Circle/ Ski Time Square Drive – All Way Stop
7. Mt. Werner Circle/ Burgess Creek Road - Side Street Stop Control
8. Mt. Werner Circle – 4 lanes
9. Mt. Werner Cir between Après Ski Way & Ski Time Square Dr – Full Access

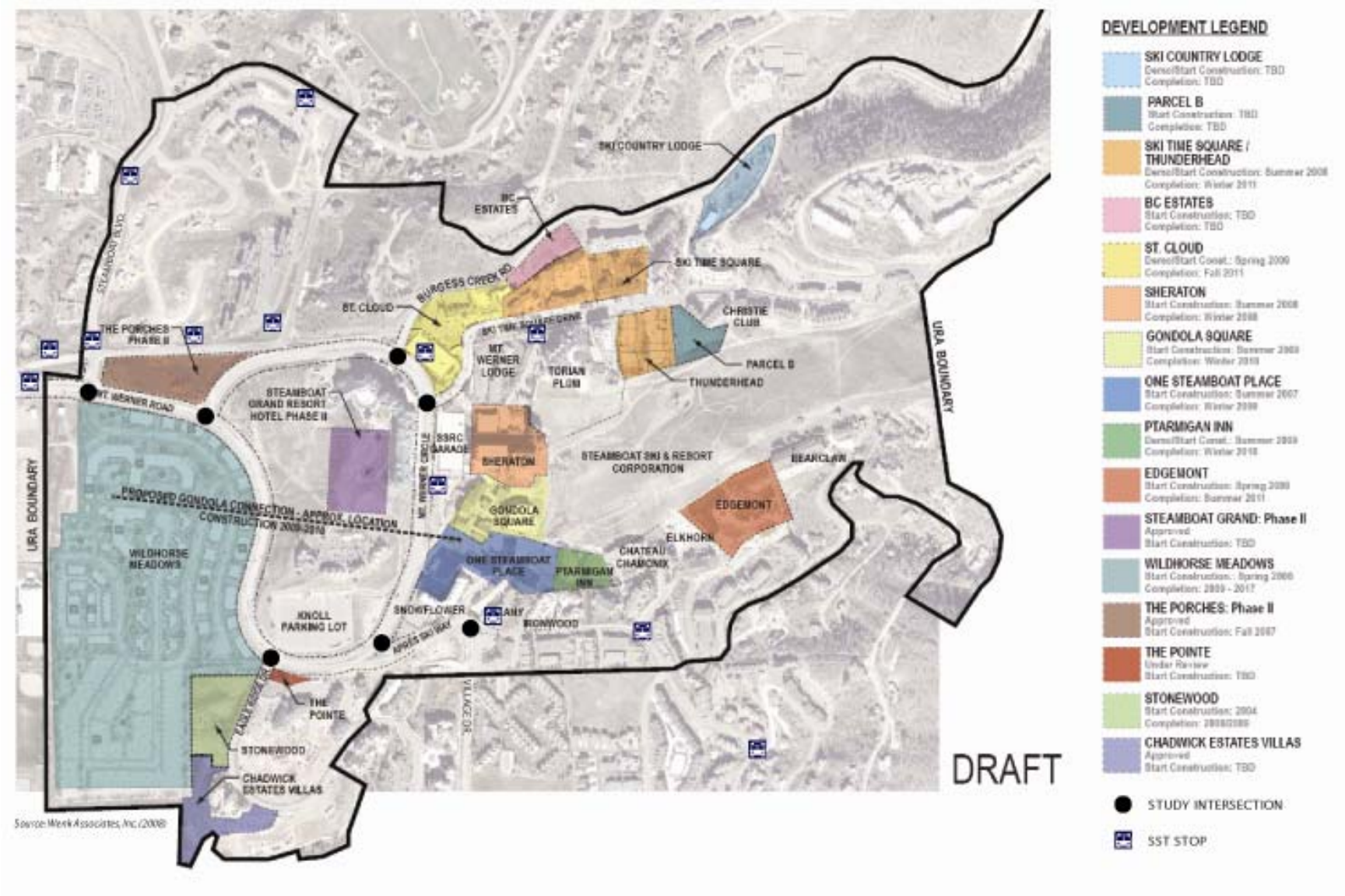
Scenario 2:

1. Mt. Werner Road/ Steamboat Boulevard – Traffic Signal
2. Mt. Werner Road/ Mt. Werner Circle – Traffic Signal
3. Mt. Werner Circle/ Eagle Ridge Drive - Side Street Stop Control
4. Mt. Werner Circle/ Apres Ski Way - Roundabout
5. Apres Ski Way/ Village Drive – All Way Stop
6. Mt. Werner Circle/ Ski Time Square Drive – Roundabout
7. Mt. Werner Circle/ Burgess Creek Road - Side Street Stop Control
8. Mt. Werner Circle – 2 lanes
9. Mt. Werner Cir between Après Ski Way & Ski Time Square Dr – Full Access

Scenario 3:
Intersection improvements are the same as Scenario 2, the change is that Mt. Werner Cir between Après Ski Way & Ski Time Square Dr is transit only access.

This study includes a spreadsheet to calculate the impact that background traffic and development traffic has on individual intersections and the associated allocation of costs. The analysis and spreadsheet are included in Appendix G.

Figure 1. Base Area Redevelopment Plans (May 2008)



B. MASTER TRANSPORTATION STUDY OBJECTIVES

The primary objectives of the study are to:

- Accurately forecast traffic at major intersections near the base area;
- Evaluate the need for intersection improvements at major intersections near the base area;
- Identify circulation standards for pedestrian, bicycle, and transit, and
- Inform the Steamboat Springs Redevelopment Authority (SSRA) capital planning process.

C. BASE AREA MOBILITY CHARRETTE OVERVIEW

In September of 2007 a design charrette was conducted with all base area stakeholders to identify mobility objectives at the base area. This multi-day charrette resulted in the following mobility goals for the base area:

- Improve year round pedestrian mobility for all users and visitors at the base area
- Place a high priority on public and private transit improvements at the base area
- Address short and long term mobility needs of the base area
- Provide appropriate family drop-off, short term and special event parking

During the charrette a series of mobility plans were created that would be "triggered" by major redevelopment projects. The mobility plans provided details for 2007 through 2012. Specific details from each year are provided below.

- 2007: Ski Time Square roadway improvements including a roundabout at the Gondola Transit Center (Completed)
- 2008: Intersection improvements along Après Ski Way at Mt Werner Circle and Village Drive (In Progress)
- 2009: Modifications to the Gondola Transit Center to accommodate a new gondola
- 2010: North portal plaza pedestrian connections
- 2011: Intersections improvements at Ski Time Square Drive and Mt Werner Circle
- 2012 and beyond: Redesign Mt Werner Circle between Ski Time Square Drive and Après Ski Way

As part of the charrette, a preliminary traffic analysis was prepared based on existing redevelopment applications and historic traffic count data for the intersections at the base area. This data provided information for preliminary mobility planning, but was too preliminary for capital planning and intersection design. As an outcome of this work, city staff identified the need to obtain new traffic counts and identify travel characteristics at the base area and prepare this Master Transportation Study.

II. METHODOLOGY

A. TRAFFIC OPERATIONS ANALYSIS

The traffic operations analysis addressed unsignalized, signalized, and roundabout intersection operations using the procedures and methodologies contained in the Highway Capacity Manual 2000 (HCM), Transportation Research Board, 2000 for both AM and PM peak hour traffic operations. Level of service (LOS) is a qualitative measure of traffic operating conditions, which varies from LOS A (the best) to LOS F (the worst) as described in Table 1 for signalized and unsignalized intersections, respectively.

TABLE 1. INTERSECTION LEVEL OF SERVICE CRITERIA

Signalized Intersections		
Level of Service	Average Stopped Delay (seconds/vehicle)	Description
A	< 10	Very low delay. Most vehicles do not stop.
B	10 to 20	Generally good progression of vehicles. Slight delays.
C	20 to 35	Fair progression. Increased number of stopped vehicles.
D	35 to 55	Noticeable congestion. Large portion of vehicles stopped.
E	55 to 80	Poor progression. High delays and frequent cycle failure.
F	> 80	Oversaturation. Forced flow. Extensive queuing.
Unsignalized Intersections		
Level of Service	Average Total Delay (seconds/vehicle)	Description
A	< 10	Little or no conflicting traffic for minor street approach.
B	10 to 15	Minor street approach begins to notice absence of available gaps.
C	15 to 25	Minor street approach begins experiencing delay for available gaps.
D	25 to 35	Minor street approach experiences queuing due to a reduction in available gaps.
E	35 to 50	Extensive minor street queuing due to insufficient gaps.
F	> 50	Insufficient gaps of suitable size to allow minor street traffic demand to cross safely through a major traffic stream.

Source: Highway Capacity Manual (Transportation Research Board, 2000).

B. LEVEL OF SERVICE STANDARDS

Given the base area context and desire to improve conditions for multimodal travel, a Level of Service “D” was agreed to with city staff as the overall operational standard for intersections. It is reasonable to notice a Level of Service “E” for the worst approach of a side-street stop control intersection realizing the overall delay at the intersection may be noticeably less.

III. EXISTING TRANSPORTATION NETWORK

A. MULTIMODAL TRANSPORTATION NETWORK

1. Existing Roadways

Mt. Werner Road is the primary motor vehicle access connecting Highway 40 and Mt. Werner Circle, which is a loop road that provides access to the base area. Mt. Werner Road and Mt. Werner Circle are four lane facilities except in the area that the Grand Hotel and Resort that fronts the base of the mountain. Access to the housing, retail and the ski base area are provided via Burgess Creek Road, Ski Time Square Drive, and Après Ski Way. These roads are all stop controlled at Mt Werner Circle. Improvements are either planned or underway for two intersections in the study area.

- A roundabout at the intersection of Après Ski Way and Mt Werner Circle has been constructed to resolve operational issues related to existing geometry complexities and provide for intersection operation improvements as new development begins to generate additional traffic at the intersection.

- A signal is planned for the intersection of Mt. Werner Road and Steamboat Boulevard as the Wildhorse Meadows development is constructed.

The existing posted speed limits for the roadways included in the study area are as follows:

- Mt. Werner Circle: 25 mph
- Steamboat Boulevard: 30 mph
- Burgess Creek Road: 25 mph
- Ski Time Square Drive: 15 mph
- Après Ski Way: 25 mph
- Village Drive: 30 mph

2. Transit Circulation

The base area has a unique mix of public and private transit service that provides access to community wide destinations. The Steamboat Springs Transit (SST) system is a well used public transport system that serves local and regional destinations. SST is a free service to users and provides service from the base area to downtown Steamboat Springs. The locations of SST bus stops within in the study area are shown in Figure 1.

The private transit system consists of mostly Steamboat Springs Resort and Condominium operators who offer service to lodging guests via small buses.

In an effort to understand how each system currently uses the roadway network a detailed video study was conducted. The results of the study suggest that 3% of traffic during peak weekends is SST buses and 25% of traffic during peak weekends is private shuttles.

3. Pedestrian Circulation

Currently sidewalks do not exist along Burgess Creek Road, and are intermittent along Après Ski Way and Mt Werner Circle. In general, existing pedestrian circulation around the base area is poor and disconnected. The Steamboat Base Area Master Plan and Sidewalk Master Plan details the existing conditions at the base area. The Urban Redevelopment Authority (URA) has begun roadway improvements in the area and sidewalks are being constructed along Ski Time Square Drive and portions of Mt Werner Circle. An asphalt, multi-use path exists along the south and west side of Mt Werner Circle but does not continue beyond Après Ski Way. City Code requires that sidewalks be constructed along public roadways with new development.

Therefore, the pedestrian circulation around the base area should improve as new development is approved and constructed.

4. Bicycle Circulations

The multi use path along Mt Werner Circle is the only formal bicycle route in the study area. There are currently no striped bicycle facilities at the base area. The Steamboat Trails Master Plan provides guidance to the existing conditions of the bicycle circulation system at the base area.

B. EXISTING TRAFFIC VOLUMES

Vehicle and pedestrian counts were collected at the following intersections on two Saturdays during February 2008:

- Mt. Werner Circle/Mt Werner Drive,
- Burgess Creek Road/Mt. Werner Circle,
- Ski Time Square Drive/Mt. Werner Circle,
- Après Ski Drive/Mt Werner Circle, and
- Après Ski Drive/Village Drive.

The first round of counts was collected on February 2, which represented a typical weekend during the ski season. The second round of counts was collected on February 16, which was President's Day weekend. President's Day weekend is typically one of the busiest weekends at the ski area. The intersections were studied during AM and PM peak periods each weekend to determine the AM and PM peak hour existing traffic volumes.

The count locations provided details on vehicle turning movements, pedestrian crossings, SST buses, and private shuttles. A 24 hour directional tube count was also collected at the east end of Ski Time Square Drive on the west side of the Christy Club, Antlers Condominiums.

On Friday, February 2nd the Steamboat Pilot reported 13 new inches of snow on top of a powder/packed powder base and snow was forecasted for the day. On February 16th, 2008 (President's Day weekend) the Steamboat Ski area was reported to have powder/packed powder conditions and there was light snow and overcast sky for most of the day.

As part of the peer study, the Steamboat Grand and Christie Club/ Antlers Condominiums were contacted to determine occupancy rates and events that occurred when the travel data was collected.

- During the February 2nd, 2008 the Steamboat Grand was 80% occupied and the Christie Club was 75% occupied.
- During the February 16th, 2008 (President's Day weekend) the Steamboat Grand was 100% occupied, there was a welcome reception for lodging guests in a meeting space of approximately 3,000 square feet and all spa appointments were booked. The Christie Club Condominiums were also 100% occupied.

The counts on the two weekends helped to determine the difference between a typical weekend and a high travel weekend. The two counts also help determine when the peak travel time occurs at the base area. The count data indicated the following.

- The AM peak travel time occurred at the same time during both weekends. The AM peak hour was between 8:15 AM and 9:15 AM.
- PM travel data was collected for both weekends between 3:30 PM – 4:45 PM. This data has nearly identical counts. However, additional data collected on February 16th, 2008 has a 13% higher PM peak hour that occurs between 2:30 PM and 3:30 PM. Considering the similarities of all the other

data points, this finding suggests that the PM peak hour occurs between 2:30 and 3:30 in the PM travel period.
- The data indicates that there a less than 1% variation in vehicle traffic between February 2nd, 2008 and February 16th, 2008 (President's Day weekend) based on the five intersections studied.

The President's Day weekend counts were used for the analysis in this study since they provided a more representative PM peak hour. The traffic counts for both weekends are provided in Appendix A.

Two intersections were added to the study after the traffic counts were collected. Therefore, the AM and PM peak hour counts at the following intersections were determined from previous traffic studies conducted at the base area.
- Mt. Werner Circle/ Eagle Ridge Drive
- Mt. Werner Road/ Steamboat Boulevard

Detailed pedestrian count data were collected at the intersection of Ski Time Square Drive and Mt Werner Circle as a representative "pedestrian gateway" that had an adjacent lodging facility. A total of 34 pedestrians in the AM peak hour and 24 in the PM peak hour were observed on the February 2nd, 2008. During Presidents Day weekend, 57 pedestrians in the AM peak hour and 91 in the PM peak hour were recorded through the intersection. This data indicates the following.
- During Presidents Day weekend there were 68% more pedestrians in the AM peak hour and 79% more in the PM peak hour.
- The comparison of pedestrian and traffic data over the two weekends suggests there is a stronger correlation between increases in lodging visitors and pedestrian activity than increases in lodging visitors and motor vehicle traffic during peak hour.

The information presented in this report only analyzes winter time characteristics at the base area due to the timing of data collection. Travel characteristics at the base area may differ in the off-season and during the summer season. However, the winter ski season was selected for analysis because it would provide the most conservative results for the AM and PM peak study hours. Traffic in the summer and off-season is typically more evenly spread throughout the day.

A travel survey was also conducted President's Day weekend. Based on the skier data collected, the Saturday of President's Day weekend, was noted to be the 12th busiest day of the ski season. The ski area conducted field surveys of public and private transit usage at the Gondola Transit Center during the weekend. The results of the survey indicated that there was a significantly high portion of transit trips during the weekend which resulted in fewer vehicle trips. This result coincides with the small variation that occured in vehicular traffic during a typical travel weekend versus a high travel weekend and also coincides with the higher pedestrian counts that occurred during the high travel weekend.

C. EXISTING TRAFFIC OPERATIONS

The existing traffic counts and intersection configurations are shown in Figure 2 and were used to assess the current operating conditions of the key base area intersections. The President's Day weekend counts were collected and used for the analysis at all of the intersections except Mt. Werner Road/Steamboat Boulevard and Mt. Werner Circle/Eagle Ridge Drive. The peak hour volumes at these two intersections were obtained from the One Steamboat Place and Wildhorse Meadows traffic studies.

All of the intersections currently operate as side-street stop control. The roundabout improvement was not in place at the Apres Ski Way/Mt. Werner Circle intersection at the time of the traffic counts. Therefore, the existing operations at this intersection represent side-street stop control that was in place at the time of the counts. The results of the existing operations analysis are summarized in Table 2. The detailed Synchro analysis worksheets are provided in Appendix B.

TABLE 2: EXISTING INTERSECTION LEVEL OF SERVICE RESULTS

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
1. Mt Werner Rd / Steamboat Blvd	Side-Street Stop	2 (13) – SBL	A (B)	10 (92) – SBL	A (F)
2. Mt Werner Rd / Mt Werner Cir	Side-Street Stop	5 (23) – SBL	A (C)	8 (43) – SBL	A (E)
3. Mt Werner Cir / Eagle Ridge Dr	Side-Street Stop	4 (18) – NBTLR	A (C)	4 (16) – NBTLR	A (C)
4. Mt Werner Cir / Apres Ski Way	Side-Street Stop	8 (20) – WBTLR	A (C)	10 (29) – WBTLR	B (D)
5. Apres Ski Way / Village Dr	Side-Street Stop	7 (16) – NBTLR	A (C)	8 (29) – NBTLR	A (D)
6. Mt Werner Cir / Ski Time Square Dr	Side-Street Stop	8 (29) – WBTL	A (D)	12 (53) – WBTL	B (D)
7. Mt Werner Cir / Burgess Creek Rd	Side-Street Stop	3 (13) – SBTL	A (B)	3 (21) – NBTLR	A (D)

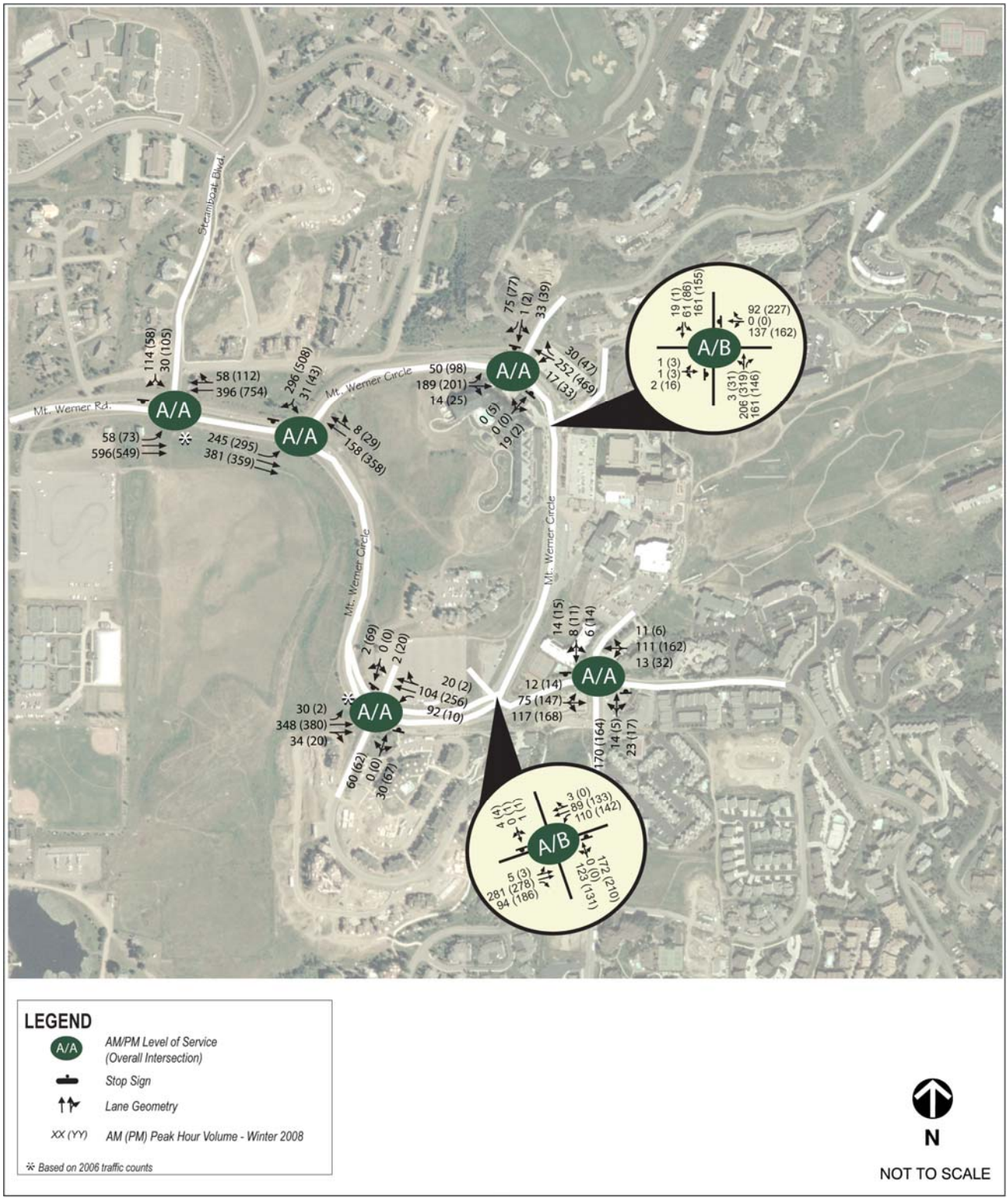
Notes

1. The unsignalized LOS and delay results are reported for the overall intersection, with the worst movement shown in parentheses.
2. Delay is reported as the average delay per vehicle in seconds.

As shown in Table 2, all of the study intersections currently operate at an overall LOS B or better. In addition, most of the intersections currently operate at a LOS D or better for all movements with the exception of the Mt. Werner Road/Steamboat Boulevard and the Mt. Werner Road/Mt. Werner Circle intersections. The southbound left movements operate at a LOS F and LOS E respectively during the PM peak hour.

On average, vehicles have to wait approximately a minute and a half to make a left turn from Steamboat Boulevard onto Mt. Werner Road during the peak hour. The operations of this intersection will continue to deteriorate as a northbound leg is added with the completion of Wildhorse Meadows. This intersection is noted as a location that will require mitigation in the 2006 Wildhorse Meadows Traffic Impact Assessment and a traffic signal is recommended in the future. The intersection does not currently meet signal warrants but is expected to as the Wildhorse Meadows development comes online. It is recommended that signal warrant analysis be conducted periodically as Wildhorse Meadows develops and a signal installed when the warrants are met.

Figure 2: Existing Traffic Volumes & Operations



IV. BACKGROUND TRAFFIC

In general, traffic in the US 40 corridor and downtown Steamboat is expected to increase approximately 2% per year. The 2% per year growth rate is based on previous traffic studies conducted in the area and discussions with the City of Steamboat Springs staff.

Based upon discussions with the City, and due to the strategic location of parking reservoirs, the 2% was not applied to all the roadways at the base area. It was assumed that in the future, the ski area parking will continue to be primarily located in a parking facility near the Wildhorse Meadows gondola which is south of Steamboat Boulevard. The parking area would intercept much of the background traffic that would otherwise travel to the base area. Therefore, the analysis presented in this report assumes that a public gondola from the parking reservoir to the base will be operating by 2015.

The 2% growth per year was only applied to traffic traveling on Mt. Werner Road west of Steamboat Boulevard and to traffic on Steamboat Boulevard and Village Drive.

A 0.5% per year growth rate was applied to traffic on Après Ski Way and Mt Werner Circle to account for any new development that is not included in this study. Without the gondola providing access to the ski area, the background volumes on Mt. Werner Circle and Après Ski Way would be expected to increase by 2% per year.

No background growth was applied to Eagle Ridge Drive, Burgess Creek Drive, or Ski Time Square Drive as traffic increases on these roadways are expected to be solely related to new development in the base area which will be accounted for with the trip generation estimates discussed in the following section.

These background growth assumptions are illustrated in Figure 3.

The background growth on the surrounding roadways was distributed through the study network to determine 2015 and 2025 background turning movements at the study area intersections. The background turning movement volumes are shown in Figures 4 and 5.

Figure 3: Background Traffic Growth Assumptions

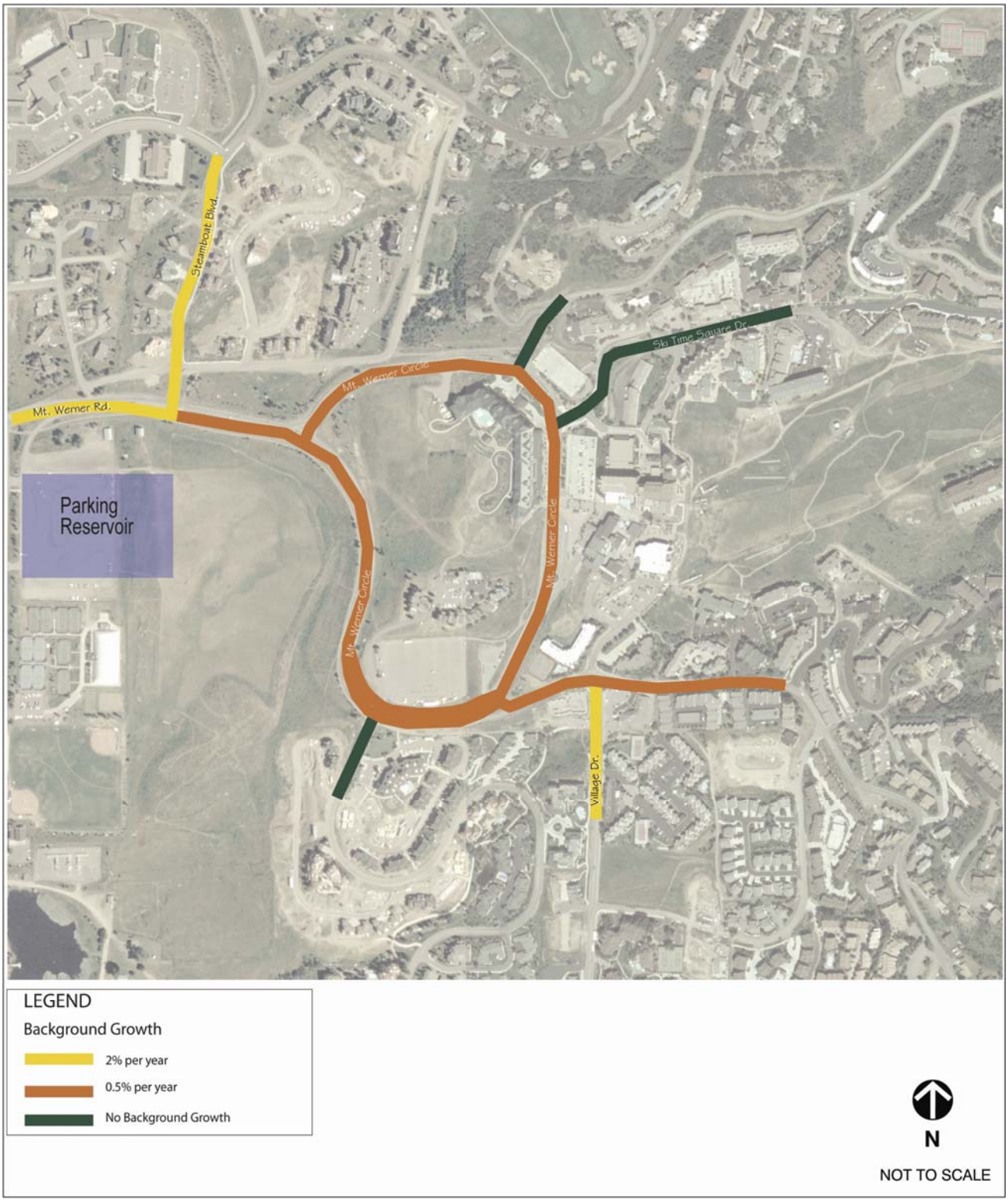


Figure 4: 2015 Background Traffic

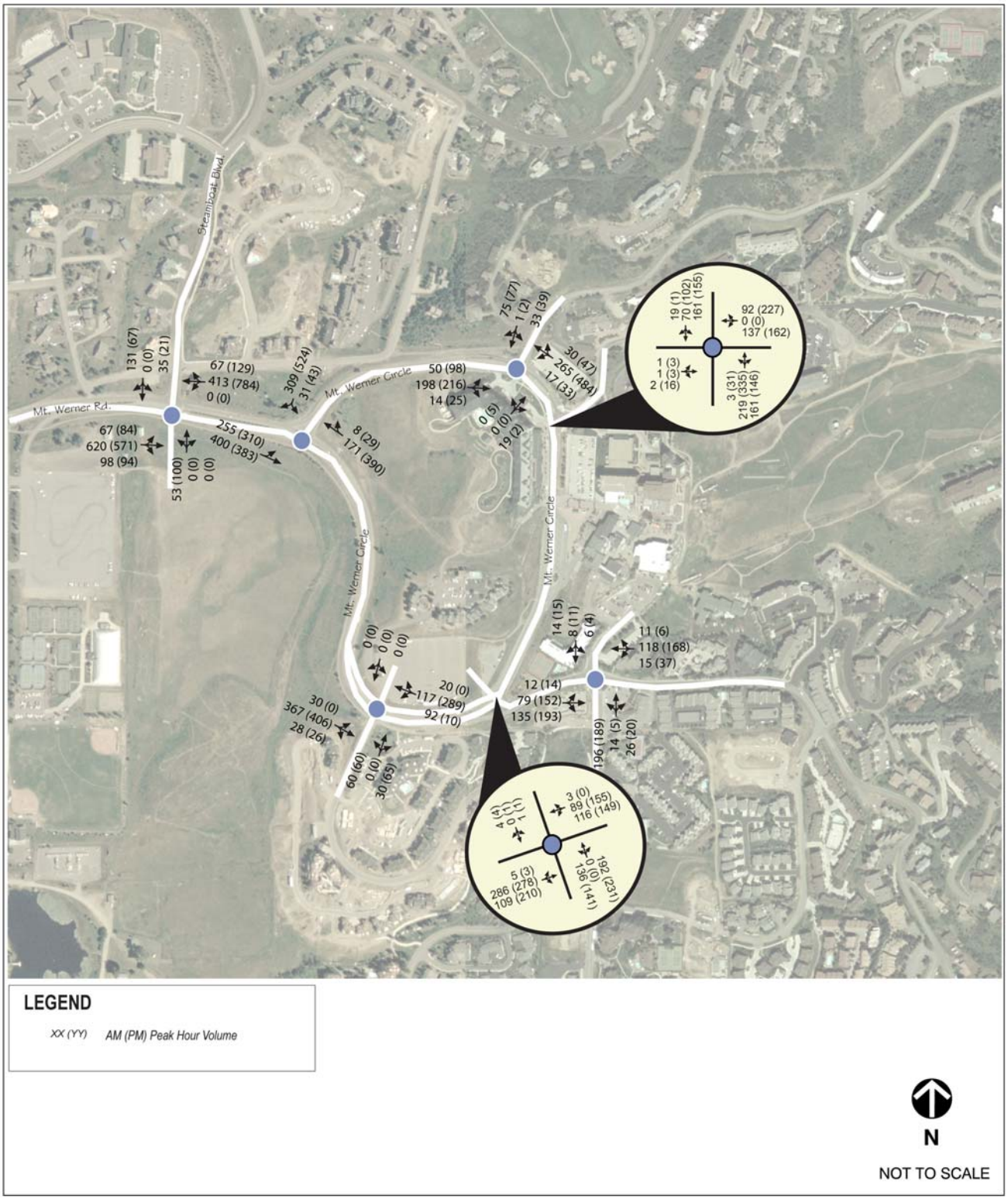
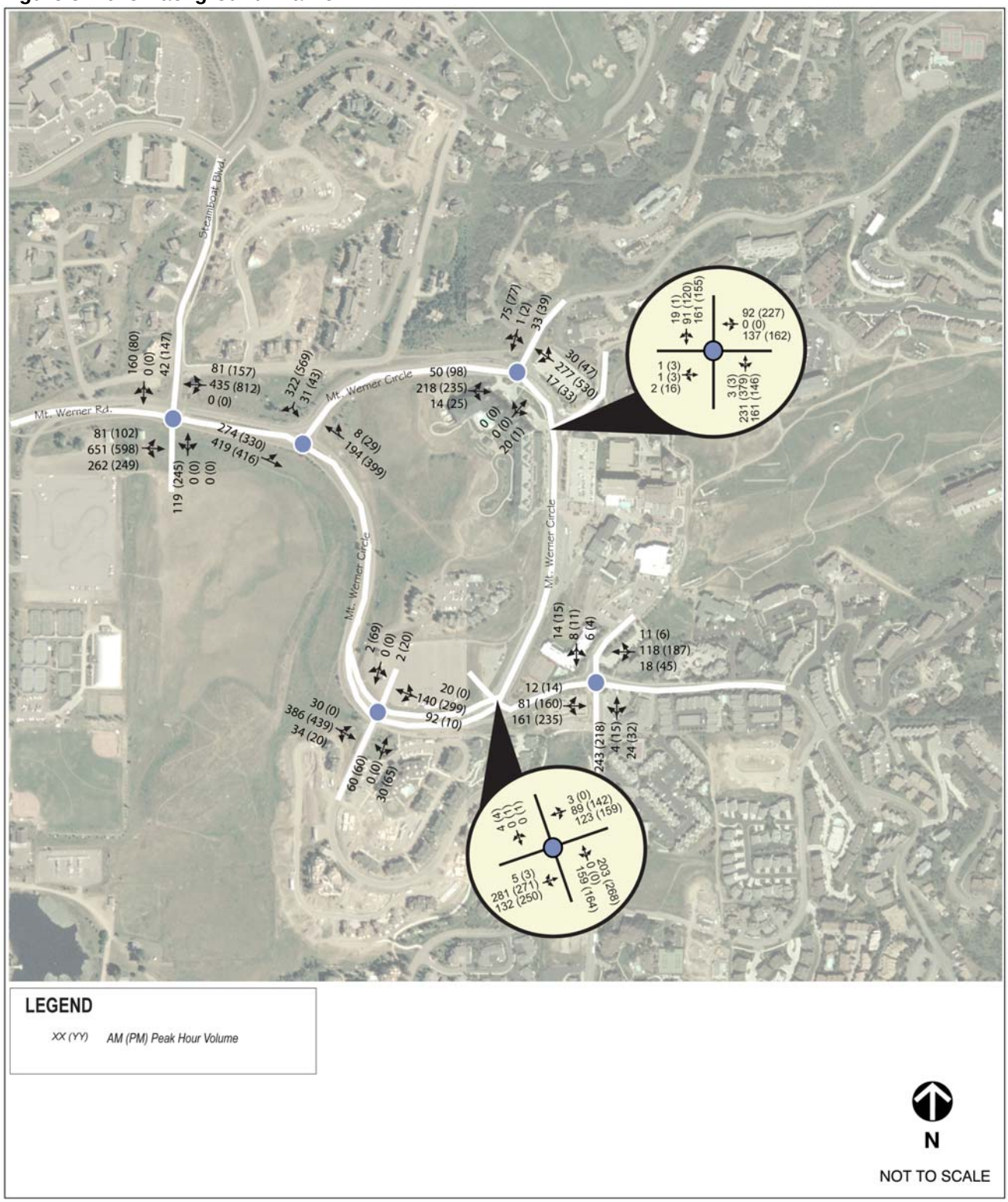


Figure 5: 2025 Background Traffic



V. PROPOSED PROJECTS

Several redevelopment projects are currently in the approval process as shown on the map in Figure 1. The redevelopment projects represent the vision established in the *Base Area Master Plan* and are planned to be constructed in the upcoming years. In an effort to understand how each of the individual projects will be developed, a series of meetings with developers, city staff, planning commission, and the SSRC Advisory Committee were conducted. The meetings provided the necessary insight to understand the potential components of each project and how each would likely meet the mobility goals established during the Base Area Mobility Charrette. The meetings also provided an opportunity to understand how remote parking, transit usage, ski ways, and gondolas would play in mitigating motor vehicle trips to and from the base area.

The development projects that are planned for the base area are summarized in Table 3. The Approved & Pending Projects are planned to be completed by 2015 and the Anticipated Projects are expected to be complete by 2025 (based on current zoning regulations). Many of these projects are in the preliminary planning stages; therefore the amount of development was determined based upon the anticipated plans. The City of Steamboat Springs provided input to the development assumptions used in this study and understands that major changes may require additional study to ensure that the findings of this study are appropriate.

A. DEVELOPMENT TRIP GENERATION

1. Standard Trip Generation

The *Trip Generation* manual (Institute of Transportation Engineers (ITE), Seventh Edition, 2003) was used as a starting point for developing trip generation estimates for all of the base area projects shown in Table 3. Four ITE land use codes were used for the analysis: Residential Condominium/Townhouse (230), Resort Hotel (330), Specialty Retail (814), and Single Family Detached Housing (210). Code 230 was used for all of the condominiums around the base that are anticipated to be “for-sale” units. Code 330 was used for the lodging units that are planned to be built as part of a resort. Code 210 was used for a limited number of large housing units planned for the Wildhorse Meadows development. Code 814 was selected for all of the base area commercial development since detailed information about specific uses is not available at this stage of the planning process. The description of land use code 814 in the *Trip Generation* manual is as follows:

> *Specialty retail centers are generally small strip shopping centers that contain a variety of retail shops and specialize in quality apparel; hard goods; and services, such as real estate offices, dance studios, florists, and small restaurants.*

This is consistent with the type of development typically found at the base of a ski area. Based on the description, 814 was assumed to be a reasonable code to use for all of the proposed commercial development shown in Table 3 including restaurant, retail, and miscellaneous commercial.

The Single Family homes in the Wildhorse Meadows area were assumed to be more typical of the ITE trip generated traffic than those generated with resort area characteristics. There is a small area designated for Single Family Homes for those that wish to purchase houses at the base but will work in the downtown Steamboat Springs or other area. It was assumed that the trips generated on a Saturday for this land use would generate trips similar to a typical Single Family use and the trips would be negligible.

The standard ITE Trip Generation methodology was applied to all of the development and the resulting trip generation estimates are shown in Table 4. The trip generation rates used for the ITE trip generation analysis are summarized in Appendix F.

The trip generation results shown in Table 4 do not take into account any reductions based on development type, location, or gondola usage.

TABLE 3: BASE AREA DEVELOPMENT

Project	Restaurant SF	Lodging Units	Owned Units	Retail SF	Misc. Commercial
Approved & Pending Projects (2015)					
The Porches Phase II			17		
The Pointe			6		
Stonewoood			23		
Chadwick			20		
Clocktower	2,000	91	90		40,000
Ski Time Square	15,000	326	32	6,200	22,000
Ski Country Lodge	3,000	100			20,000
St Cloud	5,000	94	111	16,000	22,000
Thunderhead	9,100		125	4,900	1,400
One Steamboat Place	2,000	42	53		17,000
Edgemont		130			
Ptarmigan Inn		36			
Wildhorse Meadows		286	293	21,500	
Anticipated Projects (2025)					
BC Estates		40			
Parcel B	5,000	25	100	5,000	5,000
Knoll Lot redeveloped with lodging, rest, and	2,000	25	100	5,000	5,000
New uses in Gondola Square beyond current configuration	5,000			10,000	5,000
Mt Werner Lodge redeveloped with lodging, rest, and retail G2 zoning	2,000	50	100	5,000	5,000
New Sheraton uses beyond current configuration	2,000	50		2,500	
Steamboat Grand Phase 2	2,000	50	100	5,000	5,000
Approved or Pending	36,100	1,105	770	48,600	122,400
Anticipated	18,000	200	400	32,500	25,000
Total	**54,100**	**1,305**	**1,170**	**81,100**	**147,400**

TABLE 4: STANDARD ITE TRIP GENERATION FOR BASE AREA DEVELOPMENT

Project	Land Use	ITE Code	Quantity (ksf, units)	Trip Generation						
				Daily	AM			PM		
					In	Out	Total	In	Out	Total
Approved & Pending Projects (2015)										
The Porches Phase II	Condominiums	230	17	100	1	6	7	6	3	9
The Pointe	Condominiums	230	6	35	0	2	2	2	1	3
Stonewood	Condominiums	230	23	135	2	8	10	8	4	12
Chadwick	Condominiums	230	20	117	1	7	8	7	3	10
Ski Time Square	Commercial	814	43.2	1,915	83	76	159	52	66	118
	Resort	330	326	4,378	73	28	101	59	78	137
	Condominiums	230	32	188	2	12	14	11	5	16
	Total			6,481	158	116	274	122	149	271
Ski Country Lodge	Commercial	814	23	1,019	44	41	85	27	35	62
	Resort	330	100	1,343	22	9	31	18	24	42
	Total			2,362	66	50	116	45	59	104
St. Cloud	Commercial	814	43	1,906	83	76	159	51	65	116
	Resort	330	94	1,262	21	8	29	17	23	40
	Condominiums	230	111	701	10	47	57	44	22	66
	Total			3,869	114	131	245	112	110	222
Thunderhead	Commercial	814	15.4	683	30	27	57	18	23	41
	Condominiums	230	125	776	10	51	61	48	24	72
	Total			1,459	40	78	118	66	47	113
One Steamboat Place	Commercial	814	19	842	36	34	70	23	29	52
	Resort	330	42	564	9	4	13	8	10	18
	Condominiums	230	53	311	4	19	23	18	9	27
	Total			1,717	49	57	106	49	48	97
Edgemont	Resort	330	130	1,746	29	11	40	23	31	54
Ptarmigan Inn	Resort	330	36	483	8	3	11	7	9	16
Wildhorse Meadows	Commercial	814	21.5	953	41	38	79	26	33	59
	Resort	330	286	3,841	64	25	89	52	68	120
	Condominiums	230	172	1,018	14	66	80	63	31	94
	SF Homes (part-time residents)	210	30	303	0	0	0	15	13	28
	SF Homes (full-time residents)	210	11	111	0	0	0	5	5	10
	Affordable Townhome	230	80	469	6	29	35	28	14	42
	Total			6,695	125	158	283	189	164	353
Total				**25,199**			**1,220**			**1,264**
Anticipated Projects (2025)										
BC Estates	Resort	330	40	537	9	3	12	7	10	17
Parcel B	Commercial	814	15	665	29	26	55	18	23	41
	Resort	330	25	336	6	2	8	5	6	11
	Condominiums	230	100	642	9	43	52	40	20	60
	Total			1,643	44	71	115	63	49	112
Knoll Lot	Commercial	814	12	532	23	21	44	14	18	32
	Resort	330	25	336	6	2	8	5	6	11
	Condominiums	230	100	642	9	43	52	40	20	60
	Replaced Parking Lot			(540)	(50)	(4)	(54)	(4)	(89)	(93)
	Total			970	(12)	62	50	55	(45)	10
Gondola Square	Commercial	814	20	886	38	36	74	24	30	54
Mt. Werner Lodge	Commercial	814	12	532	23	21	44	14	18	32
	Resort	330	50	672	11	4	15	9	12	21
	Condominiums	230	100	642	9	43	52	40	20	60
	Replaced Condo	230	25	(147)	(2)	(9)	(11)	(9)	(4)	(13)
	Total			1,699	41	59	100	54	46	100
Sheraton	Commercial	814	4.5	199	9	8	17	5	7	12
	Resort	330	50	672	11	4	15	9	12	21
	Total			871	20	12	32	14	19	33
Steamboat Grand - Phase II	Commercial	814	12	532	23	21	44	14	18	32
	Resort	330	50	672	11	4	15	9	12	21
	Condominiums	230	100	642	9	43	52	40	20	60
	Total			1,846	43	68	111	63	50	113
Total				**8,452**			**494**			**439**

Notes:
Single family homes expected to generate a negligible number of trips during the AM peak hour on a Saturday.

2. Trip Reduction

The common practice for estimating traffic associated with new lodging units and complementary services is to apply the standard set of guidelines from the ITE Trip Generation Handbook as shown above. The ITE rates are general guidelines and suggest alternative study in special land use situations. Given the unique travel patterns at the base area and the mixed-use character of the redevelopment projects, the base area was studied to determine if the ITE rates should be adjusted to more accurately reflect the trip generation characteristics of the base area.

First, detailed trip generation information was obtained from the traffic counts conducted in February 2008. The traffic counts were conducted at all access points for the Steamboat Grand Resort and the Christie Club/ Antlers Condominiums. This information provides local trip generation data points that are similar to future lodging and condominium uses that will be constructed as part of redevelopment projects at the base area. Next, the Steamboat Grand and Christie Club/ Antlers Condominium trip generation data was compared to the ITE trip generation rates for resorts and condo/townhomes (Land Use Codes 330 and 230) to identify differences. The data indicates the following.

Typical Weekend

- The AM peak hour of the generator is between 8:15 AM and 9:15 AM.
- The PM peak hour of the generator is between 4:00 PM and 5:00 PM.
- Adjacent street traffic peaks at the same time in the AM, however peaks between 2:30 and 3:30 in the PM.
- Trip generation rates during adjacent roadway traffic peaks at the Steamboat Grand Hotel are 7% and 29% lower than the ITE rates in the AM and PM peak, respectively.

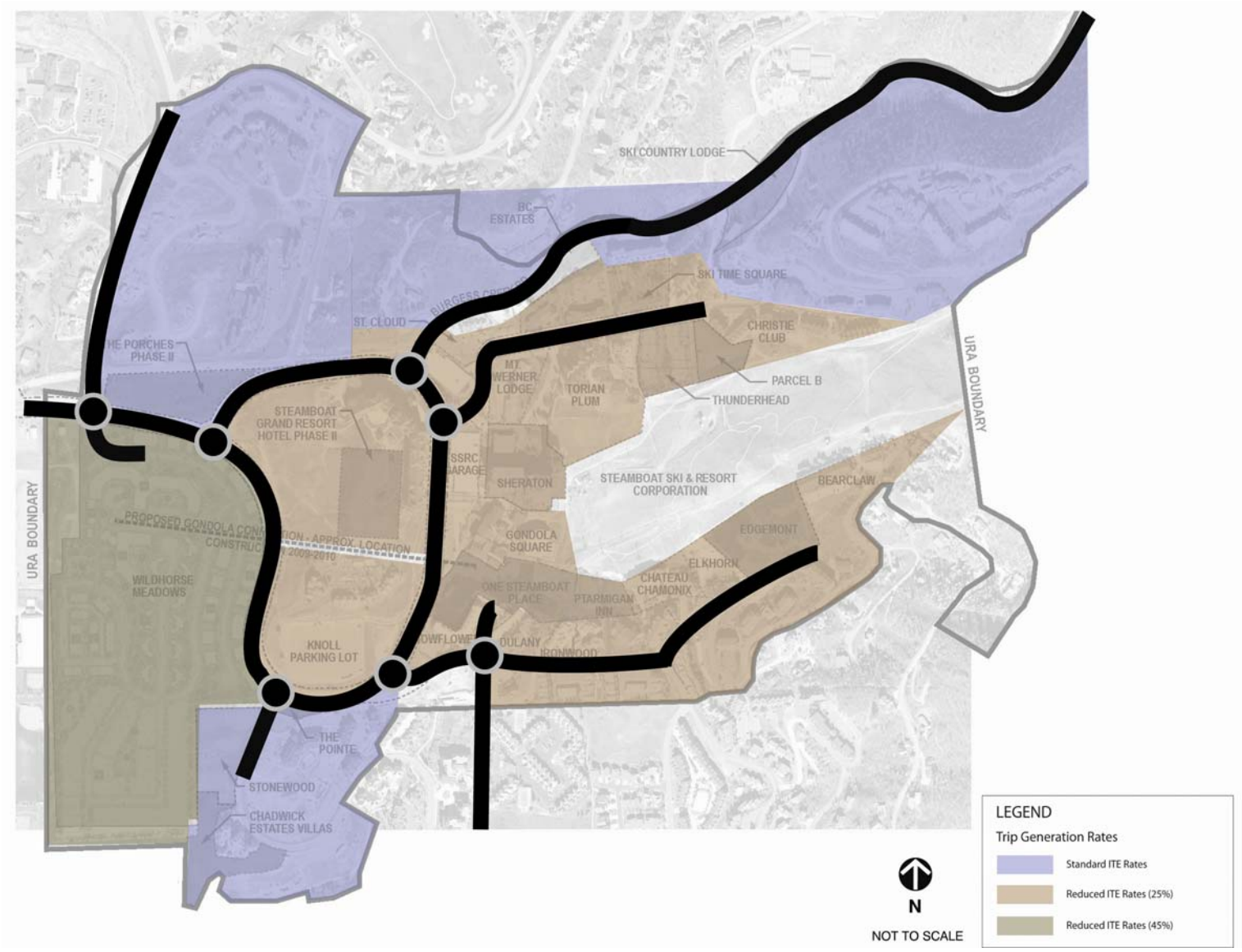
Holiday Weekend

- The AM peak hour of the generator is between 8:15 AM and 9:15 AM.
- The PM peak hour of the generator is between 4:00 PM and 5:00 PM.
- Adjacent street traffic peaks at the same time in the AM, however peaks between 2:30 and 3:30 in the PM.
- Trip generation rates at the Steamboat Grand Hotel are 23% and 42% lower and than the ITE rates in the AM and PM peak hours of the adjacent street traffic respectively.
- Trip generation rates at the Christie Club/ Antlers Condominiums are 10% higher than the ITE rates during the AM peak hour and 18% lower than the ITE rates during the PM peak hours of the adjacent street traffic.
- Trip rates account for the 28% mode split with public and private shuttle traffic.

These findings suggest that resorts and condominiums at the Steamboat Base area generate trips at a reduced rate over the ITE typical rate. Therefore, it was determined that a trip reduction should be taken from the results presented in Table 4 to more accurately reflect the number of trips that will be generated from the proposed developments at the base area.

It was determined, with the City of Steamboat Springs staff, that a 25% reduction overall in vehicle trips would be appropriate for the area. These trips will most likely be noticed as walk trips. It was also determined that some of the proposed resort and condominium developments included in this study would generate trips at a reduced rate similar to the Steamboat Grand and Christie Club/Antlers Condominiums due to their proximity to the base or the proposed gondola while other developments are too far from the base to experience the reduced vehicle trip generating characteristics. Figure 6 illustrates the locations used for the different trip generation rates.

Figure 6: Trip Generation Rates for Base Area Development



The trip reduction applied to the developments directly adjacent to the base accounts for the fact that many people will be making walking or shuttle trips in place of vehicle trips. In addition, a separate trip reduction was taken for the Wildhorse Meadows development to account for vehicle trips that will most likely be replaced by gondola trips. A reduction of about 45% was applied to the Wildhorse Meadows development which is consistent with the reduction taken in the 2006 approved Traffic Impact Assessment for Wildhorse Meadows.

The reduction factors discussed above were applied to the original trip generation estimates to determine the final trip generation for each of the developments included in the study. The final trip generation results are presented in Table 5.

TABLE 5: TRIP GENERATION FOR BASE AREA DEVELOPMENT

Project	Land Use	ITE Code	AM Reduction	PM Reduction	Quantity (ksf, units)	Trip Generation						
						Daily	AM			PM		
							In	Out	Total	In	Out	Total
Approved & Pending Projects (2015)												
The Porches Phase II	Condo	230	0	0	17	100	1	6	7	6	3	9
The Pointe	Condo	230	0	0	6	35	0	2	2	2	1	3
Stonewood	Condo	230	0	0	23	135	2	8	10	8	4	12
Chadwick	Condo	230	0	0	20	117	1	7	8	7	3	10
Ski Time Square	Commercial	814	0.25	0.25	43.2	1,436	62	58	120	39	49	88
	Resort	330	0.25	0.25	326	3,284	55	21	76	44	59	103
	Condo	230	0.25	0.25	32	141	2	9	11	8	4	12
	Total					4,861	119	88	207	91	112	203
Ski Country Lodge	Commercial	814	0	0	23	1,019	44	41	85	27	35	62
	Resort	330	0	0	100	1,343	22	9	31	18	24	42
	Total					2,362	66	50	116	45	59	104
St. Cloud	Commercial	814	0.25	0.25	43	1,429	62	57	119	38	49	87
	Resort	330	0.25	0.25	94	947	16	6	22	13	17	30
	Condo	230	0.25	0.25	111	526	7	35	42	33	16	49
	Total					2,902	85	98	183	84	82	166
Thunderhead	Commercial	814	0.25	0.25	15.4	512	22	21	43	14	18	32
	Condo	230	0.25	0.25	125	582	8	38	46	36	18	54
	Total					1,094	30	59	89	50	36	86
One Steamboat Place	Commercial	814	0.25	0.25	19	632	28	25	53	17	22	39
	Resort	330	0.25	0.25	42	423	7	3	10	6	8	14
	Condo	230	0.25	0.25	53	233	3	15	18	14	7	21
	Total					1,288	38	43	81	37	37	74
Edgemont	Resort	330	0.25	0.25	130	1,309	22	8	30	18	23	41
Ptarmigan Inn	Resort	330	0.25	0.25	36	363	6	2	8	5	6	11
Wildhorse Meadows	Commercial	814	0.45	0.48	21.5	524	23	21	44	13	17	30
	Resort	330	0.45	0.48	286	2,113	35	14	49	27	36	63
	Condo	230	0.45	0.48	172	560	7	36	43	33	16	49
	SF Homes (part-time residents)	210	0.45	0.48	30	167	0	0	0	8	7	15
	SF Homes (full-time residents)	210	0	0	11	111	0	0	0	5	5	10
	Affordable Townhome	230	0	0	80	469	6	29	35	28	14	42
	Total					3,944	71	100	171	114	95	209
Total						**18,510**			**912**			**928**
Non-Reduced Total						25,199			1,220			1,264
Net Trip Reduction						(6,689)			(308)			(336)
Anticipated Projects (2025)												
BC Estates	Resort	330	0.25	0.25	40	403	7	3	10	5	7	12
Parcel B	Commercial	814	0.25	0.25	15	499	22	20	42	13	17	30
	Resort	330	0.25	0.25	25	252	4	2	6	3	4	7
	Condo	230	0.25	0.25	100	481	7	32	39	30	15	45
	Total					1,232	33	54	87	46	36	82
Knoll Lot	Commercial	814	0.25	0.25	12	399	17	16	33	11	14	25
	Resort	330	0.25	0.25	25	252	4	2	6	3	4	7
	Condo	230	0.25	0.25	100	481	7	32	39	30	15	45
	Replaced Parking Lot					(540)	(50)	(4)	(54)	(4)	(89)	(93)
	Total					592	(22)	46	24	40	(56)	(16)
Gondola Square	Commercial	814	0.25	0.25	20	665	29	26	55	18	23	41
Mt. Werner Lodge	Commercial	814	0.25	0.25	12	399	17	16	33	11	14	25
	Resort	330	0.25	0.25	50	504	8	3	11	7	9	16
	Condo	230	0.25	0.25	100	481	7	32	39	30	15	45
	Replaced Condo	230	0.25	0.25	25	(110)	(1)	(7)	(8)	(7)	(3)	(10)
	Total					1,274	31	44	75	41	35	76
Sheraton	Commercial	814	0.25	0.25	4.5	150	6	6	12	4	5	9
	Resort	330	0.25	0.25	50	504	8	3	11	7	9	16
	Total					654	14	9	23	11	14	25
Steamboat Grand - Phase II	Commercial	814	0.25	0.25	12	399	17	16	33	11	14	25
	Resort	330	0.25	0.25	50	504	8	3	11	7	9	16
	Condo	230	0.25	0.25	100	481	7	32	39	30	15	45
	Total					1,384	32	51	83	48	38	86
Total						**6,204**			**357**			**306**
Non-Reduced Total						8,452			494			439
Net Trip Reduction						(2,248)			(137)			(133)

Notes:
Resort & Condo reductions based on February 2008 trip generation study conducted at the Steamboat base area.
Wildhorse reductions based on the Wildhorse Meadows TIA, Oct. 2006.
Single family homes expected to generate a negligible number of trips during the AM peak hour on a Saturday.

B. TRIP DISTRIBUTION

Trip distribution was based on existing traffic counts and the One Steamboat Place and Wildhorse Meadows traffic studies. In general, approximately 80% of the traffic traveling to and from the base area does so via Mt. Werner Road. The remaining 20% traveling to and from the base area does so via the south on Village Drive or Après Ski Way. A minor percentage of trips will use other roadways to access the base area. However, they were excluded from the trip distribution utilized in this study to provide a conservative estimate of the operations at the study intersections. These general distribution patterns were modified to account for vehicle traffic traveling to the base. The trips associated with the base area development are typically bound for either downtown Steamboat Springs or the ski area with a small percentage of the trips traveling to other destinations. These characteristics are captured with the trip distribution utilized in this study.

Two different trip distribution patterns were used for the base area developments depending on the trip generation rates. The trip generation characteristics are unique to the area due to the resort nature of the base area. The developments with reduced trip making characteristics are not likely to have many vehicle trips traveling to the ski area as these trips are likely to be replaced with walking trips. Therefore, only 5% of the vehicle traffic from these developments was distributed to the base. However, the developments with standard trip making characteristics will have more vehicle trips to the base. 25% of the vehicle trips from these developments were distributed to the base. These two distribution patterns are shown in Figure 7.

C. PROPOSED PROJECTS TRAFFIC

The traffic generated from the developments (shown in Table 5) was assigned to the study intersections using the distributions described above and shown in Figure 7. The total traffic added to the study intersections from the proposed developments is shown in Figures 8 and 9 for 2015 and 2025 respectively. Note that negative volumes are shown in Figure 9 at the Knoll Lot due to the different trip generation characteristics of this site as a parking lot versus the planned resort development.

Figure 7: Trip Distribution

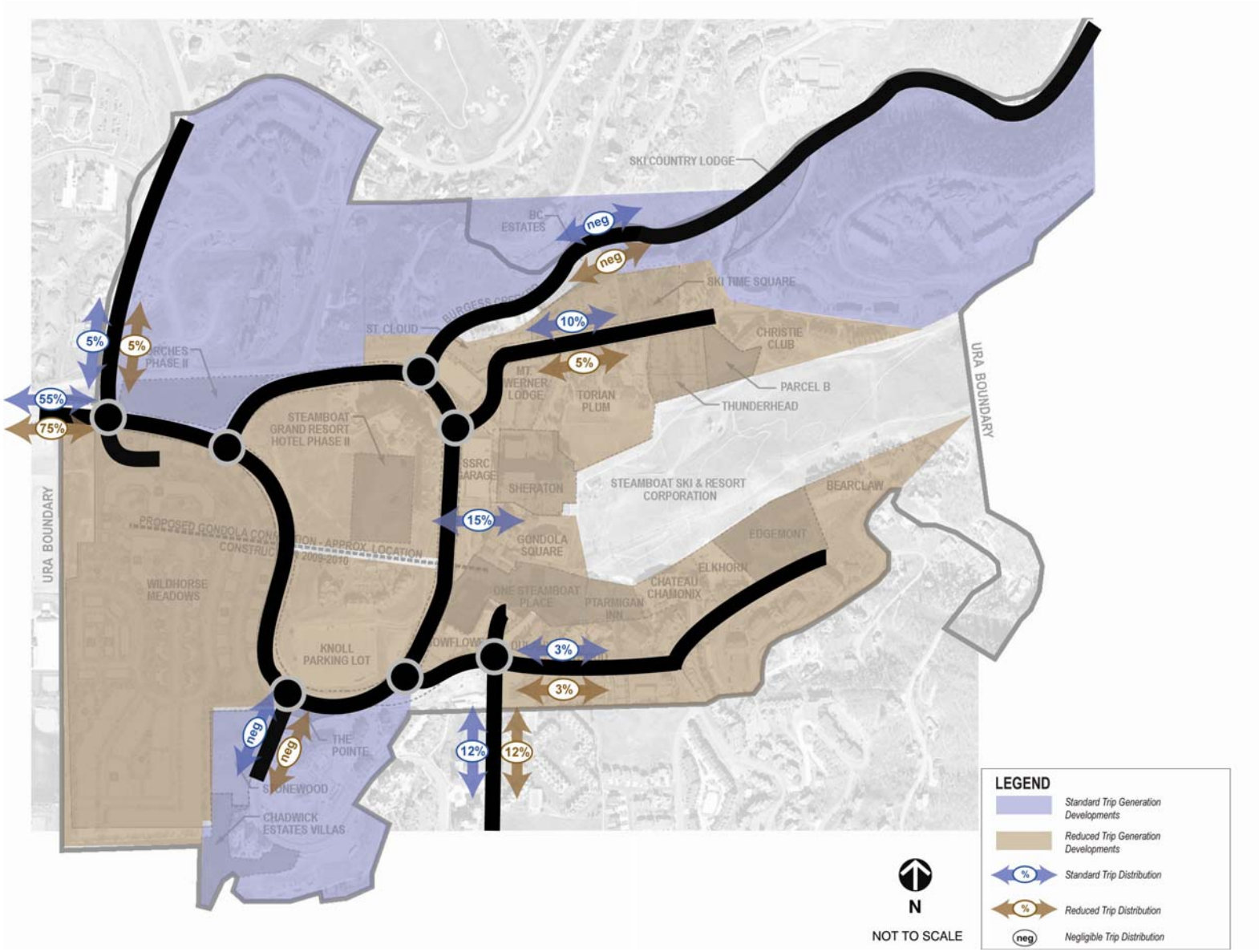


Figure 8: 2015 Proposed Development Related Traffic

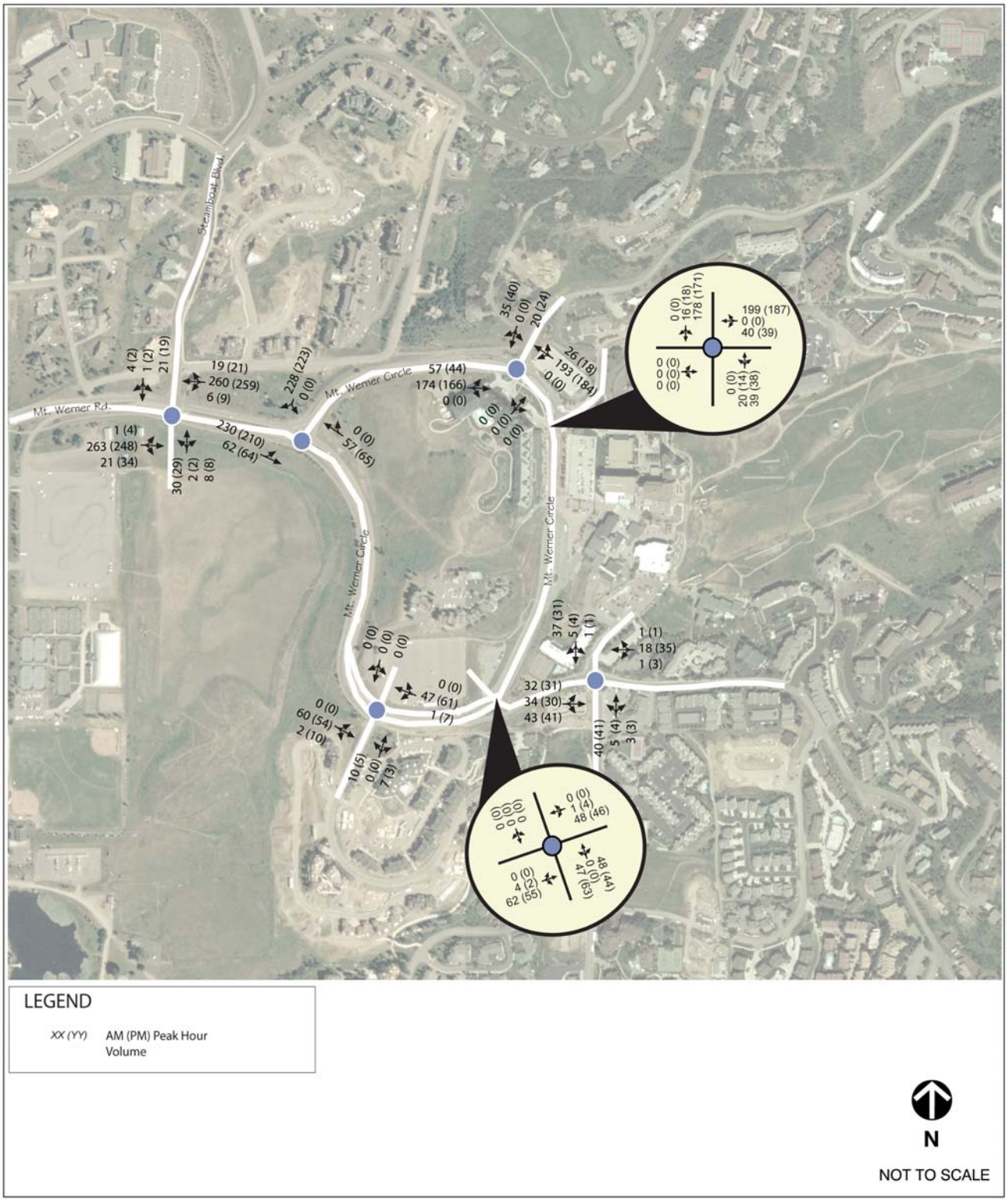
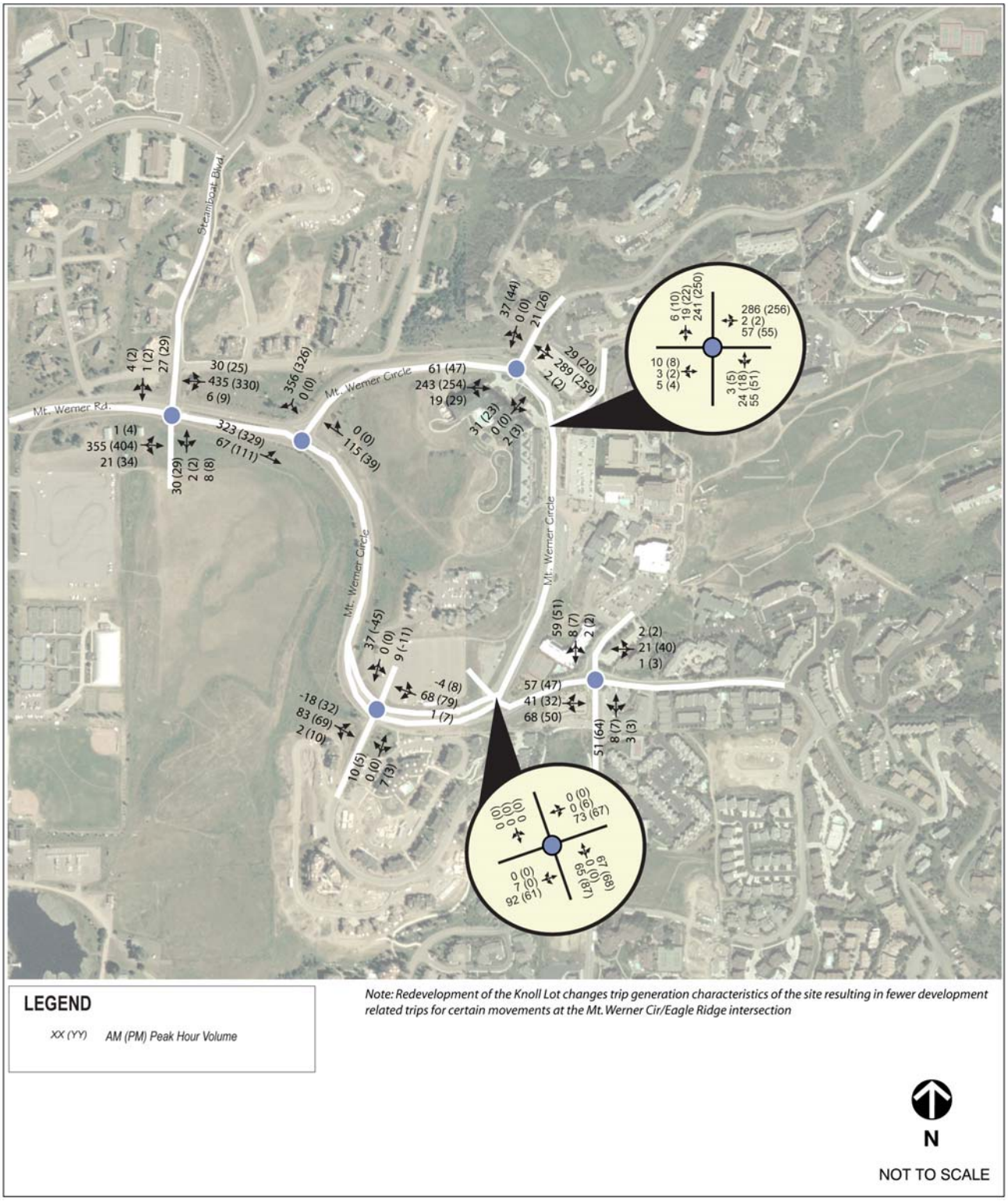


Figure 9: 2025 Proposed Development Related Traffic



LEGEND

XX (YY) AM (PM) Peak Hour Volume

Note: Redevelopment of the Knoll Lot changes trip generation characteristics of the site resulting in fewer development related trips for certain movements at the Mt. Werner Cir/Eagle Ridge intersection

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NOT TO SCALE

VI. 2015 BUILDOUT ANALYSIS

Traffic operations analysis was conducted at the study intersections for two scenarios in 2015. The analysis scenarios are summarized in Table 6. The first scenario provides the operating conditions that would exist with minor transportation improvements. The second scenario provides the expected operating conditions that would result from implementing additional transportation system improvements. Both scenarios take into account the planned improvements at Mt. Werner Road/Steamboat Boulevard and Mt. Werner Circle/Après Ski Way.

TABLE 6: 2015 ANALYSIS SCENARIOS

Location	Scenario 1: Minor Change	Scenario 2: Mitigated
1. Mt. Werner Rd/ Steamboat Blvd	Traffic Signal	Traffic Signal
2. Mt. Werner Rd/ Mt. Werner Cir	Side Street Stop Control	Traffic Signal
3. Mt. Werner Cir/ Eagle Ridge Dr	Side Street Stop Control	Side Street Stop Control
4. Mt. Werner Cir/ Après Ski Way	Roundabout	Roundabout
5. Après Ski Way/Village Dr	Side Street Stop Control	All-Way Stop
6. Mt. Werner Cir/Ski Time Square Dr	All-Way Stop	Roundabout
7. Mr. Werner Cir/Burgess Creek Rd	Side Street Stop Control	Side Street Stop Control
Mt. Werner Circle	4 lanes	2 lanes

A. 2015 TRAFFIC VOLUMES

The development related traffic shown in Figure 8 was added to the background traffic to determine the total 2015 traffic used in the analysis. The total 2015 traffic volumes at the study intersections are shown in Figure 10.

B. 2015 TRAFFIC OPERATIONS

1. Scenario 1: Minor Change

The transportation improvements beyond the existing conditions included in Scenario 1: Minor Change are:

- A traffic signal at Mt. Werner Road/Steamboat Boulevard. This was recommended in the approved 2006 Wildhorse Meadows Traffic Impact Assessment. The intersection does not currently meet warrants but is expected to as Wildhourse Meadows comes online. It is recommended that this intersection be signalized once warrants are met and warrant studies should be conducted periodically as Wildhorse Meadows is developed.
- A single lane roundabout at Mt. Werner Circle/Après Ski Way which has recently been constructed.
- All-way stop control at Mt. Werner Circle/Ski Time Square Drive.
- Additional signing and striping on Burgess Creek Road to provide two approach lanes at the intersection with Mt. Werner Circle. Based on initial observations the roadway is wide enough to accommodate this change without the need to widen the roadway or acquire additional right-of-way.

The LOS results for the 2015 Minor Change scenario are summarized in Table 7. The detailed LOS worksheets are provided in Appendix C.

TABLE 7: 2015 MINOR CHANGE SCENARIO INTERSECTION LEVEL OF SERVICE RESULTS

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
1. Mt Werner Rd / Steamboat Blvd	Traffic Signal	6	A	8	A
2. Mt Werner Rd / Mt Werner Cir	Side-Street Stop	9 (94) – SBL	A (F)	28 (348) – SBL	D (F)
3. Mt Werner Cir / Eagle Ridge Dr	Side-Street Stop	4 (24) – NBTLR	A (C)	5 (27) – NBTLR	A (D)
4. Mt Werner Cir / Apres Ski Way	Single-Lane Roundabout	11	B	11	B
5. Apres Ski Way / Village Dr	Side-Street Stop	16 (44) – NBTLR	C (E)	60 (231) – NBTLR	F (F)
6. Mt Werner Cir / Ski Time Square Dr	All-Way Stop	18	C	29	D
7. Mt Werner Cir / Burgess Creek Rd	Side-Street Stop	4 (23) – SBTL	A (C)	8 (49) – NBTLR, SBTL	A (E)

Notes
1. The signalized LOS and delay results are reported for the overall intersection.
2. The unsignalized LOS and delay results are reported for the overall intersection, with the worst movement shown in parentheses.
3. Delay is reported as the average delay per vehicle in seconds.
4. Roundabout operations analysis performed according to the HCM 2000.

As shown in Table 7, the Apres Ski Way/Village Drive intersection operates at a LOS F. In addition, the two other intersections have movements that operate below a LOS D under the Minor Change Scenario: Mt. Werner Road/Mt. Werner Circle and Mt. Werner Circle/Burgess Creek Road.

The northbound movement of the Après Ski Way/Village Drive intersection is anticipated to operate with significant delay in 2015. This is related to the background growth expected on Village Drive as well as the increase in traffic due to the proposed developments.

Analysis shows that a vehicle making a southbound left from Mt. Werner Circle onto Mt. Werner Road would have to wait approximately three minutes before there is an acceptable gap to make the maneuver. However, there are only approximately 47 vehicles in the peak hour that make this movement. Vehicles making the southbound right turn movement could experience an average of one minute of delay when traveling through this intersection due to interference with the southbound left queue. It is not expected that minor movements at this intersection would experience delay. The overall operations of this intersection are acceptable.

The southbound movement of the Mt. Werner Circle/Burgess Creek Road intersection operates with approximately 50 seconds of delay, however, the overall intersection operates acceptably.

2. <u>Scenario 2: Mitigated</u>

Scenario 2 includes the improvements in Scenario 1 plus the following transportation improvements:

- Intersection control beyond stop signs at Mt. Werner Road/Mt. Werner Circle.
- All-way stop control at Après Ski Way/Village Drive.

- A single-lane roundabout at Mt. Werner Circle/Ski Time Square Drive.

The results for Scenario 2: Mitigated are summarized in Table 8. The detailed LOS worksheets are provided in Appendix C.

TABLE 8: 2015 MITIGATED SCENARIO LEVEL OF SERVICE RESULTS

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
1. Mt Werner Rd / Steamboat Blvd	Traffic Signal	6	A	8	A
2. Mt Werner Rd / Mt Werner Cir	Traffic Signal	25	C	27	C
3. Mt Werner Cir / Eagle Ridge Dr	Side-Street Stop	4 (25) – NBTLR	A (C)	5 (28) – NBTLR	A (D)
4. Mt Werner Cir / Apres Ski Way	Single-Lane Roundabout	11	B	11	B
5. Apres Ski Way / Village Dr	All-Way Stop	12	B	17	C
6. Mt Werner Cir / Ski Time Square Dr	Single-Lane Roundabout	12	B	15	B
7. Mt Werner Cir / Burgess Creek Rd	Side-Street Stop	4 (23) – SBTL	A (C)	8 (49) – NBTLR, SBTL	A (E)

Notes

1. The signalized LOS and delay results are reported for the overall intersection.
2. The unsignalized LOS and delay results are reported for the overall intersection, with the worst movement shown in parentheses.
3. Delay is reported as the average delay per vehicle in seconds.
1. Roundabout operations analysis performed according to the HCM 2000.

As shown in Table 8, all of the intersections will operate at LOS D or better with the recommended improvements. The northbound and southbound approaches at the Burgess Creek Drive/ Mt. Werner Circle intersection operate at LOS E in the PM peak hour but the overall intersection operates acceptably.

The analysis indicates that Mt. Werner Road must remain a four lane section west of Mt. Werner Circle. The Mt. Werner Road/Steamboat Boulevard intersection will operate acceptably with the current lane configuration and a traffic signal. The signal is recommended to be in place upon completion of a signal warrant analysis which should take place periodically as Wildhorse Meadows develops.

The Mt Werner Road/ Mt Werner Circle intersection operates acceptably with either a single lane roundabout or a traffic signal. It is recommended that this intersection be signalized based on the signal recommendation at the Mt Werner Road/ Steamboat Boulevard intersection. The signal for this intersection is recommended to be in place upon completion of a signal warrant analysis which should take place periodically as Wildhorse Meadows is developed.

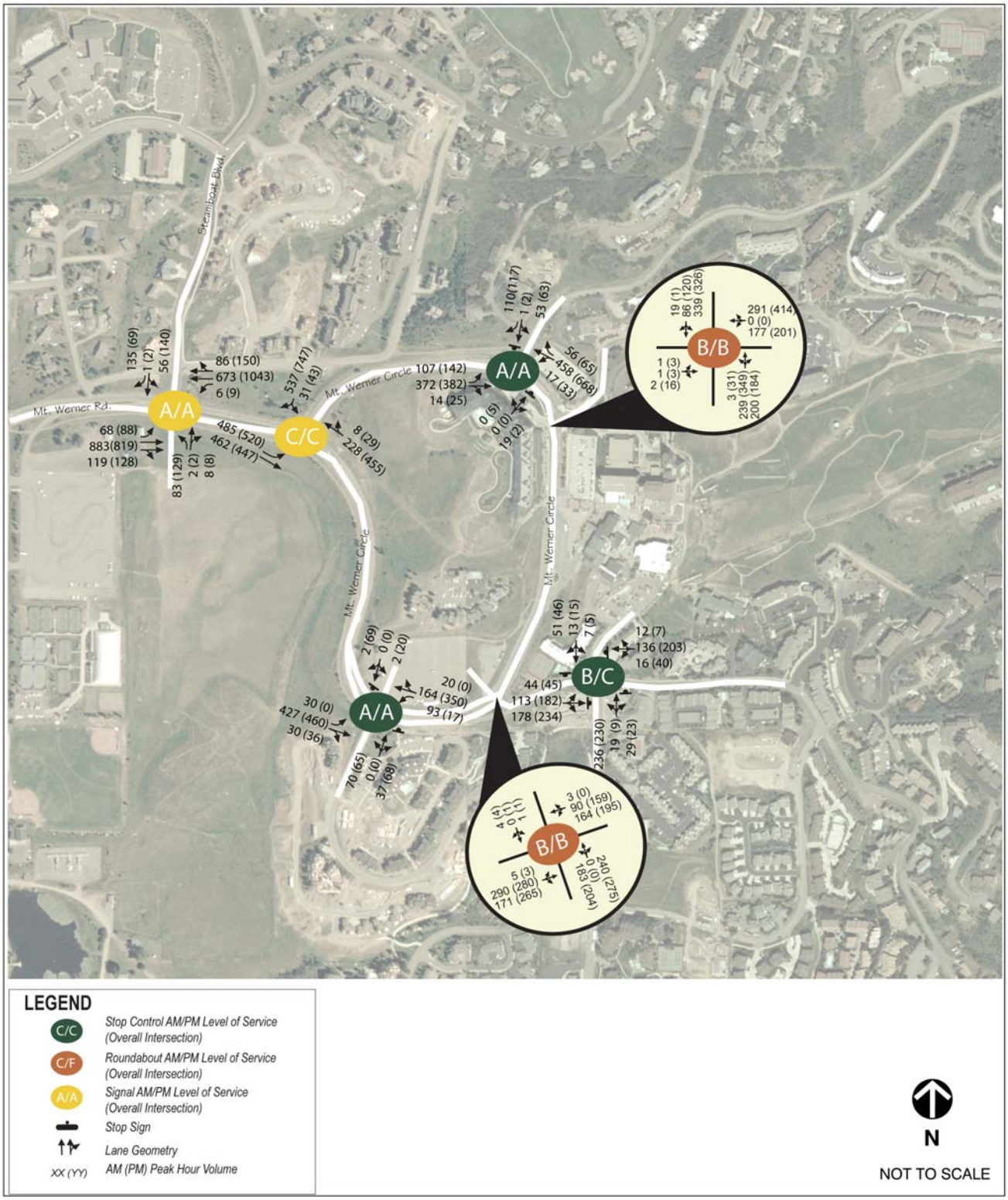
Analysis was completed with a roundabout at the intersections of Mt. Werner Road/Steamboat Boulevard and Mt. Werner Road/Mt. Werner Circle. The intersection of Mt. Werner Road/Steamboat Boulevard would require a two-lane roundabout to operate acceptably due to the heavy opposing movements. Therefore, a signal, as proposed in the Wildhorse Meadows TIS, is recommended for the intersection. Additionally, the intersection control at the Mt. Werner Road/Mt. Werner Circle should be the same as the control at Mt. Werner Road/Steamboat Boulevard. Roundabouts operate well as consecutive treatments but do not tend to operate

well with a closely spaced signalized intersection due to the platooning of vehicles. Therefore, the recommendation for Mt. Werner Road/Mt. Werner Circle is a signal.

The intersection of Après Ski Way/ Village Drive notices significant delay as a side street stop controlled intersection. The northbound left from Village Drive onto Après Ski Way is the movement shown to notice the most significant delay. To determine the timing of improvements at this intersection analysis was conducted with 50% and 75% of the northbound left turn traffic. If 50% of the northbound left turns are removed, the intersection operates at LOS B overall with a 54 second delay for the movement. As the volume increases to 75% of the total volume, the northbound left delay increases to 120 seconds while the overall intersection operates at LOS B. It is recommended the all-way stop be added upon completion of 75% of the Approved and Pending Development proposed along Après Ski Way. It should be noted that additional measures such as snow-melt, grading, and/or advanced signage are recommended to ensure that the intersection operates safely with the all-way stop.

It is recommended that an eastbound left turn lane and northbound left turn lane is separated at the all-way stop as queues occur for the eastbound approach if the eastbound left turn movement is not separated from the through movement. The queue may effect the operation of the roundabout at Après Ski Way/Mt. Werner Circle. The same problem occurs for the northbound left turn, the queues will back up beyond the driveways that are south of the intersection if the northbound left turn is not separated. The geometric layout of the intersection as an all-way stop is important to the operations of the adjacent intersection.

Figure 10: 2015 Traffic Volumes & LOS Results – Mitigated



VII. 2025 BUILDOUT ANALYSIS

Traffic operations analysis was conducted at the study intersections for three scenarios in 2025. The analysis scenarios are summarized in Table 9. The first scenario provides the operating conditions that would exist with minor transportation improvements and is consistent with the Scenario 1 analysis that was performed for 2015. The second scenario provides the expected operating conditions that would result from implementing additional transportation system improvements and is consistent with the Scenario 2 analysis that was performed for 2015. The third scenario looks at the operations that would exist if Mt. Werner Circle were made a transit only corridor between Après Ski Way and Ski Time Square Drive.

TABLE 9: 2025 ANALYSIS SCENARIOS

Location	Scenario 1: Minor Change	Scenario 2: Mitigated	Scenario 3: Transit Village
1. Mt. Werner Rd/Steamboat Blvd	Traffic Signal	Traffic Signal	Traffic Signal
2. Mt. Werner Rd/Mt. Werner Cir	Side Street Stop Control	Traffic Signal	Traffic Signal
3. Mt. Werner Cir/Eagle Ridge Dr	Side Street Stop Control	Side Street Stop Control	Side Street Stop Control
4. Mt. Werner Cir/Eagle Ridge Dr	Roundabout	Roundabout	Roundabout
5. Après Ski Way/Village Dr	Side Street Stop Control	All-Way Stop	All-Way Stop
6. Mt. Werner Cir/Ski Time Square Dr	All-Way Stop	Roundabout	Roundabout
7. Mr. Werner Cir/Burgess Creek Rd	Side Street Stop Control	Side Street Stop Control	Side Street Stop Control
Mt. Werner Circle	4 lanes	2 lanes	2 lanes
Mt. Werner Cir between Après Ski Way & Ski Time Square Dr	Full Access	Full Access	Transit Only

A. 2025 TRAFFIC VOLUMES

The approved and anticipated development traffic volumes shown in Figure 9 were added to the background traffic volumes described above to determine the total 2025 traffic projections used in the analysis. The total 2025 traffic volumes at the study intersections are shown in Figure 11.

B. 2025 TRAFFIC OPERATIONS

1. Scenario 1: Minor Change

The lane configurations and intersection control used for 2025 Scenario 1 are the same as those used in the 2015 Minor Change analysis. The LOS results for 2025 Scenario 1: Minor Change are summarized in Table 10. The detailed LOS worksheets are provided in Appendix D.

TABLE 10: 2025 MINOR CHANGE SCENARIO INTERSECTION LEVEL OF SERVICE RESULTS

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
1. Mt Werner Rd / Steamboat Blvd	Traffic Signal	8	A	16	B
2. Mt Werner Rd / Mt Werner Cir	Side-Street Stop	16 (291) – SBL	C (E)	57 (963) – SBL	F (F)
3. Mt Werner Cir / Eagle Ridge Dr	Side-Street Stop	5 (29) – NBTLR	A (D)	4 (30) – NBTLR	A (D)
4. Mt Werner Cir / Apres Ski Way	Single-Lane Roundabout	12	B	13	B
5. Apres Ski Way / Village Dr	Side-Street Stop	56 (162) – NBTLR	F (F)	193 (711) – NBTLR	F (F)
6. Mt Werner Cir / Ski Time Square Dr	All-Way Stop	28	D	57	F
7. Mt Werner Cir / Burgess Creek Rd	Side-Street Stop	7 (53) – NBTLR	A (F)	15 (194) – NBTLR	C (F)

Notes

1. The signalized LOS and delay results are reported for the overall intersection.
2. The unsignalized LOS and delay results are reported for the overall intersection, with the worst movement shown in parentheses.
3. Delay is reported as the average delay per vehicle in seconds.
1. Roundabout operations analysis performed according to the HCM 2000.

The three intersections that operated below LOS D in 2015 under the Minor Change Scenario will continue to notice significant delay if other transportation improvements are not implemented around the base. In addition, the Mt. Werner Circle/Ski Time Square Drive intersection will operate at a LOS F in 2025 without control beyond all-way stop signs.

The Mt. Werner Road/Mt. Werner Circle intersection will operate at a LOS F in 2025 without control beyond a stop sign on Mt. Werner Circle. It is not recommended that all-way stop control be considered for this intersection due to the proximity to the Mt. Werner Road/Steamboat Boulevard.

The delay at the Après Ski Way/Village Drive intersection is showing to be very significant for the northbound movement in the 2025 scenario with the current side-street stop-control configuration.

The Mt. Werner Circle/Burgess Creek Road intersection notices a significant increase in delay between 2015 and 2025. The delay for northbound vehicles exiting the Grand and southbound vehicles on Burgess Creek Drive continue to increase. It is anticipated that vehicles accessing Mt. Werner Circle from Burgess Creek Road will experience approximately one and a half minutes of delay. The increase in delay at this intersection is related to increases in traffic on Mt. Werner Circle and not development related traffic on Burgess Creek Road. It was assumed that 10% of the St. Cloud development traffic would utilize Burgess Creek Road. Limiting access to St. Cloud from Burgess Creek Road does not improve the operations of this intersection unless it is expected that more traffic would exit the St. Cloud development via Burgess Creek Road.

All-way stop control was analyzed at Mt. Werner Circle/Burgess Creek Road to determine if it mitigated the delays. The addition of an all-way stop created delays on Mt. Werner Circle and caused the overall intersection to operate below an acceptable LOS. The peak hour volumes were used to run a Peak Hour Signal Warrant analysis. The signal warrant analysis worksheets are included in Appendix E. This location

would not meet a full signal warrant analysis based on the 2025 volumes. Therefore, neither a traffic signal nor a roundabout is recommended for this location. However, it is recommended that this intersection be monitored and a ¾ movement with southbound lefts prohibited be considered if long delays and southbound queues are observed.

2. Scenario 2: Mitigated

The lane configurations and intersection control used for 2025 Mitigated Scenario are the same assumptions used in the 2015 Mitigated analysis.

The intersection configurations assumed for the Mitigated Scenario (signals at Mt. Werner Road/Steamboat Boulevard and Mt. Werner Road/Mt. Werner Circle) with the 2025 volumes are shown in Figure 9. The results for the Mitigated Scenario are summarized in Table 11. The detailed LOS worksheets are provided in Appendix D.

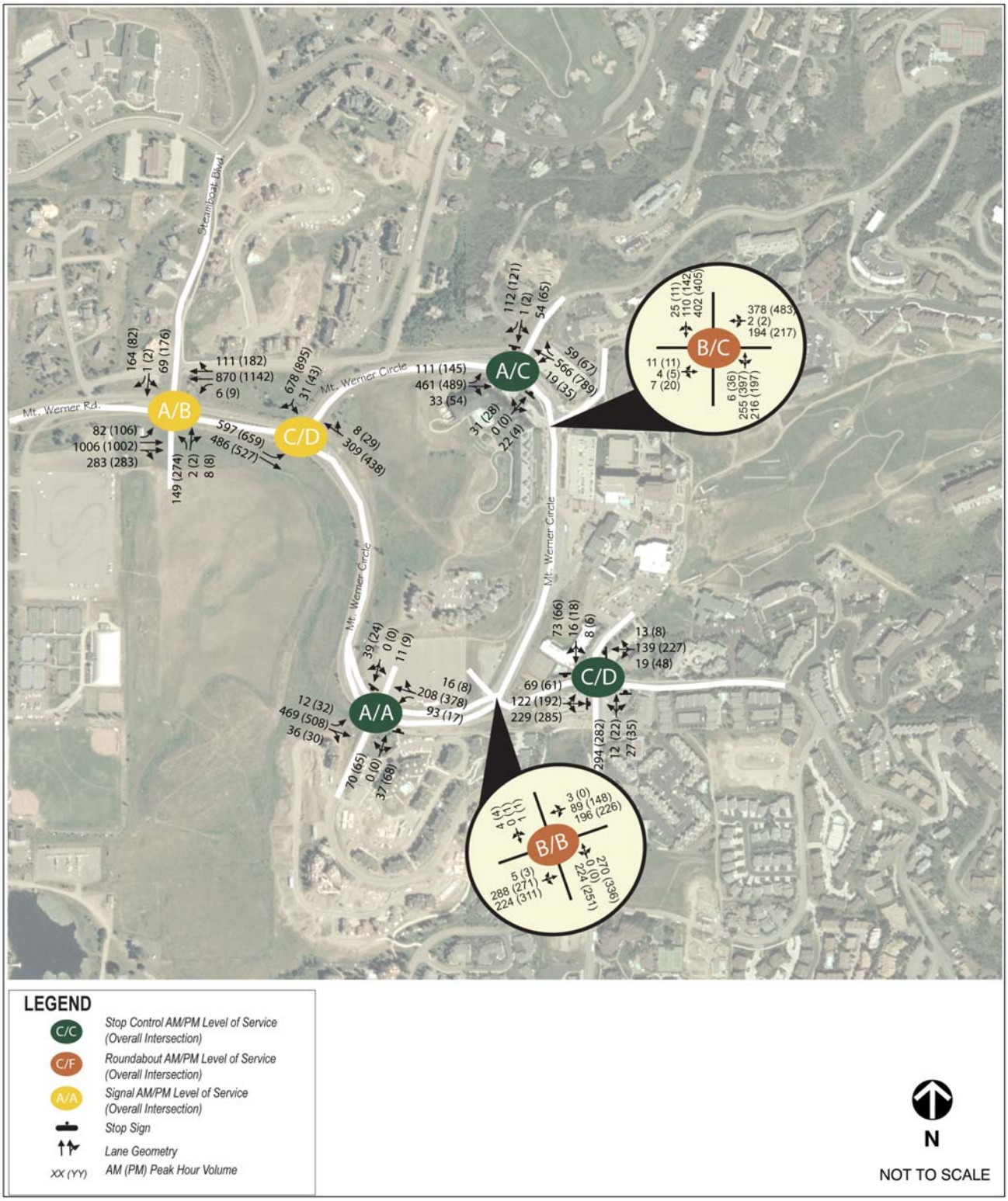
TABLE 11: 2025 MITIGATED SCENARIO LEVEL OF SERVICE RESULTS

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
1. Mt Werner Rd / Steamboat Blvd	Traffic Signal	8	A	16	B
2. Mt Werner Rd / Mt Werner Cir	Traffic Signal	25	C	52	D
3. Mt Werner Cir / Eagle Ridge Dr	Side-Street Stop	5 (30) – NBTLR	A (D)	5 (31) – NBTLR	A (D)
4. Mt Werner Cir / Apres Ski Way	Single-Lane Roundabout	12	B	13	B
5. Apres Ski Way / Village Dr	All-Way Stop	15	C	32	D
6. Mt Werner Cir / Ski Time Square Dr	Single-Lane Roundabout	13	B	20	C
7. Mt Werner Cir / Burgess Creek Rd	Side-Street Stop	7 (53) – NBTLR	A (F)	15 (194) – NBTLR	C (F)

Notes
1. The signalized LOS and delay results are reported for the overall intersection.
2. The unsignalized LOS and delay results are reported for the overall intersection, with the worst movement shown in parentheses.
3. Delay is reported as the average delay per vehicle in seconds.
1. Roundabout operations analysis performed according to the HCM 2000.

As shown in Table 11, all of the intersections would continue to operate at a LOS D or better in 2025 with the recommended transportation improvements. The northbound and southbound left movements at the Burgess Creek Road/Mt. Werner Circle intersection will continue to operate at LOS F. As discussed in the 2025 Minor Change analysis, it is not anticipated that a signal warrant will be met at this intersection. However, the intersection should be monitored and improvements such as a ¾ access with southbound left turns prohibited be considered if delays prove to be significant.

Figure 11: 2025 Traffic Volumes & LOS Results – Mitigated



3. Scenario 3: Transit Village

The Scenario 3 analysis was conducted to determine the expected operating conditions of the base area intersections with Mt. Werner Circle closed to personal vehicle traffic between Après Ski Way and Ski Time Square Drive. The possibility of creating a limited access transit village was identified as an option to consider as part of the September 2007 Base Area Mobility Charette. This alternative would create an enhanced transit and pedestrian environment at the base. This analysis was conducted to determine if a limited access transit village is feasible from a vehicular traffic standpoint.

All of the improvements shown in Scenario 2 were assumed to be in place for the Scenario 3 analysis. Traffic was rerouted around Mt. Werner Circle and 25% of the traffic was assumed to remain on Mt. Werner Circle between Après Ski Way and Ski Time Square Drive. This accounts for private shuttle and Steamboat Springs Transit (SST) trips which were shown to be about 25% of the existing traffic counts.

The level of service results are summarized in Table 12. The detailed LOS worksheets are provided in Appendix D.

TABLE 12: 2025 TRANSIT VILLAGE SCENARIO LEVEL OF SERVICE RESULTS

Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay (sec)	LOS	Delay (sec)	LOS
1. Mt Werner Rd / Steamboat Blvd	Traffic Signal	8	A	16	B
2. Mt Werner Rd / Mt Werner Cir	Traffic Signal	27	C	45	D
3. Mt Werner Cir / Eagle Ridge Dr	Side-Street Stop	4 (29) – NBTLR	A (D)	12 (120) – NBTLR	B (F)
4. Mt Werner Cir / Apres Ski Way	Single-Lane Roundabout	10	A	11	B
5. Apres Ski Way / Village Dr	All-Way Stop	16	C	33	D
6. Mt Werner Cir / Ski Time Square Dr	Single-Lane Roundabout	11	B	12	B
7. Mt Werner Cir / Burgess Creek Rd	Side-Street Stop	7 (80) – NBTLR	A (F)	8 (184) – NBTLR	A (F)

Notes
1. The signalized LOS and delay results are reported for the overall intersection.
2. The unsignalized LOS and delay results are reported for the overall intersection, with the worst movement shown in parentheses.
3. Delay is reported as the average delay per vehicle in seconds.
2. Roundabout operations analysis performed according to the HCM 2000.

In general, the LOS results with the limited access transit village are comparable to the LOS results with a full access Mt. Werner Circle. Therefore, the impacts on the vehicular operations are anticipated to be minimal.

Pedestrian travel at the base area is anticipated to increase with the redevelopment of the Knoll Lot and development of the Grand Phase II. Strategies to accommodate increased pedestrian travel should be evaluated and this Transit Village Scenario is one option to consider. This study only analyzed the individual intersection operations associated with this scenario. Further analysis is necessary to determine the overall impacts on vehicular travel time and vehicle miles traveled associated with this option.

VIII. FUTURE TRANSIT, PEDESTRIAN & BICYCLE CIRCULATION

A. TRANSIT CIRCULATION

As noted in the existing conditions, the base area has a unique mix of public and private transit service that provides access to community wide destinations. The Steamboat Springs Transit (SST) system is a well used public transport system that serves local and regional destinations. The private transit system consists of mostly Steamboat Resort and condominium operators who offer service to lodging guests via small buses.

In an effort to understand how each system currently uses the roadway network a detailed video study was conducted. The results of the study suggest that 3% of traffic during peak weekends is SST buses and 25% of traffic during peak weekends is private shuttles. It is anticipated that the level of transit service will continue to operate at a minimum of this level.

The 2025 Transit Village analysis indicated that the surrounding roadways and intersections would operate acceptably with the transit village in place.

Transit stops should remain the same as they are today with a few exceptions. As the GTC is moved from Ski Time Square Drive to Mt. Werner Circle, the stop on Ski Time Square Drive should be removed. The new transit village should be used by both private and public transit services. However, all other base area bus stops should be limited to public SST buses so as not to impact general traffic circulation.

B. PEDESTRIAN CIRCULATION

The Steamboat Base Area Master Plan, Sidewalk Master Plan, and the Mobility Charrette Summary document provide clear direction on pedestrian connections at the base area. The documents identify missing sidewalk connections that are critical to improving pedestrian connectivity, landscape interfaces that are important to creating a high quality walking environment, and crosswalk features that improve pedestrian safety. Such treatments are recommended throughout the base area with specific attention to intersections adjacent to the base with the highest levels of pedestrian activity.

In an effort to integrate the previous pedestrian planning at the base area, the traffic analysis completed for this project includes pedestrian activity at intersections. The evaluation includes actual pedestrian counts taken at major intersections and designs recommended in previous planning documents. The intersection counts suggest that peak ski weekends such as President's Day experience up to 50% more pedestrian activity. This finding supports the previous planning documents emphasis on stronger pedestrian connections between destinations at the base area. This data also suggests that pedestrian activity will increases as the base area redevelops.

It is also important to note that the increased level of pedestrian activity at the base area that results from improvements such as the promenade or new streetscape, should play a key role in reducing motor vehicle trips. As discussed in the Trip Reduction section of the Proposed Projects, such reductions were accounted for in the trip generation analysis from areas that are likely to have a high percentage of walk trips.

C. BICYCLE CIRCULATION

The Steamboat Trails Master Plan provides guidance on off-street and on-street bicycle connections in and around the base area. The major connections noted in this plan provide a unique opportunity to connect the base area with other destinations in Steamboat Springs. Although bicycling is not a predominate mode of transportation or recreation during winter months, it is gaining popularity during summer and shoulder seasons. As redevelopment occurs it is anticipated that an increasing number of employees will access the

base area using bicycles during summer months. Likewise, bicycles play a critical role in making multimodal connections to transit during moderate winter days.

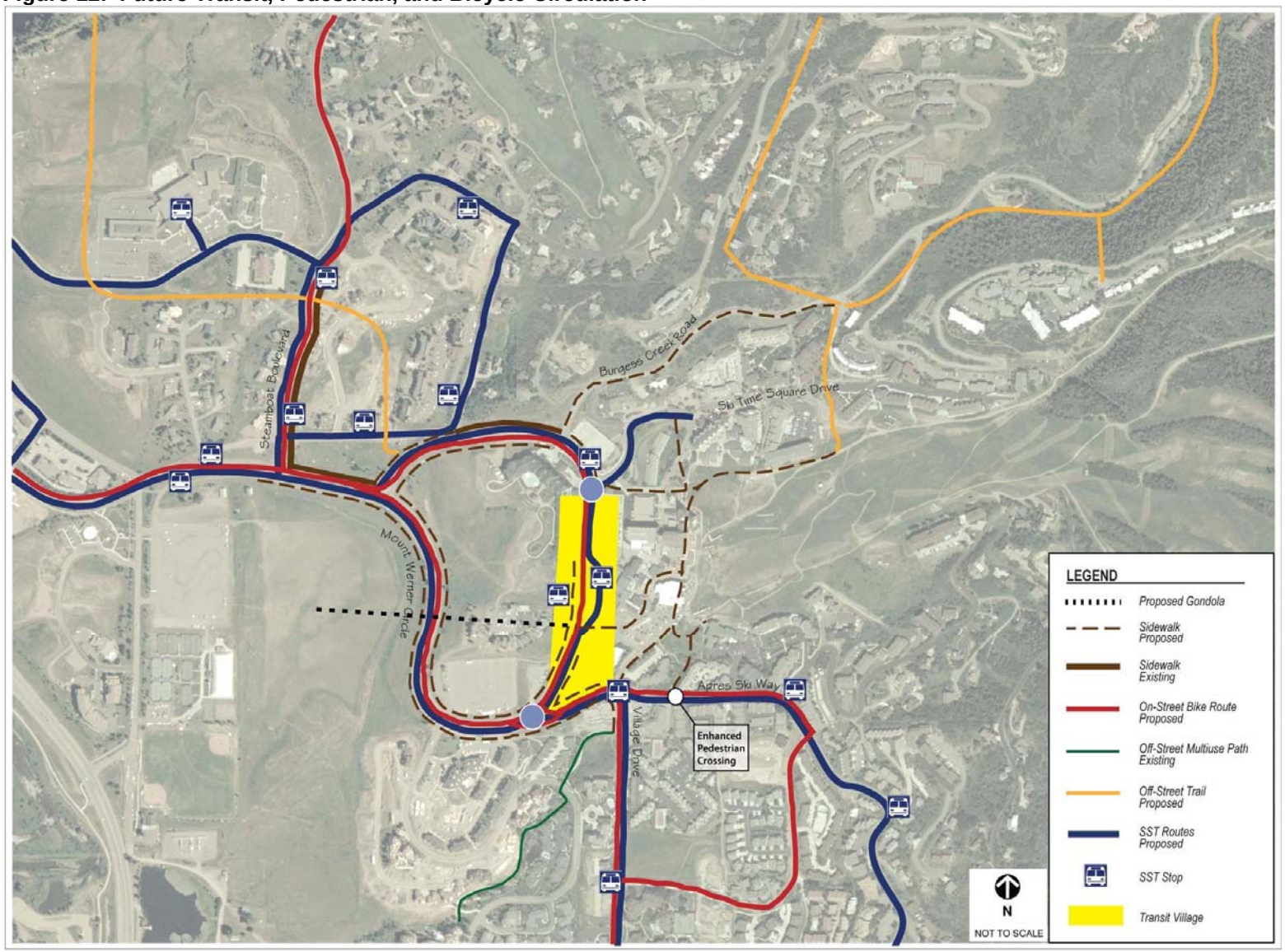
In addition to the recommendations in the Trails Master Plan a new on-street bicycle connection around Mt. Werner Circle is recommended. This connection would provide more experienced bicyclists with a direct connection to destinations around Mt. Werner Circle. This connection would require restriping Mt Werner Circle and removing one travel lane between the Mt. Werner Road and Burgess Creek Road and between Mt. Werner Road and Eagle Drive. Restriping both sections should allow for a 4' minimum bicycle lane in both directions of travel. According to AASHTO bicycle guidelines, a 4' bicycle lane is considered acceptable if the roadway section does not have curb and gutter. If curb and gutter exists a 5' minimum bicycle lane should be provided.

The roundabout at Après Ski Way includes provisions for bicyclists to travel through the roundabout or transfer to 8' wide pathways around the roundabout. The existing Ski Time Square roundabout at the GTC has ground markings that direct bicycles through the roundabout. The new roundabout at Ski Time Square should be designed with sufficient deflection to slow motorists down to bicycle speeds (15 mph maximum) through the roundabout and should have pavement markings similar to the existing roundabout. A side path connection is not recommended given the anticipated high levels of pedestrians at this intersection.

The segment between Ski Time Square Drive and Après Ski Drive should have ground markings that allow bicycles to share the travel lane with slow moving traffic. If this segment becomes limited access in the future, bicycle travel should remain and cycletracks could be striped to separate pedestrians and bicycles. In addition, ground markings along the Ski Time Square Drive and Après Ski Way corridor could be added to increase bicycle safety in the summer.

The future transit, pedestrian, and bicycle circulation plan is shown in Figure 12.

Figure 12: Future Transit, Pedestrian, and Bicycle Circulation



IX. CONCLUSIONS & RECOMMENDATIONS

The Steamboat Base Area notices travel characteristics during the ski season that are unique to the resort nature of the base and to the season. The conclusions drawn in this analysis are based upon the travel characteristics during the winter. Additional analysis may be needed to study the unique characteristics in the summer time or the off season.

The existing conditions analysis indicated that all studied intersections operate acceptably.

The analysis completed for the 2015 scenarios assumed that the approved and pending projects would be constructed by the horizon year of 2015. It should be noted that these recommendations are due to the development and traffic generated by development as opposed to the specific year. The following improvements are recommended with the completion of the approved and pending projects:

7. The Mt. Werner Road/ Steamboat Boulevard intersection will require additional operational control as Wildhorse Meadows development comes on line. This intersection was initially analyzed as a single-lane roundabout. However, the through volumes on Mt. Werner Road were too heavy for this intersection to operate acceptably as a single-lane roundabout. The Mt. Werner Road/Steamboat Boulevard intersection will operate acceptably with the current lane configuration and a traffic signal or as a double-lane roundabout. Based on the operation of the corridor as a whole, a signal is recommended at this location. The signal is recommended to be in place upon completion of a signal warrant analysis which should take place periodically as Wildhorse Meadows is developed.
8. The Mt Werner Road/ Mt Werner Circle intersection operates acceptably with either a single lane roundabout or a traffic signal. It is recommended that this intersection be signalized based on the signal recommendation at the Mt Werner Road/ Steamboat Boulevard intersection as roundabouts operate better as consecutive treatments. The signal for this intersection is recommended to be in place upon completion of a signal warrant analysis which should take place periodically as Wildhorse Meadows is developed.
9. The intersection of Après Ski Way/ Village Drive notices significant delay as a side street stop controlled intersection. The northbound left from Village Drive onto Après Ski Way is the movement shown to notice the most significant delay. To determine the timing of improvements at this intersection analysis was conducted with 50% and 75% of the northbound left turn traffic. If 50% of the northbound left turns are removed, the intersection operates at LOS B overall with a 54 second delay for the movement. As the volume increases to 75% of the total volume, the northbound left delay increases to 120 seconds while the overall intersection operates at LOS B. It is recommended that the all-way stop be added upon completion of 75% of the Approved and Pending Development proposed along Après Ski Way. It should be noted that additional measures such as snow-melt, grading, and/or advanced signage are recommended to ensure that the intersection operates safely as an all-way stop. It is recommended that an eastbound left turn lane and northbound left turn lane are separated at the all-way stop due to queuing for the eastbound approach. The queue may effect the operation of the roundabout at Après Ski Way/Mt. Werner Circle. The same problem occurs for the northbound left turn, queues where shown to back up beyond the driveways south of the intersection with the shared movement. The correct geometric layout of the intersection as an all-way stop is important to the operations of the adjacent intersections.
10. The intersection of Mt Werner Circle/ Ski Time Square Drive will need additional intersection control as redevelopment occurs along Ski Time Square Drive. The traffic exiting Ski Time Square Drive onto Mt Werner Circle will notice significant delay. The intersection will operate acceptably as an all-way stop controlled intersection or single lane roundabout through 2015. A signal or roundabout is not expected to be warranted at this intersection in 2015.
11. The intersection of Mt Werner Circle/ Burgess Creek Road should have signage added and striping to include a separate left turn and right turn lane off of Burgess Creek Road onto Mt Werner Circle. Based on initial observations the roadway is wide enough to accommodate this change without the need to

widen the roadway or acquire additional right-of-way. It is recommended this improvement be completed prior to any additional development traffic accessing Burgess Creek Road.

12. A roundabout is currently under construction at Mt. Werner Circle/ Après Ski Way. With the addition of the roundabout, this intersection will operate acceptably without additional improvements through 2015.
13. No improvements are recommended at the Mt. Werner Circle/ Eagle Ridge Drive intersection as it operate acceptably with the current side-street stop control configuration through 2015.
14. Two lanes in each direction are required on Mt Werner Road west of Mt Werner Circle, however Mt Werner Circle will operate acceptably as a single lane in each direction for the remaining portion of the roadway.

The analysis completed for the 2025 scenarios assumed that the approved and pending projects would be constructed and other anticipated projects would be in place. The following improvements are recommended with the addition of the anticipated projects:

15. All recommended improvements discussed for the 2015 scenarios are recommended to be completed plus a signal or roundabout at Mt Werner Circle/ Ski Time Square Drive. The roundabout scenario is recommended to enhance the transit village. No additional intersections improvements are necessary for 2025.
16. Upon redevelopment of the Knoll Lot and development of the Steamboat Grand Phase II, it is recommended the transit village scenario be implemented to enhance the pedestrian environment and provide for an enhanced transit village. In general, the LOS results with the limited access transit village are comparable to the LOS results with full access along Mt. Werner Circle. Therefore, the impacts on the vehicular circulation are anticipated to be minimal.

The following improvements are recommended to enhance the bicycle, pedestrian, and transit circulation at the base area:

17. The transit village should be implemented upon redevelopment of the Knoll Lot and the Steamboat Grand Phase II on Mt. Werner Circle between the Après Ski Way and Ski Time Square Drive roundabouts. Upon implementation of the transit village, the SST stop on Ski Time Square Drive should be removed.
18. Once implemented, private and public transit should use the new transit village; however, all other base area SST stops should remain as public transit stops only.
19. The pedestrian improvements recommended in the Steamboat Base Area Master Plan, Sidewalk Master Plan, and the Mobility Charette should be implemented as development at the base continues.
20. A new on-street bicycle connection around Mt. Werner Circle is recommended. This connection would provide more experienced bicyclists with a direct connection to destinations around Mt. Werner Circle. This connection would require restriping Mt Werner Circle and removing one travel lane between the Mt. Werner Road and Burgess Creek Road and between Mt. Werner Road and Eagle Drive. Restriping both sections should allow for a 4' minimum bicycle lane in both directions of travel. According to AASHTO bicycle guidelines, a 4' bicycle lane is considered acceptable if the roadway section does not have curb and gutter. If curb and gutter exists a 5' minimum bicycle lane should be provided.
21. The new roundabout at Ski Time Square and Mt Werner Circle should be designed with sufficient deflection to slow motorists down to bicycle speeds (15 mph maximum) through the roundabout and should have pavement markings guiding bicyclists through the roundabout. A side path connection is not recommended given the anticipated high levels of pedestrians at this intersection.
22. The segment between Ski Time Square Drive and Après Ski Way should have ground markings that allow bicycles to share the travel lane with slow moving traffic. If this segment becomes limited access in the future, bicycle travel should remain and cycletracks could be striped to separate pedestrians and bicycles. In addition, ground markings along the Ski Time Square Drive and Après Ski Way corridor could be added to increase bicycle safety in the summer.

APPENDICES

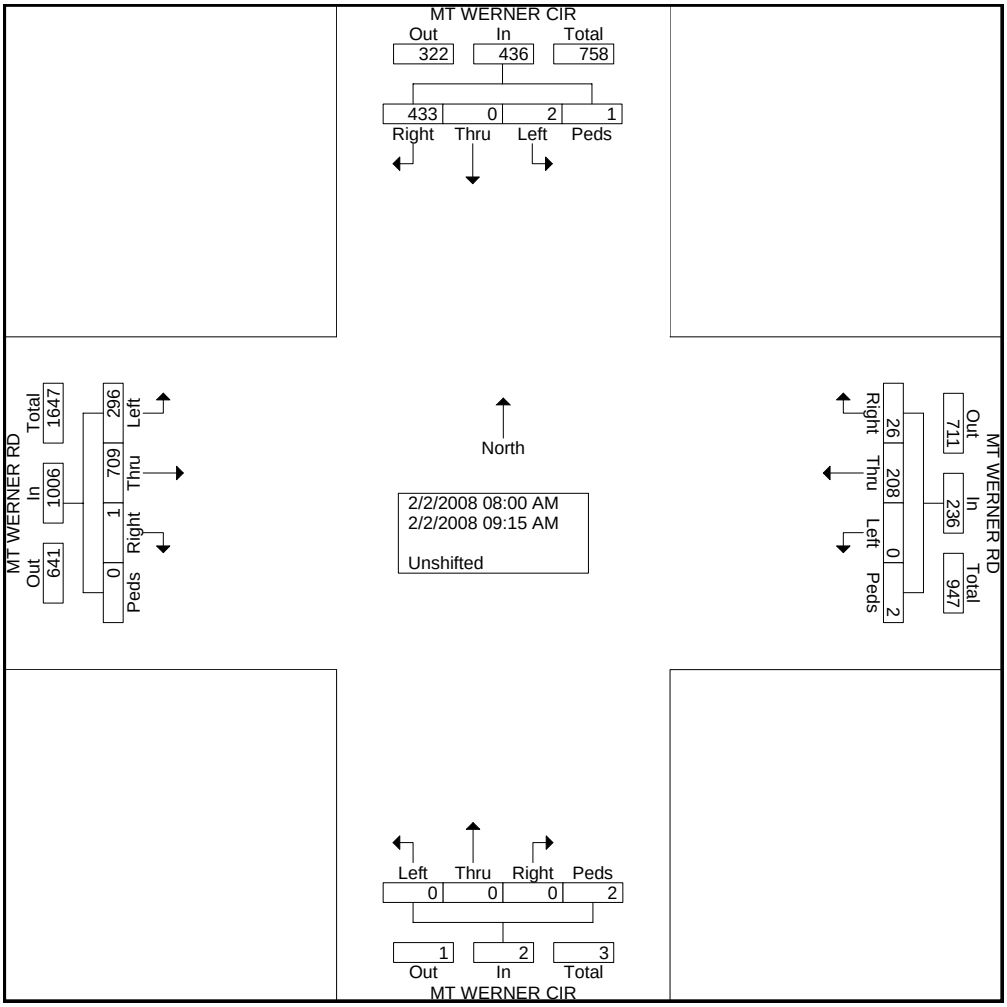
APPENDIX A – TRAFFIC COUNTS

February 2, 2008 Counts
(Typical Weekend)

File Name : #1 MTWERNERCIR&MTWERNERRD_AM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 1

Groups Printed- Unshifted

	MT WERNER CIR Southbound				MT WERNER RD Westbound				MT WERNER CIR Northbound				MT WERNER RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
08:00 AM	0	0	59	1	0	18	4	0	0	0	0	0	51	99	0	0	232
08:15 AM	0	0	62	0	0	32	6	1	0	0	0	0	50	112	0	0	263
08:30 AM	0	0	58	0	0	35	8	0	0	0	0	0	67	124	0	0	292
08:45 AM	0	0	79	0	0	32	2	1	0	0	0	2	18	185	0	0	319
Total	0	0	258	1	0	117	20	2	0	0	0	2	186	520	0	0	1106
09:00 AM	1	0	90	0	0	46	4	0	0	0	0	0	58	96	1	0	296
09:15 AM	1	0	85	0	0	45	2	0	0	0	0	0	52	93	0	0	278
Grand Total	2	0	433	1	0	208	26	2	0	0	0	2	296	709	1	0	1680
Apprch %	0.5	0	99.3	0.2	0	88.1	11	0.8	0	0	0	100	29.4	70.5	0.1	0	
Total %	0.1	0	25.8	0.1	0	12.4	1.5	0.1	0	0	0	0.1	17.6	42.2	0.1	0	



File Name : #1 MTWERNERCIR&MTWERNERRD_AM
Site Code : 00000000
Start Date : 2/2/2008
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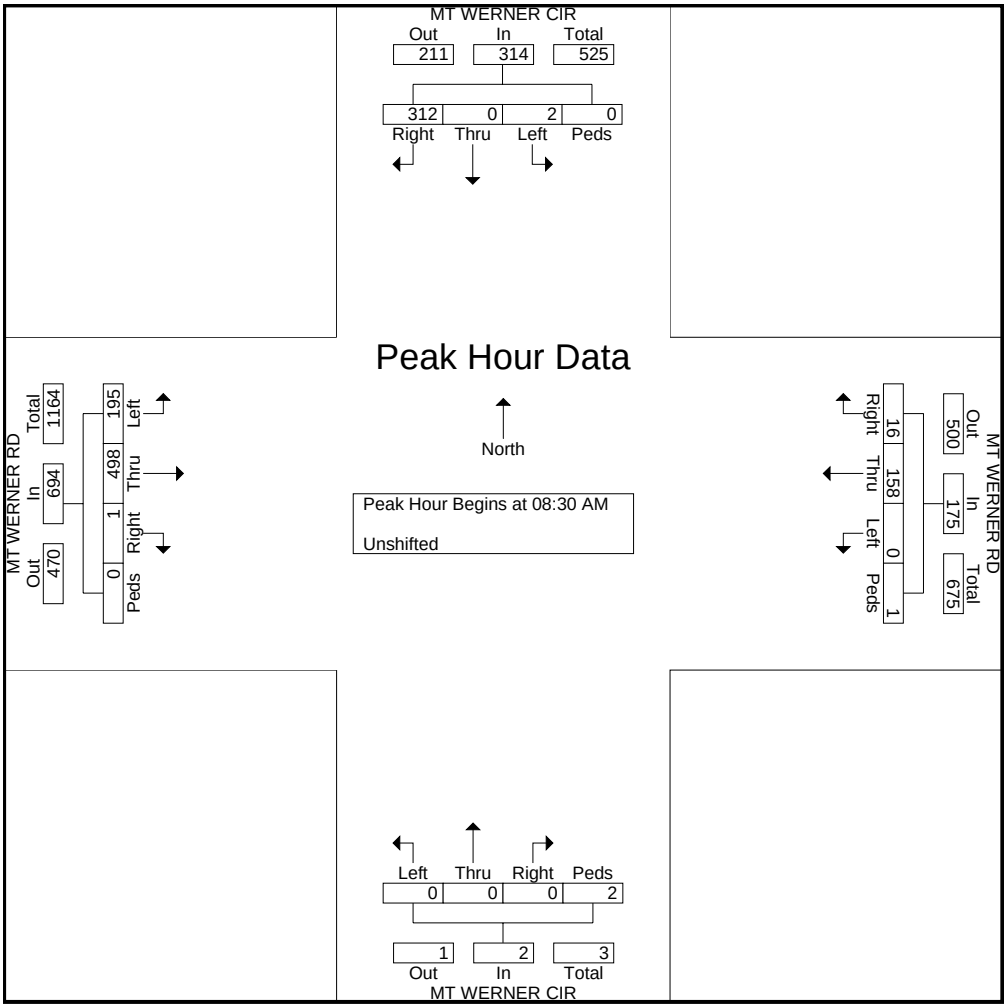
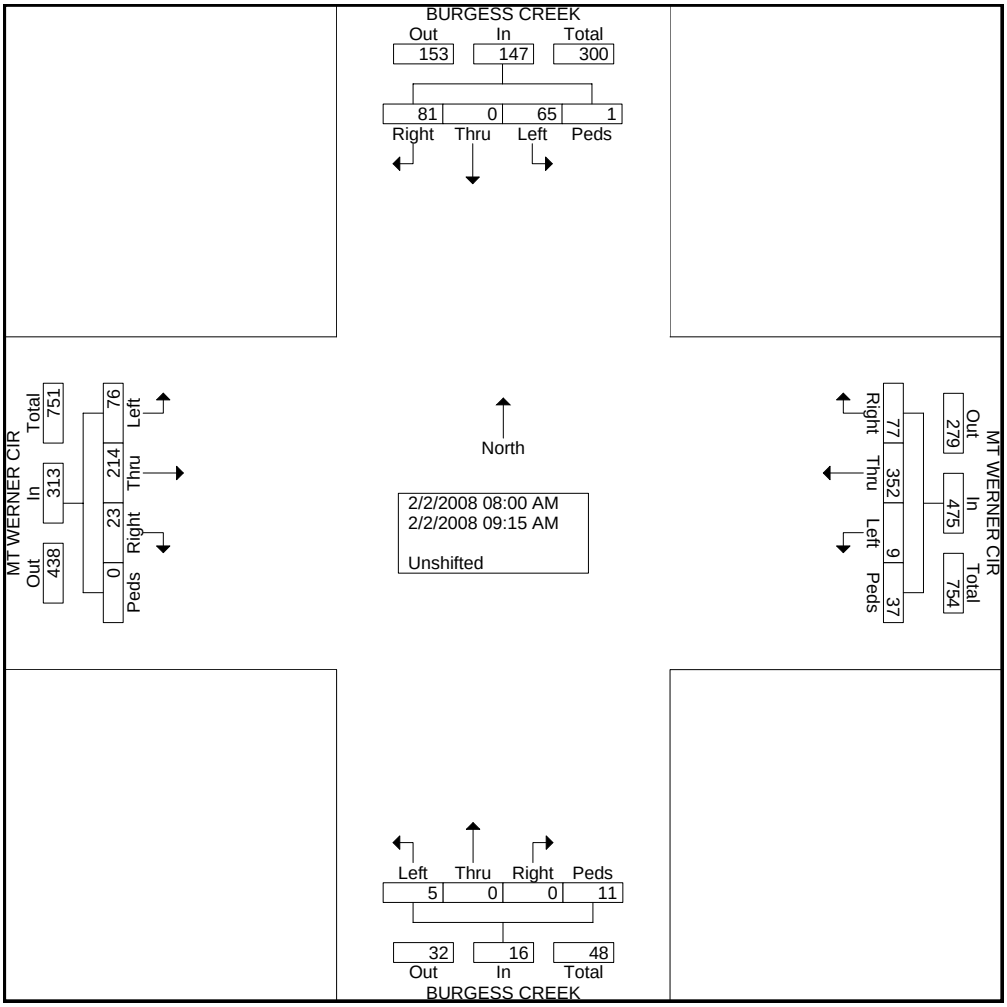
	MT WERNER CIR Southbound					MT WERNER RD Westbound					MT WERNER CIR Northbound					MT WERNER RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 08:00 AM to 09:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:30 AM																					
08:30 AM	0	0	58	0	58	0	35	8	0	43	0	0	0	0	0	67	124	0	0	191	292
08:45 AM	0	0	79	0	79	0	32	2	1	35	0	0	0	2	2	18	185	0	0	203	319
09:00 AM	1	0	90	0	91	0	46	4	0	50	0	0	0	0	0	58	96	1	0	155	296
09:15 AM	1	0	85	0	86	0	45	2	0	47	0	0	0	0	0	52	93	0	0	145	278
Total Volume	2	0	312	0	314	0	158	16	1	175	0	0	0	2	2	195	498	1	0	694	1185
% App. Total	0.6	0	99.4	0		0	90.3	9.1	0.6		0	0	0	100		28.1	71.8	0.1	0		
PHF	.500	.000	.867	.000	.863	.000	.859	.500	.250	.875	.000	.000	.000	.250	.250	.728	.673	.250	.000	.855	.929



File Name : #2 BURGESS&MTWERNER_AM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 1

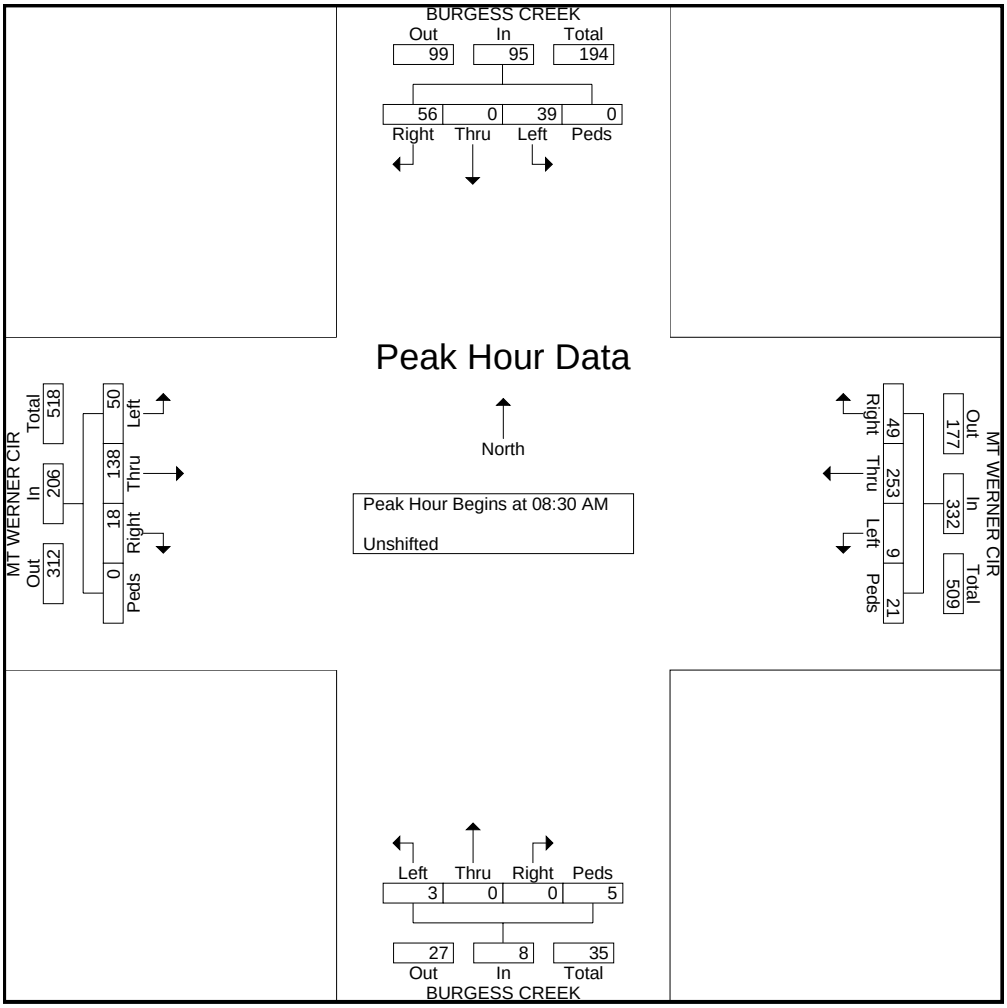
Groups Printed- Unshifted

	BURGESS CREEK Southbound				MT WERNER CIR Westbound				BURGESS CREEK Northbound				MT WERNER CIR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
08:00 AM	16	0	10	0	0	44	12	11	1	0	0	1	14	37	4	0	150
08:15 AM	10	0	15	1	0	55	16	5	1	0	0	5	12	39	1	0	160
08:30 AM	13	0	9	0	1	49	12	4	0	0	0	0	18	48	6	0	160
08:45 AM	4	0	18	0	1	60	14	12	1	0	0	2	6	12	2	0	132
Total	43	0	52	1	2	208	54	32	3	0	0	8	50	136	13	0	602
09:00 AM	13	0	12	0	4	77	11	1	1	0	0	0	17	38	5	0	179
09:15 AM	9	0	17	0	3	67	12	4	1	0	0	3	9	40	5	0	170
Grand Total	65	0	81	1	9	352	77	37	5	0	0	11	76	214	23	0	951
Apprch %	44.2	0	55.1	0.7	1.9	74.1	16.2	7.8	31.2	0	0	68.8	24.3	68.4	7.3	0	
Total %	6.8	0	8.5	0.1	0.9	37	8.1	3.9	0.5	0	0	1.2	8	22.5	2.4	0	



File Name : #2 BURGESS&MTWERNER_AM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 2

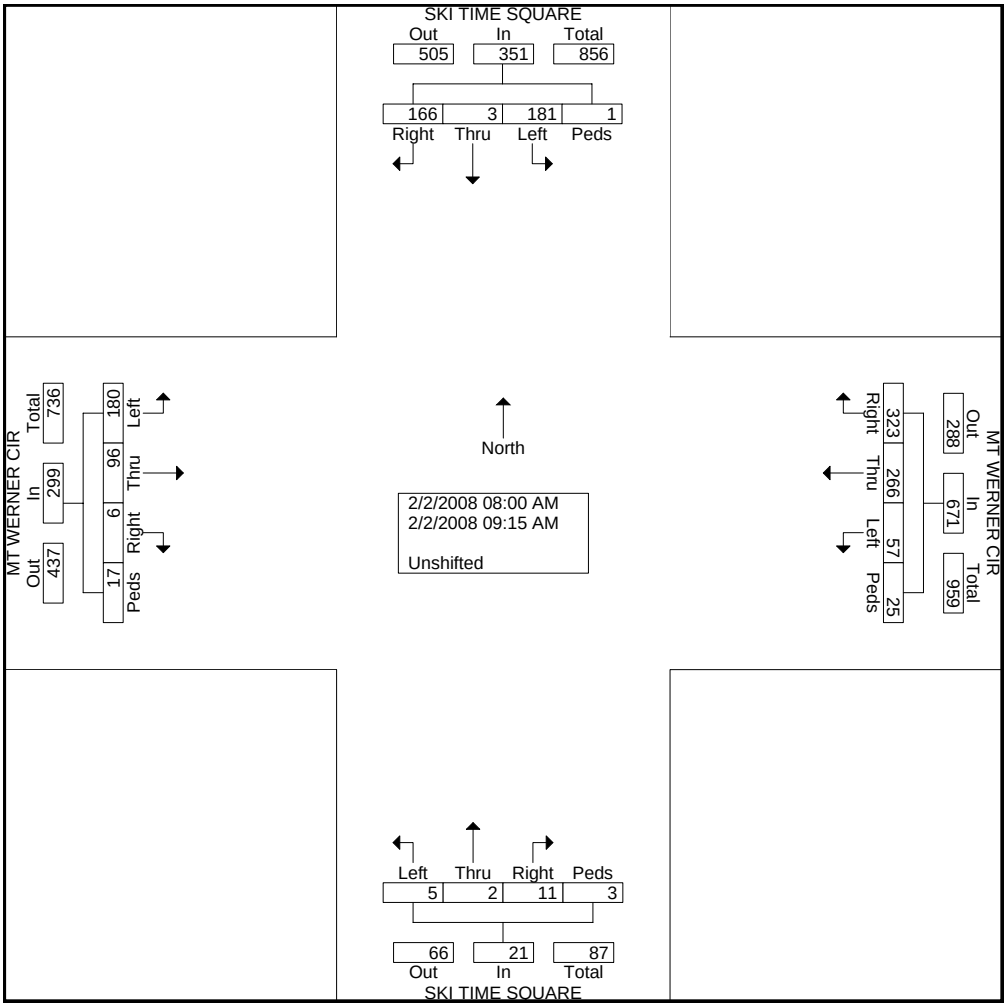
	BURGESS CREEK Southbound					MT WERNER CIR Westbound					BURGESS CREEK Northbound					MT WERNER CIR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 08:00 AM to 09:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:30 AM																					
08:30 AM	13	0	9	0	22	1	49	12	4	66	0	0	0	0	0	18	48	6	0	72	160
08:45 AM	4	0	18	0	22	1	60	14	12	87	1	0	0	2	3	6	12	2	0	20	132
09:00 AM	13	0	12	0	25	4	77	11	1	93	1	0	0	0	1	17	38	5	0	60	179
09:15 AM	9	0	17	0	26	3	67	12	4	86	1	0	0	3	4	9	40	5	0	54	170
Total Volume	39	0	56	0	95	9	253	49	21	332	3	0	0	5	8	50	138	18	0	206	641
% App. Total	41.1	0	58.9	0		2.7	76.2	14.8	6.3		37.5	0	0	62.5		24.3	67	8.7	0		
PHF	.750	.000	.778	.000	.913	.563	.821	.875	.438	.892	.750	.000	.000	.417	.500	.694	.719	.750	.000	.715	.895



File Name : #3 MTWERNERCIR&SKITIMESQ_AM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 1

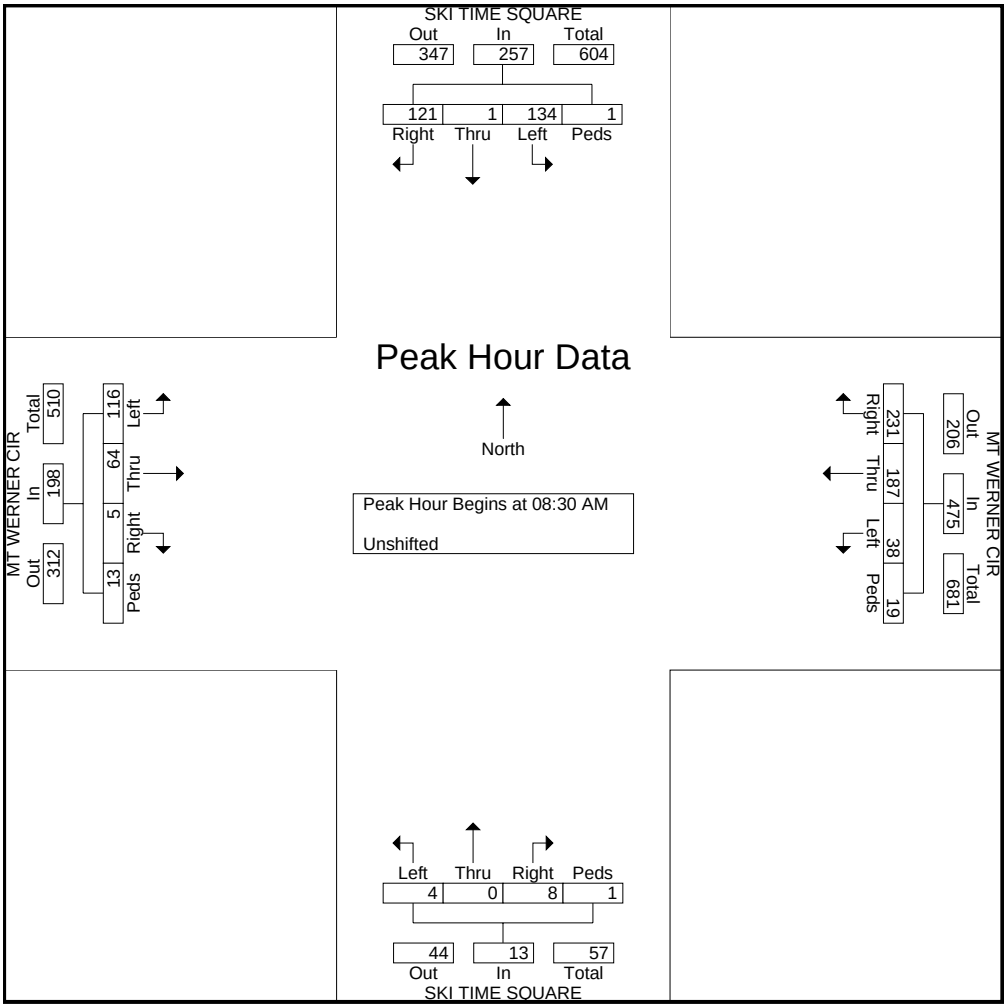
Groups Printed- Unshifted

	SKI TIME SQUARE Southbound				MT WERNER CIR Westbound				SKI TIME SQUARE Northbound				MT WERNER CIR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
08:00 AM	22	0	21	0	7	37	38	6	0	1	2	2	34	19	0	2	191
08:15 AM	25	2	24	0	12	42	54	0	1	1	1	0	30	13	1	2	208
08:30 AM	38	0	26	0	7	39	45	0	1	0	2	0	41	22	2	5	228
08:45 AM	33	1	24	1	14	47	62	7	0	0	1	1	12	5	1	5	214
Total	118	3	95	1	40	165	199	13	2	2	6	3	117	59	4	14	841
09:00 AM	29	0	33	0	12	57	58	1	3	0	2	0	30	22	0	1	248
09:15 AM	34	0	38	0	5	44	66	11	0	0	3	0	33	15	2	2	253
Grand Total	181	3	166	1	57	266	323	25	5	2	11	3	180	96	6	17	1342
Apprch %	51.6	0.9	47.3	0.3	8.5	39.6	48.1	3.7	23.8	9.5	52.4	14.3	60.2	32.1	2	5.7	
Total %	13.5	0.2	12.4	0.1	4.2	19.8	24.1	1.9	0.4	0.1	0.8	0.2	13.4	7.2	0.4	1.3	



File Name : #3 MTWERNERCIR&SKITIMESQ_AM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 2

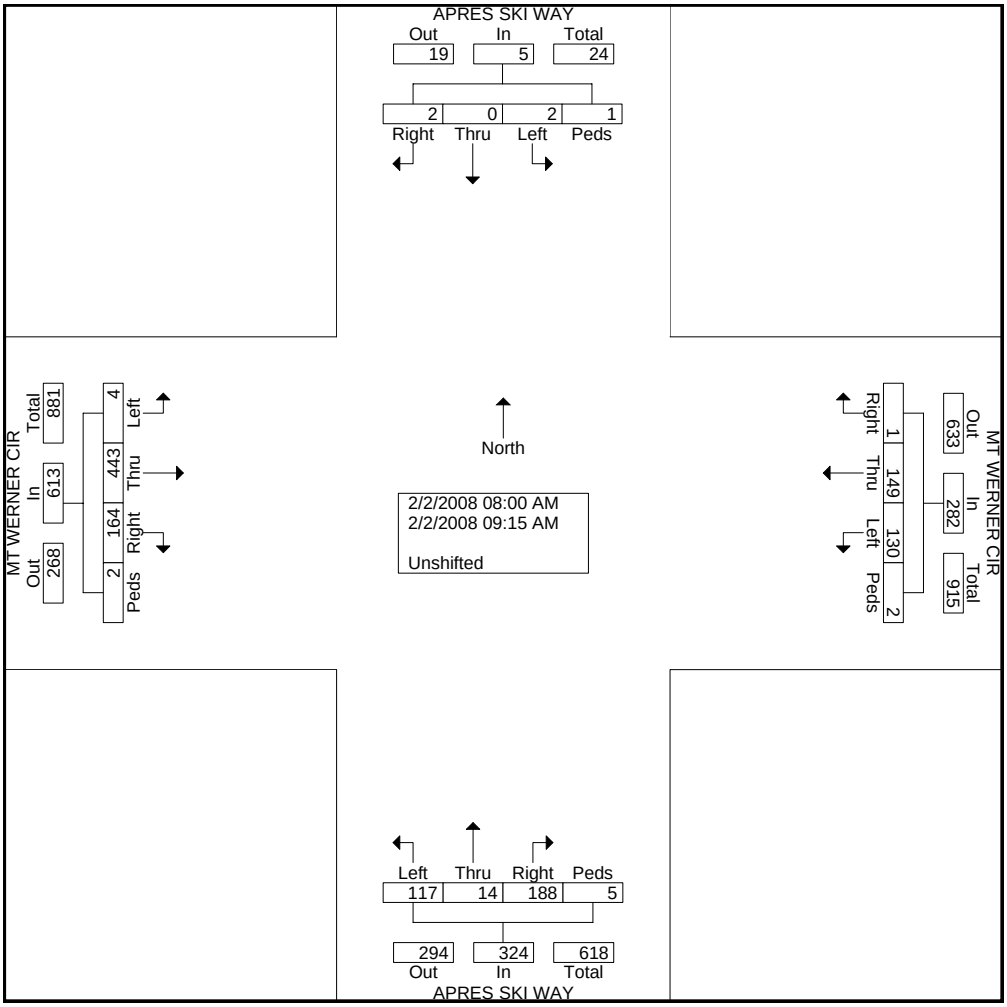
	SKI TIME SQUARE Southbound					MT WERNER CIR Westbound					SKI TIME SQUARE Northbound					MT WERNER CIR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 08:00 AM to 09:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:30 AM																					
08:30 AM	38	0	26	0	64	7	39	45	0	91	1	0	2	0	3	41	22	2	5	70	228
08:45 AM	33	1	24	1	59	14	47	62	7	130	0	0	1	1	2	12	5	1	5	23	214
09:00 AM	29	0	33	0	62	12	57	58	1	128	3	0	2	0	5	30	22	0	1	53	248
09:15 AM	34	0	38	0	72	5	44	66	11	126	0	0	3	0	3	33	15	2	2	52	253
Total Volume	134	1	121	1	257	38	187	231	19	475	4	0	8	1	13	116	64	5	13	198	943
% App. Total	52.1	0.4	47.1	0.4		8	39.4	48.6	4		30.8	0	61.5	7.7		58.6	32.3	2.5	6.6		
PHF	.882	.250	.796	.250	.892	.679	.820	.875	.432	.913	.333	.000	.667	.250	.650	.707	.727	.625	.650	.707	.932



File Name : #4 MTWERNERCIR&APRESSKIWAY_AM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 1

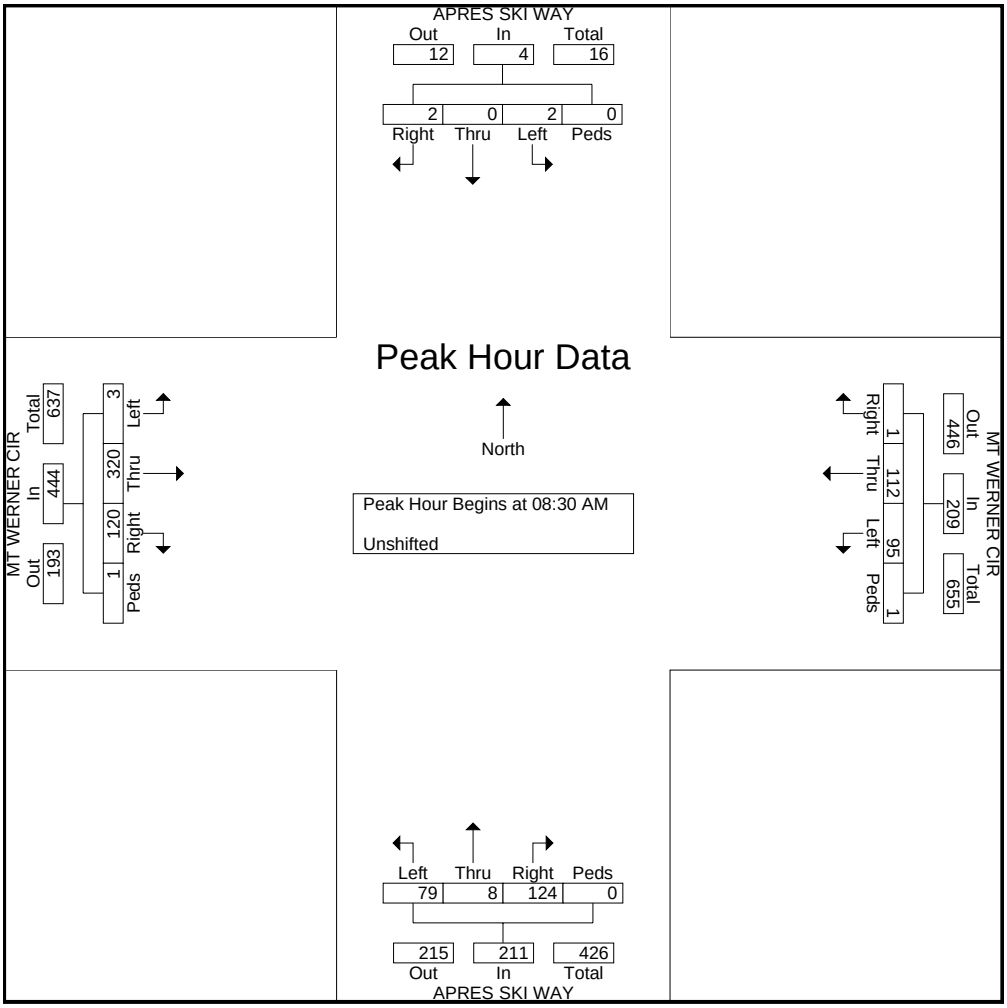
Groups Printed- Unshifted

	APRES SKI WAY Southbound				MT WERNER CIR Westbound				APRES SKI WAY Northbound				MT WERNER CIR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
08:00 AM	0	0	0	0	16	21	0	0	15	0	23	4	0	59	18	1	157
08:15 AM	0	0	0	1	19	16	0	1	23	6	41	1	1	64	26	0	199
08:30 AM	0	0	0	0	26	24	0	0	25	3	42	0	0	55	28	0	203
08:45 AM	0	0	0	0	18	26	0	1	14	3	29	0	2	126	34	1	254
Total	0	0	0	1	79	87	0	2	77	12	135	5	3	304	106	2	813
09:00 AM	0	0	0	0	27	30	0	0	18	1	22	0	1	70	27	0	196
09:15 AM	2	0	2	0	24	32	1	0	22	1	31	0	0	69	31	0	215
Grand Total	2	0	2	1	130	149	1	2	117	14	188	5	4	443	164	2	1224
Apprch %	40	0	40	20	46.1	52.8	0.4	0.7	36.1	4.3	58	1.5	0.7	72.3	26.8	0.3	
Total %	0.2	0	0.2	0.1	10.6	12.2	0.1	0.2	9.6	1.1	15.4	0.4	0.3	36.2	13.4	0.2	



File Name : #4 MTWERNERCIR&APRESSKIWAY_AM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 2

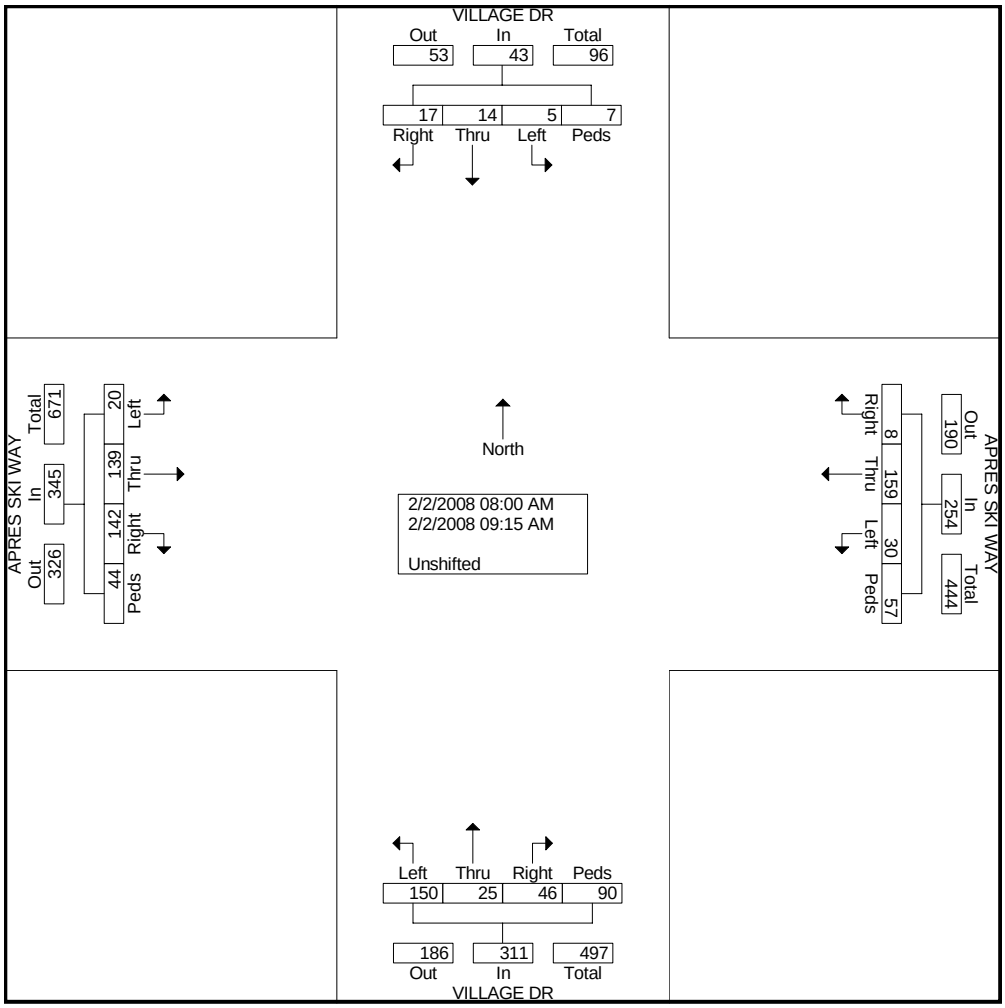
	APRES SKI WAY Southbound					MT WERNER CIR Westbound					APRES SKI WAY Northbound					MT WERNER CIR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 08:00 AM to 09:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:30 AM																					
08:30 AM	0	0	0	0	0	26	24	0	0	50	25	3	42	0	70	0	55	28	0	83	203
08:45 AM	0	0	0	0	0	18	26	0	1	45	14	3	29	0	46	2	126	34	1	163	254
09:00 AM	0	0	0	0	0	27	30	0	0	57	18	1	22	0	41	1	70	27	0	98	196
09:15 AM	2	0	2	0	4	24	32	1	0	57	22	1	31	0	54	0	69	31	0	100	215
Total Volume	2	0	2	0	4	95	112	1	1	209	79	8	124	0	211	3	320	120	1	444	868
% App. Total	50	0	50	0		45.5	53.6	0.5	0.5		37.4	3.8	58.8	0		0.7	72.1	27	0.2		
PHF	.250	.000	.250	.000	.250	.880	.875	.250	.250	.917	.790	.667	.738	.000	.754	.375	.635	.882	.250	.681	.854



File Name : #5 VILLAGE&APRESSKIWAY_AM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 1

Groups Printed- Unshifted

	VILLAGE DR Southbound				APRES SKI WAY Westbound				VILLAGE DR Northbound				APRES SKI WAY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
08:00 AM	0	1	0	2	6	25	1	14	13	2	5	11	0	23	17	3	123
08:15 AM	0	2	1	1	3	27	1	14	37	4	8	7	2	24	23	15	169
08:30 AM	2	1	4	1	4	32	1	5	33	4	10	15	3	27	21	9	172
08:45 AM	1	2	4	1	4	27	4	12	21	3	10	4	6	23	24	4	150
Total	3	6	9	5	17	111	7	45	104	13	33	37	11	97	85	31	614
09:00 AM	1	4	4	1	9	22	1	10	23	7	8	22	7	19	30	8	176
09:15 AM	1	4	4	1	4	26	0	2	23	5	5	31	2	23	27	5	163
Grand Total	5	14	17	7	30	159	8	57	150	25	46	90	20	139	142	44	953
Apprch %	11.6	32.6	39.5	16.3	11.8	62.6	3.1	22.4	48.2	8	14.8	28.9	5.8	40.3	41.2	12.8	
Total %	0.5	1.5	1.8	0.7	3.1	16.7	0.8	6	15.7	2.6	4.8	9.4	2.1	14.6	14.9	4.6	



File Name : #5 VILLAGE&APRESSKIWAY_AM
Site Code : 00000000
Start Date : 2/2/2008
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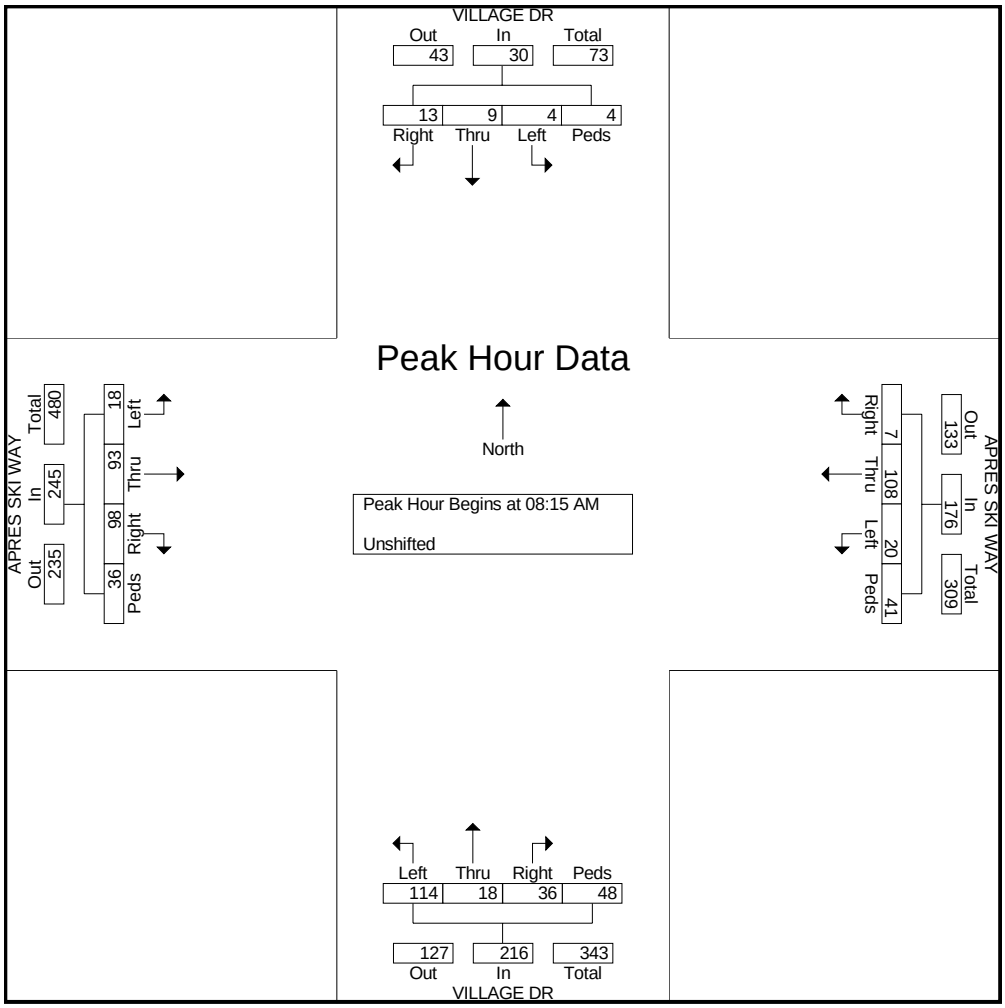
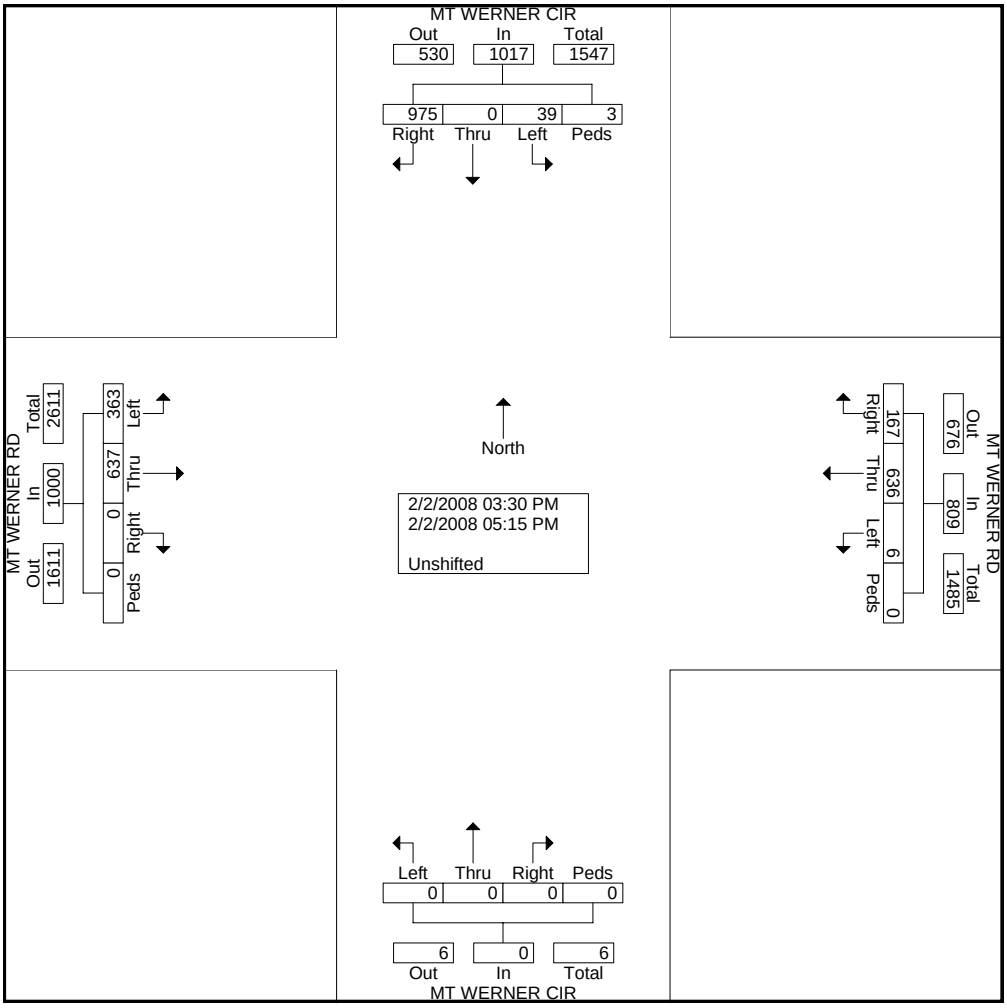
	VILLAGE DR Southbound					APRES SKI WAY Westbound					VILLAGE DR Northbound					APRES SKI WAY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 08:00 AM to 09:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:15 AM																					
08:15 AM	0	2	1	1	4	3	27	1	14	45	37	4	8	7	56	2	24	23	15	64	169
08:30 AM	2	1	4	1	8	4	32	1	5	42	33	4	10	15	62	3	27	21	9	60	172
08:45 AM	1	2	4	1	8	4	27	4	12	47	21	3	10	4	38	6	23	24	4	57	150
09:00 AM	1	4	4	1	10	9	22	1	10	42	23	7	8	22	60	7	19	30	8	64	176
Total Volume	4	9	13	4	30	20	108	7	41	176	114	18	36	48	216	18	93	98	36	245	667
% App. Total	13.3	30	43.3	13.3		11.4	61.4	4	23.3		52.8	8.3	16.7	22.2		7.3	38	40	14.7		
PHF	.500	.563	.813	1.000	.750	.556	.844	.438	.732	.936	.770	.643	.900	.545	.871	.643	.861	.817	.600	.957	.947



File Name : #1 MTWERNERCIR&MTWERNERRD_PM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 1

Groups Printed- Unshifted

	MT WERNER CIR Southbound				MT WERNER RD Westbound				MT WERNER CIR Northbound				MT WERNER RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	11	0	131	0	6	86	18	0	0	0	0	0	43	97	0	0	392
03:45 PM	2	0	105	0	0	81	25	0	0	0	0	0	48	72	0	0	333
Total	13	0	236	0	6	167	43	0	0	0	0	0	91	169	0	0	725
04:00 PM	3	0	124	1	0	73	33	0	0	0	0	0	40	87	0	0	361
04:15 PM	10	0	150	0	0	82	21	0	0	0	0	0	40	88	0	0	391
04:30 PM	4	0	131	0	0	86	24	0	0	0	0	0	50	75	0	0	370
04:45 PM	3	0	143	2	0	78	15	0	0	0	0	0	40	73	0	0	354
Total	20	0	548	3	0	319	93	0	0	0	0	0	170	323	0	0	1476
05:00 PM	3	0	117	0	0	74	19	0	0	0	0	0	41	75	0	0	329
05:15 PM	3	0	74	0	0	76	12	0	0	0	0	0	61	70	0	0	296
Grand Total	39	0	975	3	6	636	167	0	0	0	0	0	363	637	0	0	2826
Apprch %	3.8	0	95.9	0.3	0.7	78.6	20.6	0	0	0	0	0	36.3	63.7	0	0	
Total %	1.4	0	34.5	0.1	0.2	22.5	5.9	0	0	0	0	0	12.8	22.5	0	0	



File Name : #1 MTWERNERCIR&MTWERNERRD_PM
Site Code : 00000000
Start Date : 2/2/2008
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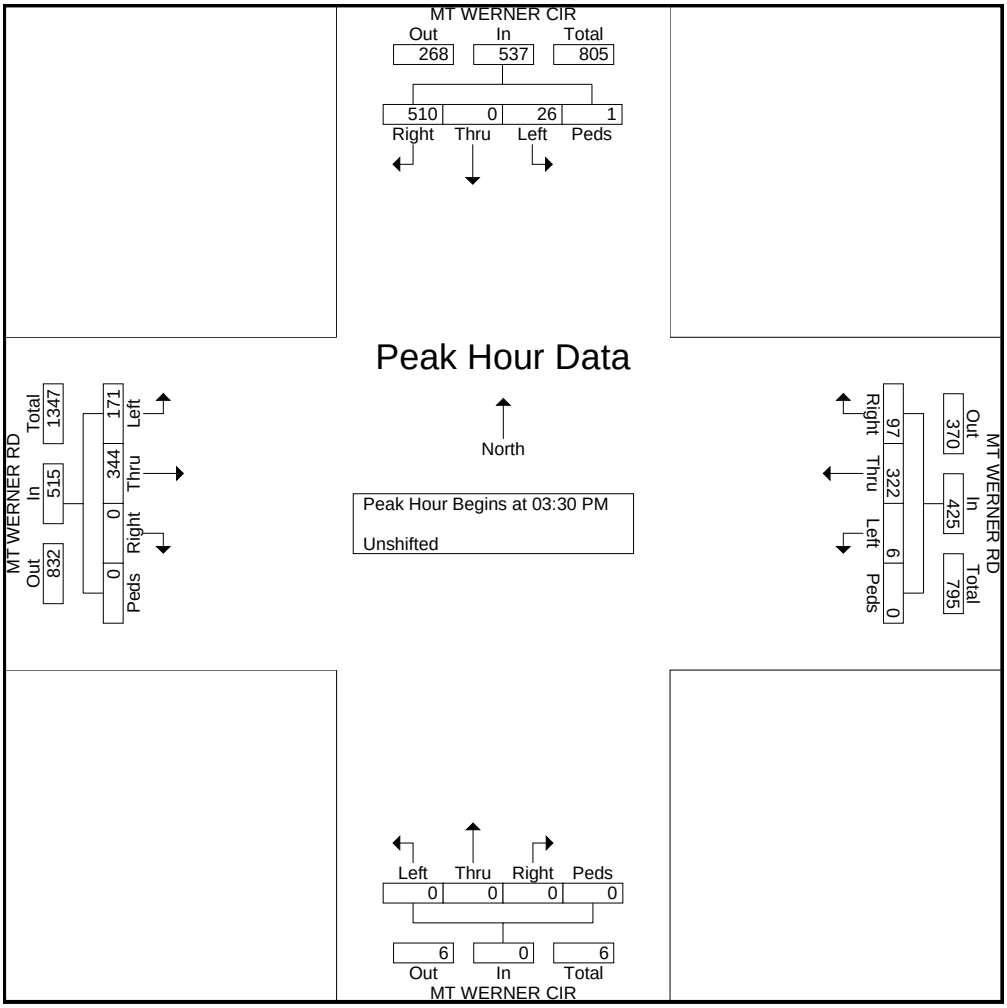
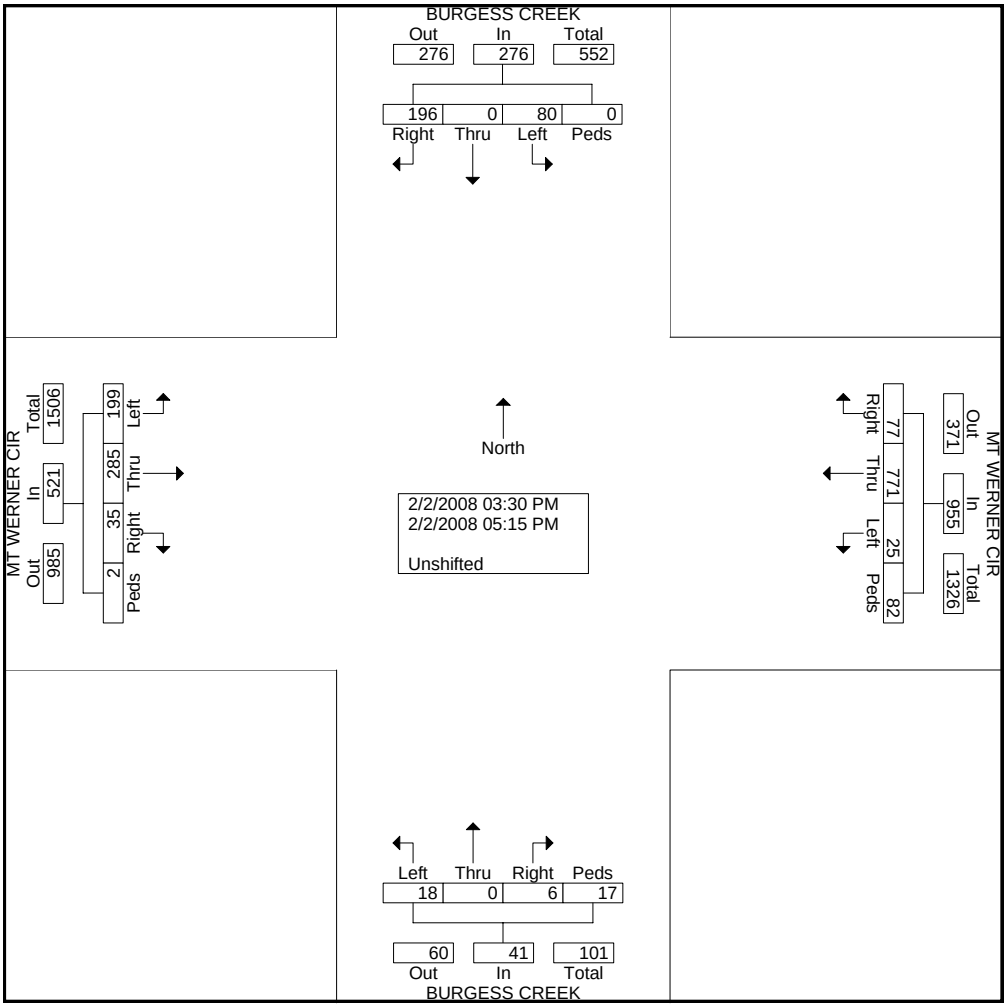
	MT WERNER CIR Southbound					MT WERNER RD Westbound					MT WERNER CIR Northbound					MT WERNER RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:30 PM																					
03:30 PM	11	0	131	0	142	6	86	18	0	110	0	0	0	0	0	43	97	0	0	140	392
03:45 PM	2	0	105	0	107	0	81	25	0	106	0	0	0	0	0	48	72	0	0	120	333
04:00 PM	3	0	124	1	128	0	73	33	0	106	0	0	0	0	0	40	87	0	0	127	361
04:15 PM	10	0	150	0	160	0	82	21	0	103	0	0	0	0	0	40	88	0	0	128	391
Total Volume	26	0	510	1	537	6	322	97	0	425	0	0	0	0	0	171	344	0	0	515	1477
% App. Total	4.8	0	95	0.2		1.4	75.8	22.8	0		0	0	0	0		33.2	66.8	0	0		
PHF	.591	.000	.850	.250	.839	.250	.936	.735	.000	.966	.000	.000	.000	.000	.000	.891	.887	.000	.000	.920	.942



File Name : #2 BURGESS&MTWERNER_PM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 1

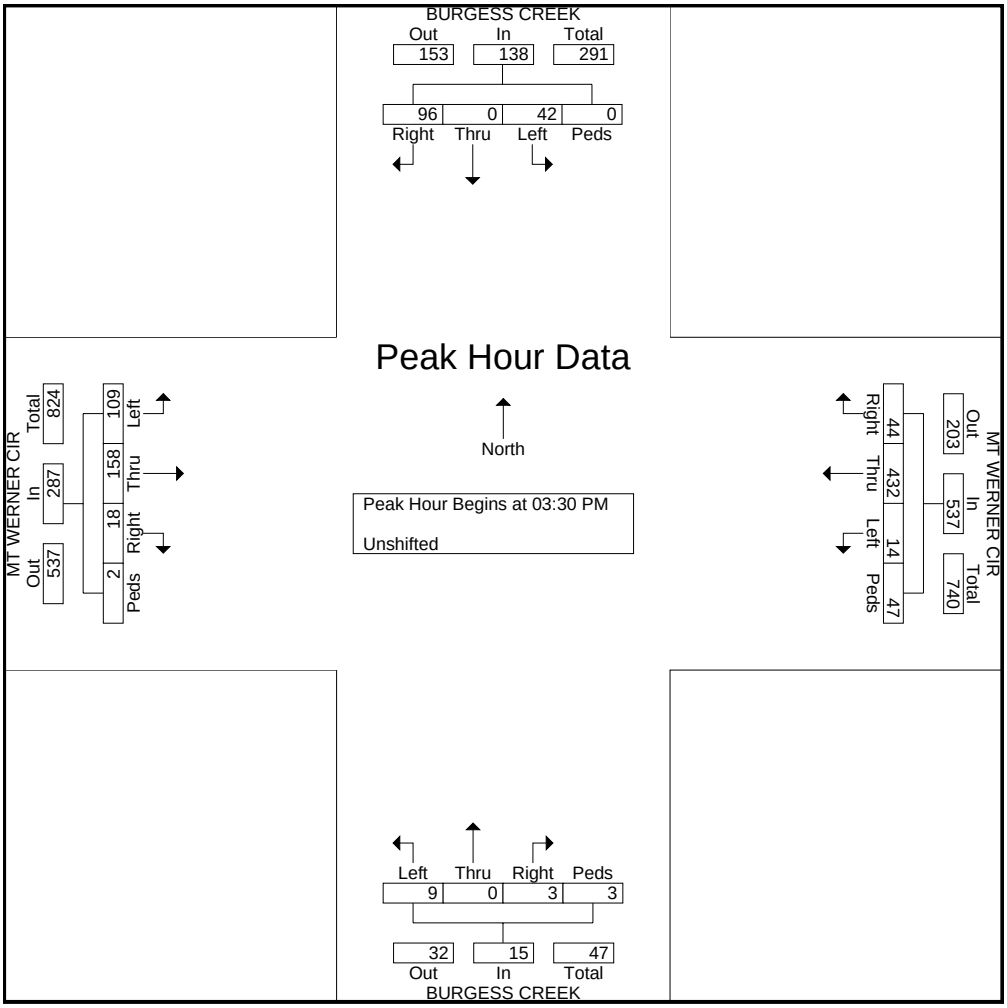
Groups Printed- Unshifted

	BURGESS CREEK Southbound				MT WERNER CIR Westbound				BURGESS CREEK Northbound				MT WERNER CIR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	10	0	24	0	2	119	13	5	4	0	0	0	25	34	2	1	239
03:45 PM	10	0	22	0	7	106	15	12	2	0	2	1	24	40	6	1	248
Total	20	0	46	0	9	225	28	17	6	0	2	1	49	74	8	2	487
04:00 PM	14	0	16	0	3	94	7	15	3	0	0	1	25	39	6	0	223
04:15 PM	8	0	34	0	2	113	9	15	0	0	1	1	35	45	4	0	267
04:30 PM	4	0	28	0	2	101	6	20	4	0	0	3	22	36	2	0	228
04:45 PM	13	0	28	0	2	89	11	7	2	0	0	5	21	32	6	0	216
Total	39	0	106	0	9	397	33	57	9	0	1	10	103	152	18	0	934
05:00 PM	8	0	28	0	5	88	10	5	1	0	2	5	20	21	6	0	199
05:15 PM	13	0	16	0	2	61	6	3	2	0	1	1	27	38	3	0	173
Grand Total	80	0	196	0	25	771	77	82	18	0	6	17	199	285	35	2	1793
Apprch %	29	0	71	0	2.6	80.7	8.1	8.6	43.9	0	14.6	41.5	38.2	54.7	6.7	0.4	
Total %	4.5	0	10.9	0	1.4	43	4.3	4.6	1	0	0.3	0.9	11.1	15.9	2	0.1	



File Name : #2 BURGESS&MTWERNER_PM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 2

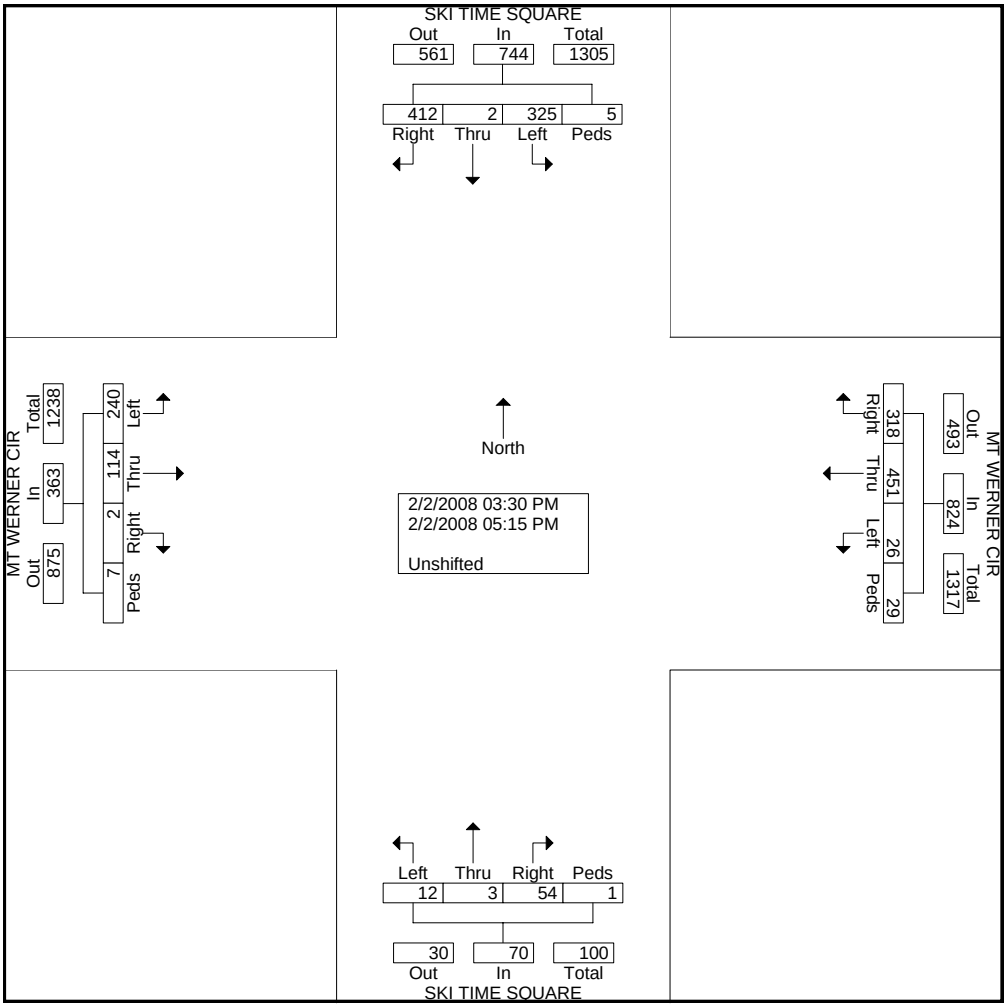
	BURGESS CREEK Southbound					MT WERNER CIR Westbound					BURGESS CREEK Northbound					MT WERNER CIR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:30 PM																					
03:30 PM	10	0	24	0	34	2	119	13	5	139	4	0	0	0	4	25	34	2	1	62	239
03:45 PM	10	0	22	0	32	7	106	15	12	140	2	0	2	1	5	24	40	6	1	71	248
04:00 PM	14	0	16	0	30	3	94	7	15	119	3	0	0	1	4	25	39	6	0	70	223
04:15 PM	8	0	34	0	42	2	113	9	15	139	0	0	1	1	2	35	45	4	0	84	267
Total Volume	42	0	96	0	138	14	432	44	47	537	9	0	3	3	15	109	158	18	2	287	977
% App. Total	30.4	0	69.6	0		2.6	80.4	8.2	8.8		60	0	20	20		38	55.1	6.3	0.7		
PHF	.750	.000	.706	.000	.821	.500	.908	.733	.783	.959	.563	.000	.375	.750	.750	.779	.878	.750	.500	.854	.915



File Name : #3 MTWERNERCIR&SKITIMESQ_PM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 1

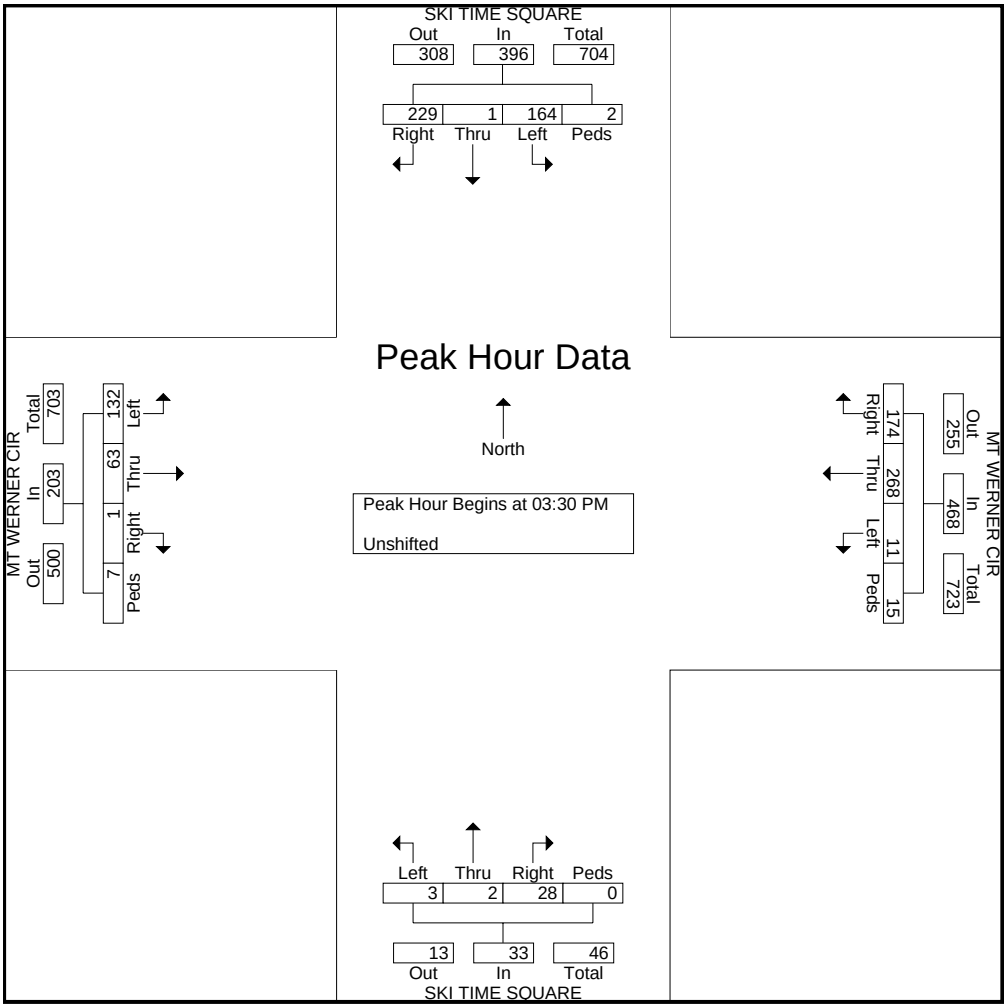
Groups Printed- Unshifted

	SKI TIME SQUARE Southbound				MT WERNER CIR Westbound				SKI TIME SQUARE Northbound				MT WERNER CIR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	37	1	62	2	1	96	33	4	0	1	8	0	35	17	0	3	300
03:45 PM	46	0	60	0	2	60	44	4	0	1	5	0	33	12	1	1	269
Total	83	1	122	2	3	156	77	8	0	2	13	0	68	29	1	4	569
04:00 PM	37	0	48	0	2	61	54	6	1	0	5	0	30	20	0	0	264
04:15 PM	44	0	59	0	6	51	43	1	2	0	10	0	34	14	0	3	267
04:30 PM	45	0	49	0	5	67	38	4	4	0	8	0	24	14	0	0	258
04:45 PM	43	0	51	0	7	42	41	8	1	0	4	0	29	19	0	0	245
Total	169	0	207	0	20	221	176	19	8	0	27	0	117	67	0	3	1034
05:00 PM	37	1	51	3	1	42	33	2	2	0	7	1	22	7	0	0	209
05:15 PM	36	0	32	0	2	32	32	0	2	1	7	0	33	11	1	0	189
Grand Total	325	2	412	5	26	451	318	29	12	3	54	1	240	114	2	7	2001
Apprch %	43.7	0.3	55.4	0.7	3.2	54.7	38.6	3.5	17.1	4.3	77.1	1.4	66.1	31.4	0.6	1.9	
Total %	16.2	0.1	20.6	0.2	1.3	22.5	15.9	1.4	0.6	0.1	2.7	0	12	5.7	0.1	0.3	



File Name : #3 MTWERNERCIR&SKITIMESQ_PM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 2

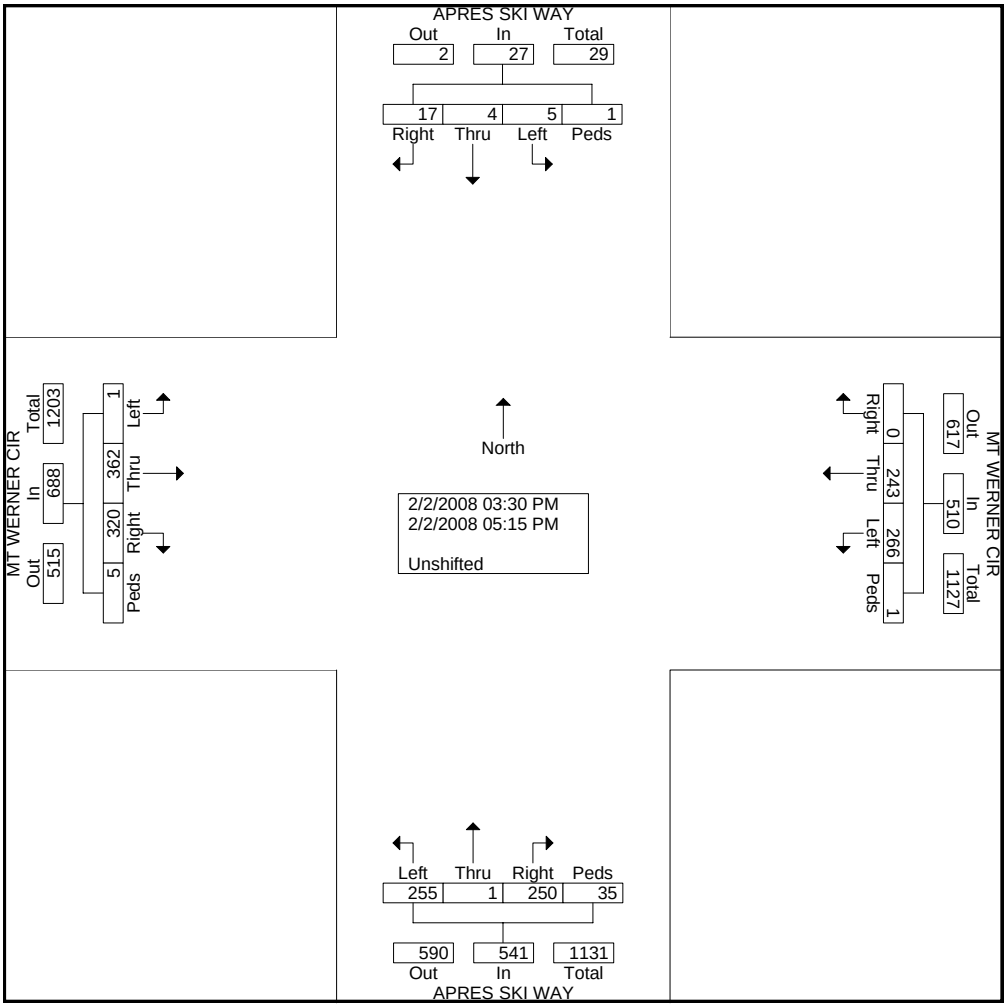
	SKI TIME SQUARE Southbound					MT WERNER CIR Westbound					SKI TIME SQUARE Northbound					MT WERNER CIR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:30 PM																					
03:30 PM	37	1	62	2	102	1	96	33	4	134	0	1	8	0	9	35	17	0	3	55	300
03:45 PM	46	0	60	0	106	2	60	44	4	110	0	1	5	0	6	33	12	1	1	47	269
04:00 PM	37	0	48	0	85	2	61	54	6	123	1	0	5	0	6	30	20	0	0	50	264
04:15 PM	44	0	59	0	103	6	51	43	1	101	2	0	10	0	12	34	14	0	3	51	267
Total Volume	164	1	229	2	396	11	268	174	15	468	3	2	28	0	33	132	63	1	7	203	1100
% App. Total	41.4	0.3	57.8	0.5		2.4	57.3	37.2	3.2		9.1	6.1	84.8	0		65	31	0.5	3.4		
PHF	.891	.250	.923	.250	.934	.458	.698	.806	.625	.873	.375	.500	.700	.000	.688	.943	.788	.250	.583	.923	.917



File Name : #4 MTWERNERCIR&APRESSKIWAY_PM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 1

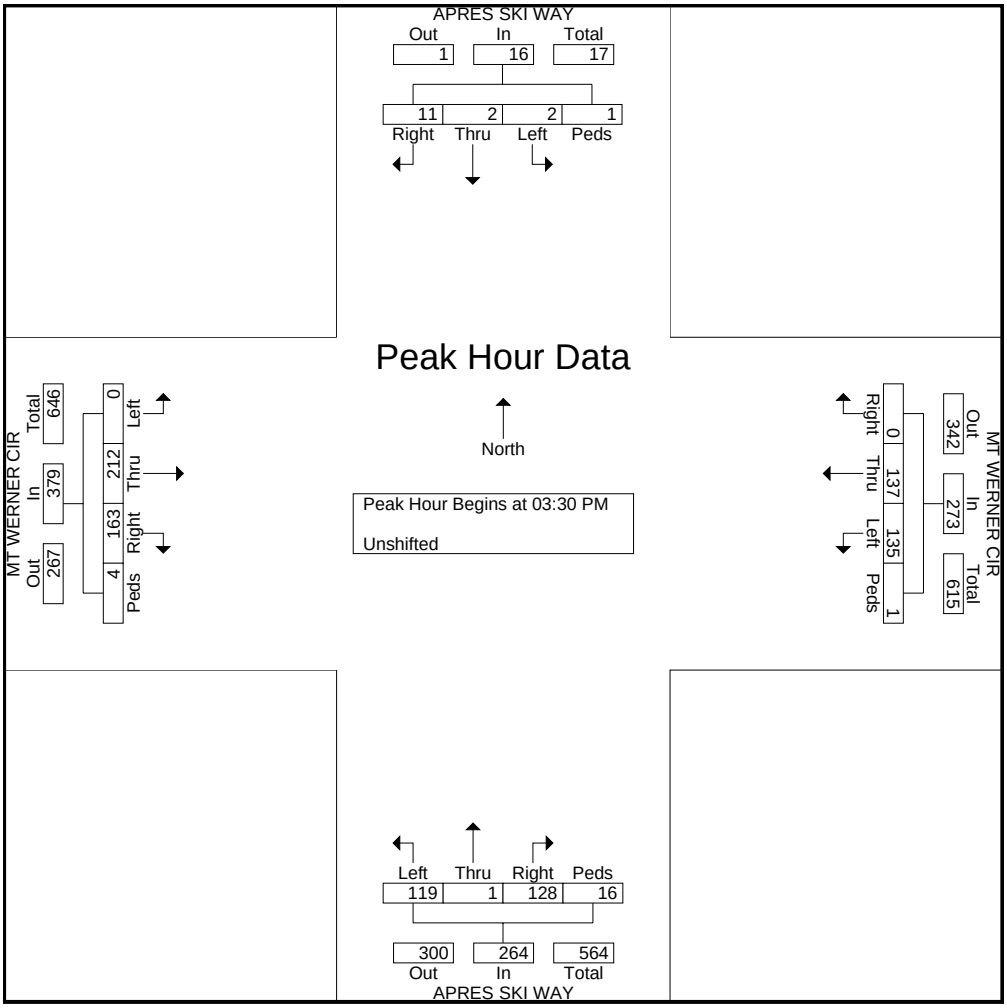
Groups Printed- Unshifted

	APRES SKI WAY Southbound				MT WERNER CIR Westbound				APRES SKI WAY Northbound				MT WERNER CIR Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	0	0	2	0	30	32	0	0	36	1	31	3	0	61	42	2	240
03:45 PM	1	1	2	1	28	31	0	1	30	0	34	5	0	51	39	0	224
Total	1	1	4	1	58	63	0	1	66	1	65	8	0	112	81	2	464
04:00 PM	1	0	5	0	43	29	0	0	17	0	36	6	0	52	42	0	231
04:15 PM	0	1	2	0	34	45	0	0	36	0	27	2	0	48	40	2	237
04:30 PM	0	1	0	0	41	34	0	0	31	0	36	7	0	50	38	1	239
04:45 PM	1	0	4	0	36	23	0	0	42	0	35	7	0	40	33	0	221
Total	2	2	11	0	154	131	0	0	126	0	134	22	0	190	153	3	928
05:00 PM	1	1	1	0	27	20	0	0	29	0	24	5	1	34	41	0	184
05:15 PM	1	0	1	0	27	29	0	0	34	0	27	0	0	26	45	0	190
Grand Total	5	4	17	1	266	243	0	1	255	1	250	35	1	362	320	5	1766
Apprch %	18.5	14.8	63	3.7	52.2	47.6	0	0.2	47.1	0.2	46.2	6.5	0.1	52.6	46.5	0.7	
Total %	0.3	0.2	1	0.1	15.1	13.8	0	0.1	14.4	0.1	14.2	2	0.1	20.5	18.1	0.3	



File Name : #4 MTWERNERCIR&APRESSKIWAY_PM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 2

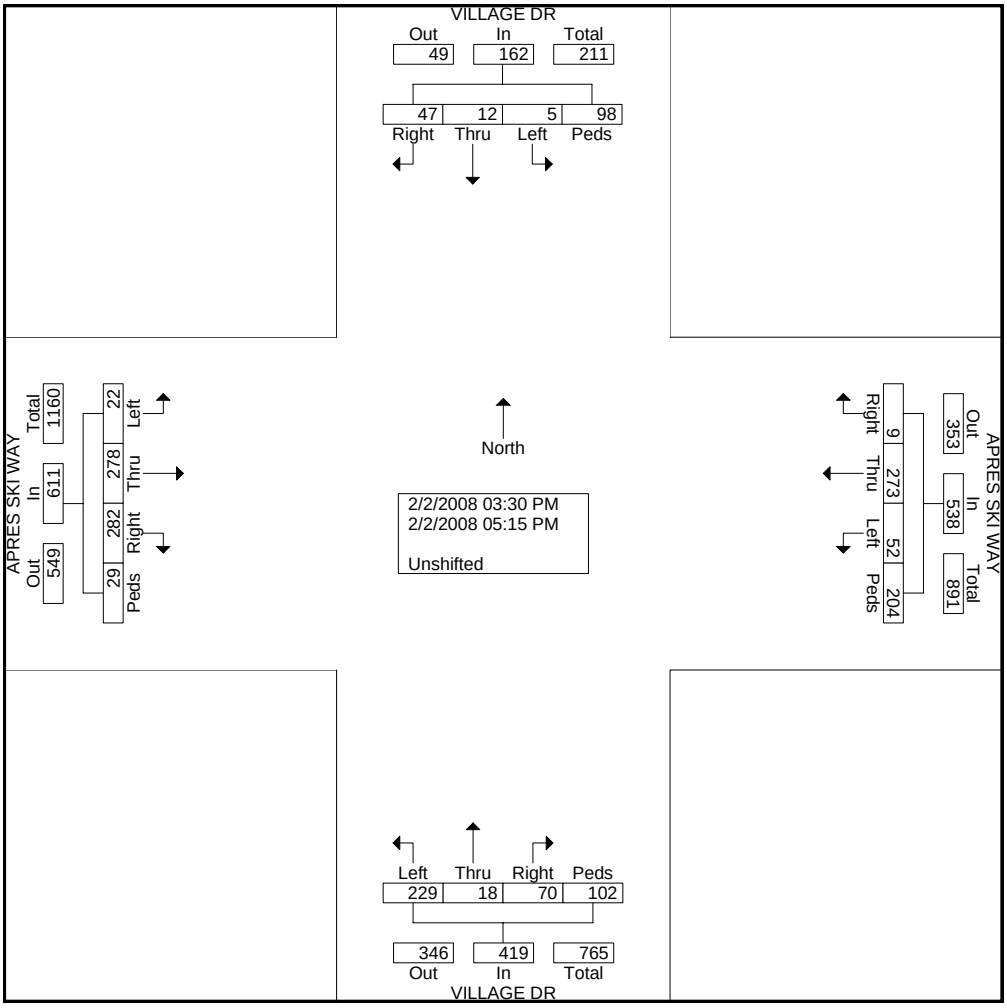
	APRES SKI WAY Southbound					MT WERNER CIR Westbound					APRES SKI WAY Northbound					MT WERNER CIR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:30 PM																					
03:30 PM	0	0	2	0	2	30	32	0	0	62	36	1	31	3	71	0	61	42	2	105	240
03:45 PM	1	1	2	1	5	28	31	0	1	60	30	0	34	5	69	0	51	39	0	90	224
04:00 PM	1	0	5	0	6	43	29	0	0	72	17	0	36	6	59	0	52	42	0	94	231
04:15 PM	0	1	2	0	3	34	45	0	0	79	36	0	27	2	65	0	48	40	2	90	237
Total Volume	2	2	11	1	16	135	137	0	1	273	119	1	128	16	264	0	212	163	4	379	932
% App. Total	12.5	12.5	68.8	6.2		49.5	50.2	0	0.4		45.1	0.4	48.5	6.1		0	55.9	43	1.1		
PHF	.500	.500	.550	.250	.667	.785	.761	.000	.250	.864	.826	.250	.889	.667	.930	.000	.869	.970	.500	.902	.971



File Name : #5 VILLAGE&APRESSKIWAY_PM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 1

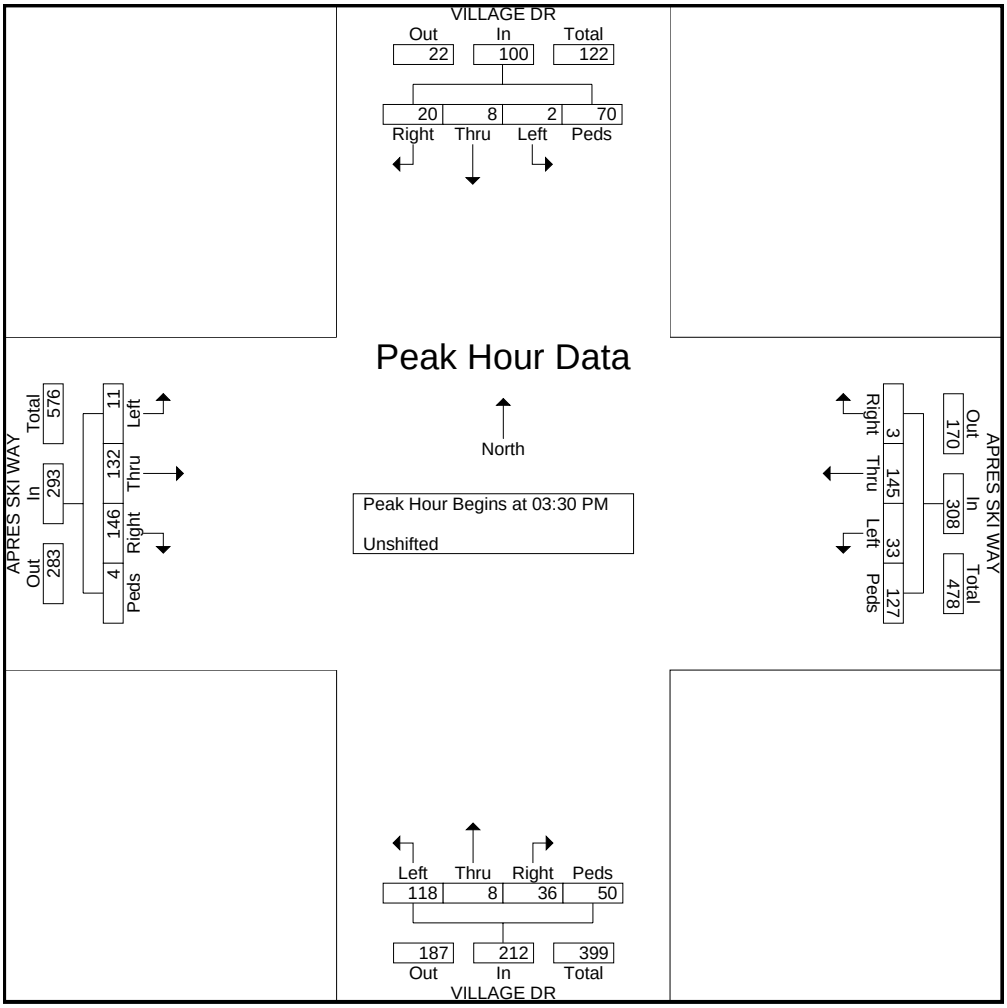
Groups Printed- Unshifted

	VILLAGE DR Southbound				APRES SKI WAY Westbound				VILLAGE DR Northbound				APRES SKI WAY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
03:30 PM	0	2	8	12	5	39	1	16	31	2	8	13	4	28	35	1	205
03:45 PM	1	4	6	28	9	35	0	42	29	5	13	8	2	35	29	1	247
Total	1	6	14	40	14	74	1	58	60	7	21	21	6	63	64	2	452
04:00 PM	0	1	3	23	8	29	1	31	29	1	9	9	2	36	42	2	226
04:15 PM	1	1	3	7	11	42	1	38	29	0	6	20	3	33	40	0	235
04:30 PM	1	0	6	9	7	33	0	14	26	3	8	14	4	41	32	0	198
04:45 PM	2	0	9	8	3	38	3	32	39	2	8	5	3	37	34	6	229
Total	4	2	21	47	29	142	5	115	123	6	31	48	12	147	148	8	888
05:00 PM	0	2	5	6	6	25	3	22	21	3	9	17	2	36	33	8	198
05:15 PM	0	2	7	5	3	32	0	9	25	2	9	16	2	32	37	11	192
Grand Total	5	12	47	98	52	273	9	204	229	18	70	102	22	278	282	29	1730
Apprch %	3.1	7.4	29	60.5	9.7	50.7	1.7	37.9	54.7	4.3	16.7	24.3	3.6	45.5	46.2	4.7	
Total %	0.3	0.7	2.7	5.7	3	15.8	0.5	11.8	13.2	1	4	5.9	1.3	16.1	16.3	1.7	



File Name : #5 VILLAGE&APRESSKIWAY_PM
Site Code : 00000000
Start Date : 2/2/2008
Page No : 2

	VILLAGE DR Southbound					APRES SKI WAY Westbound					VILLAGE DR Northbound					APRES SKI WAY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:30 PM																					
03:30 PM	0	2	8	12	22	5	39	1	16	61	31	2	8	13	54	4	28	35	1	68	205
03:45 PM	1	4	6	28	39	9	35	0	42	86	29	5	13	8	55	2	35	29	1	67	247
04:00 PM	0	1	3	23	27	8	29	1	31	69	29	1	9	9	48	2	36	42	2	82	226
04:15 PM	1	1	3	7	12	11	42	1	38	92	29	0	6	20	55	3	33	40	0	76	235
Total Volume	2	8	20	70	100	33	145	3	127	308	118	8	36	50	212	11	132	146	4	293	913
% App. Total	2	8	20	70		10.7	47.1	1	41.2		55.7	3.8	17	23.6		3.8	45.1	49.8	1.4		
PHF	.500	.500	.625	.625	.641	.750	.863	.750	.756	.837	.952	.400	.692	.625	.964	.688	.917	.869	.500	.893	.924

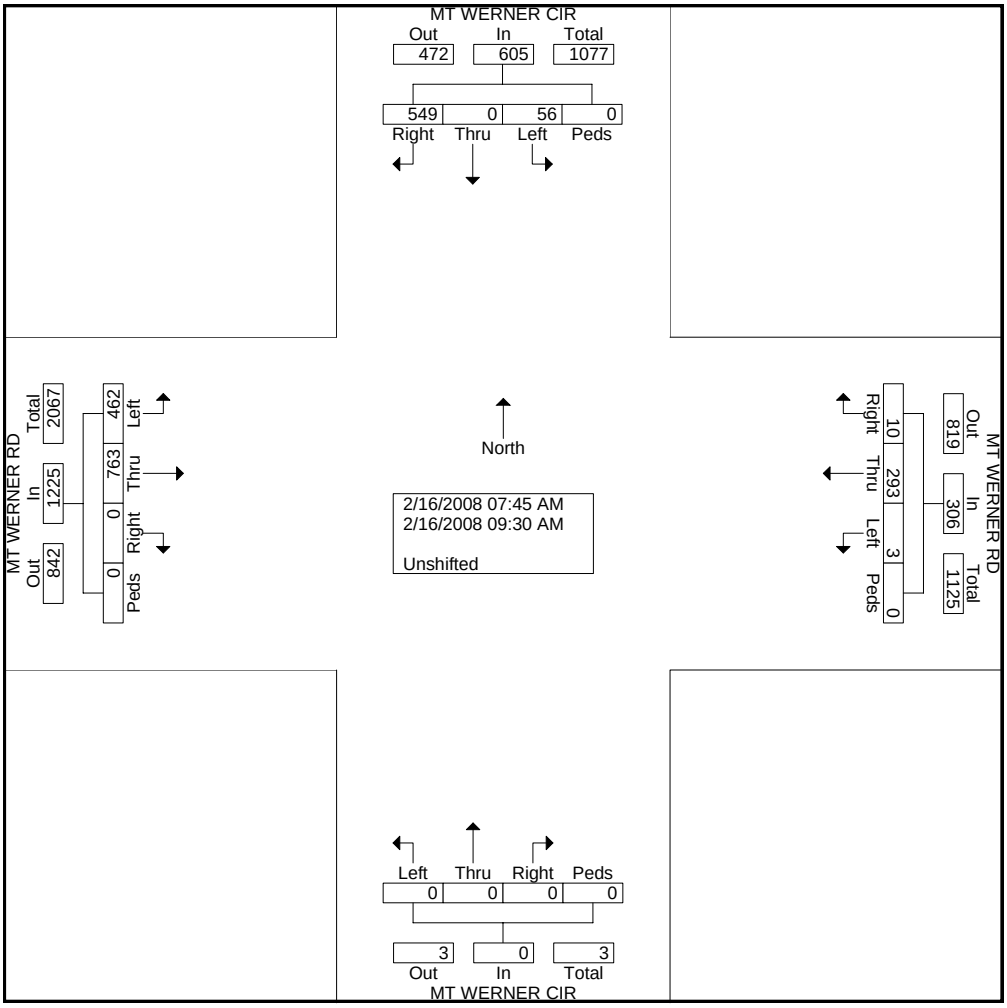


February 16, 2008 Counts
(Holiday Weekend)

File Name : AM_2085 MTWERNERCIR&MTWERNERRD
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

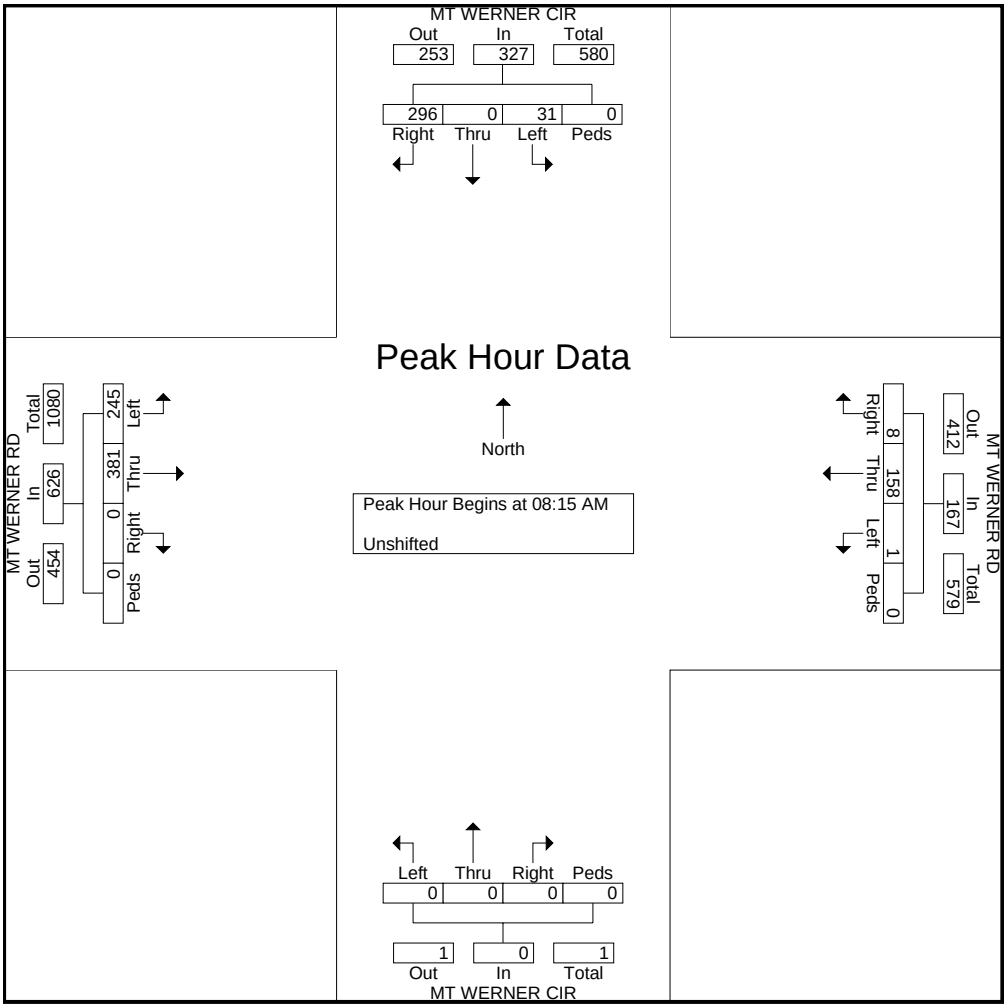
Groups Printed- Unshifted

	MT WERNER CIR Southbound				MT WERNER RD Westbound				MT WERNER CIR Northbound				MT WERNER RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:45 AM	3	0	29	0	0	29	1	0	0	0	0	0	48	90	0	0	200
Total	3	0	29	0	0	29	1	0	0	0	0	0	48	90	0	0	200
08:00 AM	2	0	39	0	0	23	0	0	0	0	0	0	55	106	0	0	225
08:15 AM	9	0	73	0	0	38	2	0	0	0	0	0	73	87	0	0	282
08:30 AM	5	0	64	0	0	37	0	0	0	0	0	0	57	100	0	0	263
08:45 AM	11	0	73	0	1	42	3	0	0	0	0	0	68	97	0	0	295
Total	27	0	249	0	1	140	5	0	0	0	0	0	253	390	0	0	1065
09:00 AM	6	0	86	0	0	41	3	0	0	0	0	0	47	97	0	0	280
09:15 AM	11	0	97	0	2	35	1	0	0	0	0	0	56	92	0	0	294
09:30 AM	9	0	88	0	0	48	0	0	0	0	0	0	58	94	0	0	297
Grand Total	56	0	549	0	3	293	10	0	0	0	0	0	462	763	0	0	2136
Apprch %	9.3	0	90.7	0	1	95.8	3.3	0	0	0	0	0	37.7	62.3	0	0	
Total %	2.6	0	25.7	0	0.1	13.7	0.5	0	0	0	0	0	21.6	35.7	0	0	



File Name : AM_2085 MTWERNERCIR&MTWERNERRD
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

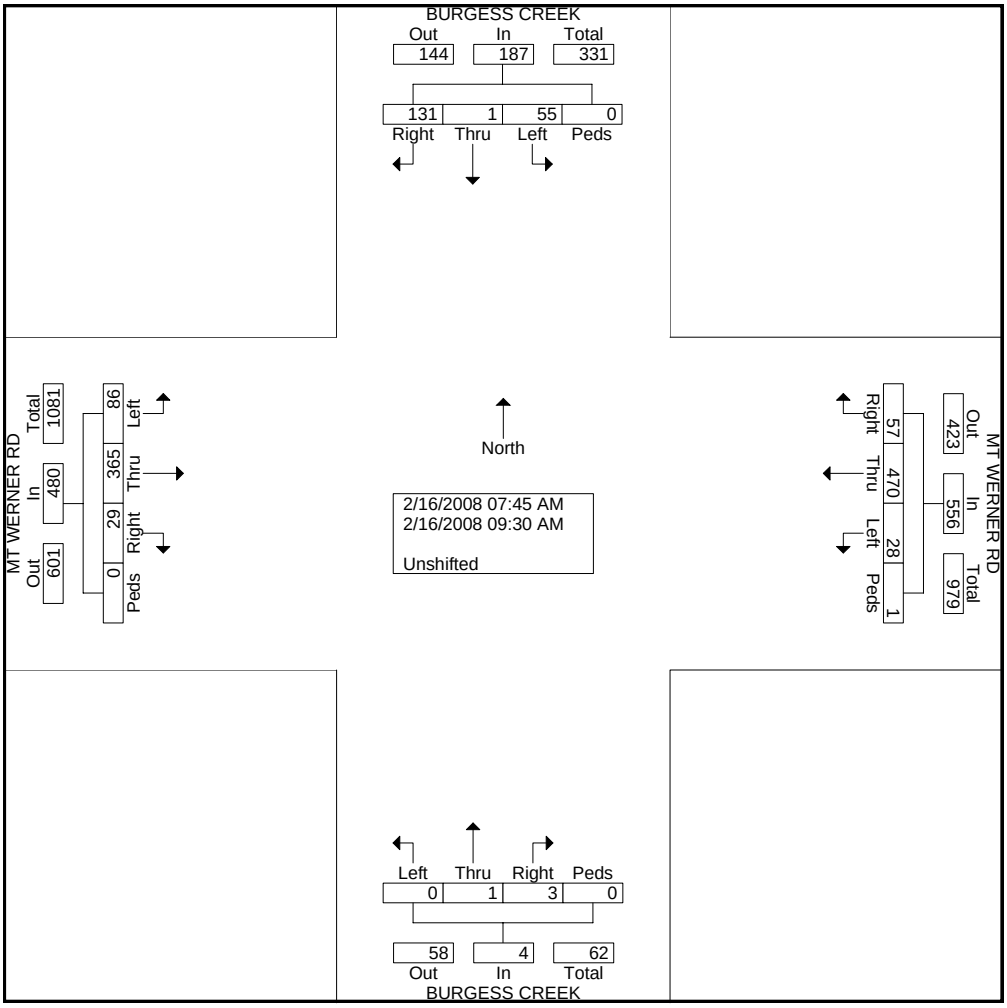
	MT WERNER CIR Southbound					MT WERNER RD Westbound					MT WERNER CIR Northbound					MT WERNER RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 09:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:15 AM																					
08:15 AM	9	0	73	0	82	0	38	2	0	40	0	0	0	0	0	73	87	0	0	160	282
08:30 AM	5	0	64	0	69	0	37	0	0	37	0	0	0	0	0	57	100	0	0	157	263
08:45 AM	11	0	73	0	84	1	42	3	0	46	0	0	0	0	0	68	97	0	0	165	295
09:00 AM	6	0	86	0	92	0	41	3	0	44	0	0	0	0	0	47	97	0	0	144	280
Total Volume	31	0	296	0	327	1	158	8	0	167	0	0	0	0	0	245	381	0	0	626	1120
% App. Total	9.5	0	90.5	0		0.6	94.6	4.8	0		0	0	0	0		39.1	60.9	0	0		
PHF	.705	.000	.860	.000	.889	.250	.940	.667	.000	.908	.000	.000	.000	.000	.000	.839	.953	.000	.000	.948	.949



File Name : AM_2086 BURGESS&MTWERNERCIR
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

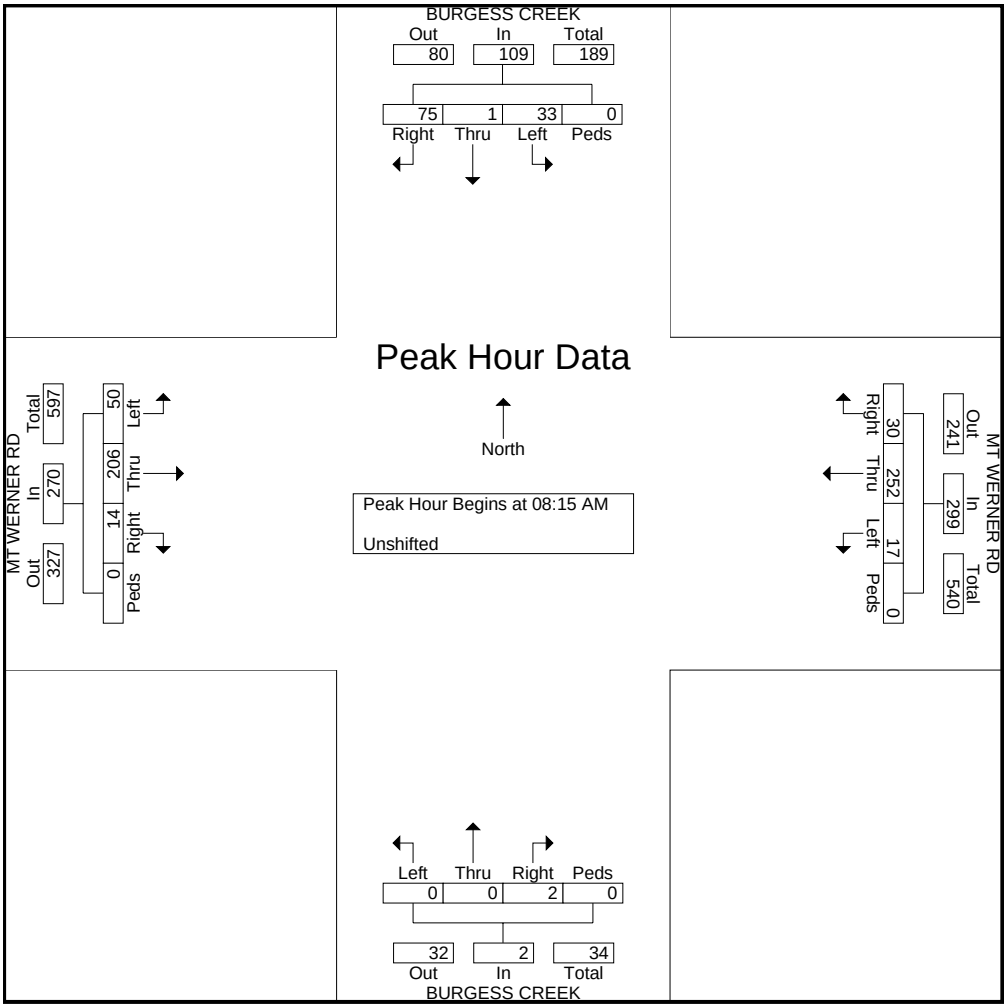
Groups Printed- Unshifted

	BURGESS CREEK Southbound				MT WERNER RD Westbound				BURGESS CREEK Northbound				MT WERNER RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:45 AM	5	0	8	0	3	28	4	1	0	1	0	0	10	31	2	0	93
Total	5	0	8	0	3	28	4	1	0	1	0	0	10	31	2	0	93
08:00 AM	4	0	5	0	3	36	4	0	0	0	0	0	12	47	3	0	114
08:15 AM	7	1	22	0	4	60	7	0	0	0	0	0	15	51	5	0	172
08:30 AM	6	0	20	0	5	49	6	0	0	0	0	0	11	50	2	0	149
08:45 AM	13	0	14	0	4	70	12	0	0	0	0	0	13	52	4	0	182
Total	30	1	61	0	16	215	29	0	0	0	0	0	51	200	14	0	617
09:00 AM	7	0	19	0	4	73	5	0	0	0	2	0	11	53	3	0	177
09:15 AM	7	0	25	0	2	83	8	0	0	0	0	0	12	40	4	0	181
09:30 AM	6	0	18	0	3	71	11	0	0	0	1	0	2	41	6	0	159
Grand Total	55	1	131	0	28	470	57	1	0	1	3	0	86	365	29	0	1227
Apprch %	29.4	0.5	70.1	0	5	84.5	10.3	0.2	0	25	75	0	17.9	76	6	0	
Total %	4.5	0.1	10.7	0	2.3	38.3	4.6	0.1	0	0.1	0.2	0	7	29.7	2.4	0	



File Name : AM_2086 BURGESS&MTWERNERCIR
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

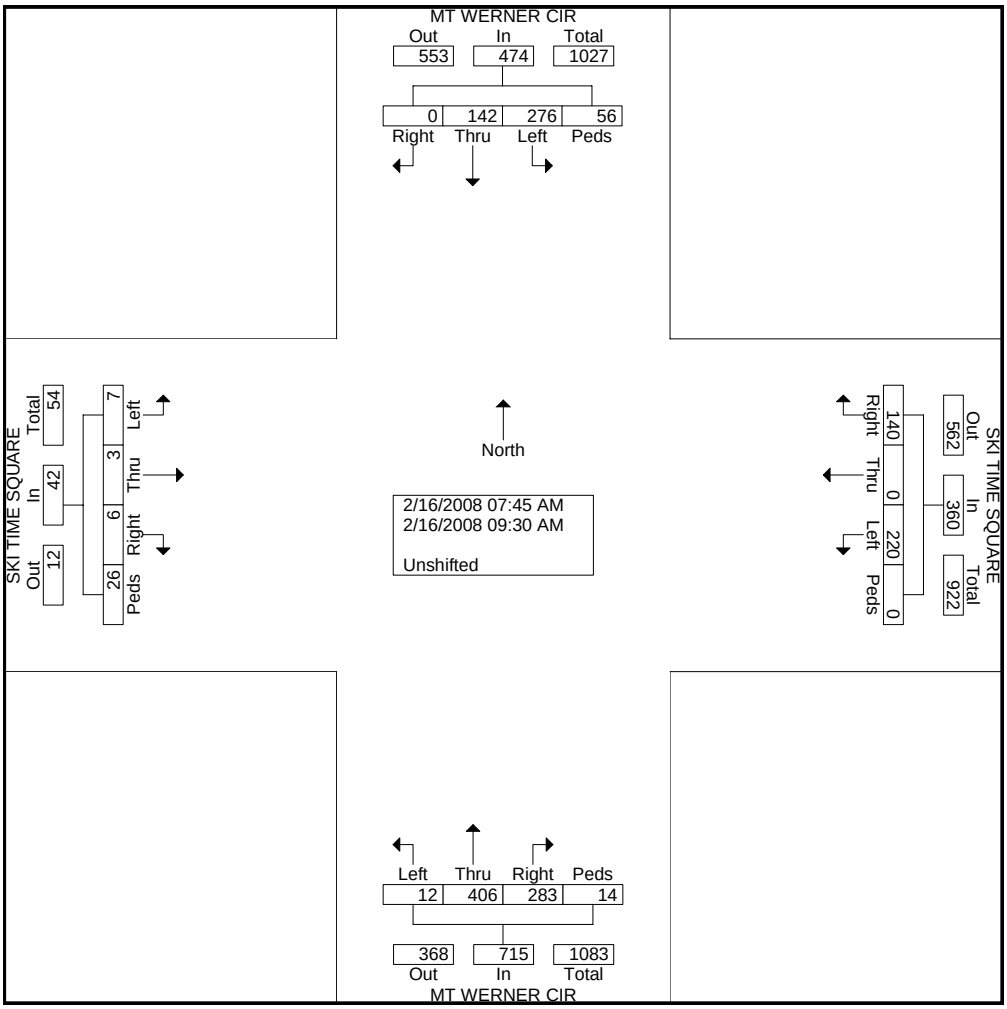
	BURGESS CREEK Southbound					MT WERNER RD Westbound					BURGESS CREEK Northbound					MT WERNER RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 09:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:15 AM																					
08:15 AM	7	1	22	0	30	4	60	7	0	71	0	0	0	0	0	15	51	5	0	71	172
08:30 AM	6	0	20	0	26	5	49	6	0	60	0	0	0	0	0	11	50	2	0	63	149
08:45 AM	13	0	14	0	27	4	70	12	0	86	0	0	0	0	0	13	52	4	0	69	182
09:00 AM	7	0	19	0	26	4	73	5	0	82	0	0	2	0	2	11	53	3	0	67	177
Total Volume	33	1	75	0	109	17	252	30	0	299	0	0	2	0	2	50	206	14	0	270	680
% App. Total	30.3	0.9	68.8	0		5.7	84.3	10	0		0	0	100	0		18.5	76.3	5.2	0		
PHF	.635	.250	.852	.000	.908	.850	.863	.625	.000	.869	.000	.000	.250	.000	.250	.833	.972	.700	.000	.951	.934



File Name : AM_2087 MTWERNERCIR&SKITIME
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

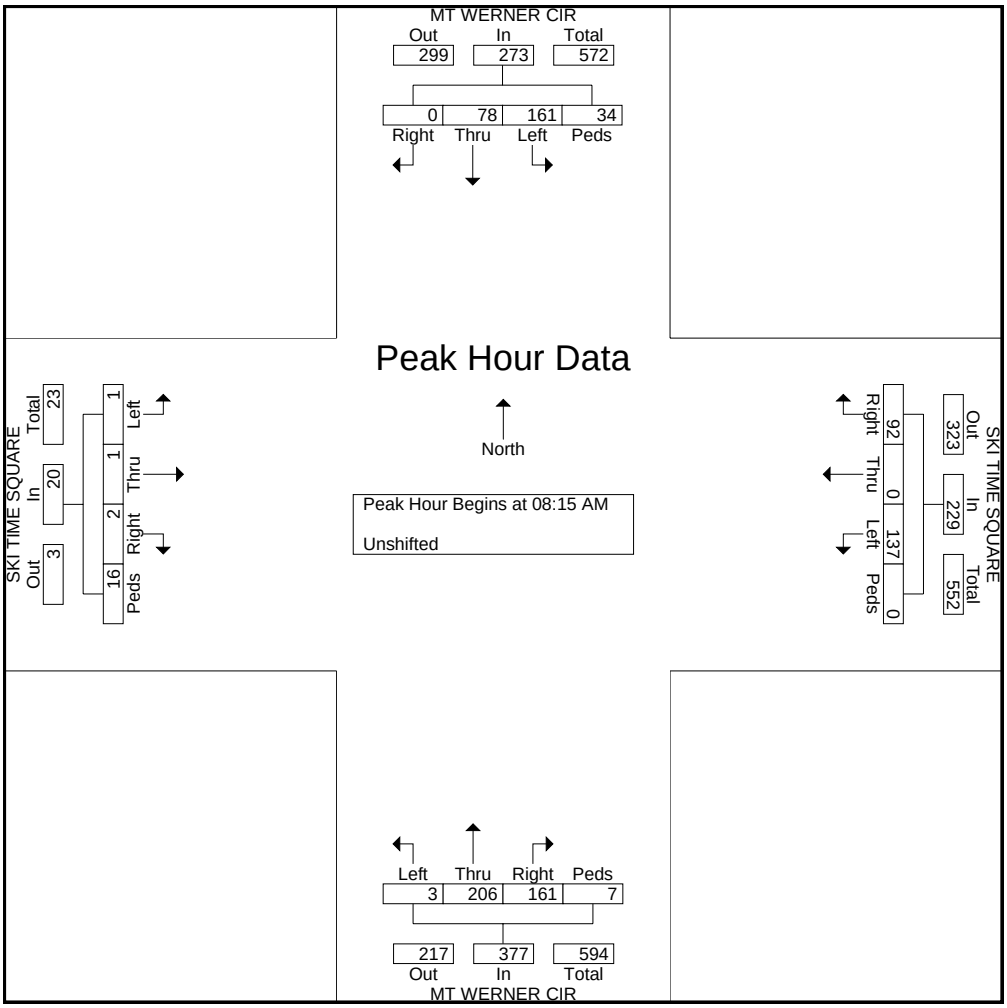
Groups Printed- Unshifted

	MT WERNER CIR Southbound				SKI TIME SQUARE Westbound				MT WERNER CIR Northbound				SKI TIME SQUARE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:45 AM	25	9	0	8	11	0	8	0	4	23	24	0	3	2	0	4	121
Total	25	9	0	8	11	0	8	0	4	23	24	0	3	2	0	4	121
08:00 AM	37	14	0	8	16	0	9	0	4	33	29	0	0	0	1	2	153
08:15 AM	43	15	0	8	24	0	33	0	1	38	39	1	1	0	1	1	205
08:30 AM	38	19	0	13	28	0	13	0	0	47	41	1	0	0	0	8	208
08:45 AM	45	19	0	7	35	0	14	0	1	71	37	3	0	1	0	4	237
Total	163	67	0	36	103	0	69	0	6	189	146	5	1	1	2	15	803
09:00 AM	35	25	0	6	50	0	32	0	1	50	44	2	0	0	1	3	249
09:15 AM	26	21	0	5	30	0	18	0	1	74	35	5	1	0	1	2	219
09:30 AM	27	20	0	1	26	0	13	0	0	70	34	2	2	0	2	2	199
Grand Total	276	142	0	56	220	0	140	0	12	406	283	14	7	3	6	26	1591
Apprch %	58.2	30	0	11.8	61.1	0	38.9	0	1.7	56.8	39.6	2	16.7	7.1	14.3	61.9	
Total %	17.3	8.9	0	3.5	13.8	0	8.8	0	0.8	25.5	17.8	0.9	0.4	0.2	0.4	1.6	



File Name : AM_2087 MTWERNERCIR&SKITIME
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

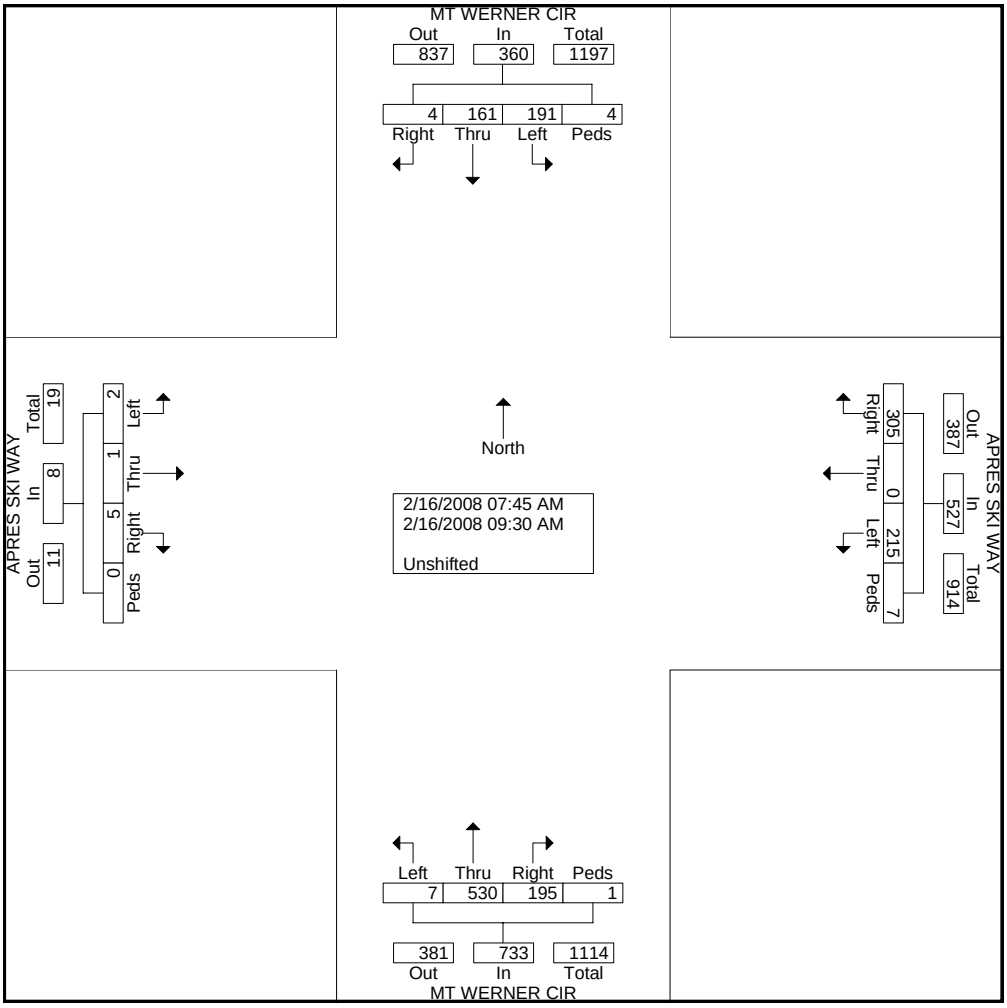
	MT WERNER CIR Southbound					SKI TIME SQUARE Westbound					MT WERNER CIR Northbound					SKI TIME SQUARE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 09:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:15 AM																					
08:15 AM	43	15	0	8	66	24	0	**33**	**0**	**57**	**1**	**38**	**39**	**1**	**79**	**1**	**0**	**1**	**1**	**3**	**205**
08:30 AM	**38**	**19**	**0**	**13**	**70**	**28**	**0**	**13**	**0**	**41**	**0**	**47**	**41**	**1**	**89**	**0**	**0**	**0**	**8**	**8**	
08:45 AM	**45**	**19**	**0**	**7**	**71**	35	0	14	0	49	1	**71**	37	**3**	**112**	0	**1**	0	4	5	237
09:00 AM	35	**25**	0	6	66	**50**	**0**	**32**	**0**	**82**	1	50	**44**	**2**	**97**	**0**	**0**	**1**	**3**	**4**	**249**
Total Volume	161	78	0	34	273	137	0	92	0	229	3	206	161	7	377	1	1	2	16	20	899
% App. Total	59	28.6	0	12.5		59.8	0	40.2	0		0.8	54.6	42.7	1.9		5	5	10	80		
PHF	.894	.780	.000	.654	.961	.685	.000	.697	.000	.698	.750	.725	.915	.583	.842	.250	.250	.500	.500	.625	.903



File Name : AM_2088 MTWERNERCIR&APRESSKI
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

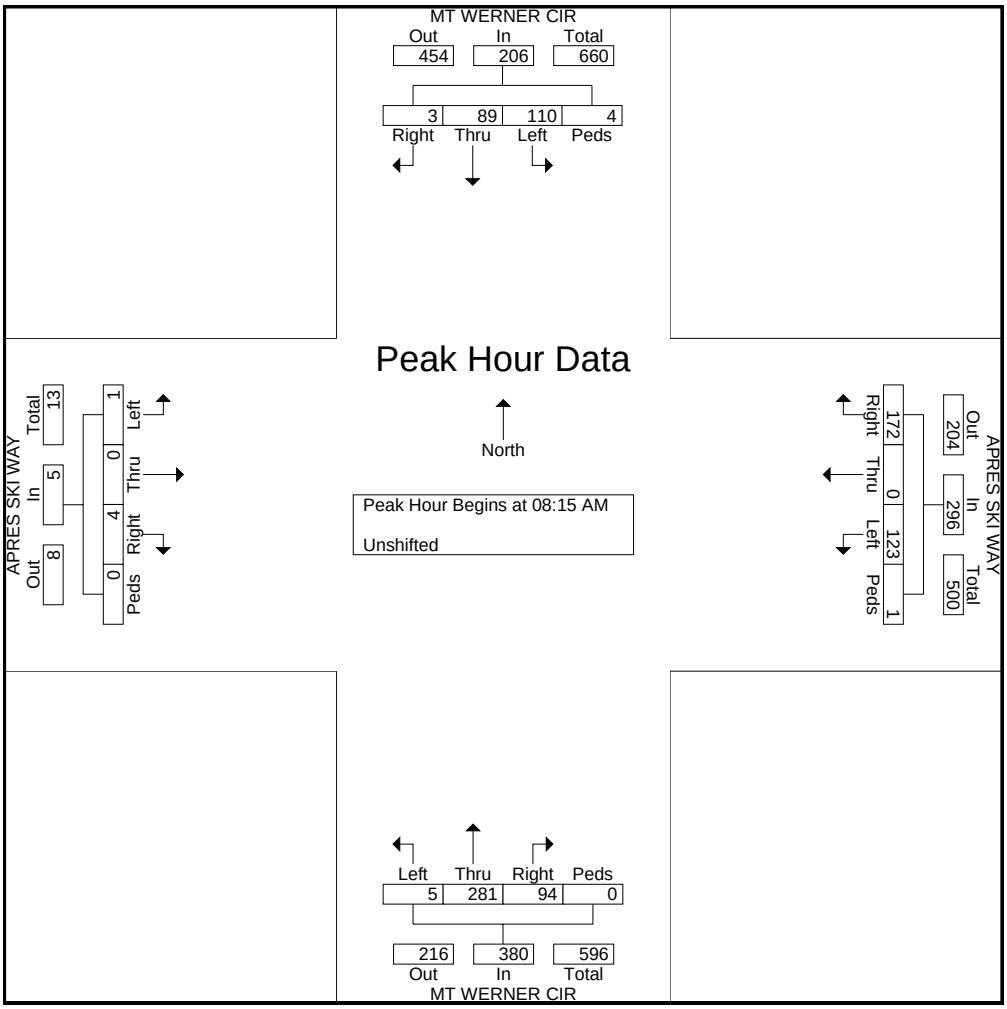
Groups Printed- Unshifted

	MT WERNER CIR Southbound				APRES SKI WAY Westbound				MT WERNER CIR Northbound				APRES SKI WAY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:45 AM	16	13	0	0	30	0	28	2	0	34	25	0	0	1	0	0	149
Total	16	13	0	0	30	0	28	2	0	34	25	0	0	1	0	0	149
08:00 AM	16	12	1	0	13	0	32	4	2	59	30	0	0	0	0	0	169
08:15 AM	23	26	2	0	32	0	38	0	2	56	22	0	1	0	1	0	203
08:30 AM	30	17	1	0	26	0	55	1	0	64	22	0	0	0	1	0	217
08:45 AM	24	20	0	0	35	0	30	0	2	92	26	0	0	0	1	0	230
Total	93	75	4	0	106	0	155	5	6	271	100	0	1	0	3	0	819
09:00 AM	33	26	0	4	30	0	49	0	1	69	24	0	0	0	1	0	237
09:15 AM	21	28	0	0	23	0	44	0	0	73	28	1	0	0	0	0	218
09:30 AM	28	19	0	0	26	0	29	0	0	83	18	0	1	0	1	0	205
Grand Total	191	161	4	4	215	0	305	7	7	530	195	1	2	1	5	0	1628
Apprch %	53.1	44.7	1.1	1.1	40.8	0	57.9	1.3	1	72.3	26.6	0.1	25	12.5	62.5	0	
Total %	11.7	9.9	0.2	0.2	13.2	0	18.7	0.4	0.4	32.6	12	0.1	0.1	0.1	0.3	0	



File Name : AM_2088 MTWERNERCIR&APRESSKI
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

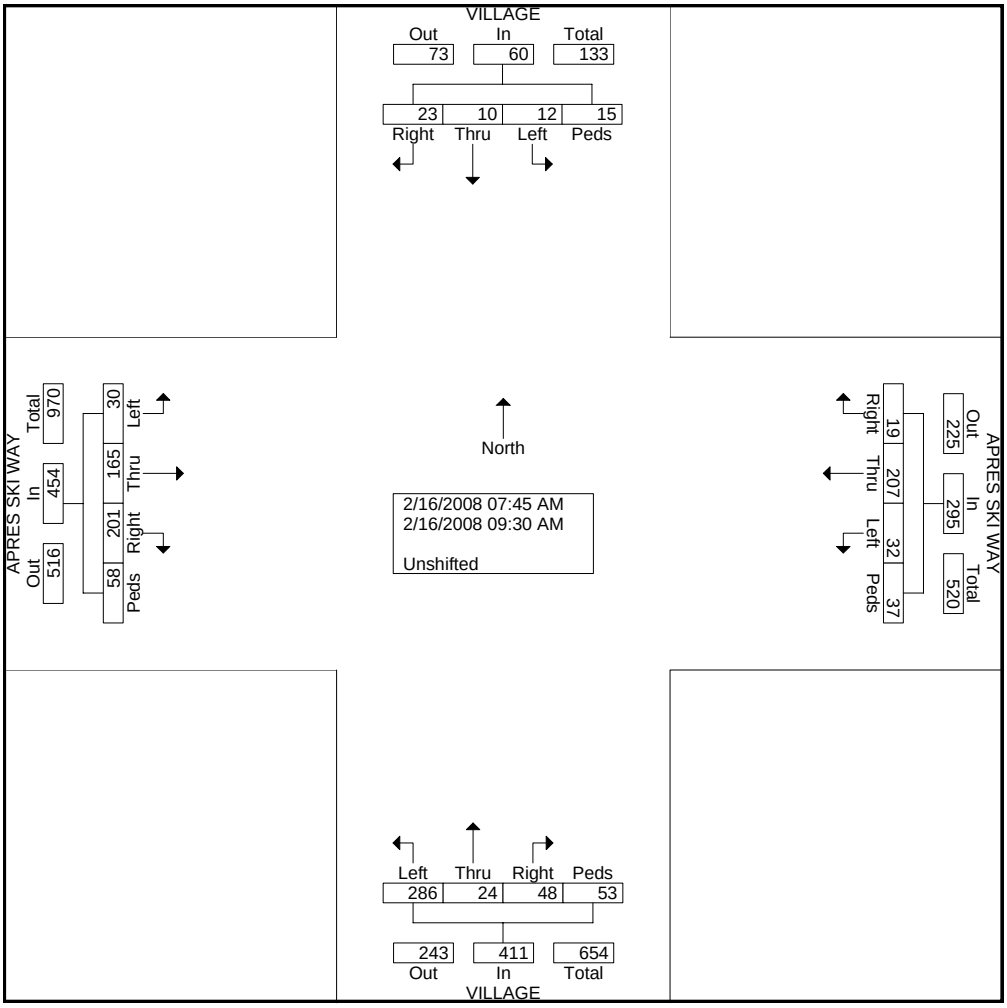
	MT WERNER CIR Southbound					APRES SKI WAY Westbound					MT WERNER CIR Northbound					APRES SKI WAY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 09:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:15 AM																					
08:15 AM	23	26	2	0	51	32	0	38	0	70	2	56	22	0	80	1	0	1	0	2	203
08:30 AM	30	17	1	0	48	26	0	55	1	82	0	64	22	0	86	0	0	1	0	1	217
08:45 AM	24	20	0	0	44	35	0	30	0	65	2	92	26	0	120	0	0	1	0	1	230
09:00 AM	33	26	0	4	63	30	0	49	0	79	1	69	24	0	94	0	0	1	0	1	237
Total Volume	110	89	3	4	206	123	0	172	1	296	5	281	94	0	380	1	0	4	0	5	887
% App. Total	53.4	43.2	1.5	1.9		41.6	0	58.1	0.3		1.3	73.9	24.7	0		20	0	80	0		
PHF	.833	.856	.375	.250	.817	.879	.000	.782	.250	.902	.625	.764	.904	.000	.792	.250	.000	1.000	.000	.625	.936



File Name : AM_2089 VILLAGE&APRESSKI
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

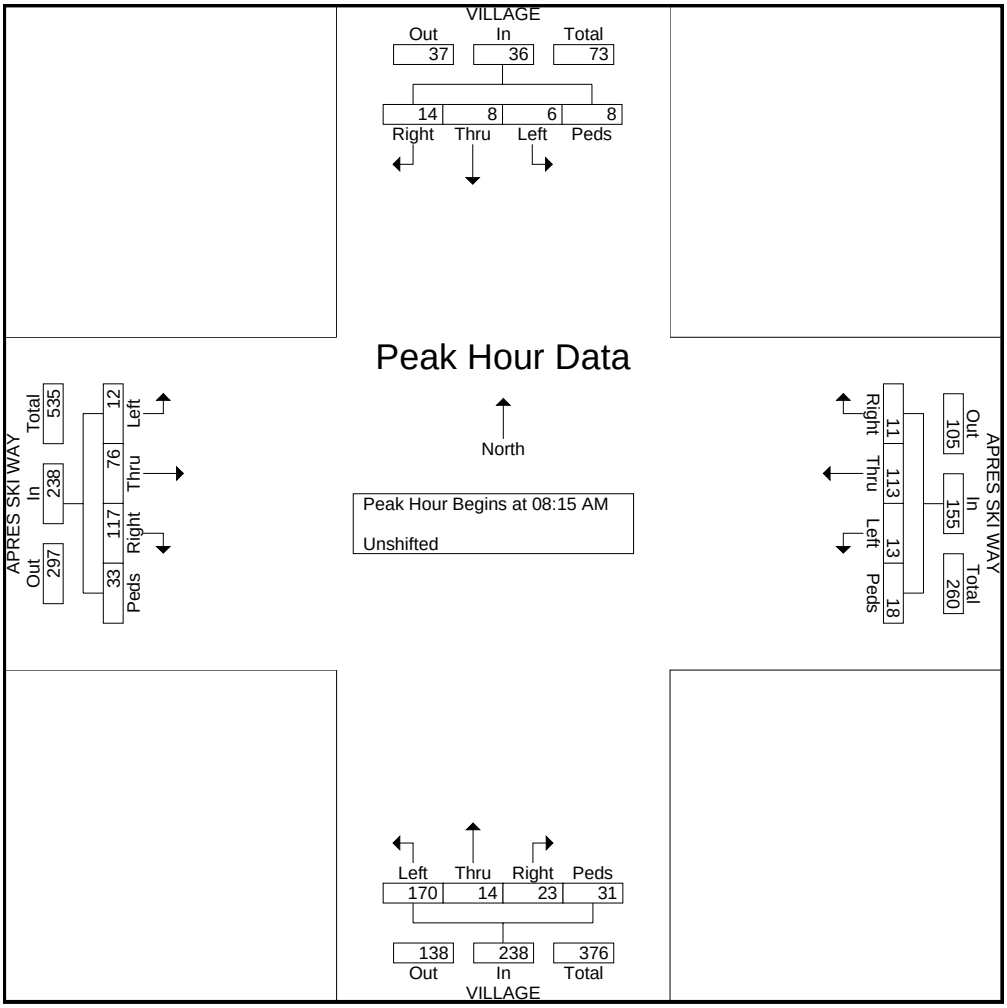
Groups Printed- Unshifted

	VILLAGE Southbound				APRES SKI WAY Westbound				VILLAGE Northbound				APRES SKI WAY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:45 AM	1	0	2	3	7	25	2	0	30	2	6	4	5	16	23	12	138
Total	1	0	2	3	7	25	2	0	30	2	6	4	5	16	23	12	138
08:00 AM	0	0	2	4	3	16	1	11	27	1	7	3	1	26	21	4	127
08:15 AM	2	1	2	5	4	28	2	3	39	3	10	6	2	14	29	15	165
08:30 AM	0	2	2	2	3	34	1	9	45	5	6	7	1	21	30	5	173
08:45 AM	2	4	4	0	3	22	6	3	42	3	6	8	5	18	29	5	160
Total	4	7	10	11	13	100	10	26	153	12	29	24	9	79	109	29	625
09:00 AM	2	1	6	1	3	29	2	3	44	3	1	10	4	23	29	8	169
09:15 AM	2	2	4	0	5	25	2	8	23	6	10	12	6	22	21	6	154
09:30 AM	3	0	1	0	4	28	3	0	36	1	2	3	6	25	19	3	134
Grand Total	12	10	23	15	32	207	19	37	286	24	48	53	30	165	201	58	1220
Apprch %	20	16.7	38.3	25	10.8	70.2	6.4	12.5	69.6	5.8	11.7	12.9	6.6	36.3	44.3	12.8	
Total %	1	0.8	1.9	1.2	2.6	17	1.6	3	23.4	2	3.9	4.3	2.5	13.5	16.5	4.8	



File Name : AM_2089 VILLAGE&APRESSKI
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

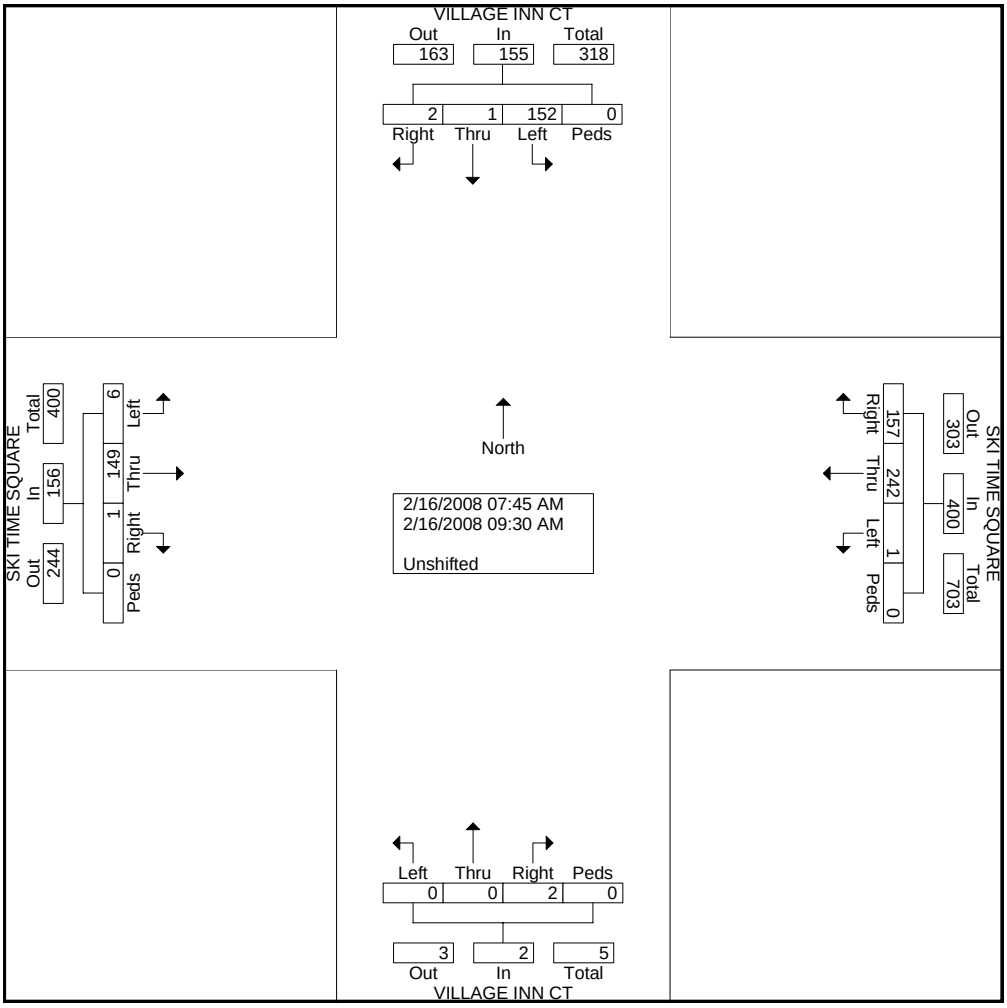
	VILLAGE Southbound					APRES SKI WAY Westbound					VILLAGE Northbound					APRES SKI WAY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 09:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:15 AM																					
08:15 AM	2	1	2	5	10	4	28	2	3	37	39	3	10	6	58	2	14	29	15	60	165
08:30 AM	0	2	2	2	6	3	34	1	9	47	45	5	6	7	63	1	21	30	5	57	173
08:45 AM	2	4	4	0	10	3	22	6	3	34	42	3	6	8	59	5	18	29	5	57	160
09:00 AM	2	1	6	1	10	3	29	2	3	37	44	3	1	10	58	4	23	29	8	64	169
Total Volume	6	8	14	8	36	13	113	11	18	155	170	14	23	31	238	12	76	117	33	238	667
% App. Total	16.7	22.2	38.9	22.2		8.4	72.9	7.1	11.6		71.4	5.9	9.7	13		5	31.9	49.2	13.9		
PHF	.750	.500	.583	.400	.900	.813	.831	.458	.500	.824	.944	.700	.575	.775	.944	.600	.826	.975	.550	.930	.964



File Name : AM_ VILLAGE&SKITIME
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

Groups Printed- Unshifted

	VILLAGE INN CT Southbound				SKI TIME SQUARE Westbound				VILLAGE INN CT Northbound				SKI TIME SQUARE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:45 AM	5	0	0	0	0	30	7	0	0	0	0	0	1	7	0	0	50
Total	5	0	0	0	0	30	7	0	0	0	0	0	1	7	0	0	50
08:00 AM	5	0	0	0	0	29	14	0	0	0	0	0	0	16	0	0	64
08:15 AM	34	1	0	0	0	35	35	0	0	0	1	0	2	19	0	0	127
08:30 AM	21	0	2	0	1	33	23	0	0	0	0	0	1	14	0	0	95
08:45 AM	16	0	0	0	0	34	23	0	0	0	0	0	1	20	0	0	94
Total	76	1	2	0	1	131	95	0	0	0	1	0	4	69	0	0	380
09:00 AM	37	0	0	0	0	25	24	0	0	0	0	0	0	27	0	0	113
09:15 AM	23	0	0	0	0	26	19	0	0	0	0	0	0	24	0	0	92
09:30 AM	11	0	0	0	0	30	12	0	0	0	1	0	1	22	1	0	78
Grand Total	152	1	2	0	1	242	157	0	0	0	2	0	6	149	1	0	713
Apprch %	98.1	0.6	1.3	0	0.2	60.5	39.2	0	0	0	100	0	3.8	95.5	0.6	0	
Total %	21.3	0.1	0.3	0	0.1	33.9	22	0	0	0	0.3	0	0.8	20.9	0.1	0	



File Name : AM_ VILLAGE&SKITIME
Site Code : 00000000
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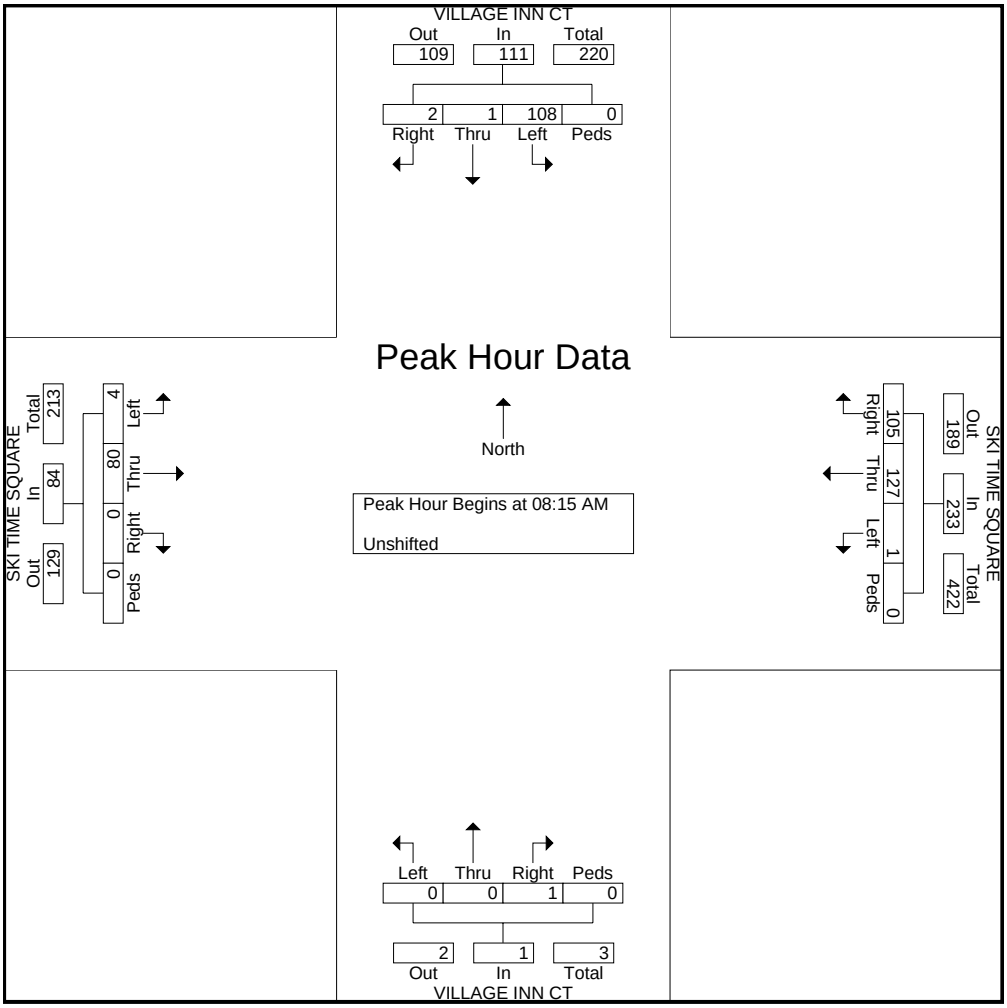
Page No : 2

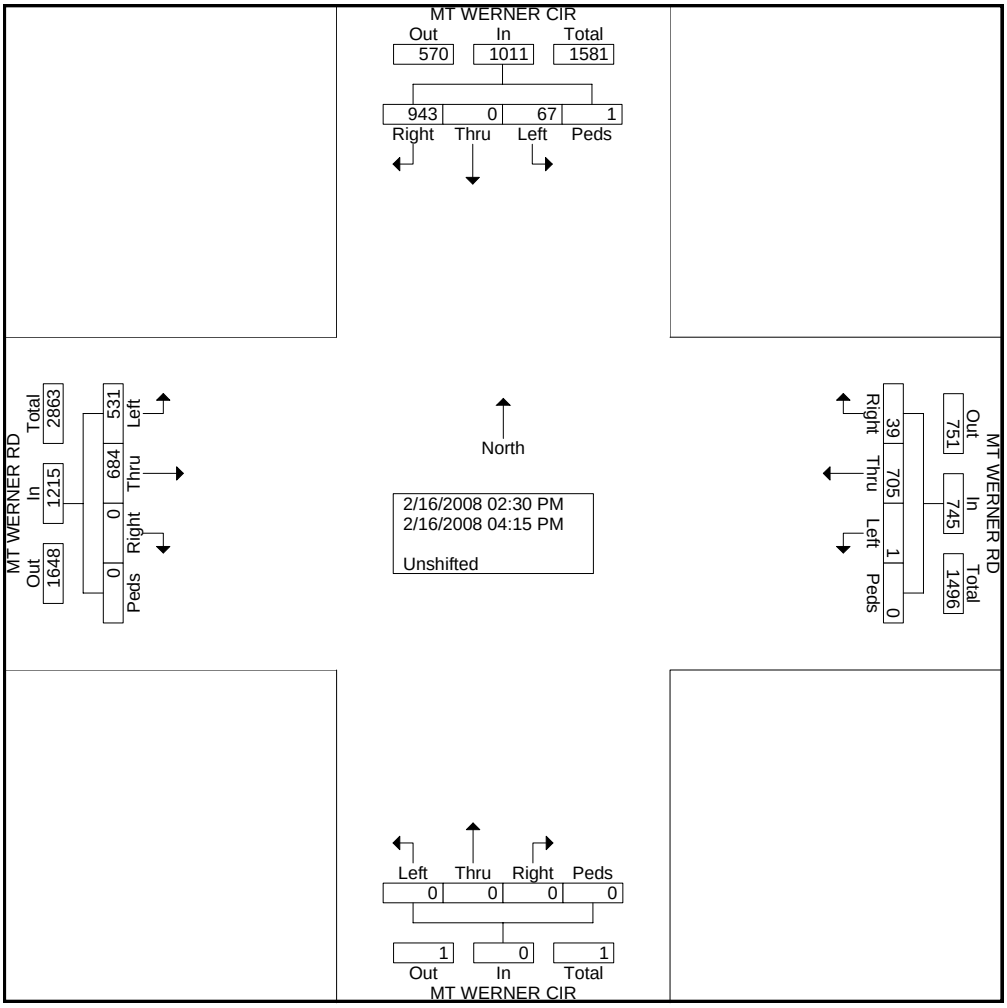
	VILLAGE INN CT Southbound					SKI TIME SQUARE Westbound					VILLAGE INN CT Northbound					SKI TIME SQUARE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:45 AM to 09:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:15 AM																					
08:15 AM	34	1	0	0	35	0	35	35	0	70	0	0	1	0	1	2	19	0	0	21	127
08:30 AM	21	0	2	0	23	1	33	23	0	57	0	0	0	0	0	1	14	0	0	15	95
08:45 AM	16	0	0	0	16	0	34	23	0	57	0	0	0	0	0	1	20	0	0	21	94
09:00 AM	37	0	0	0	37	0	25	24	0	49	0	0	0	0	0	0	27	0	0	27	113
Total Volume	108	1	2	0	111	1	127	105	0	233	0	0	1	0	1	4	80	0	0	84	429
% App. Total	97.3	0.9	1.8	0		0.4	54.5	45.1	0		0	0	100	0		4.8	95.2	0	0		
PHF	.730	.250	.250	.000	.750	.250	.907	.750	.000	.832	.000	.000	.250	.000	.250	.500	.741	.000	.000	.778	.844



File Name : PM_2085 MTWERNERCIR&MTWERNERRD
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

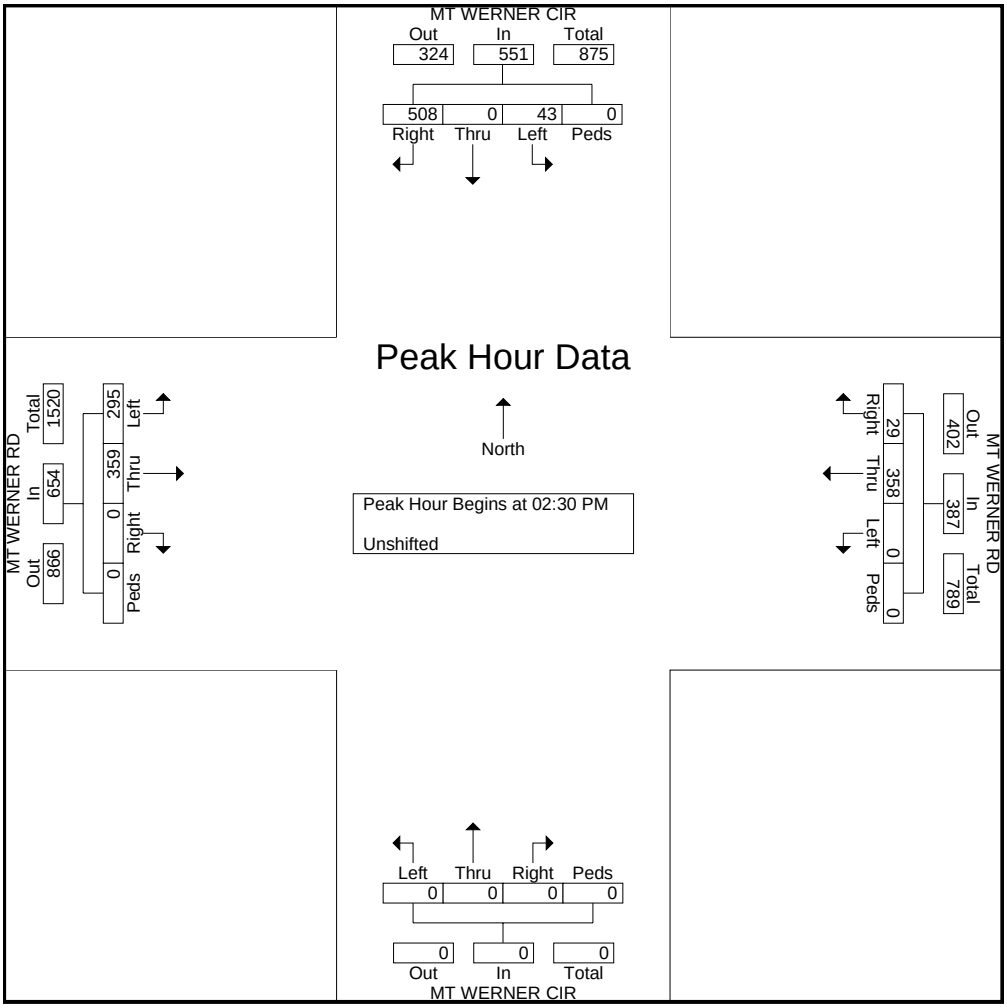
Groups Printed- Unshifted

	MT WERNER CIR Southbound				MT WERNER RD Westbound				MT WERNER CIR Northbound				MT WERNER RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
02:30 PM	12	0	125	0	0	88	9	0	0	0	0	0	78	87	0	0	399
02:45 PM	13	0	118	0	0	92	8	0	0	0	0	0	80	96	0	0	407
Total	25	0	243	0	0	180	17	0	0	0	0	0	158	183	0	0	806
03:00 PM	10	0	129	0	0	92	9	0	0	0	0	0	67	91	0	0	398
03:15 PM	8	0	136	0	0	86	3	0	0	0	0	0	70	85	0	0	388
03:30 PM	10	0	125	0	1	115	4	0	0	0	0	0	57	65	0	0	377
03:45 PM	5	0	106	1	0	84	2	0	0	0	0	0	61	91	0	0	350
Total	33	0	496	1	1	377	18	0	0	0	0	0	255	332	0	0	1513
04:00 PM	5	0	108	0	0	76	1	0	0	0	0	0	55	75	0	0	320
04:15 PM	4	0	96	0	0	72	3	0	0	0	0	0	63	94	0	0	332
Grand Total	67	0	943	1	1	705	39	0	0	0	0	0	531	684	0	0	2971
Apprch %	6.6	0	93.3	0.1	0.1	94.6	5.2	0	0	0	0	0	43.7	56.3	0	0	
Total %	2.3	0	31.7	0	0	23.7	1.3	0	0	0	0	0	17.9	23	0	0	



File Name : PM_2085 MTWERNERCIR&MTWERNERRD
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

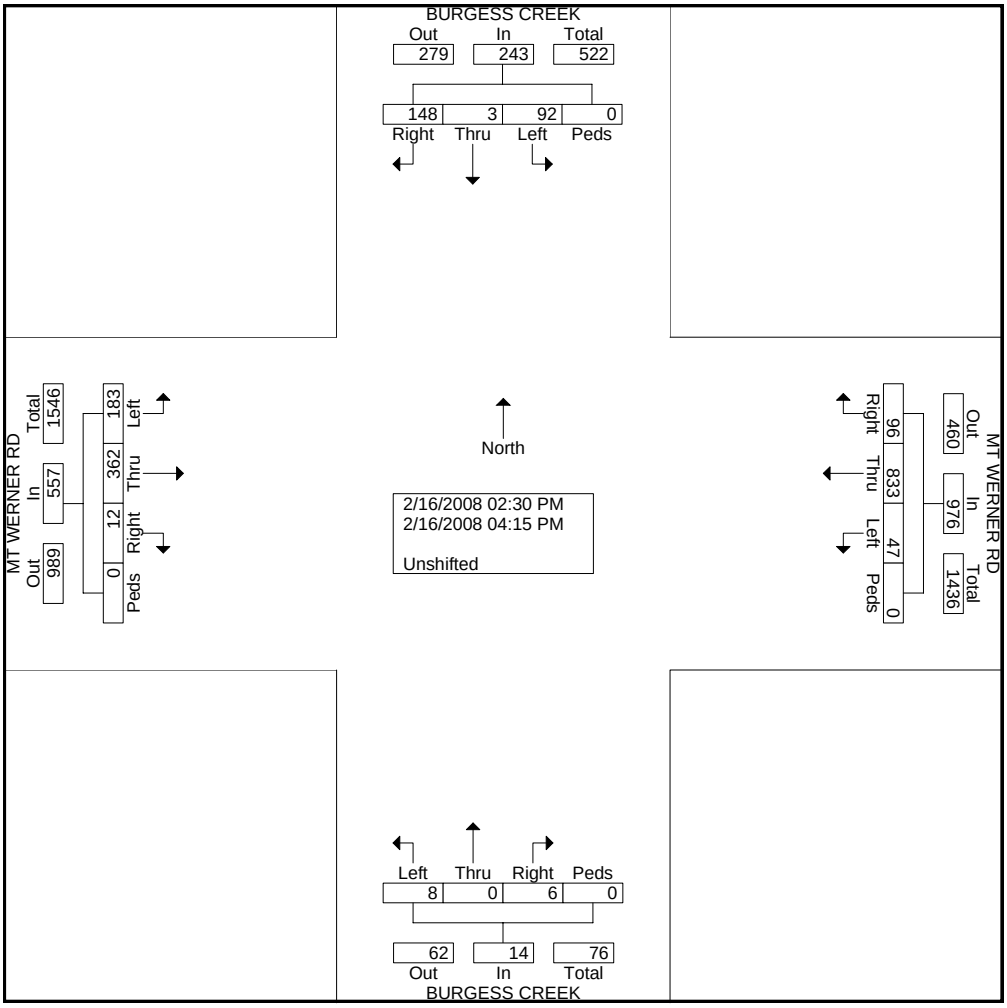
	MT WERNER CIR Southbound					MT WERNER RD Westbound					MT WERNER CIR Northbound					MT WERNER RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 03:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:30 PM																					
02:30 PM	12	0	125	0	137	0	88	9	0	97	0	0	0	0	0	78	87	0	0	165	399
02:45 PM	13	0	118	0	131	0	92	8	0	100	0	0	0	0	0	80	96	0	0	176	407
03:00 PM	10	0	129	0	139	0	92	9	0	101	0	0	0	0	0	67	91	0	0	158	398
03:15 PM	8	0	136	0	144	0	86	3	0	89	0	0	0	0	0	70	85	0	0	155	388
Total Volume	43	0	508	0	551	0	358	29	0	387	0	0	0	0	0	295	359	0	0	654	1592
% App. Total	7.8	0	92.2	0		0	92.5	7.5	0		0	0	0	0		45.1	54.9	0	0		
PHF	.827	.000	.934	.000	.957	.000	.973	.806	.000	.958	.000	.000	.000	.000	.000	.922	.935	.000	.000	.929	.978



File Name : PM_2086 BURGESS&MTWERNERCIR
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

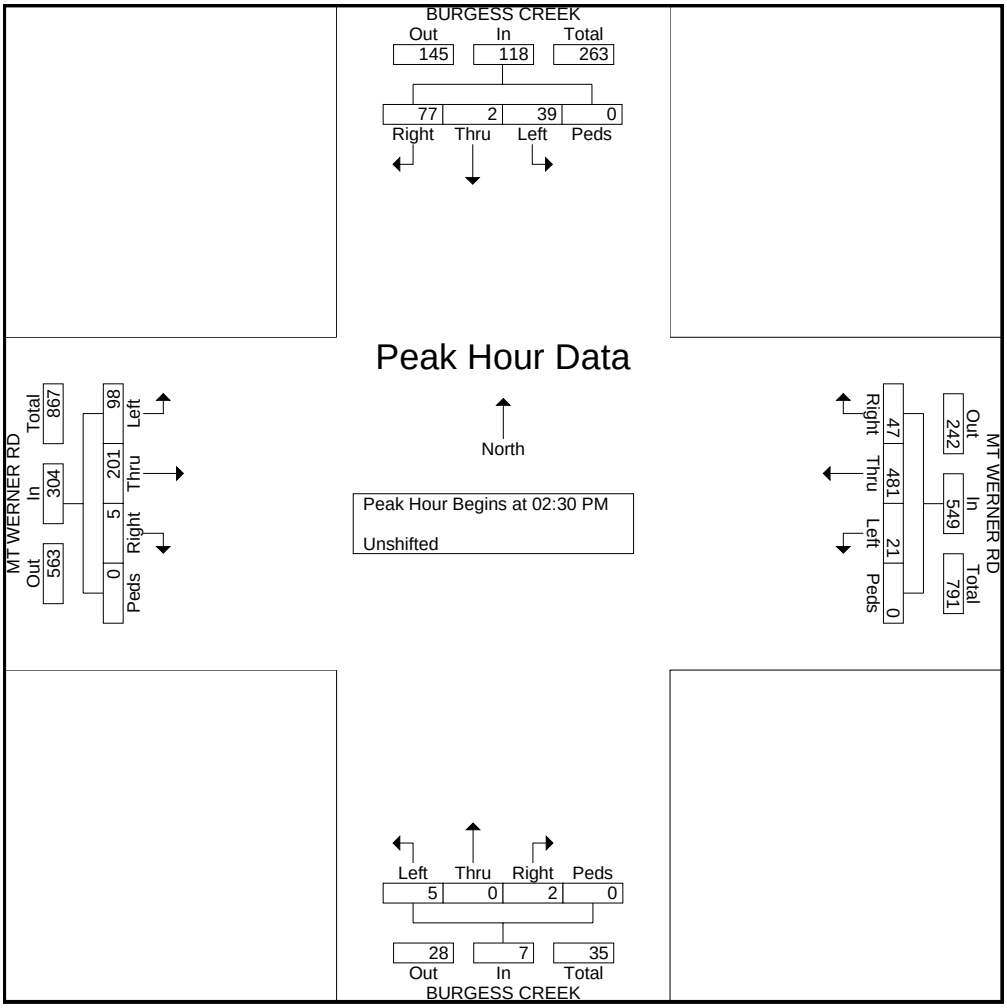
Groups Printed- Unshifted

	BURGESS CREEK Southbound				MT WERNER RD Westbound				BURGESS CREEK Northbound				MT WERNER RD Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
02:30 PM	14	0	17	0	5	120	14	0	2	0	0	0	26	57	0	0	255
02:45 PM	8	1	20	0	10	119	11	0	1	0	2	0	23	54	1	0	250
Total	22	1	37	0	15	239	25	0	3	0	2	0	49	111	1	0	505
03:00 PM	11	0	22	0	2	121	15	0	0	0	0	0	31	45	2	0	249
03:15 PM	6	1	18	0	4	121	7	0	2	0	0	0	18	45	2	0	224
03:30 PM	14	0	18	0	8	107	11	0	1	0	1	0	19	39	1	0	219
03:45 PM	15	1	16	0	9	85	12	0	1	0	1	0	29	41	3	0	213
Total	46	2	74	0	23	434	45	0	4	0	2	0	97	170	8	0	905
04:00 PM	16	0	18	0	5	88	15	0	0	0	0	0	18	34	2	0	196
04:15 PM	8	0	19	0	4	72	11	0	1	0	2	0	19	47	1	0	184
Grand Total	92	3	148	0	47	833	96	0	8	0	6	0	183	362	12	0	1790
Apprch %	37.9	1.2	60.9	0	4.8	85.3	9.8	0	57.1	0	42.9	0	32.9	65	2.2	0	
Total %	5.1	0.2	8.3	0	2.6	46.5	5.4	0	0.4	0	0.3	0	10.2	20.2	0.7	0	



File Name : PM_2086 BURGESS&MTWERNERCIR
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

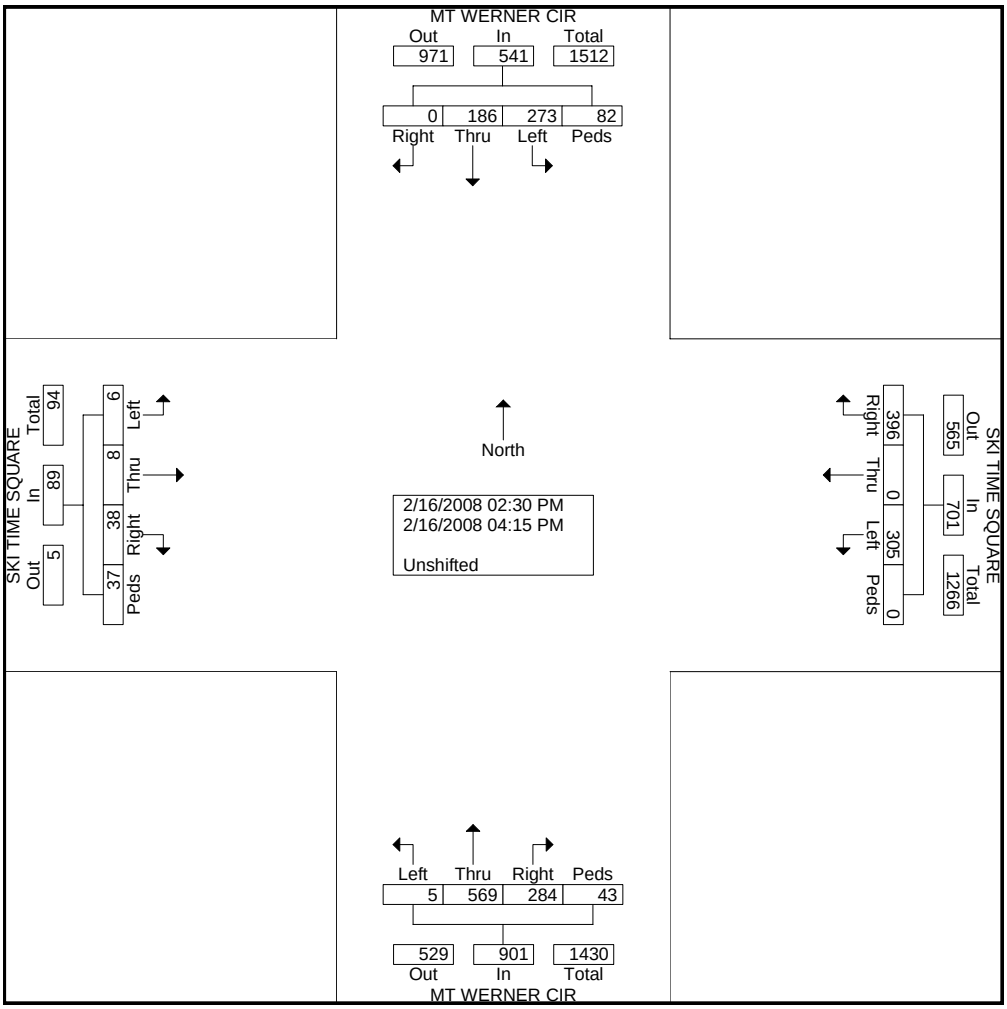
	BURGESS CREEK Southbound					MT WERNER RD Westbound					BURGESS CREEK Northbound					MT WERNER RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 03:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:30 PM																					
02:30 PM	14	0	17	0	31	5	120	14	0	139	2	0	0	0	2	26	57	0	0	83	255
02:45 PM	8	1	20	0	29	10	119	11	0	140	1	0	2	0	3	23	54	1	0	78	250
03:00 PM	11	0	22	0	33	2	121	15	0	138	0	0	0	0	0	31	45	2	0	78	249
03:15 PM	6	1	18	0	25	4	121	7	0	132	2	0	0	0	2	18	45	2	0	65	224
Total Volume	39	2	77	0	118	21	481	47	0	549	5	0	2	0	7	98	201	5	0	304	978
% App. Total	33.1	1.7	65.3	0		3.8	87.6	8.6	0		71.4	0	28.6	0		32.2	66.1	1.6	0		
PHF	.696	.500	.875	.000	.894	.525	.994	.783	.000	.980	.625	.000	.250	.000	.583	.790	.882	.625	.000	.916	.959



File Name : PM_2087 MTWERNERCIR&SKITIME
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

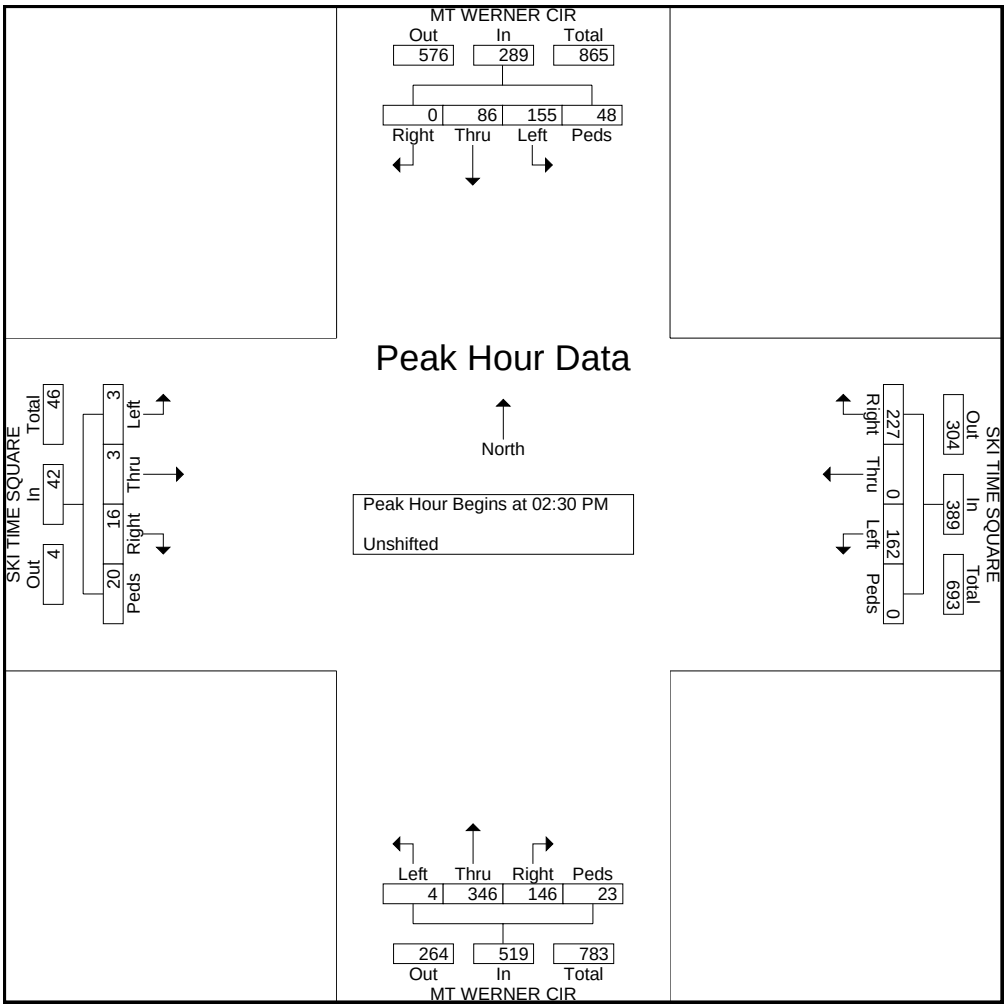
Groups Printed- Unshifted

	MT WERNER CIR Southbound				SKI TIME SQUARE Westbound				MT WERNER CIR Northbound				SKI TIME SQUARE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
02:30 PM	43	25	0	12	42	0	66	0	0	90	39	1	1	0	4	5	328
02:45 PM	52	17	0	5	41	0	63	0	1	83	38	0	2	2	6	8	318
Total	95	42	0	17	83	0	129	0	1	173	77	1	3	2	10	13	646
03:00 PM	26	20	0	13	48	0	58	0	2	86	34	17	0	0	2	0	306
03:15 PM	34	24	0	18	31	0	40	0	1	87	35	5	0	1	4	7	287
03:30 PM	38	27	0	12	32	0	42	0	0	75	46	6	1	1	5	4	289
03:45 PM	25	28	0	8	39	0	59	0	0	51	35	5	1	0	7	3	261
Total	123	99	0	51	150	0	199	0	3	299	150	33	2	2	18	14	1143
04:00 PM	23	25	0	9	39	0	35	0	0	66	25	7	1	0	6	4	240
04:15 PM	32	20	0	5	33	0	33	0	1	31	32	2	0	4	4	6	203
Grand Total	273	186	0	82	305	0	396	0	5	569	284	43	6	8	38	37	2232
Apprch %	50.5	34.4	0	15.2	43.5	0	56.5	0	0.6	63.2	31.5	4.8	6.7	9	42.7	41.6	
Total %	12.2	8.3	0	3.7	13.7	0	17.7	0	0.2	25.5	12.7	1.9	0.3	0.4	1.7	1.7	



File Name : PM_2087 MTWERNERCIR&SKITIME
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

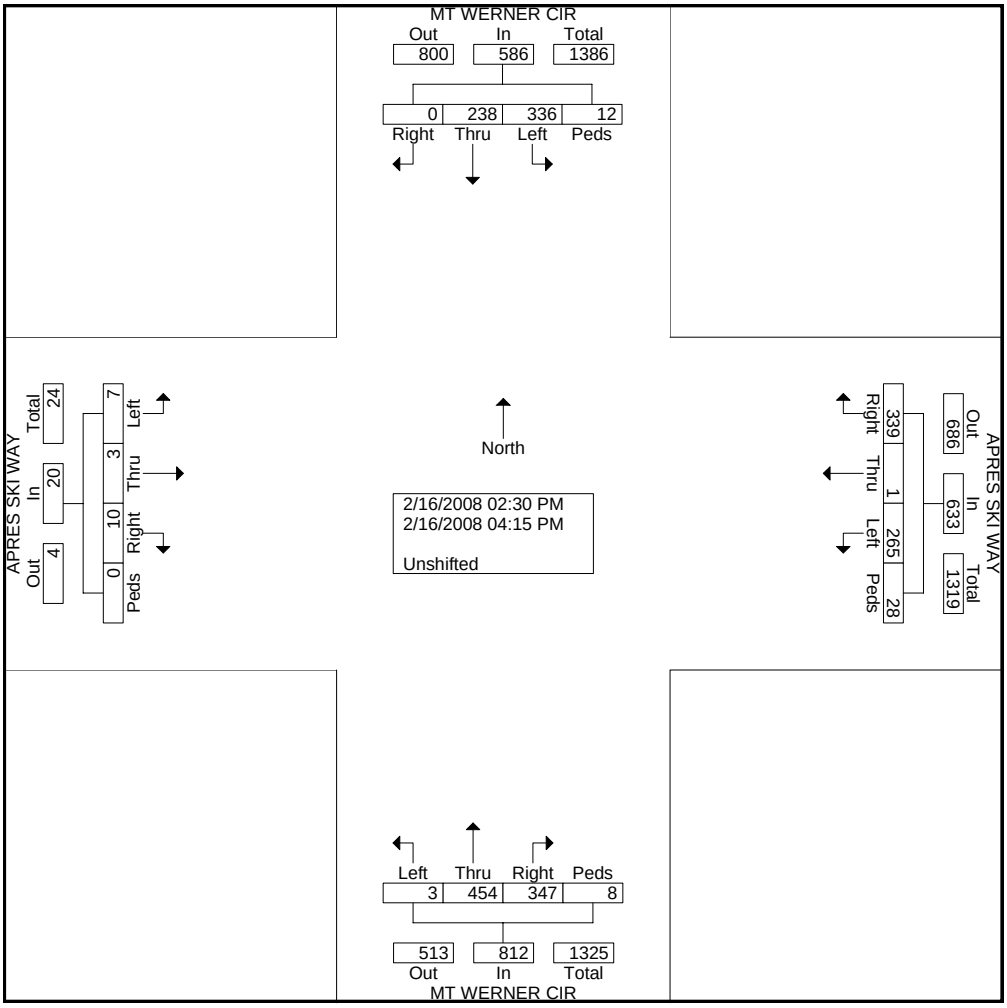
	MT WERNER CIR Southbound					SKI TIME SQUARE Westbound					MT WERNER CIR Northbound					SKI TIME SQUARE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 03:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:30 PM																					
02:30 PM	43	**25**	0	12	**80**	42	0	**66**	**0**	**108**	0	**90**	**39**	**1**	**130**	**1**	**0**	**4**	**5**	**10**	**328**
02:45 PM	**52**	**17**	**0**	**5**	**74**	**41**	**0**	**63**	**0**	**104**	**1**	**83**	**38**	**0**	**122**	**2**	**2**	**6**	**8**	**18**	318
03:00 PM	26	20	0	13	59	**48**	**0**	**58**	**0**	**106**	**2**	**86**	**34**	**17**	**139**	0	0	2	0	2	306
03:15 PM	34	24	0	**18**	**76**	**31**	**0**	**40**	**0**	**71**	**1**	**87**	**35**	**5**	**128**	**0**	**1**	**4**	**7**	**12**	**287**
Total Volume % App. Total	53.6	29.8	0	16.6		41.6	0	58.4	0		0.8	66.7	28.1	4.4		7.1	7.1	38.1	47.6		
PHF	.745	.860	.000	.667	.903	.844	.000	.860	.000	.900	.500	.961	.936	.338	.933	.375	.375	.667	.625	.583	.944



File Name : PM_2088 MTWERNERCIR&APRESSKI
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

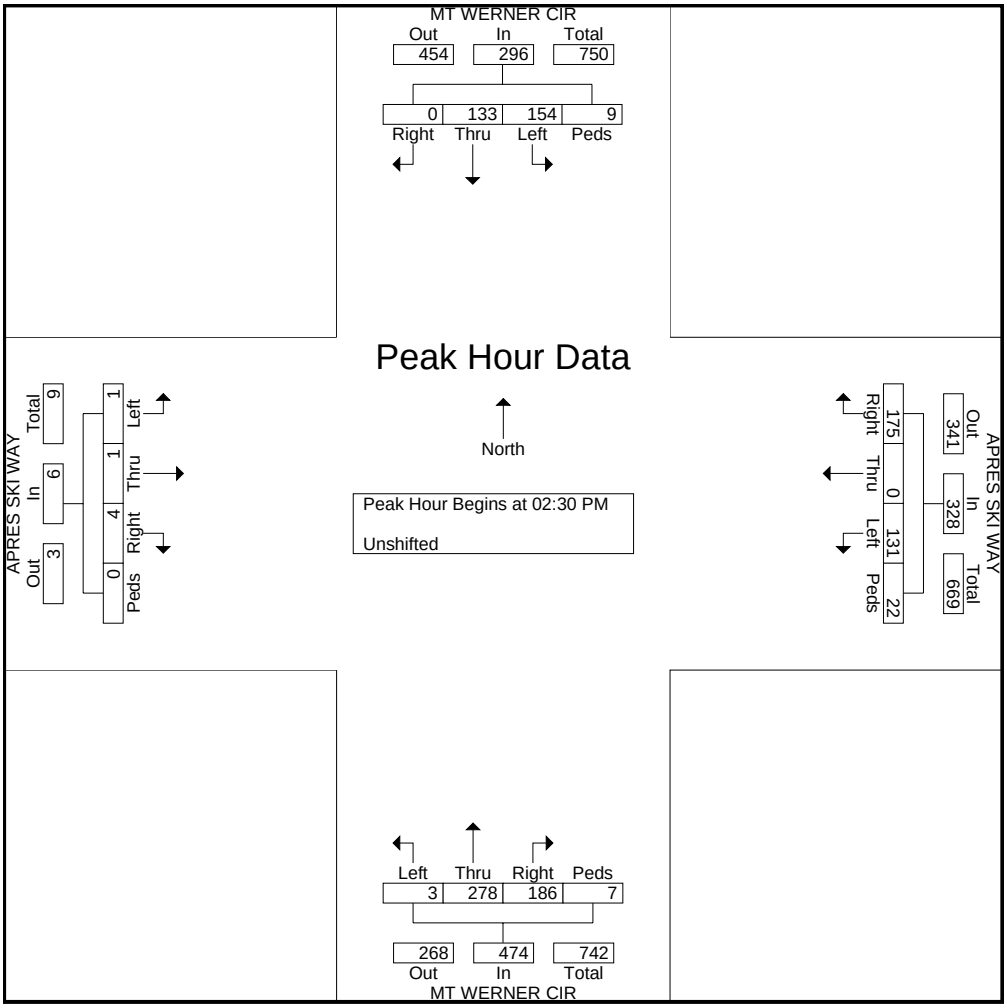
Groups Printed- Unshifted

	MT WERNER CIR Southbound				APRES SKI WAY Westbound				MT WERNER CIR Northbound				APRES SKI WAY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
02:30 PM	41	37	0	0	26	0	49	6	1	78	48	0	0	1	1	0	288
02:45 PM	44	26	0	0	39	0	41	6	1	71	54	0	0	0	1	0	283
Total	85	63	0	0	65	0	90	12	2	149	102	0	0	1	2	0	571
03:00 PM	30	37	0	4	35	0	47	8	1	70	41	2	0	0	0	0	275
03:15 PM	39	33	0	5	31	0	38	2	0	59	43	5	1	0	2	0	258
03:30 PM	43	26	0	3	41	0	47	2	0	46	36	0	0	2	2	0	248
03:45 PM	54	30	0	0	26	0	52	2	0	57	31	0	2	0	1	0	255
Total	166	126	0	12	133	0	184	14	1	232	151	7	3	2	5	0	1036
04:00 PM	40	27	0	0	33	1	35	2	0	37	40	0	2	0	1	0	218
04:15 PM	45	22	0	0	34	0	30	0	0	36	54	1	2	0	2	0	226
Grand Total	336	238	0	12	265	1	339	28	3	454	347	8	7	3	10	0	2051
Apprch %	57.3	40.6	0	2	41.9	0.2	53.6	4.4	0.4	55.9	42.7	1	35	15	50	0	
Total %	16.4	11.6	0	0.6	12.9	0	16.5	1.4	0.1	22.1	16.9	0.4	0.3	0.1	0.5	0	



File Name : PM_2088 MTWERNERCIR&APRESSKI
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

	MT WERNER CIR Southbound					APRES SKI WAY Westbound					MT WERNER CIR Northbound					APRES SKI WAY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 03:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:30 PM																					
02:30 PM	41	37	0	0	78	26	0	49	6	81	1	78	48	0	127	0	1	1	0	2	288
02:45 PM	44	26	0	0	70	39	0	41	6	86	1	71	54	0	126	0	0	1	0	1	283
03:00 PM	30	37	0	4	71	35	0	47	8	90	1	70	41	2	114	0	0	0	0	0	275
03:15 PM	39	33	0	5	77	31	0	38	2	71	0	59	43	5	107	1	0	2	0	3	258
Total Volume	154	133	0	9	296	131	0	175	22	328	3	278	186	7	474	1	1	4	0	6	1104
% App. Total	52	44.9	0	3		39.9	0	53.4	6.7		0.6	58.6	39.2	1.5		16.7	16.7	66.7	0		
PHF	.875	.899	.000	.450	.949	.840	.000	.893	.688	.911	.750	.891	.861	.350	.933	.250	.250	.500	.000	.500	.958



File Name : PM_2089 VILLAGE&APRESSKI
Site Code : 00000000
Start Date : 2/16/2008
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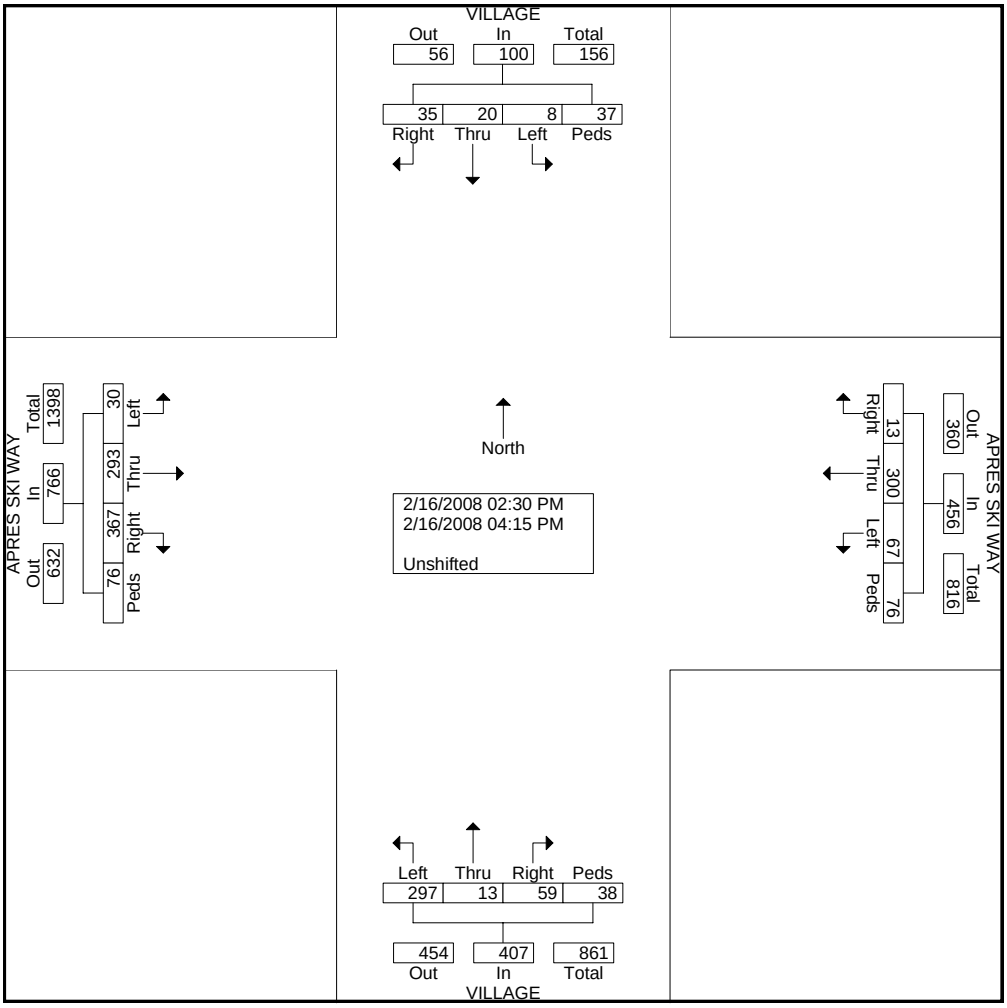
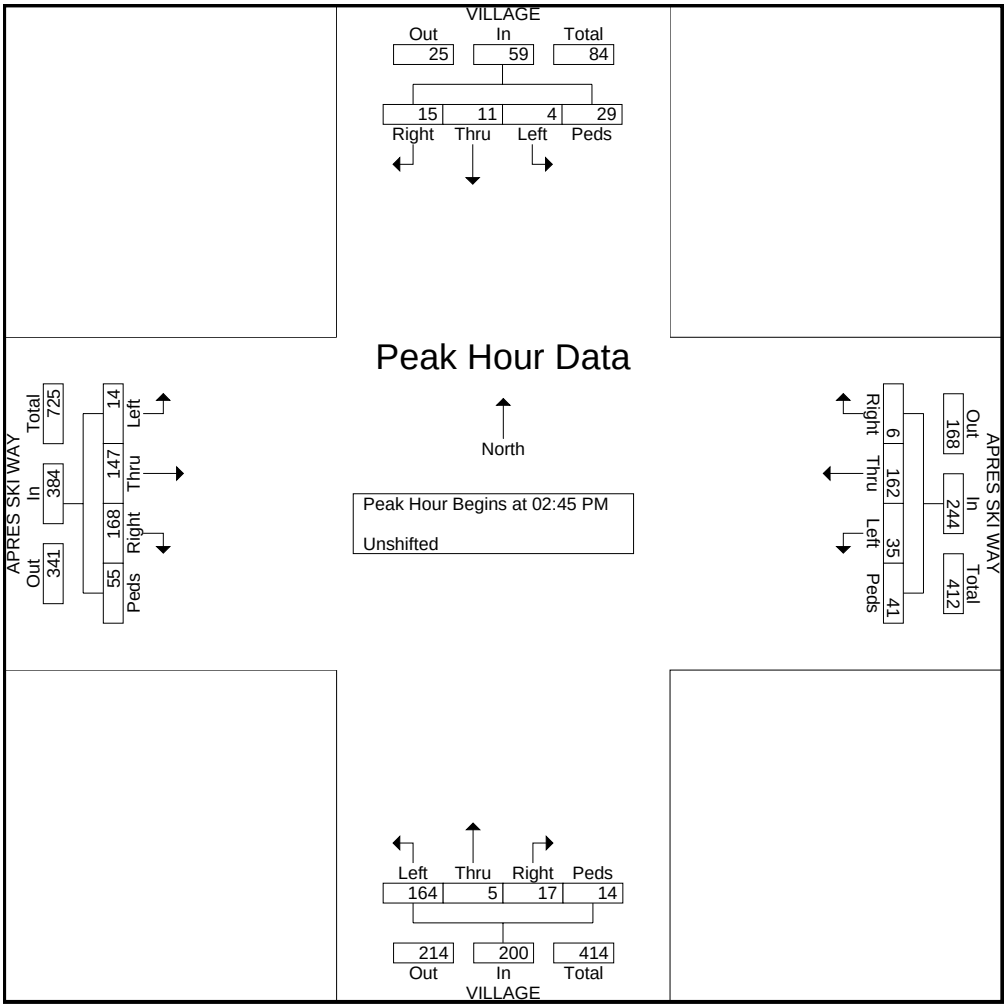
Groups Printed- Unshifted

	VILLAGE Southbound				APRES SKI WAY Westbound				VILLAGE Northbound				APRES SKI WAY Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
02:30 PM	0	5	5	5	5	35	1	6	43	3	9	7	3	29	43	11	210
02:45 PM	1	4	4	0	9	36	0	11	35	2	1	11	4	41	45	17	221
Total	1	9	9	5	14	71	1	17	78	5	10	18	7	70	88	28	431
03:00 PM	0	2	0	4	11	46	4	7	41	0	5	3	3	35	37	18	216
03:15 PM	1	3	3	9	4	40	1	9	46	1	6	0	2	37	38	11	211
03:30 PM	2	2	8	16	11	40	1	14	42	2	5	0	5	34	48	9	239
03:45 PM	2	1	5	0	10	39	2	13	28	0	7	6	7	45	46	6	217
Total	5	8	16	29	36	165	8	43	157	3	23	9	17	151	169	44	883
04:00 PM	2	0	7	3	13	39	4	8	25	1	12	0	2	40	52	2	210
04:15 PM	0	3	3	0	4	25	0	8	37	4	14	11	4	32	58	2	205
Grand Total	8	20	35	37	67	300	13	76	297	13	59	38	30	293	367	76	1729
Apprch %	8	20	35	37	14.7	65.8	2.9	16.7	73	3.2	14.5	9.3	3.9	38.3	47.9	9.9	
Total %	0.5	1.2	2	2.1	3.9	17.4	0.8	4.4	17.2	0.8	3.4	2.2	1.7	16.9	21.2	4.4	



File Name : PM_2089 VILLAGE&APRESSKI
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

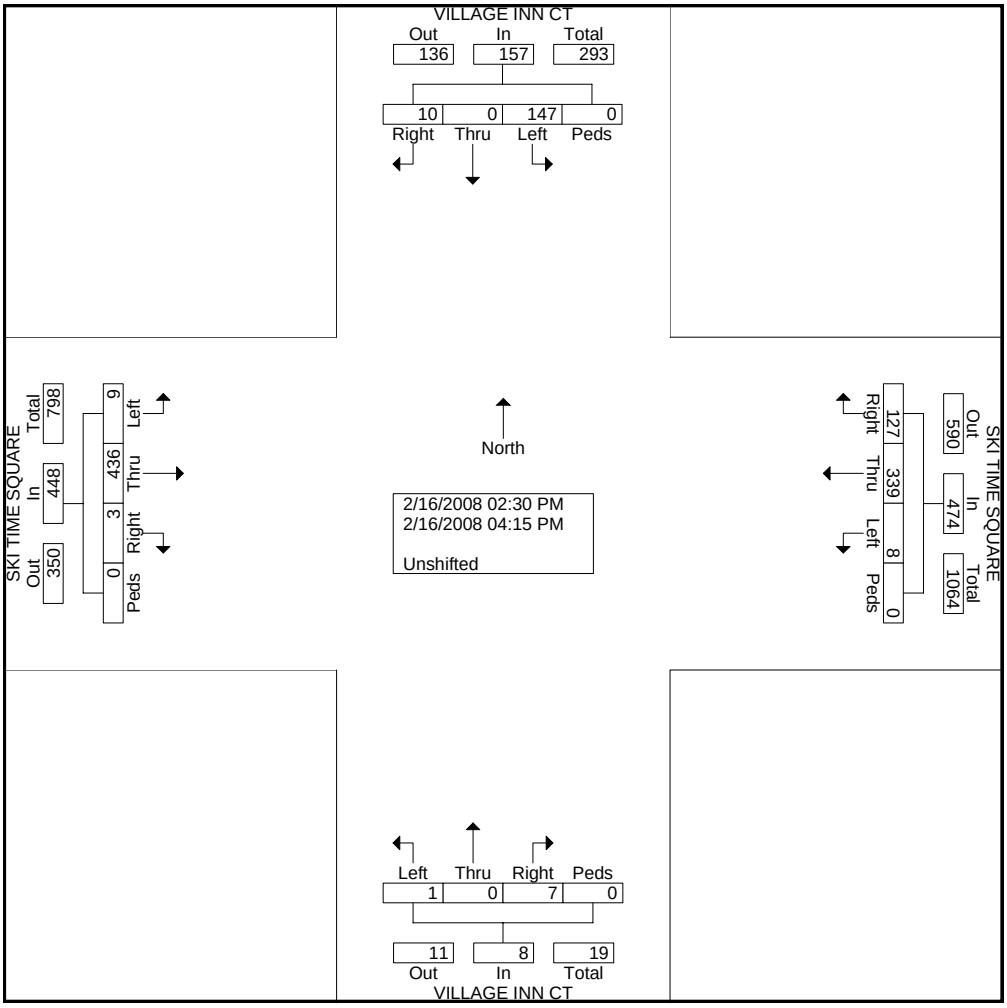
	VILLAGE Southbound					APRES SKI WAY Westbound					VILLAGE Northbound					APRES SKI WAY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 03:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:45 PM																					
02:45 PM	1	4	4	0	9	9	36	0	11	56	35	2	1	11	49	4	41	45	17	107	221
03:00 PM	0	2	0	4	6	11	46	4	7	68	41	0	5	3	49	3	35	37	18	93	216
03:15 PM	1	3	3	9	16	4	40	1	9	54	46	1	6	0	53	2	37	38	11	88	211
03:30 PM	2	2	8	16	28	11	40	1	14	66	42	2	5	0	49	5	34	48	9	96	239
Total Volume	4	11	15	29	59	35	162	6	41	244	164	5	17	14	200	14	147	168	55	384	887
% App. Total	6.8	18.6	25.4	49.2		14.3	66.4	2.5	16.8		82	2.5	8.5	7		3.6	38.3	43.8	14.3		
PHF	.500	.688	.469	.453	.527	.795	.880	.375	.732	.897	.891	.625	.708	.318	.943	.700	.896	.875	.764	.897	.928



File Name : PM_ VILLAGE&SKITIME
Site Code : 00000000
Start Date : 2/16/2008
Page No : 1

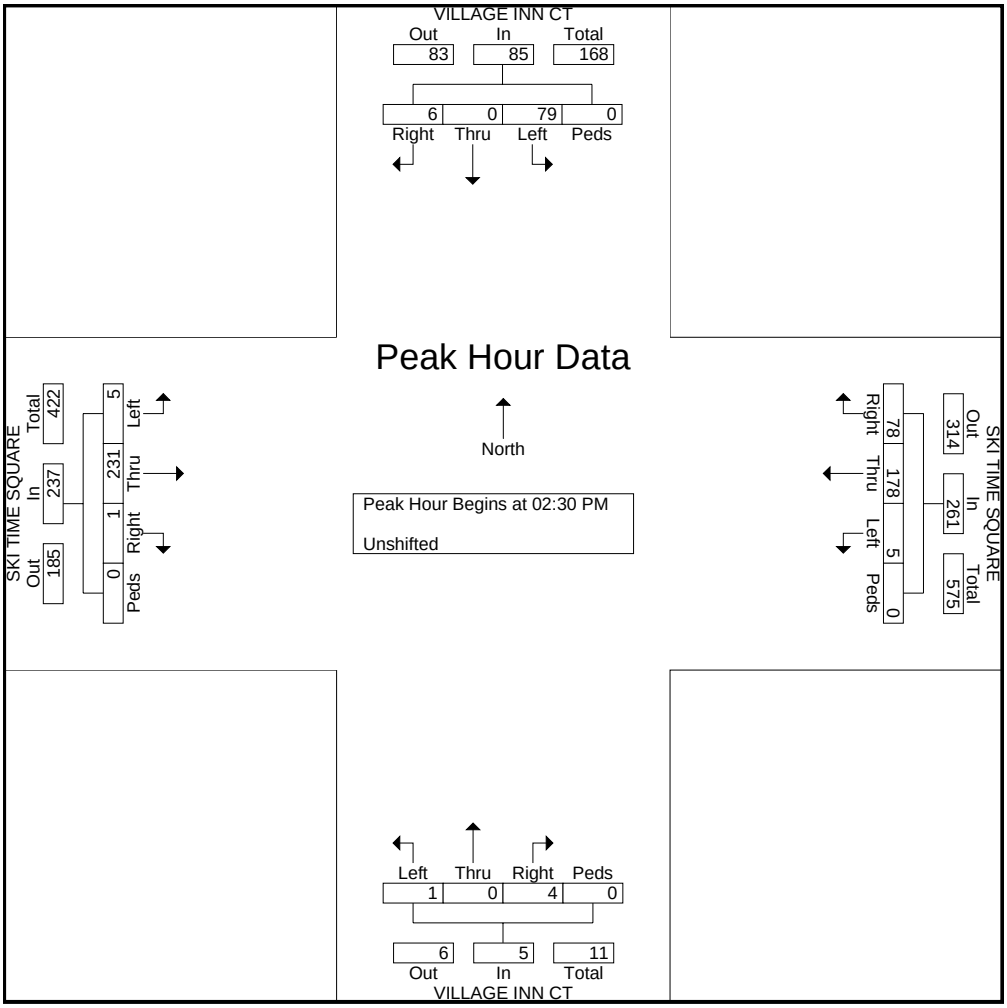
Groups Printed- Unshifted

	VILLAGE INN CT Southbound				SKI TIME SQUARE Westbound				VILLAGE INN CT Northbound				SKI TIME SQUARE Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
02:30 PM	22	0	2	0	0	58	27	0	0	0	1	0	2	63	1	0	176
02:45 PM	29	0	2	0	3	42	19	0	1	0	2	0	2	53	0	0	153
Total	51	0	4	0	3	100	46	0	1	0	3	0	4	116	1	0	329
03:00 PM	14	0	1	0	1	47	17	0	0	0	1	0	1	65	0	0	147
03:15 PM	14	0	1	0	1	31	15	0	0	0	0	0	0	50	0	0	112
03:30 PM	21	0	0	0	1	44	13	0	0	0	0	0	0	57	0	0	136
03:45 PM	16	0	3	0	0	39	17	0	0	0	0	0	3	51	0	0	129
Total	65	0	5	0	3	161	62	0	0	0	1	0	4	223	0	0	524
04:00 PM	14	0	0	0	1	42	6	0	0	0	2	0	1	46	2	0	114
04:15 PM	17	0	1	0	1	36	13	0	0	0	1	0	0	51	0	0	120
Grand Total	147	0	10	0	8	339	127	0	1	0	7	0	9	436	3	0	1087
Apprch %	93.6	0	6.4	0	1.7	71.5	26.8	0	12.5	0	87.5	0	2	97.3	0.7	0	
Total %	13.5	0	0.9	0	0.7	31.2	11.7	0	0.1	0	0.6	0	0.8	40.1	0.3	0	



File Name : PM_ VILLAGE&SKITIME
Site Code : 00000000
Start Date : 2/16/2008
Page No : 2

	VILLAGE INN CT Southbound					SKI TIME SQUARE Westbound					VILLAGE INN CT Northbound					SKI TIME SQUARE Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 02:30 PM to 03:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 02:30 PM																					
02:30 PM	22	0	2	0	24	0	58	27	0	85	0	0	1	0	1	2	63	1	0	66	176
02:45 PM	29	0	2	0	31	3	42	19	0	64	1	0	2	0	3	2	53	0	0	55	153
03:00 PM	14	0	1	0	15	1	47	17	0	65	0	0	1	0	1	1	65	0	0	66	147
03:15 PM	14	0	1	0	15	1	31	15	0	47	0	0	0	0	0	0	50	0	0	50	112
Total Volume	79	0	6	0	85	5	178	78	0	261	1	0	4	0	5	5	231	1	0	237	588
% App. Total	92.9	0	7.1	0		1.9	68.2	29.9	0		20	0	80	0		2.1	97.5	0.4	0		
PHF	.681	.000	.750	.000	.685	.417	.767	.722	.000	.768	.250	.000	.500	.000	.417	.625	.888	.250	.000	.898	.835



APPENDIX B – EXISTING LEVEL OF SERVICE WORKSHEETS

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	58	596	396	58	30	114
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	63	648	430	63	33	124
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						4
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	493				912	247
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	493				912	247
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				87	84
cM capacity (veh/h)	1066				257	753

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	63	324	324	287	207	157
Volume Left	63	0	0	0	0	33
Volume Right	0	0	0	0	63	124
cSH	1066	1700	1700	1700	1700	952
Volume to Capacity	0.06	0.19	0.19	0.17	0.12	0.16
Queue Length 95th (ft)	5	0	0	0	0	15
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	12.9
Lane LOS	A					B
Approach Delay (s)	0.8			0.0		12.9
Approach LOS						B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	29.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	245	381	158	8	31	296
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	258	401	166	8	33	312
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	175				887	87
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	175				887	87
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	82				86	67
cM capacity (veh/h)	1399				231	954

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	258	201	201	111	64	33	312
Volume Left	258	0	0	0	0	33	0
Volume Right	0	0	0	0	8	0	312
cSH	1399	1700	1700	1700	1700	231	954
Volume to Capacity	0.18	0.12	0.12	0.07	0.04	0.14	0.33
Queue Length 95th (ft)	17	0	0	0	0	12	36
Control Delay (s)	8.2	0.0	0.0	0.0	0.0	23.1	10.6
Lane LOS	A					C	B
Approach Delay (s)	3.2			0.0		11.8	
Approach LOS						B	

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	348	34	92	104	20	60	0	30	2	0	2
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
Hourly flow rate (vph)	33	378	37	100	113	22	65	0	33	2	0	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	135			415			721	797	208	611	804	67
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	135			415			721	797	208	611	804	67
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			91			77	100	96	99	100	100
cM capacity (veh/h)	1447			1140			288	284	798	332	281	982

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	33	252	163	100	75	59	98	4
Volume Left	33	0	0	100	0	0	65	2
Volume Right	0	0	37	0	0	22	33	2
cSH	1447	1700	1700	1140	1700	1700	366	497
Volume to Capacity	0.02	0.15	0.10	0.09	0.04	0.03	0.27	0.01
Queue Length 95th (ft)	2	0	0	7	0	0	26	1
Control Delay (s)	7.5	0.0	0.0	8.5	0.0	0.0	18.4	12.3
Lane LOS	A			A			C	B
Approach Delay (s)	0.5			3.6			18.4	12.3
Approach LOS							C	B

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	4	123	0	172	5	281	94	110	89	3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	0	4	131	0	183	5	299	100	117	95	3
Pedestrians		4									1	
Lane Width (ft)		12.0									12.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	678	644	53	595	645	150	102			299		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	678	644	53	595	645	150	102			299		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	63	100	79	100			91		
cM capacity (veh/h)	245	351	1000	357	350	868	1483			1259		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	5	314	105	199	100	117	63	35
Volume Left	1	131	5	0	0	117	0	0
Volume Right	4	183	0	0	100	0	0	3
cSH	619	543	1483	1700	1700	1259	1700	1700
Volume to Capacity	0.01	0.58	0.00	0.12	0.06	0.09	0.04	0.02
Queue Length 95th (ft)	1	91	0	0	0	8	0	0
Control Delay (s)	10.9	20.3	0.4	0.0	0.0	8.2	0.0	0.0
Lane LOS	B	C	A			A		
Approach Delay (s)	10.9	20.3	0.1			4.4		
Approach LOS	B	C						

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	75	117	13	111	11	170	14	23	6	8	14
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	12	78	122	14	116	11	177	15	24	6	8	15
Pedestrians		8			31			33			18	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			3			3			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	145			233			372	369	203	393	424	147
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	145			233			372	369	203	393	424	147
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			66	97	97	99	98	98
cM capacity (veh/h)	1416			1298			523	526	794	492	490	880

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	212	141	216	29
Volume Left	12	14	177	6
Volume Right	122	11	24	15
cSH	1416	1298	544	630
Volume to Capacity	0.01	0.01	0.40	0.05
Queue Length 95th (ft)	1	1	47	4
Control Delay (s)	0.5	0.8	15.9	11.0
Lane LOS	A	A	C	B
Approach Delay (s)	0.5	0.8	15.9	11.0
Approach LOS			C	B

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	1	2	137	0	92	3	206	161	161	61	19
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	1	1	2	151	0	101	3	226	177	177	67	21
Pedestrians		34			7			16				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		3			1			1				
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	799	882	127	680	716	233	122			410		
vC1, stage 1 conf vol	465	465		240	240							
vC2, stage 2 conf vol	334	417		440	476							
vCu, unblocked vol	799	882	127	680	716	233	122			410		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	49	100	87	100			85		
cM capacity (veh/h)	225	226	885	297	277	801	1424			1142		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	4	151	101	230	177	177	88
Volume Left	1	151	0	3	0	177	0
Volume Right	2	0	101	0	177	0	21
cSH	359	297	801	1424	1700	1142	1700
Volume to Capacity	0.01	0.51	0.13	0.00	0.10	0.15	0.05
Queue Length 95th (ft)	1	67	11	0	0	14	0
Control Delay (s)	15.1	28.9	10.1	0.1	0.0	8.7	0.0
Lane LOS	C	D	B	A		A	
Approach Delay (s)	15.1	21.4		0.1		5.8	
Approach LOS	C	C					

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	50	189	14	17	252	30	0	0	19	33	1	75
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	54	203	15	18	271	32	0	0	20	35	1	81
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	303			218			626	658	211	639	633	271
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	303			218			626	658	211	639	633	271
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			100	100	98	90	100	89
cM capacity (veh/h)	1258			1351			339	363	829	363	375	768

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	54	218	289	32	20	117
Volume Left	54	0	18	0	0	35
Volume Right	0	15	0	32	20	81
cSH	1258	1700	1351	1700	829	570
Volume to Capacity	0.04	0.13	0.01	0.02	0.02	0.21
Queue Length 95th (ft)	3	0	1	0	2	19
Control Delay (s)	8.0	0.0	0.6	0.0	9.4	12.9
Lane LOS	A		A		A	B
Approach Delay (s)	1.6		0.5		9.4	12.9
Approach LOS					A	B

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	73	549	754	112	105	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	79	597	820	122	114	63
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						4
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	941				1338	471
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	941				1338	471
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	89				11	88
cM capacity (veh/h)	724				129	539

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	79	298	298	546	395	177
Volume Left	79	0	0	0	0	114
Volume Right	0	0	0	0	122	63
cSH	724	1700	1700	1700	1700	195
Volume to Capacity	0.11	0.18	0.18	0.32	0.23	0.91
Queue Length 95th (ft)	9	0	0	0	0	178
Control Delay (s)	10.6	0.0	0.0	0.0	0.0	92.2
Lane LOS	B					F
Approach Delay (s)	1.2			0.0		92.2
Approach LOS						F

Intersection Summary			
Average Delay	9.6		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	295	359	358	29	43	508
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	301	366	365	30	44	518
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	395				1165	197
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	395				1165	197
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	74				68	36
cM capacity (veh/h)	1160				139	811

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	301	183	183	244	151	44	518
Volume Left	301	0	0	0	0	44	0
Volume Right	0	0	0	0	30	0	518
cSH	1160	1700	1700	1700	1700	139	811
Volume to Capacity	0.26	0.11	0.11	0.14	0.09	0.32	0.64
Queue Length 95th (ft)	26	0	0	0	0	31	118
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	42.5	17.0
Lane LOS	A					E	C
Approach Delay (s)	4.1			0.0		19.0	
Approach LOS						C	

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	380	20	10	256	2	62	0	67	20	0	69
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
Hourly flow rate (vph)	2	413	22	11	278	2	67	0	73	22	0	75
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	280			435			664	730	217	585	740	140
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	280			435			664	730	217	585	740	140
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			79	100	91	94	100	91
cM capacity (veh/h)	1279			1121			314	344	787	355	339	882

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	2	275	159	11	186	95	140	97
Volume Left	2	0	0	11	0	0	67	22
Volume Right	0	0	22	0	0	2	73	75
cSH	1279	1700	1700	1121	1700	1700	456	661
Volume to Capacity	0.00	0.16	0.09	0.01	0.11	0.06	0.31	0.15
Queue Length 95th (ft)	0	0	0	1	0	0	32	13
Control Delay (s)	7.8	0.0	0.0	8.2	0.0	0.0	16.4	11.4
Lane LOS	A			A			C	B
Approach Delay (s)	0.0			0.3			16.4	11.4
Approach LOS							C	B

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	1	4	131	0	210	3	278	186	142	133	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	1	4	136	0	219	3	290	194	148	139	0
Pedestrians		9			7						22	
Lane Width (ft)		12.0			12.0						12.0	
Walking Speed (ft/s)		4.0			4.0						4.0	
Percent Blockage		1			1						2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	835	746	78	673	746	174	148			297		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	835	746	78	673	746	174	148			297		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	55	100	73	100			88		
cM capacity (veh/h)	167	295	959	303	295	819	1421			1254		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	6	355	100	193	194	148	92	46
Volume Left	1	136	3	0	0	148	0	0
Volume Right	4	219	0	0	194	0	0	0
cSH	443	495	1421	1700	1700	1254	1700	1700
Volume to Capacity	0.01	0.72	0.00	0.11	0.11	0.12	0.05	0.03
Queue Length 95th (ft)	1	143	0	0	0	10	0	0
Control Delay (s)	13.2	28.6	0.3	0.0	0.0	8.3	0.0	0.0
Lane LOS	B	D	A			A		
Approach Delay (s)	13.2	28.6	0.1			4.3		
Approach LOS	B	D						

Intersection Summary			
Average Delay	10.1		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	147	168	32	162	6	164	5	17	4	11	15
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	15	158	181	34	174	6	176	5	18	4	12	16
Pedestrians		29			14			55			4	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		2			1			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	185			394			631	587	317	564	674	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	185			394			631	587	317	564	674	210
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			46	99	97	99	97	98
cM capacity (veh/h)	1385			1111			326	385	682	386	343	807

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	354	215	200	32
Volume Left	15	34	176	4
Volume Right	181	6	18	16
cSH	1385	1111	344	492
Volume to Capacity	0.01	0.03	0.58	0.07
Queue Length 95th (ft)	1	2	87	5
Control Delay (s)	0.4	1.6	29.0	12.8
Lane LOS	A	A	D	B
Approach Delay (s)	0.4	1.6	29.0	12.8
Approach LOS			D	B

Intersection Summary			
Average Delay	8.4		
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	3	3	16	162	0	227	31	319	146	155	86	1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	3	3	17	172	0	241	33	339	155	165	91	1
Pedestrians		48			23			20				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		4			2			2				
Right turn flare (veh)												
Median type		Raised			Raised							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1117	1053	160	888	899	362	141			518		
vC1, stage 1 conf vol	470	470		428	428							
vC2, stage 2 conf vol	647	584		460	470							
vCu, unblocked vol	1117	1053	160	888	899	362	141			518		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	98	98	27	100	64	98			84		
cM capacity (veh/h)	82	181	836	235	233	669	1385			1028		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	23	172	241	372	155	165	93
Volume Left	3	172	0	33	0	165	0
Volume Right	17	0	241	0	155	0	1
cSH	303	235	669	1385	1700	1028	1700
Volume to Capacity	0.08	0.73	0.36	0.02	0.09	0.16	0.05
Queue Length 95th (ft)	6	125	41	2	0	14	0
Control Delay (s)	17.9	53.2	13.4	0.9	0.0	9.2	0.0
Lane LOS	C	F	B	A		A	
Approach Delay (s)	17.9	30.0		0.6		5.9	
Approach LOS	C	D					

Intersection Summary			
Average Delay	12.0		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	98	201	25	33	469	47	5	0	2	39	2	77
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	102	209	26	34	489	49	5	0	2	41	2	80
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	538			235			985	1033	222	973	997	489
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	538			235			985	1033	222	973	997	489
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			97			97	100	100	81	99	86
cM capacity (veh/h)	1031			1332			176	204	817	209	214	579

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	102	235	523	49	7	123
Volume Left	102	0	34	0	5	41
Volume Right	0	26	0	49	2	80
cSH	1031	1700	1332	1700	227	603
Volume to Capacity	0.10	0.14	0.03	0.03	0.03	0.20
Queue Length 95th (ft)	8	0	2	0	2	19
Control Delay (s)	8.9	0.0	0.8	0.0	21.4	17.2
Lane LOS	A		A		C	C
Approach Delay (s)	2.7		0.7		21.4	17.2
Approach LOS					C	C

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX C – 2015 LEVEL OF SERVICE WORKSHEETS

2015 Scenario 1: Minor Change

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3476		1770	3479		1770	1634			1775	1583
Flt Permitted	0.33	1.00		0.23	1.00		0.72	1.00			0.74	1.00
Satd. Flow (perm)	612	3476		433	3479		1336	1634			1369	1583
Volume (vph)	68	883	119	6	673	86	83	2	8	56	1	135
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	72	939	127	6	716	91	88	2	9	60	1	144
RTOR Reduction (vph)	0	14	0	0	13	0	0	7	0	0	0	110
Lane Group Flow (vph)	72	1052	0	6	794	0	88	4	0	0	61	34
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	17.2	17.2		17.2	17.2		7.9	7.9			7.9	7.9
Effective Green, g (s)	17.2	17.2		17.2	17.2		7.9	7.9			7.9	7.9
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.24	0.24			0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	318	1806		225	1808		319	390			327	378
v/s Ratio Prot		c0.30			0.23			0.00				
v/s Ratio Perm	0.12			0.01			c0.07				0.04	0.02
v/c Ratio	0.23	0.58		0.03	0.44		0.28	0.01			0.19	0.09
Uniform Delay, d1	4.3	5.5		3.9	4.9		10.3	9.6			10.0	9.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4	0.5		0.0	0.2		0.5	0.0			0.3	0.1
Delay (s)	4.7	6.0		3.9	5.1		10.7	9.6			10.3	9.9
Level of Service	A	A		A	A		B	A			B	A
Approach Delay (s)		5.9			5.1			10.6			10.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	33.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	485	462	228	8	31	537
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	505	481	238	8	32	559
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		604				
pX, platoon unblocked						
vC, conflicting volume	246				1493	123
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	246				1493	123
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	62				54	38
cM capacity (veh/h)	1317				70	905

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	505	241	241	158	88	32	559
Volume Left	505	0	0	0	0	32	0
Volume Right	0	0	0	0	8	0	559
cSH	1317	1700	1700	1700	1700	70	905
Volume to Capacity	0.38	0.14	0.14	0.09	0.05	0.46	0.62
Queue Length 95th (ft)	46	0	0	0	0	46	110
Control Delay (s)	9.4	0.0	0.0	0.0	0.0	93.9	15.2
Lane LOS	A					F	C
Approach Delay (s)	4.8			0.0		19.5	
Approach LOS						C	

Intersection Summary			
Average Delay	8.9		
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	427	36	93	164	20	70	0	37	2	0	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	32	454	38	99	174	21	74	0	39	2	0	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	196			493			893	912	454	940	939	185
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	196			493			893	912	454	940	939	185
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			91			69	100	94	99	100	100
cM capacity (veh/h)	1377			1071			239	243	606	208	234	857

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	32	454	38	99	196	114	4
Volume Left	32	0	0	99	0	74	2
Volume Right	0	0	38	0	21	39	2
cSH	1377	1700	1700	1071	1700	302	335
Volume to Capacity	0.02	0.27	0.02	0.09	0.12	0.38	0.01
Queue Length 95th (ft)	2	0	0	8	0	42	1
Control Delay (s)	7.7	0.0	0.0	8.7	0.0	23.9	15.9
Lane LOS	A			A		C	C
Approach Delay (s)	0.5			2.9		23.9	15.9
Approach LOS						C	C

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	1	0	4	183	0	240	5	290	171	164	90	3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	0	4	193	0	253	5	305	180	173	95	3
Approach Volume (veh/h)		5			445			491			271	
Crossing Volume (veh/h)		460			312			174			198	
High Capacity (veh/h)		964			1084			1209			1186	
High v/c (veh/h)		0.01			0.41			0.41			0.23	
Low Capacity (veh/h)		781			889			1001			981	
Low v/c (veh/h)		0.01			0.50			0.49			0.28	

Intersection Summary				
Maximum v/c High	0.41			
Maximum v/c Low	0.50			
Intersection Capacity Utilization	81.6%	ICU Level of Service	D	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	44	113	178	16	136	12	236	19	29	7	13	51
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	45	116	184	16	140	12	243	20	30	7	13	53
Pedestrians		9			36			38			21	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			3			3			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	174			338			585	544	282	575	629	176
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	174			338			585	544	282	575	629	176
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			29	95	96	98	96	94
cM capacity (veh/h)	1379			1183			344	405	711	351	362	845

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	345	169	293	73
Volume Left	45	16	243	7
Volume Right	184	12	30	53
cSH	1379	1183	367	611
Volume to Capacity	0.03	0.01	0.80	0.12
Queue Length 95th (ft)	3	1	170	10
Control Delay (s)	1.3	0.9	44.0	11.7
Lane LOS	A	A	E	B
Approach Delay (s)	1.3	0.9	44.0	11.7
Approach LOS			E	B

Intersection Summary			
Average Delay	16.3		
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	1	1	2	177	0	291	3	239	200	339	86	19
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
Hourly flow rate (vph)	1	1	2	192	0	316	3	260	217	368	93	21

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	4	192	316	263	217	368	114
Volume Left (vph)	1	192	0	3	0	368	0
Volume Right (vph)	2	0	316	0	217	0	21
Hadj (s)	-0.22	0.53	-0.67	0.04	-0.67	0.53	-0.09
Departure Headway (s)	7.9	7.6	6.4	7.0	6.3	7.4	6.8
Degree Utilization, x	0.01	0.41	0.56	0.51	0.38	0.76	0.21
Capacity (veh/h)	399	453	533	492	554	469	511
Control Delay (s)	11.0	14.5	16.2	15.8	11.8	28.8	10.4
Approach Delay (s)	11.0	15.5		14.0		24.5	
Approach LOS	B	C		B		C	

Intersection Summary			
Delay	18.0		
HCM Level of Service	C		
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	107	372	14	17	458	56	0	0	19	53	1	110
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	114	396	15	18	487	60	0	0	20	56	1	117
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	547			411			1155	1214	403	1167	1162	487
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	547			411			1155	1214	403	1167	1162	487
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			98			100	100	97	62	99	80
cM capacity (veh/h)	1023			1148			125	159	647	149	171	580

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	114	411	505	60	20	174
Volume Left	114	0	18	0	0	56
Volume Right	0	15	0	60	20	117
cSH	1023	1700	1148	1700	647	455
Volume to Capacity	0.11	0.24	0.02	0.04	0.03	0.38
Queue Length 95th (ft)	9	0	1	0	2	44
Control Delay (s)	9.0	0.0	0.5	0.0	10.7	22.8
Lane LOS	A		A		B	C
Approach Delay (s)	1.9		0.4		10.7	22.8
Approach LOS					B	C

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
1: Mt Werner Cir & Steamboat Blvd

9/12/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3468		1770	3472		1770	1634			1775	1583
Flt Permitted	0.16	1.00		0.24	1.00		0.66	1.00			0.72	1.00
Satd. Flow (perm)	298	3468		447	3472		1231	1634			1344	1583
Volume (vph)	88	819	128	9	1043	150	129	2	8	140	2	69
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	94	871	136	10	1110	160	137	2	9	149	2	73
RTOR Reduction (vph)	0	19	0	0	17	0	0	7	0	0	0	55
Lane Group Flow (vph)	94	988	0	10	1253	0	137	4	0	0	151	18
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0		25.0	25.0		11.0	11.0			11.0	11.0
Effective Green, g (s)	25.0	25.0		25.0	25.0		11.0	11.0			11.0	11.0
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.25	0.25			0.25	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	169	1970		254	1973		308	409			336	396
v/s Ratio Prot		0.28			c0.36			0.00				
v/s Ratio Perm	0.32			0.02			0.11				c0.11	0.01
v/c Ratio	0.56	0.50		0.04	0.63		0.44	0.01			0.45	0.05
Uniform Delay, d1	6.0	5.7		4.2	6.4		13.9	12.4			13.9	12.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.9	0.2		0.1	0.7		1.0	0.0			1.0	0.0
Delay (s)	9.9	5.9		4.3	7.1		14.9	12.4			14.9	12.6
Level of Service	A	A		A	A		B	B			B	B
Approach Delay (s)		6.3			7.1			14.8			14.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	520	447	455	29	43	747
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	525	452	460	29	43	755
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		604				
pX, platoon unblocked						
vC, conflicting volume	489				1751	244
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	489				1751	244
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	51				0	0
cM capacity (veh/h)	1071				39	756

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	525	226	226	306	182	43	755
Volume Left	525	0	0	0	0	43	0
Volume Right	0	0	0	0	29	0	755
cSH	1071	1700	1700	1700	1700	39	756
Volume to Capacity	0.49	0.13	0.13	0.18	0.11	1.11	1.00
Queue Length 95th (ft)	69	0	0	0	0	108	418
Control Delay (s)	11.6	0.0	0.0	0.0	0.0	337.9	55.6
Lane LOS	B					F	F
Approach Delay (s)	6.2			0.0		70.9	
Approach LOS						F	

Intersection Summary			
Average Delay	27.7		
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	460	30	17	350	0	65	0	68	20	0	69
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	495	32	18	376	0	70	0	73	22	0	74
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	376			527			982	908	495	981	940	376
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376			527			982	908	495	981	940	376
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			65	100	87	89	100	89
cM capacity (veh/h)	1182			1040			200	271	575	197	259	670

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	0	495	32	18	376	143	96
Volume Left	0	0	0	18	0	70	22
Volume Right	0	0	32	0	0	73	74
cSH	1700	1700	1700	1040	1700	300	435
Volume to Capacity	0.00	0.29	0.02	0.02	0.22	0.48	0.22
Queue Length 95th (ft)	0	0	0	1	0	61	21
Control Delay (s)	0.0	0.0	0.0	8.5	0.0	27.4	15.6
Lane LOS				A		D	C
Approach Delay (s)	0.0			0.4		27.4	15.6
Approach LOS						D	C

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	1	1	4	204	0	275	3	280	265	195	159	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	1	1	4	210	0	284	3	289	273	201	164	0
Approach Volume (veh/h)		6			494			565			365	
Crossing Volume (veh/h)		575			293			203			213	
High Capacity (veh/h)		879			1101			1181			1172	
High v/c (veh/h)		0.01			0.45			0.48			0.31	
Low Capacity (veh/h)		706			904			976			968	
Low v/c (veh/h)		0.01			0.55			0.58			0.38	

Intersection Summary				
Maximum v/c High	0.48			
Maximum v/c Low	0.58			
Intersection Capacity Utilization	96.9%	ICU Level of Service	F	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	45	182	234	40	203	7	230	9	23	5	15	46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	48	194	249	43	216	7	245	10	24	5	16	49
Pedestrians		33			16			63			47	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		3			1			5			4	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	270			506			872	832	397	811	953	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	270			506			872	832	397	811	953	300
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			96			0	96	96	98	93	93
cM capacity (veh/h)	1242			1004			192	255	610	231	217	691

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	490	266	279	70
Volume Left	48	43	245	5
Volume Right	249	7	24	49
cSH	1242	1004	206	420
Volume to Capacity	0.04	0.04	1.35	0.17
Queue Length 95th (ft)	3	3	392	15
Control Delay (s)	1.2	1.8	230.9	15.3
Lane LOS	A	A	F	C
Approach Delay (s)	1.2	1.8	230.9	15.3
Approach LOS			F	C

Intersection Summary			
Average Delay	60.1		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	3	3	16	201	0	414	31	349	184	326	120	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	3	17	212	0	436	33	367	194	343	126	1

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	23	212	436	400	194	343	127
Volume Left (vph)	3	212	0	33	0	343	0
Volume Right (vph)	17	0	436	0	194	0	1
Hadj (s)	-0.38	0.53	-0.67	0.07	-0.67	0.53	0.03
Departure Headway (s)	8.6	8.1	6.9	7.6	6.9	8.2	7.7
Degree Utilization, x	0.06	0.48	0.83	0.85	0.37	0.79	0.27
Capacity (veh/h)	381	432	513	464	507	424	449
Control Delay (s)	12.1	17.0	34.2	39.4	12.7	34.2	12.4
Approach Delay (s)	12.1	28.6		30.7		28.3	
Approach LOS	B	D		D		D	

Intersection Summary			
Delay	29.0		
HCM Level of Service	D		
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	142	382	25	33	668	65	5	0	2	63	2	117
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	146	394	26	34	689	67	5	0	2	65	2	121
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	756			420			1457	1523	407	1445	1469	689
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	756			420			1457	1523	407	1445	1469	689
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			97			92	100	100	30	98	73
cM capacity (veh/h)	855			1140			66	95	644	93	102	446

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	146	420	723	67	7	188
Volume Left	146	0	34	0	5	65
Volume Right	0	26	0	67	2	121
cSH	855	1700	1140	1700	88	261
Volume to Capacity	0.17	0.25	0.03	0.04	0.08	0.72
Queue Length 95th (ft)	15	0	2	0	7	125
Control Delay (s)	10.1	0.0	0.8	0.0	49.4	49.3
Lane LOS	B		A		E	E
Approach Delay (s)	2.6		0.7		49.4	49.3
Approach LOS					E	E

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

2015 Scenario 2: Mitigated

HCM Signalized Intersection Capacity Analysis
1: Mt Werner Cir & Steamboat Blvd

9/12/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3476		1770	3479		1770	1634			1775	1583
Flt Permitted	0.33	1.00		0.23	1.00		0.72	1.00			0.74	1.00
Satd. Flow (perm)	612	3476		433	3479		1336	1634			1369	1583
Volume (vph)	68	883	119	6	673	86	83	2	8	56	1	135
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	72	939	127	6	716	91	88	2	9	60	1	144
RTOR Reduction (vph)	0	14	0	0	13	0	0	7	0	0	0	110
Lane Group Flow (vph)	72	1052	0	6	794	0	88	4	0	0	61	34
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	17.2	17.2		17.2	17.2		7.9	7.9			7.9	7.9
Effective Green, g (s)	17.2	17.2		17.2	17.2		7.9	7.9			7.9	7.9
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.24	0.24			0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	318	1806		225	1808		319	390			327	378
v/s Ratio Prot		c0.30			0.23			0.00				
v/s Ratio Perm	0.12			0.01			c0.07				0.04	0.02
v/c Ratio	0.23	0.58		0.03	0.44		0.28	0.01			0.19	0.09
Uniform Delay, d1	4.3	5.5		3.9	4.9		10.3	9.6			10.0	9.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4	0.5		0.0	0.2		0.5	0.0			0.3	0.1
Delay (s)	4.7	6.0		3.9	5.1		10.7	9.6			10.3	9.9
Level of Service	A	A		A	A		B	A			B	A
Approach Delay (s)		5.9			5.1			10.6			10.0	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	33.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1855		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1855		1770	1583
Volume (vph)	485	462	228	8	31	537
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	505	481	238	8	32	559
RTOR Reduction (vph)	0	0	1	0	0	487
Lane Group Flow (vph)	505	481	245	0	32	72
Turn Type	Prot					Perm
Protected Phases	7		8		2	
Permitted Phases		4				2
Actuated Green, G (s)	26.2	61.7	31.5		10.3	10.3
Effective Green, g (s)	26.2	61.7	31.5		10.3	10.3
Actuated g/C Ratio	0.33	0.77	0.39		0.13	0.13
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	580	1437	730		228	204
v/s Ratio Prot	c0.29		0.13		0.02	
v/s Ratio Perm		c0.26				c0.05
v/c Ratio	0.87	0.33	0.34		0.14	0.35
Uniform Delay, d1	25.3	2.8	16.9		30.9	31.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	13.4	0.6	0.3		0.3	1.1
Delay (s)	38.8	3.5	17.2		31.2	32.9
Level of Service	D	A	B		C	C
Approach Delay (s)		21.5	17.2		32.8	
Approach LOS		C	B		C	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	427	36	93	164	20	70	0	37	2	0	2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	32	454	38	99	174	21	74	0	39	2	0	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	196			493			912	931	473	940	939	185
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	196			493			912	931	473	940	939	185
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			91			68	100	93	99	100	100
cM capacity (veh/h)	1377			1071			232	237	591	208	234	857

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	32	493	99	196	114	4
Volume Left	32	0	99	0	74	2
Volume Right	0	38	0	21	39	2
cSH	1377	1700	1071	1700	294	334
Volume to Capacity	0.02	0.29	0.09	0.12	0.39	0.01
Queue Length 95th (ft)	2	0	8	0	44	1
Control Delay (s)	7.7	0.0	8.7	0.0	24.8	15.9
Lane LOS	A		A		C	C
Approach Delay (s)	0.5		2.9		24.8	15.9
Approach LOS					C	C

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	1	0	4	183	0	240	5	290	171	164	90	3
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1	0	4	193	0	253	5	305	180	173	95	3
Approach Volume (veh/h)		5			445			491			271	
Crossing Volume (veh/h)		460			312			174			198	
High Capacity (veh/h)		964			1084			1209			1186	
High v/c (veh/h)		0.01			0.41			0.41			0.23	
Low Capacity (veh/h)		781			889			1001			981	
Low v/c (veh/h)		0.01			0.50			0.49			0.28	

Intersection Summary				
Maximum v/c High	0.41			
Maximum v/c Low	0.50			
Intersection Capacity Utilization	81.6%	ICU Level of Service	D	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	44	113	178	16	136	12	236	19	29	7	13	51
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	45	116	184	16	140	12	243	20	30	7	13	53

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	345	169	293	73
Volume Left (vph)	45	16	243	7
Volume Right (vph)	184	12	30	53
Hadj (s)	-0.26	0.01	0.14	-0.38
Departure Headway (s)	5.0	5.5	5.5	5.4
Degree Utilization, x	0.48	0.26	0.45	0.11
Capacity (veh/h)	681	600	605	570
Control Delay (s)	12.4	10.4	12.9	9.1
Approach Delay (s)	12.4	10.4	12.9	9.1
Approach LOS	B	B	B	A

Intersection Summary			
Delay	11.9		
HCM Level of Service	B		
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	1	1	2	177	0	291	3	239	200	339	86	19
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
Hourly flow rate (vph)	1	1	2	192	0	316	3	260	217	368	93	21
Approach Volume (veh/h)		4			509			480			483	
Crossing Volume (veh/h)		654			264			371			196	
High Capacity (veh/h)		825			1126			1035			1188	
High v/c (veh/h)		0.01			0.45			0.46			0.41	
Low Capacity (veh/h)		658			926			845			983	
Low v/c (veh/h)		0.01			0.55			0.57			0.49	

Intersection Summary				
Maximum v/c High	0.46			
Maximum v/c Low	0.57			
Intersection Capacity Utilization	94.3%	ICU Level of Service	F	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	107	372	14	17	458	56	0	0	19	53	1	110
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	114	396	15	18	487	60	0	0	20	56	1	117
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		1138										
pX, platoon unblocked												
vC, conflicting volume	547			411			1155	1214	403	1167	1162	487
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	547			411			1155	1214	403	1167	1162	487
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			98			100	100	97	62	99	80
cM capacity (veh/h)	1023			1148			125	159	647	149	171	580

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	114	411	505	60	20	174
Volume Left	114	0	18	0	0	56
Volume Right	0	15	0	60	20	117
cSH	1023	1700	1148	1700	647	455
Volume to Capacity	0.11	0.24	0.02	0.04	0.03	0.38
Queue Length 95th (ft)	9	0	1	0	2	44
Control Delay (s)	9.0	0.0	0.5	0.0	10.7	22.8
Lane LOS	A		A		B	C
Approach Delay (s)	1.9		0.4		10.7	22.8
Approach LOS					B	C

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
1: Mt Werner Cir & Steamboat Blvd

9/12/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3468		1770	3472		1770	1634			1775	1583
Flt Permitted	0.16	1.00		0.24	1.00		0.66	1.00			0.72	1.00
Satd. Flow (perm)	298	3468		447	3472		1231	1634			1344	1583
Volume (vph)	88	819	128	9	1043	150	129	2	8	140	2	69
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	94	871	136	10	1110	160	137	2	9	149	2	73
RTOR Reduction (vph)	0	19	0	0	17	0	0	7	0	0	0	55
Lane Group Flow (vph)	94	988	0	10	1253	0	137	4	0	0	151	18
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0		25.0	25.0		11.0	11.0			11.0	11.0
Effective Green, g (s)	25.0	25.0		25.0	25.0		11.0	11.0			11.0	11.0
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.25	0.25			0.25	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	169	1970		254	1973		308	409			336	396
v/s Ratio Prot		0.28			c0.36			0.00				
v/s Ratio Perm	0.32			0.02			0.11				c0.11	0.01
v/c Ratio	0.56	0.50		0.04	0.63		0.44	0.01			0.45	0.05
Uniform Delay, d1	6.0	5.7		4.2	6.4		13.9	12.4			13.9	12.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.9	0.2		0.1	0.7		1.0	0.0			1.0	0.0
Delay (s)	9.9	5.9		4.3	7.1		14.9	12.4			14.9	12.6
Level of Service	A	A		A	A		B	B			B	B
Approach Delay (s)		6.3			7.1			14.8			14.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1848		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1848		1770	1583
Volume (vph)	520	447	455	29	43	747
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	525	452	460	29	43	755
RTOR Reduction (vph)	0	0	3	0	0	625
Lane Group Flow (vph)	525	452	486	0	43	130
Turn Type	Prot					Perm
Protected Phases	7		8		2	
Permitted Phases		4				2
Actuated Green, G (s)	27.3	59.8	28.5		12.2	12.2
Effective Green, g (s)	27.3	59.8	28.5		12.2	12.2
Actuated g/C Ratio	0.34	0.75	0.36		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	604	1393	658		270	241
v/s Ratio Prot	c0.30		c0.26		0.02	
v/s Ratio Perm		0.24				c0.08
v/c Ratio	0.87	0.32	0.74		0.16	0.54
Uniform Delay, d1	24.7	3.4	22.5		29.4	31.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	12.6	0.6	4.4		0.3	2.5
Delay (s)	37.3	4.0	26.9		29.7	33.8
Level of Service	D	A	C		C	C
Approach Delay (s)		21.9	26.9		33.6	
Approach LOS		C	C		C	

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	460	30	17	350	0	65	0	68	20	0	69
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	495	32	18	376	0	70	0	73	22	0	74
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	376			527			998	924	511	981	940	376
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376			527			998	924	511	981	940	376
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			64	100	87	89	100	89
cM capacity (veh/h)	1182			1040			195	265	563	196	259	670

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	527	18	376	143	96
Volume Left	0	0	18	0	70	22
Volume Right	0	32	0	0	73	74
cSH	1700	1700	1040	1700	293	435
Volume to Capacity	0.00	0.31	0.02	0.22	0.49	0.22
Queue Length 95th (ft)	0	0	1	0	63	21
Control Delay (s)	0.0	0.0	8.5	0.0	28.4	15.6
Lane LOS			A		D	C
Approach Delay (s)	0.0		0.4		28.4	15.6
Approach LOS					D	C

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	1	1	4	204	0	275	3	280	265	195	159	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	1	1	4	210	0	284	3	289	273	201	164	0
Approach Volume (veh/h)		6			494			565			365	
Crossing Volume (veh/h)		575			293			203			213	
High Capacity (veh/h)		879			1101			1181			1172	
High v/c (veh/h)		0.01			0.45			0.48			0.31	
Low Capacity (veh/h)		706			904			976			968	
Low v/c (veh/h)		0.01			0.55			0.58			0.38	

Intersection Summary				
Maximum v/c High	0.48			
Maximum v/c Low	0.58			
Intersection Capacity Utilization	96.9%	ICU Level of Service	F	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	45	182	234	40	203	7	230	9	23	5	15	46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	48	194	249	43	216	7	245	10	24	5	16	49

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	490	266	279	70
Volume Left (vph)	48	43	245	5
Volume Right (vph)	249	7	24	49
Hadj (s)	-0.25	0.05	0.16	-0.37
Departure Headway (s)	5.3	5.9	6.3	6.3
Degree Utilization, x	0.72	0.44	0.49	0.12
Capacity (veh/h)	656	556	525	468
Control Delay (s)	20.7	13.4	15.1	10.2
Approach Delay (s)	20.7	13.4	15.1	10.2
Approach LOS	C	B	C	B

Intersection Summary			
Delay	16.9		
HCM Level of Service	C		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	3	3	16	201	0	414	31	349	184	326	120	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	3	17	212	0	436	33	367	194	343	126	1
Approach Volume (veh/h)		23			647			594			471	
Crossing Volume (veh/h)		681			403			349			244	
High Capacity (veh/h)		807			1008			1052			1144	
High v/c (veh/h)		0.03			0.64			0.56			0.41	
Low Capacity (veh/h)		643			821			860			943	
Low v/c (veh/h)		0.04			0.79			0.69			0.50	

Intersection Summary				
Maximum v/c High	0.64			
Maximum v/c Low	0.79			
Intersection Capacity Utilization	109.8%	ICU Level of Service	H	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	142	382	25	33	668	65	5	0	2	63	2	117
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	146	394	26	34	689	67	5	0	2	65	2	121
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		1138										
pX, platoon unblocked												
vC, conflicting volume	756			420			1457	1523	407	1445	1469	689
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	756			420			1457	1523	407	1445	1469	689
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			97			92	100	100	30	98	73
cM capacity (veh/h)	855			1140			66	95	644	93	102	446

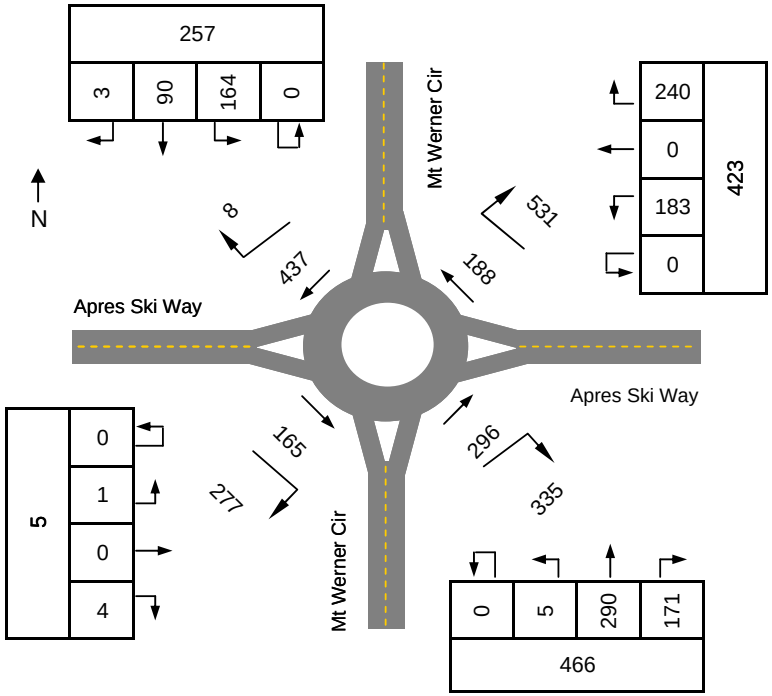
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	146	420	723	67	7	188
Volume Left	146	0	34	0	5	65
Volume Right	0	26	0	67	2	121
cSH	855	1700	1140	1700	88	261
Volume to Capacity	0.17	0.25	0.03	0.04	0.08	0.72
Queue Length 95th (ft)	15	0	2	0	7	125
Control Delay (s)	10.1	0.0	0.8	0.0	49.4	49.3
Lane LOS	B		A		E	E
Approach Delay (s)	2.6		0.7		49.4	49.3
Approach LOS					E	E

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

2015 Roundabout Analysis

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2015	E-W	Apres Ski Way		
PHF	0.95	Time	AM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	466	165	1109	0.44	11	B	50
South	257	188	1088	0.25	9	A	25
East	5	437	884	0.01	9	A	0
West	423	296	994	0.45	12	B	50
All	1151				11	B	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

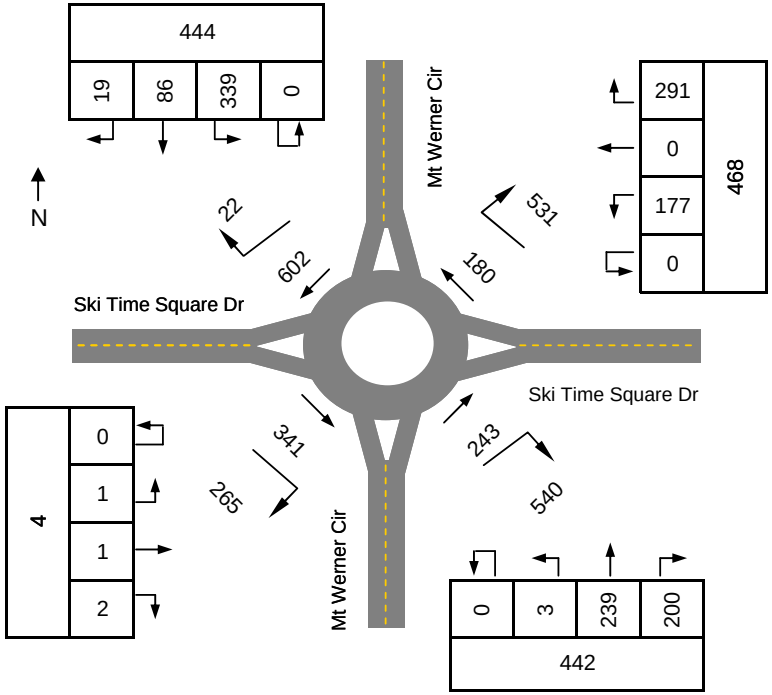
Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2015	E-W	Ski Time Square Dr		
PHF	0.92	Time	AM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	442	341	958	0.50	12	B	75
South	444	180	1095	0.44	11	B	50
East	4	602	771	0.01	10	A	0
West	468	243	1039	0.49	12	B	75
All	1358				12	B	



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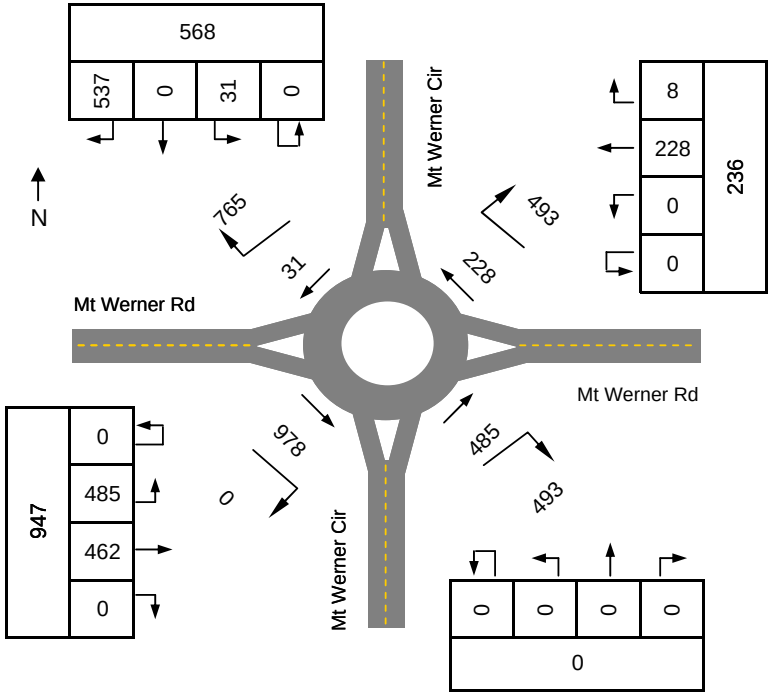
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2015	E-W	Mt Werner Rd		
PHF	0.96	Time	AM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North							
South	568	228	1052	0.56	13	B	100
East	947	31	1240	0.80	18	C	225
West	236	485	850	0.29	11	B	25
All	1751				15	C	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

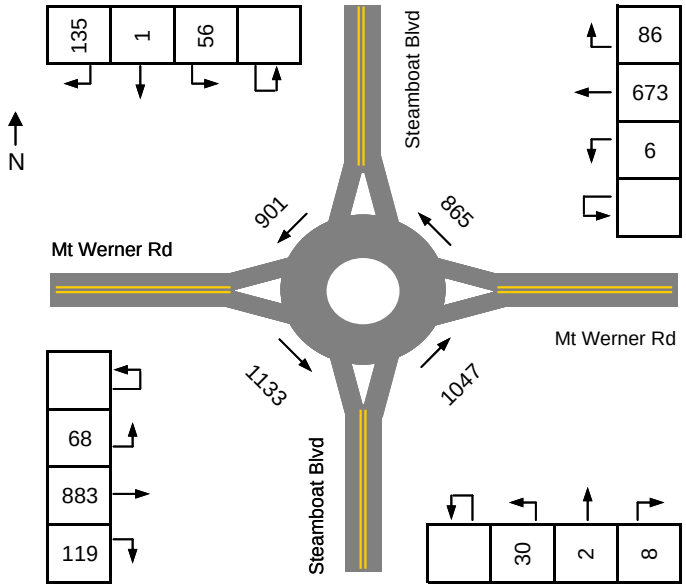
Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

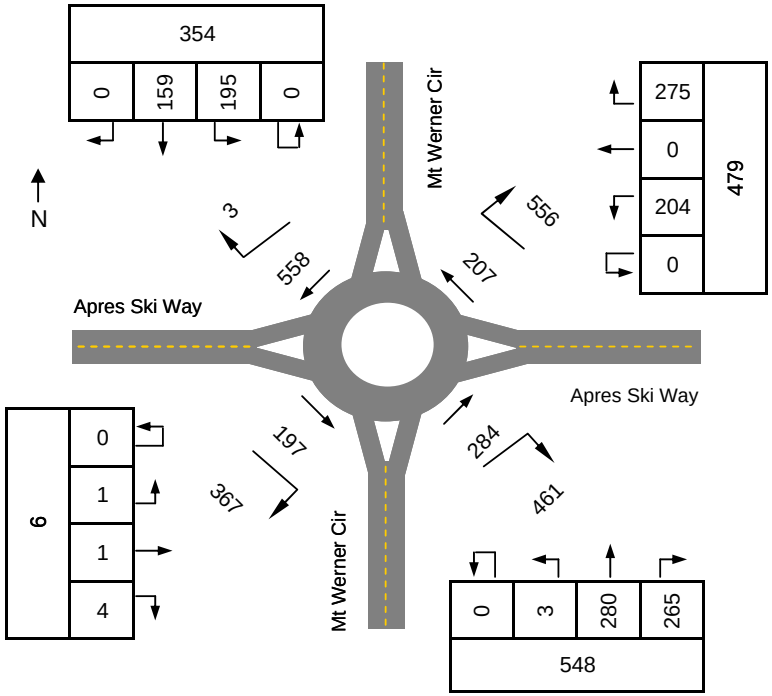
Type of Design		Double-Lane Roundabout						
Period (hr)	0.25	Date	2015		E-W	Mt Werner Rd		
PHF	0.95	Time	AM		N-S	Steamboat Blvd		
Approach	**Total Volume (vph)**	**2nd Lane Storage (veh)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	40	0	1007	852	0.05	9	A	0
South	192	0	709	958	0.21	10	A	25
East	1070	1000	63	2377	0.47	8	A	75
West	765	1000	100	2351	0.34	7	A	50
All	2067					8	A	



Source: Roundabouts: An Informational Guide (FHWA, 2000), Equation A-9
Capacity calculation is valid for inscribed diameters of 40 to 60 m (130 to 200 ft).
Does not account for flared entry lanes or pedestrian effects.
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2015	E-W	Apres Ski Way		
PHF	0.97	Time	PM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	548	197	1080	0.52	12	B	75
South	354	207	1071	0.34	10	B	50
East	6	558	799	0.01	10	A	0
West	479	284	1004	0.49	12	B	75
All	1387				11	B	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

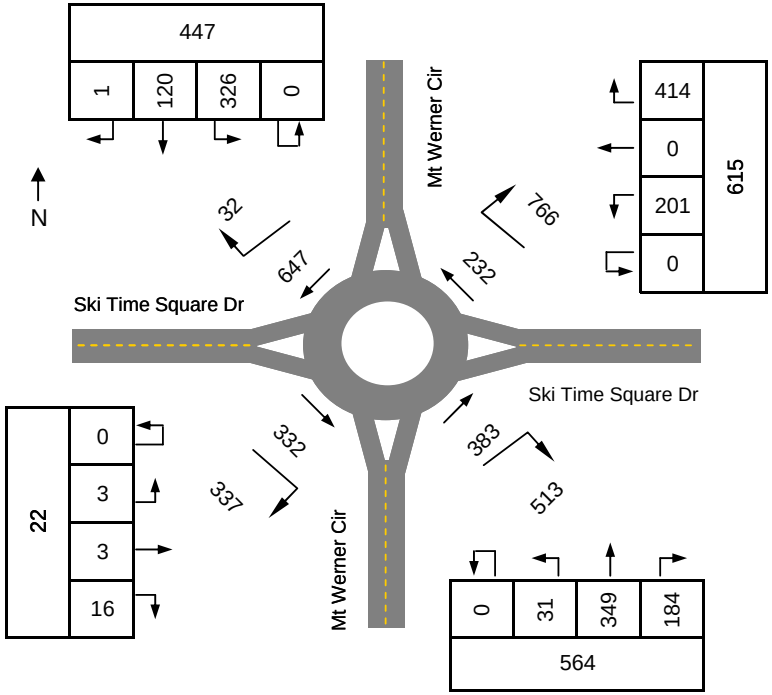
Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2015	E-W	Ski Time Square Dr		
PHF	0.95	Time	PM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	564	332	965	0.62	15	B	100
South	447	232	1049	0.45	11	B	50
East	22	647	742	0.03	10	B	0
West	615	383	925	0.70	17	C	150
All	1648				15	B	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

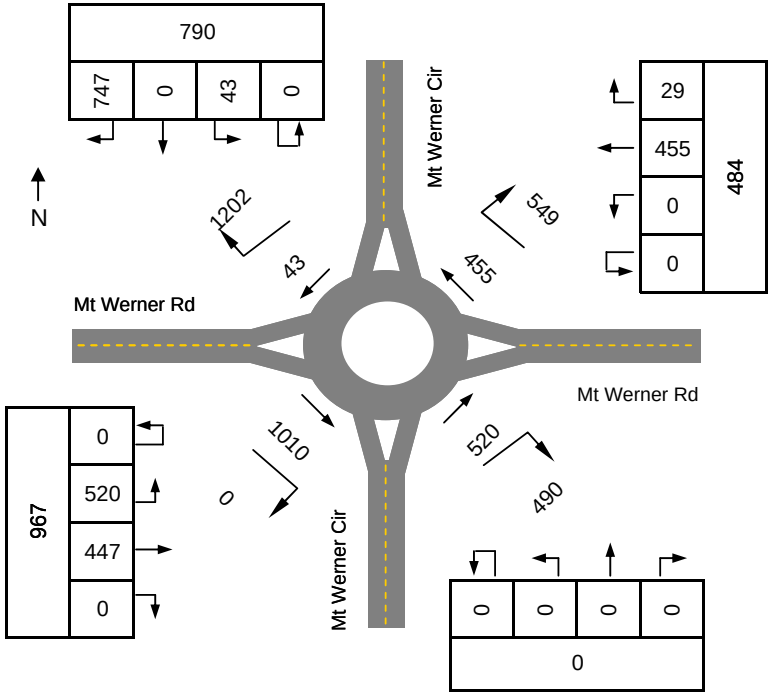
Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2015	E-W	Mt Werner Rd		
PHF	0.99	Time	PM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North							
South	790	455	871	0.92	36	E	325
East	967	43	1227	0.80	18	C	225
West	484	520	825	0.59	16	C	100
All	2241				24	C	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

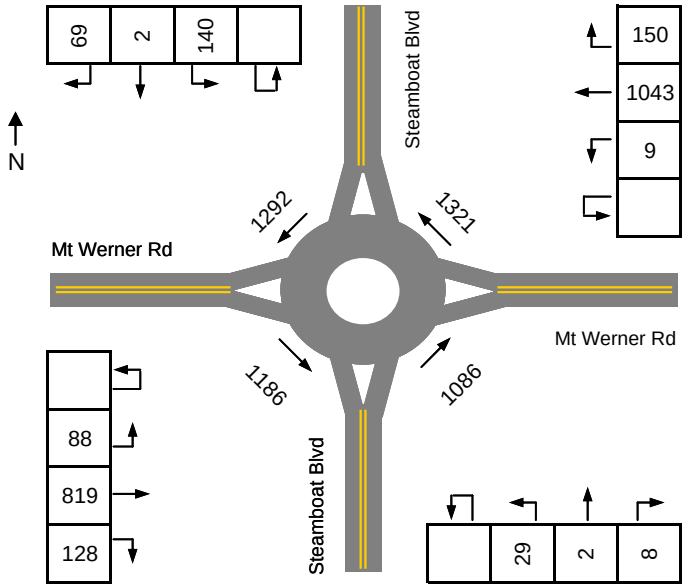
Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design		Double-Lane Roundabout						
Period (hr)	0.25	Date	2025		E-W	Mt Werner Rd		
PHF	0.95	Time	PM		N-S	Steamboat Blvd		
Approach	**Total Volume (vph)**	**2nd Lane Storage (veh)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	39	0	1047	837	0.05	10	A	0
South	211	0	1081	825	0.27	11	B	25
East	1035	1000	151	2314	0.47	8	A	75
West	1202	1000	119	2337	0.54	8	A	75
All	2487					8	A	



Source: Roundabouts: An Informational Guide (FHWA, 2000), Equation A-9
Capacity calculation is valid for inscribed diameters of 40 to 60 m (130 to 200 ft).
Does not account for flared entry lanes or pedestrian effects.
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

APPENDIX D – 2025 LEVEL OF SERVICE WORKSHEETS

2025 Scenario 1: Minor Change

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3423		1770	3479		1770	1639			1775	1583
Flt Permitted	0.23	1.00		0.16	1.00		0.71	1.00			0.74	1.00
Satd. Flow (perm)	432	3423		293	3479		1320	1639			1387	1583
Volume (vph)	82	1006	283	6	870	111	149	2	8	69	1	164
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	86	1059	298	6	916	117	157	2	8	73	1	173
RTOR Reduction (vph)	0	35	0	0	14	0	0	6	0	0	0	115
Lane Group Flow (vph)	86	1322	0	6	1019	0	157	4	0	0	74	58
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.4	25.4		25.4	25.4		10.9	10.9			10.9	10.9
Effective Green, g (s)	25.4	25.4		25.4	25.4		10.9	10.9			10.9	10.9
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.25	0.25			0.25	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	248	1963		168	1995		325	403			341	389
v/s Ratio Prot		c0.39			0.29			0.00				
v/s Ratio Perm	0.20			0.02			c0.12				0.05	0.04
v/c Ratio	0.35	0.67		0.04	0.51		0.48	0.01			0.22	0.15
Uniform Delay, d1	5.0	6.6		4.1	5.7		14.3	12.6			13.3	13.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.8	0.9		0.1	0.2		1.1	0.0			0.3	0.2
Delay (s)	5.9	7.5		4.2	5.9		15.4	12.6			13.6	13.2
Level of Service	A	A		A	A		B	B			B	B
Approach Delay (s)		7.4			5.9			15.3			13.4	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	597	486	309	8	31	678
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	615	501	319	8	32	699
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		604				
pX, platoon unblocked						
vC, conflicting volume	327				1804	163
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	327				1804	163
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	50				9	18
cM capacity (veh/h)	1230				35	852

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	615	251	251	212	114	32	699
Volume Left	615	0	0	0	0	32	0
Volume Right	0	0	0	0	8	0	699
cSH	1230	1700	1700	1700	1700	35	852
Volume to Capacity	0.50	0.15	0.15	0.12	0.07	0.91	0.82
Queue Length 95th (ft)	72	0	0	0	0	81	231
Control Delay (s)	10.8	0.0	0.0	0.0	0.0	290.7	25.3
Lane LOS	B					F	D
Approach Delay (s)	6.0			0.0		36.9	
Approach LOS						E	

Intersection Summary			
Average Delay	15.5		
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	469	36	93	208	16	70	0	37	11	0	39
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	13	494	38	98	219	17	74	0	39	12	0	41
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	236			532			975	951	494	981	980	227
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236			532			975	951	494	981	980	227
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			91			63	100	93	94	100	95
cM capacity (veh/h)	1331			1036			202	233	576	196	224	812

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	13	494	38	98	236	113	53
Volume Left	13	0	0	98	0	74	12
Volume Right	0	0	38	0	17	39	41
cSH	1331	1700	1700	1036	1700	260	480
Volume to Capacity	0.01	0.29	0.02	0.09	0.14	0.43	0.11
Queue Length 95th (ft)	1	0	0	8	0	51	9
Control Delay (s)	7.7	0.0	0.0	8.8	0.0	29.0	13.4
Lane LOS	A			A		D	B
Approach Delay (s)	0.2			2.6		29.0	13.4
Approach LOS						D	B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	1	0	4	224	0	270	5	288	224	196	89	3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	0	4	233	0	281	5	300	233	204	93	3
Approach Volume (veh/h)		5			515			539			300	
Crossing Volume (veh/h)		530			306			205			239	
High Capacity (veh/h)		911			1089			1179			1149	
High v/c (veh/h)		0.01			0.47			0.46			0.26	
Low Capacity (veh/h)		735			893			975			947	
Low v/c (veh/h)		0.01			0.58			0.55			0.32	

Intersection Summary				
Maximum v/c High	0.47			
Maximum v/c Low	0.58			
Intersection Capacity Utilization	90.6%	ICU Level of Service	E	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	69	122	229	19	139	13	282	22	35	8	16	73
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	70	124	234	19	142	13	288	22	36	8	16	74
Pedestrians		11			43			46			25	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			4			4			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	180			404			709	647	330	684	757	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	180			404			709	647	330	684	757	184
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			98			0	93	95	97	94	91
cM capacity (veh/h)	1366			1110			263	342	659	279	296	832

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	429	174	346	99
Volume Left	70	19	288	8
Volume Right	234	13	36	74
cSH	1366	1110	285	569
Volume to Capacity	0.05	0.02	1.21	0.17
Queue Length 95th (ft)	4	1	396	16
Control Delay (s)	1.7	1.1	161.8	12.7
Lane LOS	A	A	F	B
Approach Delay (s)	1.7	1.1	161.8	12.7
Approach LOS			F	B

Intersection Summary			
Average Delay	55.5		
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	4	7	194	2	378	6	255	216	402	110	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	4	7	204	2	398	6	268	227	423	116	26

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	23	206	398	275	227	423	142
Volume Left (vph)	12	204	0	6	0	423	0
Volume Right (vph)	7	0	398	0	227	0	26
Hadj (s)	-0.06	0.53	-0.67	0.05	-0.67	0.53	-0.10
Departure Headway (s)	8.8	8.1	6.8	7.6	6.9	7.9	7.3
Degree Utilization, x	0.06	0.46	0.76	0.58	0.44	0.93	0.29
Capacity (veh/h)	385	433	511	454	504	423	476
Control Delay (s)	12.3	16.6	26.9	19.6	14.0	54.5	12.0
Approach Delay (s)	12.3	23.4		17.0		43.8	
Approach LOS	B	C		C		E	

Intersection Summary			
Delay	28.2		
HCM Level of Service	D		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	111	461	33	19	566	59	31	0	22	54	1	112
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	117	485	35	20	596	62	33	0	23	57	1	118
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	658			520			1373	1434	503	1378	1389	596
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	658			520			1373	1434	503	1378	1389	596
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			98			61	100	96	45	99	77
cM capacity (veh/h)	930			1046			83	115	569	104	122	504

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	117	520	616	62	56	176
Volume Left	117	0	20	0	33	57
Volume Right	0	35	0	62	23	118
cSH	930	1700	1046	1700	129	318
Volume to Capacity	0.13	0.31	0.02	0.04	0.43	0.55
Queue Length 95th (ft)	11	0	1	0	47	79
Control Delay (s)	9.4	0.0	0.5	0.0	52.5	34.5
Lane LOS	A		A		F	D
Approach Delay (s)	1.7		0.5		52.5	34.5
Approach LOS					F	D

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3422		1770	3466		1770	1639			1775	1583
Flt Permitted	0.12	1.00		0.13	1.00		0.58	1.00			0.72	1.00
Satd. Flow (perm)	220	3422		238	3466		1089	1639			1344	1583
Volume (vph)	106	1002	283	9	1142	182	274	2	8	176	2	83
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	112	1055	298	9	1202	192	288	2	8	185	2	87
RTOR Reduction (vph)	0	31	0	0	16	0	0	6	0	0	0	47
Lane Group Flow (vph)	112	1322	0	9	1378	0	288	4	0	0	187	40
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	42.9	42.9		42.9	42.9		22.1	22.1			22.1	22.1
Effective Green, g (s)	42.9	42.9		42.9	42.9		22.1	22.1			22.1	22.1
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.30	0.30			0.30	0.30
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	129	2011		140	2037		330	496			407	479
v/s Ratio Prot		0.39			0.40			0.00				
v/s Ratio Perm	c0.51			0.04			c0.26				0.14	0.03
v/c Ratio	0.87	0.66		0.06	0.68		0.87	0.01			0.46	0.08
Uniform Delay, d1	12.7	10.1		6.4	10.3		24.1	17.8			20.6	18.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	41.8	0.8		0.2	0.9		21.5	0.0			0.8	0.1
Delay (s)	54.5	10.9		6.6	11.2		45.6	17.8			21.4	18.3
Level of Service	D	B		A	B		D	B			C	B
Approach Delay (s)		14.2			11.2			44.7			20.4	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	659	527	438	29	43	895
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	659	527	438	29	43	895
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		604				
pX, platoon unblocked						
vC, conflicting volume	467				2034	234
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	467				2034	234
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	40				0	0
cM capacity (veh/h)	1091				20	768

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	659	264	264	292	175	43	895
Volume Left	659	0	0	0	0	43	0
Volume Right	0	0	0	0	29	0	895
cSH	1091	1700	1700	1700	1700	20	768
Volume to Capacity	0.60	0.15	0.15	0.17	0.10	2.20	1.16
Queue Length 95th (ft)	106	0	0	0	0	143	697
Control Delay (s)	13.2	0.0	0.0	0.0	0.0	963.2	108.6
Lane LOS	B					F	F
Approach Delay (s)	7.3			0.0		147.8	
Approach LOS						F	

Intersection Summary			
Average Delay	56.9		
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	32	508	30	17	378	8	65	0	68	9	0	24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	34	535	32	18	398	8	68	0	72	9	0	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	406			566			1061	1044	535	1112	1072	402
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	406			566			1061	1044	535	1112	1072	402
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			63	100	87	94	100	96
cM capacity (veh/h)	1152			1006			187	218	546	156	210	648

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	34	535	32	18	406	140	35
Volume Left	34	0	0	18	0	68	9
Volume Right	0	0	32	0	8	72	25
cSH	1152	1700	1700	1006	1700	281	348
Volume to Capacity	0.03	0.31	0.02	0.02	0.24	0.50	0.10
Queue Length 95th (ft)	2	0	0	1	0	65	8
Control Delay (s)	8.2	0.0	0.0	8.6	0.0	29.8	16.5
Lane LOS	A			A		D	C
Approach Delay (s)	0.5			0.4		29.8	16.5
Approach LOS						D	C

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	1	1	4	251	0	336	3	271	311	226	148	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	1	1	4	256	0	343	3	277	317	231	151	0
Approach Volume (veh/h)		6			599			597			382	
Crossing Volume (veh/h)		638			281			233			259	
High Capacity (veh/h)		836			1111			1154			1130	
High v/c (veh/h)		0.01			0.54			0.52			0.34	
Low Capacity (veh/h)		668			913			952			930	
Low v/c (veh/h)		0.01			0.66			0.63			0.41	

Intersection Summary				
Maximum v/c High	0.54			
Maximum v/c Low	0.66			
Intersection Capacity Utilization	107.1%	ICU Level of Service	G	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	61	192	285	48	227	8	294	12	27	6	18	66
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	64	202	300	51	239	8	309	13	28	6	19	69
Pedestrians		41			20			77			57	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		3			2			6			5	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	304			579			1022	963	449	936	1109	341
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304			579			1022	963	449	936	1109	341
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			95			0	94	95	96	89	89
cM capacity (veh/h)	1197			931			134	204	561	176	167	645

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	566	298	351	95
Volume Left	64	51	309	6
Volume Right	300	8	28	69
cSH	1197	931	145	369
Volume to Capacity	0.05	0.05	2.43	0.26
Queue Length 95th (ft)	4	4	753	25
Control Delay (s)	1.5	2.0	711.1	18.1
Lane LOS	A	A	F	C
Approach Delay (s)	1.5	2.0	711.1	18.1
Approach LOS			F	C

Intersection Summary			
Average Delay	192.8		
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	5	20	217	2	483	36	397	197	405	142	11
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	11	5	21	226	2	503	38	414	205	422	148	11

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	38	228	503	451	205	422	159
Volume Left (vph)	11	226	0	38	0	422	0
Volume Right (vph)	21	0	503	0	205	0	11
Hadj (s)	-0.24	0.53	-0.67	0.08	-0.67	0.53	-0.02
Departure Headway (s)	9.7	8.5	7.4	8.2	7.4	8.6	8.1
Degree Utilization, x	0.10	0.54	1.03	1.02	0.42	1.01	0.36
Capacity (veh/h)	367	415	492	451	480	404	438
Control Delay (s)	13.7	20.0	74.1	76.1	14.5	76.3	14.4
Approach Delay (s)	13.7	57.2		56.8		59.3	
Approach LOS	B	F		F		F	

Intersection Summary			
Delay	56.9		
HCM Level of Service	F		
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	145	489	54	35	789	67	28	0	4	65	2	121
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	148	499	55	36	805	68	29	0	4	66	2	123
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	873			554			1700	1767	527	1676	1727	805
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	873			554			1700	1767	527	1676	1727	805
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	81			96			29	100	99	0	97	68
cM capacity (veh/h)	772			1016			40	65	551	62	69	382

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	148	554	841	68	33	192
Volume Left	148	0	36	0	29	66
Volume Right	0	55	0	68	4	123
cSH	772	1700	1016	1700	45	176
Volume to Capacity	0.19	0.33	0.04	0.04	0.72	1.09
Queue Length 95th (ft)	18	0	3	0	70	239
Control Delay (s)	10.8	0.0	0.9	0.0	194.3	102.2
Lane LOS	B		A		F	F
Approach Delay (s)	2.3		0.9		194.3	102.2
Approach LOS					F	F

Intersection Summary			
Average Delay	15.4		
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

2025 Scenario 2: Mitigated

HCM Signalized Intersection Capacity Analysis
1: Mt Werner Cir & Steamboat Blvd

9/12/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3423		1770	3479		1770	1639			1775	1583
Flt Permitted	0.23	1.00		0.16	1.00		0.71	1.00			0.74	1.00
Satd. Flow (perm)	432	3423		293	3479		1320	1639			1387	1583
Volume (vph)	82	1006	283	6	870	111	149	2	8	69	1	164
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	86	1059	298	6	916	117	157	2	8	73	1	173
RTOR Reduction (vph)	0	35	0	0	14	0	0	6	0	0	0	115
Lane Group Flow (vph)	86	1322	0	6	1019	0	157	4	0	0	74	58
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.4	25.4		25.4	25.4		10.9	10.9			10.9	10.9
Effective Green, g (s)	25.4	25.4		25.4	25.4		10.9	10.9			10.9	10.9
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.25	0.25			0.25	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	248	1963		168	1995		325	403			341	389
v/s Ratio Prot		c0.39			0.29			0.00				
v/s Ratio Perm	0.20			0.02			c0.12				0.05	0.04
v/c Ratio	0.35	0.67		0.04	0.51		0.48	0.01			0.22	0.15
Uniform Delay, d1	5.0	6.6		4.1	5.7		14.3	12.6			13.3	13.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.8	0.9		0.1	0.2		1.1	0.0			0.3	0.2
Delay (s)	5.9	7.5		4.2	5.9		15.4	12.6			13.6	13.2
Level of Service	A	A		A	A		B	B			B	B
Approach Delay (s)		7.4			5.9			15.3			13.4	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1857		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1857		1770	1583
Volume (vph)	597	486	309	8	31	678
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	615	501	319	8	32	699
RTOR Reduction (vph)	0	0	1	0	0	601
Lane Group Flow (vph)	615	501	326	0	32	98
Turn Type	Prot					Perm
Protected Phases	7		8		2	
Permitted Phases		4				2
Actuated Green, G (s)	32.2	60.8	24.6		11.2	11.2
Effective Green, g (s)	32.2	60.8	24.6		11.2	11.2
Actuated g/C Ratio	0.40	0.76	0.31		0.14	0.14
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	712	1416	571		248	222
v/s Ratio Prot	c0.35		c0.18		0.02	
v/s Ratio Perm		0.27				c0.06
v/c Ratio	0.86	0.35	0.57		0.13	0.44
Uniform Delay, d1	21.9	3.2	23.3		30.1	31.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.6	0.7	1.4		0.2	1.4
Delay (s)	32.5	3.8	24.7		30.4	32.9
Level of Service	C	A	C		C	C
Approach Delay (s)		19.6	24.7		32.8	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	469	36	93	208	16	70	0	37	11	0	39
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	13	494	38	98	219	17	74	0	39	12	0	41
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	236			532			994	969	513	981	980	227
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236			532			994	969	513	981	980	227
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			91			62	100	93	94	100	95
cM capacity (veh/h)	1331			1036			196	227	561	196	224	812

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	13	532	98	236	113	53
Volume Left	13	0	98	0	74	12
Volume Right	0	38	0	17	39	41
cSH	1331	1700	1036	1700	253	480
Volume to Capacity	0.01	0.31	0.09	0.14	0.45	0.11
Queue Length 95th (ft)	1	0	8	0	54	9
Control Delay (s)	7.7	0.0	8.8	0.0	30.2	13.4
Lane LOS	A		A		D	B
Approach Delay (s)	0.2		2.6		30.2	13.4
Approach LOS					D	B

Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	1	0	4	224	0	270	5	288	224	196	89	3
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	1	0	4	233	0	281	5	300	233	204	93	3
Approach Volume (veh/h)		5			515			539			300	
Crossing Volume (veh/h)		530			306			205			239	
High Capacity (veh/h)		911			1089			1179			1149	
High v/c (veh/h)		0.01			0.47			0.46			0.26	
Low Capacity (veh/h)		735			893			975			947	
Low v/c (veh/h)		0.01			0.58			0.55			0.32	

Intersection Summary				
Maximum v/c High	0.47			
Maximum v/c Low	0.58			
Intersection Capacity Utilization	90.6%	ICU Level of Service	E	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	69	122	229	19	139	13	282	22	35	8	16	73
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	70	124	234	19	142	13	288	22	36	8	16	74

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	429	174	346	99
Volume Left (vph)	70	19	288	8
Volume Right (vph)	234	13	36	74
Hadj (s)	-0.26	0.01	0.14	-0.40
Departure Headway (s)	5.3	6.0	5.9	5.9
Degree Utilization, x	0.64	0.29	0.57	0.16
Capacity (veh/h)	640	523	569	498
Control Delay (s)	17.2	11.5	16.5	10.1
Approach Delay (s)	17.2	11.5	16.5	10.1
Approach LOS	C	B	C	B

Intersection Summary			
Delay	15.3		
HCM Level of Service	C		
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	11	4	7	194	2	378	6	255	216	402	110	25
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	4	7	204	2	398	6	268	227	423	116	26
Approach Volume (veh/h)		23			604			502			565	
Crossing Volume (veh/h)		743			286			439			213	
High Capacity (veh/h)		768			1106			980			1172	
High v/c (veh/h)		0.03			0.55			0.51			0.48	
Low Capacity (veh/h)		608			909			796			968	
Low v/c (veh/h)		0.04			0.66			0.63			0.58	

Intersection Summary				
Maximum v/c High	0.55			
Maximum v/c Low	0.66			
Intersection Capacity Utilization	105.3%	ICU Level of Service	G	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	111	461	33	19	566	59	31	0	22	54	1	112
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	117	485	35	20	596	62	33	0	23	57	1	118
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		1138										
pX, platoon unblocked												
vC, conflicting volume	658			520			1373	1434	503	1378	1389	596
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	658			520			1373	1434	503	1378	1389	596
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			98			61	100	96	45	99	77
cM capacity (veh/h)	930			1046			83	115	569	104	122	504

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	117	520	616	62	56	176
Volume Left	117	0	20	0	33	57
Volume Right	0	35	0	62	23	118
cSH	930	1700	1046	1700	129	318
Volume to Capacity	0.13	0.31	0.02	0.04	0.43	0.55
Queue Length 95th (ft)	11	0	1	0	47	79
Control Delay (s)	9.4	0.0	0.5	0.0	52.5	34.5
Lane LOS	A		A		F	D
Approach Delay (s)	1.7		0.5		52.5	34.5
Approach LOS					F	D

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
1: Mt Werner Cir & Steamboat Blvd

9/12/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3422		1770	3466		1770	1639			1775	1583
Flt Permitted	0.12	1.00		0.13	1.00		0.58	1.00			0.72	1.00
Satd. Flow (perm)	220	3422		238	3466		1089	1639			1344	1583
Volume (vph)	106	1002	283	9	1142	182	274	2	8	176	2	83
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	112	1055	298	9	1202	192	288	2	8	185	2	87
RTOR Reduction (vph)	0	31	0	0	16	0	0	6	0	0	0	47
Lane Group Flow (vph)	112	1322	0	9	1378	0	288	4	0	0	187	40
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	42.9	42.9		42.9	42.9		22.1	22.1			22.1	22.1
Effective Green, g (s)	42.9	42.9		42.9	42.9		22.1	22.1			22.1	22.1
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.30	0.30			0.30	0.30
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	129	2011		140	2037		330	496			407	479
v/s Ratio Prot		0.39			0.40			0.00				
v/s Ratio Perm	c0.51			0.04			c0.26				0.14	0.03
v/c Ratio	0.87	0.66		0.06	0.68		0.87	0.01			0.46	0.08
Uniform Delay, d1	12.7	10.1		6.4	10.3		24.1	17.8			20.6	18.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	41.8	0.8		0.2	0.9		21.5	0.0			0.8	0.1
Delay (s)	54.5	10.9		6.6	11.2		45.6	17.8			21.4	18.3
Level of Service	D	B		A	B		D	B			C	B
Approach Delay (s)		14.2			11.2			44.7			20.4	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Volume (vph)	659	527	438	29	43	895
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	659	527	438	29	43	895
RTOR Reduction (vph)	0	0	0	15	0	522
Lane Group Flow (vph)	659	527	438	14	43	373
Turn Type	Prot			Perm		Perm
Protected Phases	7		8		2	
Permitted Phases		4		8		2
Actuated Green, G (s)	29.0	52.0	19.0	19.0	20.0	20.0
Effective Green, g (s)	29.0	52.0	19.0	19.0	20.0	20.0
Actuated g/C Ratio	0.36	0.65	0.24	0.24	0.25	0.25
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	642	1211	442	376	443	396
v/s Ratio Prot	c0.37		c0.24		0.02	
v/s Ratio Perm		0.28		0.01		c0.24
v/c Ratio	1.03	0.44	0.99	0.04	0.10	0.94
Uniform Delay, d1	25.5	6.8	30.4	23.5	23.1	29.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.4	1.1	40.3	0.0	0.1	30.7
Delay (s)	67.9	8.0	70.7	23.5	23.2	60.1
Level of Service	E	A	E	C	C	E
Approach Delay (s)		41.3	67.8		58.4	
Approach LOS		D	E		E	

Intersection Summary			
HCM Average Control Delay	52.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	32	508	30	17	378	8	65	0	68	9	0	24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	34	535	32	18	398	8	68	0	72	9	0	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	406			566			1077	1060	551	1112	1072	402
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	406			566			1077	1060	551	1112	1072	402
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			62	100	87	94	100	96
cM capacity (veh/h)	1152			1006			182	214	534	156	210	648

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	34	566	18	406	140	35
Volume Left	34	0	18	0	68	9
Volume Right	0	32	0	8	72	25
cSH	1152	1700	1006	1700	275	348
Volume to Capacity	0.03	0.33	0.02	0.24	0.51	0.10
Queue Length 95th (ft)	2	0	1	0	67	8
Control Delay (s)	8.2	0.0	8.6	0.0	30.9	16.5
Lane LOS	A		A		D	C
Approach Delay (s)	0.5		0.4		30.9	16.5
Approach LOS					D	C

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	1	1	4	251	0	336	3	271	311	226	148	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	1	1	4	256	0	343	3	277	317	231	151	0
Approach Volume (veh/h)		6			599			597			382	
Crossing Volume (veh/h)		638			281			233			259	
High Capacity (veh/h)		836			1111			1154			1130	
High v/c (veh/h)		0.01			0.54			0.52			0.34	
Low Capacity (veh/h)		668			913			952			930	
Low v/c (veh/h)		0.01			0.66			0.63			0.41	

Intersection Summary				
Maximum v/c High	0.54			
Maximum v/c Low	0.66			
Intersection Capacity Utilization	107.1%	ICU Level of Service	G	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	61	192	285	48	227	8	294	12	27	6	18	66
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	64	202	300	51	239	8	309	13	28	6	19	69

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	566	298	351	95
Volume Left (vph)	64	51	309	6
Volume Right (vph)	300	8	28	69
Hadj (s)	-0.26	0.05	0.16	-0.39
Departure Headway (s)	6.0	6.8	7.0	7.4
Degree Utilization, x	0.94	0.56	0.68	0.20
Capacity (veh/h)	594	502	497	423
Control Delay (s)	48.3	18.3	23.8	12.2
Approach Delay (s)	48.3	18.3	23.8	12.2
Approach LOS	E	C	C	B

Intersection Summary			
Delay	32.3		
HCM Level of Service	D		
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	11	5	20	217	2	483	36	397	197	405	142	11
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	11	5	21	226	2	503	38	414	205	422	148	11
Approach Volume (veh/h)		38			731			656			581	
Crossing Volume (veh/h)		796			463			439			266	
High Capacity (veh/h)		735			962			980			1124	
High v/c (veh/h)		0.05			0.76			0.67			0.52	
Low Capacity (veh/h)		580			780			796			925	
Low v/c (veh/h)		0.06			0.94			0.82			0.63	

Intersection Summary				
Maximum v/c High	0.76			
Maximum v/c Low	0.94			
Intersection Capacity Utilization	125.0%	ICU Level of Service	H	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	145	489	54	35	789	67	28	0	4	65	2	121
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	148	499	55	36	805	68	29	0	4	66	2	123
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		1138										
pX, platoon unblocked												
vC, conflicting volume	873			554			1700	1767	527	1676	1727	805
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	873			554			1700	1767	527	1676	1727	805
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	81			96			29	100	99	0	97	68
cM capacity (veh/h)	772			1016			40	65	551	62	69	382

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	148	554	841	68	33	192
Volume Left	148	0	36	0	29	66
Volume Right	0	55	0	68	4	123
cSH	772	1700	1016	1700	45	176
Volume to Capacity	0.19	0.33	0.04	0.04	0.72	1.09
Queue Length 95th (ft)	18	0	3	0	70	239
Control Delay (s)	10.8	0.0	0.9	0.0	194.3	102.2
Lane LOS	B		A		F	F
Approach Delay (s)	2.3		0.9		194.3	102.2
Approach LOS					F	F

Intersection Summary			
Average Delay	15.4		
Intersection Capacity Utilization	90.9%	ICU Level of Service	E
Analysis Period (min)	15		

2025 Scenario 3: Transit Village

HCM Signalized Intersection Capacity Analysis
1: Mt Werner Cir & Steamboat Blvd

9/12/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3423		1770	3479		1770	1639			1775	1583
Flt Permitted	0.23	1.00		0.16	1.00		0.71	1.00			0.74	1.00
Satd. Flow (perm)	432	3423		293	3479		1320	1639			1387	1583
Volume (vph)	82	1006	283	6	870	111	149	2	8	69	1	164
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	86	1059	298	6	916	117	157	2	8	73	1	173
RTOR Reduction (vph)	0	35	0	0	14	0	0	6	0	0	0	115
Lane Group Flow (vph)	86	1322	0	6	1019	0	157	4	0	0	74	58
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.4	25.4		25.4	25.4		10.9	10.9			10.9	10.9
Effective Green, g (s)	25.4	25.4		25.4	25.4		10.9	10.9			10.9	10.9
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.25	0.25			0.25	0.25
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	248	1963		168	1995		325	403			341	389
v/s Ratio Prot		c0.39			0.29			0.00				
v/s Ratio Perm	0.20			0.02			c0.12				0.05	0.04
v/c Ratio	0.35	0.67		0.04	0.51		0.48	0.01			0.22	0.15
Uniform Delay, d1	5.0	6.6		4.1	5.7		14.3	12.6			13.3	13.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.8	0.9		0.1	0.2		1.1	0.0			0.3	0.2
Delay (s)	5.9	7.5		4.2	5.9		15.4	12.6			13.6	13.2
Level of Service	A	A		A	A		B	B			B	B
Approach Delay (s)		7.4			5.9			15.3			13.4	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.95		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1777		1770	1583
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	1863	1777		1770	1583
Volume (vph)	566	517	315	163	36	672
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	584	533	325	168	37	693
RTOR Reduction (vph)	0	0	19	0	0	595
Lane Group Flow (vph)	584	533	474	0	37	98
Turn Type	Prot					Perm
Protected Phases	7		8		2	
Permitted Phases		4				2
Actuated Green, G (s)	30.1	60.7	26.6		11.3	11.3
Effective Green, g (s)	30.1	60.7	26.6		11.3	11.3
Actuated g/C Ratio	0.38	0.76	0.33		0.14	0.14
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	666	1414	591		250	224
v/s Ratio Prot	c0.33		c0.27		0.02	
v/s Ratio Perm		0.29				c0.06
v/c Ratio	0.88	0.38	0.80		0.15	0.44
Uniform Delay, d1	23.2	3.3	24.3		30.1	31.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	12.4	0.8	7.7		0.3	1.4
Delay (s)	35.7	4.0	32.0		30.4	32.8
Level of Service	D	A	C		C	C
Approach Delay (s)		20.6	32.0		32.7	
Approach LOS		C	C		C	

Intersection Summary			
HCM Average Control Delay	26.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	418	123	6	354	16	75	0	32	0	0	49
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	13	440	129	6	373	17	79	0	34	0	0	52
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	389			569			967	932	505	893	988	381
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389			569			967	932	505	893	988	381
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			63	100	94	100	100	92
cM capacity (veh/h)	1169			1003			213	262	567	244	243	666

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	13	569	6	389	113	52
Volume Left	13	0	6	0	79	0
Volume Right	0	129	0	17	34	52
cSH	1169	1700	1003	1700	262	666
Volume to Capacity	0.01	0.33	0.01	0.23	0.43	0.08
Queue Length 95th (ft)	1	0	0	0	51	6
Control Delay (s)	8.1	0.0	8.6	0.0	28.8	10.9
Lane LOS	A		A		D	B
Approach Delay (s)	0.2		0.1		28.8	10.9
Approach LOS					D	B

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	0	0	5	341	0	66	5	54	391	49	30	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	5	355	0	69	5	56	407	51	31	0
Approach Volume (veh/h)		5			424			469			82	
Crossing Volume (veh/h)		438			61			51			360	
High Capacity (veh/h)		981			1320			1331			1043	
High v/c (veh/h)		0.01			0.32			0.35			0.08	
Low Capacity (veh/h)		797			1102			1112			852	
Low v/c (veh/h)		0.01			0.38			0.42			0.10	

Intersection Summary				
Maximum v/c High	0.35			
Maximum v/c Low	0.42			
Intersection Capacity Utilization	72.8%	ICU Level of Service	C	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	69	122	249	19	139	13	242	62	35	35	36	26
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	70	124	254	19	142	13	247	63	36	36	37	27

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	449	174	346	99
Volume Left (vph)	70	19	247	36
Volume Right (vph)	254	13	36	27
Hadj (s)	-0.27	0.01	0.11	-0.05
Departure Headway (s)	5.4	6.1	6.0	6.4
Degree Utilization, x	0.67	0.30	0.58	0.18
Capacity (veh/h)	640	516	562	466
Control Delay (s)	18.7	11.7	16.9	10.8
Approach Delay (s)	18.7	11.7	16.9	10.8
Approach LOS	C	B	C	B

Intersection Summary			
Delay	16.2		
HCM Level of Service	C		
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	16	4	2	49	2	523	2	64	54	564	28	29
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	17	4	2	52	2	551	2	67	57	594	29	31
Approach Volume (veh/h)		23			604			126			654	
Crossing Volume (veh/h)		675			86			615			56	
High Capacity (veh/h)		811			1295			851			1326	
High v/c (veh/h)		0.03			0.47			0.15			0.49	
Low Capacity (veh/h)		647			1079			682			1108	
Low v/c (veh/h)		0.04			0.56			0.19			0.59	

Intersection Summary				
Maximum v/c High	0.49			
Maximum v/c Low	0.59			
Intersection Capacity Utilization	82.4%	ICU Level of Service	E	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	131	565	33	19	545	39	31	0	22	34	1	132
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	138	595	35	20	574	41	33	0	23	36	1	139
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		1138										
pX, platoon unblocked												
vC, conflicting volume	615			629			1502	1543	612	1507	1519	574
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	615			629			1502	1543	612	1507	1519	574
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			98			49	100	95	57	99	73
cM capacity (veh/h)	965			953			64	96	493	83	100	518

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	138	629	594	41	56	176
Volume Left	138	0	20	0	33	36
Volume Right	0	35	0	41	23	139
cSH	965	1700	953	1700	100	398
Volume to Capacity	0.14	0.37	0.02	0.02	0.56	0.44
Queue Length 95th (ft)	12	0	2	0	65	55
Control Delay (s)	9.4	0.0	0.6	0.0	79.5	27.9
Lane LOS	A		A		F	D
Approach Delay (s)	1.7		0.5		79.5	27.9
Approach LOS					F	D

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
1: Mt Werner Cir & Steamboat Blvd

9/12/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	0.88			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3422		1770	3466		1770	1639			1775	1583
Flt Permitted	0.12	1.00		0.13	1.00		0.58	1.00			0.72	1.00
Satd. Flow (perm)	220	3422		238	3466		1089	1639			1344	1583
Volume (vph)	106	1002	283	9	1142	182	274	2	8	176	2	83
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	112	1055	298	9	1202	192	288	2	8	185	2	87
RTOR Reduction (vph)	0	31	0	0	16	0	0	6	0	0	0	47
Lane Group Flow (vph)	112	1322	0	9	1378	0	288	4	0	0	187	40
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	42.9	42.9		42.9	42.9		22.1	22.1			22.1	22.1
Effective Green, g (s)	42.9	42.9		42.9	42.9		22.1	22.1			22.1	22.1
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.30	0.30			0.30	0.30
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	129	2011		140	2037		330	496			407	479
v/s Ratio Prot		0.39			0.40			0.00				
v/s Ratio Perm	c0.51			0.04			c0.26				0.14	0.03
v/c Ratio	0.87	0.66		0.06	0.68		0.87	0.01			0.46	0.08
Uniform Delay, d1	12.7	10.1		6.4	10.3		24.1	17.8			20.6	18.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	41.8	0.8		0.2	0.9		21.5	0.0			0.8	0.1
Delay (s)	54.5	10.9		6.6	11.2		45.6	17.8			21.4	18.3
Level of Service	D	B		A	B		D	B			C	B
Approach Delay (s)		14.2			11.2			44.7			20.4	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1863	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	1863	1863	1583	1770	1583
Volume (vph)	623	563	586	137	114	747
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	623	563	586	137	114	747
RTOR Reduction (vph)	0	0	0	50	0	554
Lane Group Flow (vph)	623	563	586	87	114	193
Turn Type	Prot			Perm		Perm
Protected Phases	7		8		2	
Permitted Phases		4		8		2
Actuated Green, G (s)	31.6	57.7	22.1	22.1	14.3	14.3
Effective Green, g (s)	31.6	57.7	22.1	22.1	14.3	14.3
Actuated g/C Ratio	0.40	0.72	0.28	0.28	0.18	0.18
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	699	1344	515	437	316	283
v/s Ratio Prot	c0.35		c0.31		0.06	
v/s Ratio Perm		0.30		0.05		c0.12
v/c Ratio	0.89	0.42	1.14	0.20	0.36	0.68
Uniform Delay, d1	22.6	4.5	28.9	22.2	28.8	30.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.6	1.0	83.5	0.2	0.7	6.6
Delay (s)	36.2	5.4	112.4	22.4	29.5	37.3
Level of Service	D	A	F	C	C	D
Approach Delay (s)		21.6	95.4		36.3	
Approach LOS		C	F		D	

Intersection Summary			
HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	32	603	42	5	614	8	85	0	48	9	0	24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	34	635	44	5	646	8	89	0	51	9	0	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	655			679			1406	1389	657	1414	1407	651
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	655			679			1406	1389	657	1414	1407	651
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			16	100	89	90	100	95
cM capacity (veh/h)	932			913			107	136	465	99	133	469

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	34	679	5	655	140	35
Volume Left	34	0	5	0	89	9
Volume Right	0	44	0	8	51	25
cSH	932	1700	913	1700	148	233
Volume to Capacity	0.04	0.40	0.01	0.39	0.95	0.15
Queue Length 95th (ft)	3	0	0	0	169	13
Control Delay (s)	9.0	0.0	9.0	0.0	119.7	23.1
Lane LOS	A		A		F	C
Approach Delay (s)	0.4		0.1		119.7	23.1
Approach LOS					F	C

Intersection Summary			
Average Delay	11.6		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	0	1	4	537	0	31	3	126	531	9	86	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	1	4	548	0	32	3	129	542	9	88	0
Approach Volume (veh/h)		5			580			673			97	
Crossing Volume (veh/h)		645			132			10			551	
High Capacity (veh/h)		831			1249			1374			896	
High v/c (veh/h)		0.01			0.46			0.49			0.11	
Low Capacity (veh/h)		664			1038			1151			721	
Low v/c (veh/h)		0.01			0.56			0.58			0.13	

Intersection Summary				
Maximum v/c High	0.49			
Maximum v/c Low	0.58			
Intersection Capacity Utilization	86.0%	ICU Level of Service	E	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	64	192	285	48	227	8	275	31	27	6	18	66
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	67	202	300	51	239	8	289	33	28	6	19	69

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	569	298	351	95
Volume Left (vph)	67	51	289	6
Volume Right (vph)	300	8	28	69
Hadj (s)	-0.26	0.05	0.15	-0.39
Departure Headway (s)	6.0	6.8	7.0	7.4
Degree Utilization, x	0.95	0.57	0.68	0.20
Capacity (veh/h)	594	502	498	423
Control Delay (s)	49.5	18.4	23.8	12.2
Approach Delay (s)	49.5	18.4	23.8	12.2
Approach LOS	E	C	C	B

Intersection Summary			
Delay	32.9		
HCM Level of Service	D		
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	26	5	5	54	2	655	9	99	49	553	36	11
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	27	5	5	56	2	682	9	103	51	576	38	11
Approach Volume (veh/h)		38			741			164			625	
Crossing Volume (veh/h)		670			140			608			68	
High Capacity (veh/h)		814			1242			856			1313	
High v/c (veh/h)		0.05			0.60			0.19			0.48	
Low Capacity (veh/h)		649			1031			686			1096	
Low v/c (veh/h)		0.06			0.72			0.24			0.57	

Intersection Summary				
Maximum v/c High	0.60			
Maximum v/c Low	0.72			
Intersection Capacity Utilization	98.0%	ICU Level of Service	F	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	144	562	54	35	678	67	28	0	4	34	2	155
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	147	573	55	36	692	68	29	0	4	35	2	158
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												8
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		1138										
pX, platoon unblocked												
vC, conflicting volume	760			629			1659	1727	601	1635	1686	692
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	760			629			1659	1727	601	1635	1686	692
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			96			31	100	99	49	97	64
cM capacity (veh/h)	852			953			41	71	500	68	75	444

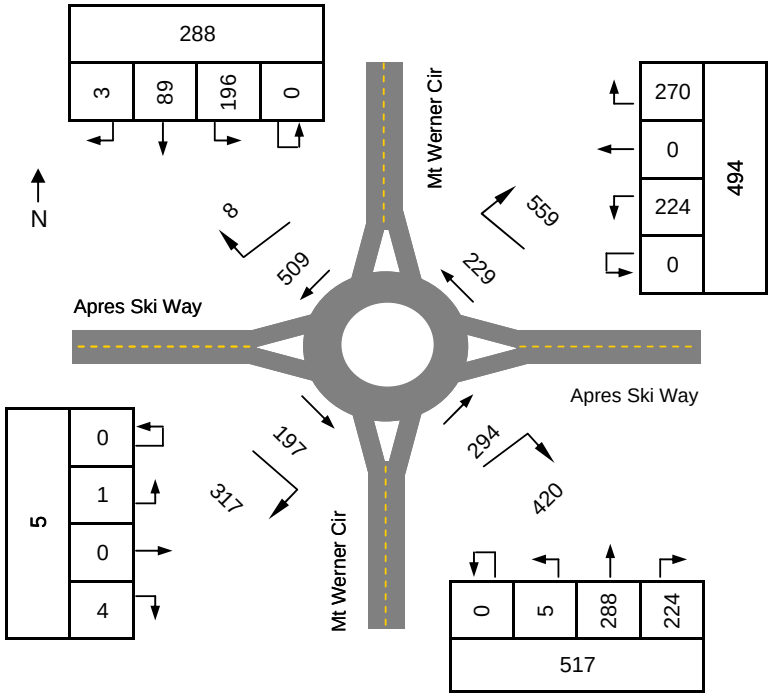
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	147	629	728	68	33	195
Volume Left	147	0	36	0	29	35
Volume Right	0	55	0	68	4	158
cSH	852	1700	953	1700	47	361
Volume to Capacity	0.17	0.37	0.04	0.04	0.70	0.54
Queue Length 95th (ft)	16	0	3	0	68	77
Control Delay (s)	10.1	0.0	1.0	0.0	184.3	34.6
Lane LOS	B		A		F	D
Approach Delay (s)	1.9		0.9		184.3	34.6
Approach LOS					F	D

Intersection Summary			
Average Delay	8.3		
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		

2025 Roundabout Analysis

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2025	E-W	Apres Ski Way		
PHF	0.96	Time	AM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	517	197	1080	0.50	12	B	75
South	288	229	1051	0.29	10	A	25
East	5	509	833	0.01	9	A	0
West	494	294	996	0.52	12	B	75
All	1304				12	B	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

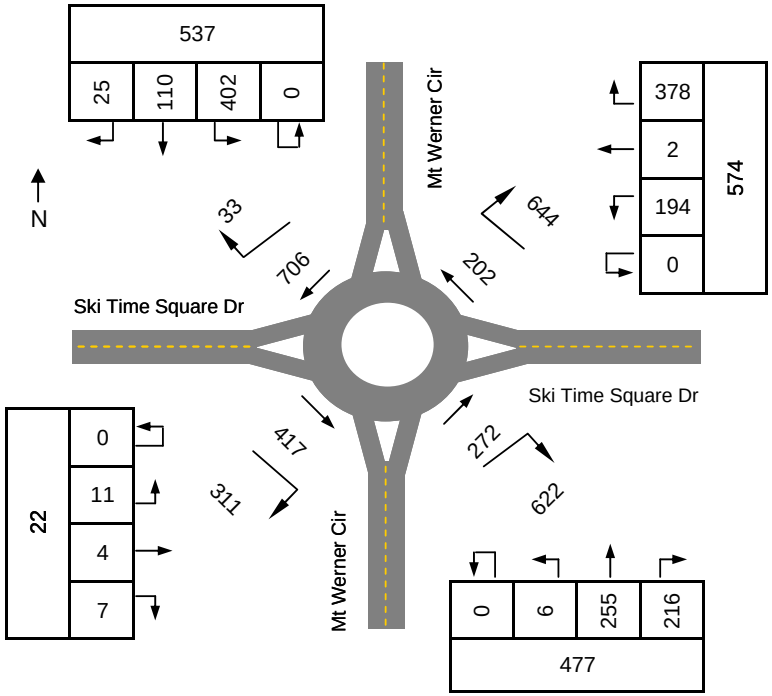
Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2025	E-W	Ski Time Square Dr		
PHF	0.95	Time	AM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	477	417	899	0.56	14	B	100
South	537	202	1075	0.53	12	B	75
East	22	706	707	0.03	10	B	0
West	574	272	1014	0.60	14	B	100
All	1610				13	B	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

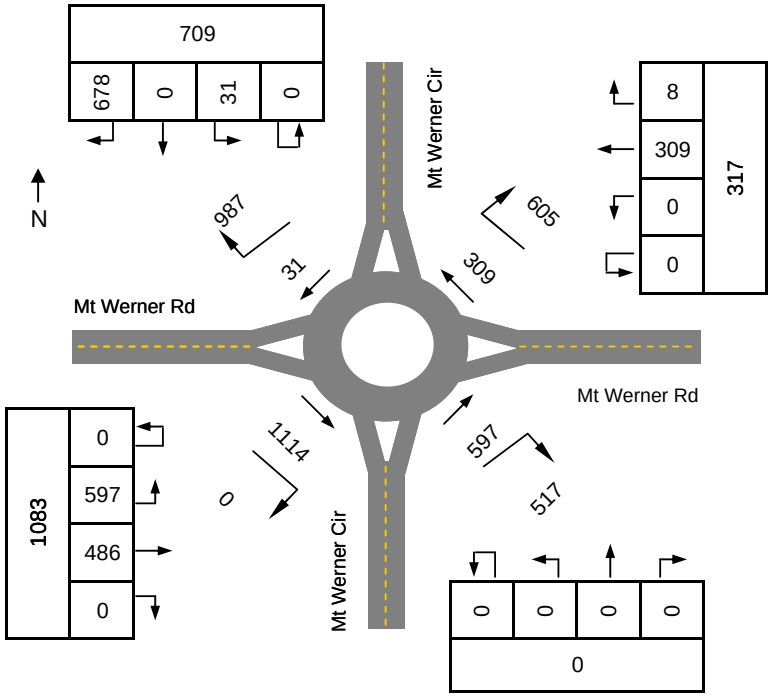
Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2025	E-W	Mt Werner Rd		
PHF	0.97	Time	AM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North							
South	709	309	984	0.74	18	C	175
East	1083	31	1240	0.90	27	D	350
West	317	597	774	0.42	13	B	50
All	2109				22	C	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

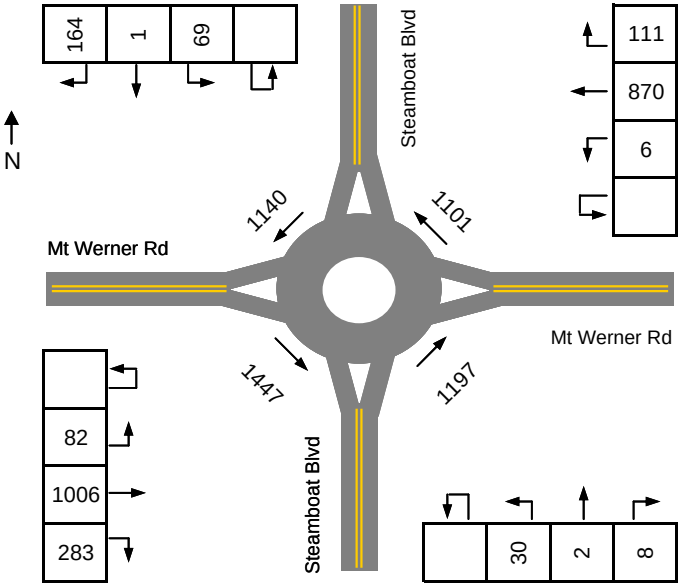
Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design		Double-Lane Roundabout						
Period (hr)	0.25	Date	2025		E-W	Mt Werner Rd		
PHF	0.95	Time	AM		N-S	Steamboat Blvd		
Approach	**Total Volume (vph)**	**2nd Lane Storage (veh)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	40	0	1157	798	0.05	10	A	0
South	234	0	906	888	0.28	11	B	25
East	1371	1000	76	2368	0.61	9	A	125
West	987	1000	114	2341	0.44	8	A	50
All	2632					9	A	



Source: Roundabouts: An Informational Guide (FHWA, 2000), Equation A-9
Capacity calculation is valid for inscribed diameters of 40 to 60 m (130 to 200 ft).
Does not account for flared entry lanes or pedestrian effects.
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

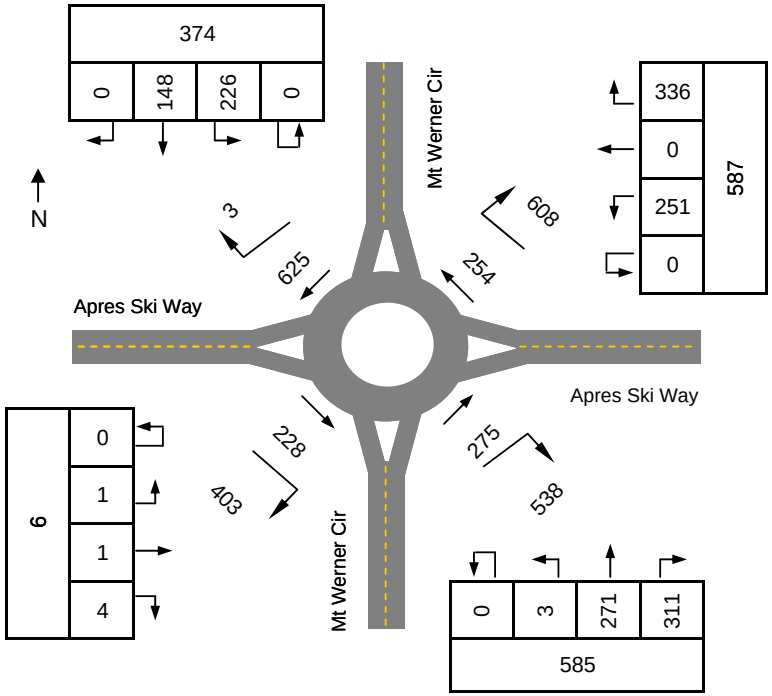
Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2025	E-W	Apres Ski Way		
PHF	0.98	Time	PM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	585	228	1052	0.57	13	B	100
South	374	254	1030	0.37	11	B	50
East	6	625	756	0.01	10	A	0
West	587	275	1012	0.59	14	B	100
All	1552				13	B	

Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*



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ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

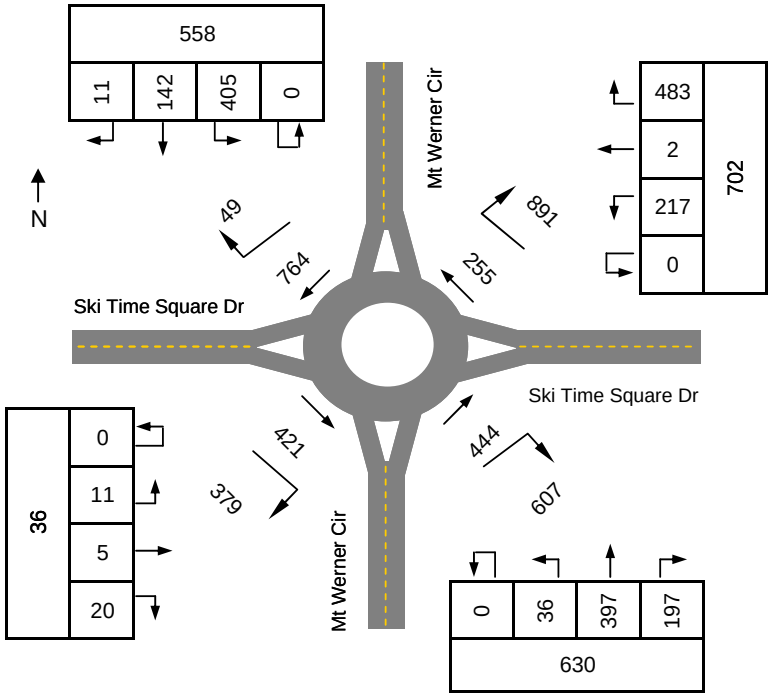
Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2025	E-W	Ski Time Square Dr		
PHF	0.96	Time	PM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	630	421	896	0.73	19	C	175
South	558	255	1029	0.57	13	B	100
East	36	764	673	0.06	11	B	0
West	702	444	879	0.83	26	D	250
All	1926				20	C	

Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*



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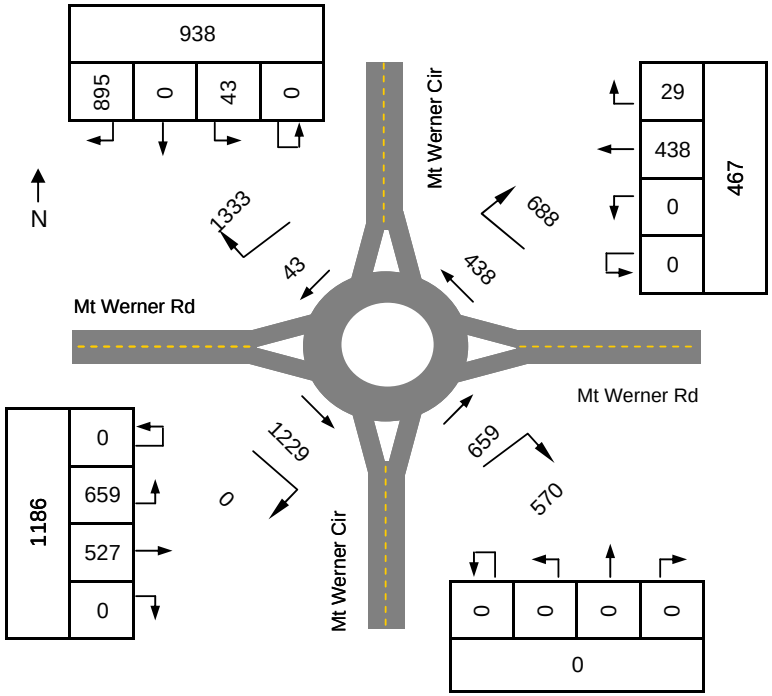
ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2025	E-W	Mt Werner Rd		
PHF	0.99	Time	PM	N-S	Mt Werner Cir		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North							
South	938	438	883	***1.07***	73	***F***	***575***
East	1186	43	1227	0.98	39	E	475
West	467	659	735	0.64	18	C	125
All	2591				47	E	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000

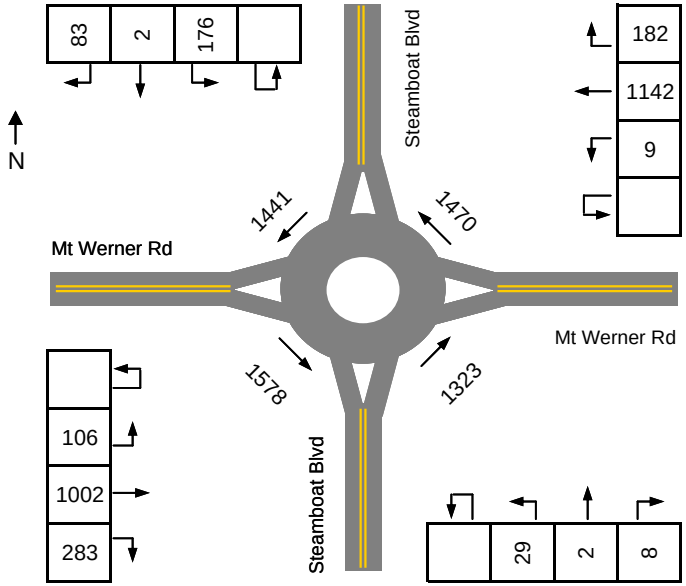
Does not account for flared entry lanes or pedestrian effects.

** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*

*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design		Double-Lane Roundabout						
Period (hr)	0.25	Date	2025		E-W	Mt Werner Rd		
PHF	0.95	Time	PM		N-S	Steamboat Blvd		
Approach	**Total Volume (vph)**	**2nd Lane Storage (veh)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	39	0	1284	752	0.05	10	B	0
South	261	0	1180	790	0.35	12	B	50
East	1391	1000	187	2289	0.64	9	A	125
West	1333	1000	137	2324	0.60	9	A	100
All	3024					9	A	



Source: Roundabouts: An Informational Guide (FHWA, 2000), Equation A-9
Capacity calculation is valid for inscribed diameters of 40 to 60 m (130 to 200 ft).
Does not account for flared entry lanes or pedestrian effects.
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

APPENDIX E – SIGNAL WARRANTS WORKSHEETS

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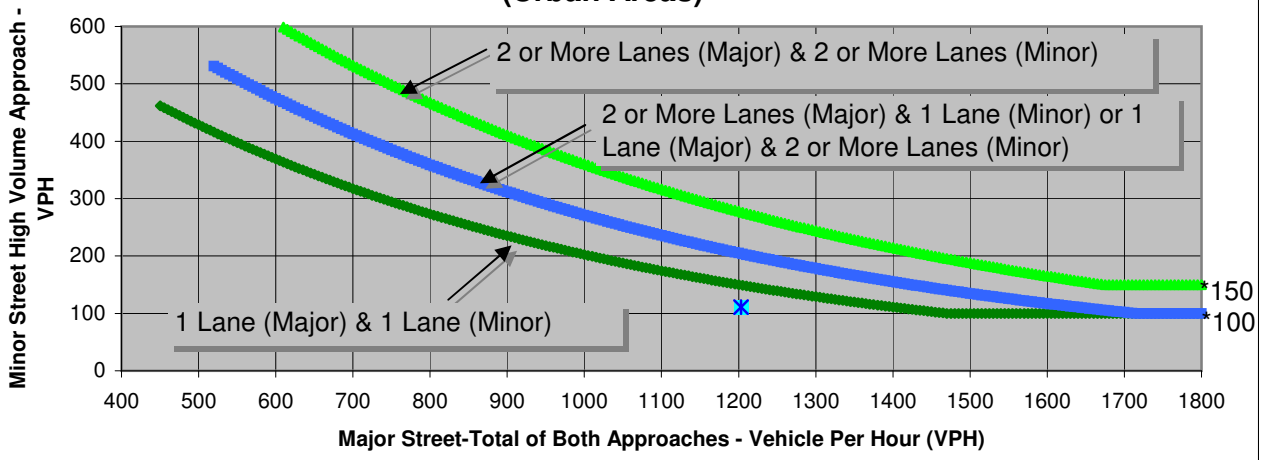
			Project No	DN08-0199	Page No 1
			Subject	Steamboat Base Area	
Computed by	LB	Date 9/11/2008		Master Transportation Study	
Checked by	DM	Date 9/12/2008			
Approved by	EG	Date 9/12/2008	Sheet No	1 of 2	

Mt Werner Cir / Burgess Creek Road 2025 AM Peak Hour

Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	n	NO
	One Lane (Y/N)	y	y	
Traffic Volume (VPH) *		1203	111	

*Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

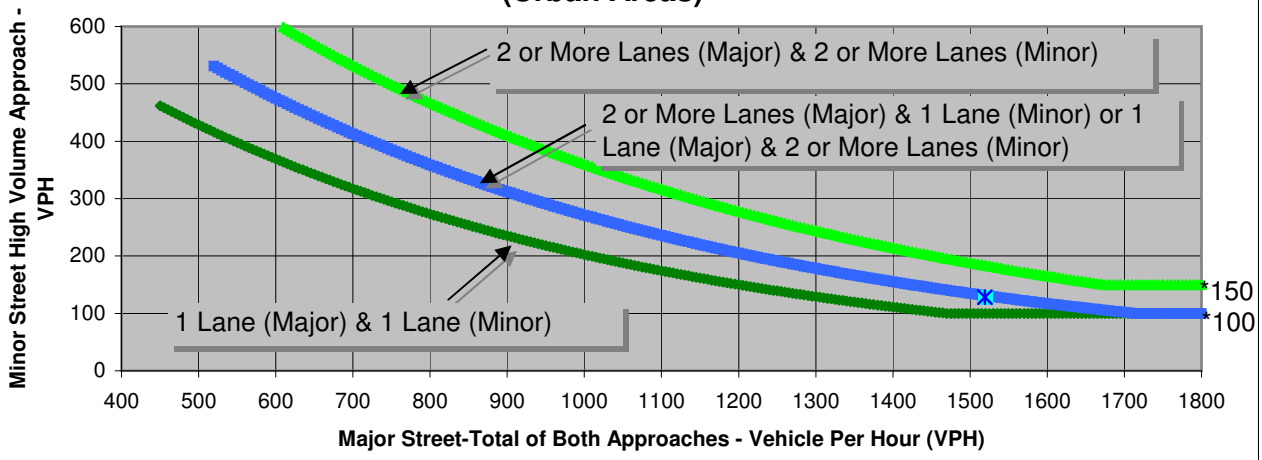
- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

FEHR & PEERS
TRANSPORTATION CONSULTANTS

			Project No	DN08-0199	Page No 2
			Subject	Steamboat Base Area	
Computed by	LB	Date 9/11/2008		Master Transportation Study	
Checked by	DM	Date 9/12/2008			
Approved by	EG	Date 9/12/2008	Sheet No	2	of 2

Mt Werner Cir / Burgess Creek Road 2025 PM Peak Hour

Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	n	n	YES
	One Lane (Y/N)	y	y	
Traffic Volume (VPH) *		1519	128	

*Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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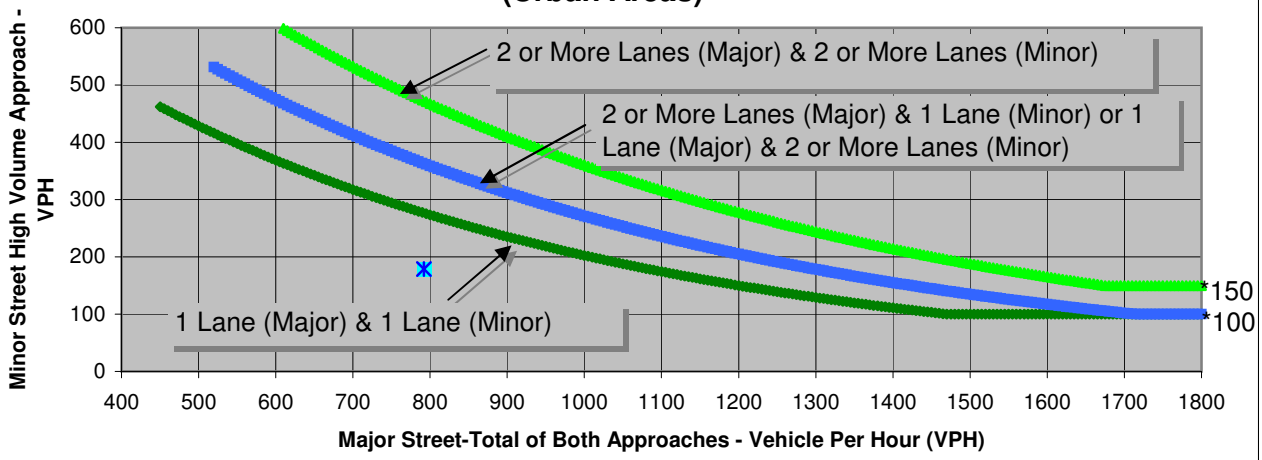
			Project No	DN08-0199	Page No 1
			Subject	Steamboat Base Area	
Computed by	LB	Date 9/11/2008		Master Transportation Study	
Checked by	DM	Date 9/12/2008			
Approved by	EG	Date 9/12/2008	Sheet No	1 of 4	

Mt Werner Cir / Mt Werner Rd Existing AM Peak Hour

Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	n	NO
	One Lane (Y/N)	n	y	
Traffic Volume (VPH) *		792	179	

*Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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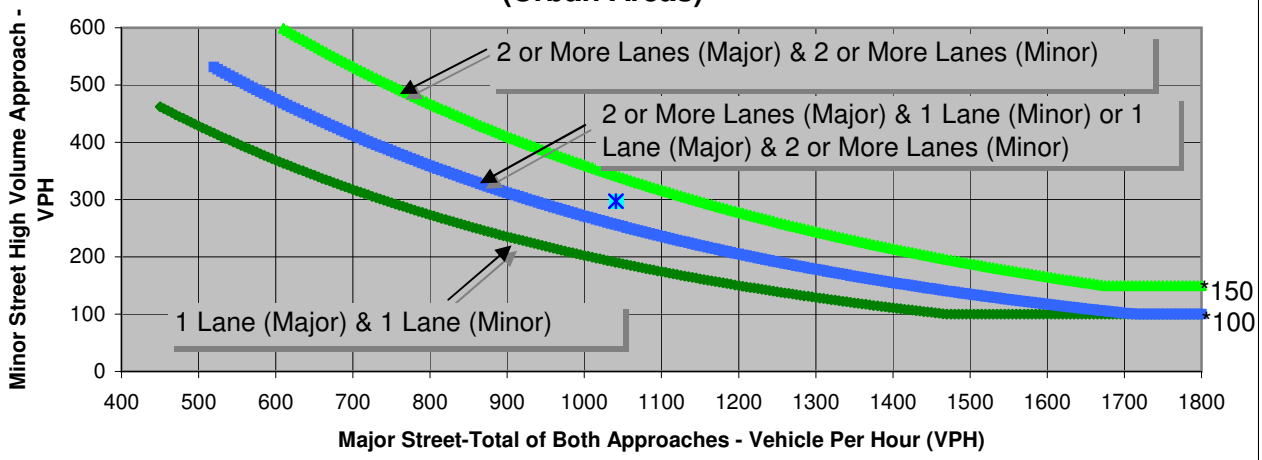
TRANSPORTATION CONSULTANTS

			Project No	DN08-0199	Page No 2
			Subject	Steamboat Base Area	
Computed by	LB	Date 9/11/2008		Master Transportation Study	
Checked by	DM	Date 9/12/2008			
Approved by	EG	Date 9/12/2008	Sheet No	2 of 4	

Mt Werner Cir / Mt Werner Rd Existing PM Peak Hour

Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	n	YES
	One Lane (Y/N)	n	y	
Traffic Volume (VPH) *		1041	297	

*Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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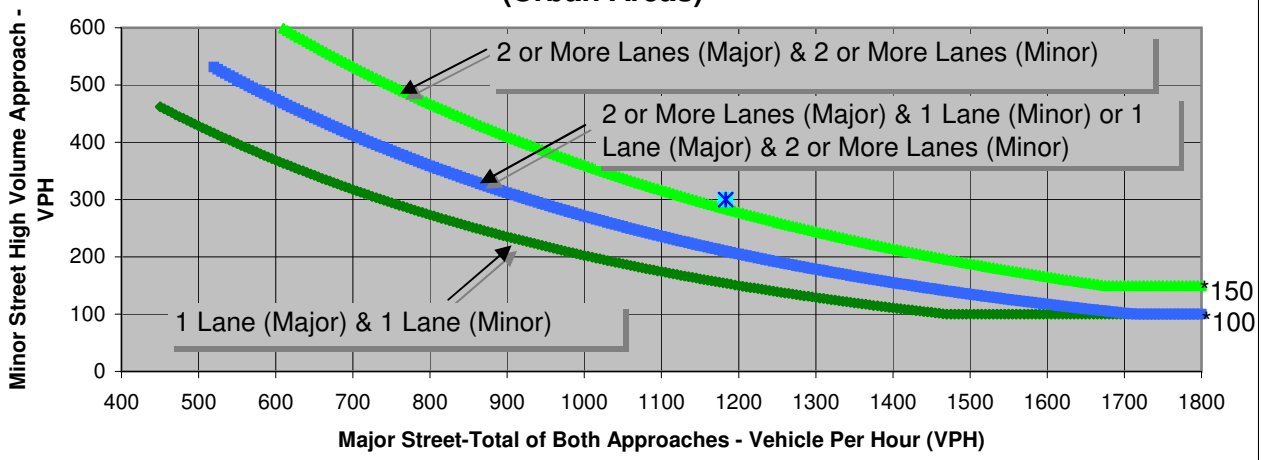
TRANSPORTATION CONSULTANTS

			Project No	DN08-0199	Page No 3
			Subject	Steamboat Base Area	
Computed by	LB	Date 9/11/2008		Master Transportation Study	
Checked by	DM	Date 9/12/2008			
Approved by	EG	Date 9/12/2008	Sheet No	3 of 4	

Mt Werner Cir / Mt Werner Rd 2015 AM Peak Hour

Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	n	YES
	One Lane (Y/N)	n	y	
Traffic Volume (VPH) *		1183	300	

*Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

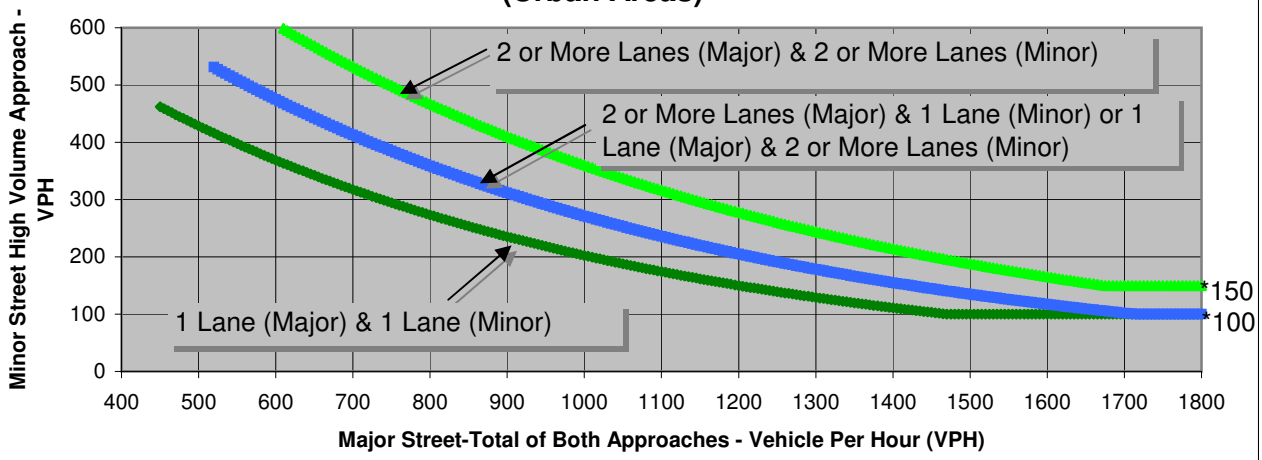
- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

FEHR & PEERS
TRANSPORTATION CONSULTANTS

			Project No	DN08-0199	Page No 4
			Subject	Steamboat Base Area	
Computed by	LB	Date 9/11/2008		Master Transportation Study	
Checked by	DM	Date 9/12/2008			
Approved by	EG	Date 9/12/2008	Sheet No	4	of 4

Mt Werner Cir / Mt Werner Rd 2015 PM Peak Hour

Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	n	YES
	One Lane (Y/N)	n	y	
Traffic Volume (VPH) *		1451	417	

*Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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			Subject	Steamboat Base Area	
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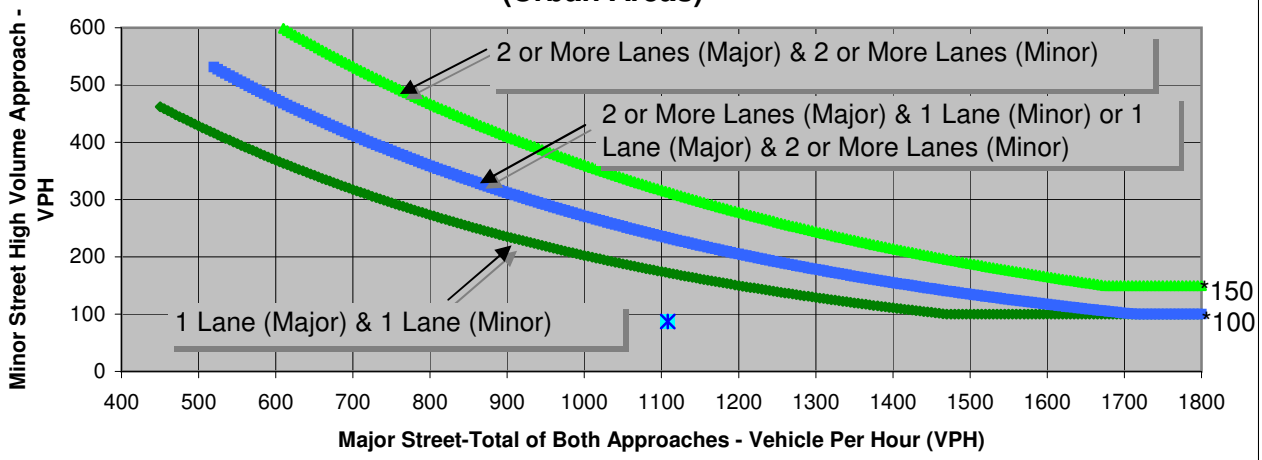
Checked by	DM	Date 9/12/2008			
Approved by	EG	Date 9/12/2008	Sheet No	1 of 4	

Mt Werner Rd / Steamboat Blvd Existing AM Peak Hour

Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	n	NO
	One Lane (Y/N)	n	y	
Traffic Volume (VPH) *		1108	87	

*Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☑ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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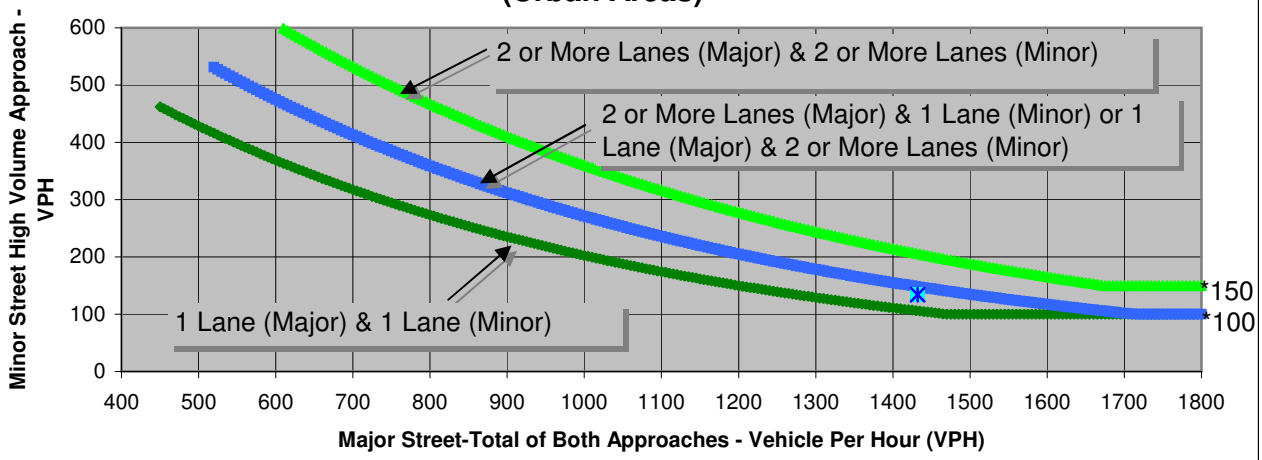
TRANSPORTATION CONSULTANTS

			Project No	DN08-0199	Page No 2
			Subject	Steamboat Base Area	
Computed by	LB	Date 9/11/2008		Master Transportation Study	
Checked by	DM	Date 9/12/2008			
Approved by	EG	Date 9/12/2008	Sheet No	2 of 4	

Mt Werner Rd / Steamboat Blvd Existing PM Peak Hour

Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	n	NO
	One Lane (Y/N)	n	y	
Traffic Volume (VPH) *		1432	134	

*Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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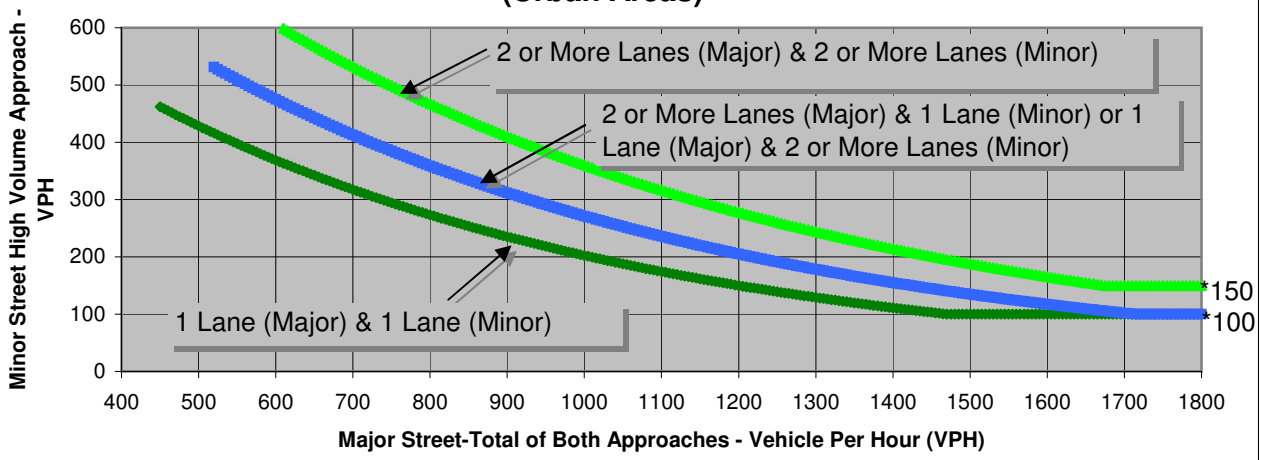
TRANSPORTATION CONSULTANTS

			Project No	DN08-0199	Page No 3
			Subject	Steamboat Base Area	
Computed by	LB	Date 9/11/2008		Master Transportation Study	
Checked by	DM	Date 9/12/2008			
Approved by	EG	Date 9/12/2008	Sheet No	3 of 4	

Mt Werner Rd / Steamboat Blvd 2015 AM Peak Hour

Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	n	YES
	One Lane (Y/N)	n	y	
Traffic Volume (VPH) *		1835	125	

*Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

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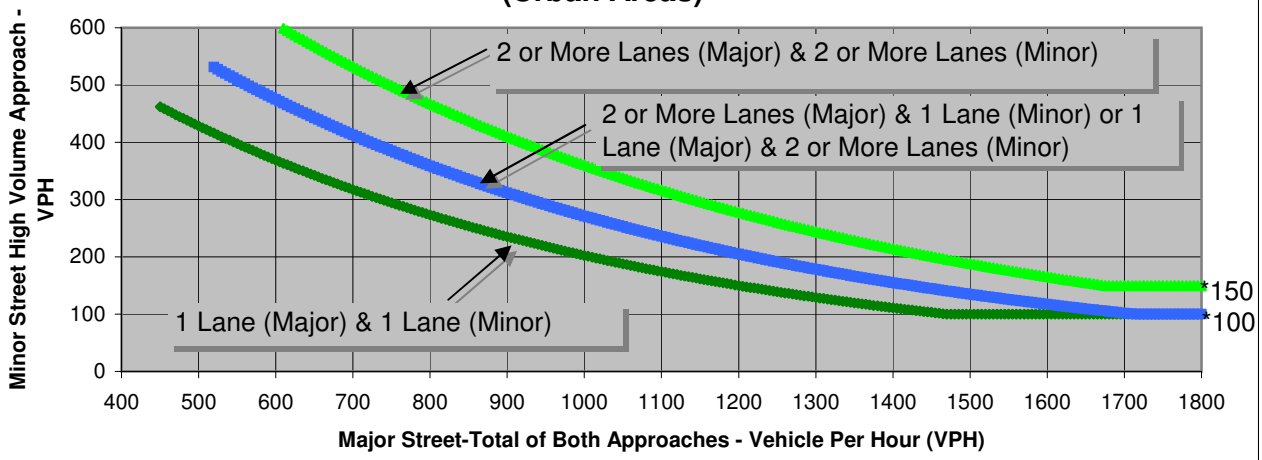
TRANSPORTATION CONSULTANTS

			Project No	DN08-0199	Page No 4
			Subject	Steamboat Base Area	
Computed by	LB	Date 9/11/2008		Master Transportation Study	
Checked by	DM	Date 9/12/2008			
Approved by	EG	Date 9/12/2008	Sheet No	4 of 4	

Mt Werner Rd / Steamboat Blvd 2015 PM Peak Hour

Figure 9-8
PEAK HOUR VOLUME WARRANT
(Urban Areas)



*Note: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
Source: Traffic Manual, Caltrans 1996.

Name of Street		Major Street	Minor Street	Warrant Met
Number of Lanes	Two or More Lane (Y/N)	y	n	YES
	One Lane (Y/N)	n	y	
Traffic Volume (VPH) *		2237	177	

*Note: Traffic Volume for Major Street is Total Volume of Both Approaches.
Traffic Volume for Minor Street is the Volume of High Volume Approach.

- ☐ Existing Conditions
- ☐ Existing Plus Project Conditions
- ☐ Cumulative No Project Conditions
- ☐ Cumulative Plus Project Conditions

APPENDIX F – ITE Trip Generation Rates

UNADJUSTED ITE TRIP GENERATION RATES					
Land Use	**ITE Code**	**Variable**	**Trip Rate**		
			Daily	**AM**	**PM**
Single-family Home	210	Dwelling Units	10.10	0[1]	0.94
Condominiums[2]	230	Dwelling Units	5.86	0.44	0.52
Resort	330	Rooms	13.43	0.31	0.42
Commercial	814	1,000 square feet	44.32	2.71	6.84

Source: ITE Trip Generation Manual, 7th Edition

Note:

[1] Single family homes at the Steamboat Springs base area are expected to generate a negligible number of trips during the AM peak hour on a Saturday.

[2] The best fit equations were used to calculate the number of trips generated from condominium developments with more than 100 units. Daily Trips = $e^{(0.85*\ln(X)+2.55)}$, AM Trips = $e^{(0.8*\ln(X)+0.26)}$, PM Trips = $e^{(0.82*\ln(X)+0.32)}$

APPENDIX G – IMPACT COST ALLOCATION

COST ALLOCATION MODELING

A preliminary cost allocation model was prepared to highlight potential impact fee adjustments the City of Steamboat Springs could consider as redevelopment occurs. This model was prepared as a preliminary assessment and uses the results and assumptions of the Master Transportation Study. Additional study and input may be required to revise the current transportation impact fee structure.

METHODOLOGY

STEP 1: The traffic volumes at each intersection in the study area were computed to determine background traffic volumes (this is future traffic without new development shown in **blue**)

STEP 2: The traffic volumes at each intersection in the study area were computed to determine development traffic volumes (this is traffic generated from new development shown in **green**)

STEP 3: Preliminary capital cost information for intersections in the study area was obtained from the Steamboat Unbridled Project Coordinator (this is the draft project list presented to URAAC in May of 2008)

STEP 4: The capital costs were allocated based on the percentage of future traffic generated by existing development and the percentage of traffic generated by new development Contact City Public Works for Current Cost Allocation