Transportation Impact Assessment

BALD MOUNTAIN LODGE

Ketchum, Idaho

Final

January, 2010

GALENA ENGINEERING, INC.
CIVIL ENGINEERS & LAND SURVEYORS

Transportation Impact Assessment

BALD MOUNTAIN LODGE

Ketchum, Idaho

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Section 1
EXECUTIVE SUMMARY

Executive Summary

INTRODUCTION

Bald Mountain Lodge, L.L.C. is proposing to develop the "Bald Mountain Lodge," a four-star hotel in the City of Ketchum, Idaho, located at the northwest corner of Main Street (State Highway 75) and River Street. Historically, this site was previous developed as the Bald Mountain Hot Springs and Hotel, and now lies vacant. This site is located in the City of Ketchum's "Community Core" (CC) land use zone, and is considered part of the "Ketchum Gateway."

The ground level of the hotel consists of several uses, including retail, restaurant, spa and fitness, and an activity center. The hotel proposes 41 second level guest suites and 41 third level guest suites for a total of 82 rooms. The fourth level consists of eighteen luxury condominiums and the proposed fifth floor consists of eight luxury condominiums. On the lower level, the hotel includes an approximately 5,000 square feet spa and pool, three meeting rooms totaling approximately 4,900 square feet, a 120-seat restaurant, and kitchen. Below the lower level, the hotel proposes two underground parking levels with 65 spaces the lowest level and 51 spaces on the upper parking level. The upper level parking level also includes various uses including spa, conference and ballroom. The total floor area of the proposed hotel is 225,700 square feet (including the parking levels). While the development fronts Main Street, the primary vehicle access to the development is a porte-cochere drop-off accessed from First Street. Vehicles entering this porte-cochere exit via a right-turn only access onto Main Street or return back to First Street at the point-of-entry. Access to the vehicle parking levels is located on River Street. The service loading dock, internal to the development, is accessed from First Street adjacent to the porte-cochere entrance.

The study area of this transportation impact assessment includes the accesses to the development and the four adjacent intersections. These intersections include one signalized intersection (Main Street/First Street), and three stop-controlled intersections (Main Street/River Street, Washington Avenue/River Street, and Washington Avenue/First Street). Peak period study area intersections traffic movements counted in seasonal off-peak months are translated to typical annual peak traffic conditions (mid-week in July) by evaluating ITD traffic count data for State Highway 75. Both the a.m. and p.m. peak periods are evaluated. Analyses of this assessment evaluate the study area's existing conditions (2009), projected build-out conditions (2013), and future conditions, or build-out plus five years (2018).

ASSESSMENT HISTORY

In January, 2009, as part of pre-application discussions between the developer and City staff, a preliminary traffic assessment was submitted to the City staff for review. This preliminary assessment summarized the proposed trip generation associated with the proposed development, and assignment of these site-generated trips to the existing intersections. In addition, this preliminary assessment provided existing conditions level-of-service (LOS) summaries of the study area's Main Street intersections (First Street and River Street). This preliminary assessment was revised to include similar existing conditions LOS summaries of the Washington Avenue intersections (First Street and River Street), and resubmitted to City staff in March, 2009.

City staff then initiated a review of the preliminary traffic assessment, as well as site plans provided by the developer, with LSC Transportation Consultants, Inc. This review included an assessment of the circulation issues associated with the proposed porte-cochere and underground parking garage access points. Results of the review by LSC Transportation Consultants, Inc. were presented to the Ketchum Planning and Zoning Commission on April 23, 2009, and summarized as follows:

- "A complete traffic impact analysis should be completed as the development process for this project moves forward.
- Trip generation estimates should be reevaluated assuming 100 percent occupancy for the hotel land use.
- The trip distribution section and graphics should be rewritten such that trip distribution percentages are directly related to the trip generation outputs.
- The trip assignment section and Figure 7 of the {preliminary traffic assessment] should include estimates of site generated traffic at the site driveways.
- The exit-only access point from the porte cochere onto Main Street should be allowed, as it is not an undue traffic safety concern and it helps to reduce overall traffic congestion generated by the proposed project.
- Traffic queuing at the Main Street exit-only access point would only occur on site property and during peak hours. Queuing would not be an issue because the traffic signal at First Street provides adequate gaps in Main Street traffic.
- Proper signage at the Main Street exit-only access point will be required both to direct traffic around to the First Street access point and to inform drivers that inbound traffic is prohibited at the Main Street access point.
- Clear line of sigh should be provided for drivers exiting onto Main Street from the porte-cochere looking north. It is recommended that no onstreet parking be provided along the Main Street side of the project.
- The existing bus stop on Main Street should be included in the site plan, along with a bench.
- The close proximity of the First Street access point to the Main Street/First Street intersection would cause the eastbound traffic queue to block access to the driveway to the left-turning vehicles a few times per hour. These left-turning vehicles would then block the westbound travel lane along 1st Street. Simulation analysis indicates that this would not create congestion at the 1st/Main intersection except under vary rare conditions during a limited number of peak hours.
- The geometry of the porte-cochere as it is currently proposed does not provide adequate space for the maneuvering or storage of vehicles. The proposed portion of the structure located in the northeast section of the Bald Mountain Lodge project site should be reduced and redesigned to provide space for adequate vehicle maneuvers.
- Reduction of River Street or Washington Avenue to 1 way operation is not recommended. The only caveat to this would be if narrowing of Rivers Street is needed to provide left turn pockets on 1st Street at Main Street (in both directions) that can be proven through an evaluation of overall Main Street traffic operations to substantially improve traffic level of service at the 1st/Main intersection.
- Modifications are recommended to the proposed on-street parking space design."

In addition to the LSC Transportation Consultants review, in March, 2009, City staff also initiated "a traffic study on Main Street to see how all the proposed developments will impact Main Street." City staff offered Bald Mountain Lodge, L.L.C. to join in this study in-lieu of completing the complete traffic impact assessment to include background forecasting, summarize development impacts on current facilities, determine what mitigation measures City staff would we recommend, and what percentage share of the cost of improvements Bald Mountain Lodge, L.L.C. would be accountable for. Bald Mountain Lodge, L.L.C. provided the City with their turning movements count data used to prepare the previously mentioned preliminary traffic assessment, but did not develop an in-lieu agreement with the City with regards to additional traffic impact assessment. Hales Engineering, in cooperation with City Staff, presented a draft report on this Main Street traffic impact study on August 3, 2009, which the following excepts from that draft report summarize with regards to the Bald Mountain Lodge study area:

"Existing (2009) Conditions Analysis

….during the existing peak hour many of the unsignalized intersections [on Main Street] have high levels of side street delay.

River Street/Main Street (SH-75) EB / F (>50.0 [secs. delay])

Existing (2009) Plus Projects Conditions Analysis

….almost all of the study intersections experience unacceptable levels of delay with the development project added to the network.

River Street/Main Street (SH-75) EB / F (>50.0 [secs. delay])
1st Street/Main Street (SH-75) E (58.4 [secs. delay])

The following mitigations are recommended:

Main Street (South of River Street):

- Widen Main Street from existing two-lane cross section to a three-lane cross section including one northbound lane and two southbound lanes.

Sun Valley Road (3rd Street) / Main Street:

- Remove split-side phasing for north/south traffic on Main Street and change to permitted phasing.
- Remove protected-only phasing for east- and westbound left-turn movements and change to protected/permitted phasing.

Corridor-Wide Improvements:

- Coordinate traffic signals along Main Street at 1st Street, Sun Valley Road, and 5th Street.

Future (2019) Conditions Analysis

With several recommendations in place, most of the study intersections experience acceptable levels of delay with the exception of the minor street approaches at the unsignalized intersections."

River Street/Main Street (SH-75) EB / E (>50.0 [secs. delay])
1st Street/Main Street (SH-75) E (58.4 [secs. delay])

In addition to the 2009 Plus Projects recommendations, the following are also recommended:

Warm Springs Road & 10th Street/Main Street:

- Re-align Warm Springs Road to 10th Street
- Install traffic signal at 10th Street / Main Street and coordinate with the other Main Street signals.
- Widen Main Street between 6th Street and 10th Street to a four-lane cross section.

Because of the closely spaced intersections and high vehicular and pedestrian traffic on Main Street, Hales Engineering recommends that future traffic impact studies for proposed developments in the vicinity of Main Street be analyzed using micro-simulation methodologies including calibration and validation as was done for this report."

On December 12, 2009, the Ketchum Planning & Zoning Commission held a public hearing to review the Bald Mountain Lodge PUD application. At this hearing, City staff presented a discussion with regards to traffic impact considerations which included an alternative typical section for Main Street. This alternative typical Main Street section indicates a five-lane cross-section with two travel lanes in both northbound and southbound directions and a center turn lane. The Bald Mountain Lodge developer indicated the five-lane typical section is not a preferred alternative for the proposed development due to impacts to proposed sidewalk and egress improvements along Main Street. In addition, the developer noted that the five-lane typical section probably does not promote the pedestrian- and transit-friendly Main Street corridor as identified in the City of Ketchum's Comprehensive Plan and Downtown Master Plan documents. Other traffic impact considerations discussed included the Commission concerns regarding traffic circulation and signing around the development, restricting service deliveries to off-peak hours, and a revised sidewalk layout designed to better define development circulation from existing street thoroughfare.

The Planning & Zoning Commission approved the Bald Mountain Lodge PUD application on December 13, 2009 with a condition that a final transportation impact study be completed with regards to potential mitigation measures that may be put into a Development Agreement between Bald Mountain Lodge, L.L.C. and the City of Ketchum.

This report addresses the PUD approval condition from the Ketchum Planning & Zoning Commission to the Ketchum City Council requiring a final transportation impact study addressing recommended transportation impact mitigation measures, if any.

FINDINGS

The results of this study indicate the proposed Bald Mountain Lodge can be constructed with minimal adverse impacts to traffic operations and safety, not already recognized, in the study area. The improvements associated with transportation elements of the proposed development plan are in accordance with reviewing agencies standards, and promote the overall concepts identified in the City of Ketchum's *Comprehensive Plan* and *Downtown Master Plan*. In addition, the proposed circulation allowing ingress and egress from the existing transportation network to the development provides these movements to an appropriate standard of safety.

Readily noted by general public input and professional engineering review, Main Street intersections currently experience undesirable levels-of-service during peak period traffic conditions. The projected traffic from this development added to these intersections has little significance on projected traffic levels-of-service and operations. As noted in the City of Ketchum's own consultants review of Main Street traffic conditions, the Main Street corridor currently experiences some delay in the through traffic progression, and "unacceptable" delays on unsignalized side street intersections. In general, the northbound through traffic progression delays are associated with a diminished capacity at the corridor intersections to accommodate desired turning movements. Similarly, southbound through traffic progression is also diminished by turning movements at intersection, but also by a lane drop, from two-lanes to one-lane, between First Street and River Street. The City is discussing several alternatives aimed at increasing this corridor capacity, including alternatives such as coordinated signal phasing, changes to roadway cross-section, and additional signalization. The City's studies note that even with such measures, unsignalized side streets will continue to experience unacceptable levels of delay. While more consideration of the Main Street improvements are warranted, such improvements should not deter from the City of Ketchum's desire to provide a multi-modal friendly Main Street corridor.

The following is a summary of the traffic operation and level-of-service analyses utilized for this Bald Mountain Lodge traffic impact assessment:

2009 (Existing) Peak Period Traffic Conditions

- No safety issues or mitigation measures were identified at the study intersections
- Main Street transitions from two-lanes to one-lane in the southbound direction between First Street and River Street thereby reducing the overall capacity of southbound traffic volumes on Main Street.
- P.M. peak period undesirable levels-of-service are experienced at both the westbound and eastbound River Street approaches to Main Street.

Projected Bald Mountain Lodge Transportation Impacts

The proposed development is estimated to generate approximately 1007 new trips daily; 43 vehicle trips during the AM Peak Hour (24 inbound and 19 outbound) and approximately 81 trips during the PM Peak Hour (43 inbound and 38 outbound). In general, these trips are anticipated to ingress and egress the site in all directions. The assumed quantified distribution is:

- 30% to and from the north
- 30% to and from the south
- 20% to and from the east, and
- 20% to and from the west.

A more detailed summary of the assignment of individual turning movements associated with peak period development ingress and egress, and internal circulation, is as follows:

Inbound

- 25% of all inbound vehicles will access the development via the porte-cochere. Of these vehicles, half (or 12.5% of all inbound vehicles) will continue to the parking garage.

- 75% of all inbound vehicles will access the development via the parking garage. An additional 12.5% of inbound vehicles enter the parking garage after first entering the porte-cochere.

- Of all the inbound vehicles from the north, approximately two-thirds of these vehicles (or approximately 20% of all inbound vehicles) will utilize Main Street, while the other third (or 10% of all inbound vehicles) will utilize Washington Avenue.

- Of all the inbound vehicles from the south, approximately 85% (or, approximately 25.5% of all inbound vehicles) will use Main Street and turn left at First Street. The other approximately 4.5% inbound from the south vehicles are assumed to use 2nd Avenue and access the development via River Street.

- All inbound vehicles from the east are assumed to use First Street. 75% of these vehicles (or 15% of all inbound vehicles) will turn left at the First Street-Main Street intersection and enter the parking garage. The remaining inbound vehicles from the east will enter via the porte-cochere

- Of all the inbound vehicles from the west, approximately half (or approximately 10% of all inbound vehicles) will use River Street and half will use First Street.

Outbound

- 25% of all outbound vehicles will egress from the development via the porte-cochere. Of these vehicles, half (or 12.5% of all outbound vehicles) will have started from the parking garage.

- 75% of all outbound vehicles will egress from the development directly from the parking garage. An additional 12.5% of all outbound vehicles will exit the parking garage and enter the porte-cochere before leaving the development.

- Of all the outbound vehicles headed north from the development, approximately 90% of these vehicles (or approximately 27% off all outbound vehicles) will utilize Main Street, while the other 10% (or 3% of all outbound vehicles) will utilize Washington Avenue.

- Of all the outbound vehicles headed south from the development, approximately 75% of these vehicles (or, approximately 22.5% of all outbound vehicles) will use Main Street. The remaining approximately 25% of outbound vehicles headed south (or, approximately 7.5% of all outbound vehicles) are assumed to use 2nd Avenue, and leave the development via River Street.

- All outbound vehicles headed east from the development are assumed to use First Street.

- All outbound vehicles headed west from the development are assumed to use River Street.

Developer Proposed Transportation Improvements

The Bald Mountain Lodge development plan proposes the following transportation improvements:

- The development plan proposes construction of an improved transit bus stop at the existing southbound Main Street location just south of First Street.
- Construction of on-site, underground parking facilities (116 spaces) accessed away from Main Street traffic (i.e. accessed from River Street).
- Construction of primary ingress and egress locations off Main Street (i.e. primary accesses are a porte-cochere entrance from First Street and the underground parking entrance on River Street. Porte-cochere egress on Main Street is limited to a right-turn (southbound) only movement, and channelized in a proposed right-turn lane to River Street).
- Construction of curb layouts enhancing separating through traffic on existing streets from essentially "internal" development movements from the porte-cochere to the underground parking, and pedestrian safety.

2013 BACKGROUND Peak Period Traffic Conditions

- 2013 background traffic volumes were estimated by applying a two-percent (2%) annual growth rate to existing traffic volumes. This growth rate is derived from reviewing data from the ITD AADT traffic counter along SH-75, the SH-75 Timmerman to Ketchum EIS, and traffic projections used in similar transportation impact studies in Blaine County.
- No safety issues or mitigation measures were identified at the study intersections
- Continued p.m. peak period undesirable levels-of-service are projected at both the westbound and eastbound River Street approaches to Main Street. Providing specific Main Street progression scenarios can diminish all capacity of these approach movements.

- P.M. peak period undesirable levels-of-service are experienced at the eastbound First Street approach to Main Street.
- Main Street through traffic capacity can be disrupted given specific turning northbound left-turn movement scenarios at the River Street intersection.

2013 TOTAL Peak Period Traffic Conditions

- No safety issues or mitigation measures were identified at the study intersections
- Continued p.m. peak period desirable levels-of-service are projected at both the westbound and eastbound River Street approaches to Main Street.
- Continued p.m. peak period undesirable levels-of-service are experienced at the eastbound First Street approach to Main Street.
- Rare queuing scenarios at the First Street westbound approach to Main Street may block access to the porte-cochere entrance.
- Main Street northbound through traffic capacity can be disrupted given specific turning northbound left-turn movement scenarios at the River Street intersection.
- Porte-cochere vehicles exiting vehicles can experience significant delays given specific Main Street southbound traffic progression scenarios. Gap access is dependent on Main Street signal coordination.

2018 BACKGROUND Peak Period Traffic Conditions

- Year 2018 background traffic volumes were estimated by applying the same 2% annual growth rate as noted above to existing traffic volumes.
- No safety issues or mitigation were identified at the study intersections
- Continued p.m. peak period undesirable levels-of-service are projected at both the westbound and eastbound River Street approaches to Main Street.
- Continued p.m. peak period undesirable levels-of-service are experienced at the eastbound First Street approach to Main Street, and at both the northbound and southbound Main Street approaches to First Street.

2018 TOTAL Peak Period Traffic Conditions

- No safety issues or mitigation measures were identified at the study intersections
- Continued p.m. peak period desirable levels-of-service are projected at both the westbound and eastbound River Street approaches to Main Street.
- Continued p.m. peak period undesirable levels-of-service are experienced at the eastbound First Street approach to Main Street.
- Rare queuing scenarios at the First Street westbound approach to Main Street may block access to the porte-cochere entrance.
- Main Street northbound through traffic capacity can be disrupted given specific turning northbound left-turn movement scenarios at the River Street intersection.
- Porte-cochere vehicles exiting vehicles can experience significant delays given specific Main Street southbound traffic progression scenarios. Gap access is dependent on Main Street signal coordination.

RECOMMENDATIONS

Based on the findings from this analysis, the following recommendations are intended to minimize impacts to Ketchum's transportation system from the proposed Bald Mountain Lodge development plan:

- Any proposed transportation improvements as part of this development plan shall be subject to accommodating Mountain Rides Transit Authority's vehicles, approval by the Ketchum Street Department and the Idaho Transportation Department.
- The proposed development plan reviewed includes a curb and sidewalk chicane design adequately discourages any left-turn movements onto Main Street from the porte-cochere.
- The proposed development plan studied includes constructing a recommended right-turn lane from the porte-cochere exit on Main Street to River Street.
- The proposed development plan includes the recommended bus stop development at the current southbound Main Street bus stop location just south of the First Street. Consideration should be given to utilizing development plan facilities, if available, for transit center activities (i.e. transit ticket availability, general transit concierge service, local activity organizations shuttle service coordination, commercial travel shuttle service hub, and travel directions.)
- The proposed development plan should only propose landscaping of the sidewalk areas around the site that will allow adequate site distance for drivers, bicyclists, and pedestrians accessing the development and its amenities.
- The proposed development plan should minimize congestion on First Street during peak periods by limiting receiving large vehicle deliveries during only non-peak periods. In addition, the developer should consider additional signage stating "Do Not Block Intersection" for eastbound traffic on First Street at the porte-cochere entrance.
- Outside of the City proposed Main Street signal phasing coordination and southbound lane addition from River Street to Serenade Lane, no recommendations for increasing study area intersection capacities are noted.
- Mid-block pedestrian crossings, as discussed in public hearings with regards to the development plan's interface across Washington Avenue with Forest Service Park, are discouraged. Instead, development of enhanced pedestrian crossings at existing intersections is encouraged.
- The proposed development should consider Main Street pedestrian crossing improvements at the River Street intersection.
- A construction traffic control plan should be developed. This plan should identify key ingress and egress routes to the development site and, if possible, identify routes where construction site-generated traffic is prohibited.
- The proposed development plan should consider implementation of employee alternative transportation incentive packages designed to reduce the estimated number of site-generated trips.

Additional details of this study's methodologies, findings, and recommendations are provided within the body and appendices of this report.

Section 2
INTRODUCTION

Introduction

PROJECT DESCRIPTION

The "Bald Mountain Lodge," is a proposed four-star hotel to be located in the City of Ketchum, Idaho, at the northwest corner of Main Street (State Highway 75) and River Street (see Figure 1, p. 13). The developer proposing this resort hotel complex is:

Bald Mountain Lodge, L.L.C.
P.O. Box 1730
Sumner, Washington 98390

The owner's representative and project manager for Bald Mountain Lodge, L.L.C. is:

James D. Garrison
206 N. Aspen Drive
Hailey, Idaho 83333
Telephone: (206) 914-1404
e-mail: sheebies@msn.com

Historically, this site was previous developed as the Bald Mountain Hot Springs and Hotel, and now lies vacant. This site is located in the City of Ketchum's "Community Core" (CC) land use zone, and is considered part of the "Ketchum Gateway." The "Gateway" distinction affords the site special considerations with regards to the impact this site provides as an entrance to the City of Ketchum's downtown core.

The ground level of the hotel consists of several uses, including retail, restaurant, spa and fitness, and an activity center. The hotel proposes 41 second level guest suites and 41 third level guest suites for a total of 82 rooms. These suites range from 1,030 to 2,725 square feet. The proposed fourth level consists of eighteen luxury condominiums and the proposed fifth floor consists of eight luxury condominiums. On the proposed lower level the hotel includes an approximately 5,000 square feet spa and pool, three meeting rooms totaling approximately 4,900 square feet, a 120-seat restaurant, and kitchen. Below the lower level, the hotel proposes two underground parking levels with 65 spaces proposed on the lowest level and 51 spaces on the upper parking level. The upper level parking level also includes various uses including spa, conference and ballroom. The total floor area of the proposed hotel is 225,700 square feet (including the parking levels).

While the development fronts Main Street, the primary vehicle access to the development is a porte-cochere drop-off accessed from First Street. Vehicles entering this porte-cochere exit via a right-turn only access onto Main Street or return back to First Street at the point-of-entry. Access to the vehicle parking levels is located on River Street. The proposed service loading dock, internal to the development, is accessed from First Street adjacent to the porte-cochere entrance. See Figure 2 on page 14.

The proposed development plan anticipates completing the development in a single phase. Construction is anticipated to be complete in 2013.

Figure 1. Vicinity Map

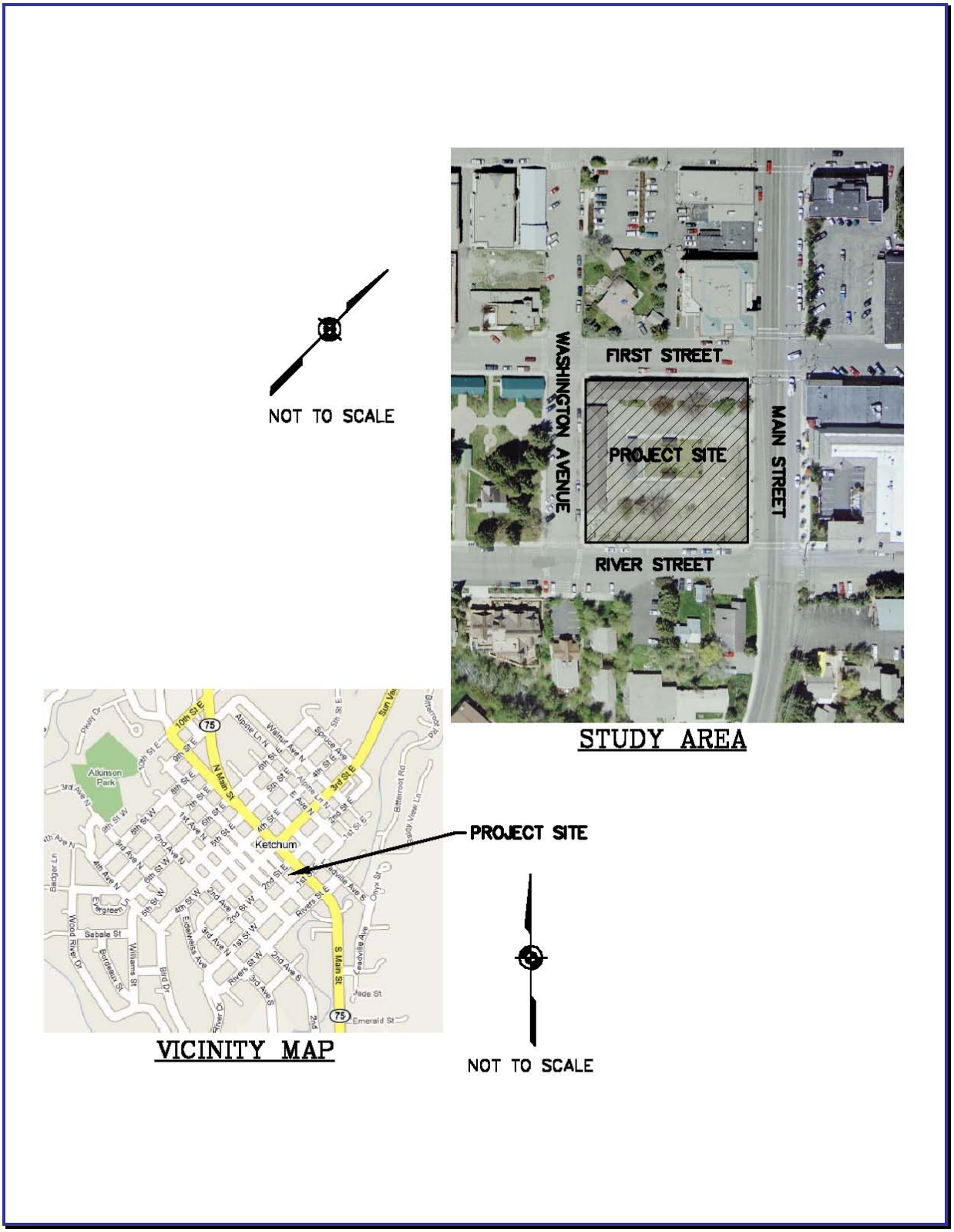
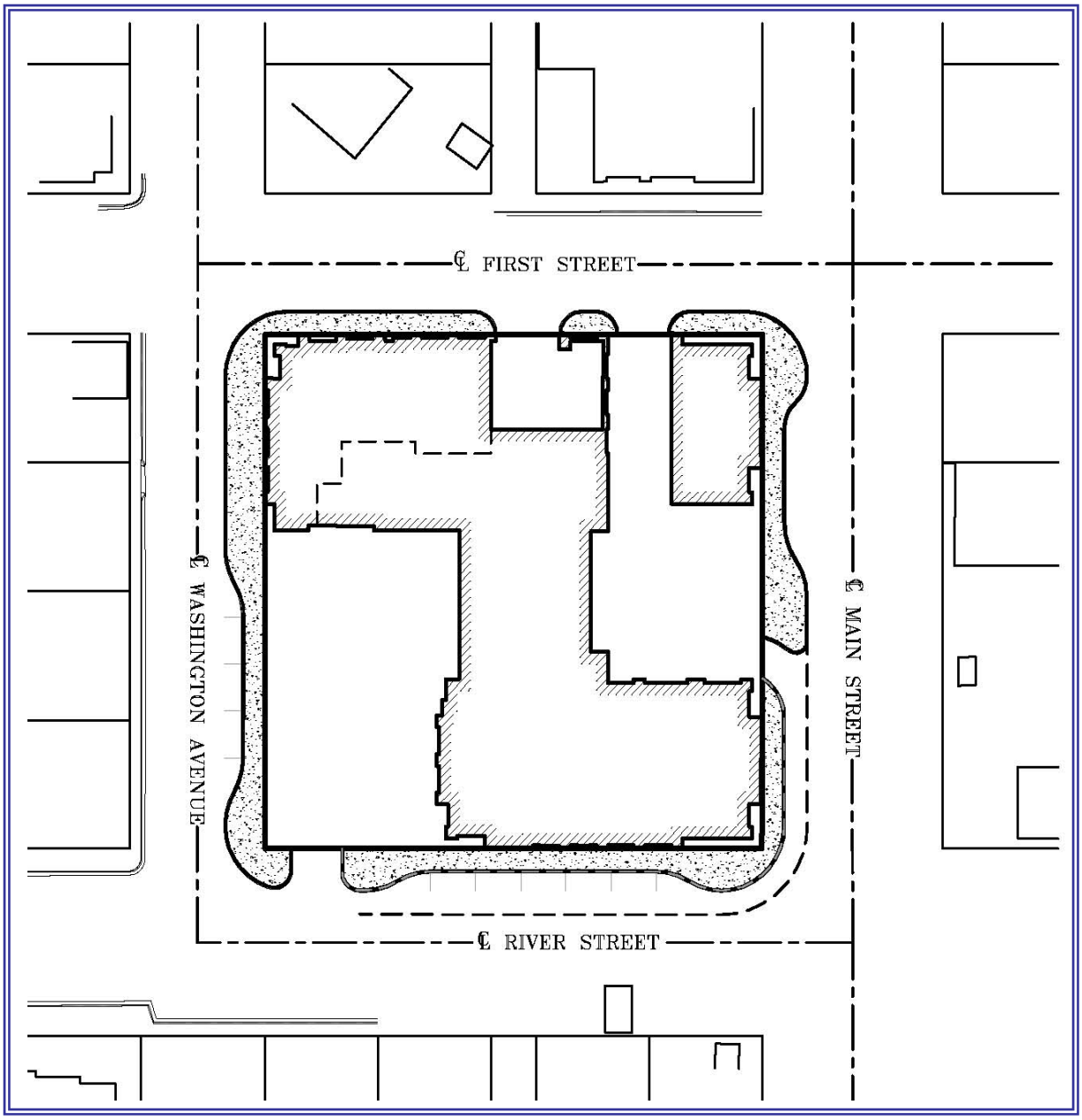


Figure 2. Proposed Development Plan Illustration



SCOPE OF THIS TRANSPORTATION IMPACT ASSESSMENT

This analysis evaluates the transportation related impacts associated with the proposed Bald Mountain Lodge development plan. This report was prepared in accordance with the City of Ketchum and Idaho Transportation Department (ITD) requirements for traffic impact studies. The study area intersections and scope of this analysis were selected based on our review of the local transportation system, our past experience with transportation studies in the City of Ketchum, and direction provided from Ketchum's City Engineer and Ketchum's Director of Community and Economic Development.

Existing intersections selected for traffic operational analyses included the following:

Main Street (SH-75) and River Street

Main Street (SH-75) and First Street

Washington Avenue and River Street

Washington Avenue and First Street

This analysis evaluates these transportation issues:

- Existing (2009) land use and peak transportation system conditions within the study area during weekday a.m. and p.m. peak periods;
- Trip generation and distribution assumptions for the proposed development plan;
- The development plan's proposed transportation system improvements;
- Anticipated build-out year 2013 background peak traffic conditions within the study area during weekday a.m. and p.m. peak periods;
- Anticipated build-out year 2013 total (background plus development plan) peak traffic conditions within the study area during weekday a.m. and p.m. peak periods;
- Projected year 2018 background peak traffic conditions within the study area during weekday a.m. and p.m. peak periods;
- Projected year 2018 total (background plus development plan) peak traffic conditions within the study area during weekday a.m. and p.m. peak periods; and,
- On-site traffic operations.

Section 3
EXISTING CONDITIONS

Existing Conditions

This existing conditions analysis identifies the development site conditions along with current operational and geometric characteristics of the roadways within the study area. These conditions are compared with projected conditions later in this report.

Galena Engineering, Inc. staff conducted on-site inventories of the proposed Bald Mountain Lodge development site and the surrounding transportation impact analysis study area beginning in January, 2009. Information collected includes existing site conditions, adjacent land uses, existing transportation facilities, and existing traffic operations in the study area.

SITE CONDITIONS AND ADJACENT LAND USES

The proposed project is located at the northwest corner of Main Street (State Highway 75) and River Street, in Ketchum, Idaho. The development site, which previously housed the Bald Mountain Hot Springs and Hotel, is bordered by Main Street on the east, River Street on the south, Washington Avenue on the west, and First Street on the north. The project site covers approximately 48,350 square feet of area zoned Ketchum's "Community Core" (CC) zone. Community Core zoning continues to the west, north and east. The area to the south is zoned Tourist. Existing land uses in these areas include professional offices south across River Street, Forest Service Park to the west across Washington Avenue, the Best Western Kentwood Motel located across Main Street to the east, and U.S. Bank o the north across First Street.

TRANSPORTATION FACILITIES

Table 1 summarizes the existing transportation facilities and roadways in the study area.

TABLE 1. Existing Transportation Facilities and Roadway Designations

Roadway	Functional Classification	Cross-section	Posted Speed (mph)	Sidewalks	Bicycle Lanes	On-Street Parking
Main Street south of River Street	Principal Arterial	2 Lanes	25	W. side only	No	No NB No SB
Main Street north of River Street	Principal Arterial	3-4 lanes	25	Yes	No	Parallel NB Parallel SB
Washington Ave. north of River St.	Local	2 Lanes	25	Yes	No	Parallel NB Diagonal SB
River Street	Local	2 Lanes	25	N. side only	No	Parallel WB No EB
First Street	Local	2 Lanes	25	Yes	No	Parallel WB Parallel EB

Roadways
Main Street bounds the project property to the east. Main Street is also ITD's State Highway 75 and classified as a Principal Arterial with an 80-feet right-of-way. Approaching the proposed development from the south (i.e. northbound) to River Street, Main Street is a two-lane roadway with a sidewalk on the west (southbound) side only, no bicycle lanes, and no on-street parking. Main Street adds a lane immediately after the River Street intersection in the northbound direction, and tapers from two-lanes to one-lane southbound mid-block from River Street to First Street. This block of Main Street has sidewalks on both sides, parallel parking on both sides, no bicycle lanes, and a transit bus stop located southbound just south of First Street. Continuing north of First Street, Main Street is a four-lane roadway with sidewalks on both sides, parallel parking on both sides, and no bicycles lanes. The intersection of Main Street and First Street is signalized.

River Street bounds the project property to the south, and is classified as a Local Street with an 80-feet right-of-way. Adjacent to the proposed development site from Main Street to Washington Avenue, River Street has sidewalk and parallel parking on the north (westbound) side only with no bicycles lanes. River Street is stop-sign controlled at its intersection with Main Street, and it approaches are free movements at the Washington Avenue intersection.

Washington Avenue bounds the project property to the west, and is classified as a Local Street with a 60-feet right-of-way. Washington Avenue has sidewalks on both sides, parallel parking on the east (northbound) side and diagonal parking on the west (southbound) side, with no bicycle lanes. Washington Avenue is stop-sign controlled at the First Street and River Street Intersections.

First Street bounds the project property to the north, and is classified as a Local Street with a 60-feet right-of-way. From Main Street to Washington Avenue, First Street is a two-lane road with a full length sidewalk on the south side (eastbound) and a partial length sidewalk on the north side (westbound). Parallel parking is located on the both sides of First Street, No bicycle lanes are identified. The intersection of First Street and Main Street is signalized, and First Street approaches are free movements at the Washington Avenue intersection..

Pedestrian and Bicycle Facilities
Summertime bicycle activity on Main Street is low as existing bicycle and pedestrian paths provide less congested travel ways. Summertime bicycle activity increases on the local streets, especially in the community core area, but remains relatively low in the study area.

Pedestrian activity can be significant in the community core and along Main Street. In addition, special events held at Forest Service Park can draw large pedestrian crowds from all surrounding neighborhoods across the study area. The existing sidewalks surrounding the study area provide ample connections to proposed development sidewalk improvements.

Transit Facilities
Mountain Rides Transportation Authority provides free local transit services throughout Ketchum, and also provides fare-based regional transit services connecting Sun Valley,

Ketchum, Hailey, and Bellevue. This transit system provides service approximately every 30 minutes during a.m. and p.m. peak periods and intermittent mid-day service. Existing bus stops near the proposed development are located on Main Street between River Street and First Street in both the northbound and southbound directions.

TRAFFIC VOLUMES AND PEAK HOUR OPERATIIONS

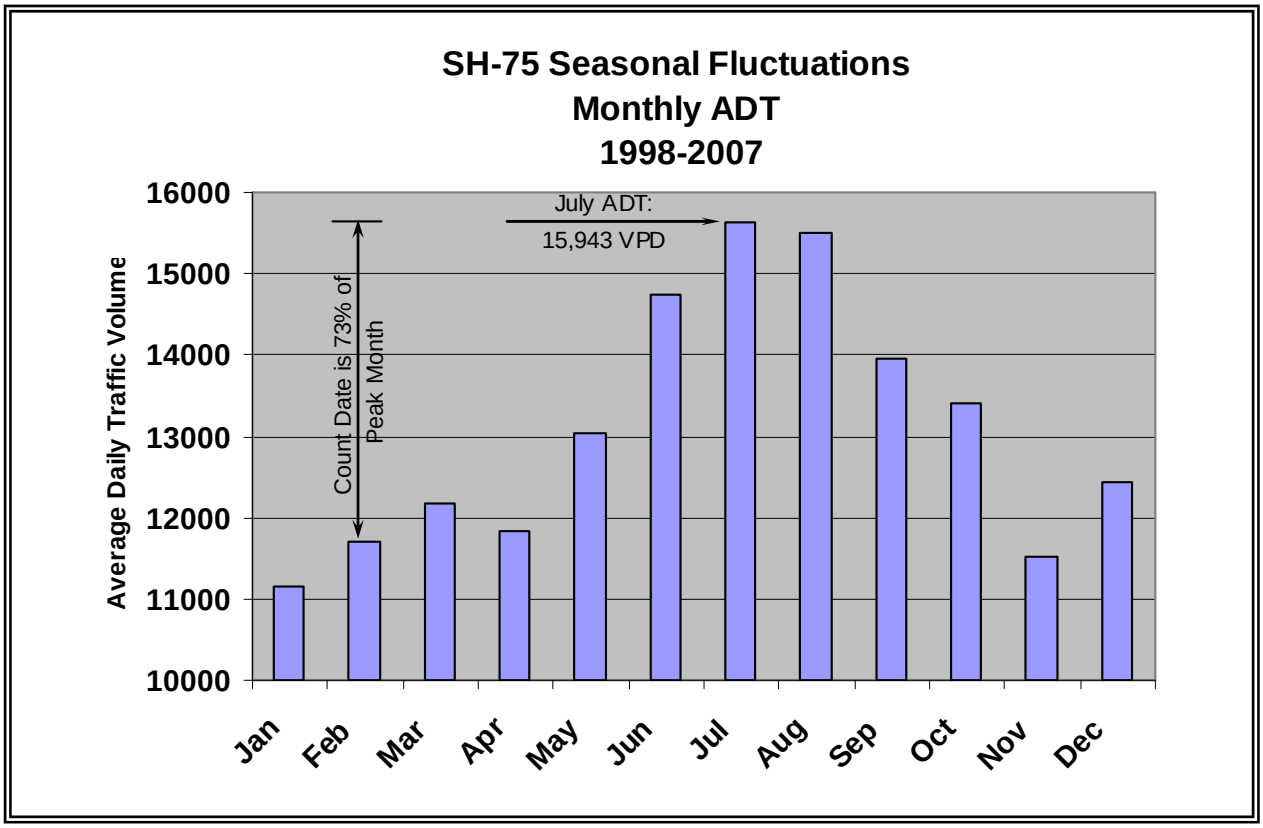
Traffic Volumes

Turning-movement counts were manually completed in February, 2008 for the Main Street intersections and supplemented in March, 2009 with the Washington Avenue intersections. Counts were collected for both the a.m. and p.m. peak periods at the four intersections. The system-wide morning and evening peak hours were found to occur between 7:45 a.m. to 8:45 a.m. and 4:00 p.m. to 5:00 p.m. Refer to the attached count summary sheets in Appendix B for additional information.

Seasonal Variations & Peak Hour Adjustments

This analysis desires to analyze traffic impacts of the proposed development plan during peak traffic periods, thereby assuming all other periods will operate at conditions better than those described in this report. This analysis peak period is assumed to be the peak hour of traffic operations in the historically peak month of the "design" year considered. Study area traffic volumes collected during non-peak months are adjusted to obtain factored peak month volumes. This seasonal variation data is extrapolated from Idaho Transportation Department's permanent traffic counter data located on SH-75 3.5 miles north of Hailey, a summary of which is in the figure below.

Figure 3. Summary of SH-75 Traffic Volume Seasonal Fluctuations



The non-peak month count factor is determined by noting the months with counts were conducted against the average peak month. For this study, as illustrated in Figure 3, the month in which the Main Street traffic counts were completed (February) has approximately 73% less average daily traffic (ADT) than the average ADT during the summer peak month (July). Therefore, a factor of 1.36 is applied to the peak hour turning movement counts to estimate peak summer intersection traffic volumes.

In addition to adjusting this study's traffic counts to reflect the peak month as described above, evaluation of the count data in 15-minute increments is performed to determine a "peak hour factor" to apply to the data. An overall peak hour factor of 0.92 is assumed in this analysis, based on the evaluation of the traffic movement counts completed at the study area intersections.

These multiple peaking factors (i.e. seasonal and hourly) indicate the level of service analysis and traffic volumes represent a reasonable "worse-case scenario" methodology. That is, this analysis essentially evaluates the conditions experienced during the approximately highest 1% (15 minutes/1440 minutes per day) of the daily traffic during the historically highest traffic month in the study area).

Figure 4, on page 21, illustrates this study's "existing" (2009) summer turning-movement counts for the weekday a.m. and p.m. peak hours.

Current Levels-of-Service

All level-of-service analyses described in this report were completed in accordance with the procedures stated in the 2000 *Highway Capacity Manual* (Reference 15). A description of levels-of-service and the criteria by which they are determined is presented in Appendix "A." Appendix "A" also indicates how level-of-service is measured and what is generally considered the acceptable range of level of service. Intersection level-of-service (LOS) is analogous to the letter grades in a school report card. Motorists making a movement through an intersection that operates at LOS "A" experience very little delay, while motorists making a movement at an intersection operating at a LOS "F" may experience unacceptable delays. While "acceptable delay" can be rather subjective from one motorist to another, transportation engineering standards typically consider LOS "D" acceptable at signalized intersections. Similarly, a critical movement volume-to-capacity ratio of 0.90 and a LOS "E" is typically considered acceptable at an unsignalized intersection.

The weekday a.m. and p.m. peak hour turning movement volumes shown in Figure 4 were used in the operational analysis of each study area intersection to determine existing summer traffic operation levels-of-service. This operation level-of-service analysis was performed with computer modeling software utilizing established *Highway Capacity Manual* techniques. Refer to Appendix E for the associated computer generated level-of-service summary reports. Table 2 (p. 22) summarizes the approach delay level of service values calculated these existing conditions. Appendix "C" includes the more detailed level-of-service worksheets for each intersection.

Figure 4. Existing (Year 2009) Summer Traffic Conditions

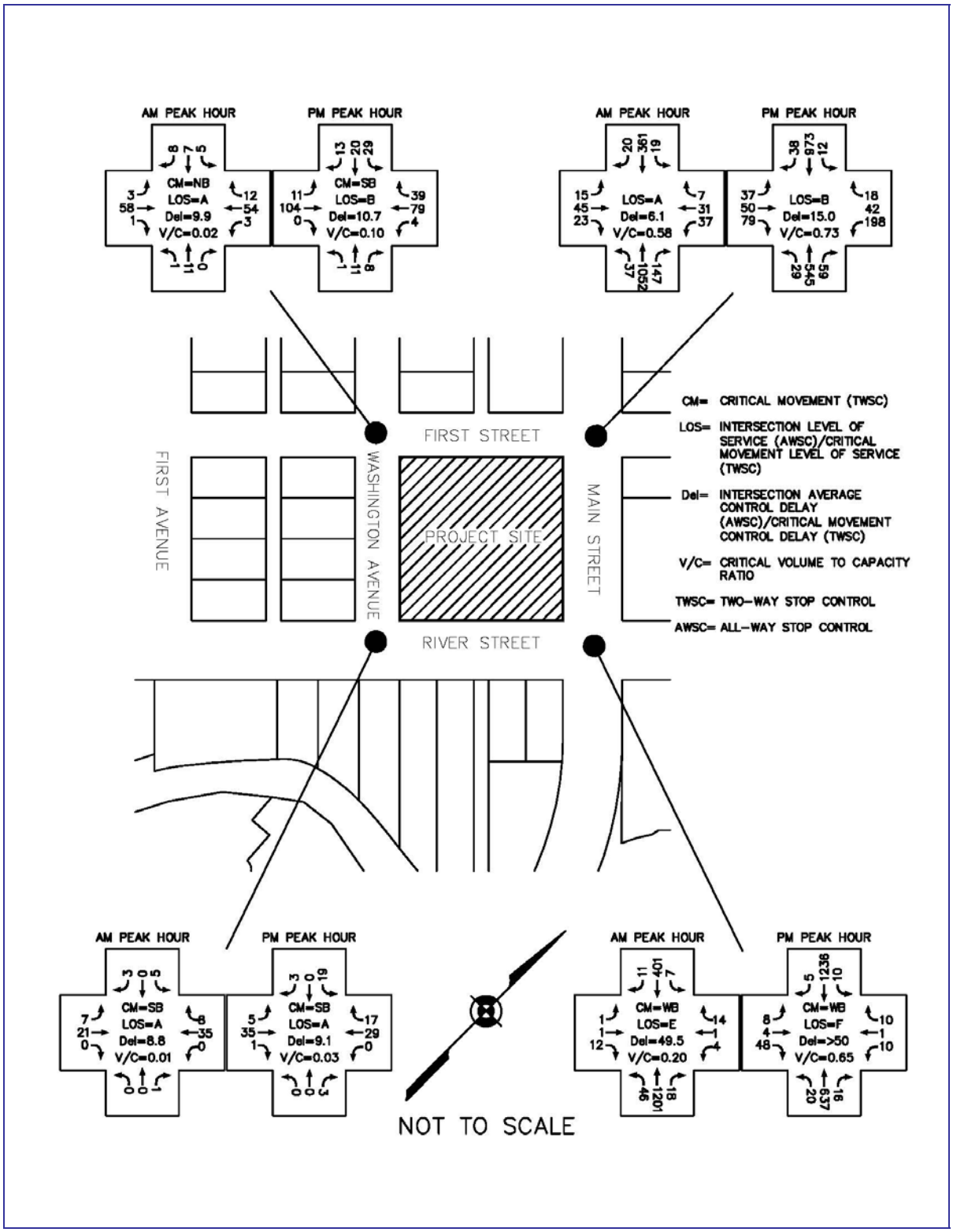


Table 2. 2009 (Existing) Intersection Approach LOS Summary

Location	Average Level of Service per Vehicle							
	SB		NB		EB		WB	
	AM	PM	AM	PM	AM	PM	AM	PM
Main St. & River St.	A (0.5)	A (0.6)	A (2.0)	A (1.3)	C (20.9)	F (>50)	E (49.5)	F (>50)
Main St. & First St.	A (2.6)	B (11.5)	A (4.8)	A (8.7)	C (25.4)	B (13.8)	C (26.1)	C (26.6)
Washington Av. / River St.	A (8.8)	A (9.1)	A (8.4)	A (8.5)	A (1.9)	A (0.9)	A (0.0)	A (0.0)
Washington Av. & First St	A (9.4)	B (10.7)	A (9.9)	B (10.1)	A (0.4)	A (0.8)	A (0.3)	A (0.3)

Notes: number in ( ) indicates average delay/vehicle in seconds
Main Street & First Street is signalized; all other intersections are unsignalized, two-way stop controlled

This year 2009 summer traffic analysis is a snapshot summary of the current operating conditions experienced in the study area. As indicated in this table, all of the study area intersections are shown to operate at acceptable levels-of-service. However, side street approaches to Main Street intersections do experience some unacceptable delays, especially at unsignalized intersections, and Main Street does experience peak period congestion.

Some queuing and delay in the southbound Main Street through-traffic progression at the lane drop (from 2-lanes to 1-lane) between First Street and River Street may be experienced during p.m. peak periods. This lane drop limits the overall capacity and efficient lane utilization southbound on Main Street. North of First Street, drivers intending to travel southbound past River Street desire to travel in the left lane, as this lane is the through-lane past River Street. However, left-turning movements also from this lane impact through-traffic progression. Likewise, the right travel lane is impacted by parallel parking movements along Main Street, and eventually merges into the left lane between First Street and River Street. These existing conditions result in Main Street congestion during peak periods, despite the resulting acceptable levels-of-service at the intersections. Likewise, northbound left-turning movements at the Main Street/River Street intersection may trigger congestion for northbound traffic south of River Street, if these turning movements are unable to find sufficient gaps in southbound traffic. This northbound approach is one-lane, but existing conditions allow two to three northbound left-turning vehicles to queue at this intersection while northbound through traffic is still able to maneuver around this queue. More than three vehicles in the queue tends to block the through progression through this intersection.

When Main Street traffic is near capacity (i.e. peak periods), gaps for turning-movements are limited for drivers approaching from side-streets. Therefore, even small turning-movement volumes result in poor level-of-service results. During such near capacity conditions, drivers typically re-route to signalized intersections to make desired turning-movements, or we see forced travel conditions where Main Street travel speeds are so slow, that drivers allow side-street drivers to enter Main Street congestion.

Traffic Safety

The study area intersections were reviewed to identify potential safety issues. No safety deficiencies were identified at these intersections, and subsequently no crash history for the study area intersection was completed as part of this analysis. Additionally, Hales Engineering, in their Main Street study, briefly discusses safety along the Main Street corridor I their draft report. These excerpts from that draft report summarize their findings:

> "SAFETY ANALYSIS
>
> Most (35 percent) of collisions along Main Street are rear-end crashes. Improving the flow of traffic along Main Street could reduce the frequency of these types of crashes.
>
> Each study intersection had on average two angle-type collisions. Although many of these intersections do not have exclusive left-turn lanes, by comparing these crashes with those crashes at an intersection that does have left turn lanes, it does not appear that there is a significant safety issue with the downtown intersections. However, 4th Street does have a significant number of crashes involving side-street traffic attempting to cross Main Street.
>
> Adding a second southbound lane on Main Street south of River Street as well as realignment Warm Springs Road to 10th Street and signalizing the intersection should improve safety at those intersections.
>
> PEDESTRIAN CONSIDERATIONS
>
> Three collisions involving pedestrians occurred along Main Street in the five year period studied. The driver was found at fault in one of the collisions. Give the high volume of traffic, numerous pedestrian crossing points, and heavy pedestrian volumes most of the year, this data leads Hales Engineering to believe that there is not a significant pedestrian safety problem along Main Street. It appears that crosswalks are visible and drivers are compliant with yielding to pedestrians."

Section 4

TRIP GENERATION AND DISTRIBUTION

Trip Generation and Distribution

Trip Generation
Projections of weekday daily, a.m. peak hour and p.m. peak hour, vehicle trip ends for the proposed development plan were estimated based on the *Trip Generation Manual, 7th Edition*, published by the Institute of Transportation Engineers (ITE) (Reference 11). A summary of the trip generation estimate is presented in Table 3, below. A more detailed printout of the itemized trip generation is included in Appendix D. Galena Engineering's experience with traffic count studies of other developments in Ketchum indicates these ITE rates are representative of actual average generation rates realized in Ketchum.

Table 3. Summary of Estimated Bald Mountain Hotel Trip Generation Scenarios

Land Use	ITE Code	Size	Average Weekday Trips/day	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour		
				Total	In	Out	Total	In	Out
Resort Hotel Luxury Condos Quality Restaurant Apparel Store	330 233 931 870 492	82 rooms 26 units 7040 s.f, 2733 s.f. 7697 s.f.	1007	43	24	19	81	43	38

This trip generation estimate separates the proposed development plan into individual land use components. These proposed components include: Resort Hotel (Land Use 330), Luxury Condo (Land Use 233), Quality Restaurant (Land Use 931), Apparel Store (Land Use 870), and Health/Fitness Club (Land Use 492). Additional assumptions of this scenario included the following:

- Increasing the average occupation rate from ITE's 82% to the City requested 100%. ITE's study of average occupancy rates for resort hotels identifies the average rate at 82%, similar to the regular hotel average occupancy rate of 83%. The trip generation rates of the resort hotel land use identifies a.m. peak hour at 0.37 trips per occupied room for the resort hotel, and a p.m. peak hour rate of 0.49 trips per occupied room. In the preliminary trip generation evaluation reviewed by the City, the developer's identified 60% occupancy rate was commented on as, "[not allowing] a valid assessment of traffic conditions in the busiest periods of the year when it is customary to assume a 100 percent occupancy rate."
- Reducing overall trips generated by the hotel and residential components by 20% to acknowledge a non-auto travel mode reduction likely recognized by the proposed development downtown location. That is, this reduction reflects the likelihood of hotel guests and condominium residents either walking to other downtown destinations, or utilizing the available free transit options.
- Reducing the Quality Restaurant trip generation rate by 66%, assuming 66% of the restaurant patrons during peak period are guests of the hotel;
- Reducing the Apparel Store a.m. peak hour generation rate to 0.00, since these shops will not be open during the a.m. peak hour, and;

- Reducing the Apparel Store p.m. peak hour generation rate by 50%, assuming 50% of the retail shop patrons are guests of the hotel.
- Reducing the Health/Fitness Club trip generation rate by 66%, assuming 66% of the spa patrons during peak period are guests of the hotel.

This analysis estimates an a.m. peak hour 43 total trips generated (24 entering, 19 exiting), and a p.m. peak hour 81 total trips generated (43 entering, 38 exiting). No additional reductions in development generated trips for captured pass-by trips, or shared trips are included in this estimate.

Traffic Distribution

The distribution of the proposed development-generated trips onto the roadway system within the study area is primarily assumed to correspond with the previous traffic counts data and assumption of use of the proposed hotel accesses with regards to the existing study area intersections. Inbound trips are those trips that assumed to enter the proposed development. Main Street and Washington Avenue include the assumed northbound and southbound traffic directions (even though actual alignment is more accurately described as northeast and southwest). River Street and First Street include the assumed westbound and eastbound traffic directions.

A summary of the proposed development-generated trip distribution is presented below. Illustrations of these assumptions are provided in Figure 5 (p. 27) and Figure 6. (p. 28). In general, these trips are anticipated to ingress and egress the site in all directions. The assumed quantified distribution is:

- 30% to and from the north
- 30% to and from the south
- 20% to and from the east, and
- 20% to and from the west.

A more detailed summary of the assignment of individual turning movements associated with peak period development ingress and egress, and internal circulation, is as follows:

Inbound

- 25% of all inbound vehicles will access the development via the porte-cochere. Of these vehicles, half (or 12.5% of all inbound vehicles) will continue to the parking garage.
- 75% of all inbound vehicles will access the development via the parking garage. An additional 12.5% of inbound vehicles enter the parking garage after first entering the porte-cochere.
- Off all the inbound vehicles from the north, approximately two-thirds of these vehicles (or approximately 20% of all inbound vehicles) will utilize Main Street, while the other third (or 10% of all inbound vehicles) will utilize Washington Avenue.
- Off all the inbound vehicles from the south, approximately 85% (or, approximately 25.5% of all inbound vehicles) will use Main Street and turn left at First Street. The other approximately 4.5% inbound from the south vehicles are assumed to use 2nd Avenue and access the development via

River Street.

- All inbound vehicles from the east are assumed to use First Street. 75% of these vehicles (or 15% of all inbound vehicles) will turn left at the First Street-Main Street intersection and enter the parking garage. The remaining inbound vehicles from the east will enter via the porte-cochere
- Of all the inbound vehicles from the west, approximately half (or approximately 10% of all inbound vehicles) will use River Street and half will use First Street.

Outbound

- 25% of all outbound vehicles will egress from the development via the porte-cochere. Of these vehicles, half (or 12.5% of all outbound vehicles) will have started from the parking garage.
- 75% of all outbound vehicles will egress from the development directly from the parking garage. An additional 12.5% of all outbound vehicles will exit the parking garage and enter the porte-cochere before leaving the development.
- Off all the outbound vehicles headed north from the development, approximately 90% of these vehicles (or approximately 27% off all outbound vehicles) will utilize Main Street, while the other 10% (or 3% of all outbound vehicles) will utilize Washington Avenue.
- Off all the outbound vehicles headed south from the development, approximately 75% of these vehicles (or, approximately 22.5% of all outbound vehicles) will use Main Street. The remaining approximately 25% of outbound vehicles headed south (or, approximately 7.5% of all outbound vehicles) are assumed to use 2nd Avenue, and leave the development via River Street.
- All outbound vehicles headed east from the development are assumed to use First Street.
- All outbound vehicles headed west from the development are assumed to use River Street.

Figure 5. Development-Generated Inbound Trip Distribution

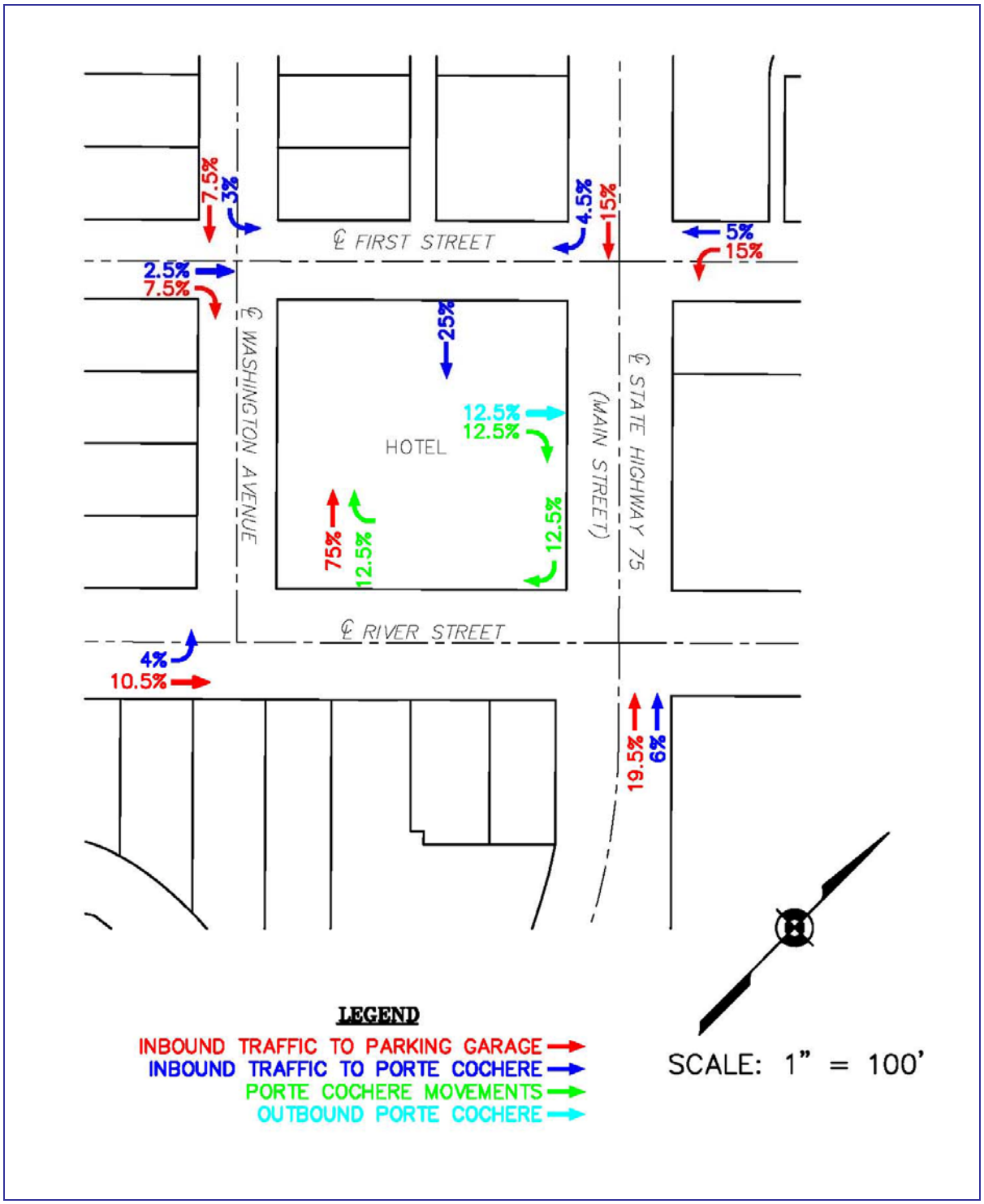
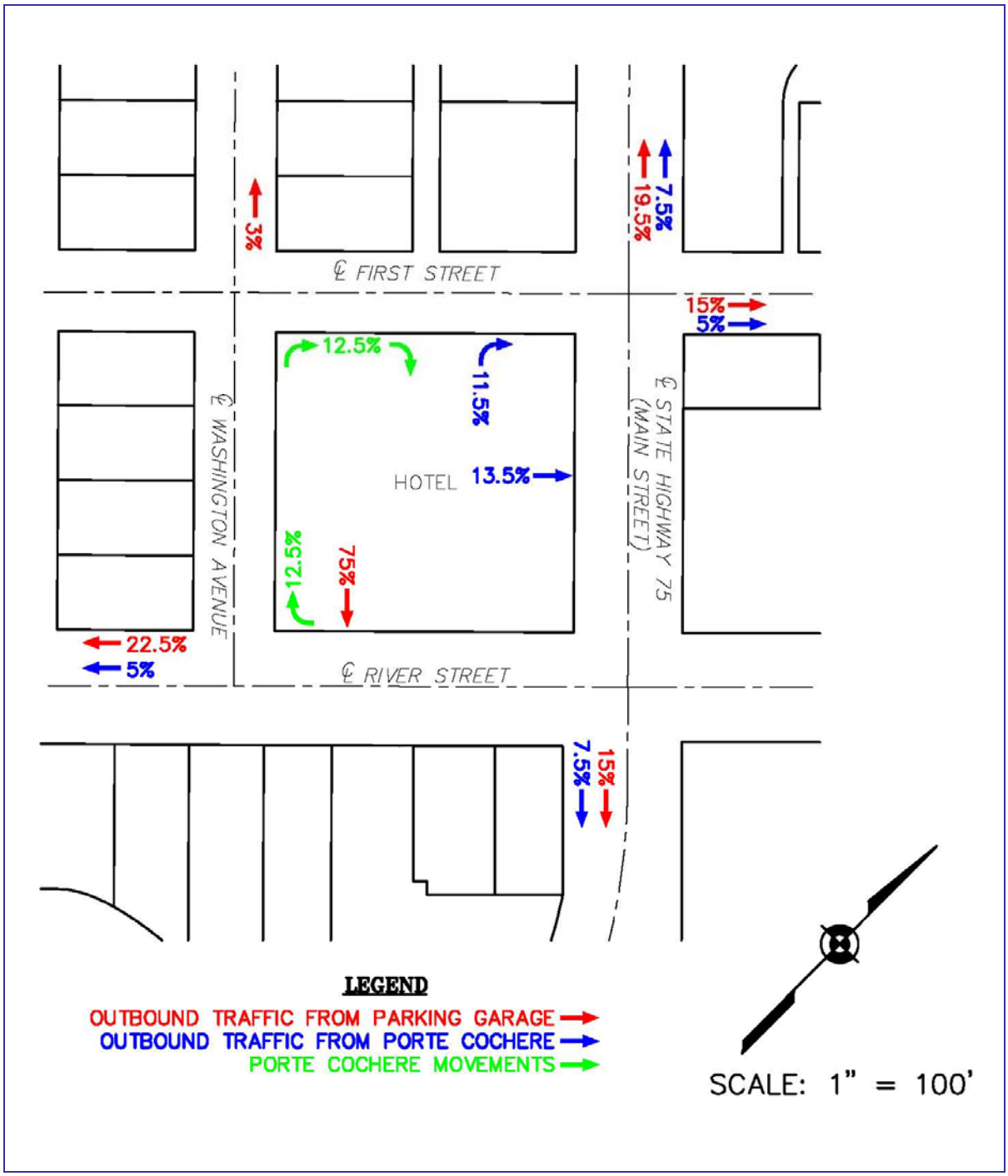


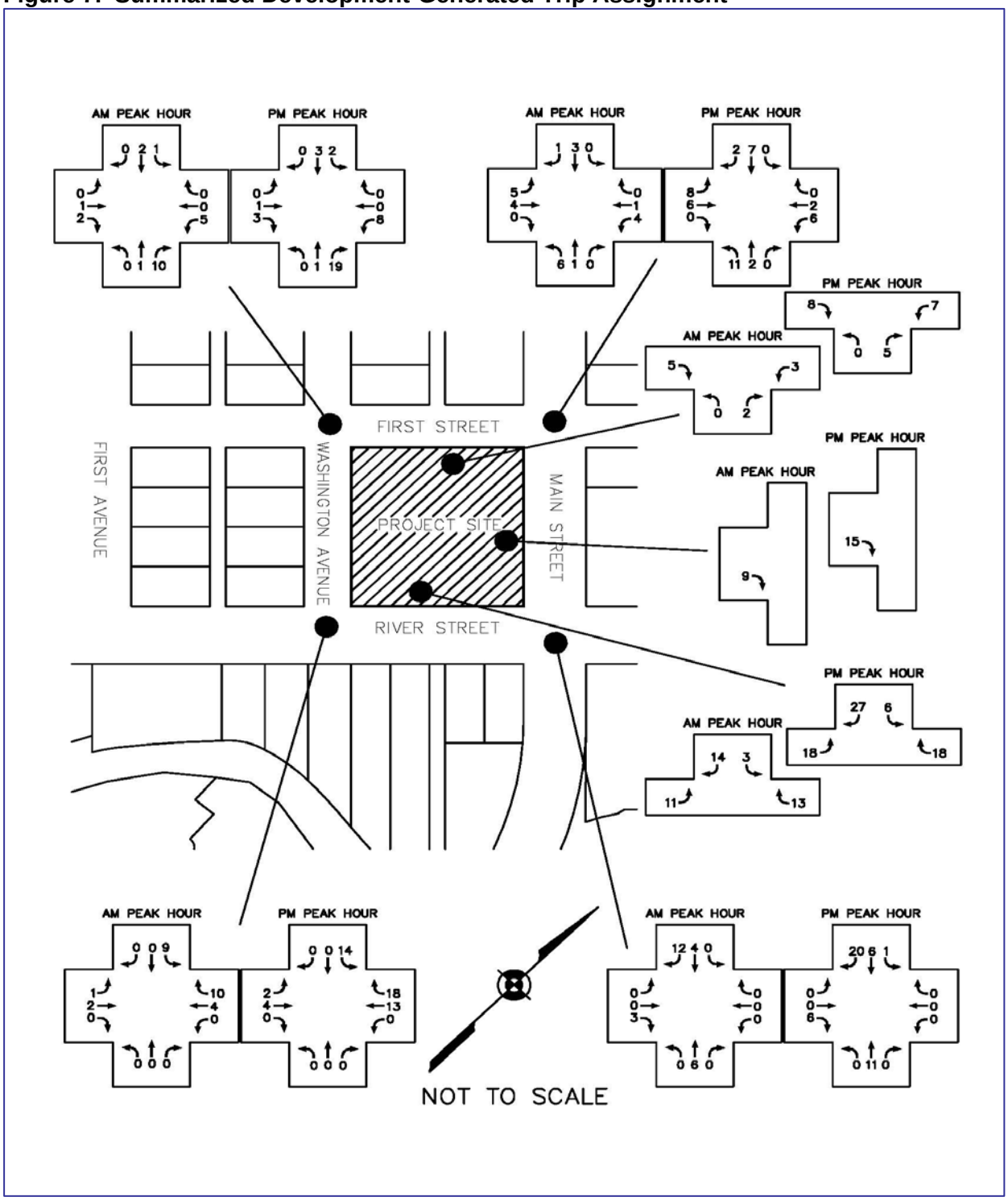
Figure 6. Development Generated Outbound Trip Distribution



Summary of Development-Generated Trip Assignment

Figure 7 below is a summary the calculated traffic volumes and their assignment to the study area intersections using the assumptions discussed above.

Figure 7. Summarized Development-Generated Trip Assignment



Section 5

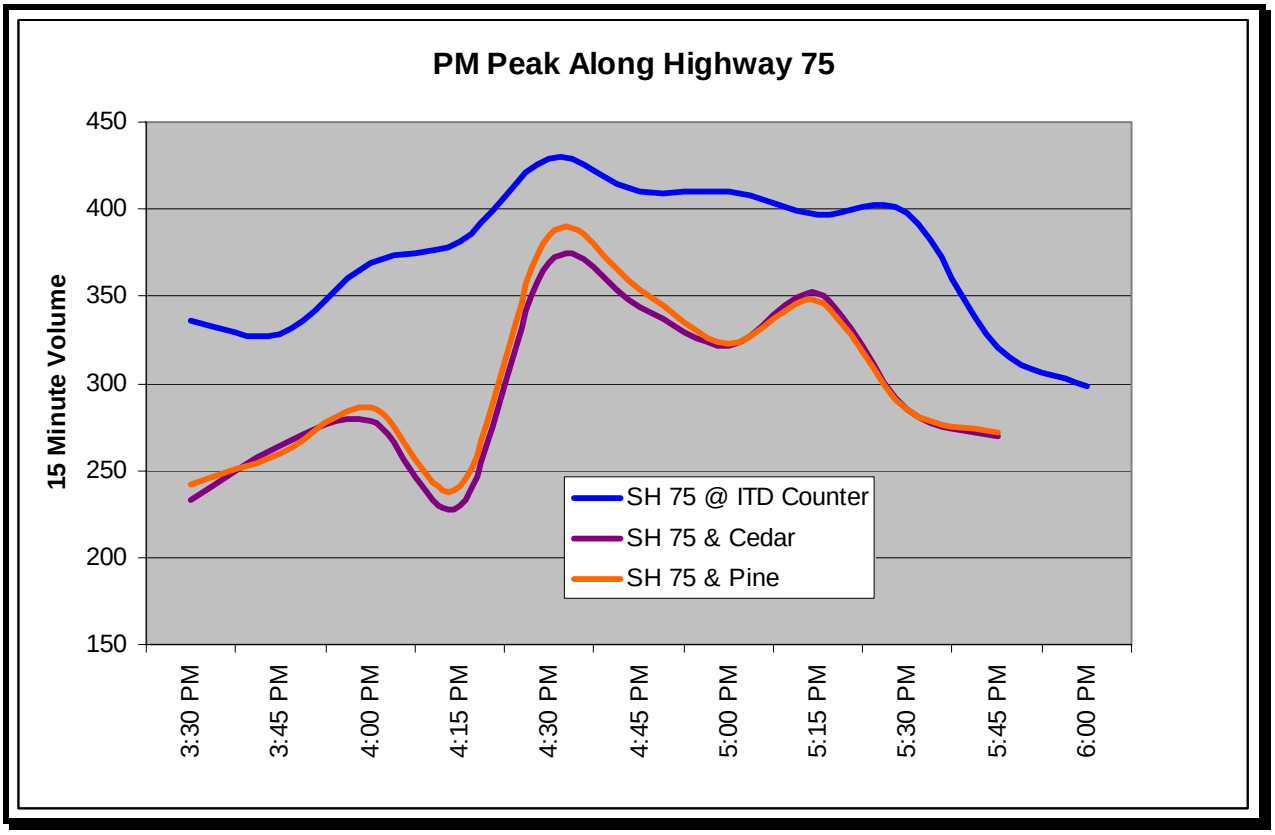
TRANSPORTATION IMPACT ANALYSIS

Transportation Impact Analysis

The transportation impact analysis identifies how the study area's transportation system will operate in the year the proposed development plan is expected to be complete (2013) and five years beyond that expected complete on (2018). The impacts of traffic generated by the proposed Bald Mountain Lodge were examined as follows:

- Any transportation improvements planned in the study area were identified and incorporated into the transportation network as appropriate for the analysis years. For this study, these improvements included developer planned improvements, such as the channelized right-turn porte-cochere exit on Main Street, and other planned facility improvements, such as improvements to Main Street traffic signal phasing and additional lane capacity south of River Street.
- A.m. and p.m. peak hours were determined based on correlation of the data available from ITD permanent traffic counter located just north of Hailey and the traffic counts completed at the study area intersection. An example illustration for the p.m. peak hour determination is shown in Figure 8, below.

Figure 8. Example P.M. Peak Hour Determination



- "Background" summer weekday a.m. and p.m. peak hour traffic conditions for year 2013 and year 2018 were analyzed at each study area intersection. These background conditions were developed by applying a forecasted two-percent (2%) annual growth rate to the existing traffic volumes to account for regional growth in the project site vicinity. The 2% annual growth rate was derived largely on review of historic permanent traffic counter data located north of Hailey, but also included review of the SH-75 Timmerman to Ketchum Draft EIS (Reference 10) and traffic projections used in similar traffic impact studies recently completed in the area.
- Development site-generated trips were assigned to the transportation network as discussed in the previous section, "Trip Generation and Trip Distribution," and year 2013 and year 2018 "total" (i.e. "background" plus development site generated traffic added together) summer traffic conditions were analyzed at each study area intersection and site access points for the weekday a.m. and p.m. peak hours.
- On-site traffic circulation, parking, and access operations were evaluated.

2013 (BUILD-OUT) TRAFFIC IMPACT ANALYSIS

2013 Background Traffic Conditions

The year 2013 background summer traffic analysis identifies how the study area's transportation system will operate without regards to the proposed Bald Mountain Lodge development plan. That is, this analysis includes additional traffic to existing conditions attributed to general growth in the region, but does not include traffic from the proposed development.

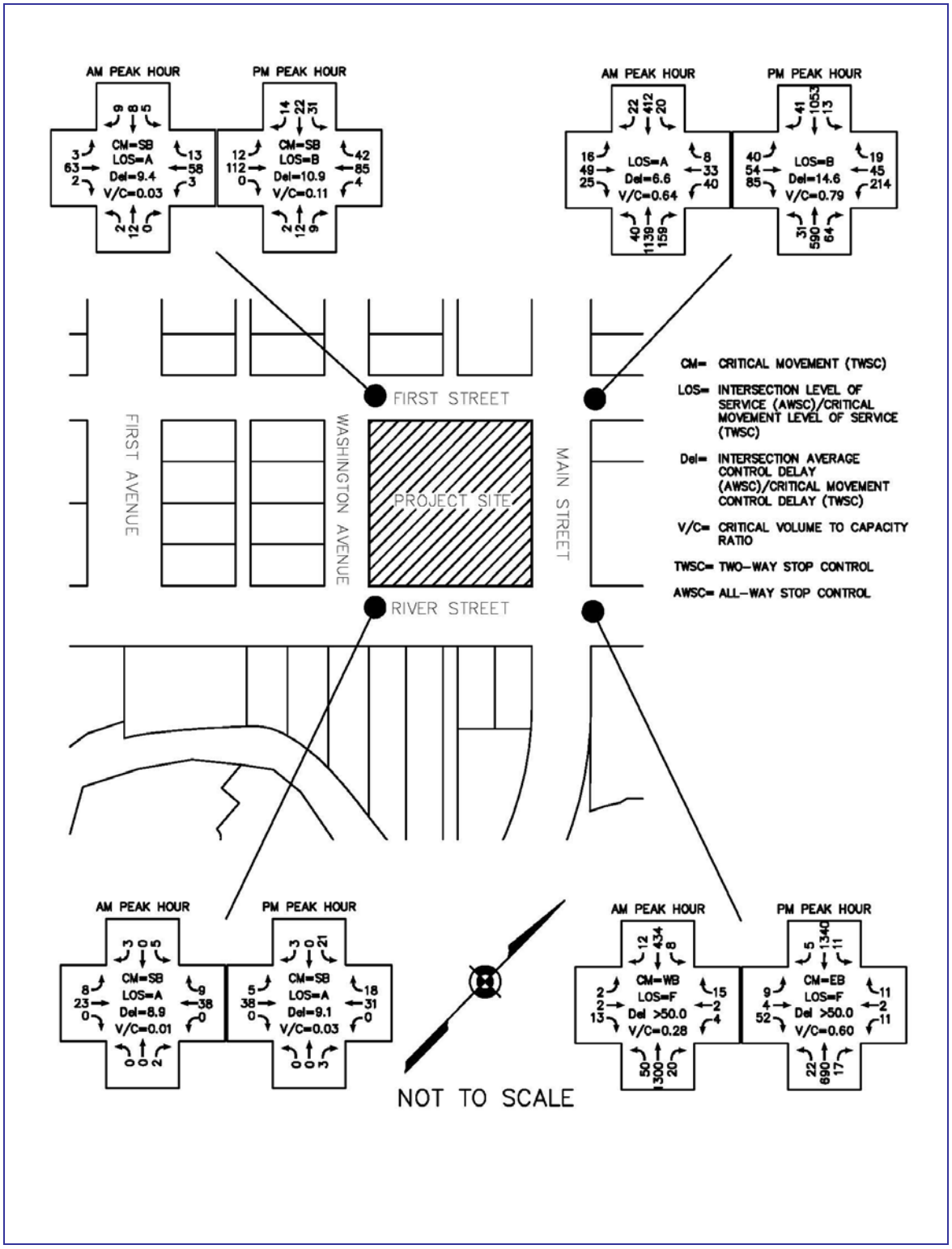
2013 Planned Transportation Improvements

This study evaluated proposed transportation improvements in the study area that included improved Main Street signal phasing and additional lane capacity south of River Street. In addition, several projects relevant to the study area, including another hotel proposed at the southeast corner of the Main Street and River Street intersection, and the SH-75 Timmerman-Ketchum proposed highway improvements, have been discussed. However, only the improved signal phasing was implemented in producing the analysis results reported, since completion of the actual construction of these projects prior to 2013 is unlikely.

2013 Background Traffic Movement Volumes

2013 background traffic movement volumes result from the application of the forecasted 2% annual growth rate to the existing count data collected, then factored to reflect summer weekday a.m. and p.m. peak hours. These traffic movement volumes are illustrated in Figure 9.

FIGURE 9. 2013 Background Traffic Conditions



2013 Background Traffic Level-of-Service Analysis
The weekday a.m. and p.m. peak hour turning movement volumes shown in Figure 9 were used in the operational analysis of each study area intersection to determine 2013 background summer traffic operation levels-of-service. This operation level-of-service analysis was performed with computer modeling software utilizing established *Highway Capacity Manual* techniques. Refer to Appendix E for the associated computer generated level-of-service summary reports.

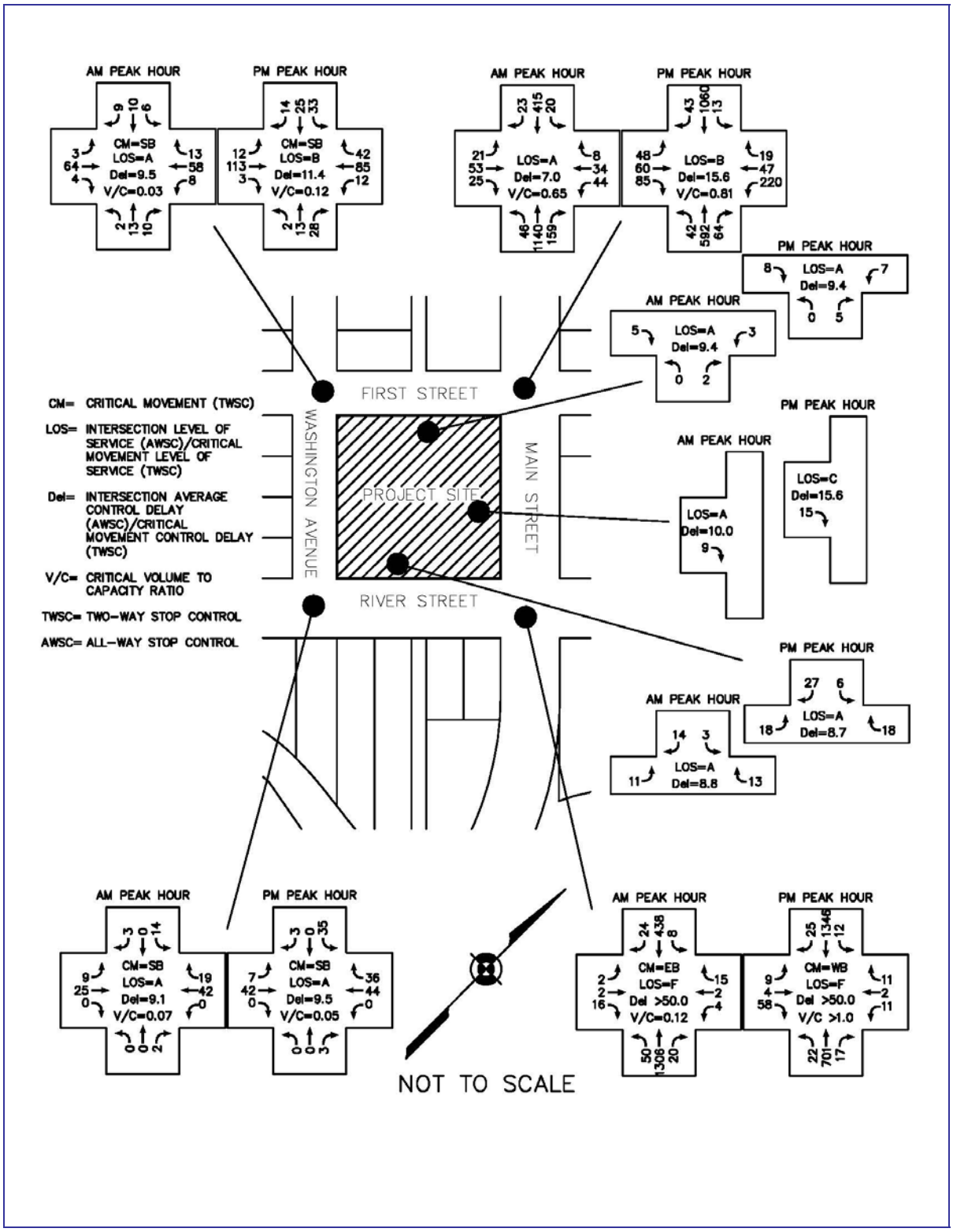
This analysis indicates that the conditions experience in 2013 will be similar to the current traffic conditions. All of the study area intersections operate at satisfactory levels-of-service, however side-street approaches to unsignalized Main Street intersections will continue to experience unacceptable delays. Main Street traffic continues to experience congestion during peak periods.

2013 Total Traffic Conditions
The year 2013 total summer traffic analysis identifies how the study area's transportation system will operate with the development-generated traffic added to the background traffic. That is, this analysis includes additional traffic attributed to general growth in the region, and includes traffic from the proposed development.

2013 Development Planned Transportation Improvements
As previously noted, this study evaluated proposed transportation improvements in the study area that included improved Main Street signal phasing and additional lane capacity south of River Street. In addition, several projects relevant to the study area, including another hotel proposed at the southeast corner of the Main Street and River Street intersection, and the SH-75 Timmerman-Ketchum proposed highway improvements, have been discussed. However, only the improved signal phasing was implemented in producing the analysis results reported, since completion of the actual construction of these projects prior to 2013 is unlikely. The development plan includes constructing a right-turn lane from the porte-cochere Main Street exit to westbound River Street. Evaluations of traffic conditions with this proposed right-turn lane are included in this analysis.

2013 Total Traffic Movement Volumes
2013 total traffic movement volumes used in this analysis result from the application of the forecasted 2% annual growth rate to the existing count data collected, which is then factored to reflect summer weekday a.m. and p.m. peak hours, and then the development-generated traffic movements are added. These traffic movement volumes are illustrated in Figure 10.

FIGURE 10. 2013 Total Traffic Conditions



2013 Total Traffic Level-of-Service Analysis
Similar to the 2013 "background" operational analysis, the weekday a.m. and p.m. peak hour turning movement volumes shown in Figure 10 were used in the operational analysis of each study area intersection to determine 2013 "total" summer traffic operation levels-of-service. Again, refer to Appendix E for the associated computer generated level-of-service summary reports.

Study Area Intersections
The addition of the development site generated traffic to the study area intersections has little impact on the traffic operation level-of-service at these intersections. To illustrate the impact the development site generated traffic has on the study area intersections, Table 4, below, summarizes the level-of-service for each approach at each intersection comparing "background" traffic conditions with "total" traffic conditions.

Table 4. 2013 Intersection Approach LOS Summary

Location	Average Level of Service per Vehicle							
	SB		NB		EB		WB	
	AM	PM	AM	PM	AM	PM	AM	PM
Main St. / River St.								
2013 Background	A (0.6)	A (0.2)	A (3.1)	B (13.6)	D (34.7)	F (>50)	F (>50)	F (>50)
2013 Total	A (0.6)	A (1.2)	A (8.7)	B (13.7)	D (32.6)	F (>50)	F (>50)	F (>50)
Main St / First St.								
2013 Background	A (2.8)	B (14.0)	A (5.5)	A (9.9)	C (25.1)	B (13.6)	C (26.0)	C (29.5)
2013 Total	A (2.8)	B (14.7)	A (5.8)	B (10.8)	C (25.1)	B (13.6)	C (26.0)	C (31.6)
Washington Av./River St.								
2013 Background	A (8.9)	A (9.1)	A (8.4)	A (8.5)	A (1.9)	A (0.9)	A (0.0)	A (0.0)
2013 Total	A (9.1)	A (9.5)	A (8.4)	A (8.5)	A (2.0)	A (1.1)	A (0.0)	A (0.0)
Washington Av./First St.								
2013 Background	A (9.4)	B (10.9)	A (9.4)	B (10.3)	A (0.3)	A (0.8)	A (0.3)	A (0.3)
2013 Total	A (9.6)	B (11.4)	A (9.6)	B (10.0)	A (0.3)	A (0.8)	A (0.8)	A (0.7)

Notes: number in ( ) indicates average delay/vehicle in seconds
Main Street & First Street is signalized; all other intersections are unsignalized, two-way stop controlled

Accesses
The accesses are also anticipated to operate at acceptable levels-of-service. The porte-cochere exit turning movement onto Main Street is expected to experience an average delay of 15.6 seconds, or a level-of-service "C." All other accesses are expected to operate a level-of-service "A." Queuing analysis at the eastbound approach to the Main Street / First Street indicates a 95th-percentile queue, or the maximum queue experienced 5% of the total signal cycles during the peak hour (i.e. three to five times during the peak hour), is approximately four to five vehicles. This queue length is long enough to extend past the proposed porte-cochere access on First Street, therefore creating a possibility for the porte-cochere entrance to be

temporarily blocked by the queued vehicles. The 50th-percentile queue length, or that queue which is expected for half of the signal cycles, is two to three vehicles. This queue length does not block the entrance. Modeled simulations of peak hour conditions rarely showed queues forming in the westbound left-turning movement into the porte-cochere, and these queue lengths no greater than two vehicles. This indicates that while the possibility of queued westbound left-turning vehicles desiring entrance into the First Street porte-cochere impacting the Main Street / First Street intersection exists, this scenario should rarely occur. The development should consider signage stating "Do Not Block Intersection" at the porte-cochere entrance for eastbound First Street drivers to help minimize, even further, the occurrence of this scenario.

Internal Circulation

The channelized right-turn lane from the porte-cochere Main Street exit to westbound River Street works well to keep the internal movements from the porte-cochere to the parking garage out of Main Street traffic. The impact of these movements at the Main Street / River Street, and parking garage access is minimized by the right-turn design of these movements. Drivers desiring to exit the porte-cochere to continue southbound on Main Street will experience p.m. peak hour delays waiting for adequate gaps to enter the traffic progression on southbound Main Street. The porte-cochere design appears to provide storage for approximately three vehicles with no impact to the turnaround movement proposed inside the porte-cochere.

The Washington Avenue intersections have ample capacity to accommodate the addition of vehicular movements from the parking garage to the porte-cochere entrance on First Street. The impact of these movements at the Washington Avenue / River Street, and Washington Avenue / First Street intersections are minimized by the right-turn design of these movements.

2018 TRAFFIC IMPACT ANALYSIS

2018 Background Traffic Conditions

The year 2018 background summer traffic analysis identifies the study area's transportation system operation without regards to the proposed Bald Mountain Lodge development plan. That is, this analysis includes additional traffic to existing conditions attributed to general growth in the region to year 2018, but does not include traffic generated from the proposed development.

2018 Planned Transportation Improvements

As previously noted, this study evaluated proposed transportation improvements in the study area that included improved Main Street signal phasing and additional lane capacity south of River Street. In addition, several projects relevant to the study area, including another hotel proposed at the southeast corner of the Main Street and River Street intersection, and the SH-75 Timmerman-Ketchum proposed highway improvements, have been discussed. For the 2018 analysis, the improved Main Street signal phasing was implemented and the additional southbound lane was added south of River Street in producing the results reported.

2018 Background Traffic Movement Volumes

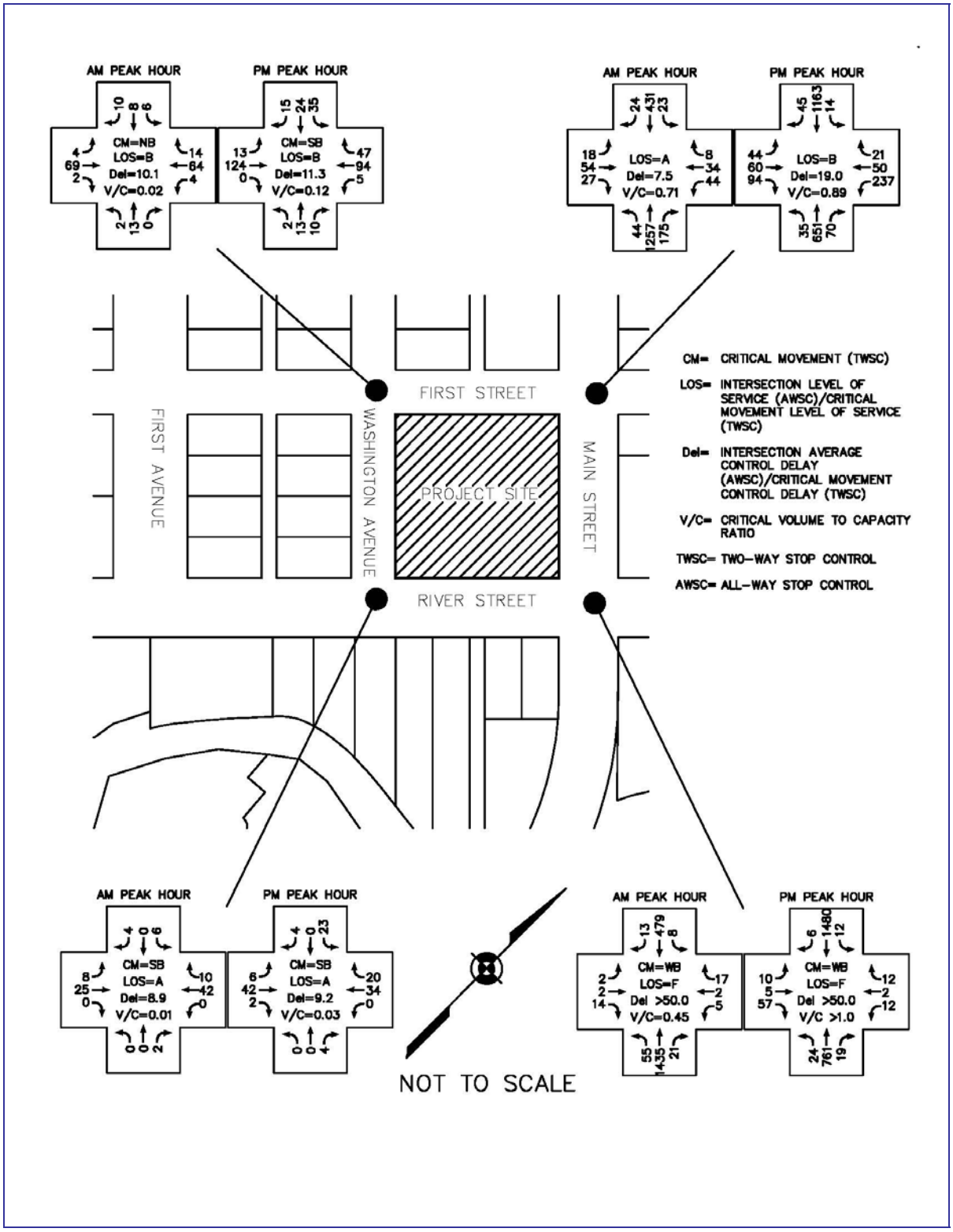
2018 background traffic movement volumes used in this analysis result from the application of the forecasted 2% annual growth rate during summer weekday a.m. and p.m. peak hours. These traffic movement volumes are illustrated in Figure 11.

2018 Background Traffic Level-of-Service Analysis

The weekday a.m. and p.m. peak hour turning movement volumes shown in Figure 11 were used in the operational analysis of each study area intersection to determine 2016 background summer traffic operation levels-of-service. Similar to all analyses of this study, this operation level-of-service analysis was performed with computer modeling software utilizing established *Highway Capacity Manual* techniques. Refer to Appendix F for the associated computer generated level-of-service summary reports.

This analysis indicates that the conditions expected in 2018 will be similar to the current traffic conditions, but with increased turning movement delays as a result of the general increase in traffic volumes. All of the study area intersections operate at satisfactory levels-of-service; however, side-street approaches to unsignalized Main Street intersections will continue to experience unacceptable delays. The additional southbound lane does little to improve side-street approach delays, but does increase the overall capacity of Main Street. While not reflected in the Main Street intersection level-of-service analyses, better southbound Main Street traffic progression south of River Street is indicated through simulation modeling.

FIGURE 11. 2018 Background Traffic Conditions



2018 Total Traffic Conditions

The year 2018 total summer traffic analysis identifies how the study area's transportation system will operate with the development-generated traffic added to the background traffic. That is, this analysis includes additional traffic attributed to general growth in the region, and adds traffic from the proposed development.

2018 Development Planned Transportation Improvements

This study evaluated proposed transportation improvements in the study area that included improved Main Street signal phasing and additional lane capacity south of River Street. In addition, several projects relevant to the study area, including another hotel proposed at the southeast corner of the Main Street and River Street intersection, and the SH-75 Timmerman-Ketchum proposed highway improvements, have been discussed. The improved signal phasing and southbound Main Street lane additions from River Street to Serenade Lane were used in producing the results reported. The development plan includes constructing a right-turn lane from the porte-cochere Main Street exit to westbound River Street. Evaluations of traffic conditions with this proposed right-turn lane are included in this analysis.

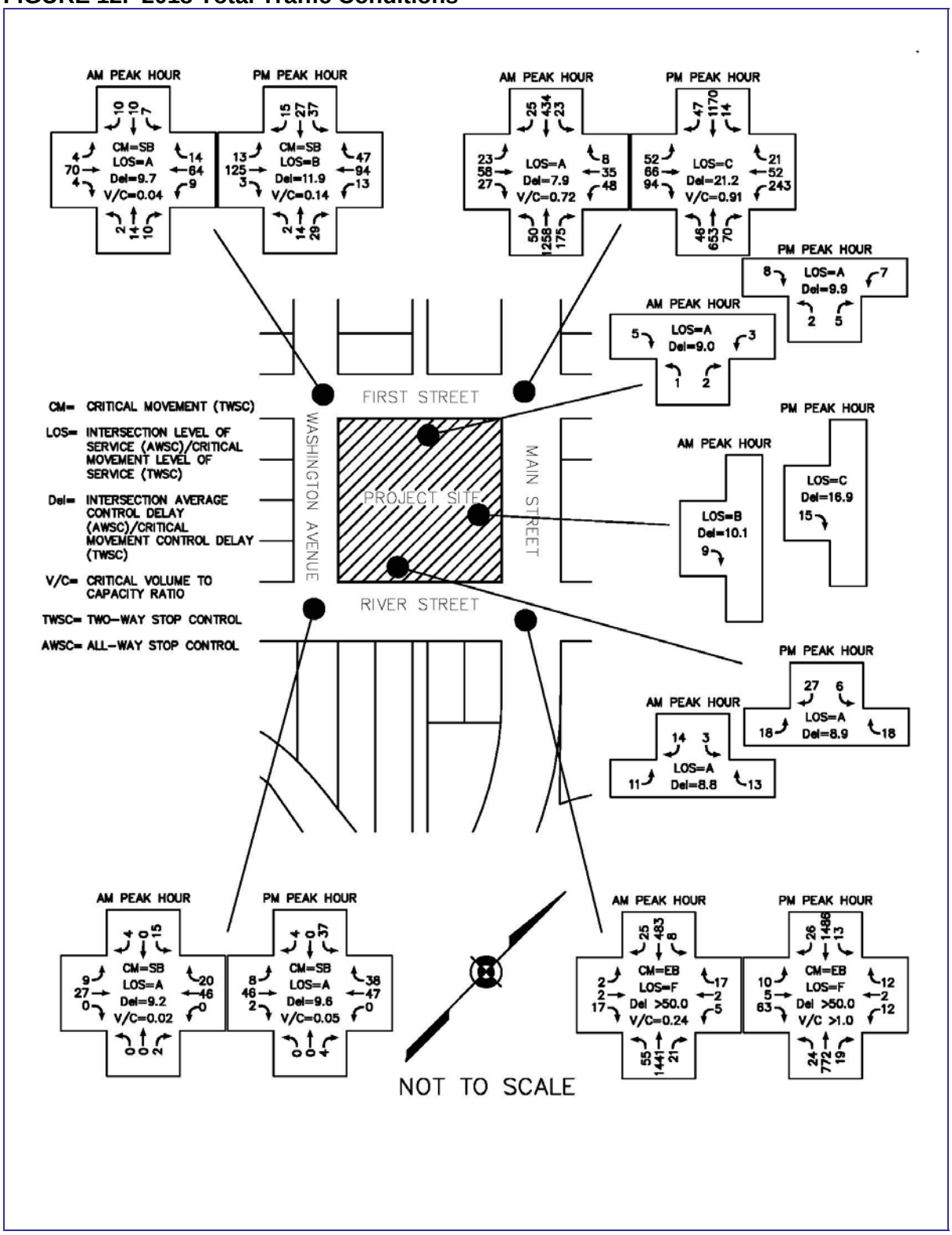
2018 Total Traffic Movement Volumes

2018 total traffic movement volumes used in this analysis are derived from applying the same forecasted 2% annual growth rate used in previous analyses to the existing count data collected, factoring for summer weekday a.m. and p.m. peak hours, and then adding the development-generated traffic. These traffic movement volumes are illustrated in Figure 12.

2018 Total Traffic Level-of-Service Analysis

Similar to the 2018 "background" operational analysis, the weekday a.m. and p.m. peak hour turning movement volumes shown in Figure 12 were used in the operational analysis of each study area intersection to determine 2018 "total" summer traffic operation levels-of-service. Again, refer to Appendix E for the associated computer generated level-of-service summary reports.

FIGURE 12. 2018 Total Traffic Conditions



Study Area Intersections

The addition of the development site generated traffic to the study area intersections has minimal impact on the traffic operation level-of-service at these intersections. To illustrate the impact the development site generated traffic has on the study area intersections, Table 5, summarizes the level-of-service for each approach at each intersection comparing "background" traffic conditions with "total" traffic conditions.

Table 5. 2018 Intersection Approach LOS Summary

Location	Average Level of Service per Vehicle							
	SB		NB		EB		WB	
	AM	PM	AM	PM	AM	PM	AM	PM
Main St. / River St.								
2018 Background	A (0.7)	A (3.2)	A (7.7)	A (2.4)	F (>50)	F (>50)	F (>50)	F (>50)
2018 Total	A (1.0)	A (0.2)	A (8.9)	B (15.0)	F (>50)	F (>50)	F (>50)	F (>50)
Main St / First St.								
2018 Background	A (2.9)	B (19.8)	A (6.8)	B (12.4)	C (25.0)	B (13.3)	C (26.0)	D (35.7)
2018 Total	A (3.0)	C (22.2)	A (7.0)	B (14.9)	C (25.2)	B (13.2)	C (26.8)	D (38.3)
Washington Av./River St.								
2018 Background	A (8.9)	A (9.2)	A (8.4)	A (8.5)	A (1.8)	A (0.9)	A (0.0)	A (0.0)
2018 Total	A (9.2)	A (9.6)	A (8.5)	A (8.6)	A (1.9)	A (1.1)	A (0.0)	A (0.0)
Washington Av./First St.								
2018 Background	A (9.5)	A (11.3)	B (10.1)	B (10.5)	A (0.4)	A (0.8)	A (0.4)	A (0.3)
2018 Total	A (9.7)	B (11.9)	A (9.7)	B (10.2)	A (0.4)	A (0.8)	A (0.8)	A (0.7)

Notes: number in ( ) indicates average delay/vehicle in seconds
Main Street & First Street is signalized; all other intersections are unsignalized, two-way stop controlled

Accesses

The accesses are also anticipated to operate at acceptable levels-of-service. The porte-cochere exit turning movement onto Main Street is expected to experience an average delay of 16.9 seconds, or a level-of-service "C." All other accesses are expected to operate a level-of-service "A." A similar queuing analysis as described in the previous "2013 Total Traffic Conditions" section of this report indicates the eastbound approach to the Main Street / First Street 95th-percentile queue, or the maximum queue experienced 5% of the total signal cycles during the peak hour (i.e. three to five times during the peak hour), is approximately five vehicles, or approximately one vehicle length more than noted in the 2013 Total Traffic Conditions. As previously noted, this queue length is long enough to extend past the proposed porte-cochere access on First Street, therefore creating a possibility for the porte-cochere entrance to be temporarily blocked by the queued vehicles. The 50th-percentile queue length, or that queue which is expected for half of the signal cycles, is two to three vehicles. This queue length does not block the entrance. Again, modeled simulations of peak hour conditions rarely showed queues forming in the westbound left-turning movement into the porte-cochere, and these queue lengths no greater than two vehicles. Therefore as noted in the 2013 Total Traffic Conditions, the same possibility of queued westbound left-turning vehicles desiring entrance into the First Street porte-

cochere impacting the Main Street / First Street intersection exists, but should rarely occur. As previously noted, the development should consider signage stating "Do Not Block Intersection" at the porte-cochere entrance for eastbound First Street drivers to help minimize, even further, the occurrence of this scenario.

Internal Circulation

Similar to the previous 2013 Total Traffic Conditions analysis, the channelized right-turn lane from the porte-cochere Main Street exit to westbound River Street works well to keep the internal movements from the porte-cochere to the parking garage out of Main Street traffic. The impact of these movements at the Main Street / River Street, and parking garage access is minimized by the right-turn design of these movements. Drivers desiring to exit the porte-cochere to continue southbound on Main Street will experience p.m. peak hour delays waiting for adequate gaps to enter the traffic progression on southbound Main Street. The porte-cochere design appears to provide storage for approximately three vehicles with no impact to the turnaround movement proposed inside the porte-cochere.

The Washington Avenue intersections have ample capacity to accommodate the addition of vehicular movements from the parking garage to the porte-cochere entrance on First Street. The impact of these movements at the Washington Avenue / River Street, and Washington Avenue / First Street intersections are minimized by the right-turn design of these movements.

CONSTRUCTION TRAFFIC CONTROL PLAN

In order to minimize construction traffic on the nearby businesses and residences, a construction traffic control plan should be developed. This plan should identify key ingress and egress routes to the development site and, if possible, identify routes where construction site-generated traffic is prohibited. Such a plan could be developed in conjunction with the City of Ketchum and as part of the development's approval process. Once available, the plan should be made readily available to all contractors and their subcontractors during the preconstruction meetings and bidding processes. If necessary, the developer should coordinate with the City for identifying proposed enforcement techniques intended to ensure construction generated traffic conforms to the adopted plan.

DEVELOPMENT PLAN PARKING

The development plan proposes two levels of on-site, underground parking; a total of 116 parking spaces. These 116 proposed parking spaces appear adequate to service the hotel's operations. No on-street parking is proposed along Main Street, which removes approximately four existing parallel spaces. Approximately five parallel spaces are proposed along River Street adjacent to the development, five less than existing. Approximately three parallel spaces are proposed along Washington Avenue adjacent to the development, seven less than existing. And, approximately three parallel spaces are proposed along First Street adjacent to the development, approximately seven less than existing. Adequate right-of-way is available on River Street and Washington Avenue to consider alternate on-street parking configurations discussed in public hearings, without impact to development plan operations.

TRAFFIC SAFETY

Observations of the study area indicate no unusual safety concerns or mitigations are identified. The development plan does not propose any improvements deficient with regards to traffic safety. Proposed access locations on First Street and River Street are close to existing intersections; however, simulation modeling indicates queuing at these locations does not impact the existing intersections.

As previously noted in the "Existing Conditions" section of this report, study area Intersections sight distances were observed and none of the intersections appear to have sight deficiencies. The same is true for proposed access locations. The following Table 6 indicates the minimum sight distance requirements used for a stop-controlled minor street, and used as the basis for sight distance observations. The design vehicle for the values shown is a passenger car with roadway grades less than 3%.

Table 6. Minimum Sight Distance Requirement for a Stop-Controlled minor Street

Major Street Speed (mph)	Minor Street Stop Controlled	
	Left Turn	Right Turn and Crossing
15	170 feet	145 feet
20	225 feet	195 feet
25	280 feet	240 feet
30	335 feet	290 feet
35	390 feet	335 feet
40	445 feet	385 feet
45	500 feet	430 feet
50	555 feet	480 feet
55	610 feet	530 feet
60	665 feet	575 feet

PEDESTRIAN AND BICYCLE FACILITIES

The study area roadways do not include bicycle lanes, and no new bicycle lanes are proposed in the development plan. The development plan does propose new sidewalks along Main Street, River Street and Washington Avenue, and First Street adjacent to the development. Designs for pedestrian infrastructure should be prepared in conformance with the Manual on Uniform Traffic Control Devices and AASHTO's guide for the development of pedestrian/bicycle facilities. Designs should also be completed in conformance with additional standards that may be adopted by the City of Ketchum.

ROADWAY IMPROVEMENTS

The existing roadways streets within this study area, with the exception of Main Street, provide sufficient capacity to service traffic generated from this proposed development. While Main Street currently experiences unacceptable traffic levels-of-service during peak hours, the development generated traffic has little impact on Main Street traffic operations, and no Main Street capacity improvements are recommended with regards to this development. Measures noted, in the process of preparing this report, regarding current planning efforts to improve Main Street traffic operations include: the City of Ketchum's Draft Report on Main Street Traffic completed by Hales Engineering in July, 2009; the City

of Ketchum's current application for grant monies to construct an additional southbound lane from River Street to Serenade Lane; and, continued regional emphasis on transit services and alternative modes of transportation aimed at reducing overall vehicle trips. In turn, the proposed development should consider working with the City of Ketchum and local transportation authorities to implement plans aimed at reducing the development-generated vehicle trips.

GEOMETRIC AND SIGNAL WARRANTS

At the unsignalized intersections in the study area, background and total traffic conditions were considered for left turn, right turn, and signal warrants for each study year. The evaluation standards for left- and right-turn lane warrants as set forth by ITD are characteristically unique compared to the more widespread methodologies such as AASHTO's *Green Book (*Reference 2), NCHRP Report 279 (Reference 13) and NCHRP Report 457 (Reference 4) based on M.D. Harmelink's published paper from 1967 (Reference 5). NCHRP Reports provide greater detail on the treatment of right turn lanes, and are used in this report. Signal warrants evaluations are based on methodologies set forth in the *Manual of Uniform Traffic Control Devices* (Reference 16).

For right-turn lanes NCHRP 279 states:

> "No specific warrants or guidelines are apparent for low speed, urban intersections. Engineers generally rely on capacity analysis and accident experience when considering right turn lanes".

Since this study area represents low speed, urban intersections, capacity analysis and accident experience drive the consideration of right-turn lanes. Evaluation of the addition of right-turn lanes at the study area intersections did not significantly improve overall intersection traffic operations, and observations indicate no unusual accident experience at these locations. Therefore, no right-turn lanes are recommended. The channelized right-turn lane from the porte-cochere Main Street exit to westbound River Street is recommended to keep these "internal" turning movements out of the main stream of Main Street traffic.

Left-turn lanes are also not recommended for the following primary reasons:

- Left-turning movements are relatively low volume movements and do not meet warrant requirements in most evaluation scenarios.
- Adequate roadway width is available on Washington Avenue, River Street, and First Street for through-movements or right-turning movements to maneuver past, and therefore are not delayed by stopped left-turning vehicles.
- Main Street intersections already operate at poor levels-of-service during peak periods. While Main Street intersections would likely operate more efficiently with left-turn lanes, such improvements are not triggered by the scope of impacts related to this development plan.

No signal warrant analysis was performed for the Main Street and River Street intersection to determine if this intersection warrants consideration of installation of a traffic signal, since signalizing this intersection has not been part of the City's and ITD's discussion with regards to Main Street improvements. The Washington Avenue intersection do not meet signal warrants by observation.

Section 6

FINDINGS AND RECOMMENDATIONS

Findings and Recommendations

Findings from this study include:

The proposed Bald Mountain Lodge can be constructed with minimal adverse impacts to traffic operations and safety, not already recognized, in the study area. The improvements associated with transportation elements of the proposed development plan are in accordance with reviewing agencies standards, and promote the overall concepts identified in the City of Ketchum's *Comprehensive Plan* and *Downtown Master Plan*. In addition, the proposed circulation allowing ingress and egress from the existing transportation network to the development provides these movements to an appropriate standard of safety.

Readily noted by general public input and professional engineering review, Main Street intersections currently experience undesirable levels-of-service during peak period traffic conditions. The projected traffic from this development added to these intersections has little significance on projected traffic levels-of-service and operations. As noted in the City of Ketchum's own consultants review of Main Street traffic conditions, the Main Street corridor currently experiences some delay in the through traffic progression, and "unacceptable" delays on unsignalized side street intersections. In general, the northbound through traffic progression delays are associated with a diminished capacity at the corridor intersections to accommodate desired turning movements. Similarly, southbound through traffic progress delays are also associated with turning movements at intersections, but also a lane drop, from two-lanes to one-lane, between First Street and River Street . The City is discussing several alternatives aimed at increasing this corridor capacity, including alternatives such as coordinated signal phasing, changes to roadway cross-section, and additional signalization. The City's studies note that even with such measures, unsignalized side streets will continue to experience unacceptable levels of delay. While more consideration of the Main Street improvements are warranted, such improvements should not deter from the City of Ketchum's desire to provide a multi-modal friendly Main Street corridor.

The following is a summary of the traffic operation and level-of-service analyses utilized for this Bald Mountain Lodge traffic impact assessment:

Existing (Year 2009) Peak Period Traffic Conditions

- No safety issues or mitigation measures were identified at the study intersections
- Main Street transitions from two-lanes to one-lane in the southbound direction between First Street and River Street thereby reducing the overall capacity of southbound traffic volumes on Main Street.
- P.M. peak period undesirable levels-of-service are experienced at both the westbound and eastbound River Street approaches to Main Street.

Projected Bald Mountain Lodge Transportation Impacts

The proposed development is estimated to generate approximately 1007 new trips daily; 43 vehicle trips during the AM Peak Hour (24 inbound and 19 outbound) and approximately 81 trips during the PM Peak Hour (43 inbound and 38 outbound). In general, these trips are anticipated to ingress and egress the site in all directions. The assumed quantified distribution is:

- 30% to and from the north
- 30% to and from the south
- 20% to and from the east, and
- 20% to and from the west.

A more detailed summary of the assignment of individual turning movements associated with peak period development ingress and egress, and internal circulation, is as follows:

Inbound

- 25% of all inbound vehicles will access the development via the porte-cochere. Of these vehicles, half (or 12.5% of all inbound vehicles) will continue to the parking garage.
- 75% of all inbound vehicles will access the development via the parking garage. An additional 12.5% of inbound vehicles enter the parking garage after first entering the porte-cochere.
- Of all the inbound vehicles from the north, approximately two-thirds of these vehicles (or approximately 20% of all inbound vehicles) will utilize Main Street, while the other third (or 10% of all inbound vehicles) will utilize Washington Avenue.
- Of all the inbound vehicles from the south, approximately 85% (or, approximately 25.5% of all inbound vehicles) will use Main Street and turn left at First Street. The other approximately 4.5% inbound from the south vehicles are assumed to use 2nd Avenue and access the development via River Street.
- All inbound vehicles from the east are assumed to use First Street. 75% of these vehicles (or 15% of all inbound vehicles) will turn left at the First Street-Main Street intersection and enter the parking garage. The remaining inbound vehicles from the east will enter via the porte-cochere
- Of all the inbound vehicles from the west, approximately half (or approximately 10% of all inbound vehicles) will use River Street and half will use First Street.

Outbound

- 25% of all outbound vehicles will egress from the development via the porte-cochere. Of these vehicles, half (or 12.5% of all outbound vehicles) will have started from the parking garage.
- 75% of all outbound vehicles will egress from the development directly from the parking garage. An additional 12.5% of all outbound vehicles will exit the parking garage and enter the porte-cochere before leaving the development.
- Of all the outbound vehicles headed north from the development, approximately 90% of these vehicles (or approximately 27% off all outbound vehicles) will utilize Main Street, while the other 10% (or 3% of all outbound vehicles) will utilize Washington Avenue.
- Of all the outbound vehicles headed south from the development, approximately 75% of these vehicles (or, approximately 22.5% of all outbound vehicles) will use Main Street. The remaining approximately 25% of outbound vehicles headed south (or, approximately 7.5% of all outbound vehicles) are assumed to use 2nd Avenue, and leave the

development via River Street.
- All outbound vehicles headed east from the development are assumed to use First Street.
- All outbound vehicles headed west from the development are assumed to use River Street.

Developer Proposed Transportation Improvements
The Bald Mountain Lodge development plan proposes the following transportation improvements:

- The development plan proposes construction of an improved transit bus stop at the existing southbound Main Street location just south of First Street.
- Construction of on-site, underground parking facilities (116 spaces) accessed away from Main Street traffic (i.e. accessed from River Street).
- Construction of primary ingress and egress locations off Main Street (i.e. primary accesses are a porte-cochere entrance from First Street and the underground parking entrance on River Street. Porte-cochere egress on Main Street is limited to a right-turn (southbound) only movement, and channelized in a proposed right-turn lane to River Street).
- Construction of curb layouts enhancing separating through traffic on existing streets from essentially "internal" development movements from the porte-cochere to the underground parking, and pedestrian safety.

2013 BACKGROUND Peak Period Traffic Conditions

- 2013 background traffic volumes were estimated by applying a two-percent (2%) annual growth rate to existing traffic volumes. This growth rate is derived from reviewing data from the ITD AADT traffic counter along SH-75, the SH-75 Timmerman to Ketchum EIS, and traffic projections used in similar transportation impact studies in Blaine County.
- No safety issues or mitigation measures were identified at the study intersections
- Continued p.m. peak period undesirable levels-of-service are projected at both the westbound and eastbound River Street approaches to Main Street. Specific Main Street progression scenarios can diminish all capacity of these approach movements.
- P.M. peak period undesirable levels-of-service are experienced at the eastbound First Street approach to Main Street.
- Main Street through traffic capacity can be disrupted given specific turning northbound left-turn movement scenarios at the River Street intersection.

2013 TOTAL Peak Period Traffic Conditions

- No safety issues or mitigation measures were identified at the study intersections
- Continued p.m. peak period desirable levels-of-service are projected at both the westbound and eastbound River Street approaches to Main Street.
- Continued p.m. peak period undesirable levels-of-service are experienced at the eastbound First Street approach to Main Street.
- Rare queuing scenarios at the First Street westbound approach to Main Street can block access to the porte-cochere entrance.

- Main Street northbound through traffic capacity can be disrupted given specific turning northbound left-turn movement scenarios at the River Street intersection.
- Porte-cochere vehicles exiting vehicles can experience delays given specific Main Street southbound traffic progression scenarios. Gap access is dependent on Main Street signal coordination.

2018 BACKGROUND Peak Period Traffic Conditions

- 2018 background traffic volumes were estimated by applying the same 2% annual growth rate as noted above to existing traffic volumes.
- No safety issues or mitigation were identified at the study intersections
- Continued p.m. peak period undesirable levels-of-service are projected at both the westbound and eastbound River Street approaches to Main Street.
- Continued p.m. peak period undesirable levels-of-service are experienced at the eastbound First Street approach to Main Street, and at both the northbound and southbound Main Street approaches to First Street.

2018 TOTAL Peak Period Traffic Conditions

- No safety issues or mitigation measures were identified at the study intersections
- Continued p.m. peak period desirable levels-of-service are projected at both the westbound and eastbound River Street approaches to Main Street.
- Continued p.m. peak period undesirable levels-of-service are experienced at the eastbound First Street approach to Main Street.
- Rare queuing scenarios at the First Street westbound approach to Main Street block access to the porte-cochere entrance.
- Main Street northbound through traffic capacity can be disrupted given specific turning northbound left-turn movement scenarios at the River Street intersection.
- Porte-cochere vehicles exiting vehicles can experience significant delays given specific Main Street southbound traffic progression scenarios. Gap access is dependent on Main Street signal coordination.

Recommendations resulting from this study include:

- Any proposed transportation improvements as part of this development plan shall be subject to accommodating Mountain Rides Transit Authority's vehicles, approval by the Ketchum Street Department and the Idaho Transportation Department.

- The proposed development plan reviewed included a curb and sidewalk chicane design adequately discourages any left-turn movements onto Main Street from the porte-cochere.

- The proposed development plan studied includes constructing a recommended right-turn lane from the porte-cochere exit on Main Street to River Street.

- The proposed development plan includes the recommended bus stop development at the current southbound Main Street bus stop location just south of the First Street. Consideration should be given to utilizing development plan

facilities, if available, for transit center activities (i.e. transit ticket availability, general transit concierge service, local activity organizations shuttle service coordination, commercial travel shuttle service hub, and travel directions.)

- The proposed development plan should only propose landscaping of the sidewalk areas around the site that will allow adequate site distance for drivers, bicyclists, and pedestrians accessing the development and its amenities.

- The proposed development plan should minimize congestion on First Street during peak periods by limiting receiving large vehicle deliveries during only non-peak periods. In addition, the developer should consider additional signage stating "Do Not Block Intersection" for eastbound traffic on First Street at the porte-cochere entrance.

- Outside of the City proposed Main Street signal phasing coordination and southbound lane addition from River Street to Serenade Lane, no recommendations for increasing study area intersection capacities are noted.

- Mid-block pedestrian crossings, as discussed in public hearings with regards to the development plan's interface across Washington Avenue with Forest Service Park, are discouraged. Instead, development of enhanced pedestrian crossings at existing intersections is encouraged.

- The proposed development should consider Main Street pedestrian crossing improvements at the River Street intersection.

- A construction traffic control plan should be developed. This plan should identify key ingress and egress routes to the development site and, if possible, identify routes where construction site-generated traffic is prohibited.

- The proposed development plan should consider implementation of employee alternative transportation incentive packages designed to reduce the estimated number of site-generated trips.

Section 7
REFERENCES

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Appendix A

LEVEL-OF-SERVICE METHODS AND CRITERIA

Level-of-Service Concept

The information presented in this appendix is adapted from the Transportation Research Board, Highway Capacity Manual, (2000).

Level-of-service (LOS) is a concept developed by transportation engineering professionals attempting to quantify the qualitative "degree of comfort" identified by motorists as they travel through an intersection or roadway segment. Elements included in this "degree of comfort" are: travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles. Analogous to a school report, LOS is denoted by six grades ranging from "A" to "F," where "A" is best and "F" is worst.

SIGNALIZED INTERSECTIONS

The six LOS grades are described qualitatively for signalized intersections in Table A-1, below. Table A-1 also identifies the quantitative relationship between LOS and average control delay per vehicle. "Control delay" includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using these definitions, LOS "D" is generally considered to represent the minimum acceptable design standard for signalized intersections.

Table A-1. Signalized Intersections Level-of-Service Definitions

LOS	Ave. Control Delay(sec)	Description
A	<10	This occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	>10 and ⩽20	This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a LOS "A," causing higher levels of average delay.
C	>20 and ⩽35	These higher delays result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	>35 and ⩽55	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	>55 and ⩽80	This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	>80	This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. This condition may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

UNSIGNALIZED INTERSECTIONS

Unsignalized intersections include "T-intersections" with either stop control on the minor leg of the intersection or on all three legs of the intersection, two-way stop controlled at four-legged intersections, and all-way stop control at four-legged intersections. The 2000 Highway Capacity Manual provides models for estimating control delay at both two-way stop controlled and all-way stop controlled intersections. Qualitative and quantitative definitions of the various service levels associated with an unsignalized intersection are presented in Table A-2. Using these definitions, LOS "E" is generally considered to represent the minimum acceptable design standard.

Table A-2. Unsignalized Intersections Level-of-Service Definitions

LOS	Ave. Control Delay(sec)	Description
A	<10	• Nearly all motorists find no restricted movement through the intersection • Very seldom is there more than one vehicle in queue.
B	>10 and ≤15	• Some motorists begin to consider the delay an inconvenience. • Occasionally there is more than one vehicle in queue.
C	>15 and ≤25	• Most motorists consider the delay restricting, but not objectionably so. • Many times there is more than one vehicle in queue.
D	>25 and ≤35	• Motorists consider the delay quite restricting. • Many times there is more than one vehicle in queue.
E	>35 and ≤50	• Represents a condition in which the movement demand is near, or equal to the probable maximum number of movements that can be accommodated. • Almost always, there is more than one vehicle in queue. • Motorists find the delays approaching unacceptable levels.
F	>50	• Forced flow. • Represents an intersection failure condition caused by geometric and/or operational constraints external to the intersection.

GENERAL DISCUSSION REGARDING LEVEL-OF-SERVICE

The LOS criteria for unsignalized intersections are different than the criteria used for signalized intersections. The primary reason for this difference is that motorists expect different levels of performance from different transportation facilities. That is, signalized intersections are expected to carry higher traffic volumes than an unsignalized intersection. Additionally, several motorist behavior considerations combine to make delays at signalized intersection more acceptable than at unsignalized intersections. For example, motorists tend to relax at signalized intersections during red light intervals, while motorists on minor street approaches to stop-controlled intersections must remain attentive to identifying available gaps and desired

movement conflicts. Also, the amount of delay experienced by motorists at unsignalized intersection varies more than at signalized intersections. For such reasons, the control delay threshold for any given LOS is less for an unsignalized intersection compared to a signalized intersection. While overall intersection LOS is calculated for all-way stop controlled intersections, LOS is only calculated for the minor approaches and the major street left-turn movements at two-way stop controlled intersections. No delay is assumed for the major street through movement. For two-way stop controlled intersections, the overall intersection LOS remains undefined. That is, LOS is only calculated for each minor street lane.

In the performance evaluation of two-way stop controlled intersections, consideration of other "measures of effectiveness" in addition to delay, such as volume/capacity ratios for individual movements, average queue lengths, and 95th-percentile queue lengths, are important. By only focusing on a single measure of effectiveness for the worst movement only, such as delay for the minor-street left-turn, analyzers may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when Highway Capacity Manual LOS thresholds are adopted as legal standards, as is sometimes the case in many public agencies.

Appendix B
TRAFFIC COUNT DATA

TURNING MOVEMENT COUNT SUMMARY

INTERSECTION: ERROR

North Street:	Highway 75
South Street:	Highway 75
East Street:	River Street
West Street:	River Street
JOB #	6560
COUNT DATE:	February 20, 08
COUNT DAY:	Tuesday
FIELD CREW:	TR/BH
COUNT TIME -	
FROM:	7:15 AM
TO:	8:45 AM

Growth Rate: 3.0%
Target Year: 2008

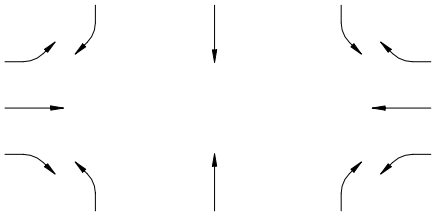
PEAK HOUR VOL. (ADJ.)

Highway 75

11 3%	401 96%	7 2%
PHF = 0.58	*PHF = 0.84*	*PHF = 0.38*

River Street

1 9%	*PHF = 0.25*
1 9%	*PHF = 0.25*
12 82%	*PHF = 0.75*



River Street

14 71%	*PHF = 0.50*
1 7%	*PHF = 0.50*
4 21%	*PHF = 0.38*

PHF = 0.63	*PHF = 0.92*	*PHF = 0.60*
46 4%	1201 95%	18 1%

Highway 75

Total Intersection Adj. Volume= **1718**

PEAK MONTH/YEAR ADJUSTMENT: 136.31%
GROWTH RATE ADJUSTMENT: 100.00%

COUNT DATA INPUT

TIME PERIOD FROM:	TO:	NORTHBOUND L	T	R	EASTBOUND L	T	R	SOUTHBOUND L	T	R	WESTBOUND L	T	R	TOTAL VOLUMES	
7:15 AM	7:30 AM	0	224	3	0	0	3	1	47	2	2	1	2	285	
7:30 AM	7:45 AM	4	240	1	0	0	3	1	61	1	0	1	1	313	
7:45 AM	8:00 AM	8	213	5	0	0	4	0	82	3	2	0	3	320	
8:00 AM	8:15 AM	6	248	4	0	0	2	1	78	1	0	0	0	340	**P15**
8:15 AM	8:30 AM	12	216	2	1	1	3	4	54	2	1	1	4	301	
8:30 AM	8:45 AM	8	204	2	0	0	0	0	80	2	0	0	3	299	

HOURLY TOTALS

TIME PERIOD FROM:	TO:	NORTHBOUND L	T	R	EASTBOUND L	T	R	SOUTHBOUND L	T	R	WESTBOUND L	T	R	TOTAL VOLUMES	
7:15 AM	8:15 AM	18	925	13	0	0	12	3	268	7	4	2	6	1258	
7:30 AM	8:30 AM	30	917	12	1	1	12	6	275	7	3	2	8	1274	**PH**
7:45 AM	8:45 AM	34	881	13	1	1	9	5	294	8	3	1	10	1260	

TURNING MOVEMENT COUNT SUMMARY

INTERSECTION:

North Street:	Highway 75
South Street:	Highway 75
East Street:	River Street
West Street:	River Street
JOB #	6560
COUNT DATE:	February 20, 08
COUNT DAY:	Tuesday
FIELD CREW:	TR/BH
COUNT TIME -	
FROM:	4:00 PM
TO:	5:15 PM

Growth Rate: 3.0%
Target Year: 2008

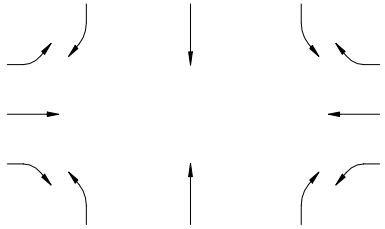
PEAK HOUR VOL. (ADJ.)

Highway 75

5 0%	1236 99%	10 1%
PHF = 0.33	*PHF = 0.92*	*PHF = 0.88*

River Street

8 14%
PHF = 0.75
4 7%
PHF = 0.75
48 80%
PHF = 0.73



River Street

10 47%
PHF = 0.35
1 7%
PHF = 0.25
10 47%
PHF = 0.58

PHF = 0.75	*PHF = 0.85*	*PHF = 0.60*	Total Intersectio
20 3%	637 95%	16 2%	Volume=

Highway 75

PEAK MONTH/YEAR ADJUSTMENT: 136.31%
GROWTH RATE ADJUSTMENT: 100.00%

COUNT DATA INPUT

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOT
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLU
4:00 PM	4:15 PM	5	138	3	1	0	10	1	241	0	0	0	1	40
4:15 PM	4:30 PM	2	125	5	2	1	12	2	213	1	2	0	1	36
4:30 PM	4:45 PM	3	98	3	2	1	5	2	246	3	3	0	5	37
4:45 PM	5:00 PM	5	106	1	1	1	8	2	207	0	2	1	0	33
5:00 PM	5:15 PM	6	93	3	0	0	12	2	238	3	1	0	2	36

HOURLY TOTALS

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOT
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLU
4:00 PM	5:00 PM	15	467	12	6	3	35	7	907	4	7	1	7	147
4:15 PM	5:15 PM	16	422	12	5	3	37	8	904	7	8	1	8	143

TURNING MOVEMENT COUNT SUMMARY

INTERSECTION:

North Street:	Highway 75
South Street:	Highway 75
East Street:	First Street
West Street:	First Street
JOB #	6560
COUNT DATE:	February 20, 08
COUNT DAY:	Tuesday
FIELD CREW:	TR/BH
COUNT TIME -	
FROM:	7:15 AM
TO:	9:15 AM

Growth Rate: 3.0%
Target Year: 2008

PEAK HOUR VOL. (ADJ.)

Highway 75

20 5%	361 90%	19 5%
PHF = 0.75	*PHF = 0.81*	*PHF = 0.70*

NORTH

First Street

15 18%	*PHF = 0.69*
45 54%	*PHF = 0.75*
23 28%	*PHF = 0.71*

First Street

7 9%	*PHF = 0.63*
31 42%	*PHF = 0.58*
37 49%	*PHF = 0.75*

PEAK MONTH/YEAR ADJUSTMENT:	136.31%
GROWTH RATE ADJUSTMENT:	100.0%

PHF = 0.75	*PHF = 0.93*	*PHF = 0.84*
37 3%	1052 85%	147 12%

Highway 75

Total Intersection Adj. Volume= **1795**

COUNT DATA INPUT

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL	
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES	
7:15 AM	7:30 AM	9	206	28	1	2	2	0	42	0	2	1	2	295	
7:30 AM	7:45 AM	4	189	40	1	4	2	0	51	1	5	3	0	300	
7:45 AM	8:00 AM	6	176	32	3	9	1	3	62	2	9	5	0	308	
8:00 AM	8:15 AM	9	208	30	4	5	6	4	82	4	7	4	2	365	**P15**
8:15 AM	8:30 AM	6	198	24	2	8	4	2	51	5	4	4	2	310	
8:30 AM	8:45 AM	6	190	22	2	11	6	5	70	4	7	10	1	334	
8:45 AM	9:00 AM	11	156	26	5	10	3	2	58	2	10	7	1	291	
9:00 AM	9:15 AM	3	162	22	5	7	5	8	67	7	7	3	0	296	

HOURLY TOTALS

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL	
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES	
7:15 AM	8:15 AM	28	779	130	9	20	11	7	237	7	23	13	4	1268	
7:30 AM	8:30 AM	25	771	126	10	26	13	9	246	12	25	16	4	1283	
7:45 AM	8:45 AM	27	772	108	11	33	17	14	265	15	27	23	5	1317	**PH**
8:00 AM	9:00 AM	32	752	102	13	34	19	13	261	15	28	25	6	1300	
8:15 AM	9:15 AM	26	706	94	14	36	18	17	246	18	28	24	4	1231	

TURNING MOVEMENT COUNT SUMMARY

INTERSECTION:

North Street:	Highway 75
South Street:	Highway 75
East Street:	First Street
West Street:	First Street
JOB #	6560
COUNT DATE:	February 20, 08
COUNT DAY:	Tuesday
FIELD CREW:	TR/BH
COUNT TIME -	
FROM:	4:00 PM
TO:	6:00 PM

Growth Rate: 3.0%
Target Year: 2008

PEAK HOUR VOL. (ADJ.)

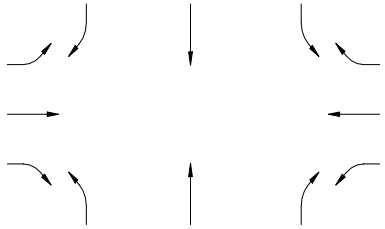
Highway 75

38 4%	973 95%	12 1%
PHF = 0.88	*PHF = 0.90*	*PHF = 0.56*

First Street

37 22%	18 7%
PHF = 0.61	*PHF = 0.65*
50 30%	42 16%
PHF = 0.93	*PHF = 0.65*
79 48%	198 77%
PHF = 0.66	*PHF = 0.77*

First Street



PHF = 0.75	*PHF = 0.84*	*PHF = 0.72*
29 5%	545 86%	59 9%

Highway 75

Total Intersection Volume=

PEAK MONTH/YEAR ADJUSTMENT: 136.31%
GROWTH RATE ADJUSTMENT: 100.0%

COUNT DATA INPUT

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOT
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLU
4:00 PM	4:15 PM	4	119	15	6	10	13	4	185	8	36	12	3	41
4:15 PM	4:30 PM	7	102	10	11	10	22	2	173	6	26	7	5	38
4:30 PM	4:45 PM	7	91	8	4	9	12	2	198	6	47	5	2	39
4:45 PM	5:00 PM	3	88	10	6	8	11	1	158	8	36	7	3	33
5:00 PM	5:15 PM	2	79	9	9	11	19	1	180	6	40	10	2	36
5:15 PM	5:30 PM	9	96	11	5	14	18	4	138	5	26	8	2	33
5:30 PM	5:45 PM	7	83	10	5	9	16	0	151	2	30	8	1	32
5:45 PM	6:00 PM	4	78	10	5	6	11	2	124	2	30	2	1	27

HOURLY TOTALS

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOT
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLU
4:00 PM	5:00 PM	21	400	43	27	37	58	9	714	28	145	31	13	152
4:15 PM	5:15 PM	19	360	37	30	38	64	6	709	26	149	29	12	147
4:30 PM	5:30 PM	21	354	38	24	42	60	8	674	25	149	30	9	143
4:45 PM	5:45 PM	21	346	40	25	42	64	6	627	21	132	33	8	136
5:00 PM	6:00 PM	22	336	40	24	40	64	7	593	15	126	28	6	130

TURNING MOVEMENT COUNT SUMMARY

INTERSECTION:

North Street:	Washington
South Street:	Washington
East Street:	First
West Street:	First
JOB #	5633.02
COUNT DATE:	March 03, 09
COUNT DAY:	Tuesday
FIELD CREW:	SF
COUNT TIME -	
FROM:	7:15 AM
TO:	9:15 AM

PEAK HOUR VOL. (ADJ.)

Washington

8 40%	**7** 33%	**5** 27%
PHF = 0.50	*PHF = 0.63*	*PHF = 0.33*

First

3 4%
PHF = 0.50
58 93%
PHF = 0.77
1 2%
PHF = 0.25

First

12 18%
PHF = 0.56
54 78%
PHF = 0.71
3 4%
PHF = 0.50

PHF = 0.25	*PHF = 0.40*	*PHF = 1.00*
1 11%	**11** 89%	**0** 0%

Washington

Total Intersection A
Volume: **162**

PEAK MONTH/YEAR ADJUSTMENT: 75%

GROWTH RATE ADJUSTMENT: 100%

COUNT DATA INPUT

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
7:15 AM	7:30 AM	0	0	0	1	3	0	0	2	1	0	5	0	12
7:30 AM	7:45 AM	1	1	1	2	4	0	1	0	1	1	5	1	18
7:45 AM	8:00 AM	1	1	0	0	14	0	0	2	1	0	14	1	34
8:00 AM	8:15 AM	0	1	0	1	12	0	0	1	1	1	6	2	25
8:15 AM	8:30 AM	0	1	0	0	12	1	1	1	1	1	14	4	36
8:30 AM	8:45 AM	0	5	0	1	5	0	3	1	3	0	6	2	26
8:45 AM	9:00 AM	1	1	0	1	8	1	1	1	0	0	8	1	23
9:00 AM	9:15 AM	0	2	0	0	14	0	2	1	3	2	8	0	32

HOURLY TOTALS

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	TO:	L	T	R	L	T	R	L	T	R	L	T	R	VOLUMES
7:15 AM	8:15 AM	2	3	1	4	33	0	1	5	4	2	30	4	89
7:30 AM	8:30 AM	2	4	1	3	42	1	2	4	4	3	39	8	113
7:45 AM	8:45 AM	1	8	0	2	43	1	4	5	6	2	40	9	121
8:00 AM	9:00 AM	1	8	0	3	37	2	5	4	5	2	34	9	110
8:15 AM	9:15 AM	1	9	0	2	39	2	7	4	7	3	36	7	117

TURNING MOVEMENT COUNT SUMMARY

INTERSECTION:

North Street:	Washington
South Street:	Washington
East Street:	First
West Street:	First
JOB #	5633.02
COUNT DATE:	March 03, 09
COUNT DAY:	Tuesday
FIELD CREW:	SF
COUNT TIME -	
FROM:	3:30 PM
TO:	5:45 PM

PEAK HOUR VOL. (ADJ.)

Washington

13 21%	**20** 32%	**29** 47%
PHF = 0.50	*PHF = 0.75*	*PHF = 0.61*

First

11 9%	*PHF = 0.67*
104 91%	*PHF = 0.89*
0 0%	*PHF = 1.00*

First

37 31%	*PHF = 0.58*
79 66%	*PHF = 0.87*
4 3%	*PHF = 0.75*

PHF = 0.25	*PHF = 1.00*	*PHF = 0.75*
1 7%	**11** 53%	**8** 40%

Washington

Total Intersection A
Volume: **319**

PEAK MONTH/YEAR ADJUSTMENT: 75%

GROWTH RATE ADJUSTMENT: 100%

COUNT DATA INPUT

TIME PERIOD FROM:	TO:	NORTHBOUND L	T	R	EASTBOUND L	T	R	SOUTHBOUND L	T	R	WESTBOUND L	T	R	TOTAL VOLUMES
3:30 PM	3:45 PM	1	0	0	1	14	0	4	1	4	0	10	2	37
3:45 PM	4:00 PM	1	3	1	1	15	0	5	0	3	2	14	4	49
4:00 PM	4:15 PM	1	2	2	3	18	0	9	5	0	0	14	5	59
4:15 PM	4:30 PM	0	2	1	3	22	0	2	2	4	1	13	12	62
4:30 PM	4:45 PM	0	2	2	2	19	0	7	3	5	1	17	6	64
4:45 PM	5:00 PM	0	2	1	0	19	0	4	5	1	1	15	5	53
5:00 PM	5:15 PM	1	4	3	1	20	0	5	4	2	0	9	1	50
5:15 PM	5:30 PM	0	2	2	1	24	0	7	4	0	1	6	4	51
5:30 PM	5:45 PM	0	0	1	1	13	0	4	0	1	1	4	1	26

HOURLY TOTALS

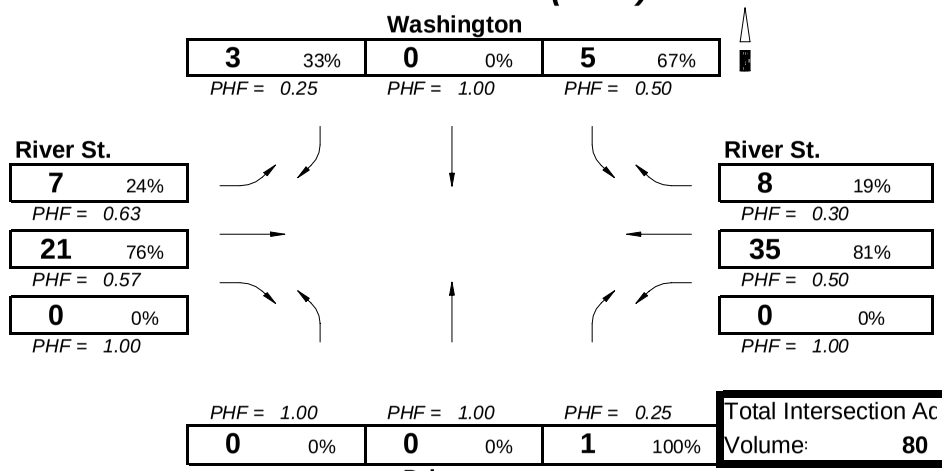
TIME PERIOD FROM:	TO:	NORTHBOUND L	T	R	EASTBOUND L	T	R	SOUTHBOUND L	T	R	WESTBOUND L	T	R	TOTAL VOLUMES
3:30 PM	4:30 PM	3	7	4	8	69	0	20	8	11	3	51	23	207
3:45 PM	4:45 PM	2	9	6	9	74	0	23	10	12	4	58	27	234
4:00 PM	5:00 PM	1	8	6	8	78	0	22	15	10	3	59	28	238
4:15 PM	5:15 PM	1	10	7	6	80	0	18	14	12	3	54	24	229
4:30 PM	5:30 PM	1	10	8	4	82	0	23	16	8	3	47	16	218
4:45 PM	5:45 PM	1	8	7	3	76	0	20	13	4	3	34	11	180

TURNING MOVEMENT COUNT SUMMARY

INTERSECTION:

North Street:	Washington
South Street:	Driveway
East Street:	River St.
West Street:	River St.
JOB #	5633.02
COUNT DATE:	March 03, 09
COUNT DAY:	Tuesday
FIELD CREW:	GTO
COUNT TIME -	
FROM:	7:15 AM
TO:	9:15 AM

PEAK HOUR VOL. (ADJ.)



PEAK MONTH/YEAR ADJUSTMENT:	75%
GROWTH RATE ADJUSTMENT:	100%

Total Intersection Ac
Volume: **80**

COUNT DATA INPUT

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	**TO:**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**VOLUMES**
7:15 AM	7:30 AM	0	0	0	0	2	0	1	0	1	1	1	0	6
7:30 AM	7:45 AM	0	1	0	1	4	0	0	0	0	1	1	3	11
7:45 AM	8:00 AM	0	0	0	1	7	0	0	0	2	0	13	1	24
8:00 AM	8:15 AM	0	0	1	1	2	0	1	0	0	0	2	0	7
8:15 AM	8:30 AM	0	0	0	2	4	0	2	0	0	0	6	0	14
8:30 AM	8:45 AM	0	0	0	1	3	0	1	0	0	0	5	5	15
8:45 AM	9:00 AM	0	0	0	0	1	0	0	0	1	0	5	1	8
9:00 AM	9:15 AM	0	0	0	0	1	2	1	0	2	0	7	2	15

HOURLY TOTALS

TIME PERIOD		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			TOTAL
FROM:	**TO:**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**VOLUMES**
7:15 AM	8:15 AM	0	1	1	3	15	0	2	0	3	2	17	4	48
7:30 AM	8:30 AM	0	1	1	5	17	0	3	0	2	1	22	4	56
7:45 AM	8:45 AM	0	0	1	5	16	0	4	0	2	0	26	6	60
8:00 AM	9:00 AM	0	0	1	4	10	0	4	0	1	0	18	6	44
8:15 AM	9:15 AM	0	0	0	3	9	2	4	0	3	0	23	8	52

TURNING MOVEMENT COUNT SUMMARY

INTERSECTION:

North Street:	Washington
South Street:	Driveway
East Street:	River St.
West Street:	River St.
JOB #	5633.02
COUNT DATE:	March 03, 09
COUNT DAY:	Tuesday
FIELD CREW:	GO
COUNT TIME -	
FROM:	3:30 PM
TO:	5:45 PM

PEAK HOUR VOL. (ADJ.)

Washington

3 13%	0 0%	19 88%
PHF = 0.25	*PHF = 1.00*	*PHF = 0.70*

River St.

5 13%
PHF = 0.50
35 84%
PHF = 0.65
1 3%
PHF = 0.25

River St.

17 37%
PHF = 0.81
29 63%
PHF = 0.55
0 0%
PHF = 1.00

PHF = 1.00	*PHF = 1.00*	*PHF = 0.50*
0 0%	0 0%	3 100%

Driveway

PEAK MONTH/YEAR ADJUSTMENT: 75%

GROWTH RATE ADJUSTMENT: 100%

Total Intersection A Volume: **112**

COUNT DATA INPUT

TIME PERIOD FROM:	TO:	NORTHBOUND L	T	R	EASTBOUND L	T	R	SOUTHBOUND L	T	R	WESTBOUND L	T	R	TOTAL VOLUMES
3:30 PM	3:45 PM	0	0	0	0	4	0	0	0	1	0	8	1	14
3:45 PM	4:00 PM	0	0	0	1	6	0	3	0	0	0	4	4	18
4:00 PM	4:15 PM	0	0	1	2	8	0	4	0	0	0	5	3	23
4:15 PM	4:30 PM	0	0	1	0	2	1	5	0	0	0	3	3	15
4:30 PM	4:45 PM	0	0	0	1	10	0	2	0	2	0	10	3	28
4:45 PM	5:00 PM	0	0	0	0	5	0	3	2	1	0	1	3	15
5:00 PM	5:15 PM	0	0	0	4	6	0	3	0	0	0	4	3	20
5:15 PM	5:30 PM	0	0	0	1	4	0	4	0	2	0	4	2	17
5:30 PM	5:45 PM	0	0	0	0	6	0	1	0	0	0	1	0	8

HOURLY TOTALS

TIME PERIOD FROM:	TO:	NORTHBOUND L	T	R	EASTBOUND L	T	R	SOUTHBOUND L	T	R	WESTBOUND L	T	R	TOTAL VOLUMES
3:30 PM	4:30 PM	0	0	2	3	20	1	12	0	1	0	20	11	70
3:45 PM	4:45 PM	0	0	2	4	26	1	14	0	2	0	22	13	84
4:00 PM	5:00 PM	0	0	2	3	25	1	14	2	3	0	19	12	81
4:15 PM	5:15 PM	0	0	1	5	23	1	13	2	3	0	18	12	78
4:30 PM	5:30 PM	0	0	0	6	25	0	12	2	5	0	19	11	80
4:45 PM	5:45 PM	0	0	0	5	21	0	11	2	3	0	10	8	60

Appendix C

2009 TRAFFIC CONDITIONS

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	7	401	11	46	1201	18	1	1	14	4	1	14
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)	8	436	12	50	1305	20	1	1	15	4	1	15
Pedestrians		20			20			20			20	
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			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	1345			468			1928	1922	482	1928	1918	1355
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1345			468			1928	1922	482	1928	1918	1355
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			95			97	98	97	90	98	91
cM capacity (veh/h)	504			1075			41	61	565	43	61	177

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	455	1375	17	21
Volume Left	8	50	1	4
Volume Right	12	20	15	15
cSH	504	1075	243	101
Volume to Capacity	0.02	0.05	0.07	0.20
Queue Length (ft)	1	4	6	18
Control Delay (s)	0.5	2.0	20.9	49.5
Lane LOS	A	A	C	E
Approach Delay (s)	0.5	2.0	20.9	49.5
Approach LOS			C	E

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	104.6%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	1236	5	20	637	16	8	4	48	10	1	10
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)	11	1343	5	22	692	17	9	4	52	11	1	11
Pedestrians		20			20			20			20	
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			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	730			1369			2164	2161	1386	2207	2155	741
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	730			1369			2164	2161	1386	2207	2155	741
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			96			70	90	69	41	98	97
cM capacity (veh/h)	860			493			29	43	169	18	44	402

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	1360	732	65	23
Volume Left	11	22	9	11
Volume Right	5	17	52	11
cSH	860	493	93	35
Volume to Capacity	0.01	0.04	0.70	0.65
Queue Length (ft)	1	3	88	56
Control Delay (s)	0.6	1.3	106.9	216.5
Lane LOS	A	A	F	F
Approach Delay (s)	0.6	1.3	106.9	216.5
Approach LOS			F	F

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.98			0.96			0.99	
Flt Protected		1.00			1.00			0.99			0.98	
Satd. Flow (prot)		3266			3221			1526			1542	
Flt Permitted		0.88			0.93			0.94			0.86	
Satd. Flow (perm)		2888			3011			1446			1353	
Volume (vph)	19	361	20	37	1052	147	15	45	23	37	31	7
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	392	22	40	1143	160	16	49	25	40	34	8
RTOR Reduction (vph)	0	3	0	0	9	0	0	22	0	0	7	0
Lane Group Flow (vph)	0	432	0	0	1334	0	0	68	0	0	75	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)		6			6			6			6	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		44.6			44.6			7.6			7.6	
Effective Green, g (s)		44.6			44.6			7.6			7.6	
Actuated g/C Ratio		0.74			0.74			0.13			0.13	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		2140			2231			183			171	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.45			c0.06			0.06	
v/c Ratio		0.20			0.60			0.37			0.44	
Uniform Delay, d1		2.4			3.6			24.1			24.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			1.2			1.3			1.8	
Delay (s)		2.6			4.8			25.4			26.1	
Level of Service		A			A			C			C	
Approach Delay (s)		2.6			4.8			25.4			26.1	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.94			0.99	
Flt Protected		1.00			1.00			0.99			0.96	
Satd. Flow (prot)		3282			3239			1474			1526	
Flt Permitted		0.95			0.88			0.90			0.69	
Satd. Flow (perm)		3109			2861			1337			1089	
Volume (vph)	12	973	38	29	545	59	37	50	79	198	42	18
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	1058	41	32	592	64	40	54	86	215	46	20
RTOR Reduction (vph)	0	4	0	0	12	0	0	28	0	0	5	0
Lane Group Flow (vph)	0	1108	0	0	676	0	0	152	0	0	276	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)		6			6			6			6	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		26.9			26.9			16.7			16.7	
Effective Green, g (s)		26.9			26.9			16.7			16.7	
Actuated g/C Ratio		0.52			0.52			0.32			0.32	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1621			1491			433			352	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.24			0.13			c0.26	
v/c Ratio		0.68			0.45			0.35			0.78	
Uniform Delay, d1		9.2			7.7			13.3			15.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		2.4			1.0			0.5			10.8	
Delay (s)		11.5			8.7			13.8			26.6	
Level of Service		B			A			B			C	
Approach Delay (s)		11.5			8.7			13.8			26.6	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	51.6	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	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	7	8	1	11	0	3	58	1	3	54	12
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)	5	8	9	1	12	0	3	63	1	3	59	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											300	
pX, platoon unblocked												
vC, conflicting volume	148	142	65	154	148	64	72			64		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	148	142	65	154	148	64	72			64		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	99	99	100	98	100	100			100		
cM capacity (veh/h)	808	746	999	796	740	1001	1528			1538		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	22	13	67	75
Volume Left	5	1	3	3
Volume Right	9	0	1	13
cSH	848	744	1528	1538
Volume to Capacity	0.03	0.02	0.00	0.00
Queue Length (ft)	2	1	0	0
Control Delay (s)	9.4	9.9	0.4	0.3
Lane LOS	A	A	A	A
Approach Delay (s)	9.4	9.9	0.4	0.3
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	14.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	29	20	13	1	11	8	11	104	0	4	79	37
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)	32	22	14	1	12	9	12	113	0	4	86	40
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											300	
pX, platoon unblocked												
vC, conflicting volume	266	252	106	277	272	113	126			113		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	266	252	106	277	272	113	126			113		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	95	97	99	100	98	99	99			100		
cM capacity (veh/h)	664	644	948	643	628	940	1460			1476		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	67	22	125	130
Volume Left	32	1	12	4
Volume Right	14	9	0	40
cSH	701	725	1460	1476
Volume to Capacity	0.10	0.03	0.01	0.00
Queue Length (ft)	8	2	1	0
Control Delay (s)	10.7	10.1	0.8	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	10.7	10.1	0.8	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	0	3	0	0	1	7	21	0	0	35	8
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)	5	0	3	0	0	1	8	23	0	0	38	9
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	82	80	42	84	85	23	47			23		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	82	80	42	84	85	23	47			23		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	100	100	100	100			100		
cM capacity (veh/h)	902	806	1028	897	801	1054	1561			1592		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	9	1	30	47
Volume Left	5	0	8	0
Volume Right	3	1	0	9
cSH	945	1054	1561	1592
Volume to Capacity	0.01	0.00	0.00	0.00
Queue Length (ft)	1	0	0	0
Control Delay (s)	8.8	8.4	1.9	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.8	8.4	1.9	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	18.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	19	0	3	0	0	3	5	35	1	0	29	17
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)	21	0	3	0	0	3	5	38	1	0	32	18
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	93	91	41	93	99	39	50			39		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93	91	41	93	99	39	50			39		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	98	100	100	100	100	100	100			100		
cM capacity (veh/h)	885	797	1030	885	788	1033	1557			1571		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	24	3	45	50
Volume Left	21	0	5	0
Volume Right	3	3	1	18
cSH	902	1033	1557	1571
Volume to Capacity	0.03	0.00	0.00	0.00
Queue Length (ft)	2	0	0	0
Control Delay (s)	9.1	8.5	0.9	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.1	8.5	0.9	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D

TRIP GENERATION SUMMARY

BALD MOUNTAIN LODGE

SITE GENERTED TRIP GENERATION
Resort Hotel plus Luxury Condos plus Restaurant plus Retail plus Spa

I.T.E. Trip Generation Table & Distribution/Assignment

	Land Use Category	Units	Proposed Qnty.	Occupancy Reduction	Alt. Mode Reduction (%)	ITE Avg. Generation Rate	Directional Distribution				Calc. Vol.	
RESORT HOTEL	**RESORT HOTEL** (330): AM Peak Hour of Adjacent Street Traffic	Occupied Rooms	82	0%	20%	0.37	72%	Entering	30%	NB	5	17
									30%	SB	5	
									20%	EB	3	
									20%	WB	3	
							28%	Exiting	30%	NB	2	7
									30%	SB	2	
									20%	EB	1	
									20%	WB	1	
	RESORT HOTEL (330): PM Peak Hour of Adjacent Street Traffic	Occupied Rooms	82	0%	20%	0.49	43%	Entering	30%	NB	4	14
									30%	SB	4	
									20%	EB	3	
									20%	WB	3	
							57%	Exiting	30%	NB	5	18
									30%	SB	5	
									20%	EB	4	
									20%	WB	4	
LUXURY CONDOS	**LUXURY CONDO** (233): AM Peak Hour of Adjacent Street Traffic	Units	26	0%	20%	0.56	23%	Entering	30%	NB	1	3
									30%	SB	1	
									20%	EB	1	
									20%	WB	1	
							77%	Exiting	30%	NB	3	9
									30%	SB	3	
									20%	EB	2	
									20%	WB	2	
	LUXURY CONDO (233): PM Peak Hour of Adjacent Street Traffic	Units	26	0%	20%	0.55	63%	Entering	30%	NB	2	7
									30%	SB	2	
									20%	EB	1	
									20%	WB	1	
							37%	Exiting	30%	NB	1	4
									30%	SB	1	
									20%	EB	1	
									20%	WB	1	
QUALITY RESTAURANT	**QUALITY RESTAURANT** (931): AM Peak Hour of Adjacent Street Traffic	1000 s.f	7	66%	0%	0.81	82%	Entering	30%	NB	0	2
									30%	SB	0	
									20%	EB	0	
									20%	WB	0	
							18%	Exiting	30%	NB	0	0
									30%	SB	0	
									20%	EB	0	
									20%	WB	0	
	QUALITY RESTAURANT (931): PM Peak Hour of Adjacent Street Traffic	1000 s.f.	7	66%	0%	7.49	67%	Entering	30%	NB	4	12
									30%	SB	4	
									20%	EB	2	
									20%	WB	2	
							33%	Exiting	30%	NB	2	6
									30%	SB	2	
									20%	EB	1	
									20%	WB	1	
RETAIL SHOPS	**APPAREL STORE** (870): AM Peak Hour of Adjacent Street Traffic	1000 sf	3	0%	0%	NOT OPEN		Entering	30%	NB	#######	#VALUE!
									30%	SB	#######	
									20%	EB	#######	
									20%	WB	#######	
								Exiting	30%	NB	#######	#VALUE!
									30%	SB	#######	
									20%	EB	#######	
									20%	WB	#######	
	APPAREL STORE (870): PM Peak Hour of Adjacent Street Traffic	1000 sf	3	50%	0%	3.83	50%	Entering	30%	NB	1	3
									30%	SB	1	
									20%	EB	1	
									20%	WB	1	
							50%	Exiting	30%	NB	1	3
									30%	SB	1	
									20%	EB	1	
									20%	WB	1	
SPA/FITNESS/ACTIVITY	**HEALTH/FITNESS CLUB** (492): AM Peak Hour of Adjacent Street Traffic	1000 s.f	8	66%	0%	1.21	42%	Entering	30%	NB	0	1
									30%	SB	0	
									20%	EB	0	
									20%	WB	0	
							58%	Exiting	30%	NB	1	2
									30%	SB	1	
									20%	EB	0	
									20%	WB	0	
	HEALTH/FITNESS CLUB (492): PM Peak Hour of Adjacent Street Traffic	1000 s.f.	8	66%	0%	4.05	51%	Entering	30%	NB	2	5
									30%	SB	2	
									20%	EB	1	
									20%	WB	1	
							49%	Exiting	30%	NB	2	5
									30%	SB	2	
									20%	EB	1	
									20%	WB	1	

Appendix E

2013 TRAFFIC CONDITIONS

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	8	434	12	50	1300	20	2	2	13	4	2	15
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)	9	472	13	54	1413	22	2	2	14	4	2	16
Pedestrians		20			20			20			20	
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			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	1455			505			2068	2073	512	2077	2075	1464
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1455			505			2068	2073	512	2077	2075	1464
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			95			93	96	97	87	95	89
cM capacity (veh/h)	457			1042			31	48	544	33	48	152

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2	SW 1
Volume Total	480	13	54	1435	2	16	23
Volume Left	9	0	54	0	2	0	4
Volume Right	0	13	0	22	0	14	16
cSH	457	1700	1042	1700	31	230	80
Volume to Capacity	0.02	0.01	0.05	0.84	0.07	0.07	0.28
Queue Length (ft)	1	0	4	0	5	6	26
Control Delay (s)	0.6	0.0	8.6	0.0	131.0	21.8	66.6
Lane LOS	A		A		F	C	F
Approach Delay (s)	0.6		0.3		34.7		66.6
Approach LOS					D		F

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	8	438	24	50	1306	20	2	2	16	4	2	15
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)	9	476	26	54	1420	22	2	2	17	4	2	16
Pedestrians		20			20			20			20	
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			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	1461			522			2079	2083	516	2091	2099	1470
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1461			522			2079	2083	516	2091	2099	1470
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			95			93	95	97	86	95	89
cM capacity (veh/h)	455			1027			30	48	540	32	47	151

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2	SW 1
Volume Total	485	26	54	1441	4	17	23
Volume Left	9	0	54	0	2	0	4
Volume Right	0	26	0	22	0	17	16
cSH	455	1700	1027	1700	37	540	79
Volume to Capacity	0.02	0.02	0.05	0.85	0.12	0.03	0.29
Queue Length (ft)	1	0	4	0	9	2	27
Control Delay (s)	0.6	0.0	8.7	0.0	115.3	11.9	68.6
Lane LOS	A		A		F	B	F
Approach Delay (s)	0.5		0.3		32.6		68.6
Approach LOS					D		F

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	96.4%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	1340	5	22	690	17	9	4	52	11	2	11
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)	12	1457	5	24	750	18	10	4	57	12	2	12
Pedestrians		20			20			20			20	
Lane Width (ft)		12.0			14.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		2			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	788			1482			2334	2339	771	1658	2333	799
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	788			1482			2334	2339	771	1658	2333	799
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 %	99			95			39	87	83	72	93	96
cM capacity (veh/h)	813			443			16	32	330	43	33	317

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2	SW 1
Volume Total	740	734	24	768	14	57	26
Volume Left	12	0	24	0	10	0	12
Volume Right	0	5	0	18	0	57	12
cSH	813	1700	443	1700	19	330	68
Volume to Capacity	0.01	0.43	0.05	0.45	0.75	0.17	0.38
Queue Length (ft)	1	0	4	0	50	15	37
Control Delay (s)	0.4	0.0	13.6	0.0	396.3	18.1	88.0
Lane LOS	A		B		F	C	F
Approach Delay (s)	0.2		0.4		93.8		88.0
Approach LOS					F		F

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	1346	25	22	701	17	9	4	58	11	2	11
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)	13	1463	27	24	762	18	10	4	63	12	2	12
Pedestrians		20			20			20			20	
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			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	800			1510			2352	2357	1503	2413	2375	811
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	800			1510			2352	2357	1503	2413	2375	811
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			95			52	86	56	0	93	97
cM capacity (veh/h)	809			435			20	32	144	10	31	367

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2	SW 1
Volume Total	1476	27	24	780	14	63	26
Volume Left	13	0	24	0	10	0	12
Volume Right	0	27	0	18	0	63	12
cSH	809	1700	435	1700	23	144	20
Volume to Capacity	0.02	0.02	0.05	0.46	0.62	0.44	1.28
Queue Length (ft)	1	0	4	0	45	49	88
Control Delay (s)	1.2	0.0	13.7	0.0	300.8	48.0	568.9
Lane LOS	A		B		F	E	F
Approach Delay (s)	1.2		0.4		94.3		568.9
Approach LOS					F		F

Intersection Summary			
Average Delay	10.0		
Intersection Capacity Utilization	99.0%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.98			0.96			0.99	
Flt Protected		1.00			1.00			0.99			0.98	
Satd. Flow (prot)		3268			3222			1527			1541	
Flt Permitted		0.88			0.93			0.94			0.84	
Satd. Flow (perm)		2874			3001			1454			1334	
Volume (vph)	20	412	22	40	1139	159	16	49	25	40	33	8
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	448	24	43	1238	173	17	53	27	43	36	9
RTOR Reduction (vph)	0	3	0	0	9	0	0	24	0	0	8	0
Lane Group Flow (vph)	0	491	0	0	1445	0	0	73	0	0	80	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)		6			6			6			6	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		43.9			43.9			7.7			7.7	
Effective Green, g (s)		43.9			43.9			7.7			7.7	
Actuated g/C Ratio		0.74			0.74			0.13			0.13	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		2117			2210			188			172	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.48			c0.07			0.07	
v/c Ratio		0.23			0.65			0.39			0.47	
Uniform Delay, d1		2.5			4.0			23.8			24.0	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			1.5			1.3			2.0	
Delay (s)		2.8			5.5			25.1			26.0	
Level of Service		A			A			C			C	
Approach Delay (s)		2.8			5.5			25.1			26.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	59.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.98			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.98	
Satd. Flow (prot)		3267			3221			1530			1541	
Flt Permitted		0.88			0.92			0.94			0.82	
Satd. Flow (perm)		2873			2982			1449			1292	
Volume (vph)	20	415	23	46	1140	159	21	53	25	44	34	8
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	451	25	50	1239	173	23	58	27	48	37	9
RTOR Reduction (vph)	0	3	0	0	9	0	0	23	0	0	8	0
Lane Group Flow (vph)	0	495	0	0	1453	0	0	85	0	0	86	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)		6			6			6			6	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		43.2			43.2			7.9			7.9	
Effective Green, g (s)		43.2			43.2			7.9			7.9	
Actuated g/C Ratio		0.73			0.73			0.13			0.13	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		2100			2180			194			173	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.49			c0.07			0.07	
v/c Ratio		0.24			0.67			0.44			0.50	
Uniform Delay, d1		2.6			4.2			23.6			23.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			1.6			1.6			2.3	
Delay (s)		2.8			5.8			25.1			26.0	
Level of Service		A			A			C			C	
Approach Delay (s)		2.8			5.8			25.1			26.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.94			0.99	
Flt Protected		1.00			1.00			0.99			0.96	
Satd. Flow (prot)		3282			3239			1475			1527	
Flt Permitted		0.95			0.87			0.89			0.67	
Satd. Flow (perm)		3105			2831			1332			1065	
Volume (vph)	13	1053	41	31	590	64	40	54	85	214	45	19
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1145	45	34	641	70	43	59	92	233	49	21
RTOR Reduction (vph)	0	4	0	0	13	0	0	21	0	0	5	0
Lane Group Flow (vph)	0	1200	0	0	732	0	0	173	0	0	298	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)		6			6			6			6	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		26.4			26.4			17.8			17.8	
Effective Green, g (s)		26.4			26.4			17.8			17.8	
Actuated g/C Ratio		0.51			0.51			0.34			0.34	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1570			1432			454			363	
v/s Ratio Prot												
v/s Ratio Perm		c0.39			0.26			0.15			c0.28	
v/c Ratio		0.76			0.51			0.38			0.82	
Uniform Delay, d1		10.4			8.6			13.0			15.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		3.6			1.3			0.5			13.8	
Delay (s)		14.0			9.9			13.6			29.5	
Level of Service		B			A			B			C	
Approach Delay (s)		14.0			9.9			13.6			29.5	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.94			0.99	
Flt Protected		1.00			1.00			0.99			0.96	
Satd. Flow (prot)		3281			3237			1481			1527	
Flt Permitted		0.95			0.83			0.88			0.66	
Satd. Flow (perm)		3104			2679			1320			1044	
Volume (vph)	13	1060	43	42	592	64	48	60	85	220	47	19
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1152	47	46	643	70	52	65	92	239	51	21
RTOR Reduction (vph)	0	5	0	0	13	0	0	21	0	0	5	0
Lane Group Flow (vph)	0	1208	0	0	746	0	0	188	0	0	306	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)		6			6			6			6	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		26.2			26.2			18.3			18.3	
Effective Green, g (s)		26.2			26.2			18.3			18.3	
Actuated g/C Ratio		0.50			0.50			0.35			0.35	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1549			1337			460			364	
v/s Ratio Prot												
v/s Ratio Perm		c0.39			0.28			0.16			c0.30	
v/c Ratio		0.78			0.56			0.41			0.84	
Uniform Delay, d1		10.8			9.1			13.0			15.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		4.0			1.7			0.6			15.8	
Delay (s)		14.7			10.8			13.6			31.6	
Level of Service		B			B			B			C	
Approach Delay (s)		14.7			10.8			13.6			31.6	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	52.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	8	9	1	12	0	3	63	2	3	58	13
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)	5	9	10	1	13	0	3	68	2	3	63	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											300	
pX, platoon unblocked												
vC, conflicting volume	159	154	70	167	160	70	77			71		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	159	154	70	167	160	70	77			71		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	99	99	100	98	100	100			100		
cM capacity (veh/h)	793	735	993	780	729	993	1521			1530		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	24	14	74	80
Volume Left	5	1	3	3
Volume Right	10	0	2	14
cSH	838	733	1521	1530
Volume to Capacity	0.03	0.02	0.00	0.00
Queue Length (ft)	2	1	0	0
Control Delay (s)	9.4	10.0	0.3	0.3
Lane LOS	A	B	A	A
Approach Delay (s)	9.4	10.0	0.3	0.3
Approach LOS	A	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	14.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	10	9	2	13	10	3	64	4	8	58	13
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)	7	11	10	2	14	11	3	70	4	9	63	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											300	
pX, platoon unblocked												
vC, conflicting volume	184	168	70	181	173	72	77			74		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	184	168	70	181	173	72	77			74		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	98	99	100	98	99	100			99		
cM capacity (veh/h)	753	719	993	759	715	991	1521			1526		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	27	27	77	86
Volume Left	7	2	3	9
Volume Right	10	11	4	14
cSH	808	809	1521	1526
Volume to Capacity	0.03	0.03	0.00	0.01
Queue Length (ft)	3	3	0	0
Control Delay (s)	9.6	9.6	0.3	0.8
Lane LOS	A	A	A	A
Approach Delay (s)	9.6	9.6	0.3	0.8
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	17.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	31	22	14	2	12	9	12	112	0	4	85	42
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)	34	24	15	2	13	10	13	122	0	4	92	46
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											300	
pX, platoon unblocked												
vC, conflicting volume	288	272	115	299	295	122	138			122		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	288	272	115	299	295	122	138			122		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	95	96	98	100	98	99	99			100		
cM capacity (veh/h)	641	627	937	618	609	929	1446			1466		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	73	25	135	142
Volume Left	34	2	13	4
Volume Right	15	10	0	46
cSH	681	705	1446	1466
Volume to Capacity	0.11	0.04	0.01	0.00
Queue Length (ft)	9	3	1	0
Control Delay (s)	10.9	10.3	0.8	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	10.9	10.3	0.8	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	28.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
6: Washington Avenue & First Street

1/22/2010

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	33	25	14	2	13	28	12	113	3	12	85	42
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)	36	27	15	2	14	30	13	123	3	13	92	46
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											300	
pX, platoon unblocked												
vC, conflicting volume	329	293	115	321	315	124	138			126		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	329	293	115	321	315	124	138			126		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	94	96	98	100	98	97	99			99		
cM capacity (veh/h)	584	606	937	593	590	926	1446			1460		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	78	47	139	151
Volume Left	36	2	13	13
Volume Right	15	30	3	46
cSH	639	773	1446	1460
Volume to Capacity	0.12	0.06	0.01	0.01
Queue Length (ft)	10	5	1	1
Control Delay (s)	11.4	10.0	0.8	0.7
Lane LOS	B	A	A	A
Approach Delay (s)	11.4	10.0	0.8	0.7
Approach LOS	B	A		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	0	3	0	0	2	9	25	0	0	42	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)	15	0	3	0	0	2	10	27	0	0	46	21
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	105	103	56	106	113	27	66			27		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	105	103	56	106	113	27	66			27		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	98	100	100	100	100	100	99			100		
cM capacity (veh/h)	869	782	1011	866	772	1048	1535			1587		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	18	2	37	66
Volume Left	15	0	10	0
Volume Right	3	2	0	21
cSH	891	1048	1535	1587
Volume to Capacity	0.02	0.00	0.01	0.00
Queue Length (ft)	2	0	0	0
Control Delay (s)	9.1	8.4	2.0	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.1	8.4	2.0	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	35	0	3	0	0	3	7	42	0	0	44	36
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)	38	0	3	0	0	3	8	46	0	0	48	39
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	132	128	67	132	148	46	87			46		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	132	128	67	132	148	46	87			46		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	95	100	100	100	100	100	99			100		
cM capacity (veh/h)	835	758	996	835	740	1024	1509			1562		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	41	3	53	87
Volume Left	38	0	8	0
Volume Right	3	3	0	39
cSH	846	1024	1509	1562
Volume to Capacity	0.05	0.00	0.01	0.00
Queue Length (ft)	4	0	0	0
Control Delay (s)	9.5	8.5	1.1	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.5	8.5	1.1	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	23.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	3	14	11	20	63	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	15	12	22	68	14
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	114	68	83			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	114	68	83			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	99			
cM capacity (veh/h)	875	995	1515			

Direction, Lane #	SE 1	NE 1	SW 1	SW 2
Volume Total	18	34	68	14
Volume Left	3	12	0	0
Volume Right	15	0	0	14
cSH	971	1515	1700	1700
Volume to Capacity	0.02	0.01	0.04	0.01
Queue Length (ft)	1	1	0	0
Control Delay (s)	8.8	2.7	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.8	2.7	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	6	27	18	53	31	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	29	20	58	34	20
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	130	34	53			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	130	34	53			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	99			
cM capacity (veh/h)	853	1040	1552			

Direction, Lane #	SE 1	NE 1	SW 1	SW 2
Volume Total	36	77	34	20
Volume Left	7	20	0	0
Volume Right	29	0	0	20
cSH	1000	1552	1700	1700
Volume to Capacity	0.04	0.01	0.02	0.01
Queue Length (ft)	3	1	0	0
Control Delay (s)	8.7	1.9	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.7	1.9	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	2	97	5	3	100
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	105	5	3	109
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						101
pX, platoon unblocked						
vC, conflicting volume	223	108			111	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	223	108			111	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	763	946			1479	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	2	111	112
Volume Left	0	0	3
Volume Right	2	5	0
cSH	946	1700	1479
Volume to Capacity	0.00	0.07	0.00
Queue Length (ft)	0	0	0
Control Delay (s)	8.8	0.0	0.2
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	0.2
Approach LOS	A		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	5	188	8	7	125
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	204	9	8	136
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						101
pX, platoon unblocked						
vC, conflicting volume	360	209			213	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	360	209			213	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	635	832			1357	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	5	213	143
Volume Left	0	0	8
Volume Right	5	9	0
cSH	832	1700	1357
Volume to Capacity	0.01	0.13	0.01
Queue Length (ft)	0	0	0
Control Delay (s)	9.4	0.0	0.5
Lane LOS	A		A
Approach Delay (s)	9.4	0.0	0.5
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	484	0	0	1345	0	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	526	0	0	1462	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	163					
pX, platoon unblocked						
vC, conflicting volume			526		1257	263
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			526		1257	263
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1037		163	735

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1
Volume Total	263	263	731	731	10
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	10
cSH	1700	1700	1700	1700	735
Volume to Capacity	0.15	0.15	0.43	0.43	0.01
Queue Length (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	10.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		10.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1370	0	0	713	0	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1489	0	0	775	0	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	163					
pX, platoon unblocked						
vC, conflicting volume			1489		1877	745
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1489		1877	745
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	95
cM capacity (veh/h)			447		63	357

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1
Volume Total	745	745	388	388	16
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	16
cSH	1700	1700	1700	1700	357
Volume to Capacity	0.44	0.44	0.23	0.23	0.05
Queue Length (ft)	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	15.6
Lane LOS					C
Approach Delay (s)	0.0		0.0		15.6
Approach LOS					C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix F

2018 TRAFFIC CONDITIONS

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	8	479	13	55	1435	21	2	2	14	5	2	17
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)	9	521	14	60	1560	23	2	2	15	5	2	18
Pedestrians		20			20			20			20	
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			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	1603			555			2288	2280	561	2285	2283	1611
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1603			555			2288	2280	561	2285	2283	1611
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			94			89	94	97	76	94	85
cM capacity (veh/h)	401			999			20	35	510	23	35	124

Direction, Lane #	SE 1	SE 2	NW 1	NE 1	SW 1
Volume Total	529	14	1642	20	26
Volume Left	9	0	60	2	5
Volume Right	0	14	23	15	18
cSH	401	1700	999	98	58
Volume to Capacity	0.02	0.01	0.06	0.20	0.45
Queue Length (ft)	2	0	5	18	43
Control Delay (s)	0.7	0.0	7.7	50.9	109.6
Lane LOS	A		A	F	F
Approach Delay (s)	0.7		7.7	50.9	109.6
Approach LOS				F	F

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	123.9%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	25	483	24	55	1441	21	2	2	17	5	2	17
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)	27	525	26	60	1566	23	2	2	18	5	2	18
Pedestrians		20			20			20			20	
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			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	1609			571			2325	2328	302	2074	2343	1618
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1609			571			2325	2328	302	2074	2343	1618
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 %	93			94			83	93	97	78	93	79
cM capacity (veh/h)	395			981			13	31	671	24	30	89

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NE 1	NE 2	SW 1
Volume Total	202	350	26	60	1589	4	18	26
Volume Left	27	0	0	60	0	2	0	5
Volume Right	0	0	26	0	23	0	18	18
cSH	395	1700	1700	981	1700	18	671	52
Volume to Capacity	0.07	0.21	0.02	0.06	0.93	0.24	0.03	0.50
Queue Length (ft)	6	0	0	5	0	17	2	48
Control Delay (s)	3.0	0.0	0.0	8.9	0.0	259.1	10.5	130.1
Lane LOS	A			A		F	B	F
Approach Delay (s)	1.0			0.3		57.9		130.1
Approach LOS						F		F

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	12	1480	6	24	761	19	10	5	57	12	2	12
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)	13	1609	7	26	827	21	11	5	62	13	2	13
Pedestrians		20			20			20			20	
Lane Width (ft)		12.0			16.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		2			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	868			1635			2579	2575	1649	2629	2571	878
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	868			1635			2579	2575	1649	2629	2571	878
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			93			19	76	47	0	91	96
cM capacity (veh/h)	763			390			13	23	118	5	23	336

Direction, Lane #	SE 1	SE 2	NW 1	NE 1	NE 2	SW 1
Volume Total	1622	7	874	16	62	28
Volume Left	13	0	26	11	0	13
Volume Right	0	7	21	0	62	13
cSH	763	1700	390	16	118	11
Volume to Capacity	0.02	0.00	0.07	1.04	0.53	2.57
Queue Length (ft)	1	0	5	63	62	113
Control Delay (s)	3.2	0.0	2.4	574.8	65.6	1396.9
Lane LOS	A		A	F	F	F
Approach Delay (s)	3.2		2.4	171.7		1396.9
Approach LOS				F		F

Intersection Summary			
Average Delay	23.1		
Intersection Capacity Utilization	106.0%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	13	1486	26	24	772	19	10	5	63	12	2	12
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)	14	1615	28	26	839	21	11	5	68	13	2	13
Pedestrians		20			20			20			20	
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			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		278										
pX, platoon unblocked												
vC, conflicting volume	880			1635			2589	2595	848	1849	2585	889
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	880			1635			2589	2595	848	1849	2585	889
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			93			0	75	77	48	90	95
cM capacity (veh/h)	751			386			10	22	295	25	22	277

Direction, Lane #	SE 1	SE 2	SE 3	NW 1	NW 2	NE 1	NE 2	SW 1
Volume Total	553	1077	28	26	860	16	68	28
Volume Left	14	0	0	26	0	11	0	13
Volume Right	0	0	28	0	21	0	68	13
cSH	751	1700	1700	386	1700	12	295	43
Volume to Capacity	0.02	0.63	0.02	0.07	0.51	1.37	0.23	0.66
Queue Length (ft)	1	0	0	5	0	69	22	62
Control Delay (s)	0.5	0.0	0.0	15.0	0.0	834.0	20.9	189.0
Lane LOS	A			B		F	C	F
Approach Delay (s)	0.2			0.4		177.2		189.0
Approach LOS						F		F

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.98			0.96			0.99	
Flt Protected		1.00			1.00			0.99			0.98	
Satd. Flow (prot)		3267			3222			1528			1541	
Flt Permitted		0.86			0.93			0.94			0.82	
Satd. Flow (perm)		2808			2992			1456			1291	
Volume (vph)	23	431	24	44	1257	175	18	54	27	44	34	8
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	468	26	48	1366	190	20	59	29	48	37	9
RTOR Reduction (vph)	0	3	0	0	9	0	0	25	0	0	8	0
Lane Group Flow (vph)	0	516	0	0	1595	0	0	83	0	0	86	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)		6			6			6			6	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		43.2			43.2			7.9			7.9	
Effective Green, g (s)		43.2			43.2			7.9			7.9	
Actuated g/C Ratio		0.73			0.73			0.13			0.13	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		2053			2187			195			173	
v/s Ratio Prot												
v/s Ratio Perm		0.18			c0.54			c0.07			0.07	
v/c Ratio		0.25			0.73			0.43			0.50	
Uniform Delay, d1		2.6			4.6			23.5			23.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			2.2			1.5			2.3	
Delay (s)		2.9			6.8			25.0			26.0	
Level of Service		A			A			C			C	
Approach Delay (s)		2.9			6.8			25.0			26.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.98			0.97			0.99	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		3266			3222			1531			1541	
Flt Permitted		0.86			0.92			0.94			0.79	
Satd. Flow (perm)		2808			2975			1448			1256	
Volume (vph)	23	434	25	50	1258	175	23	58	27	48	35	8
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	472	27	54	1367	190	25	63	29	52	38	9
RTOR Reduction (vph)	0	4	0	0	10	0	0	25	0	0	8	0
Lane Group Flow (vph)	0	520	0	0	1601	0	0	92	0	0	91	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)		6			6			6			6	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		42.8			42.8			8.0			8.0	
Effective Green, g (s)		42.8			42.8			8.0			8.0	
Actuated g/C Ratio		0.73			0.73			0.14			0.14	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		2044			2165			197			171	
v/s Ratio Prot												
v/s Ratio Perm		0.19			c0.54			c0.08			0.08	
v/c Ratio		0.25			0.74			0.47			0.53	
Uniform Delay, d1		2.7			4.7			23.4			23.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.3			2.3			1.7			3.2	
Delay (s)		3.0			7.0			25.2			26.8	
Level of Service		A			A			C			C	
Approach Delay (s)		3.0			7.0			25.2			26.8	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.94			0.99	
Flt Protected		1.00			1.00			0.99			0.96	
Satd. Flow (prot)		3282			3239			1474			1527	
Flt Permitted		0.94			0.82			0.89			0.65	
Satd. Flow (perm)		3101			2649			1322			1034	
Volume (vph)	14	1163	45	35	651	70	44	60	94	237	50	21
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	1264	49	38	708	76	48	65	102	258	54	23
RTOR Reduction (vph)	0	5	0	0	13	0	0	14	0	0	5	0
Lane Group Flow (vph)	0	1323	0	0	809	0	0	201	0	0	330	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)		6			6			6			6	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		25.8			25.8			19.3			19.3	
Effective Green, g (s)		25.8			25.8			19.3			19.3	
Actuated g/C Ratio		0.49			0.49			0.36			0.36	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1507			1287			481			376	
v/s Ratio Prot												
v/s Ratio Perm		c0.43			0.31			0.16			c0.32	
v/c Ratio		0.88			0.63			0.42			0.88	
Uniform Delay, d1		12.2			10.1			12.7			15.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		7.6			2.3			0.6			19.9	
Delay (s)		19.8			12.4			13.3			35.7	
Level of Service		B			B			B			D	
Approach Delay (s)		19.8			12.4			13.3			35.7	
Approach LOS		B			B			B			D	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			0.99	
Frt		0.99			0.99			0.94			0.99	
Flt Protected		1.00			1.00			0.99			0.96	
Satd. Flow (prot)		3281			3238			1481			1528	
Flt Permitted		0.94			0.74			0.87			0.64	
Satd. Flow (perm)		3099			2418			1309			1015	
Volume (vph)	14	1170	47	48	653	70	52	66	94	243	52	21
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	1272	51	52	710	76	57	72	102	264	57	23
RTOR Reduction (vph)	0	5	0	0	13	0	0	14	0	0	5	0
Lane Group Flow (vph)	0	1333	0	0	825	0	0	217	0	0	339	0
Confl. Peds. (#/hr)	20		20	20		20	20		20	20		20
Parking (#/hr)		6			6			6			6	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		25.5			25.5			20.0			20.0	
Effective Green, g (s)		25.5			25.5			20.0			20.0	
Actuated g/C Ratio		0.48			0.48			0.37			0.37	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1477			1153			489			379	
v/s Ratio Prot												
v/s Ratio Perm		c0.43			0.35			0.18			c0.34	
v/c Ratio		0.90			0.72			0.44			0.89	
Uniform Delay, d1		12.9			11.1			12.6			15.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		9.3			3.8			0.6			22.5	
Delay (s)		22.2			14.9			13.2			38.3	
Level of Service		C			B			B			D	
Approach Delay (s)		22.2			14.9			13.2			38.3	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	8	10	2	13	0	4	69	2	4	64	14
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)	7	9	11	2	14	0	4	75	2	4	70	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											300	
pX, platoon unblocked												
vC, conflicting volume	178	172	77	186	178	76	85			77		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	178	172	77	186	178	76	85			77		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	99	99	100	98	100	100			100		
cM capacity (veh/h)	769	717	984	756	711	985	1512			1521		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	26	16	82	89
Volume Left	7	2	4	4
Volume Right	11	0	2	15
cSH	824	717	1512	1521
Volume to Capacity	0.03	0.02	0.00	0.00
Queue Length (ft)	2	2	0	0
Control Delay (s)	9.5	10.1	0.4	0.4
Lane LOS	A	B	A	A
Approach Delay (s)	9.5	10.1	0.4	0.4
Approach LOS	A	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	15.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	7	10	10	2	14	10	4	70	4	9	64	14
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)	8	11	11	2	15	11	4	76	4	10	70	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											300	
pX, platoon unblocked												
vC, conflicting volume	202	186	77	200	191	78	85			80		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	202	186	77	200	191	78	85			80		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	98	99	100	98	99	100			99		
cM capacity (veh/h)	730	702	984	736	697	982	1512			1517		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	29	28	85	95
Volume Left	8	2	4	10
Volume Right	11	11	4	15
cSH	794	788	1512	1517
Volume to Capacity	0.04	0.04	0.00	0.01
Queue Length (ft)	3	3	0	0
Control Delay (s)	9.7	9.7	0.4	0.8
Lane LOS	A	A	A	A
Approach Delay (s)	9.7	9.7	0.4	0.8
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	17.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	35	24	15	2	13	10	13	124	0	5	95	47
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)	38	26	16	2	14	11	14	135	0	5	103	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											300	
pX, platoon unblocked												
vC, conflicting volume	321	303	129	332	328	135	154			135		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	321	303	129	332	328	135	154			135		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	94	96	98	100	98	99	99			100		
cM capacity (veh/h)	607	602	921	584	582	914	1426			1450		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	80	27	149	160
Volume Left	38	2	14	5
Volume Right	16	11	0	51
cSH	650	682	1426	1450
Volume to Capacity	0.12	0.04	0.01	0.00
Queue Length (ft)	11	3	1	0
Control Delay (s)	11.3	10.5	0.8	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	11.3	10.5	0.8	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	29.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	37	27	15	2	14	29	13	125	3	13	94	47
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)	40	29	16	2	15	32	14	136	3	14	102	51
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)											300	
pX, platoon unblocked												
vC, conflicting volume	361	323	128	353	347	138	153			139		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	361	323	128	353	347	138	153			139		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	93	95	98	100	97	97	99			99		
cM capacity (veh/h)	554	583	922	560	565	911	1427			1444		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	86	49	153	167
Volume Left	40	2	14	14
Volume Right	16	32	3	51
cSH	611	748	1427	1444
Volume to Capacity	0.14	0.07	0.01	0.01
Queue Length (ft)	12	5	1	1
Control Delay (s)	11.9	10.2	0.8	0.7
Lane LOS	B	B	A	A
Approach Delay (s)	11.9	10.2	0.8	0.7
Approach LOS	B	B		

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	6	0	4	0	0	2	8	25	0	0	42	10
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)	7	0	4	0	0	2	9	27	0	0	46	11
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	98	96	51	100	101	27	57			27		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	98	96	51	100	101	27	57			27		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	100	100	100	99			100		
cM capacity (veh/h)	879	790	1017	874	785	1048	1548			1587		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	11	2	36	57
Volume Left	7	0	9	0
Volume Right	4	2	0	11
cSH	929	1048	1548	1587
Volume to Capacity	0.01	0.00	0.01	0.00
Queue Length (ft)	1	0	0	0
Control Delay (s)	8.9	8.4	1.8	0.0
Lane LOS	A	A	A	
Approach Delay (s)	8.9	8.4	1.8	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	0	4	0	0	2	9	27	0	0	46	20
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)	16	0	4	0	0	2	10	29	0	0	50	22
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	112	110	61	114	121	29	72			29		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112	110	61	114	121	29	72			29		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	98	100	100	100	100	100	99			100		
cM capacity (veh/h)	860	775	1004	855	765	1045	1528			1584		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	21	2	39	72
Volume Left	16	0	10	0
Volume Right	4	2	0	22
cSH	887	1045	1528	1584
Volume to Capacity	0.02	0.00	0.01	0.00
Queue Length (ft)	2	0	0	0
Control Delay (s)	9.2	8.5	1.9	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.2	8.5	1.9	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	23	0	4	0	0	4	6	42	2	0	34	20
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)	25	0	4	0	0	4	7	46	2	0	37	22
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	112	109	48	112	118	47	59			48		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112	109	48	112	118	47	59			48		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	97	100	100	100	100	100	100			100		
cM capacity (veh/h)	859	778	1021	859	769	1023	1545			1559		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	29	4	54	59
Volume Left	25	0	7	0
Volume Right	4	4	2	22
cSH	880	1023	1545	1559
Volume to Capacity	0.03	0.00	0.00	0.00
Queue Length (ft)	3	0	0	0
Control Delay (s)	9.2	8.5	0.9	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.2	8.5	0.9	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	37	0	4	0	0	4	8	46	2	0	47	38
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)	40	0	4	0	0	4	9	50	2	0	51	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	145	141	72	145	161	51	92			52		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	145	141	72	145	161	51	92			52		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	95	100	100	100	100	100	99			100		
cM capacity (veh/h)	817	745	991	817	727	1017	1502			1554		

Direction, Lane #	SE 1	NW 1	NE 1	SW 1
Volume Total	45	4	61	92
Volume Left	40	0	9	0
Volume Right	4	4	2	41
cSH	831	1017	1502	1554
Volume to Capacity	0.05	0.00	0.01	0.00
Queue Length (ft)	4	0	0	0
Control Delay (s)	9.6	8.6	1.1	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.6	8.6	1.1	0.0
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	3	14	11	33	69	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	15	12	36	75	14
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	135	75	89			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	135	75	89			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	99			
cM capacity (veh/h)	852	986	1506			

Direction, Lane #	SE 1	NE 1	SW 1	SW 2
Volume Total	18	48	75	14
Volume Left	3	12	0	0
Volume Right	15	0	0	14
cSH	960	1506	1700	1700
Volume to Capacity	0.02	0.01	0.04	0.01
Queue Length (ft)	1	1	0	0
Control Delay (s)	8.8	1.9	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.8	1.9	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	6	27	18	69	57	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	29	20	75	62	20
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	176	62	82			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	176	62	82			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	99			
cM capacity (veh/h)	803	1003	1516			

Direction, Lane #	SE 1	NE 1	SW 1	SW 2
Volume Total	36	95	62	20
Volume Left	7	20	0	0
Volume Right	29	0	0	20
cSH	960	1516	1700	1700
Volume to Capacity	0.04	0.01	0.04	0.01
Queue Length (ft)	3	1	0	0
Control Delay (s)	8.9	1.6	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.9	1.6	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	21.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	2	82	5	3	102
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	2	89	5	3	111
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						101
pX, platoon unblocked						
vC, conflicting volume	209	92			95	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	209	92			95	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	777	966			1499	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	3	95	114
Volume Left	1	0	3
Volume Right	2	5	0
cSH	893	1700	1499
Volume to Capacity	0.00	0.06	0.00
Queue Length (ft)	0	0	0
Control Delay (s)	9.0	0.0	0.2
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	0.2
Approach LOS	A		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	17.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	2	5	207	8	7	140
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	5	225	9	8	152
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						101
pX, platoon unblocked						
vC, conflicting volume	397	229			234	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	397	229			234	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	99			99	
cM capacity (veh/h)	605	810			1334	

Direction, Lane #	NW 1	NE 1	SW 1
Volume Total	8	234	160
Volume Left	2	0	8
Volume Right	5	9	0
cSH	738	1700	1334
Volume to Capacity	0.01	0.14	0.01
Queue Length (ft)	1	0	0
Control Delay (s)	9.9	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	9.9	0.0	0.4
Approach LOS	A		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	507	0	0	1460	0	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	551	0	0	1587	0	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	163					
pX, platoon unblocked						
vC, conflicting volume			551		1345	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			551		1345	276
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1015		143	722

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1
Volume Total	276	276	793	793	10
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	10
cSH	1700	1700	1700	1700	722
Volume to Capacity	0.16	0.16	0.47	0.47	0.01
Queue Length (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	10.1
Lane LOS					B
Approach Delay (s)	0.0		0.0		10.1
Approach LOS					B

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1510	0	0	794	0	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1641	0	0	863	0	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)	163					
pX, platoon unblocked						
vC, conflicting volume			1641		2073	821
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1641		2073	821
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	95
cM capacity (veh/h)			390		47	318

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1
Volume Total	821	821	432	432	16
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	16
cSH	1700	1700	1700	1700	318
Volume to Capacity	0.48	0.48	0.25	0.25	0.05
Queue Length (ft)	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	16.9
Lane LOS					C
Approach Delay (s)	0.0		0.0		16.9
Approach LOS					C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		