YELLOWSTONE COUNTY BOARD OF PLANNING

City of Billings and

Yellowstone County, Montana

AGENDA

JUNE 23, 2026 MEETING TIME: 4:30 p.m.
City Council Chambers, 5th Floor
316 N 26th St, Billings MT

NOTICE TO THE PUBLIC

Citizens are invited to:

- Review the Agenda Packet on the City's website at: Agendas and Minutes

Public comment will be taken only during the Public Comment periods as indicated on the agenda and during the Public Hearings, if any are scheduled, under the Regular agenda. Comments may be sent to the Board via email before 12:00 pm on the meeting date. All emails received prior to this time will be entered into the record for the public hearing. Comments may be submitted by:

- Mail: City/County Planning Division PO Box 1178, Billings MT 59103
- Email: plnonline@billingsmt.gov
- NOTICE: All meetings and official activities of the MPO are held in buildings and locations that comply with accessibility standards according to the Americans with Disabilities Act (ADA). Special arrangements for participation in public hearings by individuals with hearing, speech, or vision impairment may be made upon request at least three days prior to the hearing. Please notify the Planning Division at 406-657-8247.

1. **CALL TO ORDER - Planning Board President:** Welcome and Introduction Board Members and Staff.

2. **APPROVAL OF AGENDA* -** including any additions or deletions to agenda. The agenda for a regular meeting will be closed at 5:00 p.m. three (3) working days prior to the date of the meeting.

3. **APPROVAL OF MEETING MINUTES OF**: June 9, 2026

4. **PUBLIC COMMENT PERIOD** – As required (3 minute maximum per person). *Any member of the public may be heard on any subject that is not on the agenda. The Planning Board will not take any action on these items at this time, but could choose to add an item to the next meeting's agenda for discussion.*
   4a) Comments on items not on agenda and requests to add items to future agendas
   4b) Comments on items on the non-public hearing agenda items

5. **DISCLOSURE OF CONFLICT OF INTEREST**:

6. **DISCLOSURE OF EX PARTE COMMUNICATION**:

7. **OLD BUSINESS** (Agenda items that were not discussed or not completed in a previous meeting or items requiring action).

   a. **Pronghorn City Major Subdivision – Applicant Request to Postpone Consideration to July 14, 2026**
   Dave Green, Planner

   b. **PUBLIC HEARINGS/PUBLIC HEARING PARTICIPATION GUIDELINES.** The County Planning Board welcomes public input on matters brought before the Board. To ensure a fair and effective public comment process, we ask that you consider the following guidelines when presenting your comments: Address the Planning Board directly. You must state your name and address before commenting. This is an opportunity to explain how you will be affected by the decision and why that is an important consequence. By state law, the Planning Board must consider only certain criteria when reviewing subdivisions (76-3-608(a), MCA). Please see the attached guidelines for the criterion.

   c. **Public Hearing and Board Action. Yellowstone Club Estates, 8th Filing Preliminary Plat and Variances Requested – Recommendation for Conditional Approval and Adoption of Findings of Fact**
   Hunter Kelly, Planner I

d. **Public Hearing and Board Action. 44 West Subdivision, 2nd Filing. Preliminary Plat – Recommendation for Conditional Approval and Adoption of Findings of Fact**
Dave Green, Planner II

e. **Public Hearing and Board Action. 44 West Subdivision, 3rd Filing. Preliminary Plat – Recommendation for Conditional Approval and Adoption of Findings of Fact**
Dave Green, Planner II

f. **Public Hearing and Board Action. Shop House Acres Subdivision. Preliminary Plat – Recommendation for Conditional Approval and Adoption of Findings of Fact**
Dave Green, Planner II

8. **NEW BUSINESS:** (Agenda items new to this meeting).

9. **OTHER BUSINESS:**

a. (Standing Item) Long Range Strategic Issues and an overview of future City and County issues and projects.

10. **ADJOURNMENT**

FUTURE AGENDA ITEMS

CITY/COUNTY PLANNING BOARD
City Council Chambers, 5th Floor
316 N 26th St, Billings MT

BILLINGS - YELLOWSTONE COUNTY
MPO
METROPOLITAN PLANNING ORGANIZATION

Public Hearing Participation Guidelines

NOTICE: All meetings and official activities of the MPO are held in buildings and locations that comply with accessibility standards according to the Americans with Disabilities Act (ADA). A TTY number for the hearing impaired, 406-657-3079, is available upon request. Special arrangements for participation in the public hearings by individuals with hearing, speech, or vision impairment may be made upon request at least three days prior to the hearing. Please notify the Planning Division Office, at 406-247-8610.

The County Planning Board welcomes public input on matters brought before the Board. To ensure a fair and effective public comment process, we ask that you consider the following guidelines when presenting your comments: **Address the Planning Board directly. You must state your name and address before commenting**. This is an opportunity to explain how you will be affected by the decision and why that is an important consequence. Be informed of the process and the requirements of the Board. If you are commenting about a subdivision, please limit your comments to the review criteria.

By state law, the Planning Board must consider only certain criteria when reviewing subdivisions (76-3-608(a), MCA). These criteria include:
-Effect on agriculture and agricultural water user facilities; Effect on local services; -Effect on the natural environment; Effect on wildlife and wildlife habitat; Effect on public health and safety

Provide specific information about why you are concerned about the pending application, how the decision will impact the review criteria listed above, and provide suggestions on how to minimize or eliminate the impact.

Respect the right of others to participate. Wait until the previous speaker has completed their comments before making your own comments. Do not talk over the person commenting or with other people in attendance.

The public hearing is not an opportunity to question or accuse the applicant or their agent. If you have questions of the Board, the applicant or the agent, ask questions directly to the Board during the public hearing portion of the meeting. The Board will respond or request the applicant or agent to respond after the public comment portion of the hearing is closed.

After the public comment portion of the hearing is closed, no further comments are allowed unless you are addressed directly by a Board member.

You should expect the Board to make a balanced recommendation in accordance with its statutory responsibilities. The Board's ability to make reasonable and thoughtful recommendations is dependent on a fair consideration of everyone's interests.

Thank you for participating.

Date: 06/23/2026
Title:
Presented by:
Department: Planning & Community Services
Presentation:

Information

RECOMMENDATION
APPROVAL OF **MEETING MINUTES**: June 9, 2026

BACKGROUND (Consistency with Adopted Plans and Policies, if applicable)

ALTERNATIVES
City Council may:

- Approve; or,
- Not Approve

FISCAL EFFECTS

Attachments

Minutes of June 9, 2026

CITY/COUNTY PLANNING BOARD

Tuesday, June 9, 2026 at 4:30pm

Members	Position	01/13/2026	01/27/2026	02/10/2026	02/242026	03/10/2026	03/24/2026	04/142026	04/28/2026	05/12/2026	05/27/2026	06/09/2026	06/23/2026	07/14/2026	07/28/2026	08/11/2026	08/25/2026	09/08/2026	09/22/2026	10/13/2026	10/27/2026	11/10/2026	11/24/2026	12/082026	12/22/2026
Jim Ronquillo	Billings Ward I	1	C	C	C	1	1	A	A	A	1	1													
Roger Gravgaard	Billings Ward II	1	C	C	C	1	1	1	V	1	1	1													
Dennie Stephenson	Billings Ward III	1	C	C	C	1	1	1	1	1	1	1													
John Staley **PRESIDENT**	Billings Ward IV	1	C	C	C	1	1	1	1	1	1	1													
David Nordel	Billings Ward V	V	C	C	C	A	A	V	A	A	1	A													
Troy Boucher	YC District 1	1	C	C	C	A	V	1	A	V	A	A													
Dennis Cook, **VICE PRESIDENT**	YC District 2	1	C	C	C	1	1	1	1	1	1	1													
Vacant	YC District 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vacant	YC District 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vacant	YC District 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alexis Bonogofsky	YC District 6	1	C	C	C	A	A	A	1	V	V	V													
Vacant	YC District 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scott Reiter Megan Trevino	Ex-Officio SD2	1 A	C C	C C	C C	1 A	1 A	A A	A 1	V A	A 1	1 A													

Please note: “A” stands for excused absence, “1” stands for present, “V” stands for Zoom participation, “C” stands for Canceled

Call the Meeting to Order: President Staley called the meeting to order at 4:45 PM

Introduction of Planning Board Members and Planning Department Staff

Attending Staff: Wyeth Friday, PCSD Director; Anna Vickers, Planning Division Manager; Lora Mattox, Transportation Planning Coordinator; Elyse Monat, Transportation Planner; Dave Green, Planner II; Hunter Kelly, Planner; Brenda Berns, Planning Clerk

Others in Attendance: Ronni Tallerico, YCPW; Matt Suek, IMEG; Taylor Kasperick, Performance Engineering; Greg McCall, McCall Development; Craig Dalton, Performance Engineering; John Ringert, Kittelson & Assoc.

2. Approval of Agenda

Motion
Motion by Board member Stephenson to approve the agenda as submitted. Second by Board member Cook. Motion passed unanimously.

3. Approval of Minutes: May 27, 2026

Motion
Motion by Board member Stephenson to approve May 27, 2026 meeting minutes as submitted. Second by Board Member Ronquillo. Motion passed unanimously.

4. Public Comment: No public comment was received.

5. Disclosure of Outside (Ex-Parte) Communication – None were disclosed.

6. Disclosure of Conflicts of Interest – None were disclosed.

7. Old Business – There was no old business.

8. New Business

a. **Public Hearing and Recommendation for Adoption of the 21st Street Underpass Study.** Elyse Monat, Transportation Planner

Ms. Monat presented the 21st Street Underpass Study on behalf of John Ringert, Kittelson & Associates of the project purpose, study area, existing conditions analysis, public involvement efforts, alternatives evaluation, public feedback, regulatory considerations, and next steps. The project team reviewed existing traffic operations, pedestrian and bicycle activity, emergency service and transit operations, crash history, roadway conditions, structural elements, and drainage infrastructure within the study area.

Board members discussed traffic patterns and potential diversion routes associated with the proposed improvements. The project team summarized findings from traffic analyses and stakeholder coordination efforts.
The project team provided an overview of the public involvement process, which included virtual outreach and public surveys conducted throughout the study. Public comments and feedback received on the alternatives were summarized.
The Board reviewed the alternatives considered during the study, including factors related to roadway connectivity, emergency vehicle access, project costs, and operational considerations.
The presentation also included a summary of regulatory requirements, permitting considerations, and coordination with partner agencies and stakeholders.
The Board acknowledged the work of the project team and received information regarding the anticipated next steps in the project development process.

President Staley opened the public hearing. No comments were received. President Staley closed the public hearing.

Board Discussion
Board members discussed the study findings, project purpose, safety concerns, usage of the underpass, and the alternatives evaluated as part of the feasibility study. Questions were raised regarding project costs, the need for future improvements, crash history, and whether closure of the underpass had been considered. Staff clarified that the study was intended to evaluate existing conditions and potential alternatives to inform future decision-making and did not recommend implementation of any specific alternative.
Board members also discussed potential safety enhancements, including improved lighting and signage. Staff noted that lighting improvements were considered as part of the study and that coordination with BNSF would be required for certain improvements. The Board acknowledged the study as a planning document intended to provide information for future consideration.

Motion
Board Member Ronquillo motioned to forward a recommendation of approval of the 21st Street Underpass Study to the Policy Coordinating Committee with the condition to assure the inclusion of lighting if a project is selected. Seconded by Board Member Stephenson. The motion passed unanimously.

b. **Public Hearing and Recommendation for Approval of the West Billings Neighborhood Plan**. Wyeth Friday, PCSD Director

Mr. Friday presented an overview of the West Billings Neighborhood Plan and noted that the plan will proceed through the adoption process, including consideration by the Yellowstone County Board of County Commissioners and the Billings City Council. The presentation reviewed updates to the 2001 West Billings Plan and the 2016 West End Multimodal Plan, growth trends in West Billings, land use changes, public outreach efforts, population projections, and transportation planning considerations. Staff discussed the plan's application within Yellowstone County and the relationship between City and County planning and regulatory authority.

The Board received information regarding existing and future transportation improvements, level of service analysis, and the plan's guiding principles related to land use, community vitality, natural and recreational areas, and the transportation network. The presentation emphasized the integration of land use and transportation planning to address anticipated growth and future transportation needs in West Billings.

Board Discussion
Board members discussed public safety facilities in the West Billings area, including existing and future fire and law enforcement service locations. Staff responded to questions regarding planned facilities and service coverage within the growth area.

President Staley opened the public hearing. No comments were received. President Staley closed the public hearing.

Motion
Motion by Board Member Stephenson to Recommend Approval of the West Billings Neighborhood Plan to the Board of County Commissioners. Second by Board Member Ronquillo. Motion passed unanimously.

Discussion
Board members discussed future school facility needs in West Billings. Representatives from School District 2 noted that a recent demographic study projects declining enrollment over the next 20 years and indicated that existing school sites provide capacity for future educational needs.

c. **Plat Review and Board Discussion. Yellowstone Club Estates City Major Subdivision.**
Hunter Kelly, Planner

Mr. Kelly presented the subdivision proposal, including the property information, plat review, and associated variance request. The variance would allow a portion of the proposed trail to exceed the standard maximum grade requirement. Staff explained that Lots 1 and 9 would remain in Yellowstone County and would provide access to the trail system.

Recommendation
- Staff recommends conditional approval subject to 4 conditions of approval and acceptance of the variance request.
- A Public Hearing will be held at the next PB meeting on 6-23-26
- Board of County Commissioners will review and act on 7-21-26
- City Council will review on 7-27-26

Applicant's Agent: Taylor Kasperick, Performance Engineering

Board Questions
The Board questioned why the property would remain in the County and whether it would receive City services.
It was explained that the property consists of vacant land and utility connections have been made available. The agricultural covenant will remain in place. Due to the property's proximity to City utilities, City services may be accessible; however, there are no current plans to develop Lots 1 and 9.

d. **Plat Review and Board Discussion. 44 West 2nd Filing City Major Subdivision.**
Dave Green, Planner II

Mr. Green gave an overview of the subdivision and Property information, Proposed Plat, and Traffic Study.

Recommendation
- Staff recommends conditional approval subject to 2 conditions of approval
- A Public Hearing will be held 6-23-26
- The City Council of Billings is scheduled for July 27, 2026

Applicant's Agent: Craig Dalton, Performance Engineering

Board Questions
The Board questioned whether a right-turn lane would be constructed into the subdivision.
It was explained that the proposed improvement is a left-turn lane into the subdivision from Central Avenue.

Board member Gravgaard shared his appreciation to Greg McCall, McCall Development on behalf of the Planning Board in exceeding the parkland dedication requirement.

e. **Plat Review and Board Discussion West 3rd Filing City Major Subdivision.**
Dave Green, Planner II

Mr. Green gave an overview of the subdivision and Property information, Proposed plat, and Traffic Study. **Applicant's Agent:** Craig Dalton, Performance Engineering. No questions were received.

Recommendation
- Staff recommends conditional approval subject to 2 conditions of approval
- A Public Hearing will be held 6-23-26
- The City Council of Billings is scheduled for July 27, 2026

f. **Plat Review and Board Discussion. Shop House Acres County Major Subdivision**.
Dave Green Planner II

Mr. Green provided an overview of the proposed subdivision, including the plat layout, access, utilities, and traffic considerations. The Board discussed the proposed development and existing site conditions.
Staff explained that the subdivision would include a combination of public and private infrastructure. A variance request associated with subdivision connectivity was reviewed, and staff recommended approval.
The Board was informed of the proposed water, wastewater, and stormwater systems and how services would be provided within the development.
Staff also provided an update on surrounding infrastructure capacity and ongoing coordination with County Public Works regarding transportation impacts and the traffic study.

Recommendation

- Staff recommends conditional approval subject to 8 conditions of approval.
- A Public Hearing will be held at the next PB meeting on June 23, 2026
- The Board of County Commissioners is scheduled for July 21, 2026

Applicant's Agent: Matt Suek, IMEG

Board Questions
The Board inquired whether any feedback had been received from neighboring property owners. It was reported that no comments had been received.
The Board questioned the proposed use of private roads within the development. It was explained that the design is intended to meet County requirements and provide safe access to the site.
The Board discussed emergency access provisions and recommended amending a condition of approval to ensure that emergency responders have access through any electronic gate system.

9. Other Business
Wyeth Friday provided an update on upcoming planning efforts and public outreach activities. It was noted that the City Council has adopted the Growth Policy and Future Land Use Map, and that public open houses are planned to gather input on subdivision regulations and the Billings 2045 initiative.
The Board discussed the status of ongoing coordination with Yellowstone County regarding future planning board structure and governance. Anna Vickers reported that City and County legal counsel will be meeting to evaluate options and develop a process moving forward. It was noted that the current board will remain in place until a transition plan has been established.

Adjournment 6:26 PM
Brenda J Berns, Planning Clerk

Date: 06/23/2026
Title:
Presented by:
Department: Planning & Community Services
Presentation:

Information

RECOMMENDATION

Pronghorn City Major Subdivision – Applicant Request to Postpone Consideration to July 14, 2026
Dave Green, Planner

BACKGROUND (Consistency with Adopted Plans and Policies, if applicable)

ALTERNATIVES
City Council may:

- Approve; or,
- Not Approve

FISCAL EFFECTS

Attachments

Applicant Requested Public Hearing Date Change

June 15, 2026

RE: Pronghorn Subdivision-Preliminary Major Plat - Project Status Update and Public Hearing Date Change.

To Whom it May Concern,

At the Public Hearing Planning Board meeting held on May 27th regarding the preliminary plat for Pronghorn Subdivision, the project was tabled as the Board and County Staff requested that we pursue an alternative access option for the subdivision. At that time, the project was tentatively scheduled for the June 23rd Planning Board meeting.

However, additional time has been needed to finalize the proposed layout change and therefore the project will now be placed on the July 14th Planning Board meeting agenda for the public hearing held at the City Council Chambers in City Hall, 5th Floor, 316 N. 26th St.

As the updated layout and access is finalized, additional information will be mailed prior to the meeting.

Please let me know if any additional information is needed in the meantime.

Sincerely,

Kolten Knatterud, PE

Kolten.l.knatterud@imegcorp.com
406-248-9000

KLK/hsc
\\files\active\Projects\2024\24001698.00\Design\Civil\PLANNING\Working Docs\20260615 Pronghorn Public Meeting Change Notice.docx

Planning Board

Date:	06/23/2026
Title:	Yellowstone Club Estates, 8th Filing - Preliminary Plat Public Hearing
Presented by:	Hunter Kelly, Planner 1
Department:	Planning & Community Services
Presentation:	Yes

Information

RECOMMENDATION

Staff proposes the Planning Board recommend to the Billings City Council and Yellowstone County Board of Commissioners that the preliminary plat of Yellowstone Club Estates, 8th Filing be conditionally approved, the variances accepted, and the Findings of Fact adopted as presented in the staff report.

BACKGROUND (Consistency with Adopted Plans and Policies, if applicable)

On May 1, 2026, Performance Engineering, on behalf of 22500 NOL, LLC (DBA Yellowstone Country Club), applied for preliminary subsequent major plat approval for Yellowstone Club Estates, 8th Filing. The proposed subdivision creates nine (9) lots for development. The subject property is generally located near Tommy Armour Circle & Ben Hogan Lane. The property is zoned N3 – Suburban Neighborhood Residential for Lots 2-8 within the city, and P1- Parks and Open Space for Lots 1 and 9 within the county. The land is currently vacant land.

This subdivision is a dual-jurisdiction application. Lots 2-8 have been annexed into the City of Billings via a previous application, and Lots 1 and 9 will remain in Yellowstone County. The property also has an existing agricultural covenant. The agricultural covenant will be modified to remove Lots 2-8 which are within the City of Billings and will contain only Lots 1 and 9.

VARIANCES

One (1) variance has been requested. The applicant is requesting a variance from Section 23-406.C.1 of the City of Billings Subdivision regulations, and Section 4.6.D of the Yellowstone County Subdivision Regulations, which requires new subdivisions to comply with the currently adopted Active Transportation Plan. The plan currently depicts a multi-use trail in the vicinity of Lots 2 and 3 of the proposed subdivision. That specific area of land contains topographic constraints, including slopes approaching 50% and elevation differences ranging from approximately 18 to 22 feet. Staff is recommending approval of the variance, based on the following criteria:

1. The granting of the variance will not be detrimental to the public health, safety, or general welfare or injurious to other adjoining properties.
    - The proposed trail on the Active Transportation Plan does not have a significant or developed connection adjacent to the subject property. This variance does not remove the requirement for a trail connection altogether, but would simply delay the connection and adjust the location of the connection for future development.
2. Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, an undue hardship to the owner would result if the strict letter of the regulation was enforced.
    - The area designated for a trail connection as-written contains changes in grade approaching 50%, with sudden elevation changes ranging from 18 to 22 feet high. Current road and trail development standards limit grades for a given road to approximately 12%. (See grading map on the applicant's request letter)
3. The variance will not result in an increase in taxpayer burden.
    - Since this variance would delay the construction and future maintenance of a trail network, it will not increase taxpayer burden.
4. The variance will not in any manner place the subdivision in non-conformance with any adopted zoning regulations or Growth Policy.
    - The delay of the connection to the trail network would not place this subdivision in conflict with the 2016 Growth Policy.
5. The subdivider must prove that the alternative design is equally effective, and the objectives of the improvements are satisfied.
    - The SIA included provisions that ensure the trail network will be constructed as part of future development on Lot 1 or Lot 9.

PROPOSED CONDITIONS OF APPROVAL

1. To minimize the effects on local service prior to final plat approval, the applicant will coordinate with the USPS to determine what type of delivery system is preferred and to locate and provide the correct amount of space for safely

delivering the mail to the residents.
2. To minimize the effects on the natural environment, a weed management plan shall be completed on Lots 1 and 9.
3. Minor changes may be made in the SIA and final documents, as requested by the City-County Planning Department, City and County Public Works, and City and County Legal Departments to clarify the documents and bring them into the standard acceptable format.
4. The final plat shall comply with all requirements of the City of Billings and Yellowstone County Subdivision Regulations, as well as all rules, regulations, policies, and resolutions of the City of Billings, Yellowstone County, and the laws and Administrative Rules of the State of Montana.

PROCEDURAL HISTORY

Pre-Application Meeting: April 2, 2026
Preliminary Plat application submitted to Planning Division: May 1, 2026
Departmental Review Meeting: May 15, 2026
Preliminary Plat Resubmittal: May 22, 2026
Planning Board Plat Review: June 9, 2026
Planning Board Public Hearing: June 23, 2026
Preliminary Plat to Board of County Commissioners: July 21, 2026
Preliminary Plat to City Council: July 27, 2026
60 Working-Day Preliminary Plat Review period ends: July 28, 2026

PLAT INFORMATION

General Location: near Tommy Armour Circle & Ben Hogan Lane
Legal Description: Agricultural Tract 11-A-2 of the amended Tract 11-A of the Remainder of Tract 11 of Certificate Of Survey No. 836 located in the N1/2 of Section 30, Township 01 North, Range 25 East, P.M.M., Yellowstone County, Montana
Owner/Subdivider: 22500 NOL, LLC (DBA Yellowstone Country Club)
Engineer/Surveyor: Performance Engineering
Existing Zoning: N3 – Suburban Neighborhood Residential and P1- Parks and Open Space
Existing Land Use: Vacant Land
Proposed Zoning: N3 – Suburban Neighborhood Residential and P1- Parks and Open Space
Proposed Land Use: Residential
Gross & Net Area: 84.04 Acres
Lot Size:
Minimum: 0.48 Acres
Maximum: 47.38 Acres
Parkland Requirements: 0.55 Acres, provided through Cash-in-lieu contribution

This subdivision is not subject to the Billings 2045 Land Use Plan and Future Land Use Map as it was submitted prior to adoption or effective dates of the new land use regulations. Incidentally, this request matches the Future Land Use Map designations for this area as Urban Residential Limited. Applications that will be subject to the new regulations, Plan and Map will be processed after July 1, 2026.

STAKEHOLDERS

There are no stakeholder responses at this time. Stakeholder input will be received at a public hearing scheduled for this subdivision on June 23, 2026.

June 9 Planning Board Discussion

Planning staff gave a presentation regarding the subdivision, and then yielded the floor for questions. Board Member Staley asked about the possible water and wastewater connections for Lots 1 and 9, the lots remaining in the County. Staff responded by reiterating that those lots will be put under an agricultural covenant, and coordination with county staff concluded that any development of these lots in the future would likely require annexation into the city, so requiring connections and improvements as part of this subdivision would not make sense given the future potential for annexation. The Board had no more questions for staff, and invited the applicant's agent, Taylor Kasperick, to speak on the item. Mr. Kasperick stated he had no additional input regarding the proposal, but is available for any questioning. The Board did not have any questions. The Board then closed the discussion.

ALTERNATIVES

In accordance with state law, the City Council and the Board of County Commissioners has 60 working days to act upon this major preliminary plat. The 60-working day review period for the proposed plat ends July 28, 2026. State, City, and County subdivision regulations also require that preliminary plat be reviewed using specific criteria, as stated within this report. The City nor the County may unreasonably restrict an owner's ability to develop land if the subdivider provides evidence that any identified adverse effects can be mitigated. Within the 60 working day review period, the City Council

and Board of County Commissioners are required to:

- Approve;
- Conditionally Approve; or
- Deny the Preliminary Plat

FISCAL EFFECTS

The preliminary plat of this subdivision will have no financial impact on the Planning Division.

SUMMARY

One of the purposes of the City's and County's subdivision review process is to identify potential negative effects of property being subdivided. Negative effects that are identified become the subdivider's responsibility to mitigate. Various City and County departments, private service/utility providers and the affected school district/s, have reviewed this application and provided input on effects and mitigation. The Findings of Fact, which are presented as an attachment, discuss potential negative impacts of the subdivision and conditions of approval are recommended as measures to further mitigate any impacts. In this case, there were found to be minimal impacts from this proposed subdivision.

Attachments

Preliminary Plat
Draft Subdivision Improvement Agreement
Findings of Fact
Variance Request Letter
Agricultural Covenant

SITE DATA	
GROSS AREA	84.04 AC
MAX. LOT AREA	47.38 AC
MIN. LOT AREA	0.48 AC
NO. OF LOTS	9
EXISTING ZONING	P1
PROPOSED ZONING	P1, N3
EXISTING LAND USE	VACANT
PROPOSED LAND USE	VACANT W/ RESIDENTIAL
PARKLAND DEDICATION REQ'D.	0.55 AC
PARKLAND PROVIDED	CASH IN LIEU
WATER / SEWER PROVIDER	CITY OF BILLINGS
FIRE SERVICE AREA	CITY OF BILLINGS/BUFSA

PRELIMINARY PLAT OF

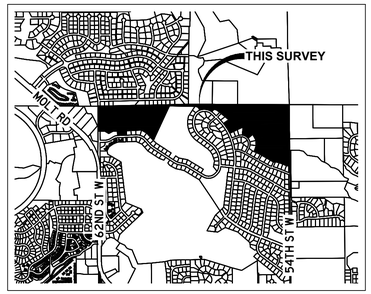
YELLOWSTONE CLUB ESTATES, 8TH FILING

BEING AGRICULTURAL TRACT 11-A-2 OF THE AMENDED TRACT 11-A OF THE REMAINDER OF TRACT 11 OF CERTIFICATE OF SURVEY NO. 836 LOCATED IN THE N1/2 OF SECTION 30, TOWNSHIP 01 NORTH, RANGE 25 EAST, P.M.M., YELLOWSTONE COUNTY, MONTANA

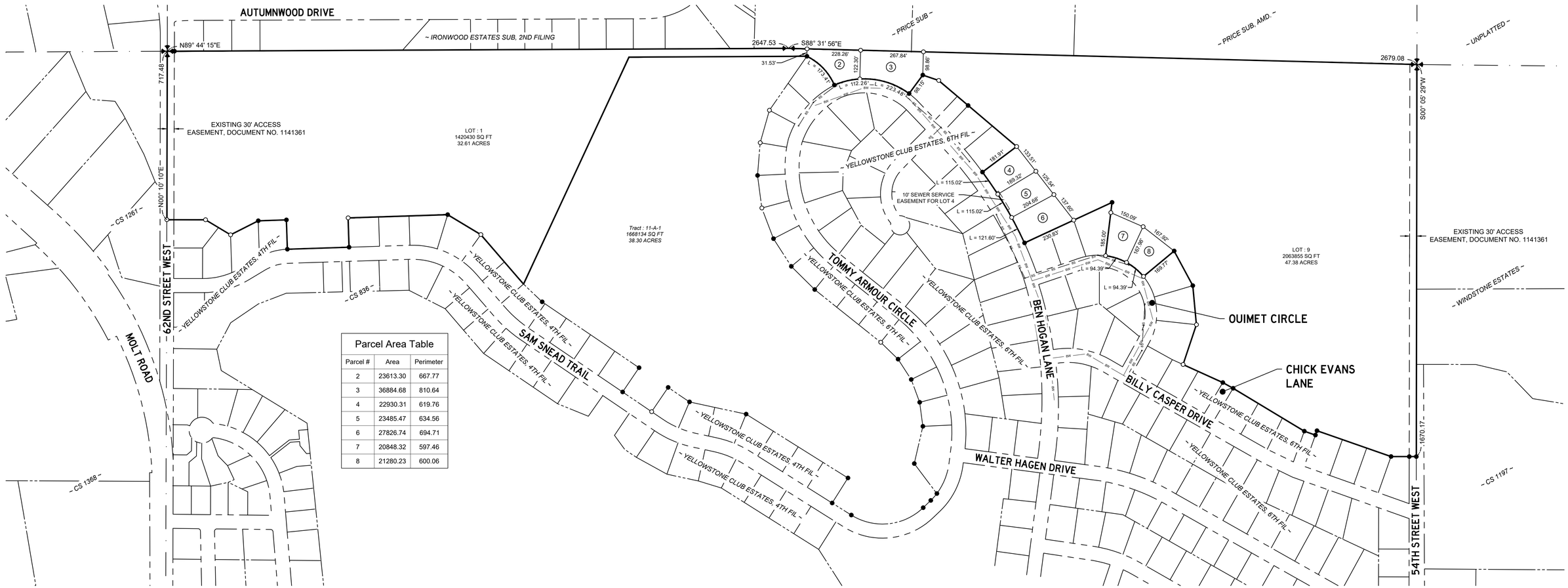
PREPARED FOR : 22500 NOL, LLC

PREPARED BY : PERFORMANCE ENGINEERING, LLC

TOTAL AREA OF SUBDIVISION : ± 84.04 ACRES



VICINITY MAP
NOT TO SCALE



Parcel Area Table		
Parcel #	Area	Perimeter
2	23613.30	667.77
3	36884.68	810.64
4	22930.31	619.76
5	23485.47	634.56
6	27826.74	694.71
7	20848.32	597.46
8	21280.23	600.06

LEGEND

- PROPERTY CORNER, FOUND
- PROPERTY CORNER, SET
- SECTION CORNER, FOUND
- QUARTER CORNER, FOUND
- SURVEY BOUNDARY
- PROPOSED PROPERTY LINE
- EXISTING PROPERTY LINE
- SECTION LINE
- RIGHT-OF-WAY LINE

0 200 400
IN FEET

SHEET 1 OF 1

5/7/2025 10:38:44 AM

Z:\Yellowstone Country Club\2025-002 YCC Due Diligence\CAD\DWG\Plats\25-002 Prelim Plat.dwg

SUBDIVISION IMPROVEMENTS AGREEMENT
& WAIVER OF RIGHT TO PROTEST FURTURE SPECIAL IMPROVEMENT DISTRICTS

Yellowstone Club Estates, 8th Filing

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SUBDIVISION IMPROVEMENTS AGREEMENT & WAIVER OF RIGHT TO PROTEST FUTURE SPECIAL IMPROVEMENT DISTRICTS

Yellowstone Club Estates, 8th Filing

This agreement is made and entered into this ____ day of _____, 200__, by and between *22500 NOL, LLC,* whose address for the purpose of this agreement is **3200 Paul Allen Way, Billings, MT 59106**, hereinafter referred to as "Subdivider," and the **CITY OF BILLINGS**, Billings, Montana, hereinafter referred to as "City", and **YELLOWSTONE COUNTY**, Montana, hereinafter referred to as "County."

WITNESSETH:

WHEREAS, the plat of *Yellowstone Club Estates, 8th Filing* located in Yellowstone County, Montana, was submitted to the Yellowstone County Board of Planning; and

WHEREAS, at a regular meeting conducted on _____ day of _____, 20__, the Board of Planning recommended conditional approval of a preliminary plat of *Yellowstone Club Estates, 8th Filing* and

WHEREAS, at a regular meeting conducted on _____ day of _____, 20__, the City Council conditionally approved a preliminary plat of *Yellowstone Club Estates, 8th Filing* and

WHEREAS, at a regular meeting conducted on _____ day of _____, 20__, the Yellowstone County Board of County Commissioners conditionally approved a preliminary plat of *Yellowstone Club Estates, 8th Filing*; and

WHEREAS, a Subdivision Improvements Agreement is required by the City and County prior to the approval of the final plat.

WHEREAS, the provisions of this agreement shall be effective and applicable to *Yellowstone Club Estates, 8th Filing* upon the filing of the final plat thereof in the office of the Clerk and Recorder of Yellowstone County, Montana. The Subdivision shall comply with all requirements of the City of Billings Subdivision Regulations, the rules, regulations, policies, and resolutions of the City of Billings, and the laws and administrative rules of the State of Montana.

THEREFORE, THE PARTIES TO THIS AGREEMENT, for and in consideration of the mutual promises herein contained and for other good and valuable consideration, do hereby agree as follows:

I. VARIANCES

A. A variance has been requested and approved from Section 23-406.C.1 of the City of Billings Subdivision regulations requiring provision of a multi-use trail connection as depicted on the Active Transportation Plan of the City. Such trail connection is impractical as shown on the Active Transportation Plan due to existing topography in the depicted location consisting of roughly 50% grades and elevation differences of roughly 18 to 22 feet. A condition of the approved variance is provision of a trail connection upon Agricultural Tract 1 in the future when development of said tract is applied for.

II. PROPERTY CONDITIONS AND INFORMATION FOR LOT PURCHASERS

A. Lot owners should be aware that this subdivision is being built in close proximity to prime deer and antelope habitat and it is likely that homeowners will experience problems with damage to landscaped shrubs, flowers, and gardens. The Montana Fish, Wildlife, and Parks Department does not provide damage assistance unless there is damage to commercial crops and/or a threat to public health and safety.

B. Lot owners should be aware that soil characteristics within the area of this subdivision, as described in the 1972 Yellowstone County Soil Survey, indicate that there could be potential limitations for proposed construction on the lots, which may require a geotechnical survey prior to construction.

C. No water rights have been transferred to the lot owners. Irrigation ditches that may exist on the perimeter of this development are for the benefit of other properties. Perimeter ditches and drains shall remain in place and shall not be altered by the Subdivider or subsequent owners.

D. There is attached hereto a Waiver waiving the right to protest the creation of the special improvement district or districts which by this reference is expressly incorporated herein and made as much a part hereof as though fully and completely set forth herein at this point. The Waiver will be filed with the plat, shall run with the land, and shall constitute the guarantee by the Subdivider and property owner or owners of the developments described herein. Said Waiver is effective upon filing and is not conditioned on the completion of the conditions set forth in this Agreement. The Subdivider and owner specifically agree that they are waiving valuable rights and do so voluntarily.

E. The subdivider and subsequent contractors/builders acknowledge that there is a Stormwater Pollution and Prevention Plan (SWPPP) filed with the city and the Montana Department of Environmental Quality (MDEQ). This SWPPP shall be adhered to during all phases of construction and shall be updated as required by

MDEQ under the General Permit for Stormwater Discharges Associated with Construction Activity, Chapter 28, BMCC and the Billings Stormwater Management Manual.

F. Individual lot owners should be aware that Best Management Practices for stormwater control shall be required for new construction on lots. Best Management Practices are defined within Section 28-201, BMCC and detailed in the Billings Stormwater Management Manual.

III. TRANSPORTATION

A. Streets

- All public roadways adjacent to Lots 2-8 in the Subdivision, inclusive, have been completed as part of previous projects including Ben Hogan Lane/Tommy Armour Circle and Ouimet Circle.

- 30'-wide access easements have been provided upon Lot 1 and Lot 9 along 62nd Street West/Bushwood Drive and 54th Street West, respectively. As Lot 1 and Lot 9 are larger than 20 acres and are being left as agricultural tracts, further right-of-way dedication would be provided at the time of future development on those parcels.

- Lot owners will be required to construct their driveways and obtain an approach permit from the City prior to construction.

B. Sidewalks

- Sidewalks do not currently exist within Yellowstone Club Estates, 4th and 6th Filing, along Sam Snead Trail, Ben Hogan Lane, and Billy Casper Drive. Construction of sidewalks by individual lot owners will not be required at the time of development.

- No sidewalks within the public right-of-way are proposed for the development; however, sidewalks are included in the waiver of right to protest.

C. Street Lighting

- No street lighting is proposed for the development; however, street lighting is included in the waiver of right to protest.

D. Traffic Control Devices

- No additional traffic control devices are proposed for the development; however, traffic control devices are included in the waiver of right to protest.

- A TIS is not required for the development as it falls below the threshold set forth by the City.

- Traffic control devices within and adjacent to the Yellowstone Club Estates Subdivision, including along Sam Snead Trail, Ben Hogan Lane, and Billy Casper Drive, have been previously installed in accordance with applicable City of Billings standards. No new traffic control devices, including street name signs, regulatory signs, or warning signs, are required or proposed.

- The existing traffic control devices are considered adequate to serve the proposed development. Any repair or replacement of existing signs or devices necessitated by construction activities shall be the responsibility of the developer and shall be completed in accordance with City of Billings specifications.

E. Access

- The development will be accessed via the existing public right-of-way.

- Lot owners will be required to construct their driveways and obtain an approach permit from the City prior to construction.

- Access to all lots will be provided by existing public streets, including Sam Snead Trail, Ben Hogan Lane, Ouimet Circle, and Chick Evans Lane. These right-of-ways are currently constructed and in service, and no new access points, street connections, or extensions are proposed as part of this development. The existing street network provides adequate access to each lot, and no additional access improvements are required. All access will continue to comply with applicable City of Billings standards.

F. Billings Area Bikeway and Trail Master Plan

- The Billings Area Bikeway and Trail Master Plan identifies a future bicycle boulevard along Ben Hogan Lane, adjacent to the subdivision. As denoted within the variance application associated with this subdivision, at time of future development of Agricultural Tract 1 and/or Tract 11-A-1 of the Amended Plat of Certificate of Survey No. 836, a trail connection from Sam Snead Trail shall be made to the Block 12 Park of Ironwood Estates Subdivision 2nd Filing (Tax Code A316560).

G. Public Transit

- No improvements to public transit service are proposed for this subdivision.

IV. EMERGENCY SERVICE

Construction of buildings made of combustible materials shall have adequate fire apparatus access roads and water supply (fire hydrants) in place to allow for fire suppression requirements. Prior to the issuance of a building permit for construction using combustible materials (i.e. lumber, plywood, wood trusses, etc.), fire apparatus access roads and water supply requirements shall be provided in accordance with the International Fire Code as adopted by the City of Billings.

At a minimum, the following is required:

- An unobstructed gravel road or gravel road base must be within 150 feet of the furthest portion of a building under construction as measured along the approved route.
- The access roads are required to support fire apparatus vehicle loading (40 tons) during all weather conditions and shall be a minimum of twenty (20) feet wide.
- An operational fire hydrant shall be located within 600 feet of the furthest portion of a residence under construction or within 400 feet of the furthest portion of a commercial building under construction as measured along the access roads to the site.
- The above requirements do not alter or effect the current minimum subdivision requirements for fire apparatus access and water supply.

V. STORM DRAINAGE

All drainage improvements shall comply with the provisions set forth in Chapter 28, BMCC, and the Stormwater Management Manual in place at the time of lot development for Lots 2-8, inclusive. A complete stormwater management plan shall be submitted to the Engineering Division for review and approval at the time of development.

No new stormwater drainage facilities are proposed as part of this filing. Any drainage associated with individual lot development shall comply with City of Billings requirements and shall not adversely impact adjacent properties or existing infrastructure.

Any development outside Lots 2-8 (i.e., Lot 1 and Lot 9) shall comply with stormwater management requirements of the Montana Department of Environmental Quality and the Yellowstone County Road Construction Manual.

VI. UTILITIES

The Subdivision Improvements Agreement does not constitute an approval for extension of or connection to water mains and sanitary sewers. The property owner shall make application for extension/connection of water mains and sanitary sewers to the Public Works Department – Engineering Division, if required to serve the subject properties. The extension/connection of/to water mains and sanitary sewers is subject to the approval of the applications and the conditions of approval. Applications shall be submitted for processing prior to the start of any construction and prior to review and approval of any project plans and specifications.

The Developer/Owner acknowledges that the subdivision shall be subject to the applicable System Development Fees in effect at the time new water and/or sanitary sewer service connections are made.

The design/installation of sanitary sewers and appurtenances, and water mains and appurtenances (fire hydrants, etc) shall be in accordance with design standards, specifications, rules, regulations of and as approved by the City of Billings Public Works Department, Fire Department and the Montana Department of Environmental Quality.

A. Water

- Water service for Lots 2-6, inclusive, will be provided by connection to the existing 8-inch public water main located within Ben Hogan Lane. Water service for Lots 7 and 8 will be provided by connection to the existing 6-inch public water main located within Ouimet Circle. No extensions of the public water system are required as part of this development, and individual lots will be served by service connections to the existing water main in accordance with City of Billings standards and specifications. Water service connections shall be of the size and material as approved by the City of Billings at the time of construction.

- Lots 1 and 9 are not annexed into the City of Billings, and no facilities with water supply are allowed without separate application for annexation into the City of Billings.

B. Sanitary Sewer

- Sewer service for Lots 2-6, inclusive, will be provided by connection to the existing 8-inch public sewer main located within Ben Hogan Lane. A sewer service easement shall be provided to allow for provision of sewer service to Lot 4 through Lot 5 from the existing 8-inch public sewer main in Ben Hogan Lane. Sewer service for Lots 7 and 8 will be provided by connection to the existing 8-inch public sewer main located within Ouimet Circle. No extensions of the public sewer system are required as part of this development, and individual lots will be served by service connections to the existing sewer main in accordance with City of Billings standards and specifications.

- Lots 1 and 9 are not annexed into the City of Billings, and no facilities with sewer service are allowed without separate application for annexation into the City of Billings.

C. Power, Telephone, Gas, and Cable Television

- Electric, telephone, natural gas, and cable television service will be provided by connections to existing utility infrastructure within Sam Snead Trail, Ben Hogan Lane, and Ouimet Circle. No new utility mains or lines are proposed as part of this development. Individual lot owners will

connect to the existing services in accordance with the standards and requirements of the respective utility providers.

VII. PARKS/OPEN SPACE

- Section 23-1002 of the City of Billings Subdivision Regulations covers the parkland requirements for subdivisions. The required parkland for this filing is 0.55 acres. In accordance with prior filings in the subdivision, the required parkland will be provided as a cash-in-lieu payment rather than as dedicated land.

VIII. IRRIGATION

No water rights have been transferred to the lot owners. Irrigation ditches that may exist on the perimeter of this development are for the benefit of other properties. Perimeter ditches and drains shall remain in place and shall not be altered by the Subdivider or subsequent owners unless authorization from current and downstream users is provided.

IX. SOILS/GEOTECHNICAL STUDY

A geotechnical study has not been completed as part of this subdivision. It will be required for the developers of the lots to conduct their own, site specific, geotechnical study prior to development of the lots. Lot owners should be aware that soil characteristics within the subdivision, as described in the 1972 Yellowstone County Soil Survey, may present limitations for proposed construction.

X. PHASING OF IMPROVEMENTS

Ther is no phasing of improvements.

XI. FINANCIAL GUARANTEES

Except as otherwise provided, Subdivider shall install and construct said required public improvements with cash or by utilizing the mechanics of a private contract secured by letters of credit or a letter of commitment to lend funds from a commercial lender. All engineering and legal work in connection with such improvements shall be paid by the contracting parties pursuant to said private contract, and the improvements shall be installed as approved by the City Engineer and Utility Department Manager.

XII. LEGAL PROVISIONS APPLYING TO SUBDIVIDER

A. Subdivider agrees to guarantee all public improvements for a period of two years from the date of final acceptance by the City of Billings.

B. The owners of the properties involved in this proposed Subdivision by signature subscribed herein below agree, consent, and shall be bound by the provisions of this Agreement.

C. The covenants, agreements, and all statements in this Agreement run with the land and apply to and shall be binding on the heirs, personal representatives, successors, assigns and transferees of the respective parties.

D. In the event it becomes necessary for either party to this Agreement to retain an attorney to enforce any of the terms or conditions of this Agreement or to give any notice required herein, then the prevailing party or the party giving notice shall be entitled to reasonable attorney fees and costs.

E. Any amendments or modifications of this Agreement or any provisions herein shall be made in writing and executed in the same manner as this original document and shall after execution become a part of this Agreement.

F. Subdivider shall comply with all applicable federal, state, and local statutes, ordinances, and administrative regulations during the performance and discharge of its obligations. Subdivider acknowledges and agrees that nothing contained herein shall relieve or exempt it from such compliance.

IN WITNESS WHEREOF, the parties hereto have set their hands and official seals on the date first above written.

"SUBDIVIDER" *22500 NOL, LLC*

By: _____

Title: _____

STATE OF MONTANA)
: ss
County of)

On this _____ day of _____, 20__, before me, a Notary Public in and for the State of Montana, personally appeared _____ _____, known to me to be the _____ of *22500 NOL, LLC,* who executed the foregoing instrument and acknowledged to me that he/she executed the same.

_____
Notary Public in and for the State of Montana
Printed Name: _____
Residing at: _____
My commission expires: _____

This agreement is hereby approved and accepted by the City of Billings, this ____ day of _____, 20__.

"CITY"
CITY OF BILLINGS
MONTANA

By: _____
Mayor

Attest: _____
City Clerk

STATE OF MONTANA)
: ss
County of Yellowstone)

On this ____ day of _____, 20__, before me, a Notary Public in and for the State of Montana, personally appeared _____ and _____, known to me to be the Mayor and City Clerk, respectively, of the City of Billings, Montana, whose names are subscribed to the foregoing instrument in such capacity and acknowledged to me that they executed the same on behalf of the City of Billings, Montana.

_____
Notary Public in and for the State of Montana
Printed Name: _____
Residing at: _____
My commission expires: _____

This agreement is hereby approved and accepted by Yellowstone County, this ____ day of _____, 20__.

"COUNTY"
COUNTY OF YELLOWSTONE
MONTANA

County of Yellowstone
Board of County Commissioners

By: _____
Chairman

_____
Commissioner

_____
Commissioner

Attest: _____
County Clerk and Recorder

STATE OF MONTANA)
: ss
County of Yellowstone)

On this ____ day of _____, 20__, before me, a Notary Public in and for the State of Montana, personally appeared _____, _____, and _____, known to me to be the Board of County Commissioners and the County Clerk and Recorder, respectively, of Yellowstone County, Montana, whose names are subscribed to the foregoing instrument in such capacity and acknowledged to me that they executed the same on behalf of Yellowstone County, Montana.

_____
Notary Public in and for the State of Montana
Printed Name: _____
Residing at: _____
My commission expires: _____

Waiver of Right to Protest
FUTURE SPECIAL IMPROVEMENT DISTRICTS

FOR VALUABLE CONSIDERATION, the undersigned, being the Subdivider and all of the owners of the hereinafter described real property, do hereby waive the right to protest the formation of one or more special improvement district(s) for a period of no more than twenty years from the recording of this waiver, for street light maintenance and energy, and for the construction of streets, street widening, sidewalks, survey monuments, street name signs, curb and gutter, street lights, driveways, traffic signals, and traffic control devices, parks and park maintenance, trails, sanitary sewer lines, water lines, storm drains (either within or outside the area), and other improvements which the City of Billings may require.

This Waiver and Agreement is independent from all other agreements and is supported by sufficient independent consideration to which the undersigned are parties and shall run with the land and shall be binding upon the undersigned, their successors and assigns, and the same shall be recorded in the office of the County Clerk and Recorder of Yellowstone County, Montana.

This Waiver is in addition to any other recorded waiver related to the property described herein and is not intended to replace, supersede, or invalidate any such waiver.

The real property hereinabove mentioned is more particularly described as follows:

Yellowstone Club Estates, 8th Filing

Signed and dated this _____ day of _____, 20___.

Subdivider/Owner

_____

STATE OF MONTANA)
: ss
County of Yellowstone)

On this ____ day of _____, 20___, before me, a Notary Public in and for the State of Montana, personally appeared _____, known to me to be *22500 NOL, LLC*, the person who executed the forgoing instrument and acknowledged to me that he/she executed the same.

_____
Notary Public in and for the State of Montana
Printed Name: _____
Residing at: _____
My commission expires: _____

FINDINGS OF FACT

The Planning staff has prepared the Findings of Fact for the preliminary plat of Yellowstone Club Estates, 8th Filing. These findings are based on the preliminary plat application and supplemental documents and address the review criteria required by the Montana Subdivision and Platting Act (76-3-608, MCA) and the Billings Subdivision Regulations (Section 23-303(H), BMCC).

A. What are the effects on agriculture, local services, the natural environment, wildlife, wildlife habitat, and public health, safety, and welfare? [MCA 76-3-608 (3) (a) and BMCC 23-302.H.2.]

1. Effect on agriculture and agricultural water user facilities

The subject property is vacant land that currently has an agricultural covenant. The subdivider is proposing to modify the agricultural covenant to remove Lots 2-8 which will be developed within the city. This will leave Lots 1 and 9 within the county. The perimeter ditches and drains shall remain in place and not be altered by the subdivider or subsequent owners. The subdivision should not affect agricultural water users' facilities.

2. Effect on local services

a. **Utilities** – Water service will be provided by the City of Billings. New individual services will be provided to all the lots, and new fire hydrants will be installed as required by the City Fire Department. The water service for this subdivision comes from Ben Hogan Lane and Ouimet Circle. Any needed extension of those water lines will be installed by the subdivider to meet the requirements of the City of Billings Engineering Department regulations. The subdivider will install all new water lines in the local streets and individual services for each lot in accordance with design standards, specifications, rules, and regulations of the City of Billings Engineering/Public Works Department and MDEQ. This is outlined in the SIA under Section 'VI – Utilities, Subsection A – Water'.

   Sanitary sewer service will be provided by connecting to the existing City of Billings' sewer mains. There is an existing sewer mains found in Ben Hogan Lane and Quimet Circle. All new services shall be installed in accordance with design standards, specifications, rules, and regulations of the City of Billings Public Works Department and MDEQ. This is outlined in the SIA under Section 'VI – Utilities, Subsection B – Sanitary Sewer'.

   Private Utilities will be provided from existing facilities to the subdivision. No additional easements on the lot frontage have been requested.

   Stormwater – Stormwater drainage for the public streets is proposed to be provided by curb and gutters that discharge into storm water pipes. These and all other drainage improvements shall satisfy the criteria set forth by the *City of Billings Stormwater Management Manual* and will be subject to review and approval by the City Engineering Department.

b. **Solid Waste** – The City of Billings will provide solid waste collection and disposal. The City's landfill has adequate capacity for this waste.

c. **Streets** – The subdivision is adjacent to Sam Snead Trail, Ben Hogan Lane, Quimet Circle, and Chick Evans Lane. These rights-of-way are currently constructed and in service, and no new access points, street connections, or extensions are proposed as part of this development. Street improvements are included in the Waiver of Right to Protest Future Special Improvement Districts.

   Sidewalks are not currently installed along Sam Snead Trail, Ben Hogan Lane, or Billy Casper Drive. No sidewalks will be installed as part of this subdivision, but such improvements are included in the Waiver of Right to Protest Future Special Improvement Districts. This information is all in the SIA under Section 'III - Transportation.'

d. **Emergency Services** – The Billings Police and Fire Departments will respond to emergencies within the proposed subdivision. The nearest fire station is Station #7, approximately 1.9 road miles or 5 minutes driving time to the subject property. The subdivision is located within the ambulance service area of American Medical Response (AMR).

e. **Schools** –School District #2 provides educational services to elementary through high school students. The school district did not raise any special requests or concerns during their review of this proposal.

f. **Parks and Recreation** – This subdivision requires 0.55 Acres of parkland. The developer is meeting this requirement via a cash-in-lieu contribution.

g. **Mail Delivery -** The United States Postal Service will provide postal service to the subdivision and has indicated that centralized mailbox units will be required as were installed for the previous filings of this subdivision. The developer will need to coordinate mailbox locations with the postal service **(Condition #1).**

3. Effect on the natural environment

The subject property is currently vacant land with the proposed use of residential land. The property is not located in a floodplain. During development, storm water pollution prevention best management practices are required to be used and monitored to prevent erosion on exposed ground. Overall, the effect on the natural environment should be minimal. Lots 1 and 9 within the county will be required to obtain a Weed Management Plan **(Condition #2)**.

4. Effect on wildlife and wildlife habitat

There are no known endangered or threatened species on the property. There is a paragraph in the SIA that warns future lot owners of the presence of deer in the area, which may cause damage to their landscaping. This subdivision should have a minimal effect on wildlife and wildlife habitat.

5. Effect on the public health, safety, and welfare

There will be no significant impacts to public health, safety, and welfare because of this subdivision.

B. Was an Environmental Assessment required? [(MCA 76-3-616 and BMCC 23-302.H.1.]

The proposed subdivision is exempt from the requirement for an Environmental Assessment pursuant to Section 76-3-616, MCA.

C. Does the subdivision conform to the City of Billings 2016 Growth Policy, the 2014 Transportation Plan, and the Billings Area Bikeway and Trail Master Plan? [BMCC 23-302.H.4.]

1. City of Billings 2016 Growth Policy

The proposed subdivision is consistent with the following goals of the Growth Policy:

1. **Strong Neighborhoods** (livable, safe, sociable, and resilient neighborhoods): Neighborhoods that are safe and attractive and provide essential services are much desired.
2. **Home Base** (healthy, safe, and diverse housing options): Planning and construction of interconnected sidewalks and trails are important to the economy and livability of Billings.
3. **Essential Investments** (relating public and private expenditures to public values): Planning and construction of safe and affordable interconnected sidewalks and trails are important to the economy and livability of Billings.

This subdivision is not subject to the Billings 2045 Land Use Plan and Future Land Use Map as it was submitted prior to adoption or effective dates of the new land use regulations. Incidentally, this request matches the Future Land Use Map designations for this area as Urban Residential Limited. Applications that will be subject to the new regulations, Plan and Map will be processed after July 1, 2026.

3. 2023 Billings Urban Area Long Range Transportation Plan

The proposed subdivision adheres to the goals and objectives of the 2023 Transportation Plan and preserves the street network and street hierarchy specified in the plan.

4. Billings Area Bikeway and Trail Master Plan (BABTMP)

The proposed subdivision is within the jurisdiction of the Billings Area Bikeways and Trail Master Plan. There is a proposed trail network that would connect the subdivision to Canyonwoods Drive multi-use trail, however the applicant is requesting a variance from

Section 23-406.C.1 of the City of Billings Subdivision regulations, and Section 4.6.D of the Yellowstone County Subdivision Regulations, which requires new subdivisions to comply with the currently adopted Active Transportation Plan. The applicant is requesting this variance due to topographic constraints on the area in question, with slopes reaching over 50% in grade. Construction of this connection will be deferred to a time of future develop of either Lot 1 or 9, as stipulated in the SIA, under Section 'III - Transportation, subsection F- Billings Area Bikeway and Trail Master Plan.'

D. Does the subdivision conform to the Montana Subdivision and Platting Act and to local subdivision regulations? [MCA 76-3-608 (3) (b) and BMCC 23-302.H.3.a.]

The proposed subdivision satisfies the requirements of the Montana Subdivision and Platting Act and the design standards specified in the local subdivision regulations. The subdivider and the local government have complied with the subdivision review and approval procedures set forth in the local and state subdivision regulations.

E. Does the proposed subdivision conform to all requirements of the zoning in effect? [BMCC 23-302.H.3.e.]

The subject property is zoned N3 – Suburban Neighborhood Residential for Lots 2-8 within the city and P1- Parks and Open Space for Lots 1 and 9 within the county. The lot frontages conform to the requirements of this zone. Other building setbacks and structure specific requirements will be reviewed for compliance at the time of building permit review.

F. Does the proposed plat provide easements for the location and installation of any utilities? [MCA 76-3-608 (3) (c) and BMCC 23-302.H.3.b.]

The subdivider will provide utility easements as requested by private utility companies on the face of the plat.

G. Does the proposed plat provide legal and physical access to each parcel within the subdivision and notation of that access on the plat? [MCA 76-3-608 (3) (d) and BMCC 23-302.H.3.c.]

Legal and physical access is provided to the proposed will be from Sam Snead Trail, Ben Hogan Lane, Quimet Circle, and Chick Evans Lane. No new internal accesses created as part of this subdivision.

CONCLUSIONS OF FINDINGS OF FACT

- The preliminary plat of Yellowstone Club Estates, 8th Filing does not create any adverse impacts that warrant denial of the subdivision.

- The proposed subdivision conforms to several of the goals and policies of the 2016 Growth Policy and does not conflict with the Transportation or Bikeway/Trail Plans.

- The proposed subdivision complies with state and local subdivision regulations, local zoning, and sanitary requirements and provides legal and physical access to each lot.

- Any potential negative or adverse impacts will be mitigated with the proposed conditions of approval.

RECOMMENDATION

Staff recommends to County Commissioners that the preliminary plat of Yellowstone Club Estates, 8th Filing be conditionally approved and adopt the Findings of Fact as presented in the staff report.

Approved by the Yellowstone County Commissioners July 21, 2026

_____
Mark Morse, County Commissioner

_____
Mike Waters, County Commissioner

_____
Chris White, County Commissioner

RECOMMENDATION

Staff recommends to City Council that the preliminary plat of Yellowstone Club Estates, 8th Filing be conditionally approved and adopt the Findings of Fact as presented in the staff report.

Approved by the Billings City Council, July 27, 2026

_____
Mike Nelson, Mayor

Variance Request – Multi-Use Trail Connection
Yellowstone Club Estates, 8th Filing

Yellowstone Club Estates, 8th Filing (Subdivision) proposes development on land adjacent to existing developed subdivisions including Price Subdivision and Ironwood Subdivision. As part of the City of Billings Subdivision Regulations, **Section 23-406.C.1** requires subdivisions to comply with the Currently adopted Active Transportation Plan, depicting a multi-use trail in the vicinity of Lots 2 and 3 of the proposed Subdivision. This variance request seeks relief from strict application of Section 23-406.C.1 as it relates to providing direct trail connectivity through the site in the location shown on the Active Transportation Plan.

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1. The granting of the variance will not be detrimental to the public health, safety, or general welfare or injurious to other adjoining properties.
The granting of this variance will not be detrimental to public health, safety, or general welfare, nor injurious to adjoining properties. The conceptual trail connection identified in the Active Transportation Plan traverses terrain with extreme topographic constraints, including slopes approaching 50% and elevation differences ranging from approximately 18 to 22 feet as can be seen on the included exhibit depicting the surrounding area. Construction of a trail in this location would present safety concerns related to slope stability, user accessibility, and long-term maintenance.

Furthermore, the alignment would require connection through the Price Subdivision, which is already developed and lacks legal access for such a connection. As such, enforcing the connection at this location would not provide a safe or functional public facility and could create conflicts with existing development.

The proposed variance avoids forcing an unsafe or impractical connection while preserving the opportunity for a future trail connection to be constructed in a more appropriate location.

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2. Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, an undue hardship to the owner would result if the strict letter of the regulation was enforced.
Strict application of Section 23-406 would create an undue hardship due to the unique topographical constraints of the property. The site contains steep slopes on the order of 50% and significant vertical elevation changes (18 to 22 feet) across the area where the conceptual trail connection is shown.

These conditions make construction of a compliant and accessible trail infeasible without extensive grading, retaining structures, or other extraordinary engineering measures. Such improvements would result in disproportionate costs and environmental disturbance relative to the benefit provided.

In addition, the required connection as shown on the Active Transportation Plan would extend into the Price Subdivision, which is governed by an existing Subdivision Improvement Agreement (agreement between the City of Billings and Price Subdivision) and Codes of

Covenants and Restrictions that do not provide for this access and disallow further development where legal access for the trail planned in the Active Transportation Plan could be required by the City. The SIA further limits additional development or modification within Price Subdivision under current conditions, making implementation of the connection outside the control of the applicant.

These combined physical and legal constraints constitute a clear hardship specific to this property.

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3. The variance will not result in an increase in taxpayer burden.
Approval of this variance will not result in an increased burden to taxpayers. Constructing a trail in this location would require significant grading, structural improvements, and ongoing maintenance due to the steep terrain, all of which could impose long-term public costs if dedicated to the City.

By deferring the connection to a more feasible future location, the City avoids the cost of maintaining a facility that is difficult to construct, potentially unsafe, and inefficient to serve users.

Future development of Agricultural Tract 1, as identified in this Subdivision's Subdivision Improvement Agreement, will be required to provide a trail connection to the existing park in Ironwood Subdivision. This ensures that the intended connectivity is ultimately achieved without premature or inefficient public expenditure.

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4. The variance will not in any manner place the subdivision in nonconformance with any adopted zoning regulations or Growth Policy.
The requested variance will not place the subdivision in nonconformance with any adopted zoning regulations or the City of Billings Growth Policy. The subdivision will continue to comply with all applicable zoning requirements, including land use, lot design, and development standards.

While the Active Transportation Plan identifies a conceptual trail connection in this vicinity, the plan allows for flexibility in implementation based on site-specific conditions. Deferring the connection to a more feasible alignment through future development maintains consistency with the overall intent of the plan while recognizing existing constraints.

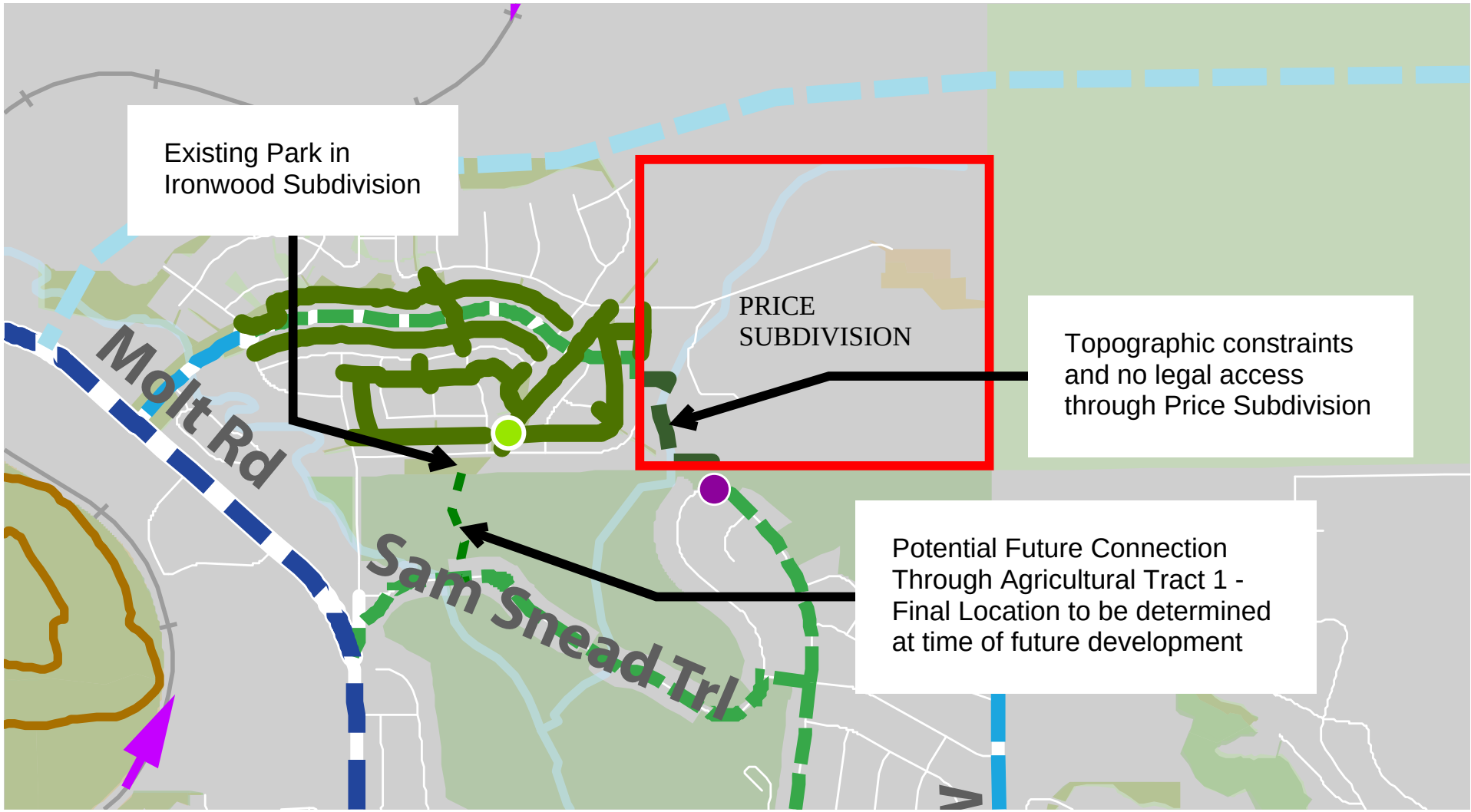
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5. The subdivider must prove that the alternative design is equally effective, and the objectives of the improvements are satisfied.
The proposed alternative design is equally effective in meeting the intent of Section 23-406.C.1 and the City's transportation planning objectives. While the immediate construction of the conceptual trail connection is not feasible at this location, the overall goal of providing connectivity to parks and the non-motorized network will still be achieved.

As documented in this Subdivision's Subdivision Improvement Agreement, future development of Agricultural Tract 1 will be required to construct a trail connection to the existing park within Ironwood Subdivision. This alternative ensures that a safe, functional, and accessible trail

connection is ultimately provided in a location that is better suited for construction and long-term use.

This approach satisfies the objectives of connectivity, safety, and efficient infrastructure development without imposing undue hardship or creating impractical design conditions.


Existing Park in
Ironwood Subdivision
PRICE
SUBDIVISION
Topographic constraints
and no legal access
through Price Subdivision
Molt Rd
Sam Snead Trl
Potential Future Connection
Through Agricultural Tract 1 -
Final Location to be determined
at time of future development

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NOTES

1. CONTOURS AT 1' AND 5' INTERVALS.

ADDENDUM/REVISION	DATE	BY	CHECKED BY

VERIFY SCALE!
THESE PRINTS MAY BE REDUCED.
LINE BELOW MEASURES ONE-INCH ON ORIGINAL DRAWING.

MODIFY SCALE ACCORDINGLY

BGR — DESIGNED BY
BGR — DRAWN BY
QUALITY ASSURANCE
TJK — CHECKED BY

EXHIBIT

PERFORMANCE ENGINEERING
3412 COLTON BLVD, STE 202 (406) 384-0080
BILLINGS, MT 59102 performance-ec.com

YELLOWSTONE CLUB ESTATES, 8TH FILING

TRAIL MASTER PLAN CONNECTION POINT

PROJECT NUMBER
2025-002

SHEET NUMBER
1 OF 2

DRAWING NUMBER
EX A

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NOTES

1. CONTOURS AT 1' AND 5' INTERVALS.

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BGR
DESIGNED BY

BGR
DRAWN BY

QUALITY ASSURANCE
TJK
CHECKED BY

EXHIBIT

PERFORMANCE ENGINEERING
3412 COLTON BLVD, STE 202 (406) 384-0080
BILLINGS, MT 59102 performance-ec.com

YELLOWSTONE CLUB ESTATES, 8TH FILING

TRAIL MASTER PLAN CONNECTION POINT

PROJECT NUMBER
2025-002

SHEET NUMBER
2 OF 2

DRAWING NUMBER
EX B

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Return Address:
Performance Engineering
3412 Colton Boulevard, Suite 202
Billings, MT 59102

Termination and Revocation of Certificate of Survey-Agricultural Exemption

THIS AGREEMENT is made and entered into by **22500 NOL, LLC**, as owners of Agricultural Tract 11-A-2 of the Amended Tract 11-A of the Remainder of Tract 11, Certificate of Survey No. 836 in Yellowstone County, Montana, and **YELLOWSTONE COUNTY**, MONTANA, as the governing body.

WHEREAS, Agricultural Tract 11-A-2 of the Amended Tract 11-A of the Remainder of Tract 11, Certificate of Survey No. 836 (Document No. 4042155), situated in the N ½ of Section 30, Township 01 North, Range 25 East, P.M.M., Yellowstone County, Montana, was subject to a Declaration of Agricultural Covenant (Document No. 4042156); and

WHEREAS, said tract was surveyed and platted as Yellowstone Club Estates, 8th Filing creating nine lots, which complied with all requirements, rules, regulations, policies, and resolutions of the City of Billings and Yellowstone County, and the laws and administrative rules of the State of Montana; and,

WHEREAS, Lots 2 through 8, inclusive, of said Yellowstone Club Estates, 8th Filing, have been annexed into the City of Billings and it is agreed upon between 22500 NOL, LLC and Yellowstone County that said Declaration of Agricultural Covenant is terminated and revoked on said lots; and,

WHEREAS, Only Lot 1 and 9 of Yellowstone Club Estates, 8th Filing, shall continue to remain bound by the terms of the original Declaration of Agricultural Covenant (Document No. 4042156),

WHEREAS, the Plat of Yellowstone Club Estates, 8th Filing, was filed under Document No. _____, records of Yellowstone County, Montana; and

WHEREAS, Yellowstone Club Estates, 8th Filing, consists of 9 lots and the owners desire to lift the agricultural covenant on seven of said nine lots including Lots 2 through 8, inclusive;

THEREFORE, the parties to this agreement do hereby agree that the provisions of the Declaration of Agricultural Covenant (Document No. 4042156) imposed on Agricultural Tract 11-A-2 of the Amended

Tract 11-A of the Remainder of Tract 11, Certificate of Survey No. 836 (Document No. 4042155) is hereby removed from Lots 2 through 8, inclusive, of Yellowstone Club Estates, 8th Filing.

Dated this_____ day of _____ 20__.

22500 NOL, LLC

_____ _____
Title: Date

State of Montana)
:
County of Yellowstone)

On this _____ day of _____, 20___, before me, a Notary Public for the State of Montana, personally appeared, _____, being the _____ of 22500 NOL, LLC known to me to be the persons whose name is subscribed to the within instrument and acknowledged to me that they executed the same.

IN WITNESS, WHEREOF, I have hereunto set my hand and affixed my notary seal the day and year first above written.

(seal) _____

Print Name: _____
Notary Public for the State of Montana
Residing at Billings, Montana
My commission expires_____

Yellowstone County Commissioners

_____
Chairperson

_____
Commissioner

_____
Commissioner

Attest:

_____
Jeff Martin, Clerk & Recorder

State of Montana)
:
County of Yellowstone)

On this _____ day of _____, 20___, before me, a Notary Public for the State of Montana, personally appeared, _____, _____, and _____, members of the Board of County Commissioners, and Jeff Martin, County Clerk & Recorder, known to me to be the persons whose names are subscribed to the within instrument and acknowledged to me that they executed the same.

IN WITNESS, WHEREOF, I have hereunto set my hand and affixed my notary seal the day and year first above written.

(seal)

_____

Print Name: _____
Notary Public for the State of Montana
Residing at Billings, Montana
My commission expires_____

Planning Board

Date:	06/23/2026
Title:	44 West Subdivision, 2nd Filing, Major Preliminary Plat - Public Hearing
Presented by:	David Green
Department:	Planning & Community Services
Presentation:	Yes

Information

RECOMMENDATION
Staff recommends the Planning Board recommend to City Council that the preliminary plat of 44 West Subdivision, 2nd Filing be conditionally approved, and the Findings of Fact adopted as presented in the staff report.

BACKGROUND (Consistency with Adopted Plans and Policies, if applicable)
On May 1, 2026, Performance Engineering, on behalf of McCall Development, applied for preliminary plat approval for 44 West Subdivision, 2nd Filing. The proposed subdivision creates 108 lots for development. The subject property is generally located south of Central Avenue, and west of Twin Pines Townhomes. The property is currently zoned Mixed Residential 2 (NX2), Mixed Residential 1 (NX1) and Corridor Mixed Use 1 (CMU1).

VARIANCES
The applicant is not applying for any variances from subdivision regulations.

PROPOSED CONDITIONS OF APPROVAL

1. Minor changes may be made in the SIA and final documents, as requested by the Planning, Legal or Public Works Departments to clarify the documents and bring them into the standard acceptable format.
2. The final plat shall comply with all requirements of the City of Billings Subdivision Regulations, rules, regulations, policies, and resolutions of the City of Billings, and the laws and Administrative Rules of the State of Montana.

PROCEDURAL HISTORY
Pre-Application Meeting: April 2, 2026
Preliminary Plat application submitted to Planning Division: April 2, 2026
Departmental Review Meeting: May 14, 2026
Preliminary Plat Resubmittal: May 21, 2026
Planning Board Plat Review: June 9, 2026
Planning Board Public Hearing: June 23, 2026
Preliminary Plat to City Council: July 27, 2026
60 Working-Day Preliminary Plat Review period ends: July 28, 2026

PLAT INFORMATION
General Location: South of Central Avenue, and west of Twin Pines Townhomes
Legal Description: Being Lot 3, Block 1 of Clearwater Estates Subdivision, 2nd Filing and Lot 11 and portions of Lot 12 of Block 3 of 44 West Subdivision.
Owner/Subdivider: McCall Development, Inc.
Engineer/Surveyor: Performance Engineering
Existing Zoning: NX2, NX1, and CMU1
Existing Land Use: Agricultural land
Proposed Land Use: Residential
Gross Area: ± 18.11 Acres
Proposed number of lots: 108
Lot Size:
Minimum: ± 2,497 square feet
Maximum: ± 4.13 acres
Parkland Requirements: Subdivision regulations require a dedication of 1.39 acres. The applicant is proposing to provide 1.94 acres of private parkland.

Traffic Impact Study
A traffic impact study (TIS) was completed for the entire subdivision, 44 West, at full build out. This includes the 55 acres of farmland to the south of 44 West Subdivision 1st, 2nd, and 3rd Filings. From Central Avenue to the Monad Drain, on the southern end of the 55 acres of farmland. In the SIA under the heading 'III Transportation. A. Street', the agent shows the percentage of contribution that this filing will be responsible for at final plat. All required intersection improvement

contributions identified therein shall be completed by the Subdivider at the Subdivider's expense. The percent of traffic contributions to the following intersections for this filing:

a. S. 48th and Central – 0.30%
b. Shiloh and Broadwater – 0.50%
c. Shiloh and Central – 1.70%
d. Shiloh and Monad – 0.40%
e. Central and S 44th West – 2.50%

The cash contributions shall be based on the percent of traffic contributions to the intersections based on the total cost of an intersection as determined by City Engineering for the year in which the contribution is made. These cash contributions for the intersection improvement will be made prior to final plat approval.

The TIS shows that a left-turn lane on Central Avenue at the 44th Street West intersection with Central, is required to be constructed with this filing, 44 West Subdivision, 2nd Filing.

STAKEHOLDERS

At the Planning Board discussion meeting held June 9, 2026, staff gave a brief overview of the proposed subdivision. After the presentation, staff stood for any questions the board members might have. There were none. Mr. Craig Dalton, agent, stood to answer any questions the board may have for him. Board Member Staley asked if the turn lane was a right-hand turn. Mr. Dalton stated it is a left-hand turn lane that is required at 44th Street West. There were no other questions from the board.

Stakeholder input will be received at a public hearing scheduled for this subdivision on June 23, 2026.

ALTERNATIVES

In accordance with state law, the City Council has 60 working days to act upon this major preliminary plat. The 60 working day review period for the proposed plat ends July 28, 2026. State and City subdivision regulations also require that the preliminary plat be reviewed using specific criteria, as stated within this report. The City may not unreasonably restrict an owner's ability to develop land if the subdivider provides evidence that any identified adverse effects can be mitigated. Within the 60 working day review period, the City Council is required to:

1. Approve;
2. Conditionally Approve; or
3. Deny the Preliminary Plat

FISCAL EFFECTS

The preliminary plat of this subdivision will have no financial impact on the Planning Division.

SUMMARY

One of the purposes of the City's subdivision review process is to identify potential negative effects of property being subdivided. Negative effects that are identified become the subdivider's responsibility to mitigate. Various City departments, private service/utility providers and the affected school district/s, have reviewed this application and provided input on effects and mitigation. The Findings of Fact, which are presented as an attachment, discuss potential negative impacts of the subdivision and conditions of approval are recommended as measures to further mitigate any impacts. In this case, there were found to be minimal impacts from this proposed subdivision.

Attachments

Proposed Plat
Draft SIA
Findings of Fact
Traffic Study
TIS Studied Intersections

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ADJOINING PROPERTY OWNER INFORMATION:

1. 44 WEST DEVELOPMENT, LLC
1536 MULLOWNEY LANE, SUITE 100
BILLINGS, MT 59101

2. BRADLEY W & TAMMY JO HARDT
4620 CENTRAL AVENUE
BILLINGS, MT 59106

3. 4 MT HOMES INC.
PO BOX 51366
BILLINGS, MT 59105

4. BROWN DEVELOPMENT, LLC
745 SOUTH 56TH STREET WEST
BILLINGS, MT 59106

5. LEITZ, BRYAN KARL
4420 CENTRAL AVE
BILLINGS, MT 59106

6. HOFMANN, EDWARD L JR
4246 CENTRAL AVE
BILLINGS, MT 59106

7. JANET B BERGMAN REVOCABLE TRUST
1322 BROADWATER AVE
BILLINGS, MT 59102

PRELIMINARY PLAT OF

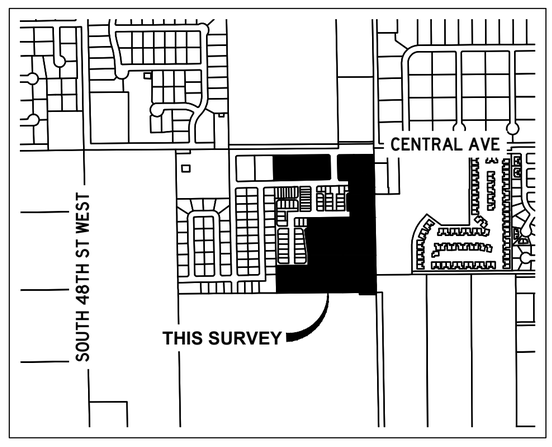
44 WEST SUBDIVISION, 2ND FILING

BEING LOT 3, BLOCK 1 OF CLEARWATER ESTATES SUBDIVISION, 2ND FILING AND LOT 11 AND PORTIONS OF LOT 12 OF BLOCK 3 OF 44 WEST SUBDIVISION LOCATED IN THE NW1/4 OF SECTION 10, TOWNSHIP 01 SOUTH, RANGE 26 EAST, P.M.M., CITY OF BILLINGS, YELLOWSTONE COUNTY, MONTANA

PREPARED FOR : 44 WEST DEVELOPMENT, LLC

PREPARED BY : PERFORMANCE ENGINEERING, LLC

TOTAL AREA OF SUBDIVISION : ± 18.11 ACRES



VICINITY MAP
NOT TO SCALE

SITE DATA	
GROSS AREA	18.11 AC
NET AREA	14.35 AC
LOT COUNT	108
MAX. LOT AREA	180,154 SF
MIN. LOT AREA	2,497 SF
ZONING	NX1/NX2/CMU1
PARKLAND DED.	1.94 AC

0 50 100
IN FEET

Z:\McCall\2026-055 44 West 2nd & 3rd\CAD\DWG\Plat\26-067 44 West 2nd Prelim.dwg

SUBDIVISION IMPROVEMENTS AGREEMENT
&WAIVER OF RIGHT TO PROTEST FUTURE SPECIAL IMPROVEMENT DISTRICTS

44 West Subdivision, 2nd Filing

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(City of Billings)

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SUBDIVISION IMPROVEMENTS AGREEMENT & WAIVER OF RIGHT TO PROTEST FUTURE SPECIAL IMPROVEMENT DISTRICTS

44 West Subdivision, 2nd Filing

This agreement is made and entered into this ____ day of _____, 20__, by and between *44 West Development, LLC*, whose address for the purpose of this agreement is **1536 Mullowney Lane, Suite 100; Billings, Montana 59101**, hereinafter referred to as "Subdivider," and **CITY OF BILLINGS**, Billings, Montana, hereinafter referred to as "City."

WITNESSETH:

WHEREAS, the plat of *44 West Subdivision, 2nd Filing*, located in Yellowstone County, Montana was submitted to the Yellowstone County Board of Planning; and

WHEREAS, at a regular meeting conducted on _____ day of _____, 20__, the Board of Planning recommended conditional approval of a preliminary plat of *44 West Subdivision, 2nd Filing*; and

WHEREAS, at a regular meeting conducted on _____ day of _____, 20__, the City Council conditionally approved a preliminary plat of *44 West Subdivision, 2nd Filing*; and

WHEREAS, a Subdivision Improvements Agreement is required by the City prior to the approval of the final plat.

WHEREAS, the provisions of this agreement shall be effective and applicable to *44 West Subdivision, 2nd Filing* upon the filing of the final plat thereof in the office of the Clerk and Recorder of Yellowstone County, Montana. The Subdivision shall comply with all requirements of the City of Billings Subdivision Regulations, the rules, regulations, policies, and resolutions of the City of Billings, and the laws and administrative rules of the State of Montana.

THEREFORE, THE PARTIES TO THIS AGREEMENT, for and in consideration of the mutual promises herein contained and for other good and valuable consideration, do hereby agree as follows:

I. VARIANCES

A. Subdivider has requested, and the City hereby grants, the following variances by City Council from the strict interpretation of the City's Subdivision Regulations (Section 23.1101, BMCC):

1. No variances are requested.

II. PROPERTY CONDITIONS AND INFORMATION FOR LOT PURCHASERS

A. Lot owners will be required to construct that segment of the required sidewalk that fronts their property at the time of lot development. If sidewalk is not constructed within 5 years, the City has the right to construct the sidewalk and assess the property owners.

B. Lot owners should be aware that this subdivision is being built in close proximity to prime deer and antelope habitat and it is likely that homeowners will experience problems with damage to landscaped shrubs, flowers, and gardens. The Montana Fish, Wildlife, and Parks Department does not provide damage assistance unless there is damage to commercial crops and/or a threat to public health and safety.

C. Lot owners should be aware that soil characteristics within the area of this subdivision, as described in the 1972 Yellowstone County Soil Survey, indicate that there could be potential limitations for proposed construction on the lots, which may require a geotechnical survey prior to construction.

D. No water rights have been transferred to the lot owners. Irrigation ditches that exist on the perimeter of this development are for the benefit of other properties. Perimeter ditches and drains shall remain in place and shall not be altered by the Subdivider or subsequent owners.

E. There is attached hereto a Waiver waiving the right to protest the creation of the special improvement district or districts which by this reference is expressly incorporated herein and made as much a part hereof as though fully and completely set forth herein at this point. The Waiver will be filed with the plat, shall run with the land, and shall constitute the guarantee by the Subdivider and property owner or owners of the developments described herein. Said Waiver is effective upon filing and is not conditioned on the completion of the conditions set forth in this Agreement. The Subdivider and owner specifically agree that they are waiving valuable rights and do so voluntarily.

F. The subdivider and subsequent contractors/builders acknowledge that there is a Stormwater Pollution and Prevention Plan (SWPPP) filed with the City and the Montana Department of Environmental Quality (MDEQ). This SWPPP shall be adhered to during all phases of construction and shall be updated as required by MDEQ under the General Permit for Stormwater Discharges Associated with Construction Activity, Chapter 28, BMCC and the Billings Stormwater Management Manual.

G. Individual lot owners should be aware that Best Management Practices for stormwater control shall be required for new construction on lots. Best Management Practices are defined within Section 28-201, BMCC and detailed in the Billings Stormwater Management Manual.

III. TRANSPORTATION

A. Streets

- All internal access roads and site improvements within the subdivision will be in accordance with the City of Billings Site Development Ordinance, City Zoning Ordinance, the Stormwater Management Manual, and other applicable City codes, rules, and regulations.

- All internal streets to provide a 34-foot back of curb to back of curb street width. The street improvements will be completed by private contract or SID

- A traffic accessibility study has been completed for the *44 West Subdivision, 2nd Filing.* All required intersection improvement contributions identified therein shall be completed by the Subdivider at the Subdivider's expense. The percent of traffic contributions to the following intersections shall be in accordance with the traffic accessibility study:

    a. S. 48th and Central – 0.30%
    b. Shiloh and Broadwater – 0.50%
    c. Shiloh and Central – 1.70%
    d. Shiloh and Monad – 0.40%
    e. Central and 44th S West – 2.50%

  The cash contributions shall be based on the percent of traffic contributions to the intersections based on the total cost of an intersection as determined by City Engineering for the year in which the contribution is made. These cash contributions for the intersection improvement will be made prior to final plat approval.

- A left turn lane on Central Avenue at the 44th Street West intersection is required to be constructed with this subdivision.

B. Carriage Lanes

- All carriage lanes within the subdivision shall be built to grade with a satisfactory subbase, base course, and asphalt surface or concrete surface. All carriage lane approaches constructed with asphalt shall be replaced with concrete by the Subdivider at the time when home construction is complete. In the event asphalt approaches within the subdivision are not

replace with concrete within three years of the date of recording of the final plat, the City may construct the concrete approaches and assess the Subdivider for the costs associated with the approach construction. Carriage Lane pavement widths shall be 12 feet. No trees are allowed to be planted in Carriage Lane rights-of-way. In addition, no shrubs taller than two (2) feet are allowed to be planted in Carriage Lane rights-of-way.

C. Sidewalks

- Individual lot owners will be responsible for the construction of the sidewalks within public right-of-way or easements adjacent to or through their lot at the time of lot construction and shall be included in each building permit. The Subdivider shall construct sidewalk adjacent to private parks at the time of private park development.

- Sidewalks shall be 5-foot wide with a minimum 5-foot boulevard planting strip between the sidewalk and the curb with handicap ramps and aprons installed where necessary.

D. Street Lighting

- Street lighting will be installed by private contract or SID. A Street Light Maintenance District will be created in the future and is included in the waiver of right to protest.

E. Traffic Control Devices

- Street name signs for streets within the subdivision, or located immediately adjacent thereto, shall be furnished and installed in accordance with the specifications of the City of Billings Public Works and Fire Departments.

- No traffic signals are required within this subdivision.

- The Subdivider shall furnish and install all necessary traffic control devices in accordance with the Manual of Uniform Traffic Control Devices and approved by the City of Billings Public Works Department.

F. Access

- Access to the Subdivision will be provided by Dryfly Lane, Hatch Lane and Driftboat Trail. Carriage Lane access is also provided to all residential lots within the subdivision.

G. Billings Area Bikeway and Trail Master Plan

- The Subdivision is within the Billings Area Bikeway and Trail Master Plan. A 10-foot-wide multi-use trail was constructed as part of a previous filing along Central Avenue. No additional trail improvements are required.

H. Public Transit

- MET Transit provides services along Central Avenue with the closest stop at the intersection of Central Avenue and Shiloh Road, approximately 0.5 miles east of the Subdivision. No improvements are required to ensure public transit service.

IV. EMERGENCY SERVICE

Construction of buildings made of combustible materials shall have adequate fire apparatus access roads and water supply (fire hydrants) in place to allow for fire suppression requirements. Prior to the issuance of a building permit for construction using combustible materials (i.e. lumber, plywood, wood trusses, etc.), fire apparatus access roads and water supply requirements shall be provided in accordance with the International Fire Code as adopted by the City of Billings.

At a minimum, the following is required:

- An unobstructed gravel road or gravel road base must be within 150 feet of the furthest portion of a building under construction as measured along the approved route.
- The access roads are required to support fire apparatus vehicle loading (40 tons) during all weather conditions and shall be a minimum of twenty (20) feet wide.
- An operational fire hydrant shall be located within 600 feet of the furthest portion of a residence under construction or within 400 feet of the furthest portion of a commercial building under construction as measured along the access roads to the site.
- The above requirements do not alter or effect the current minimum subdivision requirements for fire apparatus access and water supply.

V. STORM DRAINAGE

All drainage improvements shall comply with the provisions set forth in Chapter 28, BMCC, and the Stormwater Management Manual in place at the time of development. Additionally, a comprehensive drainage study has been completed for the Monad Drain with requirements that superseded the Stormwater Management Manual. The *Comprehensive Drainage Plan for the Monad Drain* is on-file at the City Engineering Department. A complete stormwater management plan shall be submitted to the Engineering Division for review and approval at the time of development.

Stormwater drainage will discharge to a drainage ditch constructed as part of the 44 West Subdivision, 1st Filing private contract. The ditch conveys stormwater drainage south to a stormwater detention facility that is located within an off-site area on Tract 3, Certificate of Survey No. 3844. This detention facility has been sized to accept runoff generated from the *44 West Subdivision, 2nd Filing*. The detention facility will outfall to the Monad Drain as described in the *Comprehensive Drainage Plan for the Monad Drain.*

Per the *Comprehensive Drainage Plan for the Monad Drain*, construction of a dike and control structure within the drain will be required as part of a future subdivision of Tract 3 of Certificate of Survey No. 3844, or as determined necessary by City Engineering. These improvements are included as part of the Waiver of Right to Protest a Special Improvement District.

The HOA is responsible for participating in the maintenance of stormwater facilities directly associated with the treatment and detention of runoff produced by the Subdivision.

VI. UTILITIES

The Subdivision Improvements Agreement does not constitute an approval for extension of or connection to water mains and sanitary sewers. The property owner shall make application for extension/connection of water mains and sanitary sewers to the Public Works Department – Engineering Division. The extension/connection of/to water mains and sanitary sewers is subject to the approval of the applications and the conditions of approval. Applications shall be submitted for processing prior to the start of any construction and prior to review and approval of any project plans and specifications.

The Developer/Owner acknowledges that the subdivision shall be subject to the applicable System Development Fees in effect at the time new water and/or sanitary sewer service connections are made.

The design/installation of sanitary sewers and appurtenances, and water mains and appurtenances (fire hydrants, etc.) shall be in accordance with design standards, specifications, rules, regulations of and as approved by the City of Billings Public Works Department, Fire Department and the Montana Department of Environmental Quality.

A. Water

- The Subdivision is served by existing 12-inch water main in Tippet Trail and existing 8-inch water mains located in Hatch Lane, Dryfly Lane, and Driftboat Trail.
- Water mains no less than 8 inches in diameter will be extended throughout the Subdivision. Mains shall be sized to accommodate future growth inside and outside of the Subdivision.

B. Sanitary Sewer

- Gravity sewer mains no less than 8 inches in diameter will be extended throughout the Subdivision. Mains shall be sized to accommodate future growth inside and outside of the Subdivision.

C. Power, Telephone, Gas, and Cable Television

- Private utility facilities currently exist to serve the subdivision. The private utility facilities will be installed within Carriage Lane right-of-way and by easements included on the plat, as requested by the utility companies, to provide routes to the Carriage Lanes.

VII. PARKS/OPEN SPACE

Section 76-3-621 of the Montana Code Annotated covers the park dedication requirement. Paragraph (1) calls for park area to be 11 percent of the land proposed to be subdivided into parcels of one-half acre or smaller. The required Parkland Dedication for the *44 West Subdivision, 2nd Filing* is 1.39 acres. Parkland dedications, in the amount of 1.94 acres, are depicted on the face of the plat as PRIVATE PARK.

Parks will be privately owned and maintained by a Private HOA created by the Subdivider.

VIII. POSTAL DELIVERY

The Subdivider shall provide centralized delivery boxes with sufficient pullout to accommodate a mail carrier vehicle. The location of the boxes shall be reviewed and approved by the United States Postal Service.

IX. IRRIGATION

No water rights have been transferred to the lot owners. Irrigation ditches that exist on the perimeter of this development are for the benefit of other properties. Perimeter ditches and drains shall remain in place and shall not be altered by the Subdivider or subsequent owners.

X. SOILS/GEOTECHNICAL STUDY

A soils/geotechnical study has been performed for the subdivision. A copy of this report is included as part of the infrastructure permitting documents and made public record through the Engineering Department. Lot owners and contractors/builders are encouraged to review the report and its recommendations or complete a site-specific geotechnical investigation.

XI. PHASING OF IMPROVEMENTS

The Subdivision is not proposed to be constructed in phases.

XII. FINANCIAL GUARANTEES

Except as otherwise provided, Subdivider shall install and construct said required improvements with cash or by utilizing the mechanics of a private contract secured by letters of credit or a letter of commitment to lend funds from a commercial lender, or by SID. All engineering and legal work in connection with such improvements shall be paid by the contracting parties pursuant to said private contract, and the improvements shall be installed as approved by the City Engineer and Utility Department Manager.

XIII. LEGAL PROVISIONS APPLYING TO SUBDIVIDER

A. Subdivider agrees to guarantee all public improvements for a period of two (2) years from the date of final acceptance by the City of Billings.

B. The owners of the properties involved in this proposed Subdivision by signature subscribed herein below agree, consent, and shall be bound by the provisions of this Agreement.

C. The covenants, agreements, and all statements in this Agreement run with the land and apply to and shall be binding on the heirs, personal representatives, successors, assigns and transferees of the respective parties.

D. In the event it becomes necessary for either party to this Agreement to retain an attorney to enforce any of the terms or conditions of this Agreement or to give any notice required herein, then the prevailing party or the party giving notice shall be entitled to reasonable attorney fees and costs.

E. Any amendments or modifications of this Agreement or any provisions herein shall be made in writing and executed in the same manner as this original document and shall after execution become a part of this Agreement.

F. Subdivider shall comply with all applicable federal, state, and local statutes, ordinances, and administrative regulations during the performance and discharge of its obligations. Subdivider acknowledges and agrees that nothing contained herein shall relieve or exempt it from such compliance.

IN WITNESS WHEREOF, the parties hereto have set their hands and official seals on the date first above written.

"SUBDIVIDER" *44 West Development, LLC*

By: _____

Title: _____

STATE OF MONTANA)
: ss
County of Yellowstone)

On this ____ day of _____, 20__, before me, a Notary Public in and for the State of Montana, personally appeared _____, known to me to be the _____ of *44 West Development, LLC*, who executed the foregoing instrument and acknowledged to me that he/she executed the same.

_____
Notary Public in and for the State of Montana
Printed Name: _____
Residing at: _____
My commission expires: _____

This agreement is hereby approved and accepted by the City of Billings, this ____ day of _____, 20__.

"CITY"
CITY OF BILLINGS
MONTANA

By: _____
Mayor

Attest: _____
City Clerk

STATE OF MONTANA)
: ss
County of Yellowstone)

On this ____ day of _____, 20__, before me, a Notary Public in and for the State of Montana, personally appeared _____ and _____, known to me to be the Mayor and City Clerk, respectively, of the City of Billings, Montana, whose names are subscribed to the foregoing instrument in such capacity and acknowledged to me that they executed the same on behalf of the City of Billings, Montana.

_____
Notary Public in and for the State of Montana
Printed Name: _____
Residing at: _____
My commission expires: _____

Waiver of Right to Protest
FUTURE SPECIAL IMPROVEMENTS DISTRICTS

FOR VALUABLE CONSIDERATION, the undersigned, being the Subdivider and all of the owners of the hereinafter described real property, do hereby waive the right to protest the formation of one or more Special Improvement District(s) for a period of no more than twenty years from the recording of this waiver, for street light maintenance and energy, and for the construction of streets, street widening, sidewalks, survey monuments, street name signs, curb and gutter, street lights, driveways, traffic signals, and traffic control devices, parks and park maintenance, trails, sanitary sewer lines, water lines, storm drains (either within or outside the area), and other improvements which the City of Billings may require.

This Waiver and Agreement is independent from all other agreements and is supported by sufficient independent consideration to which the undersigned are parties, and shall run with the land and shall be binding upon the undersigned, their successors and assigns, and the same shall be recorded in the office of the County Clerk and Recorder of Yellowstone County, Montana.

This Waiver is in addition to any other recorded waiver related to the property described herein and is not intended to replace, supersede, or invalidate any such waiver.

The real property hereinabove mentioned is more particularly described as follows:

44 West Subdivision, 2nd Filing

Signed and dated this _____ day of _____, 20__.

44 West Development, LLC

By:_____

Title:_____

STATE OF MONTANA)
: ss
County of Yellowstone)

On this ____ day of _____, 20__, before me, a Notary Public in and for the State of Montana, personally appeared _____, known to me to be the _____ of *44 West Development, LLC*, who executed the foregoing instrument and acknowledged to me that he/she executed the same.

_____
Notary Public in and for the State of Montana
Printed Name: _____
Residing at: _____
My commission expires: _____

FINDINGS OF FACT

The Planning staff has prepared the Findings of Fact for the preliminary plat of 44 West Subdivision, 2nd Filing. These findings are based on the preliminary plat application and supplemental documents and address the review criteria required by the Montana Subdivision and Platting Act (76-3-608, MCA) and the Billings Subdivision Regulations (Section 23-303(H), BMCC).

A. What are the effects on agriculture, local services, the natural environment, wildlife, wildlife habitat, and public health, safety and welfare? [MCA 76-3-608 (3) (a) and BMCC 23-302.H.2.]

1. Effect on agriculture and agricultural water user facilities

The subject property has been used for agricultural purposes in the past. The Monad Drain is to the south of this proposed subdivision and is not part of the proposed area to be subdivided. Perimeter ditches and drains shall remain in place and not be altered by the subdivider or subsequent owners. The subdivision should not affect agricultural water users' facilities. With farming activity wildlife habitat has not been maintained. Perimeter areas are good for birds to hide in and smaller ungulates, such as deer.

2. Effect on local services

a. **Utilities** – Water service will be provided by the City of Billings. A 16-inch water main will be extended along Central Avenue for the proposed subdivision. 12-inch and 8-inch water lines will be provided within the proposed subdivision. 12-inch in the northern area and 8-inch throughout the majority of the subdivision. New individual services will be provided to all the lots, and new fire hydrants will be installed as required by the City Fire Department.

   Sanitary sewer service to the subdivision will be by an existing 10-inch sanitary sewer main located within the alleyway along the western boundary at the south end of the Subdivision. The Subdivider is responsible for extending an 8-inch gravity sewer main to Central Avenue via South 44th Street West to allow for future connections to the north of the Subdivision. Sewer lines within the subdivision shall be no smaller than 8-inches in diameter.

   The subdivider will install all new water lines and sewer lines in the local streets and individual services for each lot in accordance with design standards, specifications, rules, and regulations of the City of Billings Engineering/Public Works Department and MDEQ. This is outlined in the SIA under the heading 'VI. Utilities.'

   Private Utilities will be provided from existing facilities to the subdivision. The private utilities will be installed within the Carriage Lane right-of-way and by easements included on the plat, as requested by the utility companies, to provide routes to the Carriage Lanes.

   Stormwater – The storm drainage system for 44 West Subdivision, 2nd Filing, will consist of a curb and gutter surface collection and curb inlets that drain into storm drainage piping,

as well as surface conveyance. The Subdivision will be allowed to discharge stormwater into the Monad Drain as part of its stormwater management strategy. A complete stormwater management plan has been submitted to the Engineering Division for review and approval with the 44 West Subdivision, 1st Filing at the time of its development. This is outlined in the SIA under the heading V. Storm Drainge.

All drainage improvements shall satisfy the criteria set forth by the *City of Billings Stormwater Management Manual* and will be subject to review and approval by the City Engineering Department.

b. **Solid Waste** – The City of Billings will provide solid waste collection and disposal. The City's landfill has adequate capacity for this waste.

c. **Streets** – All internal streets within the subdivision shall be built to grade with a satisfactory subbase, base course, curb and gutter, and asphalt surface. All public roads will be built to provide a 34-foot back-to-back curb street width.

All internal streets and carriage lanes will be built according to the standards of the City of Billings Public Works Department. Street improvements are included in the Waiver of Right to Protest Future Special Improvement Districts.

The sidewalks will be installed by the respective lot owners on a lot-by-lot basis, as lots develop. Sidewalks along the street frontage shall be minimum 5-foot-wide and separated with a boulevard width not less than five feet. The developer will also install all ADA required ramps at the intersections within the proposed subdivision. The developer shall construct the 5-foot-wide boulevard sidewalk adjacent to private parks. This information is all in the SIA under the heading Transportation.

A left turn lane on Central Avenue at the 44th Street West intersection is required to be constructed with this subdivision.

Traffic Impact Study overview:

A traffic accessibility study has been completed for the 44 West Subdivision, 2nd Filing. A TIS was done for the entire subdivision at full build out. All required intersection improvement contributions identified therein shall be completed by the Subdivider at the Subdivider's expense. The percent of traffic contributions to the following intersections:

a. S. 48th and Central – 0.30%
b. Shiloh and Broadwater – 0.50%
c. Shiloh and Central – 1.70%
d. Shiloh and Monad – 0.40%
e. Central and S 44th West – 2.50%

The cash contributions shall be based on the percent of traffic contributions to the intersections based on the total cost of an intersection as determined by City Engineering for the year in which

the contribution is made. These cash contributions for the intersection improvement will be made prior to final plat approval.

A left turn lane on Central Avenue at the 44th Street West intersection is required to be constructed with this subdivision.

Street lighting is required for this subdivision. In the SIA the applicant has indicated that street lighting will be installed by private contract or SID. A Street Light Maintenance District will be created for operation and maintenance of the lighting at a future date and is included in the waiver of right to protest. This is outlined in the SIA under the heading 'III. Transportation, D. Street Lighting.'

d. **Emergency Services** – The Billings Police and Fire Departments will respond to emergencies within the proposed subdivision. The fire station that provides service for this area is Fire Station #7, is located at 1501 54th Street West. The subdivision is located within the ambulance service area of American Medical Response (AMR).

e. **Schools** – School District #2 provides service to students within this subdivision for elementary through high school. Big Sky for elementary school, capacity is shown as 394 with a current enrollment of 368. Ben Steele for middle school, capacity is shown as 750 with a current enrollment of 744. West for high school, capacity shown as 1731with current enrollment of 2133.

f. **Parks and Recreation** – This subdivision is required to provide 1.39 acres of parkland. The applicant will be providing 1.94 acres of private parkland for this subdivision. The parkland will be maintained by the Homeowner Association. The Parks Department responded that they approved of the proposed parkland for the subdivision.

g. **Mail Delivery -** The developer shall coordinate with the United States Postal Service to determine the preferred type and location of mail delivery system for this subdivision. This requirement is outlined in the SIA under the heading 'VIII. Postal Delivery.'

h. **Phasing of Development** – This subdivision will not be developed in phases.

3. Effect on the natural environment

The subject property is currently vacant with the proposed use of residential development with a small portion of possible commercial development. The property is not located within a floodplain. During development, storm water pollution prevention best management practices are required to be used and monitored to prevent erosion on exposed ground. Overall, the effect on the natural environment should be minimal.

4. Effect on wildlife and wildlife habitat

There are no known endangered or threatened species on the property. There is a paragraph in the SIA that warns future lot owners of the presence of deer in the area, which may cause damage to their landscaping. This subdivision should have a minimal effect on wildlife and wildlife habitat.

5. Effect on public health, safety and welfare

There will be no significant impacts to public health, safety and welfare because of this subdivision.

B. Was an Environmental Assessment required? [(MCA 76-3-616 and BMCC 23-302.H.1.]

The proposed subdivision is exempt from the requirement for an Environmental Assessment pursuant to Section 76-3-616, MCA.

C. Does the subdivision conform to the City of Billings 2016 Growth Policy, the 2014 Transportation Plan, and the Billings Area Bikeway and Trail Master Plan? [BMCC 23-302.H.4.]

1. City of Billings 2016 Growth Policy

The proposed subdivision is consistent with the following goals of the Growth Policy:

> **Strong Neighborhoods (livable, safe, sociable and resilient neighborhoods):** Neighborhoods that are safe and attractive and provide essential services are much desired.
>
> **Home Base (healthy, safe and diverse housing options):** Planning and construction of interconnected sidewalks and trails are important to the economy and livability of Billings.
>
> **Essential Investments (relating public and private expenditures to public values)**: Planning and construction of safe and affordable interconnected sidewalks and trails are important to the economy and livability of Billings.
>
> Developed parks that provide recreation and active living opportunities are desirable for an attractive and healthy community.

3. 2023 Billings Urban Area Long Range Transportation Plan

The proposed subdivision adheres to the goals and objectives of the 2023 Transportation Plan and preserves the street network and street hierarchy specified in the plan.

4. Billings Area Bikeway and Trail Master Plan (BABTMP)

The proposed subdivision is within the Billings Area Bikeways and Trail Master Plan. There are no trails identified within the subdivision. There is a 10-foot-wide bike and pedestrian trail already built along the south side of Central Avenue. This was installed with previous filings of 44 West Subdivision. No additional improvements of this nature are anticipated.

D. Does the subdivision conform to the Montana Subdivision and Platting Act and to local subdivision regulations? [MCA 76-3-608 (3) (b) and BMCC 23-302.H.3.a.]

The proposed subdivision satisfies the requirements of the Montana Subdivision and Platting Act, and the design standards specified in the local subdivision regulations. The subdivider and the local government have complied with the subdivision review and approval procedures set forth in the local and state subdivision regulations.

E. Does the proposed subdivision conform to all requirements of the zoning in effect? [BMCC 23-302.H.3.e.]

The subject property is located within NX2 – Mixed Residential 2 (2 to 8 units), NX1 Mixed Residential 1 (1 to 4 units) and CMU1 - Corridor Mixed Use 1. The lot frontages conform to the requirements of this zone. Other building setbacks and structure specific requirements will be reviewed for compliance at the time of building permit review.

F. Does the proposed plat provide easements for the location and installation of any utilities? [MCA 76-3-608 (3) (c) and BMCC 23-302.H.3.b.]

The subdivider will provide utility easements as requested by private utility companies on the face of the plat.

G. Does the proposed plat provide legal and physical access to each parcel within the subdivision and notation of that access on the plat? [MCA 76-3-608 (3) (d) and BMCC 23-302.H.3.c.]

Legal and physical access to the subdivision will be provided by Central Avenue, South 44th Street West and Tippet Trail and Road E (temporary name). Carriage Lane access is also provided to residential lots within the subdivision.

CONCLUSIONS OF FINDINGS OF FACT

- The preliminary plat of 44 West Subdivision, 2nd Filing does not create any adverse impacts that warrant denial of the subdivision.

- The proposed subdivision conforms to several of the goals and policies of the 2016 Growth Policy and does not conflict with the Transportation or Bikeway/Trail Plans.

- The proposed subdivision complies with state and local subdivision regulations, local zoning, and sanitary requirements and provides legal and physical access to each lot.

- Any potential negative or adverse impacts will be mitigated with the proposed conditions of approval.

RECOMMENDATION

Staff proposes the Planning Board recommends to City Council that the preliminary plat of 44 West Subdivision, 2nd Filing, be conditionally approved and the Findings of Fact adopted as presented in the staff report.

Traffic Impact Study

Prepared for submittal to:

CITY OF Billings

for the project:

Clearwater/44 West Subdivision

on behalf of:

Performance Engineering
3412 Colton Blvd., Suite 202
Billings, MT 59102



by:

TRAFFIC & TRANSPORTATION CONSULTING

406 Traffic & Transportation Consulting
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PTOE #1185, certified in 2003

August 2025

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A: Original Raw Count Data for Intersections

B: Intersection Analysis Software Output

C: Estimated Future Traffic Volume Maps

D: Auxiliary Turn Lane Analysis Charts

E: 44th at Central Avenue Intersection Signal Warrant Summaries

F: Intersection Cost Participation Calculations

1 INTRODUCTION

This report documents the Traffic Impact Study (TIS) conducted for the Clearwater/44 West subdivision project in northwest Billings. This is a working title for the project. Some parts of the site could be marketed under a different name before final occupancy. The study was conducted by and under the direction of a Professional Traffic Operations Engineer and Montana-licensed PE with expertise and experience in traffic engineering.

1.1 PROJECT SITE AND STUDY AREA

The overall subdivision site is shown in **Exhibit 1** along with the intersections studied. The existing study intersections were identified during preapplication review with City of Billings staff as:

1. S. 48th Street West at Central Avenue
2. Shiloh Road at Broadwater Avenue
3. Shiloh Road at Central Avenue
4. Shiloh Road at Bell Avenue
5. Shiloh Road at Monad Road

From here forward in this report, existing intersections are generally referred to only by their distinguishing street names (e.g., “Shiloh at Central”) for the sake of brevity. The two new subdivision access points on Central Avenue, Double Haul Lane and S. 44th Street West, have been analyzed for all future scenarios that include project traffic. The site’s third access will be to existing Bell Avenue, which is expected to be extended west into the site to serve the final phase. The new western terminus of Bell will be built to accommodate a potential future connection to the property west of this site, but no such connection has been planned there at the time of this study. The east-west Bell Avenue alignment generally separates the subdivision site into northern and southern parts of similar size.

1.2 LAND USE AND PHASING

The site is currently agricultural land, though it was in the process of being cleared for construction at the time of this study. The subdivision’s proposed land uses will be almost exclusively residential, with 259 single-family detached homes and 125 attached ones. The latter will include 60 attached multi-story units (townhomes) and 65 “cottage” units that would be smaller units not directly classifiable as apartments. One commercial lot sized to support two 11,000 square-foot buildings will be situated near the northwest corner of the site, abutting Central Avenue and Double Haul Lane.

The project is divided into two logical phases. All 125 of the “attached” type of residential units are included in Phase 1 and are located on the northern part of the site. Phase 1 also includes about one half (131) of the total single-family detached units. Phase 2 includes the commercial parcel and all residential lots on the southern part of the site, which are for the remaining 128 single-family homes. Phase 1 is further divided into three sub-phases, termed A, B, and C for this study, to help identify when certain traffic impact mitigation improvements would be needed. The dwelling unit totals for each sub-phase are described later in this report, in the context of this sensitivity analysis. Bell Avenue access was only assumed to be available for Phase 2.

Because the site is generally rural, the types and locations of specific pathways or other facilities and connections for pedestrians and bicycles have not yet been identified. A brief examination of potential traffic calming needs indicated that some streets have long enough blocks that the need for such measures could arise. On-street parking is expected to be allowed throughout the site wherever street width and sight distance allow for it and such parking does not interfere with operations at the Central Avenue access intersections.

Exhibit 2 shows the Clearwater/44 West site plan on which the analysis here is based. It includes land use types, streets, alleys, access points, and parkland areas, as well as phasing. This site plan drawing is provided for illustrative purposes only. The full high-resolution drawing is submitted separately by the applicant.

Exhibit 1. Overall Site Location and Study Intersections

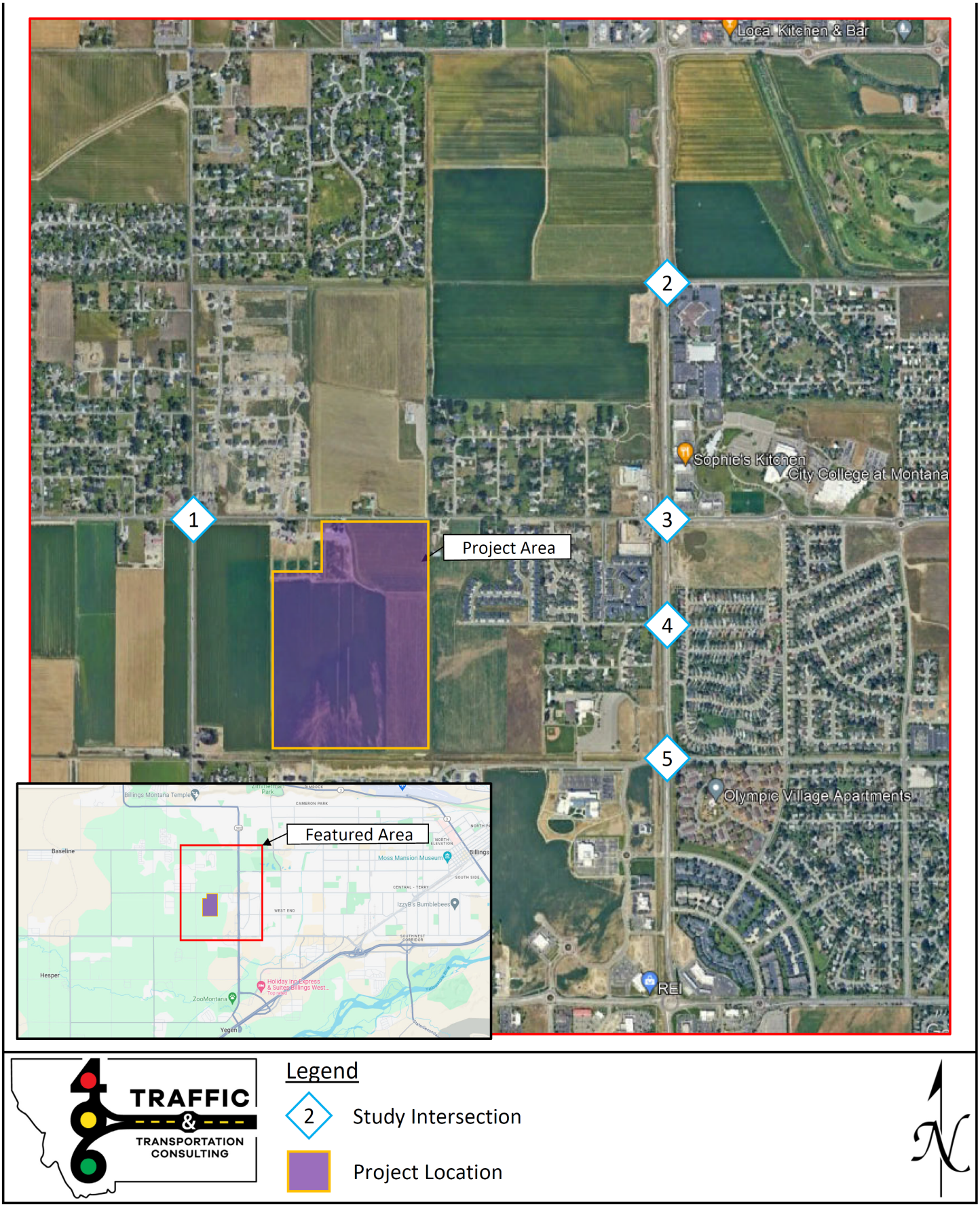
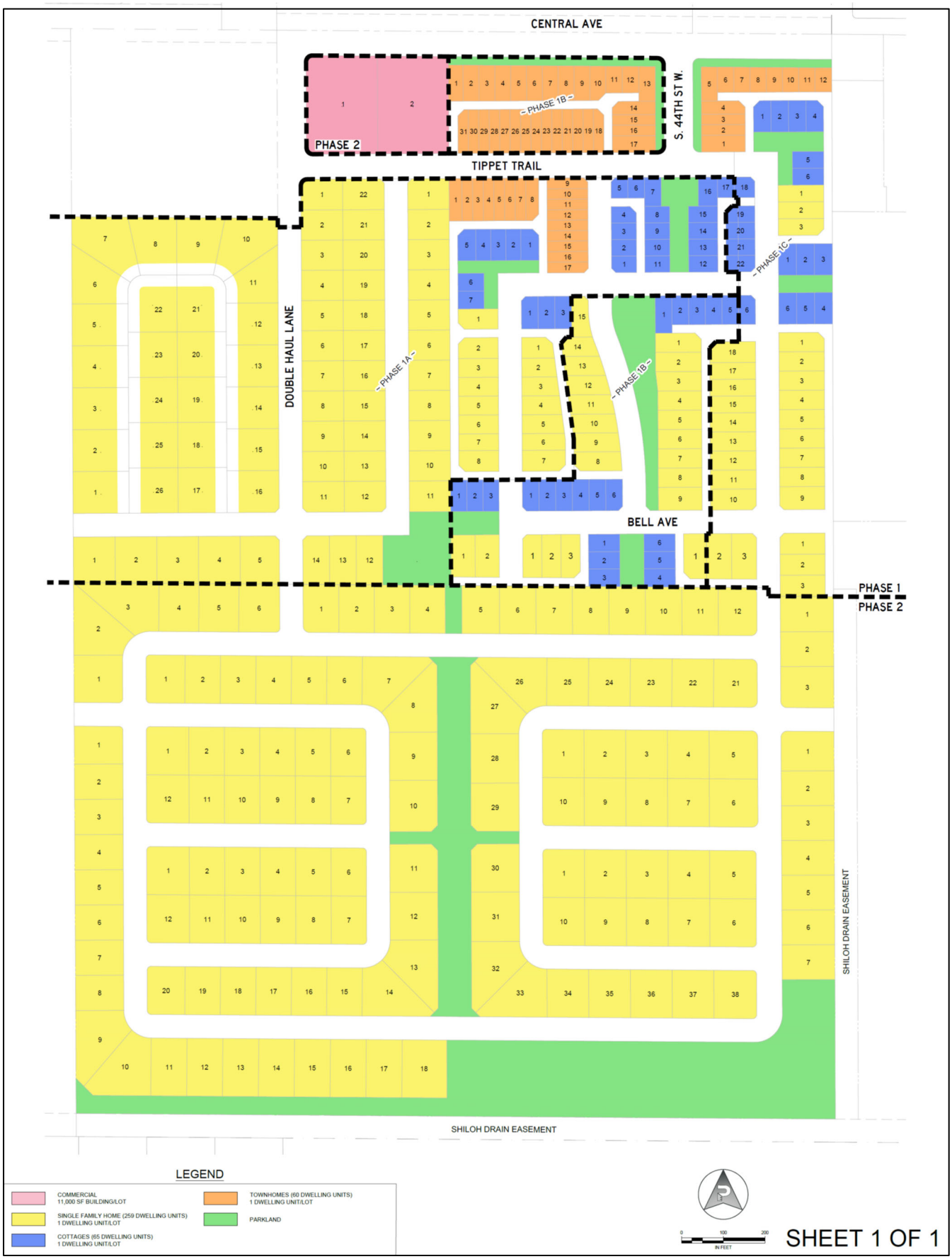


Exhibit 2. Site Plan and Phasing



Excerpted from: Performance Engineering concept site plan provided 7/17/2025

For analysis purposes, both Double Haul Lane and S. 44th Street West are assumed to have one northbound lane and one southbound lane at their intersections with Central, such that vehicles leaving the site waits in a single shared lane whether they are turning right or left.

1.3 Analysis Methods and References

Raw field traffic counts were gathered from other recent traffic study work in the area by Sanbell and provided to this project's applicant team. These raw counts were then adjusted slightly for this TIS based on both (a) recent traffic growth and (b) 2024 City of Billings annualization factors prior to their use in impact analysis.

Trip generation rates, or equations as applicable, are from the Institute of Transportation Engineers (ITE) Trip Generation suite's 11th edition, which was the most current available at the onset of this study. ITE trip generation data, when aggregated across enough varied sites, produce both simple average rates and best-fit equations, either linear or logarithmic, to help the analyst derive proper estimates for their situation. Equations are generally preferred over rates, especially for larger sites where trip generation per unit of land use can diminish with increasing project size. General ITE guidance calls for the use of the fitted curve equation when the data set for the land use type in question is comprised of studies from 20 or more separate sites and when the equation produces a correlation coefficient (R^2) of 0.75 or higher, with 1.0 being the best possible fit.

Operational performance was analyzed at the study intersections through the use of the industry-standard methods presented in the USDOT's Highway Capacity Manual (HCM), published in its modern form as Transportation Research Board Special Report 209. Synchro Studio 12 was employed as both a data repository and a capacity analysis tool, with reports for each intersection generated using Synchro's application of the assumptions of the HCM's 7th edition, the most recent available at the time of this study.

The HCM methodology for intersection capacity analysis produces delay estimates for each turning movement (or "lane group", when multiple turning movements operate from the same lane). These delay estimates are assigned Level of Service (LOS) grades that range from A (best) to F (worst), as indicated in **Exhibit 3**. It's also important to note that for unsignalized intersections with only side-street Stop sign control, LOS for the intersection is represented by the LOS for the worst lane group. "T" intersections with side-street stop control also fall under this category. All stop-controlled intersections in this study area, including the two new proposed accesses to Central, are "T" intersections, where the approach on the stem of the T, rather than a main street turning movement, contains the worst lane group.

Exhibit 3. LOS Definitions

LOS	Delay, seconds per vehicle
A	0 - 10.0
B	10.1 - 15.0
C	15.1 - 25.0
D	25.1 - 35.0
E	35.1 - 50.0
F	50.1 or more

Source: HCM 7th Edition

Operations impacts are determined by how peak hour LOS relates to acceptability standards. Billings employs a LOS standard of C or better. When LOS without the project is D or worse, an operations impact is usually defined when the project would increase delay.

In addition to intersection operations analysis, the need for auxiliary left- and right-turn lanes was examined as part of this study effort. These movements on arterial roadways at stop-controlled site access points with volumes that meet MDT criteria with respect to the department's guidelines indicated in Chapter 28 of its Traffic Engineering Manual. These auxiliary lanes would serve traffic entering the project site. Only locations with free-flowing traffic on the primary street are considered in this auxiliary lane analysis.

Potential mitigation of traffic impacts at the Central/44th intersection included the examination of traffic signal warrants according to the guidance in the Manual on Uniform Traffic Control Devices (MUTCD).

2 EXISTING AND BACKGROUND CONDITIONS

2.1 STREETS AND INTERSECTIONS

Shiloh Road, which also carries the designation of MT-302, is a north-south urban principal arterial according to the MDT (Montana Department of Transportation, and a principal arterial according to the 2023 Billings LRTP (Long Range Transportation Plan). It has two travel lanes in each direction and a speed limit of 45 mph in the study area. Shiloh Road has been a key facilitator of the city's westward expansion, with substantial residential and commercial growth having occurred adjacent to it in recent years. It is characterized by a series of roundabouts at intersections with several of western Billings's east-west arterials and collectors. It also provides access to Interstate 90 via Zoo Drive to the south. A raised median prevents left turns at many two-way stop-controlled intersections, including the one at Bell Avenue. Exclusive left-turn lanes exist at a few select site accesses and local streets. A sidewalk runs along the east side of the road, and a shared-use path called Shiloh Road Trail runs along the west side, much of it separated from the road by a large ditch. There are also two MET Transit bus stops on its east side between the Broadwater and Central roundabouts. These are not considered to be close enough to the project to site to provide meaningful transit access.

Central Avenue is an east-west road that is classified by the MDT as an urban collector to the west of Shiloh Road and as an urban principal arterial to the east of it. Accordingly, it has one travel lane in each direction to the west of Shiloh, and two travel lanes in each direction to the east of it. Its entire length from 64th St W to Montana Avenue is classified as a principal arterial in the 2023 Billings LRTP. It has a speed limit of 45 mph on both sides of Shiloh Road, but it becomes 50 mph to the west of 48th St W. It connects residential neighborhoods to many of western Billings' commercial centers. Central currently has no exclusive turning lanes or multimodal facilities to the west of Shiloh Road. However, the 2023 Billings LRTP shows that a shared-use path and/or trail are planned to be installed on Central Avenue to the west of Shiloh Road. There are also plans to expand Central Avenue to a three-lane cross-section to the west of Shiloh Road: one travel lane in each direction and a center left-turn lane.

48th Street W is a north-south local road according to the MDT, and a principal arterial according to the 2023 Billings LRTP. It has one travel lane in each direction, and its speed limit is 45 mph to the north of Central Avenue and 50 mph to the south of it. It links residences and agricultural properties on the western edges of Billings to the east-west routes that lead into the city, such as Central Avenue and King Avenue. No exclusive turning lanes or multimodal facilities currently exist on 48th in the study area.

Bell Avenue is an east-west local street according to both the MDT and the 2023 Billings LRTP. It has one travel lane in each direction and no posted speed limit. Currently, it provides access to Shiloh Road for a private senior living community and a few other residences. Its eastern terminus is at its intersection with Shiloh Road, where left turns are prohibited. Its western terminus is at a dead-end approximately 2300 feet to the west of this intersection, just past Big Pine Court. While three other streets that intersect Bell Avenue also lead to Central Avenue, these streets traverse private property. As such, Bell Avenue has no outlet for non-residents. The street has no exclusive turning lanes or bike infrastructure, but there is a sidewalk along most of its northern side, starting from the Shiloh Road Trail.

Monad Road is an east-west road that is classified by the MDT as an urban major collector to the east of Shiloh Road and as a local street to the west of it. The 2023 Billings LRTP classifies it as a minor arterial to the east of Shiloh Road, and it was planned to be a collector to the west of Shiloh Road at the time of the LRTP's publishing. West of Shiloh, it has one travel lane in each direction, as well as a center left-turn lane. East of Shiloh Road, it has one travel lane in each direction, but no center left-turn lane. Its speed limit is 35 mph to the east of Shiloh, but it does not have a speed limit posted on the west side. Monad Road connects many of western Billings' residential neighborhoods to the industrial areas near the railroad tracks and to north-south routes such as 32nd Street W and 24th Street W that lead to large commercial centers. It has exclusive right-turn lanes on the east and west legs of the roundabout at Shiloh Road, as well as an exclusive left-turn lane at

Henry Chapple Street. To the east of Shiloh Road, there are sidewalks, designated on-street parking, and unprotected bike lanes on both sides of the road. To the west of Shiloh, there is a shared-use path on much of the north side and a sidewalk on much of the south side of the street. There are also two nearby MET Transit bus stops on the south side of the road: one at Henry Chapple Street and the other at Hurdle Circle.

Broadwater Avenue is an east-west urban principal arterial according to the MDT, and a principal arterial according to the 2023 Billings LRTP. It has one travel lane in each direction and a speed limit of 35 mph in the study area. It serves as a link between residential neighborhoods in western Billings, some small commercial centers, and downtown Billings. Its eastern terminus is at its intersection with Division Street, 1st Ave N, and N 36th Street near downtown. Its western terminus is currently at a roundabout intersection with Shiloh Road. Currently, the roundabout's west leg only connects to two agricultural lots in active use, but the roundabout's infrastructure here has been built out in preparation for a potential westward extension of the road. 48th St W also intersects a road called Broadwater Avenue, but this local road segment is currently disconnected from the rest of the arterial network and is only accessible via 48th Street W. The arterial Broadwater Avenue has an exclusive westbound right-turn lane at the Shiloh roundabout. There is a shared-use path on the road's north side, and there is a sidewalk on the road's south side extending east.

Intersection traffic control currently comes in only three forms at the five existing study intersections: two-way stop control (TWSC), all-way stop control (AWSC), and roundabouts. Each leg of the three roundabouts has a crosswalk with a pedestrian refuge in the splitter island. Most of these crosswalks have solar-powered rectangular rapid flashing beacons. The intersection of Shiloh Road and Bell Avenue is considered two-way stop-controlled even though only one direction of traffic is stop-controlled. Only four movements are permitted at this intersection: northbound and southbound through movements and southbound and eastbound rights. Shiloh Road's center median prevents all left turns. The intersection of 48th Street and Central Avenue is all-way stop-controlled and is augmented with flashing red beacons facing all four directions, but it is projected to be upgraded to signalized control in 2026. **Exhibit 4** shows schematically the existing traffic control and lane arrangements at each existing intersection as well as posted speed limits on selected road segments as of the start of this study effort.

2.2 EXISTING TRAFFIC VOLUMES

Existing (2024) annualized volumes were estimated from raw field counts as described earlier in subsection 1.3 and are shown in **Exhibit 5**. These raw counts are provided in Appendix A.

2.3 HISTORIC GROWTH AND BACKGROUND CONDITION TRAFFIC

The "Background Condition" described here is represented by the volumes and intersection performance after multiple years of traffic growth assumed to occur during the permitting, construction, sales, and occupancy of the project. These steps are expected to be complete for Phase 1A in 2027. The resulting volumes and operating conditions form the basis for evaluating marginal intersection delay effects of traffic generated by this first phase of the Clearwater/44 West subdivision. Each new phase is projected to be completed two years before the last; Phase 1B in 2029, Phase 1C in 2031, and full buildout (Phase 2) in 2033. In order to estimate traffic growth without the project, average daily traffic volumes were gathered from selected MDT periodic data collection locations in the study area. The best and most logical data set available was represented by the four legs of the Shiloh intersection at Central. Data were recorded or estimated by MDT annually on each leg dating back at least 20 years. This historical traffic information is shown in the graph in **Exhibit 6**.

Counts from the most recent ten of these years were used to calculate the average annual growth rate in daily traffic for these four locations in aggregate, which was approximately 3.8% per year. This rate was then applied to the annualized peak hour intersection counts for each study year. Because the four phases of this project will be constructed sequentially and were not considered independent 'all-or-nothing' conditions at each two-year interval, each phase's traffic builds on that of the previous phase and each phase's traffic impacts were analyzed incrementally.

Exhibit 4. Existing Road and Intersection Basics

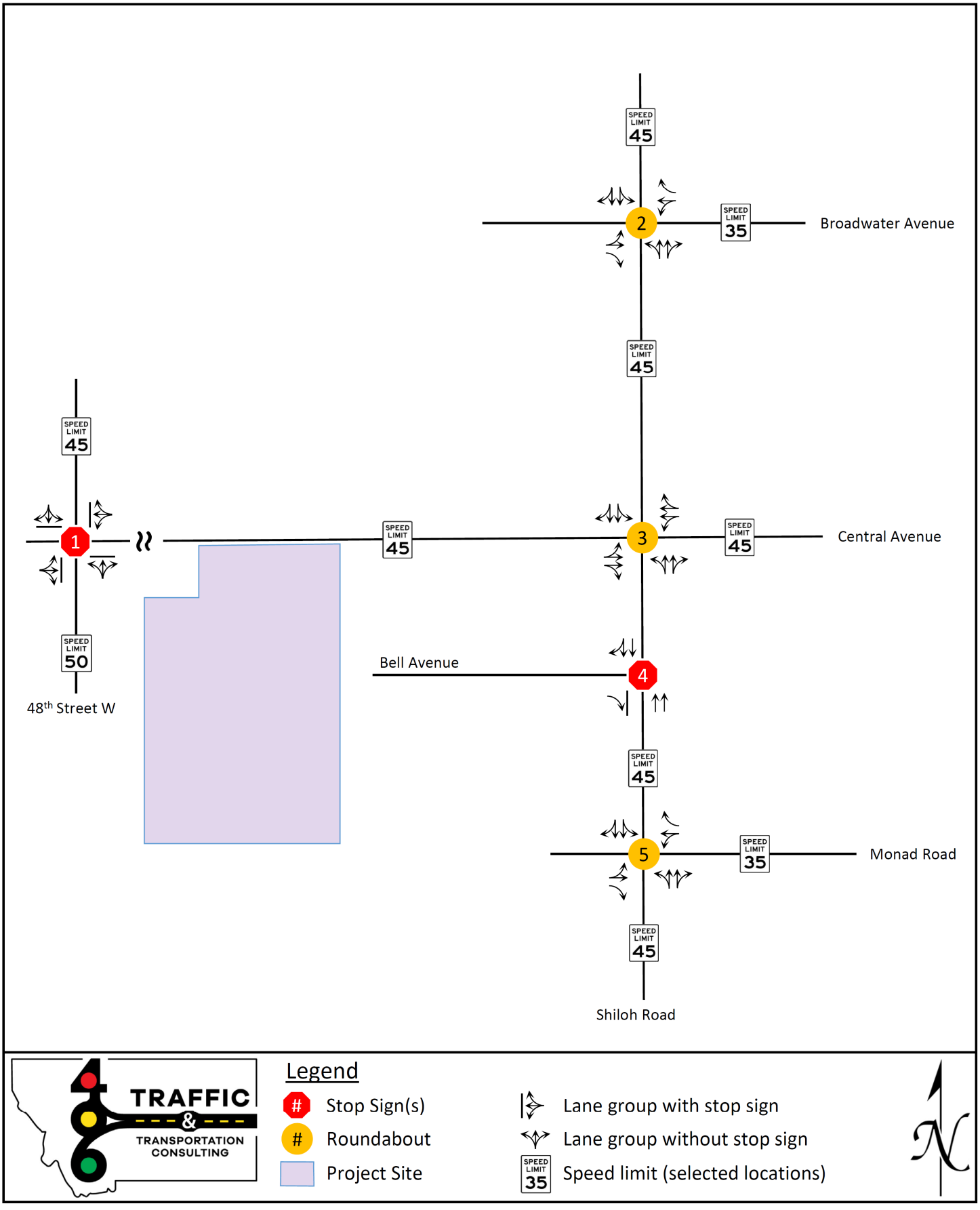


Exhibit 5. Existing Traffic Volumes

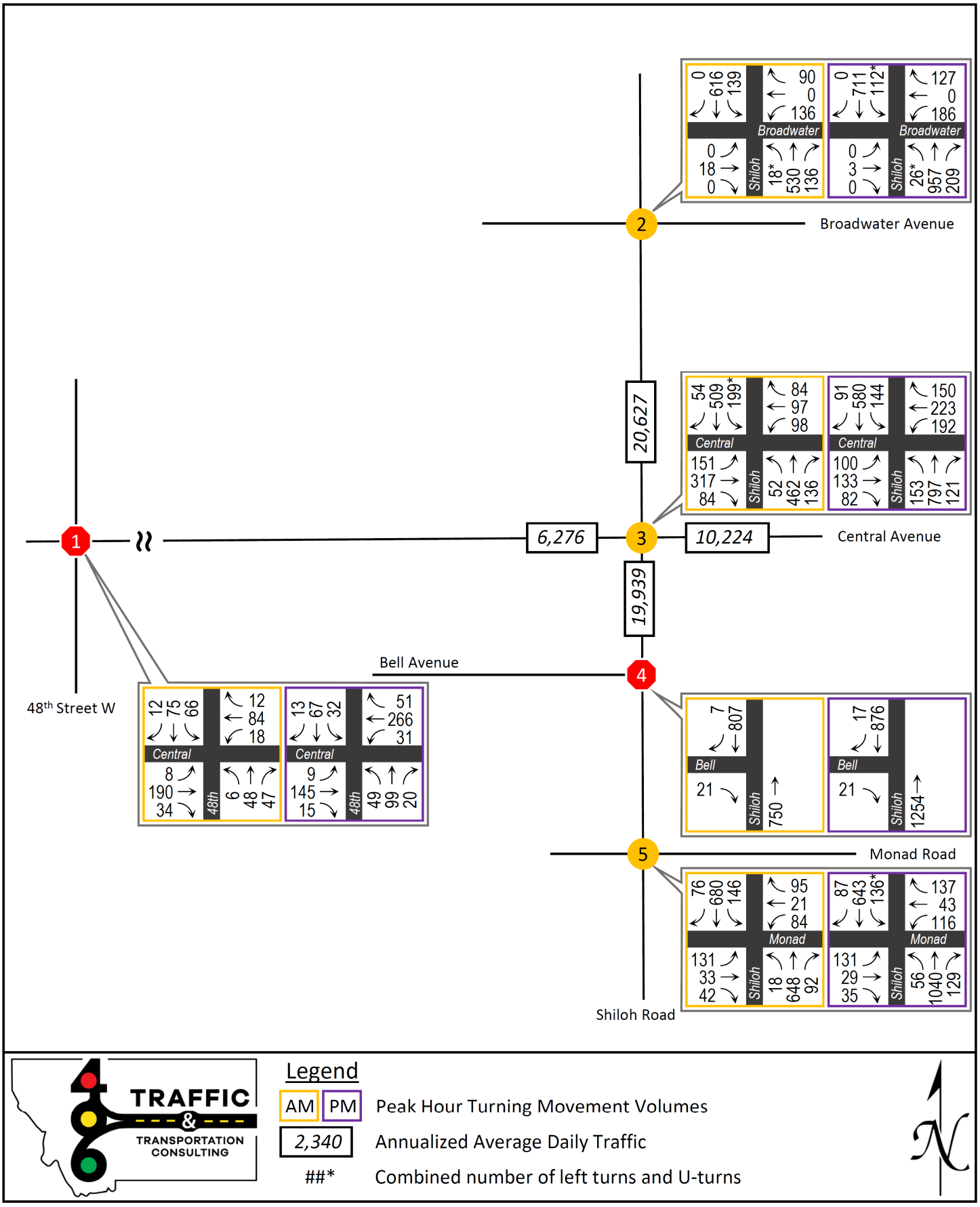
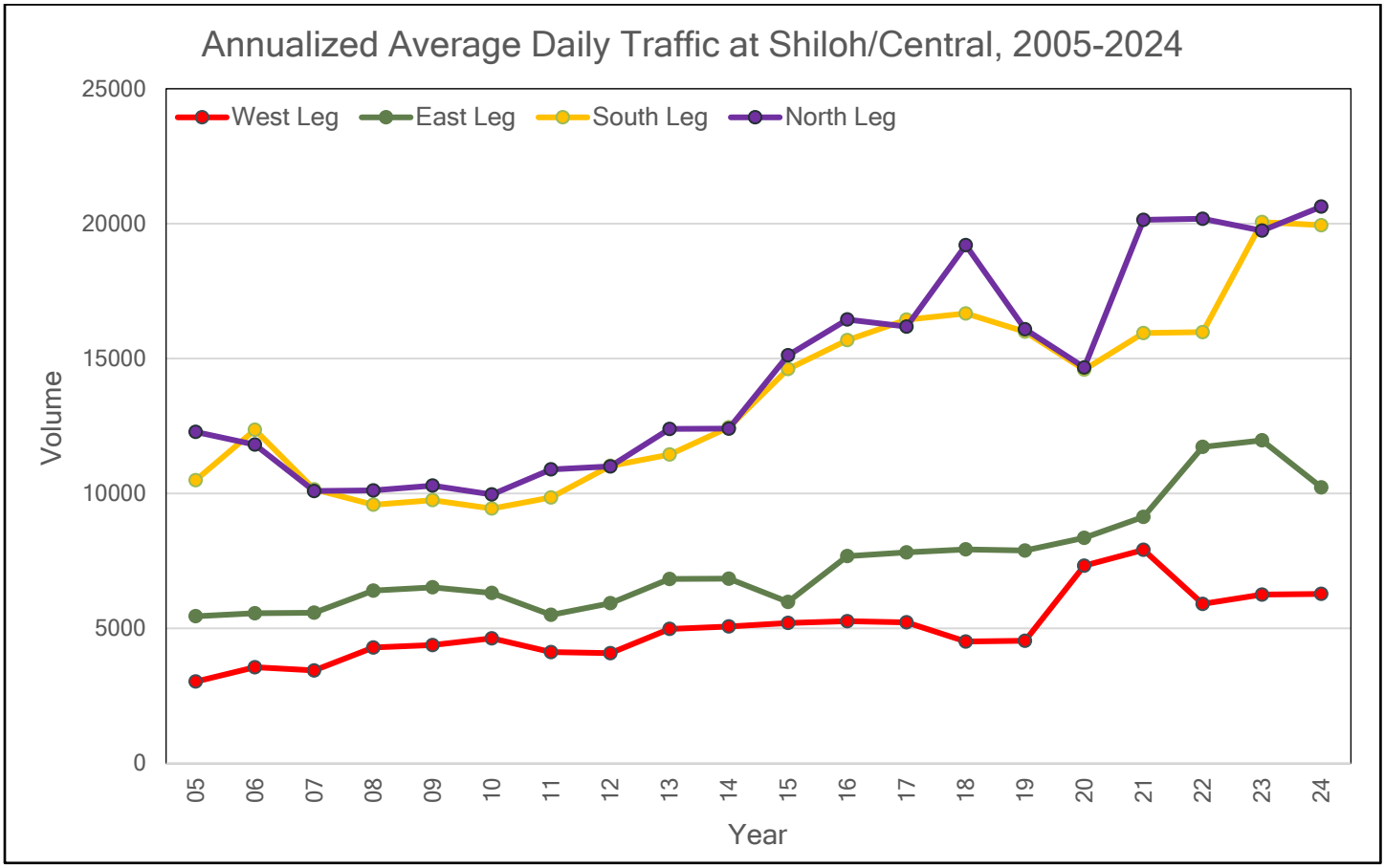


Exhibit 6. Historical Daily Traffic Volumes



2.4 Intersection Traffic Operations Without the Project

The existing and background peak hour intersection Level of Service (LOS) and delay results are shown in **Exhibit 7**. Analysis software results are provided in Appendix B.

Exhibit 7. Existing and Future Background Intersection LOS and Delay

	Intersection	Traffic Control	Peak Hour LOS (delay, in seconds/vehicle)
AM Peak Hour	1. 48th at Central	AWSC	A (9.6)
	2. Shiloh at Broadwater	Roundabout	A (6.0)
	3. Shiloh at Central	Roundabout	B (11.2)
	4. Shiloh at Bell	TWSC*	B (11.9)
	5. Shiloh at Monad	Roundabout	A (9.0)
PM Peak Hour	1. 48th at Central	AWSC	B (12.5)
	2. Shiloh at Broadwater	Roundabout	A (9.1)
	3. Shiloh at Central	Roundabout	B (13.6)
	4. Shiloh at Bell	TWSC*	B (12.2)
	5. Shiloh at Monad	Roundabout	B (10.0)

* *At Intersection 4, the worst lane group, which determines LOS, is Eastbound in both peak hours.*

The results in the table indicate that with 2024 annualized average traffic volume, all intersections operate at LOS B or better. Each roundabout has at least one approach that operates at LOS C in one or both peaks, but no approaches at LOS D or worse. Note that the only movement that must yield at Intersection 4 is eastbound Bell Avenue and that northbound traffic is not considered part of the intersection, due to the median present on Shiloh Road. At Intersection 5 in the PM peak, the delay estimate appears consistent with LOS A, but it is a rounded value that is actually just over 10.0 seconds so the software returns a LOS B result.

3 PROJECT TRIP GENERATION AND DISTRIBUTION

3.1 TRIP GENERATION

Trip generation rates, or equations as applicable, are from the Institute of Transportation Engineers (ITE) Trip Generation package's 11th edition. ITE trip generation data, when aggregated across enough varied sites, produce both simple average rates and best-fit equations, either linear or logarithmic, to help the analyst derive proper estimates for their situation. Equations are generally preferred over rates, especially for larger sites where trip generation per unit of land use can diminish with increasing project size.

Clearwater/44 West will consist almost entirely of residential land uses. Small parkland areas within the subdivision are designed and intended for use by residents and their guests, and will be similar to park spaces located in other residential areas around Billings. For that reason, they will not generate external traffic. The strip retail space in Phase 2, programmed for 22,000 square feet, has not had specific tenants or any sub-type(s) of retail use identified, but no drive-through activity is expected.

Three types of adjustments to trip generation were evaluated for this project. First, a discount is sometimes taken to reflect internal capture where multiple uses are present in a single project site. Second, a modal adjustment can be taken if a facility is clearly served by robust high-capacity transit and serves a clientele inclined to use transit to get there, or if the potential land use mix and walk/bike network are likely to lead to nonmotorized trips, either internal or external. Finally, some land uses such as gas stations or coffee shops attract trips that were already using the adjacent or nearby road network by virtue of improved convenience over a similar site that could have been used before. These are called "pass-by" and "diverted-linked" trips. Pass-by trips are those on streets bordering the site, while diverted-linked trips are those that might go slightly out of their way to stop at the establishment on their way to their destination.

The Phase 2 retail element is the only part of the site considered for these discounts. Due to the retail site's location, small size, and expected similarity to other sites along the Central Avenue corridor, only a small aggregate discount of the first two types was assumed here; it is not expected to support a use special enough or large enough to generate offsite multimodal or pass-by/diverted-linked trip activity. The estimated reduction in vehicle trip use for the on-site retail due to residents' use applied here is 10%. This reduction in retail vehicle trip use could take the form of subdivision residents (a) residents stopping at the on-site retail on their way to/from home, (b) choosing to drive to and from the on-site retail rather than a site farther away due to its proximity and convenience, or (c) choosing to walk or bike to and from the on-site retail for the same reason.

To arrive at phase-specific residential trip generation totals, the land use totals for the entire project (259 single family lots and 125 townhome or cottage lots) were first estimated, then the resulting trip totals were proportioned according to the amount of each home type in each phase. **Exhibit 8** shows trip generation details for each phase of the project.

Exhibit 8. Clearwater/44 West Trip Generation

		Daily	AM Peak Hour	PM Peak Hour
Full Project	ITE Land Use 210 – Single Family Detached Housing: X = 259 dwelling units			
	Equation	Ln(T) = 0.92(X) + 2.68	Ln(T) = 0.91(X) + 0.12	T = 0.60(X) - 3.93
	Peak hour in/out split		*25% / 75%*	*63% / 37%*
	Trips	2,422	177 (44 in / 133 out)	243 (153 in / 90 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 125 dwelling units (townhomes and "cottage" homes)			
	Equation	T = 7.62(X) - 50.48	T=0.52(X) - 5.70	T = 0.60(X) - 3.93
	Peak hour in/out split		*25% / 75%*	*59% / 41%*
	Trips	902	59 (15 in / 44 out)	71 (42 in / 29 out)
	ITE Land Use 822 – Strip Retail Plaza: X = 22 ksf (thousands of square feet)			
	Equation	T = 42.2(X) + 229.68	T = 2.36(X)	T = 6.59(X)
	Peak hour in/out split		*60% / 40%*	*50% / 50%*
	Gross retail trips	1,158	52 (31 in / 21 out)	145 (72 in / 73 out)
	Less 10% internal	-116	-5 (-3 in / -2 out)	-14 (-7 in / -7 out)
	Trips [net]	1,042	47 (28 in / 19 out)	131 (65 in, 66 out)
	Combined net trips, all uses:	**4,366**	**283 (87 in / 196 out)**	**445 (260 in / 185 out)**
by Phase		**Daily**	**AM Peak Hour**	**PM Peak Hour**
1A	ITE Land Use 210 – Single Family Detached Housing: X = 82 dwelling units			
	Trips	767	56 (14 in / 42 out)	77 (48 in / 29 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 44 dwelling units			
	Trips	317	21 (5 in / 16 out)	25 (15 in / 10 out)
	Phase 1A Total Trips	1,084	77 (19 in / 58 out)	102 (63 in / 39 out)
1B	ITE Land Use 210 – Single Family Detached Housing: X = 23 dwelling units			
	Trips	215	16 (4 in / 12 out)	22 (14 in / 8 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 51 dwelling units (townhomes and cottages)			
	Trips	368	24 (6 in / 18 out)	29 (17 in / 12 out)
	Phase 1B Total Trips	583	40 (10 in / 30 out)	51 (31 in / 20 out)
1C	ITE Land Use 210 – Single Family Detached Housing: X = 26 dwelling units			
	Trips	243	17 (4 in / 13 out)	24 (15 in / 9 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 30 dwelling units (townhomes and "cottage" homes)			
	Trips	216	15 (4 in / 11 out)	17 (10 in / 7 out)
	Phase 1C Total Trips	459	32 (8 in / 24 out)	41 (25 in / 16 out)
2	Phase 2 – Single Family Detached Housing: X = 128 dwelling units			
	Trips	1,197	88 (22 in / 66 out)	120 (76 in / 44 out)
	ITE Land Use 822 – Strip Retail Plaza: X = 22 ksf (thousands of square feet)			
	Trips [net]	1,042	47 (28 in / 19 out)	131 (65 in, 66 out)
	Phase 2 Total Trips	2,239	135 (50 in / 85 out)	251 (141 in, 110 out)
	Combined net trips, all phases:	**4,366**	**283 (87 in / 196 out)**	**445 (260 in / 185 out)**

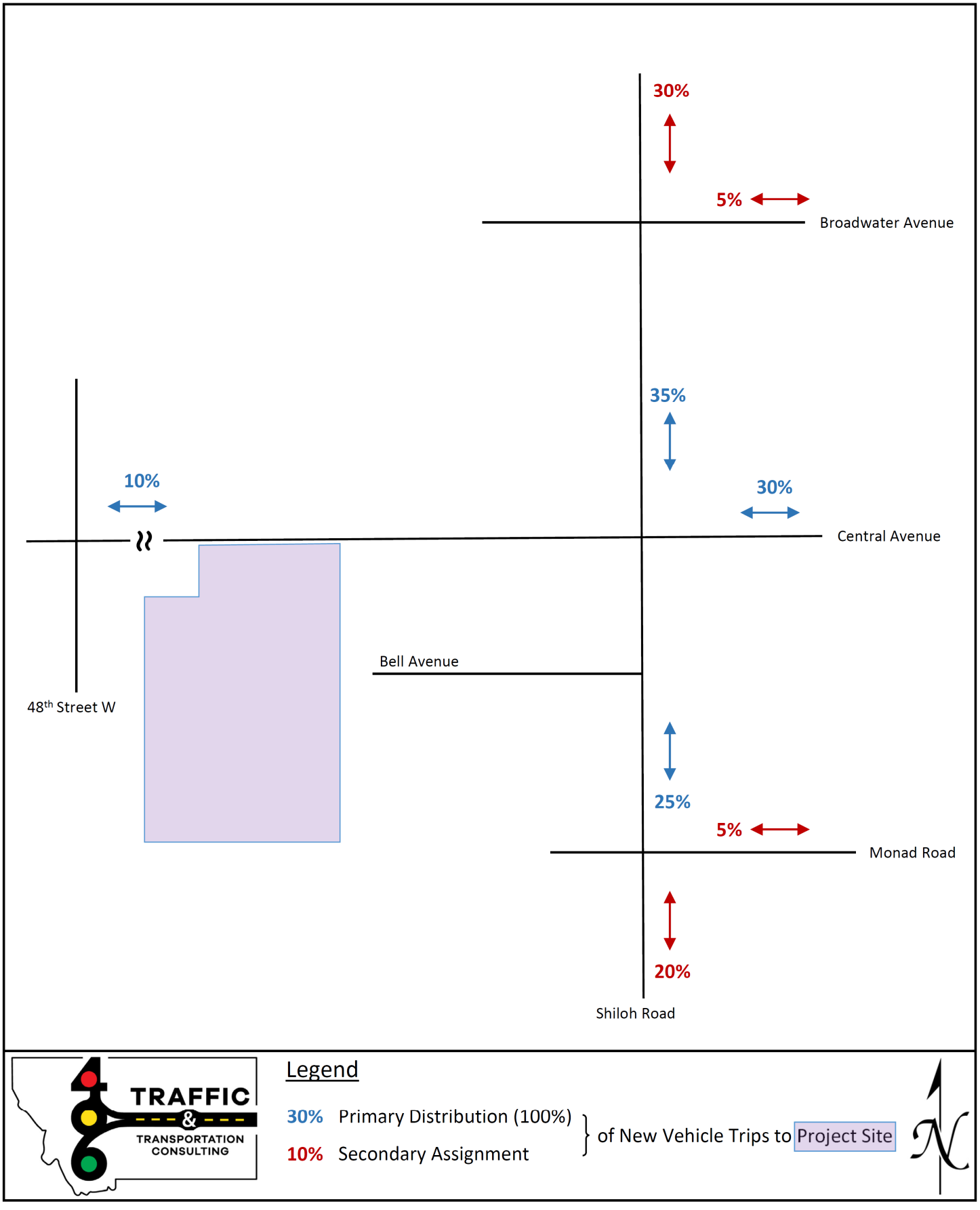
Source: Equations from ITE Trip Generation, 11th Edition.

3.2 TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution has been estimated for the streets surrounding the project site in percentages that add to 100%. Farther from the site, traffic eventually disperses in smaller percentages to/from other routes. Because there is no new information regarding a future developer's plan to connect Bell Avenue and/or the similar connection in Phase 2 to the neighborhood to the west, no Clearwater traffic was assumed to use either such connection. Trip distribution and large-scale assignment percentages are shown in **Exhibit 9**.

Note that the Shiloh median that blocks all left turns results in some differences in routing of in-out pairs once Bell becomes available for Phase 2 access to this site. For example, many residents leaving the site bound for the Shiloh/Monad intersection can turn right at the Shiloh/Bell intersection, but when they return to this site they must go north on Shiloh past Bell, then make a u-turn or left turn at the Shiloh/Central roundabout.

Exhibit 9. Trip Distribution Percentages for New Trips



Background traffic, project trips and total traffic reflected as peak hour intersection turning movement volumes and selected daily link volumes are shown in exhibits for each future phase-specific study year. Only the future traffic for the first phase (1A) is a true "without the project" estimate. Each subsequent phase's impact is assessed with the previous phase assumed to be open. As such, "Phase 2" conditions represent full project buildout. For the sake of report continuity, all 'future traffic volume' exhibits are provided in Appendix C.

4 CAPACITY ANALYSIS

The analysis results described in this section are organized by project phase order. Note again that project traffic by phase is additive such that, for example, Phase 1B also includes Phase 1A. Summaries of intersection capacity and auxiliary turn lane analysis results are provided for each phase in the study area when it's projected to be fully open. As with the existing condition, intersection capacity analysis software output results for the future conditions analyzed are provided in Appendix B. Turn lane warrant summaries for applicable situations are provided in Appendix D and summaries of MUTCD signal warrant analysis for Intersection 7 are provided by phase in Appendix E.

4.1 PHASE 1A

The peak hour intersection Level of Service (LOS) and delay results in 2027 with and without Clearwater/ 44 West subdivision Phase 1A traffic are shown in **Exhibit 10**.

Exhibit 10. Projected 2027 Intersection LOS and Delay: Phase 1A

	Intersection	Traffic Control	LOS (delay, in seconds/vehicle)	
			Background (Without Phase 1A)	With Phase 1A
AM Peak Hour	1. 48th at Central	Signal	A (6.2)	A (6.2)
	2. Shiloh at Broadwater	Roundabout	A (6.5)	A (6.6)
	3. Shiloh at Central	Roundabout	B (14.5)	C (15.9)
	4. Shiloh at Bell	TWSC*	B (12.6)	B (12.7)
	5. Shiloh at Monad	Roundabout	B (10.8)	B (10.9)
	6. Double Haul at Central	TWSC*	-	B (12.5)
	7. 44th at Central	TWSC*	-	B (12.6)
PM Peak Hour	1. 48th at Central	Signal	A (7.0)	A (7.0)
	2. Shiloh at Broadwater	Roundabout	B (11.0)	B (11.2)
	3. Shiloh at Central	Roundabout	C (18.9)	C (21.8)
	4. Shiloh at Bell	TWSC*	B (12.9)	B (13.0)
	5. Shiloh at Monad	Roundabout	B (12.5)	B (12.7)
	6. Double Haul at Central	TWSC*	-	B (11.3)
	7. 44th at Central	TWSC*	-	B (10.7)

* *Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.*

Both of the site accesses on Central would operate at LOS B in both 2027 peak hours. All intersections and both new site accesses would operate within the City's LOS standard of C or better in both peak hours. As a result of this finding, no additional control beyond a side-street (northbound) stop sign is considered necessary.

A simple look at 2027 Phase 1 turning volumes on Central made it clear that the potential need for auxiliary left turn lanes was worth examining, in accord with the MDT procedures described earlier in this report, in subsection 1.3. Right turn lane volumes at Intersections 6 and 7 would be too low (under 40 vph) for potential auxiliary turn lane consideration. Although left-turning volumes into the site will be higher in the PM peak due to the project's residential nature, conditions on the appropriate MDT left turn chart have been plotted for both peaks. While a westbound left turn auxiliary lane at Double Haul is not justified by Phase 1A traffic under the assumptions in this study, the potential case for such a lane at 44th appears to be inconclusive.

At Intersection 7, no signal warrants would be met under Phase 1A conditions.

4.2 PHASE 1B

The peak hour intersection Level of Service (LOS) and delay results in 2029 with and without Clearwater/44 West subdivision Phase 1B traffic are shown in **Exhibit 11**.

Exhibit 11. Projected 2029 Intersection LOS and Delay: Phase 1B

	Intersection	Traffic Control	LOS (delay, in seconds/vehicle) Without Phase 1B	With Phase 1B
AM Peak Hour	1. 48th at Central	Signal	A (6.4)	A (6.4)
	2. Shiloh at Broadwater	Roundabout	A (7.2)	A (7.2)
	3. Shiloh at Central	Roundabout	C (20.9)	C (22.4)
	4. Shiloh at Bell	TWSC*	B (13.2)	B (13.3)
	5. Shiloh at Monad	Roundabout	B (12.8)	B (13.0)
	6. Double Haul at Central	TWSC*	B (13.0)	B (13.1)
	7. 44th at Central	TWSC*	B (13.0)	B (13.6)
PM Peak Hour	1. 48th at Central	Signal	A (7.3)	A (7.3)
	2. Shiloh at Broadwater	Roundabout	B (13.1)	B (13.3)
	3. Shiloh at Central	Roundabout	D (31.1)	D (33.7)
	4. Shiloh at Bell	TWSC*	B (13.6)	B (13.6)
	5. Shiloh at Monad	Roundabout	C (15.5)	C (15.7)
	6. Double Haul at Central	TWSC*	B (11.7)	B (12.1)
	7. 44th at Central	TWSC*	B (11.0)	B (11.3)

* *Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.*

Both of the site accesses on Central would operate at LOS B in both 2029 peak hours. The 2029 study year marks the first time an intersection's peak LOS would exceed the City's standard (C or better), with the Shiloh intersection at Central projected operate at LOS D with or without Phase 1B traffic. In addition, each of the four approaches to the intersection would operate at the same LOS with or without Phase 1B traffic. The discussion of mitigating the LOS impact at this location is deferred to the next subsection, on Phase 1C.

With respect to auxiliary turn lanes at Intersections 6 and 7, as with 2027, the 2029 right turn lane volumes would remain too low for potential consideration. Although left-turning volumes into the site will be higher in the PM peak due to the project's residential nature, conditions on the appropriate MDT chart have been plotted for both peaks. A westbound left turn auxiliary lane at 44th would be justified by Phase 1B traffic, but the potential case for such a lane at Double Haul Lane appears to be inconclusive.

Note that the LOS results shown in Exhibit 11 above for the 44th intersection do not reflect the addition of a westbound left turn auxiliary lane, but that lane addition could be expected to result in a slight improvement in overall operations.

At Intersection 7, no signal warrants would be met under Phase 1B conditions.

4.2 PHASE 1C

The peak hour intersection Level of Service (LOS) and delay results in 2031 with and without Clearwater/44 West subdivision Phase 1C traffic are shown in **Exhibit 12**.

Exhibit 12. Projected 2031 Intersection LOS and Delay: Phase 1C

	Intersection	Traffic Control	LOS (delay, in seconds/vehicle) Without Phase 1C	With Phase 1C
AM Peak Hour	1. 48th at Central	Signal	A (6.6)	A (6.6)
	2. Shiloh at Broadwater	Roundabout	A (7.8)	A (7.8)
	3. Shiloh at Central	Roundabout	D (32.8)	E (35.3)
	4. Shiloh at Bell	TWSC*	B (13.9)	B (14.0)
	5. Shiloh at Monad	Roundabout	C (15.8)	C (15.9)
	6. Double Haul at Central	TWSC*	B (13.7)	B (13.7)
	7. 44th at Central	TWSC*	B (14.2)	B (15.0)
PM Peak Hour	1. 48th at Central	Signal	A (7.7)	A (7.7)
	2. Shiloh at Broadwater	Roundabout	C (16.5)	C (16.7)
	3. Shiloh at Central	Roundabout	F (54.2)	F (58.6)
	4. Shiloh at Bell	TWSC*	B (14.3)	B (14.4)
	5. Shiloh at Monad	Roundabout	C (20.6)	C (20.9)
	6. Double Haul at Central	TWSC*	B (12.5)	B (12.5)
	7. 44th at Central	TWSC*	B (11.6)	B (12.0)

* *Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.*

Both of the site accesses on Central would operate at LOS B in both 2031 peak hours. The Shiloh intersection at Central would remain the only intersection projected operate at LOS D or worse, and it would do so in both peaks with or without Phase 1C traffic. PM peak hour traffic would be expected to experience considerably higher delay than AM peak hour traffic, so the PM case is the one subject to the examination of potential mitigation to reduce projected delay.

To address future capacity deficiencies, a primary tool at roundabouts is the addition of a channelized right turn bypass lane on the approach(es) with the highest right-turning volumes. Such a bypass lane requires widening and would lengthen pedestrian crossings, as with the addition of a turn lane at any intersection. The westbound approach to Shiloh/Central would exhibit the longest delays and queues in the 2031 PM peak hour scenario, so it was the one examined for potential benefit. It also has the highest right-turn volume of the four approaches. Simple testing shows that addition of a bypass lane would reduce westbound delay by about 67%, which would be enough of an improvement to improve the overall intersection PM peak LOS (and delay) from the F (58.6) shown in Exhibit 12 above to E (40.0). Synchro's estimate of the 95th percentile westbound queue would be reduced by about half, from 17 vehicles in each lane to 9 in one lane and 8 in the other. While no site-oriented movements would benefit directly from the bypass lane because it carries no such trips, the secondary benefit makes it worth exploring further as an intersection delay impact mitigation action.

The projection of substandard operations at Shiloh/Central, even without Phase 1C traffic, echoes similar findings for other major Shiloh roundabouts from recent studies. Some of this congestion stems from the scarcity of east-west street network connections other than the major arterials that are generally a mile apart. To that end, a secondary, "bigger-picture" part of the overall solution could involve the westward extension of the east-west streets a half-mile north/south of Central (Broadwater and/or Monad) to help relieve the traffic burden on Grand, Central, and King. Examination of the complex and detailed effects of such extensions are well outside the scope of this project's mitigation analysis but still bear mentioning for general interest. The applicant team encourages the City to consider prioritizing, to the extent practicable, additional east-west connectivity between Shiloh and 48th with eventual functional extensions of Broadwater and/or Monad as additional land use changes occur along those alignments.

With respect to auxiliary turn lanes at Intersections 6 and 7, as with 2027 and 2029 the 2031 right turn lane volumes would remain too low for potential consideration. Although left-turning volumes into the site will be higher in the PM peak due to the project's residential nature, conditions on the appropriate MDT chart have been plotted for both peaks. Westbound left turn auxiliary lanes would be justified by Phase 1C traffic at both Double Haul Lane and 44th.

Note that the LOS results shown in Exhibit 12 above for the Double Haul and 44th intersections do not reflect the addition of westbound left turn auxiliary lanes, but that lane addition could be expected to result in a slight improvement in overall operations.

At Intersection 7, only the Four-Hour signal warrant would be met under Phase 1C conditions.

4.2 PHASE 2

The peak hour intersection Level of Service (LOS) and delay results in 2033 with and without Clearwater/44 West subdivision Phase 2 traffic are shown in **Exhibit 13**.

Exhibit 13. Projected 2033 Intersection LOS and Delay: Phase 2

	Intersection	Traffic Control	LOS (delay, in seconds/vehicle) Without Phase 2	With Phase 2
AM Peak Hour	1. 48th at Central	Signal	A (6.9)	A (6.9)
	2. Shiloh at Broadwater	Roundabout	A (8.5)	A (8.7)
	3. Shiloh at Central	Roundabout	F (58.5)	F (74.9)
	4. Shiloh at Bell	TWSC*	B (14.8)	C (15.6)
	5. Shiloh at Monad	Roundabout	C (21.1)	C (22.3)
	6. Double Haul at Central	TWSC*	B (14.4)	C (16.3)
	7. 44th at Central	TWSC*	C (15.8)	C (18.0)
PM Peak Hour	1. 48th at Central	Signal	A (8.2)	A (8.3)
	2. Shiloh at Broadwater	Roundabout	C (22.3)	C (24.6)
	3. Shiloh at Central	Roundabout	F (96.1)	F (144.6)
	4. Shiloh at Bell	TWSC*	C (15.2)	C (16.2)
	5. Shiloh at Monad	Roundabout	D (30.4)	D (33.5)
	6. Double Haul at Central	TWSC*	B (13.1)	B (14.8)
	7. 44th at Central	TWSC*	B (12.5)	B (14.8)

* *Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.*

In 2033, both of the site accesses on Central would operate at LOS B in the PM peak hour and at LOS C in the AM peak hour with or without the addition of Phase 2 traffic. The Shiloh intersection at Central would operate at LOS F in both peaks with or without Phase 2 traffic. Increasing background traffic also results in a projection that the Shiloh intersection at Monad would operate beyond the City's standard under the 2033 conditions examined, at LOS D, with or without Phase 2 traffic. At all roundabout intersections, PM peak hour traffic would be expected to experience considerably higher delay than AM peak hour traffic.

Mitigation of the Shiloh/Central condition would take the same form described for Phase 1C impacts, at least in concept: the eventual addition of a westbound right turn bypass lane. Testing with 2033 Phase 2 PM volumes indicates that addition of a bypass lane would reduce westbound delay by about 59%, which would be enough of an improvement to improve the overall intersection PM peak LOS (and delay) from the F (144.6) shown in Exhibit 13 above to F (105.9). Synchro's estimate of the 95th percentile westbound queue would be reduced by about 43%, from 29 vehicles per lane to 17. If additional delay mitigation is needed to reduce overall delay to pre-Phase 2 level [F (96.0)], a northbound right turn lane could also be considered.

No mitigations were tested for the LOS D condition at the Monad intersection.

With respect to auxiliary turn lanes at Intersections 6 and 7, as with previous phases the 2033 right turn lane volumes would remain too low for potential consideration. Because left turn lanes were justified by traffic from the previous phase, no new analysis of those lanes was conducted with the addition of Phase 2 traffic. The potential need for a right turn auxiliary lane was examined for the intersection of Shiloh at Bell, and this analysis indicated that PM peak hour traffic in Phase 2 would help to justify the addition of such a lane. As with previous phases, the LOS results shown in Exhibit 13 above do not reflect the addition of any auxiliary lanes.

At Intersection 7, the Four-Hour signal warrant would be met by a considerable margin under Phase 2 conditions, and the Eight-Hour warrant would be within the margin of estimating/forecasting uncertainty, with minor street volume slightly over the minimum threshold. With these two warrants technically met, a signal could be considered under 2033 conditions at this location. The project team recommends further monitoring of traffic volume conditions and consideration of future traffic to and from the property directly across Central to the north. That development project would create a new fourth leg (a southbound approach) to this intersection and was only in the early stages of planning/permitting at the time this TIS report was completed.

5 COST PARTICIPATION

The net new trips identified in this report were subject to examination under the City's arterial intersection cost participation program to the extent that they would travel through studied intersections. City staff also requested that the two project access intersections on Central be included even though they are effectively local streets (low-speed with parking and driveways, not connected to other major routes) rather than arterials. Critical traffic shares that drive intersection cost participation can be excluded if they fall below 2%, but project trips from all phases are considered together when evaluating such a possibility. Right turns are not considered in cost participation, so intersection 4 (Bell) was omitted here with the permission of City staff because the Shiloh Road median dictates that the intersection's only conflicting critical pairs involve right turns. Phase-specific project trips used in this calculation are documented in the traffic volume graphics provided in Appendix C.

The retail part of the site is scheduled to be developed in Phase 2 but it's located in the area covered by Phase 1A. Because that area is subject to a Subdivision Improvement Agreement that directly benefits the two future retail lots on the Phase 1 property, cost participation associated with retail trips was pulled forward from Phase 2 to Phase 1A.

Exhibit 14 shows the incremental intersection cost participation for the new trips associated and the cost share calculation with each project phase. As shown in the table, no intersections qualify for the "sub-2%" waiver when all phases are considered.

Exhibit 14. Intersection Cost Participation by Phase

	Phase				Project
Intersection	**1A**	**1B**	**1C**	**2**	**Total**
1. 48th at Central	1.1%	0.3%	0.2%	0.6%	2.2%
2. Shiloh at Broadwater	1.9%	0.5%	0.4%	1.2%	4.0%
3. Shiloh at Central	7.4%	1.7%	1.4%	3.3%	13.8%
5. Shiloh at Monad	1.8%	0.4%	0.3%	1.0%	3.5%
Arterial Intersection Subtotal:	**12.2%**	**2.9%**	**2.3%**	**6.1%**	**23.5%**
6. Double Haul at Central (Local)	8.6%	0.3%	0.2%	2.0%	11.1%
7. 44th at Central (Local)	9.2%	2.5%	2.1%	2.8%	16.6%
Total Participation:	**30.0%**	**5.7%**	**4.6%**	**10.9%**	**51.2%**

Note: each % represents the highest project critical-volume share of the two peak hours (AM or PM)

For all six intersections evaluated for cost participation in all phases, the PM peak hour critical-pair traffic volume would be equal to or greater than in the AM peak hour. It's important to note that more than half of the critical traffic shares indicated would occur at the two local intersections (6 and 7), both of which would operate within the City's LOS C standard in both peaks in all project phases. The details of these cost participation calculations are provided in Appendix F.

This concludes the Clearwater/44 West Subdivision TIS.

Appendix A: Original Raw Traffic Count Data for Intersections

Study Name **Central and 48th**
Start Date **8/8/2023**
Start Time **7:30 AM**
Type **Road**
Classification **Totals**

	48th Street Southbound				Central Avenue Westbound				48th Street Northbound				Central Avenue Eastbound			
Start Time	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM																
7:15 AM																
7:30 AM	3	13	19	0	3	27	2	0	18	9	2	0	5	62	1	0
7:45 AM	3	26	21	0	3	24	5	0	9	10	1	0	12	48	1	0
8:00 AM	4	19	12	0	3	17	5	0	10	13	3	0	10	44	2	0
8:15 AM	2	15	13	0	3	14	5	0	8	14	0	0	6	31	4	0
8:30 AM																
8:45 AM																
4:00 PM																
4:15 PM																
4:30 PM																
4:45 PM																
5:00 PM	1	15	6	0	14	70	7	0	7	23	9	0	5	38	1	0
5:15 PM	3	19	12	0	17	60	12	0	5	30	19	0	5	40	2	0
5:30 PM	4	18	5	0	8	69	6	0	6	20	10	0	2	32	4	0
5:45 PM	5	14	8	0	10	60	5	0	1	23	9	0	2	31	2	0

Study Name **Shiloh & Broadwater**
Start Date **3/7/2024**
Start Time **7:00 AM**
Type **Road**
Classification **Totals**

	Shiloh Road Southbound				Broadwater Avenue Westbound				Shiloh Road Northbound				Eastbound Approach Eastbound			
Start Time	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	0	111	22	0	17	0	8	0	23	52	0	0	0	1	0	0
7:15 AM	0	147	52	0	21	0	25	0	35	102	0	6	0	3	0	0
7:30 AM	0	182	63	0	18	0	33	0	28	122	0	2	0	4	0	0
7:45 AM	0	170	34	0	23	0	39	0	38	140	0	4	0	4	0	0
8:00 AM	0	131	22	0	26	0	29	0	39	143	0	6	0	6	0	0
8:15 AM	0	139	21	0	24	0	36	0	32	130	0	6	0	4	0	0
8:30 AM	0	133	23	0	18	0	28	0	42	137	0	5	0	3	0	0
8:45 AM	0	150	49	0	18	0	28	0	34	124	0	3	0	4	0	0
4:00 PM	0	143	17	0	33	0	42	0	27	244	0	5	0	2	0	0
4:15 PM	0	151	25	0	20	0	46	0	36	226	0	2	0	0	1	0
4:30 PM	0	151	31	0	21	0	38	0	50	238	2	2	0	0	0	0
4:45 PM	0	177	21	0	24	0	37	0	35	201	1	3	0	0	0	0
5:00 PM	0	169	23	0	40	0	56	0	56	281	0	8	0	3	0	0
5:15 PM	0	193	32	1	44	0	52	0	63	283	4	8	0	0	0	0
5:30 PM	0	179	35	1	20	0	43	0	57	202	1	1	0	0	0	0
5:45 PM	0	160	33	2	20	1	35	0	43	200	0	0	0	0	0	0

Study Name **Shiloh & Central**
Start Date **3/21/2024**
Start Time **7:00 AM**
Type **Road**
Classification **Totals**

	Shiloh Road Southbound				Central Avenue Westbound				Shiloh Road Northbound				Central Avenue Eastbound			
Start Time	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	6	74	22	0	7	13	15	0	19	66	9	1	19	51	15	0
7:15 AM	8	118	48	0	7	18	28	0	32	84	14	0	25	90	17	0
7:30 AM	16	128	69	1	18	25	29	0	41	96	15	0	22	112	36	0
7:45 AM	17	135	67	0	26	19	34	0	36	130	19	0	20	91	42	0
8:00 AM	7	116	32	0	29	25	17	0	33	114	10	0	21	76	37	0
8:15 AM	15	135	31	1	12	29	19	0	27	127	9	0	22	41	38	0
8:30 AM	9	98	29	0	15	30	21	0	26	146	10	0	16	30	31	0
8:45 AM	10	102	31	1	20	22	24	0	17	119	20	0	22	40	30	0
4:00 PM	19	127	37	0	23	51	45	0	35	168	24	0	21	29	27	0
4:15 PM	20	100	34	0	35	41	58	0	26	156	45	0	20	39	25	0
4:30 PM	23	127	35	0	38	50	62	0	30	163	47	0	21	26	27	0
4:45 PM	19	153	33	0	41	45	49	0	26	174	41	0	15	36	23	0
5:00 PM	26	152	34	0	38	63	48	0	31	235	32	0	21	46	23	0
5:15 PM	24	154	43	0	35	67	35	0	35	233	35	0	26	26	28	0
5:30 PM	17	142	35	0	40	74	46	0	32	148	35	0	14	32	27	0
5:45 PM	21	148	30	0	31	46	41	0	32	162	26	0	24	22	30	0

Study Name Shiloh & Bell
Start Date 5/18/2023
Start Time 7:00 AM
Type Road
Classification Totals

	Shiloh Road Southbound				n/a Westbound				Shiloh Road Northbound				Bell Avenue Eastbound			
Start Time	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	1	126		0						103	0	0	1		0	0
7:15 AM	0	186		0						111	0	0	2		0	0
7:30 AM	2	181		0						228	0	0	7		0	0
7:45 AM	2	239		0						213	0	0	7		0	0
8:00 AM	1	184		0						169	0	0	7		0	0
8:15 AM	3	233		0						167	0	0	1		0	0
8:30 AM	2	163		0						180	0	0	3		0	0
8:45 AM	6	174		0						169	0	0	5		0	0
4:00 PM	2	225		0						272	0	0	6		0	0
4:15 PM	4	224		0						262	0	0	3		0	0
4:30 PM	3	212		0						311	0	0	2		0	0
4:45 PM	5	212		0						307	0	0	7		0	0
5:00 PM	4	241		0						357	0	0	8		0	0
5:15 PM	5	243		0						324	0	0	4		0	0
5:30 PM	6	213		0						263	0	0	7		0	0
5:45 PM	6	219		0						254	0	0	2		0	0

Study Name Shiloh & Monad
Start Date 10/24/2023
Start Time 7:00 AM
Type Road
Classification Totals

	Shiloh Road Southbound				Monad Road Westbound				Shiloh Road Northbound				Monad Road Eastbound			
Start Time	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	6	126	12	0	8	7	12	0	16	67	5	0	10	5	12	0
7:15 AM	12	129	36	0	11	9	15	0	22	113	1	0	13	3	25	0
7:30 AM	9	138	32	0	24	3	22	0	29	175	5	0	17	14	33	0
7:45 AM	16	215	49	0	29	8	21	0	21	190	8	0	12	7	36	0
8:00 AM	23	181	23	0	18	2	22	0	23	142	1	0	9	10	24	0
8:15 AM	26	128	38	0	22	7	17	0	17	123	3	0	2	1	34	0
8:30 AM	12	150	42	5	17	1	15	0	16	111	2	1	5	2	24	0
8:45 AM	10	135	20	0	20	5	9	0	14	109	1	0	10	3	16	0
4:00 PM	16	166	26	0	30	6	21	0	33	210	10	0	12	8	23	0
4:15 PM	15	162	23	0	25	10	20	0	30	203	7	0	6	15	23	0
4:30 PM	21	174	35	0	37	12	29	0	22	233	9	0	8	9	41	0
4:45 PM	18	154	27	1	29	8	32	0	28	236	18	0	6	0	35	0
5:00 PM	16	138	44	0	29	15	27	0	35	277	12	0	9	10	31	0
5:15 PM	30	160	25	0	38	6	25	0	40	266	16	0	11	9	20	0
5:30 PM	19	180	23	0	37	8	34	0	34	183	13	0	9	7	31	0
5:45 PM	24	156	28	0	37	10	16	0	25	176	13	0	11	12	21	0

Appendix B: Intersection Analysis Software Output

Scenario sequence:

Existing

2027 Background

2027 Phase 1A

2029 Without Phase 1B

2029 Phase 1B

2031 Without Phase 1C

2031 Phase 1C

2033 Without Phase 2

2033 Phase 2 (Full project buildout)

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	188	33	18	83	12	6	47	46	66	75	12
Future Vol, veh/h	8	188	33	18	83	12	6	47	46	66	75	12
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	1	1	1
Mvmt Flow	9	211	37	20	93	13	7	53	52	74	84	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	10.2	9.1	8.8	9.7
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	3%	16%	43%
Vol Thru, %	47%	82%	73%	49%
Vol Right, %	46%	14%	11%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	229	113	153
LT Vol	6	8	18	66
Through Vol	47	188	83	75
RT Vol	46	33	12	12
Lane Flow Rate	111	257	127	172
Geometry Grp	1	1	1	1
Degree of Util (X)	0.151	0.337	0.175	0.24
Departure Headway (Hd)	4.871	4.715	4.972	5.018
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	730	756	716	710
Service Time	2.946	2.777	3.045	3.088
HCM Lane V/C Ratio	0.152	0.34	0.177	0.242
HCM Control Delay, s/veh	8.8	10.2	9.1	9.7
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.5	1.5	0.6	0.9

Intersection	
Intersection Delay, s/veh	6.0
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	241	728	803
Demand Flow Rate, veh/h	0	243	742	811
Vehicles Circulating, veh/h	957	594	149	165
Vehicles Exiting, veh/h	19	297	808	672
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	6.1	5.7	6.1
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.601	0.399	0.470	0.530	0.470	0.530
Follow-Up Headway, s	1.000	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	3600	1420	1350	1420	1420	1420	1420	1420
B (Slope)	1.151e-3	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	146	97	349	393	381	430
Cap Entry Lane, veh/h	1196	629	782	857	1240	1240	1222	1222
Entry HV Adj Factor	1.000	1.000	0.993	0.990	0.980	0.981	0.991	0.990
Flow Entry, veh/h	0	0	145	96	342	386	378	426
Cap Entry, veh/h	1196	629	776	848	1215	1217	1211	1210
V/C Ratio	0.000	0.000	0.187	0.113	0.281	0.317	0.312	0.352
Control Delay, s/veh	3.0	5.7	6.6	5.4	5.5	5.9	5.9	6.3
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	0	1	1	1	2

Intersection	
Intersection Delay, s/veh	11.2
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	620	313	730	857
Demand Flow Rate, veh/h	632	322	753	866
Vehicles Circulating, veh/h	917	768	762	285
Vehicles Exiting, veh/h	234	747	787	805
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.6	8.0	13.7	7.6
Approach LOS	B	A	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.469	0.531	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	297	335	151	171	354	399	407	459
Cap Entry Lane, veh/h	581	651	666	739	670	743	1039	1115
Entry HV Adj Factor	0.981	0.981	0.973	0.969	0.970	0.970	0.990	0.990
Flow Entry, veh/h	291	329	147	166	343	387	403	454
Cap Entry, veh/h	570	639	648	717	649	721	1028	1103
V/C Ratio	0.511	0.514	0.227	0.231	0.529	0.537	0.392	0.412
Control Delay, s/veh	15.3	14.0	8.3	7.7	14.2	13.3	7.7	7.6
LOS	C	B	A	A	B	B	A	A
95th %tile Queue, veh	3	3	1	1	3	3	2	2

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	22	0	766	825	8
Future Vol, veh/h	0	22	0	766	825	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	25	0	861	927	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	468	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	547	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	547	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.89	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	547	-	-
HCM Lane V/C Ratio	-	0.045	-	-
HCM Ctrl Dly (s/v)	-	11.9	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	9.0
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	251	244	924	1100
Demand Flow Rate, veh/h	259	251	933	1111
Vehicles Circulating, veh/h	1122	985	386	154
Vehicles Exiting, veh/h	143	334	995	1082
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.0	9.3	9.2	7.6
Approach LOS	B	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.795	0.205	0.526	0.474	0.471	0.529	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	206	53	132	119	439	494	522	589
Cap Entry Lane, veh/h	481	547	545	615	999	999	1234	1234
Entry HV Adj Factor	0.970	0.962	0.971	0.975	0.989	0.991	0.990	0.990
Flow Entry, veh/h	200	51	128	116	434	490	517	583
Cap Entry, veh/h	466	526	530	599	989	991	1222	1221
V/C Ratio	0.428	0.097	0.242	0.194	0.439	0.494	0.423	0.477
Control Delay, s/veh	15.5	8.1	10.2	8.4	8.7	9.6	7.2	8.0
LOS	C	A	B	A	A	A	A	A
95th %tile Queue, veh	2	0	1	1	2	3	2	3

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	143	15	30	264	50	48	98	20	31	67	13
Future Vol, veh/h	9	143	15	30	264	50	48	98	20	31	67	13
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	10	166	17	35	307	58	56	114	23	36	78	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	10.7	14.6	11.2	10.4
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	5%	9%	28%
Vol Thru, %	59%	86%	77%	60%
Vol Right, %	12%	9%	15%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	166	167	344	111
LT Vol	48	9	30	31
Through Vol	98	143	264	67
RT Vol	20	15	50	13
Lane Flow Rate	193	194	400	129
Geometry Grp	1	1	1	1
Degree of Util (X)	0.305	0.293	0.567	0.209
Departure Headway (Hd)	5.692	5.44	5.099	5.82
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	629	658	708	614
Service Time	3.742	3.488	3.138	3.873
HCM Lane V/C Ratio	0.307	0.295	0.565	0.21
HCM Control Delay, s/veh	11.2	10.7	14.6	10.4
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.3	1.2	3.6	0.8

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	360	1370	946
Demand Flow Rate, veh/h	0	360	1370	955
Vehicles Circulating, veh/h	1169	1130	130	244
Vehicles Exiting, veh/h	30	370	1039	1246
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	13.6	9.0	7.6
Approach LOS	-	B	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.594	0.406	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	214	146	644	726	449	506
Cap Entry Lane, veh/h	461	526	477	543	1262	1262	1137	1137
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.991
Flow Entry, veh/h	0	0	214	146	644	726	445	501
Cap Entry, veh/h	461	526	477	543	1261	1262	1126	1127
V/C Ratio	0.000	0.000	0.448	0.269	0.510	0.575	0.395	0.445
Control Delay, s/veh	7.8	6.8	15.8	10.4	8.3	9.5	7.2	8.0
LOS	A	A	C	B	A	A	A	A
95th %tile Queue, veh	0	0	2	1	3	4	2	2

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	339	607	1152	877
Demand Flow Rate, veh/h	339	607	1152	886
Vehicles Circulating, veh/h	993	1130	408	611
Vehicles Exiting, veh/h	504	430	924	1126
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.3	19.9	12.1	12.6
Approach LOS	B	C	B	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.469	0.531	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	159	180	285	322	541	611	416	470
Cap Entry Lane, veh/h	541	611	477	543	927	1004	769	845
Entry HV Adj Factor	1.002	0.998	1.001	0.999	1.001	0.999	0.991	0.989
Flow Entry, veh/h	159	180	285	322	541	611	412	465
Cap Entry, veh/h	543	609	478	543	928	1003	762	835
V/C Ratio	0.294	0.295	0.597	0.593	0.583	0.609	0.541	0.556
Control Delay, s/veh	10.8	9.8	21.1	18.8	12.1	12.0	12.8	12.4
LOS	B	A	C	C	B	B	B	B
95th %tile Queue, veh	1	1	4	4	4	4	3	3

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	21	0	1280	896	17
Future Vol, veh/h	0	21	0	1280	896	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	23	0	1391	974	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	496	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	525	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	525	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.18	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	525	-	-
HCM Lane V/C Ratio	-	0.044	-	-
HCM Ctrl Dly (s/v)	-	12.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	10.0
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	201	305	1263	893
Demand Flow Rate, veh/h	206	305	1263	902
Vehicles Circulating, veh/h	931	1268	310	222
Vehicles Exiting, veh/h	193	305	827	1351
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.8	14.1	11.1	7.1
Approach LOS	A	B	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.820	0.180	0.538	0.462	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	169	37	164	141	594	669	424	478
Cap Entry Lane, veh/h	573	644	420	483	1071	1071	1160	1160
Entry HV Adj Factor	0.979	0.973	1.000	1.000	0.999	1.001	0.990	0.991
Flow Entry, veh/h	165	36	164	141	594	669	420	473
Cap Entry, veh/h	561	626	420	483	1070	1072	1149	1149
V/C Ratio	0.295	0.057	0.390	0.292	0.555	0.625	0.365	0.412
Control Delay, s/veh	10.6	6.4	15.9	11.9	10.2	11.9	6.8	7.4
LOS	B	A	C	B	B	B	A	A
95th %tile Queue, veh	1	0	2	1	4	5	2	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	210	37	20	93	13	7	53	51	74	84	13
Future Volume (veh/h)	9	210	37	20	93	13	7	53	51	74	84	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	10	236	42	22	104	15	8	60	57	83	94	15
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	197	404	70	250	371	49	207	200	178	395	228	31
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	28	1398	243	133	1285	169	50	787	702	526	899	121
Grp Volume(v), veh/h	288	0	0	141	0	0	125	0	0	192	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1587	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	1.3	0.0	0.0	1.3	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.03		0.15	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	671	0	0	670	0	0	585	0	0	654	0	0
V/C Ratio(X)	0.43	0.00	0.00	0.21	0.00	0.00	0.21	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	2341	0	0	2198	0	0	2171	0	0	2205	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.0	0.0	0.0	5.4	0.0	0.0	6.0	0.0	0.0	6.2	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.4	0.0	0.0	5.6	0.0	0.0	6.1	0.0	0.0	6.4	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		288			141			125			192	
Approach Delay, s/veh		6.4			5.6			6.1			6.4	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	9.5	10.2	9.5	10.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	25.5	25.5	25.5
Max Q Clear Time (g_c+I1), s	3.3	4.9	4.0	3.3
Green Ext Time (p_c), s	0.5	1.4	0.9	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	6.2
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	6.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	269	813	862
Demand Flow Rate, veh/h	0	272	829	871
Vehicles Circulating, veh/h	1035	664	167	185
Vehicles Exiting, veh/h	21	332	868	751
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	6.9	6.3	6.6
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	164	108	390	439	409	462
Cap Entry Lane, veh/h	521	589	733	808	1220	1220	1200	1200
Entry HV Adj Factor	1.000	1.000	0.988	0.991	0.980	0.982	0.991	0.989
Flow Entry, veh/h	0	0	162	107	382	431	405	457
Cap Entry, veh/h	521	589	724	800	1196	1198	1189	1187
V/C Ratio	0.000	0.000	0.224	0.134	0.320	0.360	0.341	0.385
Control Delay, s/veh	6.9	6.1	7.5	5.9	6.0	6.5	6.3	6.8
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	0	1	2	2	2

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	694	349	816	955
Demand Flow Rate, veh/h	708	360	840	964
Vehicles Circulating, veh/h	1022	858	851	318
Vehicles Exiting, veh/h	260	833	879	900
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	20.2	9.3	18.5	8.7
Approach LOS	C	A	C	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.469	0.531	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	333	375	169	191	395	445	453	511
Cap Entry Lane, veh/h	527	596	613	685	617	689	1007	1084
Entry HV Adj Factor	0.980	0.981	0.972	0.969	0.970	0.971	0.990	0.990
Flow Entry, veh/h	326	368	164	185	383	432	449	506
Cap Entry, veh/h	516	584	596	664	599	669	998	1073
V/C Ratio	0.632	0.630	0.276	0.279	0.640	0.646	0.450	0.472
Control Delay, s/veh	21.3	19.2	9.7	8.9	19.3	17.9	8.8	8.7
LOS	C	C	A	A	C	C	A	A
95th %tile Queue, veh	4	4	1	1	5	5	2	3

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	25	0	856	922	9
Future Vol, veh/h	0	25	0	856	922	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	28	0	962	1036	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	523	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	504	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	504	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.57	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	504	-	-
HCM Lane V/C Ratio	-	0.056	-	-
HCM Ctrl Dly (s/v)	-	12.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	280	272	1033	1230
Demand Flow Rate, veh/h	288	280	1043	1242
Vehicles Circulating, veh/h	1255	1099	430	171
Vehicles Exiting, veh/h	158	374	1113	1208
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	18.7	11.1	11.0	8.7
Approach LOS	C	B	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.795	0.205	0.525	0.475	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	229	59	147	133	490	553	584	658
Cap Entry Lane, veh/h	426	489	491	558	960	960	1215	1215
Entry HV Adj Factor	0.972	0.966	0.974	0.970	0.991	0.990	0.990	0.991
Flow Entry, veh/h	223	57	143	129	486	548	578	652
Cap Entry, veh/h	414	472	478	541	952	951	1203	1204
V/C Ratio	0.538	0.121	0.299	0.238	0.510	0.576	0.480	0.541
Control Delay, s/veh	21.1	9.3	12.2	9.9	10.2	11.7	8.1	9.2
LOS	C	A	B	A	B	B	A	A
95th %tile Queue, veh	3	0	1	1	3	4	3	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	160	17	34	295	56	54	109	22	35	75	15
Future Volume (veh/h)	10	160	17	34	295	56	54	109	22	35	75	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	12	186	20	40	343	65	63	127	26	41	87	17
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	168	587	61	190	530	95	270	255	46	259	270	45
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	33	1484	153	76	1341	241	340	1075	194	298	1139	191
Grp Volume(v), veh/h	218	0	0	448	0	0	216	0	0	145	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1658	0	0	1608	0	0	1628	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.2	0.0	0.0	5.4	0.0	0.0	2.8	0.0	0.0	1.7	0.0	0.0
Prop In Lane	0.06		0.09	0.09		0.15	0.29		0.12	0.28		0.12
Lane Grp Cap(c), veh/h	815	0	0	816	0	0	571	0	0	574	0	0
V/C Ratio(X)	0.27	0.00	0.00	0.55	0.00	0.00	0.38	0.00	0.00	0.25	0.00	0.00
Avail Cap(c_a), veh/h	1867	0	0	1866	0	0	1828	0	0	1817	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.1	0.0	0.0	6.1	0.0	0.0	8.2	0.0	0.0	7.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.3	0.0	0.0	6.7	0.0	0.0	8.6	0.0	0.0	8.0	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		218			448			216			145	
Approach Delay, s/veh		5.3			6.7			8.6			8.0	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.3		14.2		10.3		14.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		4.8		4.2		3.7		7.4				
Green Ext Time (p_c), s		1.0		1.0		0.7		2.4				

Intersection Summary												
HCM 7th Control Delay, s/veh			7.0									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	11.0
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	402	1531	1057
Demand Flow Rate, veh/h	0	402	1531	1067
Vehicles Circulating, veh/h	1306	1262	145	272
Vehicles Exiting, veh/h	33	414	1161	1392
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	18.2	10.6	8.7
Approach LOS	-	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.595	0.405	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	239	163	720	811	501	566
Cap Entry Lane, veh/h	406	468	423	486	1245	1245	1109	1109
Entry HV Adj Factor	1.000	1.000	1.000	1.000	0.999	1.001	0.991	0.990
Flow Entry, veh/h	0	0	239	163	720	811	497	560
Cap Entry, veh/h	406	468	423	486	1244	1245	1099	1097
V/C Ratio	0.000	0.000	0.565	0.336	0.579	0.652	0.452	0.511
Control Delay, s/veh	8.9	7.7	21.8	12.8	9.7	11.4	8.2	9.2
LOS	A	A	C	B	A	B	A	A
95th %tile Queue, veh	0	0	3	1	4	5	2	3

Intersection	
Intersection Delay, s/veh	18.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	379	680	1287	980
Demand Flow Rate, veh/h	379	680	1287	990
Vehicles Circulating, veh/h	1110	1262	455	683
Vehicles Exiting, veh/h	563	480	1034	1259
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.7	31.8	15.7	16.6
Approach LOS	B	D	C	C

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	178	201	320	360	605	682	465	525
Cap Entry Lane, veh/h	486	553	423	486	888	965	720	795
Entry HV Adj Factor	1.001	0.999	0.999	1.001	1.000	1.000	0.991	0.989
Flow Entry, veh/h	178	201	320	360	605	682	461	519
Cap Entry, veh/h	487	552	422	486	888	965	713	786
V/C Ratio	0.366	0.364	0.757	0.741	0.681	0.707	0.646	0.661
Control Delay, s/veh	13.4	12.0	34.4	29.4	15.7	15.7	17.0	16.3
LOS	B	B	D	D	C	C	C	C
95th %tile Queue, veh	2	2	6	6	6	6	5	5

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	23	0	1430	1001	19
Future Vol, veh/h	0	23	0	1430	1001	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	25	0	1554	1088	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	554	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	481	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	481	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	481	-	-
HCM Lane V/C Ratio	-	0.052	-	-
HCM Ctrl Dly (s/v)	-	12.9	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	224	341	1411	997
Demand Flow Rate, veh/h	229	341	1411	1007
Vehicles Circulating, veh/h	1040	1417	347	248
Vehicles Exiting, veh/h	215	341	922	1510
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.8	18.7	14.2	8.0
Approach LOS	B	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.821	0.179	0.537	0.463	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	188	41	183	158	663	748	473	534
Cap Entry Lane, veh/h	519	587	367	426	1036	1036	1133	1133
Entry HV Adj Factor	0.980	0.976	1.000	1.000	1.000	1.000	0.990	0.989
Flow Entry, veh/h	184	40	183	158	663	748	468	528
Cap Entry, veh/h	508	572	367	426	1036	1035	1122	1121
V/C Ratio	0.363	0.070	0.499	0.371	0.640	0.722	0.417	0.471
Control Delay, s/veh	12.9	7.1	21.7	15.2	12.6	15.6	7.6	8.4
LOS	B	A	C	C	B	C	A	A
95th %tile Queue, veh	2	0	3	2	5	7	2	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	211	37	21	97	14	7	53	51	74	84	13
Future Volume (veh/h)	9	211	37	21	97	14	7	53	51	74	84	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	10	237	42	24	109	16	8	60	57	83	94	15
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	197	407	71	252	371	49	207	199	178	395	228	31
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	27	1399	243	139	1275	170	50	787	702	526	899	121
Grp Volume(v), veh/h	289	0	0	149	0	0	125	0	0	192	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1584	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	1.4	0.0	0.0	1.3	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.03		0.15	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	674	0	0	672	0	0	584	0	0	653	0	0
V/C Ratio(X)	0.43	0.00	0.00	0.22	0.00	0.00	0.21	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	2335	0	0	2189	0	0	2166	0	0	2200	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.0	0.0	0.0	5.5	0.0	0.0	6.0	0.0	0.0	6.2	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.4	0.0	0.0	5.6	0.0	0.0	6.2	0.0	0.0	6.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		289			149			125			192	
Approach Delay, s/veh		6.4			5.6			6.2			6.5	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	9.5	10.2	9.5	10.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	25.5	25.5	25.5
Max Q Clear Time (g_c+I1), s	3.3	4.9	4.0	3.4
Green Ext Time (p_c), s	0.5	1.4	0.9	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	6.2
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	6.6
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	270	831	902
Demand Flow Rate, veh/h	0	273	847	911
Vehicles Circulating, veh/h	1076	679	167	186
Vehicles Exiting, veh/h	21	335	909	766
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	7.0	6.4	6.8
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.604	0.396	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	165	108	398	449	428	483
Cap Entry Lane, veh/h	502	569	723	797	1220	1220	1199	1199
Entry HV Adj Factor	1.000	1.000	0.988	0.991	0.981	0.981	0.990	0.989
Flow Entry, veh/h	0	0	163	107	391	440	424	478
Cap Entry, veh/h	502	569	714	790	1197	1197	1187	1186
V/C Ratio	0.000	0.000	0.228	0.135	0.326	0.368	0.357	0.403
Control Delay, s/veh	7.2	6.3	7.7	5.9	6.1	6.6	6.5	7.1
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	0	1	2	2	2

Intersection	
Intersection Delay, s/veh	15.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	751	356	823	962
Demand Flow Rate, veh/h	766	367	847	971
Vehicles Circulating, veh/h	1022	884	889	332
Vehicles Exiting, veh/h	281	852	899	919
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	22.8	9.7	20.3	8.9
Approach LOS	C	A	C	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.469	0.531	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	360	406	172	195	398	449	456	515
Cap Entry Lane, veh/h	527	596	599	670	596	667	995	1071
Entry HV Adj Factor	0.980	0.980	0.973	0.968	0.971	0.971	0.991	0.990
Flow Entry, veh/h	353	398	167	189	387	436	452	510
Cap Entry, veh/h	517	584	583	648	579	648	986	1060
V/C Ratio	0.683	0.682	0.287	0.291	0.668	0.673	0.458	0.481
Control Delay, s/veh	24.1	21.7	10.1	9.3	21.2	19.6	9.0	8.9
LOS	C	C	B	A	C	C	A	A
95th %tile Queue, veh	5	5	1	1	5	5	2	3

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	25	0	862	939	9
Future Vol, veh/h	0	25	0	862	939	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	28	0	969	1055	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	533	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	497	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	497	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.68	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	497	-	-
HCM Lane V/C Ratio	-	0.057	-	-
HCM Ctrl Dly (s/v)	-	12.7	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	280	273	1039	1250
Demand Flow Rate, veh/h	288	281	1049	1262
Vehicles Circulating, veh/h	1275	1105	433	171
Vehicles Exiting, veh/h	158	377	1130	1215
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	19.3	11.2	11.1	8.8
Approach LOS	C	B	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.795	0.205	0.523	0.477	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	229	59	147	134	493	556	593	669
Cap Entry Lane, veh/h	418	480	488	555	958	958	1215	1215
Entry HV Adj Factor	0.972	0.966	0.974	0.970	0.991	0.991	0.990	0.990
Flow Entry, veh/h	223	57	143	130	488	551	587	662
Cap Entry, veh/h	406	464	476	538	949	948	1204	1203
V/C Ratio	0.548	0.123	0.301	0.241	0.515	0.581	0.488	0.550
Control Delay, s/veh	21.8	9.5	12.3	10.0	10.3	11.8	8.2	9.3
LOS	C	A	B	B	B	B	A	A
95th %tile Queue, veh	3	0	1	1	3	4	3	3

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	477	1	9	178	4	26
Future Vol, veh/h	477	1	9	178	4	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	536	1	10	200	4	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	537	0	757	537
Stage 1	-	-	-	-	537	-
Stage 2	-	-	-	-	220	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1031	-	376	544
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	816	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1031	-	371	544
Mov Cap-2 Maneuver	-	-	-	-	371	-
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	807	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.41	12.52
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	512	-	-	87	-
HCM Lane V/C Ratio	0.066	-	-	0.01	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

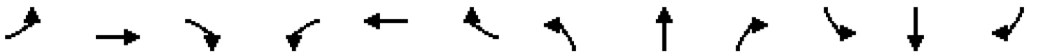
Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	502	1	9	185	2	26
Future Vol, veh/h	502	1	9	185	2	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	564	1	10	208	2	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	565	0	793	565
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	228	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1007	-	358	525
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	810	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1007	-	354	525
Mov Cap-2 Maneuver	-	-	-	-	354	-
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	801	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.4	12.57
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	507	-	-	84	-
HCM Lane V/C Ratio	0.062	-	-	0.01	-
HCM Ctrl Dly (s/v)	12.6	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	165	17	34	298	57	54	109	23	36	75	15
Future Volume (veh/h)	10	165	17	34	298	57	54	109	23	36	75	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	12	192	20	40	347	66	63	127	27	42	87	17
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	167	593	59	189	534	96	268	254	47	260	269	45
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	32	1490	149	75	1341	241	338	1070	200	304	1134	189
Grp Volume(v), veh/h	224	0	0	453	0	0	217	0	0	146	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1658	0	0	1608	0	0	1627	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.3	0.0	0.0	5.5	0.0	0.0	2.8	0.0	0.0	1.8	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.12	0.29		0.12
Lane Grp Cap(c), veh/h	819	0	0	819	0	0	569	0	0	574	0	0
V/C Ratio(X)	0.27	0.00	0.00	0.55	0.00	0.00	0.38	0.00	0.00	0.25	0.00	0.00
Avail Cap(c_a), veh/h	1855	0	0	1852	0	0	1814	0	0	1802	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.1	0.0	0.0	6.1	0.0	0.0	8.2	0.0	0.0	7.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.3	0.0	0.0	6.7	0.0	0.0	8.7	0.0	0.0	8.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		224			453			217			146	
Approach Delay, s/veh		5.3			6.7			8.7			8.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.3		14.3		10.3		14.3				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		4.8		4.3		3.8		7.5				
Green Ext Time (p_c), s		1.0		1.1		0.7		2.4				

Intersection Summary												
HCM 7th Control Delay, s/veh			7.0									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	11.2
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	406	1544	1075
Demand Flow Rate, veh/h	0	406	1544	1085
Vehicles Circulating, veh/h	1328	1273	145	276
Vehicles Exiting, veh/h	33	416	1183	1403
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	18.8	10.7	8.9
Approach LOS	-	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.599	0.401	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	243	163	726	818	510	575
Cap Entry Lane, veh/h	398	459	419	481	1245	1245	1105	1105
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.991
Flow Entry, veh/h	0	0	243	163	726	818	505	570
Cap Entry, veh/h	398	459	419	481	1244	1245	1094	1094
V/C Ratio	0.000	0.000	0.581	0.339	0.583	0.657	0.462	0.521
Control Delay, s/veh	9.0	7.8	22.7	13.0	9.8	11.5	8.4	9.4
LOS	A	A	C	B	A	B	A	A
95th %tile Queue, veh	0	0	4	1	4	5	2	3

Intersection	
Intersection Delay, s/veh	21.8
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	418	713	1307	1000
Demand Flow Rate, veh/h	418	713	1307	1010
Vehicles Circulating, veh/h	1110	1295	481	736
Vehicles Exiting, veh/h	636	493	1047	1272
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	13.5	38.6	17.2	19.3
Approach LOS	B	E	C	C

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.469	0.531	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	196	222	335	378	614	693	475	535
Cap Entry Lane, veh/h	486	553	410	472	867	943	686	760
Entry HV Adj Factor	1.002	0.998	1.000	1.000	1.000	1.000	0.990	0.991
Flow Entry, veh/h	196	222	335	378	614	693	470	530
Cap Entry, veh/h	487	552	410	472	868	943	679	753
V/C Ratio	0.403	0.402	0.817	0.800	0.708	0.735	0.693	0.704
Control Delay, s/veh	14.3	12.8	41.8	35.7	17.1	17.3	19.8	18.9
LOS	B	B	E	E	C	C	C	C
95th %tile Queue, veh	2	2	7	7	6	7	6	6

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	23	0	1449	1013	19
Future Vol, veh/h	0	23	0	1449	1013	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	25	0	1575	1101	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	561	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	476	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	476	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.98	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	476	-	-
HCM Lane V/C Ratio	-	0.052	-	-
HCM Ctrl Dly (s/v)	-	13	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.7
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	224	344	1427	1010
Demand Flow Rate, veh/h	229	344	1427	1021
Vehicles Circulating, veh/h	1054	1433	349	248
Vehicles Exiting, veh/h	215	343	934	1529
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.1	19.2	14.5	8.1
Approach LOS	B	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.821	0.179	0.532	0.468	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	188	41	183	161	671	756	480	541
Cap Entry Lane, veh/h	512	580	361	420	1034	1034	1133	1133
Entry HV Adj Factor	0.980	0.976	1.000	1.000	1.000	1.000	0.989	0.990
Flow Entry, veh/h	184	40	183	161	671	756	475	536
Cap Entry, veh/h	502	566	361	420	1033	1034	1121	1122
V/C Ratio	0.367	0.071	0.507	0.383	0.649	0.731	0.424	0.477
Control Delay, s/veh	13.1	7.2	22.3	15.7	12.9	16.0	7.7	8.5
LOS	B	A	C	C	B	C	A	A
95th %tile Queue, veh	2	0	3	2	5	7	2	3

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	287	4	28	455	3	17
Future Vol, veh/h	287	4	28	455	3	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	322	4	31	511	3	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	327	0	899	325
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	574	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1233	-	310	716
Stage 1	-	-	-	-	732	-
Stage 2	-	-	-	-	563	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1233	-	298	716
Mov Cap-2 Maneuver	-	-	-	-	298	-
Stage 1	-	-	-	-	732	-
Stage 2	-	-	-	-	543	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.46	11.32
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	592	-	-	104	-
HCM Lane V/C Ratio	0.038	-	-	0.026	-
HCM Ctrl Dly (s/v)	11.3	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

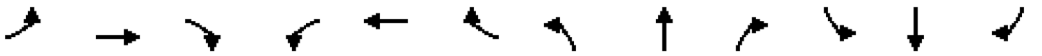
Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	302	2	28	482	1	17
Future Vol, veh/h	302	2	28	482	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	339	2	31	542	1	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	342	0	945	340
Stage 1	-	-	-	-	340	-
Stage 2	-	-	-	-	604	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1217	-	291	702
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1217	-	280	702
Mov Cap-2 Maneuver	-	-	-	-	280	-
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	525	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.44	10.74
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	648	-	-	99	-
HCM Lane V/C Ratio	0.031	-	-	0.026	-
HCM Ctrl Dly (s/v)	10.7	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	227	40	23	104	15	7	57	55	79	90	14
Future Volume (veh/h)	10	227	40	23	104	15	7	57	55	79	90	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	255	45	26	117	17	8	64	62	89	101	16
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	190	430	74	245	392	52	197	199	181	386	228	31
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	27	1401	242	135	1278	168	45	781	711	529	897	120
Grp Volume(v), veh/h	311	0	0	160	0	0	134	0	0	206	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1582	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	3.2	0.0	0.0	1.5	0.0	0.0	1.4	0.0	0.0	2.2	0.0	0.0
Prop In Lane	0.04		0.14	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	694	0	0	689	0	0	577	0	0	645	0	0
V/C Ratio(X)	0.45	0.00	0.00	0.23	0.00	0.00	0.23	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	2245	0	0	2100	0	0	2083	0	0	2111	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.1	0.0	0.0	5.5	0.0	0.0	6.2	0.0	0.0	6.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.5	0.0	0.0	5.6	0.0	0.0	6.4	0.0	0.0	6.8	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		311			160			134			206	
Approach Delay, s/veh		6.5			5.6			6.4			6.8	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.7		10.8		9.7		10.8				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.4		5.2		4.2		3.5				
Green Ext Time (p_c), s		0.6		1.5		1.0		0.8				

Intersection Summary												
HCM 7th Control Delay, s/veh			6.4									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	291	895	972
Demand Flow Rate, veh/h	0	294	913	982
Vehicles Circulating, veh/h	1160	731	180	201
Vehicles Exiting, veh/h	23	362	980	824
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	7.6	6.8	7.3
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.605	0.395	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	178	116	429	484	462	520
Cap Entry Lane, veh/h	464	530	689	763	1206	1206	1183	1183
Entry HV Adj Factor	1.000	1.000	0.989	0.991	0.981	0.980	0.989	0.991
Flow Entry, veh/h	0	0	176	115	421	474	457	515
Cap Entry, veh/h	464	530	681	756	1182	1182	1170	1172
V/C Ratio	0.000	0.000	0.258	0.152	0.356	0.401	0.391	0.440
Control Delay, s/veh	7.8	6.8	8.4	6.4	6.5	7.1	7.0	7.7
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	1	2	2	2	2

Intersection	
Intersection Delay, s/veh	20.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	804	384	887	1037
Demand Flow Rate, veh/h	820	395	914	1048
Vehicles Circulating, veh/h	1104	952	956	359
Vehicles Exiting, veh/h	303	918	968	988
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	32.0	10.9	27.7	10.0
Approach LOS	D	B	D	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	385	435	186	209	430	484	493	555
Cap Entry Lane, veh/h	489	556	562	632	560	630	970	1047
Entry HV Adj Factor	0.982	0.980	0.970	0.973	0.970	0.972	0.989	0.990
Flow Entry, veh/h	378	426	180	203	417	470	487	550
Cap Entry, veh/h	480	544	545	615	543	612	959	1037
V/C Ratio	0.787	0.783	0.331	0.331	0.768	0.768	0.508	0.530
Control Delay, s/veh	33.9	30.4	11.5	10.4	29.0	26.5	10.1	10.0
LOS	D	D	B	B	D	D	B	A
95th %tile Queue, veh	7	7	1	1	7	7	3	3

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	26	0	928	1010	10
Future Vol, veh/h	0	26	0	928	1010	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	29	0	1043	1135	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	573	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	468	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	468	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.21	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	468	-	-
HCM Lane V/C Ratio	-	0.062	-	-
HCM Ctrl Dly (s/v)	-	13.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	304	293	1119	1344
Demand Flow Rate, veh/h	313	302	1130	1357
Vehicles Circulating, veh/h	1372	1193	469	185
Vehicles Exiting, veh/h	170	406	1216	1310
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	25.6	12.9	13.0	9.8
Approach LOS	D	B	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.796	0.204	0.523	0.477	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	249	64	158	144	531	599	638	719
Cap Entry Lane, veh/h	382	442	450	515	927	927	1200	1200
Entry HV Adj Factor	0.970	0.969	0.969	0.972	0.991	0.990	0.990	0.991
Flow Entry, veh/h	242	62	153	140	526	593	632	712
Cap Entry, veh/h	371	429	437	501	918	918	1188	1189
V/C Ratio	0.652	0.145	0.351	0.280	0.573	0.646	0.532	0.599
Control Delay, s/veh	29.4	10.5	14.4	11.4	11.9	14.0	9.1	10.4
LOS	D	B	B	B	B	B	A	B
95th %tile Queue, veh	4	1	2	1	4	5	3	4

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	514	1	9	192	4	26
Future Vol, veh/h	514	1	9	192	4	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	578	1	10	216	4	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	579	0	814	578
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	236	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	995	-	347	515
Stage 1	-	-	-	-	561	-
Stage 2	-	-	-	-	803	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	995	-	343	515
Mov Cap-2 Maneuver	-	-	-	-	343	-
Stage 1	-	-	-	-	561	-
Stage 2	-	-	-	-	794	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.39	13.01
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	483	-	-	81	-
HCM Lane V/C Ratio	0.07	-	-	0.01	-
HCM Ctrl Dly (s/v)	13	-	-	8.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

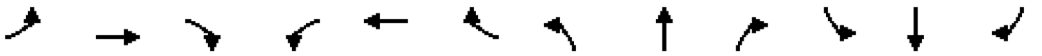
Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	539	1	9	199	2	26
Future Vol, veh/h	539	1	9	199	2	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	606	1	10	224	2	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	607	0	850	606
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	244	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	971	-	331	497
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	797	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	971	-	327	497
Mov Cap-2 Maneuver	-	-	-	-	327	-
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	787	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.38	13.04
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	479	-	-	78	-
HCM Lane V/C Ratio	0.066	-	-	0.01	-
HCM Ctrl Dly (s/v)	13	-	-	8.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	177	18	36	321	61	58	118	25	38	81	16
Future Volume (veh/h)	11	177	18	36	321	61	58	118	25	38	81	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	13	206	21	42	373	71	67	137	29	44	94	19
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	158	617	60	180	555	100	258	261	49	247	276	48
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	32	1492	146	73	1342	242	333	1075	200	293	1140	197
Grp Volume(v), veh/h	240	0	0	486	0	0	233	0	0	157	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1657	0	0	1608	0	0	1630	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.5	0.0	0.0	6.2	0.0	0.0	3.2	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.12	0.28		0.12
Lane Grp Cap(c), veh/h	836	0	0	835	0	0	567	0	0	571	0	0
V/C Ratio(X)	0.29	0.00	0.00	0.58	0.00	0.00	0.41	0.00	0.00	0.27	0.00	0.00
Avail Cap(c_a), veh/h	1747	0	0	1746	0	0	1709	0	0	1698	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.2	0.0	0.0	6.3	0.0	0.0	8.7	0.0	0.0	8.3	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.4	0.0	0.0	7.0	0.0	0.0	9.2	0.0	0.0	8.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		240			486			233			157	
Approach Delay, s/veh		5.4			7.0			9.2			8.5	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.8		15.3		10.8		15.3				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.2		4.5		4.0		8.2				
Green Ext Time (p_c), s		1.1		1.1		0.7		2.6				

Intersection Summary												
HCM 7th Control Delay, s/veh			7.3									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	13.1
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	437	1661	1155
Demand Flow Rate, veh/h	0	437	1661	1167
Vehicles Circulating, veh/h	1428	1370	156	297
Vehicles Exiting, veh/h	36	447	1272	1510
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	24.5	12.3	10.0
Approach LOS	-	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.597	0.403	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	261	176	781	880	548	619
Cap Entry Lane, veh/h	363	422	383	443	1232	1232	1084	1084
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.991	0.989
Flow Entry, veh/h	0	0	261	176	781	880	543	612
Cap Entry, veh/h	363	422	383	443	1232	1233	1074	1072
V/C Ratio	0.000	0.000	0.682	0.397	0.634	0.714	0.506	0.571
Control Delay, s/veh	9.9	8.5	30.7	15.4	11.0	13.4	9.3	10.6
LOS	A	A	D	C	B	B	A	B
95th %tile Queue, veh	0	0	5	2	5	7	3	4

Intersection	
Intersection Delay, s/veh	31.1
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	446	764	1406	1075
Demand Flow Rate, veh/h	446	764	1406	1086
Vehicles Circulating, veh/h	1195	1391	515	788
Vehicles Exiting, veh/h	679	530	1126	1367
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	16.1	63.5	22.3	25.7
Approach LOS	C	F	C	D

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	210	236	359	405	661	745	510	576
Cap Entry Lane, veh/h	450	514	375	435	841	917	654	727
Entry HV Adj Factor	0.998	1.002	1.000	1.000	1.000	1.000	0.991	0.990
Flow Entry, veh/h	210	236	359	405	661	745	505	570
Cap Entry, veh/h	449	515	376	435	840	917	648	719
V/C Ratio	0.467	0.459	0.956	0.930	0.786	0.813	0.780	0.793
Control Delay, s/veh	17.2	15.1	69.5	58.2	22.0	22.5	26.3	25.3
LOS	C	C	F	F	C	C	D	D
95th %tile Queue, veh	2	2	11	11	8	9	7	8

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	25	0	1559	1090	20
Future Vol, veh/h	0	25	0	1559	1090	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	27	0	1695	1185	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	603	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	447	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	447	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.58	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	447	-	-
HCM Lane V/C Ratio	-	0.061	-	-
HCM Ctrl Dly (s/v)	-	13.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	15.5
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	242	371	1535	1086
Demand Flow Rate, veh/h	247	371	1535	1097
Vehicles Circulating, veh/h	1132	1541	375	267
Vehicles Exiting, veh/h	232	369	1004	1645
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.1	24.7	18.2	8.9
Approach LOS	B	C	C	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.822	0.178	0.534	0.466	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	203	44	198	173	721	814	516	581
Cap Entry Lane, veh/h	476	542	327	383	1009	1009	1114	1114
Entry HV Adj Factor	0.982	0.977	1.000	1.000	1.001	0.999	0.989	0.991
Flow Entry, veh/h	199	43	198	173	721	814	510	576
Cap Entry, veh/h	468	530	327	383	1010	1009	1102	1103
V/C Ratio	0.426	0.081	0.605	0.452	0.714	0.806	0.463	0.522
Control Delay, s/veh	15.4	7.8	29.6	19.2	15.5	20.5	8.4	9.4
LOS	C	A	D	C	C	C	A	A
95th %tile Queue, veh	2	0	4	2	6	9	3	3

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	309	4	28	489	3	17
Future Vol, veh/h	309	4	28	489	3	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	347	4	31	549	3	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	352	0	962	349
Stage 1	-	-	-	-	349	-
Stage 2	-	-	-	-	612	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1207	-	284	694
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	541	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1207	-	273	694
Mov Cap-2 Maneuver	-	-	-	-	273	-
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	521	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.44	11.65
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	564	-	-	97	-
HCM Lane V/C Ratio	0.04	-	-	0.026	-
HCM Ctrl Dly (s/v)	11.7	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	324	2	28	516	1	17
Future Vol, veh/h	324	2	28	516	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	364	2	31	580	1	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	366	0	1008	365
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	643	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1192	-	267	680
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	524	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1192	-	256	680
Mov Cap-2 Maneuver	-	-	-	-	256	-
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	503	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.42	10.98
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	623	-	-	93	-
HCM Lane V/C Ratio	0.032	-	-	0.026	-
HCM Ctrl Dly (s/v)	11	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	228	40	23	106	16	7	57	55	79	90	14
Future Volume (veh/h)	10	228	40	23	106	16	7	57	55	79	90	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	256	45	26	119	18	8	64	62	89	101	16
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	190	431	74	244	392	54	197	199	181	385	228	31
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	27	1402	241	132	1274	175	45	781	712	529	897	120
Grp Volume(v), veh/h	312	0	0	163	0	0	134	0	0	206	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1582	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	3.2	0.0	0.0	1.6	0.0	0.0	1.4	0.0	0.0	2.2	0.0	0.0
Prop In Lane	0.04		0.14	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	695	0	0	690	0	0	577	0	0	644	0	0
V/C Ratio(X)	0.45	0.00	0.00	0.24	0.00	0.00	0.23	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	2242	0	0	2097	0	0	2079	0	0	2107	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.0	0.0	0.0	5.5	0.0	0.0	6.3	0.0	0.0	6.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.5	0.0	0.0	5.6	0.0	0.0	6.5	0.0	0.0	6.8	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		312			163			134			206	
Approach Delay, s/veh		6.5			5.6			6.5			6.8	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.7		10.8		9.7		10.8				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.4		5.2		4.2		3.6				
Green Ext Time (p_c), s		0.6		1.5		1.0		0.8				
Intersection Summary												
HCM 7th Control Delay, s/veh			6.4									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	291	903	974
Demand Flow Rate, veh/h	0	294	921	984
Vehicles Circulating, veh/h	1162	738	180	201
Vehicles Exiting, veh/h	23	363	982	831
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	7.7	6.8	7.4
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.605	0.395	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	178	116	433	488	462	522
Cap Entry Lane, veh/h	464	529	685	758	1206	1206	1183	1183
Entry HV Adj Factor	1.000	1.000	0.989	0.991	0.980	0.981	0.991	0.989
Flow Entry, veh/h	0	0	176	115	424	479	458	516
Cap Entry, veh/h	464	529	677	752	1182	1182	1172	1170
V/C Ratio	0.000	0.000	0.260	0.153	0.359	0.405	0.391	0.441
Control Delay, s/veh	7.8	6.8	8.5	6.4	6.5	7.1	7.0	7.7
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	1	2	2	2	2

Intersection	
Intersection Delay, s/veh	22.4
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	834	388	890	1040
Demand Flow Rate, veh/h	851	399	917	1051
Vehicles Circulating, veh/h	1104	966	977	366
Vehicles Exiting, veh/h	313	928	978	999
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	35.1	11.1	29.6	10.2
Approach LOS	E	B	D	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	400	451	188	211	431	486	494	557
Cap Entry Lane, veh/h	489	556	555	625	550	619	964	1040
Entry HV Adj Factor	0.980	0.980	0.969	0.974	0.971	0.971	0.990	0.990
Flow Entry, veh/h	392	442	182	206	418	472	489	551
Cap Entry, veh/h	479	544	538	608	533	601	954	1030
V/C Ratio	0.818	0.812	0.339	0.338	0.784	0.785	0.512	0.535
Control Delay, s/veh	37.3	33.2	11.8	10.6	31.0	28.3	10.2	10.1
LOS	E	D	B	B	D	D	B	B
95th %tile Queue, veh	8	8	1	1	7	7	3	3

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	26	0	931	1019	10
Future Vol, veh/h	0	26	0	931	1019	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	29	0	1046	1145	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	578	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	464	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	464	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.28	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	464	-	-
HCM Lane V/C Ratio	-	0.063	-	-
HCM Ctrl Dly (s/v)	-	13.3	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	13.0
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	304	293	1122	1354
Demand Flow Rate, veh/h	313	302	1133	1367
Vehicles Circulating, veh/h	1382	1196	471	185
Vehicles Exiting, veh/h	170	408	1224	1313
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	26.1	13.0	13.1	9.9
Approach LOS	D	B	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.796	0.204	0.523	0.477	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	249	64	158	144	533	600	642	725
Cap Entry Lane, veh/h	379	439	449	514	925	925	1200	1200
Entry HV Adj Factor	0.970	0.969	0.969	0.972	0.990	0.991	0.991	0.990
Flow Entry, veh/h	242	62	153	140	528	595	636	717
Cap Entry, veh/h	367	425	435	499	916	917	1189	1188
V/C Ratio	0.658	0.146	0.352	0.280	0.576	0.649	0.535	0.604
Control Delay, s/veh	30.1	10.6	14.4	11.4	12.0	14.1	9.1	10.6
LOS	D	B	B	B	B	B	A	B
95th %tile Queue, veh	4	1	2	1	4	5	3	4

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	514	1	9	193	5	26
Future Vol, veh/h	514	1	9	193	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	578	1	10	217	6	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	579	0	815	578
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	237	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	995	-	347	515
Stage 1	-	-	-	-	561	-
Stage 2	-	-	-	-	802	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	995	-	343	515
Mov Cap-2 Maneuver	-	-	-	-	343	-
Stage 1	-	-	-	-	561	-
Stage 2	-	-	-	-	793	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.39	13.14
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	477	-	-	80	-
HCM Lane V/C Ratio	0.073	-	-	0.01	-
HCM Ctrl Dly (s/v)	13.1	-	-	8.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

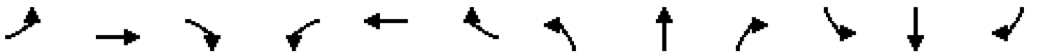
Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	539	1	18	199	3	53
Future Vol, veh/h	539	1	18	199	3	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	606	1	20	224	3	60

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	607	0	870	606
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	264	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	971	-	322	497
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	780	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	971	-	314	497
Mov Cap-2 Maneuver	-	-	-	-	314	-
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	762	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.73	13.59
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	482	-	-	149	-
HCM Lane V/C Ratio	0.131	-	-	0.021	-
HCM Ctrl Dly (s/v)	13.6	-	-	8.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	179	18	36	322	61	58	118	25	39	81	16
Future Volume (veh/h)	11	179	18	36	322	61	58	118	25	39	81	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	13	208	21	42	374	71	67	137	29	45	94	19
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	158	619	60	179	556	100	258	261	49	249	275	47
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	32	1494	145	73	1342	242	333	1076	200	299	1134	196
Grp Volume(v), veh/h	242	0	0	487	0	0	233	0	0	158	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1657	0	0	1609	0	0	1629	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.6	0.0	0.0	6.3	0.0	0.0	3.3	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.12	0.28		0.12
Lane Grp Cap(c), veh/h	837	0	0	835	0	0	567	0	0	571	0	0
V/C Ratio(X)	0.29	0.00	0.00	0.58	0.00	0.00	0.41	0.00	0.00	0.28	0.00	0.00
Avail Cap(c_a), veh/h	1746	0	0	1744	0	0	1707	0	0	1694	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.2	0.0	0.0	6.3	0.0	0.0	8.7	0.0	0.0	8.3	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.4	0.0	0.0	7.0	0.0	0.0	9.2	0.0	0.0	8.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		242			487			233			158	
Approach Delay, s/veh		5.4			7.0			9.2			8.5	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.8		15.4		10.8		15.4				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.3		4.6		4.0		8.3				
Green Ext Time (p_c), s		1.1		1.2		0.7		2.6				

Intersection Summary	
HCM 7th Control Delay, s/veh	7.3
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	13.3
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	439	1668	1164
Demand Flow Rate, veh/h	0	439	1668	1176
Vehicles Circulating, veh/h	1439	1376	156	299
Vehicles Exiting, veh/h	36	448	1283	1516
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	25.1	12.4	10.1
Approach LOS	-	D	B	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.599	0.401	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	263	176	784	884	553	623
Cap Entry Lane, veh/h	359	418	381	441	1232	1232	1082	1082
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.989	0.990
Flow Entry, veh/h	0	0	263	176	784	884	547	617
Cap Entry, veh/h	359	418	381	441	1232	1232	1070	1071
V/C Ratio	0.000	0.000	0.691	0.399	0.636	0.717	0.511	0.576
Control Delay, s/veh	10.0	8.6	31.5	15.5	11.1	13.5	9.4	10.7
LOS	B	A	D	C	B	B	A	B
95th %tile Queue, veh	0	0	5	2	5	7	3	4

Intersection	
Intersection Delay, s/veh	33.7
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	465	775	1416	1084
Demand Flow Rate, veh/h	465	775	1416	1095
Vehicles Circulating, veh/h	1195	1407	527	809
Vehicles Exiting, veh/h	709	536	1133	1373
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	16.7	70.2	23.6	28.0
Approach LOS	C	F	C	D

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	219	246	364	411	666	750	515	580
Cap Entry Lane, veh/h	450	514	370	429	831	907	641	714
Entry HV Adj Factor	0.998	1.002	1.001	0.999	0.999	1.001	0.990	0.991
Flow Entry, veh/h	219	246	364	411	666	750	510	575
Cap Entry, veh/h	449	515	370	429	831	908	635	707
V/C Ratio	0.487	0.478	0.984	0.957	0.801	0.827	0.803	0.812
Control Delay, s/veh	17.8	15.6	76.7	64.4	23.3	23.8	28.7	27.3
LOS	C	C	F	F	C	C	D	D
95th %tile Queue, veh	3	3	11	11	9	10	8	9

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	25	0	1568	1096	20
Future Vol, veh/h	0	25	0	1568	1096	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	27	0	1704	1191	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	607	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	445	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	445	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.62	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	445	-	-
HCM Lane V/C Ratio	-	0.061	-	-
HCM Ctrl Dly (s/v)	-	13.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	15.7
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	242	373	1543	1092
Demand Flow Rate, veh/h	247	373	1543	1103
Vehicles Circulating, veh/h	1138	1549	376	267
Vehicles Exiting, veh/h	232	370	1009	1655
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.2	25.1	18.5	9.0
Approach LOS	B	D	C	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.822	0.178	0.531	0.469	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	203	44	198	175	725	818	518	585
Cap Entry Lane, veh/h	474	540	325	381	1009	1009	1114	1114
Entry HV Adj Factor	0.982	0.977	1.000	1.000	1.000	1.000	0.991	0.989
Flow Entry, veh/h	199	43	198	175	725	818	513	579
Cap Entry, veh/h	465	527	325	381	1009	1008	1103	1102
V/C Ratio	0.428	0.082	0.610	0.460	0.719	0.811	0.465	0.525
Control Delay, s/veh	15.6	7.8	30.0	19.6	15.7	20.9	8.4	9.4
LOS	C	A	D	C	C	C	A	A
95th %tile Queue, veh	2	0	4	2	6	9	3	3

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	311	6	28	490	4	17
Future Vol, veh/h	311	6	28	490	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	349	7	31	551	4	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	356	0	966	353
Stage 1	-	-	-	-	353	-
Stage 2	-	-	-	-	613	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1203	-	282	691
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	540	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1203	-	272	691
Mov Cap-2 Maneuver	-	-	-	-	272	-
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	520	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.44	12.05
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	534	-	-	97	-
HCM Lane V/C Ratio	0.044	-	-	0.026	-
HCM Ctrl Dly (s/v)	12.1	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

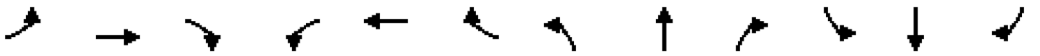
Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	324	4	56	516	2	35
Future Vol, veh/h	324	4	56	516	2	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	364	4	63	580	2	39

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	369	0	1072	366
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	706	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1190	-	244	679
Stage 1	-	-	-	-	701	-
Stage 2	-	-	-	-	490	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1190	-	225	679
Mov Cap-2 Maneuver	-	-	-	-	225	-
Stage 1	-	-	-	-	701	-
Stage 2	-	-	-	-	451	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.8	11.31
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	612	-	-	176	-
HCM Lane V/C Ratio	0.068	-	-	0.053	-
HCM Ctrl Dly (s/v)	11.3	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	246	43	24	114	18	8	61	60	86	97	16
Future Volume (veh/h)	10	246	43	24	114	18	8	61	60	86	97	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	276	48	27	128	20	9	69	67	97	109	18
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	179	453	77	232	411	58	189	205	186	377	234	32
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	23	1408	239	124	1276	181	45	782	710	528	891	124
Grp Volume(v), veh/h	335	0	0	175	0	0	145	0	0	224	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1581	0	0	1537	0	0	1543	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Cycle Q Clear(g_c), s	3.7	0.0	0.0	1.7	0.0	0.0	1.6	0.0	0.0	2.6	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	710	0	0	701	0	0	580	0	0	643	0	0
V/C Ratio(X)	0.47	0.00	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.35	0.00	0.00
Avail Cap(c_a), veh/h	2130	0	0	1989	0	0	1973	0	0	1995	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.2	0.0	0.0	5.6	0.0	0.0	6.5	0.0	0.0	6.8	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.7	0.0	0.0	5.7	0.0	0.0	6.7	0.0	0.0	7.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		335			175			145			224	
Approach Delay, s/veh		6.7			5.7			6.7			7.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.2		11.5		10.2		11.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.6		5.7		4.6		3.7				
Green Ext Time (p_c), s		0.7		1.7		1.1		0.8				

Intersection Summary												
HCM 7th Control Delay, s/veh			6.6									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	312	968	1047
Demand Flow Rate, veh/h	0	315	987	1058
Vehicles Circulating, veh/h	1248	792	193	214
Vehicles Exiting, veh/h	24	388	1055	893
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	8.4	7.3	8.0
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	190	125	464	523	497	561
Cap Entry Lane, veh/h	428	492	651	724	1191	1191	1169	1169
Entry HV Adj Factor	1.000	1.000	0.989	0.992	0.980	0.981	0.991	0.990
Flow Entry, veh/h	0	0	188	124	455	513	492	555
Cap Entry, veh/h	428	492	645	718	1168	1169	1158	1157
V/C Ratio	0.000	0.000	0.292	0.173	0.389	0.439	0.425	0.480
Control Delay, s/veh	8.4	7.3	9.3	6.9	7.0	7.7	7.5	8.4
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	1	2	2	2	3

Intersection	
Intersection Delay, s/veh	32.8
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	892	417	956	1116
Demand Flow Rate, veh/h	910	430	985	1127
Vehicles Circulating, veh/h	1184	1035	1045	392
Vehicles Exiting, veh/h	335	995	1049	1073
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	55.8	12.8	44.8	11.5
Approach LOS	F	B	E	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	428	482	202	228	463	522	530	597
Cap Entry Lane, veh/h	454	519	521	589	516	584	941	1018
Entry HV Adj Factor	0.980	0.981	0.971	0.970	0.970	0.970	0.989	0.990
Flow Entry, veh/h	419	473	196	221	449	507	524	591
Cap Entry, veh/h	445	509	506	572	501	567	931	1008
V/C Ratio	0.942	0.929	0.388	0.387	0.897	0.894	0.563	0.587
Control Delay, s/veh	59.8	52.3	13.5	12.2	47.1	42.8	11.5	11.4
LOS	F	F	B	B	E	E	B	B
95th %tile Queue, veh	11	11	2	2	10	11	4	4

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	29	0	1001	1095	10
Future Vol, veh/h	0	29	0	1001	1095	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	33	0	1125	1230	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	621	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	435	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	435	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.94	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	435	-	-
HCM Lane V/C Ratio	-	0.075	-	-
HCM Ctrl Dly (s/v)	-	13.9	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	15.8
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	325	317	1205	1455
Demand Flow Rate, veh/h	335	327	1216	1469
Vehicles Circulating, veh/h	1485	1283	504	199
Vehicles Exiting, veh/h	183	437	1316	1411
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	37.1	15.2	15.7	11.2
Approach LOS	E	C	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.797	0.203	0.523	0.477	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	267	68	171	156	572	644	690	779
Cap Entry Lane, veh/h	344	402	415	477	898	898	1185	1185
Entry HV Adj Factor	0.972	0.971	0.971	0.968	0.990	0.991	0.991	0.990
Flow Entry, veh/h	259	66	166	151	566	638	684	771
Cap Entry, veh/h	335	390	403	462	889	890	1174	1173
V/C Ratio	0.775	0.169	0.412	0.327	0.637	0.717	0.582	0.657
Control Delay, s/veh	43.5	11.9	17.1	13.2	14.1	17.2	10.2	12.0
LOS	E	B	C	B	B	C	B	B
95th %tile Queue, veh	6	1	2	1	5	6	4	5

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	553	1	9	208	5	26
Future Vol, veh/h	553	1	9	208	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	621	1	10	234	6	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	622	0	876	622
Stage 1	-	-	-	-	622	-
Stage 2	-	-	-	-	254	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	958	-	319	487
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	958	-	316	487
Mov Cap-2 Maneuver	-	-	-	-	316	-
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	779	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.36	13.72
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	448	-	-	75	-
HCM Lane V/C Ratio	0.078	-	-	0.011	-
HCM Ctrl Dly (s/v)	13.7	-	-	8.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

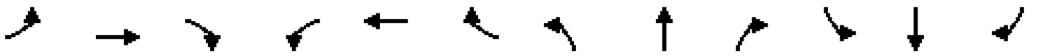
Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	578	1	18	214	3	53
Future Vol, veh/h	578	1	18	214	3	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	649	1	20	240	3	60

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	651	0	931	650
Stage 1	-	-	-	-	650	-
Stage 2	-	-	-	-	281	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	936	-	296	469
Stage 1	-	-	-	-	520	-
Stage 2	-	-	-	-	767	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	936	-	289	469
Mov Cap-2 Maneuver	-	-	-	-	289	-
Stage 1	-	-	-	-	520	-
Stage 2	-	-	-	-	748	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.69	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	454	-	-	140	-
HCM Lane V/C Ratio	0.139	-	-	0.022	-
HCM Ctrl Dly (s/v)	14.2	-	-	8.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	192	19	39	346	66	62	127	27	42	87	17
Future Volume (veh/h)	12	192	19	39	346	66	62	127	27	42	87	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	14	223	22	45	402	77	72	148	31	49	101	20
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	149	644	61	171	576	105	248	268	49	241	282	48
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	31	1496	142	73	1339	243	333	1078	199	303	1136	192
Grp Volume(v), veh/h	259	0	0	524	0	0	251	0	0	170	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1655	0	0	1609	0	0	1631	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	7.3	0.0	0.0	3.8	0.0	0.0	2.3	0.0	0.0
Prop In Lane	0.05		0.08	0.09		0.15	0.29		0.12	0.29		0.12
Lane Grp Cap(c), veh/h	854	0	0	852	0	0	565	0	0	571	0	0
V/C Ratio(X)	0.30	0.00	0.00	0.62	0.00	0.00	0.44	0.00	0.00	0.30	0.00	0.00
Avail Cap(c_a), veh/h	1631	0	0	1629	0	0	1595	0	0	1582	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.4	0.0	0.0	6.6	0.0	0.0	9.3	0.0	0.0	8.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.7	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.8	0.0	0.0	0.7	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.6	0.0	0.0	7.3	0.0	0.0	9.8	0.0	0.0	9.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		259			524			251			170	
Approach Delay, s/veh		5.6			7.3			9.8			9.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		11.5		16.6		11.5		16.6				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.8		4.9		4.3		9.3				
Green Ext Time (p_c), s		1.2		1.2		0.8		2.8				

Intersection Summary												
HCM 7th Control Delay, s/veh			7.7									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	16.5
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	473	1797	1254
Demand Flow Rate, veh/h	0	473	1797	1267
Vehicles Circulating, veh/h	1550	1482	170	322
Vehicles Exiting, veh/h	39	485	1380	1633
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	36.4	14.8	11.5
Approach LOS	-	E	B	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.598	0.402	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	283	190	845	952	595	672
Cap Entry Lane, veh/h	324	380	345	403	1217	1217	1059	1059
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.991	0.989
Flow Entry, veh/h	0	0	283	190	845	952	589	665
Cap Entry, veh/h	324	380	345	403	1216	1217	1049	1048
V/C Ratio	0.000	0.000	0.820	0.472	0.695	0.783	0.562	0.634
Control Delay, s/veh	11.1	9.5	48.0	19.0	12.9	16.6	10.5	12.4
LOS	B	A	E	C	B	C	B	B
95th %tile Queue, veh	0	0	7	2	6	9	4	5

Intersection	
Intersection Delay, s/veh	54.2
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	496	833	1522	1166
Demand Flow Rate, veh/h	496	833	1522	1178
Vehicles Circulating, veh/h	1287	1512	566	867
Vehicles Exiting, veh/h	758	576	1217	1478
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	20.7	125.6	34.6	42.9
Approach LOS	C	F	D	E

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	233	263	392	441	715	807	554	624
Cap Entry Lane, veh/h	413	475	336	393	802	878	608	680
Entry HV Adj Factor	1.001	1.000	0.999	1.001	1.000	1.000	0.989	0.990
Flow Entry, veh/h	233	263	392	441	715	807	548	618
Cap Entry, veh/h	413	475	336	393	802	877	601	673
V/C Ratio	0.564	0.553	1.167	1.123	0.892	0.919	0.911	0.918
Control Delay, s/veh	22.2	19.3	137.2	115.3	33.5	35.6	44.0	42.0
LOS	C	C	F	F	D	E	E	E
95th %tile Queue, veh	3	3	16	16	12	14	11	12

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	0	1686	1179	22
Future Vol, veh/h	0	27	0	1686	1179	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	29	0	1833	1282	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	653	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	415	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	415	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14.34	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	415	-	-
HCM Lane V/C Ratio	-	0.071	-	-
HCM Ctrl Dly (s/v)	-	14.3	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	20.6
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	260	401	1660	1175
Demand Flow Rate, veh/h	266	401	1660	1187
Vehicles Circulating, veh/h	1225	1666	405	288
Vehicles Exiting, veh/h	250	399	1085	1780
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	17.2	34.8	25.2	10.0
Approach LOS	C	D	D	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.823	0.177	0.531	0.469	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	219	47	213	188	780	880	558	629
Cap Entry Lane, veh/h	437	501	292	345	982	982	1093	1093
Entry HV Adj Factor	0.978	0.979	1.000	1.000	1.000	1.000	0.990	0.990
Flow Entry, veh/h	214	46	213	188	780	880	552	623
Cap Entry, veh/h	428	491	292	345	983	982	1082	1082
V/C Ratio	0.501	0.094	0.731	0.546	0.794	0.896	0.511	0.576
Control Delay, s/veh	19.1	8.6	43.3	25.0	20.1	29.7	9.3	10.6
LOS	C	A	E	D	C	D	A	B
95th %tile Queue, veh	3	0	5	3	9	13	3	4

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	334	6	28	528	4	17
Future Vol, veh/h	334	6	28	528	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	375	7	31	593	4	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	382	0	1035	379
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	656	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1176	-	257	668
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1176	-	247	668
Mov Cap-2 Maneuver	-	-	-	-	247	-
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	496	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.41	12.49
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	504	-	-	91	-
HCM Lane V/C Ratio	0.047	-	-	0.027	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

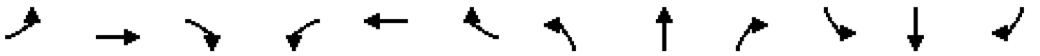
Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	347	4	56	554	2	35
Future Vol, veh/h	347	4	56	554	2	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	390	4	63	622	2	39

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	394	0	1140	392
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	748	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1164	-	222	657
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	468	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1164	-	204	657
Mov Cap-2 Maneuver	-	-	-	-	204	-
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.76	11.61
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	586	-	-	165	-
HCM Lane V/C Ratio	0.071	-	-	0.054	-
HCM Ctrl Dly (s/v)	11.6	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	247	43	24	116	18	8	61	60	86	97	16
Future Volume (veh/h)	10	247	43	24	116	18	8	61	60	86	97	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	278	48	27	130	20	9	69	67	97	109	18
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	179	456	77	231	414	58	188	205	186	376	233	32
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	23	1410	238	122	1281	179	45	782	710	528	891	124
Grp Volume(v), veh/h	337	0	0	177	0	0	145	0	0	224	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1581	0	0	1537	0	0	1543	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Cycle Q Clear(g_c), s	3.7	0.0	0.0	1.8	0.0	0.0	1.7	0.0	0.0	2.6	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	712	0	0	703	0	0	579	0	0	642	0	0
V/C Ratio(X)	0.47	0.00	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.35	0.00	0.00
Avail Cap(c_a), veh/h	2125	0	0	1985	0	0	1968	0	0	1990	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.2	0.0	0.0	5.6	0.0	0.0	6.5	0.0	0.0	6.8	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.7	0.0	0.0	5.7	0.0	0.0	6.7	0.0	0.0	7.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		337			177			145			224	
Approach Delay, s/veh		6.7			5.7			6.7			7.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.2		11.5		10.2		11.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.7		5.7		4.6		3.8				
Green Ext Time (p_c), s		0.7		1.7		1.1		0.9				

Intersection Summary												
HCM 7th Control Delay, s/veh			6.6									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	312	977	1050
Demand Flow Rate, veh/h	0	315	996	1061
Vehicles Circulating, veh/h	1251	799	193	214
Vehicles Exiting, veh/h	24	390	1058	900
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	8.4	7.4	8.0
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	190	125	468	528	499	562
Cap Entry Lane, veh/h	427	490	647	720	1191	1191	1169	1169
Entry HV Adj Factor	1.000	1.000	0.989	0.992	0.981	0.981	0.989	0.991
Flow Entry, veh/h	0	0	188	124	459	518	494	557
Cap Entry, veh/h	427	490	640	714	1169	1168	1156	1158
V/C Ratio	0.000	0.000	0.294	0.174	0.393	0.443	0.427	0.481
Control Delay, s/veh	8.4	7.3	9.4	7.0	7.0	7.7	7.5	8.4
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	1	2	2	2	3

Intersection	
Intersection Delay, s/veh	35.3
Intersection LOS	E

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	916	419	959	1118
Demand Flow Rate, veh/h	934	432	988	1129
Vehicles Circulating, veh/h	1184	1046	1061	397
Vehicles Exiting, veh/h	342	1003	1057	1081
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	61.1	13.0	47.9	11.6
Approach LOS	F	B	E	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	439	495	203	229	464	524	531	598
Cap Entry Lane, veh/h	454	519	516	584	509	576	937	1013
Entry HV Adj Factor	0.981	0.981	0.971	0.971	0.971	0.970	0.989	0.991
Flow Entry, veh/h	431	485	197	222	451	508	525	592
Cap Entry, veh/h	445	509	501	566	494	559	927	1004
V/C Ratio	0.966	0.954	0.394	0.392	0.912	0.909	0.567	0.590
Control Delay, s/veh	65.1	57.5	13.7	12.4	50.2	45.8	11.7	11.6
LOS	F	F	B	B	F	E	B	B
95th %tile Queue, veh	12	12	2	2	11	11	4	4

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	29	0	1003	1102	10
Future Vol, veh/h	0	29	0	1003	1102	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	33	0	1127	1238	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	625	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	433	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	433	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	433	-	-
HCM Lane V/C Ratio	-	0.075	-	-
HCM Ctrl Dly (s/v)	-	14	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	15.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	325	317	1207	1464
Demand Flow Rate, veh/h	335	327	1218	1478
Vehicles Circulating, veh/h	1494	1285	506	199
Vehicles Exiting, veh/h	183	439	1323	1413
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	38.0	15.3	15.9	11.2
Approach LOS	E	C	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.797	0.203	0.523	0.477	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	267	68	171	156	572	646	695	783
Cap Entry Lane, veh/h	342	399	414	476	896	896	1185	1185
Entry HV Adj Factor	0.972	0.971	0.971	0.968	0.991	0.990	0.990	0.991
Flow Entry, veh/h	259	66	166	151	567	640	688	776
Cap Entry, veh/h	332	387	402	461	888	887	1173	1174
V/C Ratio	0.782	0.171	0.413	0.328	0.638	0.721	0.587	0.661
Control Delay, s/veh	44.6	12.1	17.2	13.2	14.1	17.4	10.3	12.1
LOS	E	B	C	B	B	C	B	B
95th %tile Queue, veh	6	1	2	1	5	6	4	5

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	554	1	9	210	5	26
Future Vol, veh/h	554	1	9	210	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	622	1	10	236	6	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	624	0	879	623
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	256	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	958	-	318	486
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	787	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	958	-	314	486
Mov Cap-2 Maneuver	-	-	-	-	314	-
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	777	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.36	13.74
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	447	-	-	74	-
HCM Lane V/C Ratio	0.078	-	-	0.011	-
HCM Ctrl Dly (s/v)	13.7	-	-	8.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

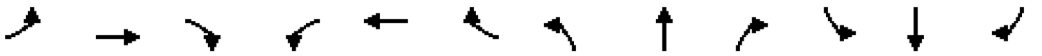
Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	578	2	25	214	5	75
Future Vol, veh/h	578	2	25	214	5	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	649	2	28	240	6	84

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	652	0	947	651
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	297	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	935	-	290	469
Stage 1	-	-	-	-	519	-
Stage 2	-	-	-	-	754	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	935	-	280	469
Mov Cap-2 Maneuver	-	-	-	-	280	-
Stage 1	-	-	-	-	519	-
Stage 2	-	-	-	-	728	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.94	14.99
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	450	-	-	188	-
HCM Lane V/C Ratio	0.2	-	-	0.03	-
HCM Ctrl Dly (s/v)	15	-	-	9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	194	19	39	347	66	62	127	27	42	87	17
Future Volume (veh/h)	12	194	19	39	347	66	62	127	27	42	87	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	14	226	22	45	403	77	72	148	31	49	101	20
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	149	646	60	171	577	105	248	268	49	241	282	48
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	31	1499	140	73	1339	243	333	1078	199	303	1136	192
Grp Volume(v), veh/h	262	0	0	525	0	0	251	0	0	170	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1655	0	0	1609	0	0	1631	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	7.3	0.0	0.0	3.8	0.0	0.0	2.3	0.0	0.0
Prop In Lane	0.05		0.08	0.09		0.15	0.29		0.12	0.29		0.12
Lane Grp Cap(c), veh/h	855	0	0	853	0	0	565	0	0	570	0	0
V/C Ratio(X)	0.31	0.00	0.00	0.62	0.00	0.00	0.44	0.00	0.00	0.30	0.00	0.00
Avail Cap(c_a), veh/h	1630	0	0	1627	0	0	1593	0	0	1580	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.4	0.0	0.0	6.6	0.0	0.0	9.3	0.0	0.0	8.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.7	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.8	0.0	0.0	0.7	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.6	0.0	0.0	7.3	0.0	0.0	9.9	0.0	0.0	9.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		262			525			251			170	
Approach Delay, s/veh		5.6			7.3			9.9			9.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		11.5		16.6		11.5		16.6				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.8		4.9		4.3		9.3				
Green Ext Time (p_c), s		1.2		1.3		0.8		2.8				

Intersection Summary												
HCM 7th Control Delay, s/veh			7.7									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	16.7
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	474	1802	1261
Demand Flow Rate, veh/h	0	474	1802	1274
Vehicles Circulating, veh/h	1558	1486	170	323
Vehicles Exiting, veh/h	39	486	1388	1637
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	37.0	14.9	11.6
Approach LOS	-	E	B	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.599	0.401	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	284	190	847	955	599	675
Cap Entry Lane, veh/h	322	378	344	401	1217	1217	1058	1058
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.989	0.990
Flow Entry, veh/h	0	0	284	190	847	955	593	668
Cap Entry, veh/h	322	378	344	401	1216	1217	1047	1048
V/C Ratio	0.000	0.000	0.825	0.473	0.696	0.785	0.566	0.638
Control Delay, s/veh	11.2	9.5	49.0	19.1	12.9	16.7	10.7	12.5
LOS	B	A	E	C	B	C	B	B
95th %tile Queue, veh	0	0	7	2	6	9	4	5

Intersection	
Intersection Delay, s/veh	58.6
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	514	842	1531	1175
Demand Flow Rate, veh/h	514	842	1531	1187
Vehicles Circulating, veh/h	1287	1527	578	885
Vehicles Exiting, veh/h	785	582	1223	1484
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	21.6	135.9	37.2	47.4
Approach LOS	C	F	E	E

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	242	272	396	446	720	811	558	629
Cap Entry Lane, veh/h	413	475	331	388	793	869	598	669
Entry HV Adj Factor	0.998	1.002	0.999	1.001	0.999	1.001	0.990	0.990
Flow Entry, veh/h	242	272	396	446	720	811	552	623
Cap Entry, veh/h	412	476	331	388	793	869	592	663
V/C Ratio	0.586	0.572	1.195	1.150	0.908	0.933	0.933	0.940
Control Delay, s/veh	23.3	20.0	148.0	125.2	36.1	38.2	48.4	46.4
LOS	C	C	F	F	E	E	E	E
95th %tile Queue, veh	4	4	17	17	12	14	12	13

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	0	1694	1184	22
Future Vol, veh/h	0	27	0	1694	1184	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	29	0	1841	1287	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	655	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	413	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	413	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14.38	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	413	-	-
HCM Lane V/C Ratio	-	0.071	-	-
HCM Ctrl Dly (s/v)	-	14.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	20.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	260	402	1667	1180
Demand Flow Rate, veh/h	266	402	1667	1192
Vehicles Circulating, veh/h	1230	1673	406	288
Vehicles Exiting, veh/h	250	400	1089	1788
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	17.3	35.3	25.7	10.0
Approach LOS	C	E	D	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.823	0.177	0.530	0.470	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	219	47	213	189	783	884	560	632
Cap Entry Lane, veh/h	435	499	290	342	981	981	1093	1093
Entry HV Adj Factor	0.978	0.979	1.000	1.000	1.001	0.999	0.991	0.990
Flow Entry, veh/h	214	46	213	189	783	884	555	626
Cap Entry, veh/h	426	488	290	342	982	981	1082	1081
V/C Ratio	0.503	0.094	0.735	0.552	0.798	0.901	0.513	0.578
Control Delay, s/veh	19.2	8.6	44.1	25.5	20.4	30.4	9.3	10.7
LOS	C	A	E	D	C	D	A	B
95th %tile Queue, veh	3	0	5	3	9	13	3	4

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	336	7	28	529	4	17
Future Vol, veh/h	336	7	28	529	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	378	8	31	594	4	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	385	0	1039	381
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	657	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1173	-	256	666
Stage 1	-	-	-	-	690	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1173	-	245	666
Mov Cap-2 Maneuver	-	-	-	-	245	-
Stage 1	-	-	-	-	690	-
Stage 2	-	-	-	-	495	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.41	12.53
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	502	-	-	90	-
HCM Lane V/C Ratio	0.047	-	-	0.027	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	347	6	79	554	3	49
Future Vol, veh/h	347	6	79	554	3	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	390	7	89	622	3	55

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	397	0	1193	393
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	800	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1162	-	206	656
Stage 1	-	-	-	-	682	-
Stage 2	-	-	-	-	442	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1162	-	182	656
Mov Cap-2 Maneuver	-	-	-	-	182	-
Stage 1	-	-	-	-	682	-
Stage 2	-	-	-	-	391	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.04	12.03
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	570	-	-	225	-
HCM Lane V/C Ratio	0.102	-	-	0.076	-
HCM Ctrl Dly (s/v)	12	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	265	46	26	124	19	8	66	64	92	105	17
Future Volume (veh/h)	11	265	46	26	124	19	8	66	64	92	105	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	12	298	52	29	139	21	9	74	72	103	118	19
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	171	476	81	222	434	59	178	210	191	365	241	33
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	23	1408	240	120	1285	176	41	783	714	522	899	122
Grp Volume(v), veh/h	362	0	0	189	0	0	155	0	0	240	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1580	0	0	1538	0	0	1543	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
Cycle Q Clear(g_c), s	4.2	0.0	0.0	2.0	0.0	0.0	1.9	0.0	0.0	2.9	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	727	0	0	716	0	0	579	0	0	639	0	0
V/C Ratio(X)	0.50	0.00	0.00	0.26	0.00	0.00	0.27	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	2018	0	0	1882	0	0	1870	0	0	1887	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.4	0.0	0.0	5.7	0.0	0.0	6.8	0.0	0.0	7.1	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.9	0.0	0.0	5.8	0.0	0.0	7.0	0.0	0.0	7.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		362			189			155			240	
Approach Delay, s/veh		6.9			5.8			7.0			7.5	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.6		12.2		10.6		12.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.9		6.2		4.9		4.0				
Green Ext Time (p_c), s		0.7		1.8		1.2		0.9				

Intersection Summary												
HCM 7th Control Delay, s/veh			6.9									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	337	1049	1129
Demand Flow Rate, veh/h	0	340	1070	1140
Vehicles Circulating, veh/h	1345	859	208	233
Vehicles Exiting, veh/h	28	419	1137	966
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	9.4	8.0	8.8
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	205	135	503	567	536	604
Cap Entry Lane, veh/h	392	453	613	684	1175	1175	1149	1149
Entry HV Adj Factor	1.000	1.000	0.990	0.993	0.980	0.980	0.990	0.990
Flow Entry, veh/h	0	0	203	134	493	556	531	598
Cap Entry, veh/h	392	453	607	679	1152	1152	1137	1138
V/C Ratio	0.000	0.000	0.335	0.197	0.428	0.482	0.467	0.526
Control Delay, s/veh	9.2	8.0	10.6	7.6	7.6	8.4	8.2	9.2
LOS	A	A	B	A	A	A	A	A
95th %tile Queue, veh	0	0	1	1	2	3	3	3

Intersection	
Intersection Delay, s/veh	58.5
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	977	449	1031	1207
Demand Flow Rate, veh/h	996	463	1062	1219
Vehicles Circulating, veh/h	1280	1122	1139	425
Vehicles Exiting, veh/h	364	1079	1137	1160
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	107.9	15.3	83.1	13.6
Approach LOS	F	C	F	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	468	528	218	245	499	563	573	646
Cap Entry Lane, veh/h	416	478	481	547	473	539	913	989
Entry HV Adj Factor	0.981	0.981	0.968	0.971	0.971	0.971	0.990	0.990
Flow Entry, veh/h	459	518	211	238	485	547	567	640
Cap Entry, veh/h	408	469	466	531	460	524	904	980
V/C Ratio	1.125	1.104	0.453	0.448	1.054	1.044	0.628	0.653
Control Delay, s/veh	114.6	102.0	16.3	14.4	87.1	79.5	13.6	13.6
LOS	F	F	C	B	F	F	B	B
95th %tile Queue, veh	17	17	2	2	15	16	5	5

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	31	0	1080	1184	11
Future Vol, veh/h	0	31	0	1080	1184	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	35	0	1213	1330	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	671	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	403	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	403	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14.77	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	403	-	-
HCM Lane V/C Ratio	-	0.086	-	-
HCM Ctrl Dly (s/v)	-	14.8	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

Intersection	
Intersection Delay, s/veh	21.1
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	351	341	1299	1574
Demand Flow Rate, veh/h	362	351	1312	1590
Vehicles Circulating, veh/h	1607	1384	546	213
Vehicles Exiting, veh/h	196	474	1423	1522
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	62.4	18.4	20.5	13.0
Approach LOS	F	C	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.796	0.204	0.521	0.479	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	288	74	183	168	617	695	747	843
Cap Entry Lane, veh/h	308	362	378	438	864	864	1170	1170
Entry HV Adj Factor	0.970	0.973	0.972	0.970	0.989	0.991	0.990	0.990
Flow Entry, veh/h	279	72	178	163	610	688	740	834
Cap Entry, veh/h	299	352	367	425	855	856	1159	1158
V/C Ratio	0.936	0.204	0.484	0.384	0.714	0.804	0.639	0.721
Control Delay, s/veh	75.0	13.8	21.1	15.6	17.6	23.0	11.6	14.3
LOS	F	B	C	C	C	C	B	B
95th %tile Queue, veh	9	1	3	2	6	9	5	7

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	596	1	9	225	5	26
Future Vol, veh/h	596	1	9	225	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	670	1	10	253	6	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	671	0	943	670
Stage 1	-	-	-	-	670	-
Stage 2	-	-	-	-	273	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	920	-	291	457
Stage 1	-	-	-	-	508	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	920	-	288	457
Mov Cap-2 Maneuver	-	-	-	-	288	-
Stage 1	-	-	-	-	508	-
Stage 2	-	-	-	-	763	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.34	14.41
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	417	-	-	69	-
HCM Lane V/C Ratio	0.083	-	-	0.011	-
HCM Ctrl Dly (s/v)	14.4	-	-	9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

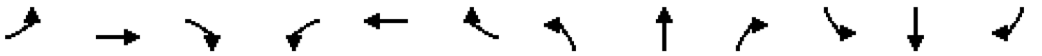
Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	620	2	25	229	5	75
Future Vol, veh/h	620	2	25	229	5	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	697	2	28	257	6	84

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	699	0	1011	698
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	313	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	898	-	265	441
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	741	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	898	-	256	441
Mov Cap-2 Maneuver	-	-	-	-	256	-
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	714	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.9	15.84
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	422	-	-	177	-
HCM Lane V/C Ratio	0.213	-	-	0.031	-
HCM Ctrl Dly (s/v)	15.8	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	208	21	42	373	71	67	137	29	45	93	18
Future Volume (veh/h)	13	208	21	42	373	71	67	137	29	45	93	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	15	242	24	49	434	83	78	159	34	52	108	21
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	139	670	64	163	598	109	239	273	51	230	292	48
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	31	1495	142	75	1334	242	336	1070	202	302	1144	190
Grp Volume(v), veh/h	281	0	0	566	0	0	271	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	0	1652	0	0	1608	0	0	1635	0	0
Q Serve(g_s), s	0.0	0.0	0.0	2.3	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.3	0.0	0.0	8.6	0.0	0.0	4.4	0.0	0.0	2.7	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.13	0.29		0.12
Lane Grp Cap(c), veh/h	872	0	0	869	0	0	563	0	0	570	0	0
V/C Ratio(X)	0.32	0.00	0.00	0.65	0.00	0.00	0.48	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	1507	0	0	1504	0	0	1472	0	0	1462	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.5	0.0	0.0	7.0	0.0	0.0	10.0	0.0	0.0	9.4	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.8	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.1	0.0	0.0	0.9	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.7	0.0	0.0	7.8	0.0	0.0	10.7	0.0	0.0	9.7	0.0	0.0
LnGrp LOS	A			A			B			A		
Approach Vol, veh/h		281			566			271			181	
Approach Delay, s/veh		5.7			7.8			10.7			9.7	
Approach LOS		A			A			B			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.2		18.1		12.2		18.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		6.4		5.3		4.7		10.6				
Green Ext Time (p_c), s		1.3		1.4		0.9		3.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			8.2									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	22.3
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	508	1937	1354
Demand Flow Rate, veh/h	0	508	1937	1368
Vehicles Circulating, veh/h	1673	1597	181	346
Vehicles Exiting, veh/h	41	521	1492	1759
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	60.2	18.6	13.5
Approach LOS	-	F	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.600	0.400	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	305	203	910	1027	643	725
Cap Entry Lane, veh/h	290	342	311	365	1204	1204	1036	1036
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.990
Flow Entry, veh/h	0	0	305	203	910	1027	636	718
Cap Entry, veh/h	290	342	311	365	1205	1204	1026	1026
V/C Ratio	0.000	0.000	0.982	0.556	0.756	0.853	0.620	0.699
Control Delay, s/veh	12.4	10.5	84.1	24.3	15.3	21.5	12.2	14.7
LOS	B	B	F	C	C	C	B	B
95th %tile Queue, veh	0	0	10	3	8	11	4	6

Intersection	
Intersection Delay, s/veh	96.1
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	546	903	1646	1261
Demand Flow Rate, veh/h	546	903	1646	1274
Vehicles Circulating, veh/h	1385	1638	617	946
Vehicles Exiting, veh/h	835	625	1314	1595
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	28.4	222.9	61.1	80.2
Approach LOS	D	F	F	F

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	257	289	424	479	774	872	599	675
Cap Entry Lane, veh/h	378	437	299	353	765	840	565	635
Entry HV Adj Factor	0.999	1.001	1.001	0.999	1.000	1.000	0.990	0.990
Flow Entry, veh/h	257	289	424	479	774	872	593	668
Cap Entry, veh/h	377	438	299	353	765	841	560	629
V/C Ratio	0.681	0.661	1.417	1.358	1.011	1.038	1.059	1.062
Control Delay, s/veh	31.0	26.1	239.3	208.4	58.6	63.2	81.8	78.9
LOS	D	D	F	F	F	F	F	F
95th %tile Queue, veh	5	5	23	23	18	20	17	18

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	29	0	1821	1273	24
Future Vol, veh/h	0	29	0	1821	1273	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	32	0	1979	1384	26

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	705	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	384	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	384	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	15.22	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	384	-	-
HCM Lane V/C Ratio	-	0.082	-	-
HCM Ctrl Dly (s/v)	-	15.2	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

Intersection	
Intersection Delay, s/veh	30.4
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	281	432	1793	1268
Demand Flow Rate, veh/h	287	432	1793	1280
Vehicles Circulating, veh/h	1321	1800	436	309
Vehicles Exiting, veh/h	268	429	1172	1923
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	21.7	54.7	39.3	11.4
Approach LOS	C	F	E	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.819	0.181	0.530	0.470	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	235	52	229	203	843	950	602	678
Cap Entry Lane, veh/h	400	462	258	307	955	955	1072	1072
Entry HV Adj Factor	0.979	0.981	1.000	1.000	1.000	1.000	0.990	0.991
Flow Entry, veh/h	230	51	229	203	843	950	596	672
Cap Entry, veh/h	392	453	258	307	955	955	1061	1062
V/C Ratio	0.587	0.113	0.888	0.660	0.883	0.995	0.562	0.632
Control Delay, s/veh	24.3	9.5	72.1	35.1	28.6	48.7	10.5	12.2
LOS	C	A	F	E	D	E	B	B
95th %tile Queue, veh	4	0	8	4	12	19	4	5

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	362	7	28	569	4	17
Future Vol, veh/h	362	7	28	569	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	407	8	31	639	4	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	415	0	1113	411
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	702	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1144	-	231	641
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	491	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1144	-	221	641
Mov Cap-2 Maneuver	-	-	-	-	221	-
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	470	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.39	13.05
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	84	-
HCM Lane V/C Ratio	0.05	-	-	0.027	-
HCM Ctrl Dly (s/v)	13.1	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	373	6	79	594	3	49
Future Vol, veh/h	373	6	79	594	3	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	419	7	89	667	3	55

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	426	0	1267	422
Stage 1	-	-	-	-	422	-
Stage 2	-	-	-	-	845	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1133	-	186	631
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	421	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1133	-	163	631
Mov Cap-2 Maneuver	-	-	-	-	163	-
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	369	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.99	12.45
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	542	-	-	211	-
HCM Lane V/C Ratio	0.108	-	-	0.078	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.3	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	268	46	27	130	20	8	66	65	93	105	17
Future Volume (veh/h)	11	268	46	27	130	20	8	66	65	93	105	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	12	301	52	30	146	22	9	74	73	104	118	19
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	170	479	81	221	437	60	177	208	193	365	240	33
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	23	1410	238	119	1286	176	40	778	719	525	895	122
Grp Volume(v), veh/h	365	0	0	198	0	0	156	0	0	241	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1581	0	0	1537	0	0	1542	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Cycle Q Clear(g_c), s	4.2	0.0	0.0	2.1	0.0	0.0	1.9	0.0	0.0	2.9	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.47	0.43		0.08
Lane Grp Cap(c), veh/h	730	0	0	718	0	0	578	0	0	638	0	0
V/C Ratio(X)	0.50	0.00	0.00	0.28	0.00	0.00	0.27	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	2007	0	0	1872	0	0	1859	0	0	1876	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.4	0.0	0.0	5.7	0.0	0.0	6.8	0.0	0.0	7.2	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.9	0.0	0.0	5.9	0.0	0.0	7.1	0.0	0.0	7.6	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		365			198			156			241	
Approach Delay, s/veh		6.9			5.9			7.1			7.6	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	10.7	12.3	10.7	12.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	25.5	25.5	25.5
Max Q Clear Time (g_c+I1), s	3.9	6.2	4.9	4.1
Green Ext Time (p_c), s	0.7	1.8	1.2	1.0

Intersection Summary	
HCM 7th Control Delay, s/veh	6.9
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	340	1078	1143
Demand Flow Rate, veh/h	0	343	1100	1154
Vehicles Circulating, veh/h	1362	883	208	236
Vehicles Exiting, veh/h	28	425	1154	990
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	9.7	8.2	8.9
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.606	0.394	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	208	135	517	583	542	612
Cap Entry Lane, veh/h	386	446	599	670	1175	1175	1146	1146
Entry HV Adj Factor	1.000	1.000	0.990	0.993	0.980	0.980	0.991	0.990
Flow Entry, veh/h	0	0	206	134	507	571	537	606
Cap Entry, veh/h	386	446	593	665	1152	1152	1135	1134
V/C Ratio	0.000	0.000	0.347	0.201	0.440	0.496	0.473	0.534
Control Delay, s/veh	9.3	8.1	11.0	7.8	7.8	8.6	8.4	9.4
LOS	A	A	B	A	A	A	A	A
95th %tile Queue, veh	0	0	2	1	2	3	3	3

Intersection	
Intersection Delay, s/veh	74.9
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1041	466	1049	1223
Demand Flow Rate, veh/h	1062	480	1080	1235
Vehicles Circulating, veh/h	1287	1170	1198	460
Vehicles Exiting, veh/h	408	1108	1151	1190
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	137.0	16.9	108.8	14.9
Approach LOS	F	C	F	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	499	563	226	254	508	572	580	655
Cap Entry Lane, veh/h	413	475	460	525	448	513	884	960
Entry HV Adj Factor	0.980	0.980	0.968	0.972	0.971	0.972	0.991	0.990
Flow Entry, veh/h	489	552	219	247	493	556	575	648
Cap Entry, veh/h	405	466	446	510	435	499	876	950
V/C Ratio	1.208	1.184	0.491	0.484	1.133	1.115	0.656	0.682
Control Delay, s/veh	144.4	130.5	18.1	15.9	114.6	103.7	14.9	14.9
LOS	F	F	C	C	F	F	B	B
95th %tile Queue, veh	20	21	3	3	18	18	5	6

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	51	0	1095	1190	21
Future Vol, veh/h	0	51	0	1095	1190	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	57	0	1230	1337	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	680	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	398	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	398	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	15.56	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	398	-	-
HCM Lane V/C Ratio	-	0.144	-	-
HCM Ctrl Dly (s/v)	-	15.6	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.5	-	-

Intersection	
Intersection Delay, s/veh	22.3
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	351	345	1315	1607
Demand Flow Rate, veh/h	362	355	1328	1623
Vehicles Circulating, veh/h	1640	1400	552	213
Vehicles Exiting, veh/h	196	480	1450	1542
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	69.0	19.0	21.5	13.5
Approach LOS	F	C	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.796	0.204	0.515	0.485	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	288	74	183	172	624	704	763	860
Cap Entry Lane, veh/h	299	352	372	432	859	859	1170	1170
Entry HV Adj Factor	0.970	0.973	0.972	0.971	0.990	0.990	0.990	0.990
Flow Entry, veh/h	279	72	178	167	618	697	755	852
Cap Entry, veh/h	290	343	362	419	851	850	1158	1158
V/C Ratio	0.964	0.210	0.491	0.398	0.726	0.819	0.652	0.735
Control Delay, s/veh	83.1	14.3	21.6	16.1	18.2	24.4	12.0	14.9
LOS	F	B	C	C	C	C	B	B
95th %tile Queue, veh	10	1	3	2	7	9	5	7

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	597	6	39	228	12	62
Future Vol, veh/h	597	6	39	228	12	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	671	7	44	256	13	70

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	678	0	1018	674
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	344	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	914	-	263	454
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	718	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	914	-	248	454
Mov Cap-2 Maneuver	-	-	-	-	248	-
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	678	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.33	16.33
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	401	-	-	263	-
HCM Lane V/C Ratio	0.208	-	-	0.048	-
HCM Ctrl Dly (s/v)	16.3	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.2	-

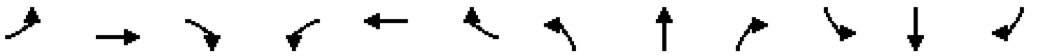
Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	656	3	30	259	8	94
Future Vol, veh/h	656	3	30	259	8	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	737	3	34	291	9	106

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	740	0	1097	739
Stage 1	-	-	-	-	739	-
Stage 2	-	-	-	-	358	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	866	-	236	417
Stage 1	-	-	-	-	472	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	866	-	225	417
Mov Cap-2 Maneuver	-	-	-	-	225	-
Stage 1	-	-	-	-	472	-
Stage 2	-	-	-	-	674	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.97	17.97
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	391	-	-	187	-
HCM Lane V/C Ratio	0.293	-	-	0.039	-
HCM Ctrl Dly (s/v)	18	-	-	9.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	218	21	44	381	73	67	137	31	47	93	18
Future Volume (veh/h)	13	218	21	44	381	73	67	137	31	47	93	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	15	253	24	51	443	85	78	159	36	55	108	21
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	136	683	62	162	604	110	235	271	54	232	287	47
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	29	1503	137	77	1330	242	333	1063	212	319	1128	186
Grp Volume(v), veh/h	292	0	0	579	0	0	273	0	0	184	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1649	0	0	1608	0	0	1633	0	0
Q Serve(g_s), s	0.0	0.0	0.0	2.5	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.5	0.0	0.0	9.0	0.0	0.0	4.6	0.0	0.0	2.8	0.0	0.0
Prop In Lane	0.05		0.08	0.09		0.15	0.29		0.13	0.30		0.11
Lane Grp Cap(c), veh/h	881	0	0	876	0	0	559	0	0	567	0	0
V/C Ratio(X)	0.33	0.00	0.00	0.66	0.00	0.00	0.49	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	1480	0	0	1474	0	0	1444	0	0	1431	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.6	0.0	0.0	7.0	0.0	0.0	10.2	0.0	0.0	9.6	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.9	0.0	0.0	0.7	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.2	0.0	0.0	1.0	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.8	0.0	0.0	7.9	0.0	0.0	10.9	0.0	0.0	9.9	0.0	0.0
LnGrp LOS	A			A			B			A		
Approach Vol, veh/h		292			579			273			184	
Approach Delay, s/veh		5.8			7.9			10.9			9.9	
Approach LOS		A			A			B			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.4		18.5		12.4		18.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		6.6		5.5		4.8		11.0				
Green Ext Time (p_c), s		1.3		1.4		0.9		3.1				

Intersection Summary												
HCM 7th Control Delay, s/veh			8.3									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	24.6
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	516	1974	1394
Demand Flow Rate, veh/h	0	516	1974	1408
Vehicles Circulating, veh/h	1721	1628	181	354
Vehicles Exiting, veh/h	41	527	1540	1790
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	70.8	19.7	14.5
Approach LOS	-	F	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.607	0.393	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	313	203	928	1046	662	746
Cap Entry Lane, veh/h	277	329	302	356	1204	1204	1029	1029
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.990
Flow Entry, veh/h	0	0	313	203	928	1046	655	739
Cap Entry, veh/h	277	329	302	356	1204	1205	1018	1019
V/C Ratio	0.000	0.000	1.037	0.570	0.770	0.868	0.643	0.725
Control Delay, s/veh	13.0	10.9	100.2	25.6	16.1	22.9	12.9	15.9
LOS	B	B	F	D	C	C	B	C
95th %tile Queue, veh	0	0	12	3	8	12	5	7

Intersection	
Intersection Delay, s/veh	144.6
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	636	969	1691	1306
Demand Flow Rate, veh/h	636	969	1691	1319
Vehicles Circulating, veh/h	1431	1718	686	1057
Vehicles Exiting, veh/h	945	659	1381	1630
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	43.0	313.7	92.6	136.1
Approach LOS	E	F	F	F

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	299	337	455	514	795	896	620	699
Cap Entry Lane, veh/h	362	421	278	330	718	793	511	578
Entry HV Adj Factor	1.000	1.000	1.001	0.999	1.000	1.000	0.990	0.990
Flow Entry, veh/h	299	337	455	514	795	896	614	692
Cap Entry, veh/h	362	421	278	329	718	793	505	573
V/C Ratio	0.826	0.801	1.637	1.559	1.107	1.130	1.214	1.209
Control Delay, s/veh	47.3	39.1	334.7	295.1	89.6	95.2	139.2	133.3
LOS	E	E	F	F	F	F	F	F
95th %tile Queue, veh	7	7	28	30	23	26	23	25

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	42	0	1863	1292	58
Future Vol, veh/h	0	42	0	1863	1292	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	46	0	2025	1404	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	734	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	367	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	367	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	16.19	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	367	-	-
HCM Lane V/C Ratio	-	0.124	-	-
HCM Ctrl Dly (s/v)	-	16.2	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.4	-	-

Intersection	
Intersection Delay, s/veh	33.5
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	281	439	1829	1301
Demand Flow Rate, veh/h	287	439	1829	1314
Vehicles Circulating, veh/h	1355	1836	441	309
Vehicles Exiting, veh/h	268	434	1201	1966
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	23.1	60.9	44.0	11.8
Approach LOS	C	F	E	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.819	0.181	0.522	0.478	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	235	52	229	210	860	969	618	696
Cap Entry Lane, veh/h	388	449	249	298	951	951	1072	1072
Entry HV Adj Factor	0.979	0.981	1.000	1.000	1.000	1.000	0.990	0.991
Flow Entry, veh/h	230	51	229	210	860	969	612	690
Cap Entry, veh/h	380	440	249	298	950	951	1061	1062
V/C Ratio	0.605	0.116	0.918	0.704	0.905	1.019	0.577	0.649
Control Delay, s/veh	26.0	9.8	80.1	39.9	31.6	55.0	10.8	12.7
LOS	D	A	F	E	D	F	B	B
95th %tile Queue, veh	4	0	8	5	13	20	4	5

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	366	16	84	573	11	69
Future Vol, veh/h	366	16	84	573	11	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	411	18	94	644	12	78

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	429	0	1253	420
Stage 1	-	-	-	-	420	-
Stage 2	-	-	-	-	833	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1130	-	190	633
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	427	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1130	-	165	633
Mov Cap-2 Maneuver	-	-	-	-	165	-
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	371	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.08	14.83
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	456	-	-	230	-
HCM Lane V/C Ratio	0.197	-	-	0.084	-
HCM Ctrl Dly (s/v)	14.8	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.3	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	425	10	65	650	7	62
Future Vol, veh/h	425	10	65	650	7	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	478	11	73	730	8	70

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	489	0	1360	483
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	876	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1074	-	164	583
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	407	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1074	-	145	583
Mov Cap-2 Maneuver	-	-	-	-	145	-
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	361	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.78	14.75
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	446	-	-	164	-
HCM Lane V/C Ratio	0.174	-	-	0.068	-
HCM Ctrl Dly (s/v)	14.8	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.2	-

Appendix C: Estimated Future Traffic Volume Maps

Exhibit C-1. 2027 Background Traffic

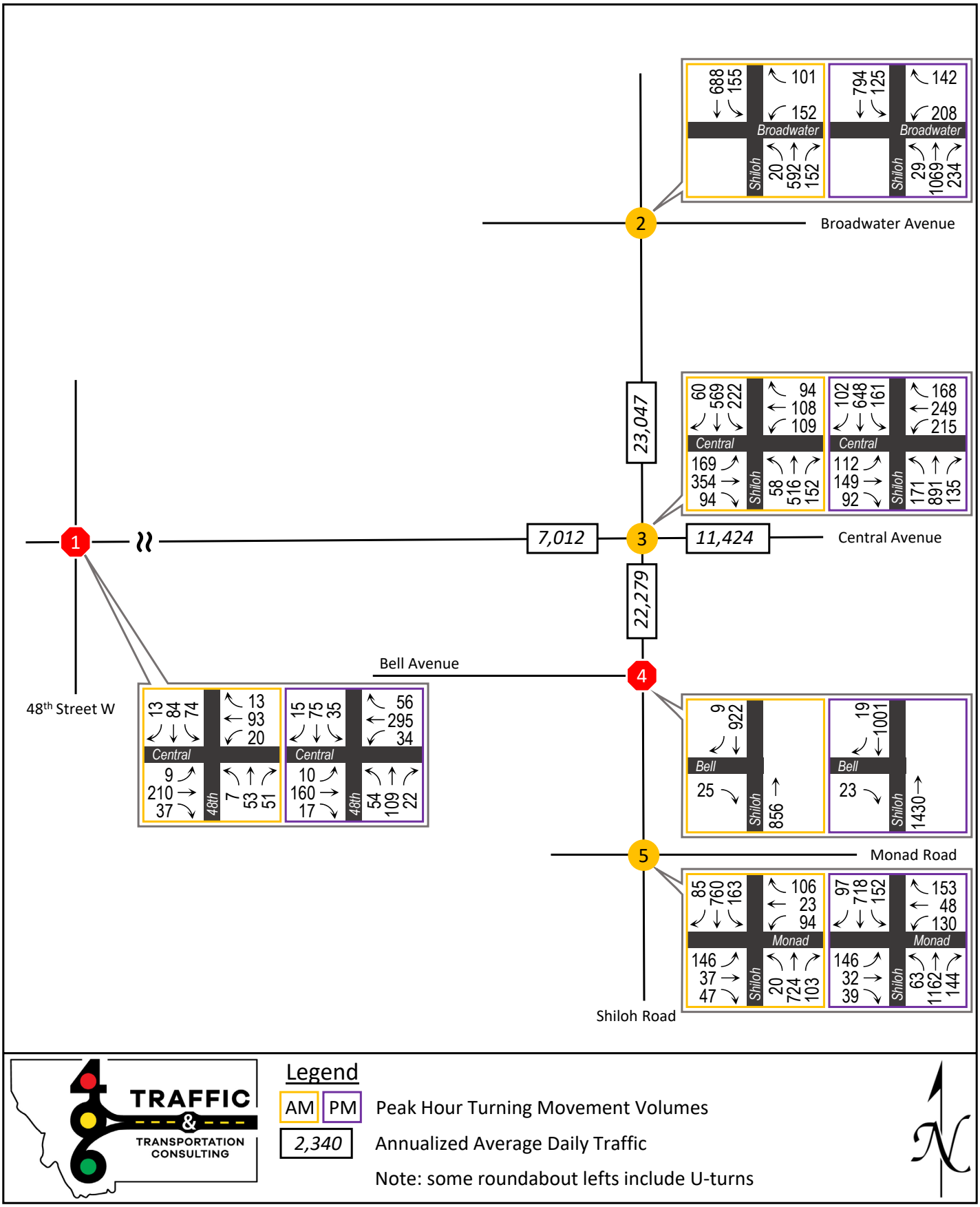


Exhibit C-2. 2027 Phase 1A Project Trips

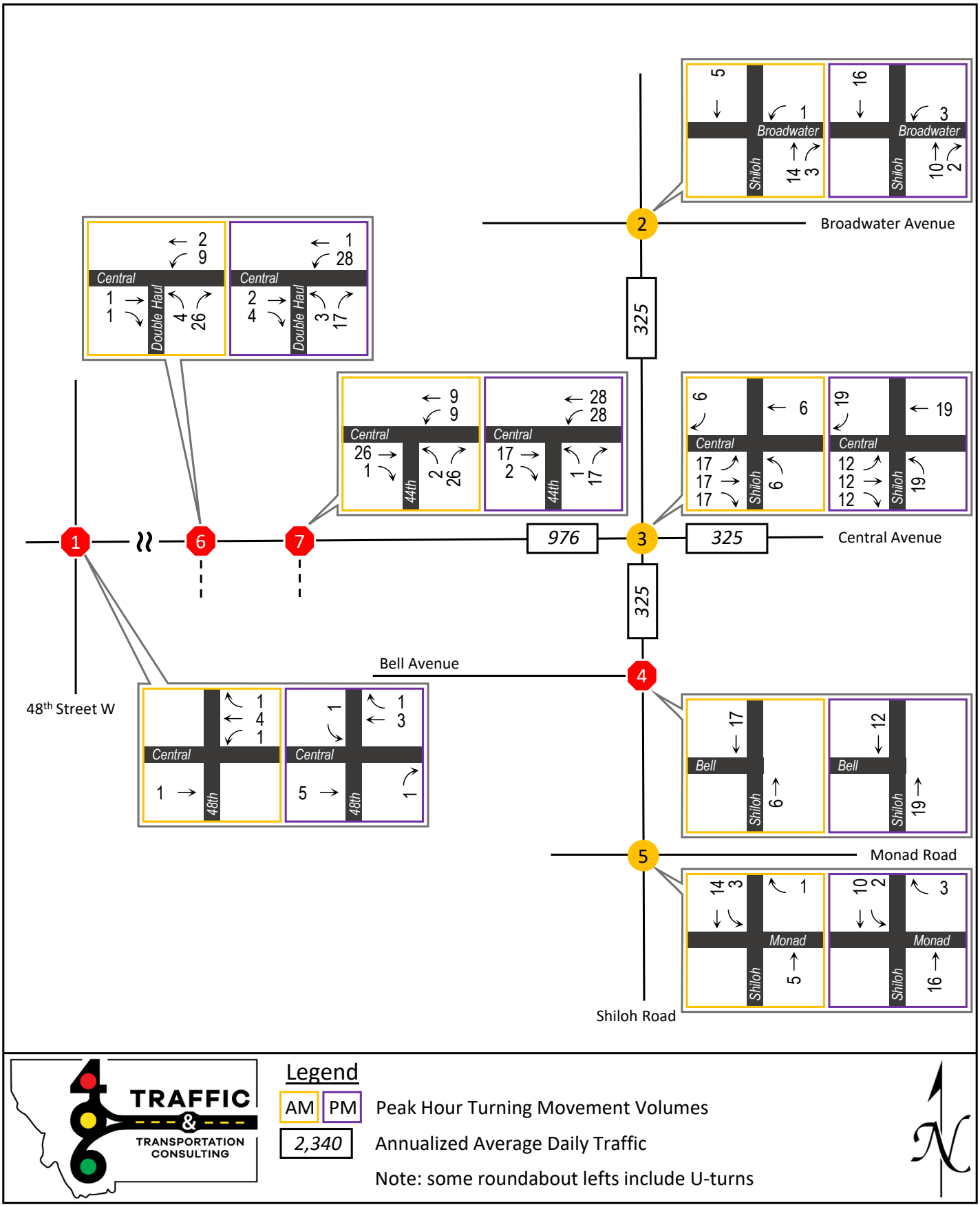


Exhibit C-3. 2027 Phase 1A Total Traffic

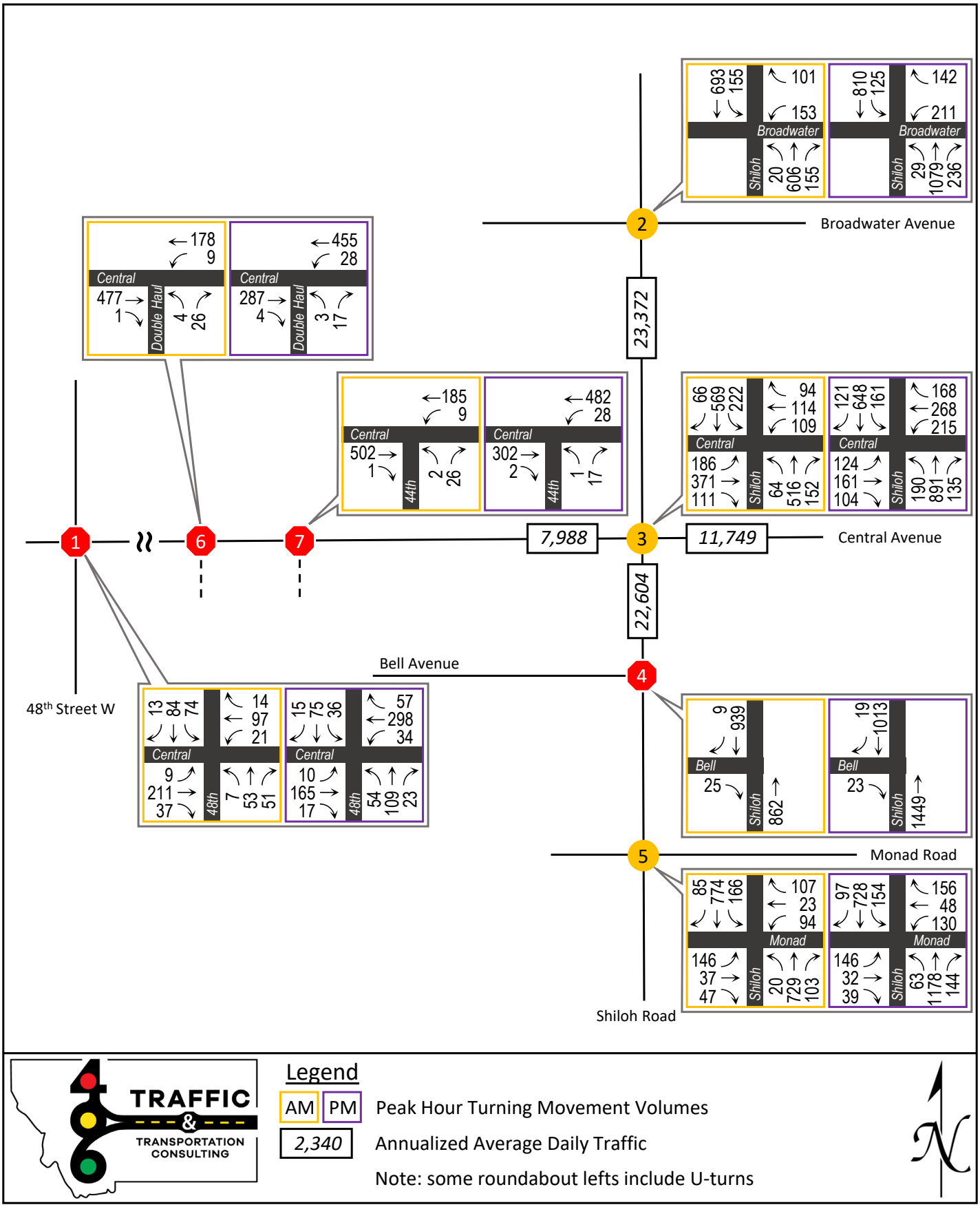


Exhibit C-4. 2029 Traffic Without Phase 1B

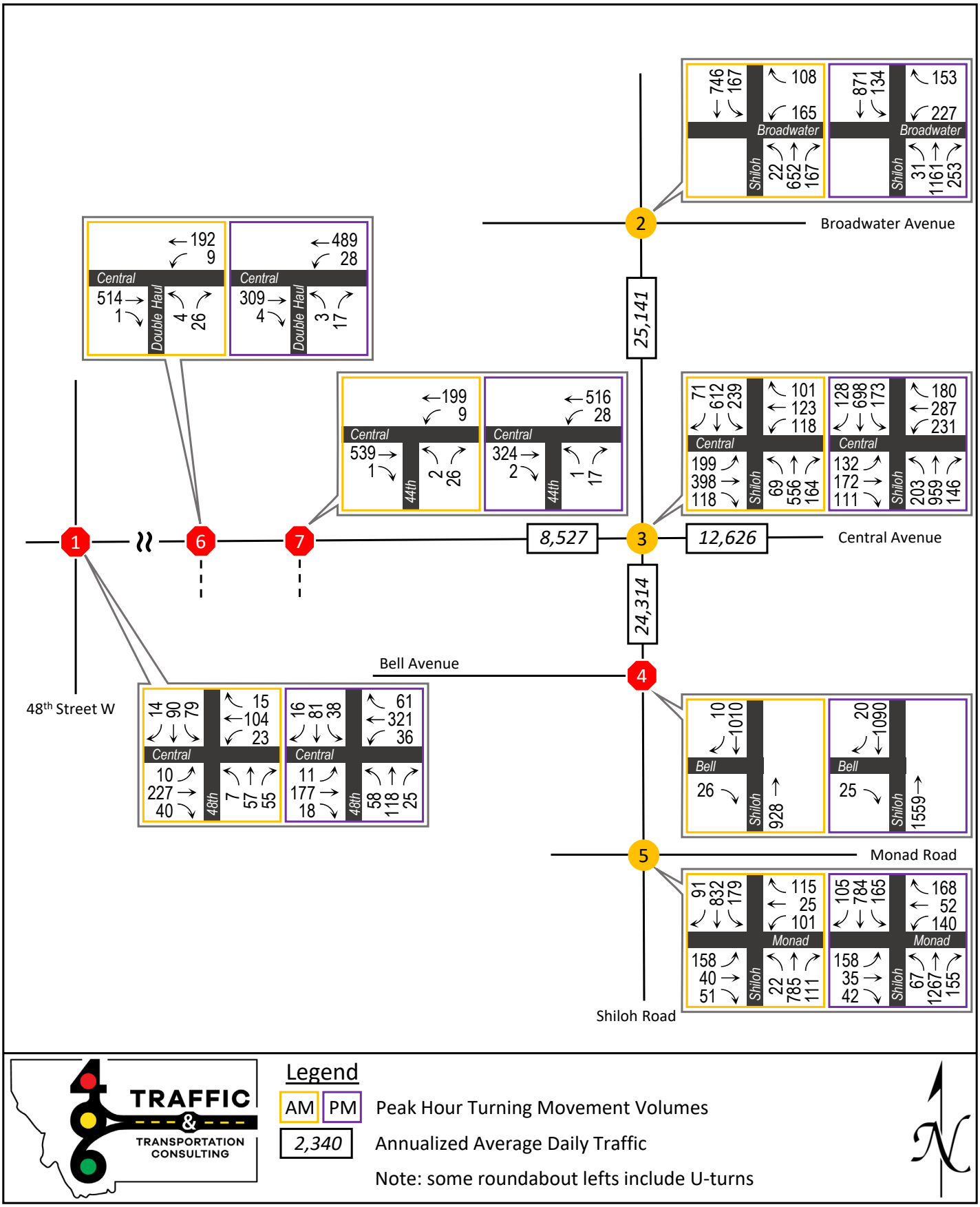


Exhibit C-5. 2029 Phase 1B Project Trips

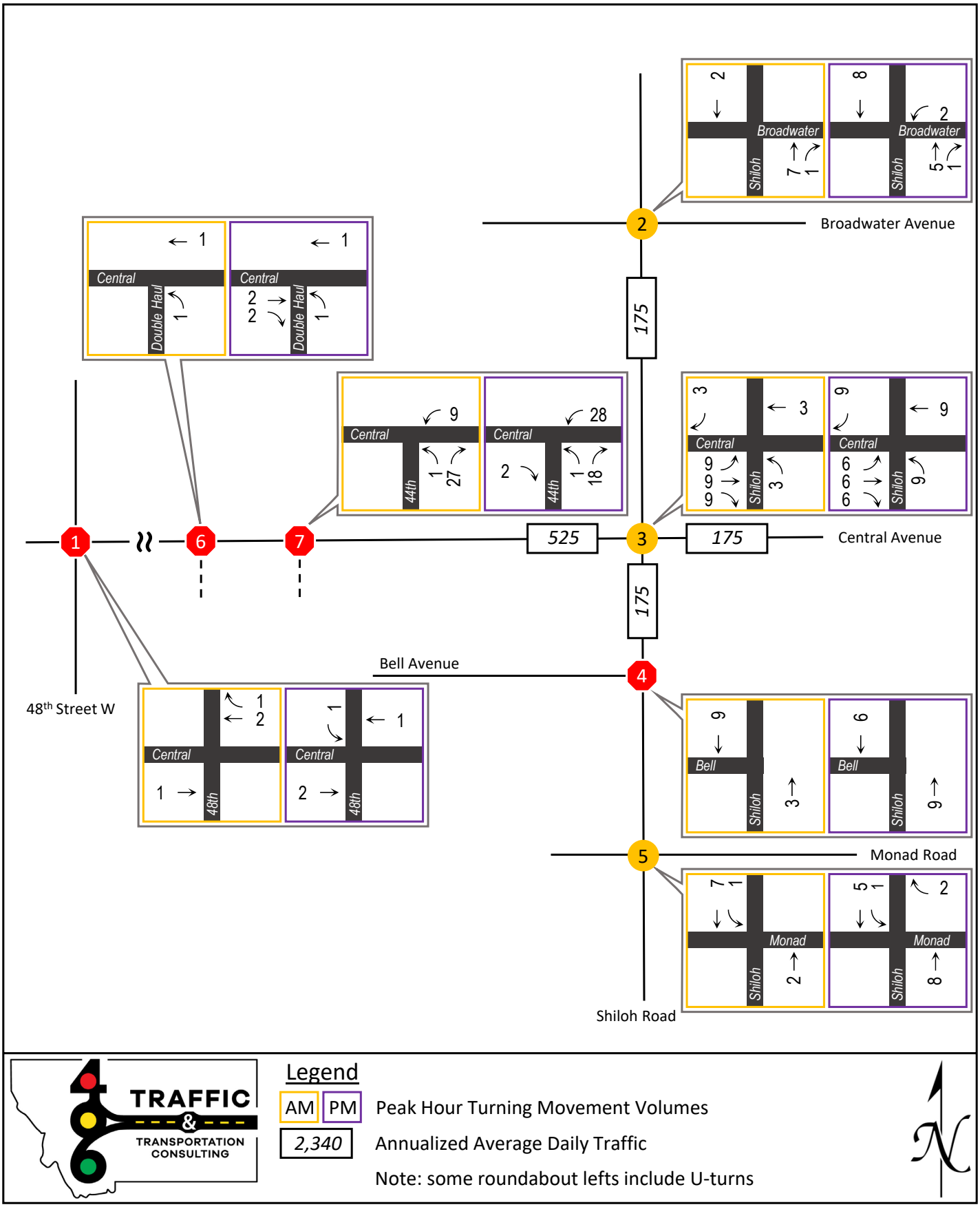


Exhibit C-6. 2029 Phase 1B Total Traffic

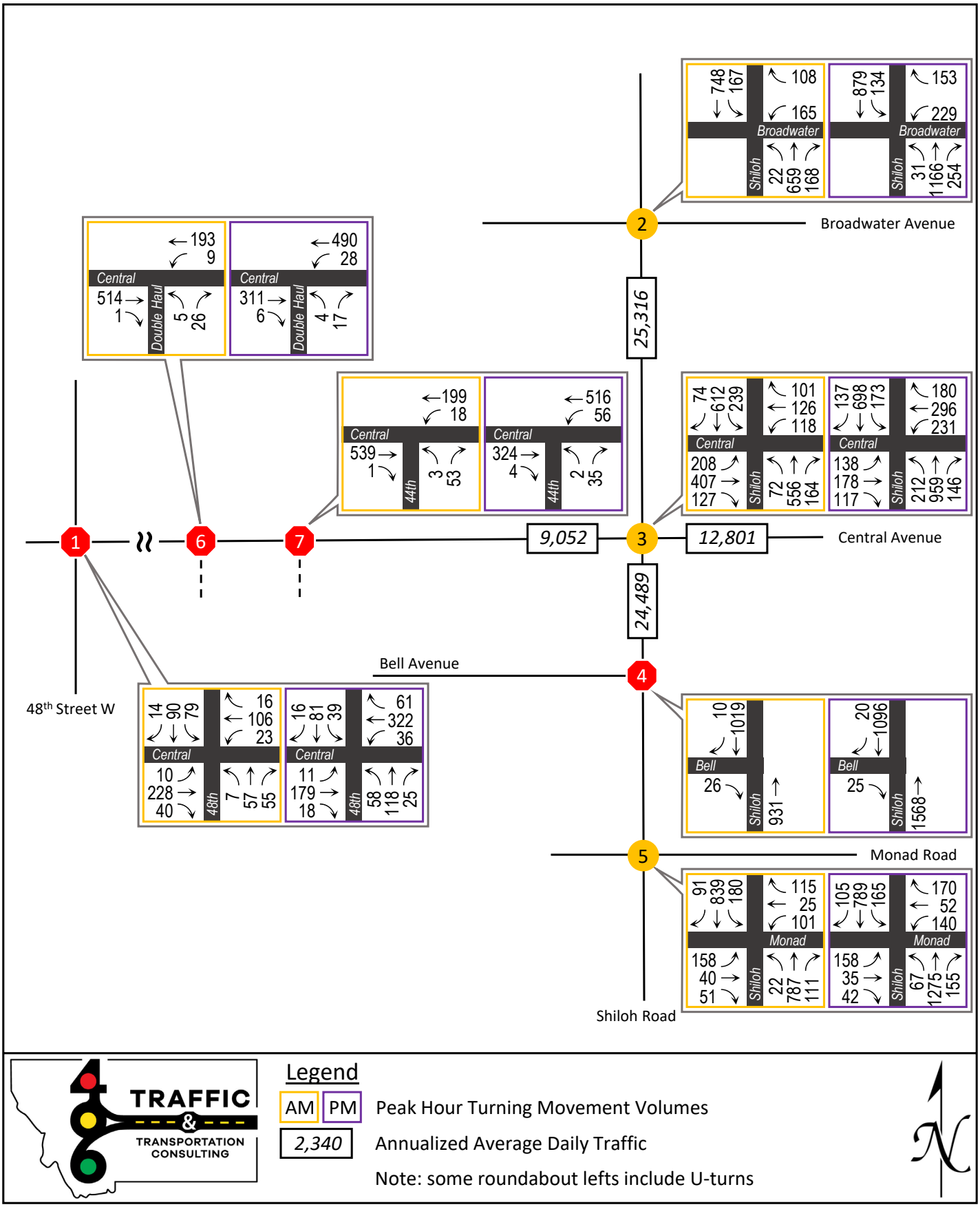


Exhibit C-7. 2031 Traffic Without Phase 1C

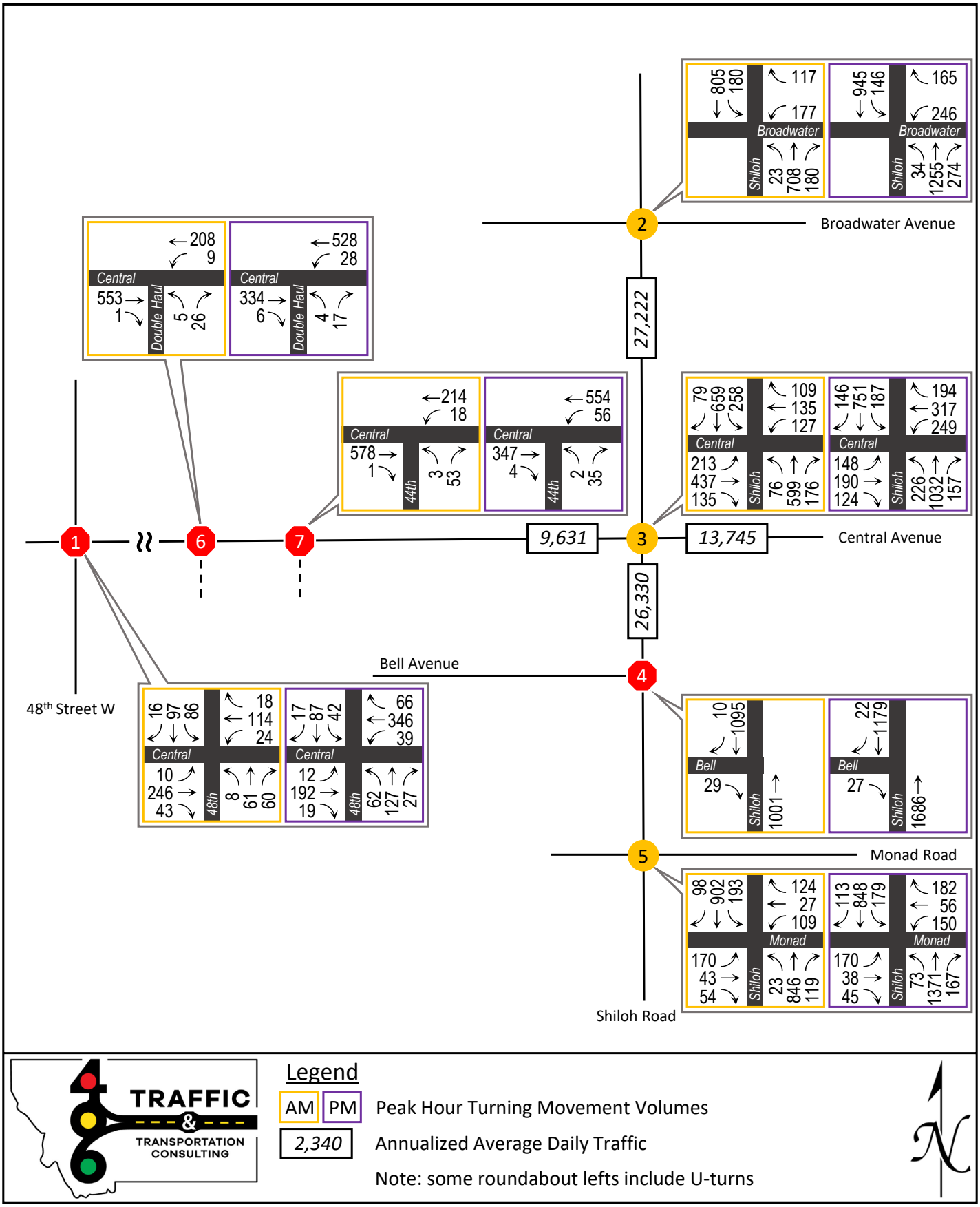


Exhibit C-8. 2031 Phase 1C Project Trips

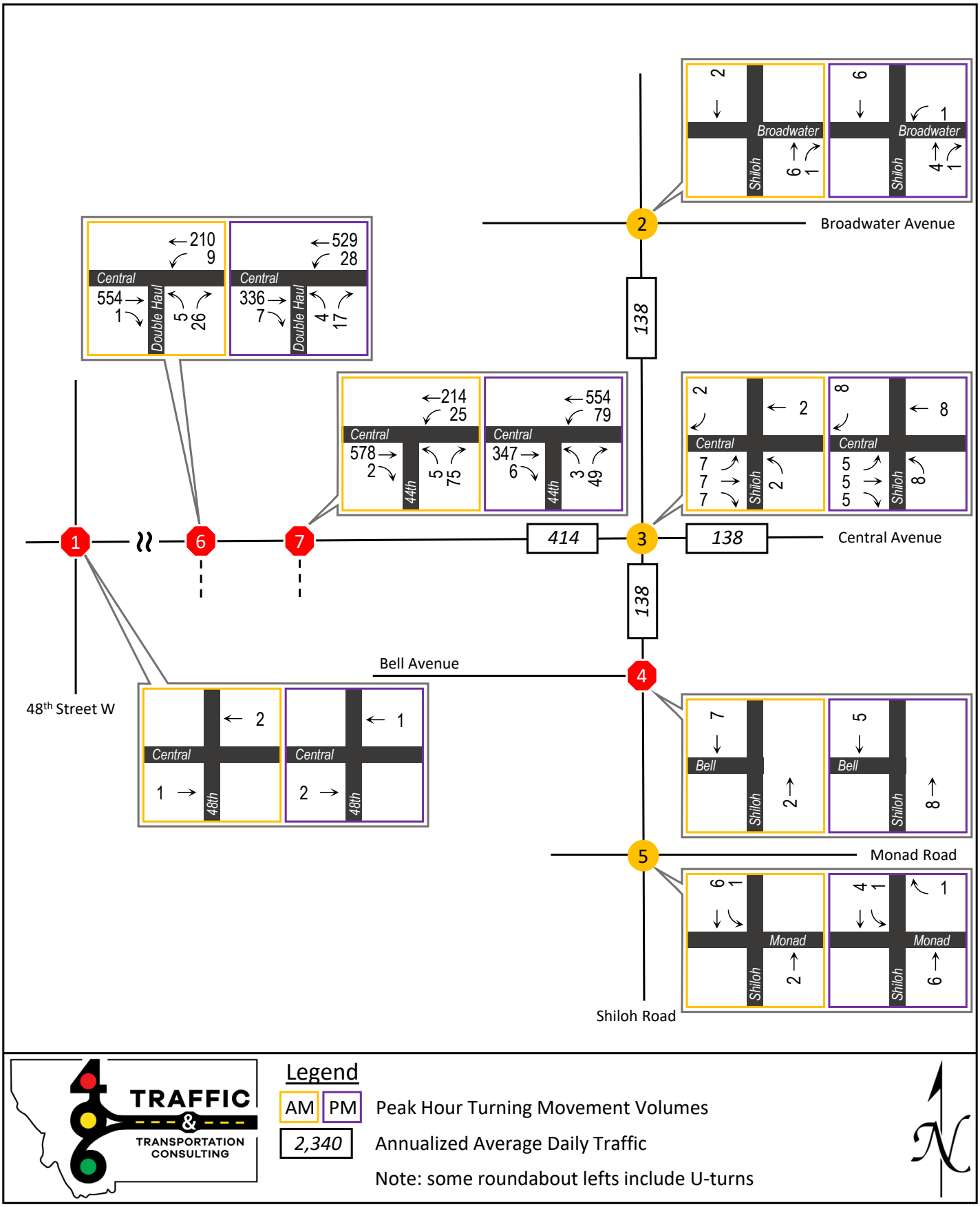


Exhibit C-9. 2031 Phase 1C Total Traffic

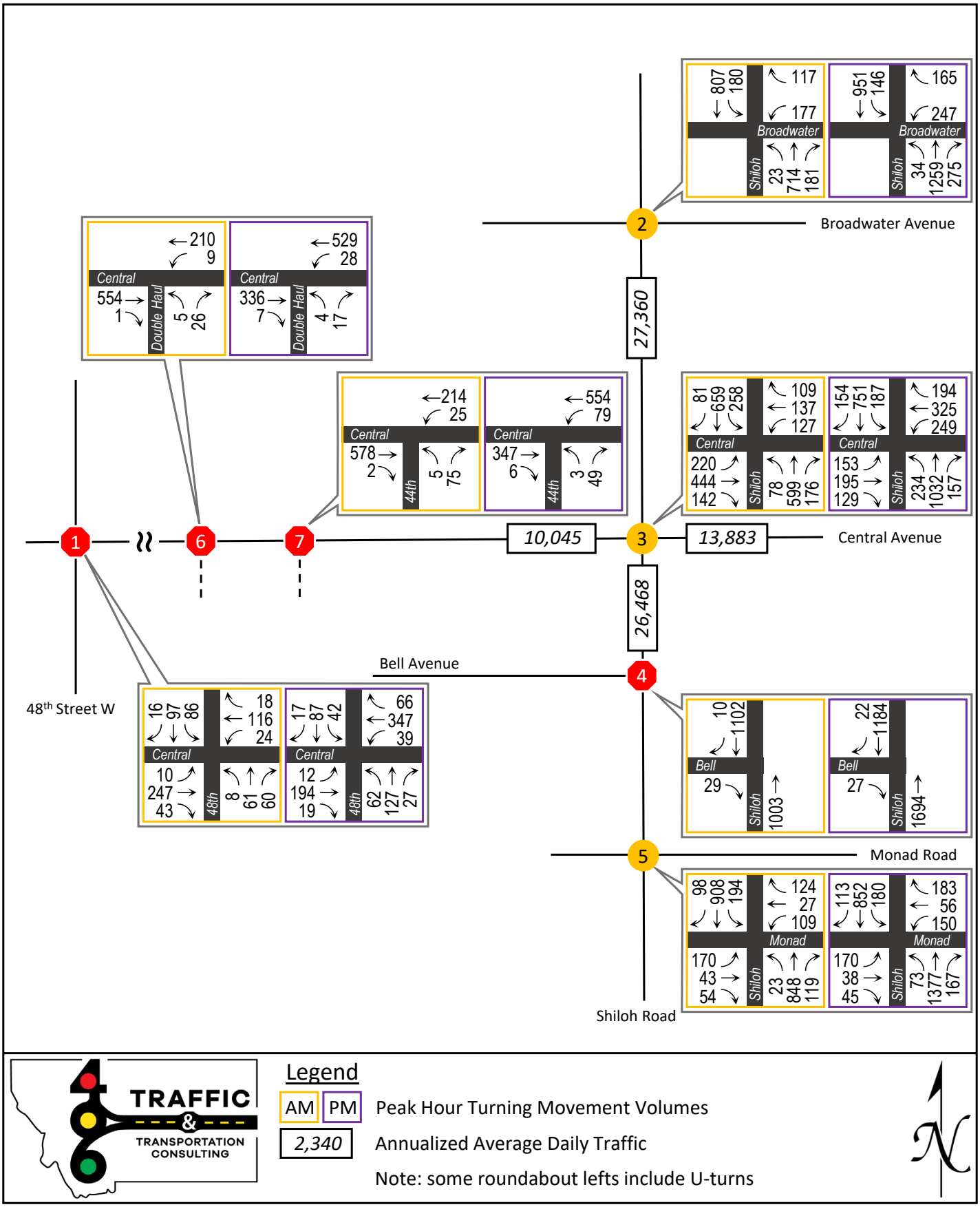


Exhibit C-10. 2033 Traffic Without Phase 2

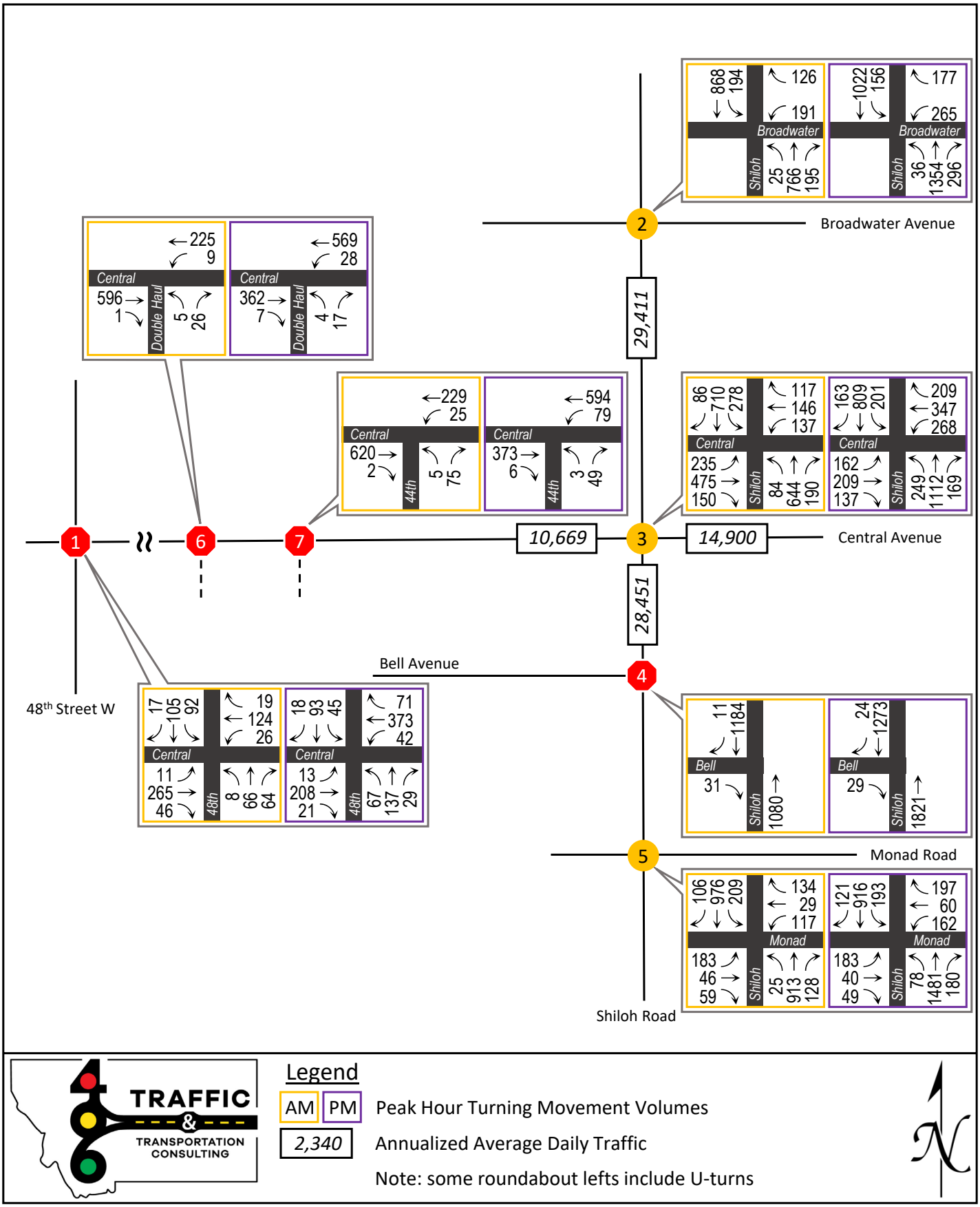


Exhibit C-11. 2033 Phase 2 Project Trips

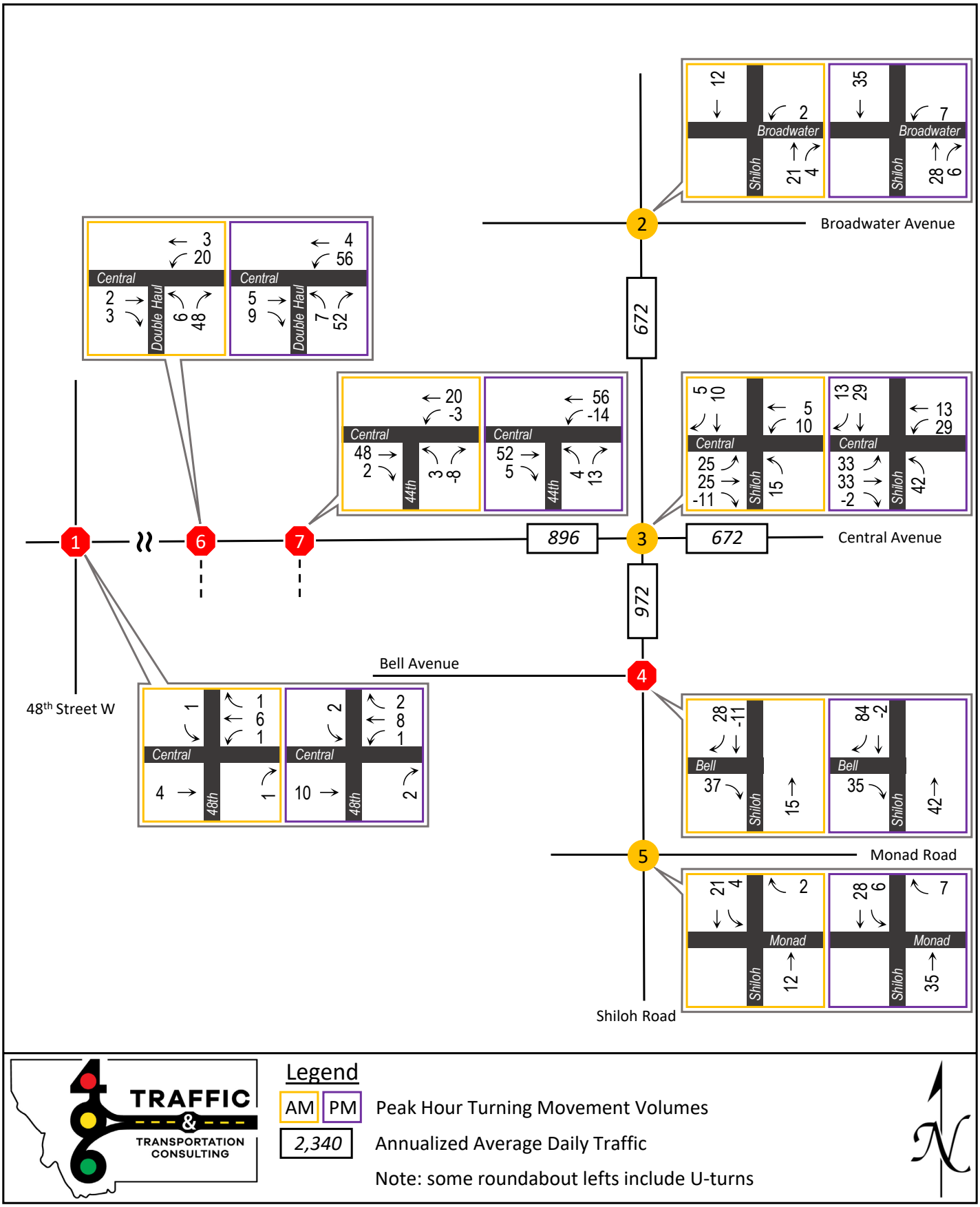
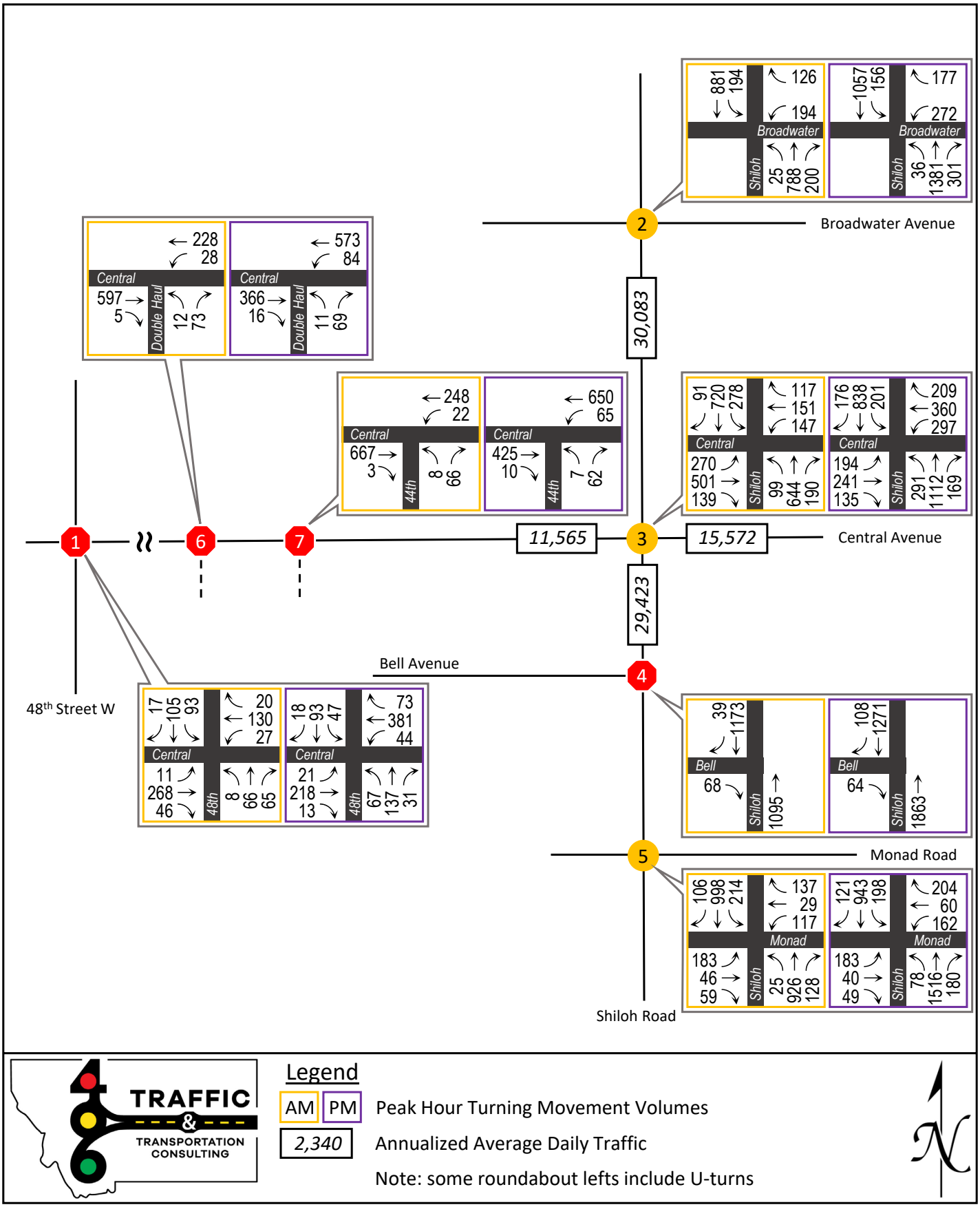
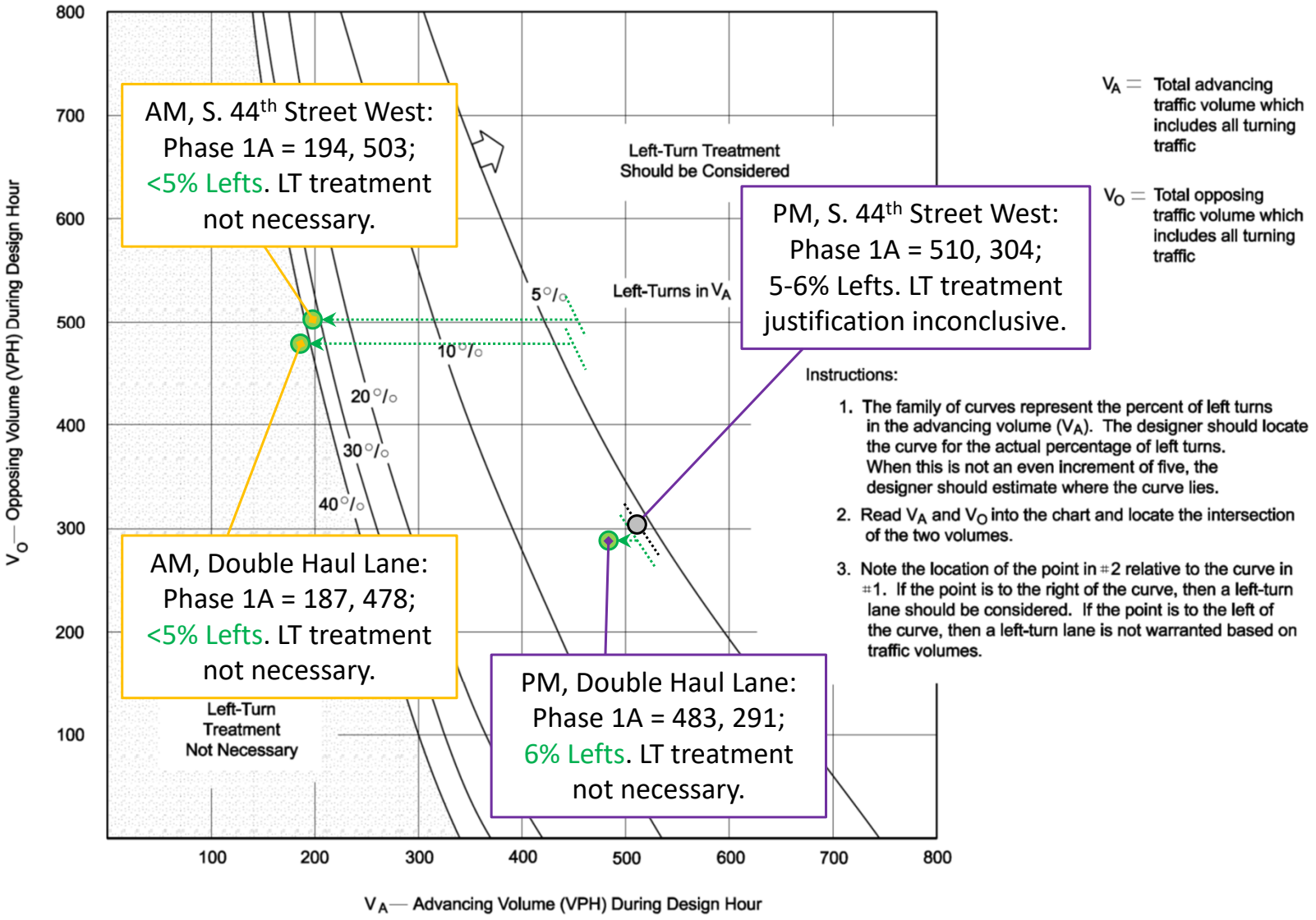


Exhibit C-12. 2033 Total Traffic with Phase 2 (Full project buildout)



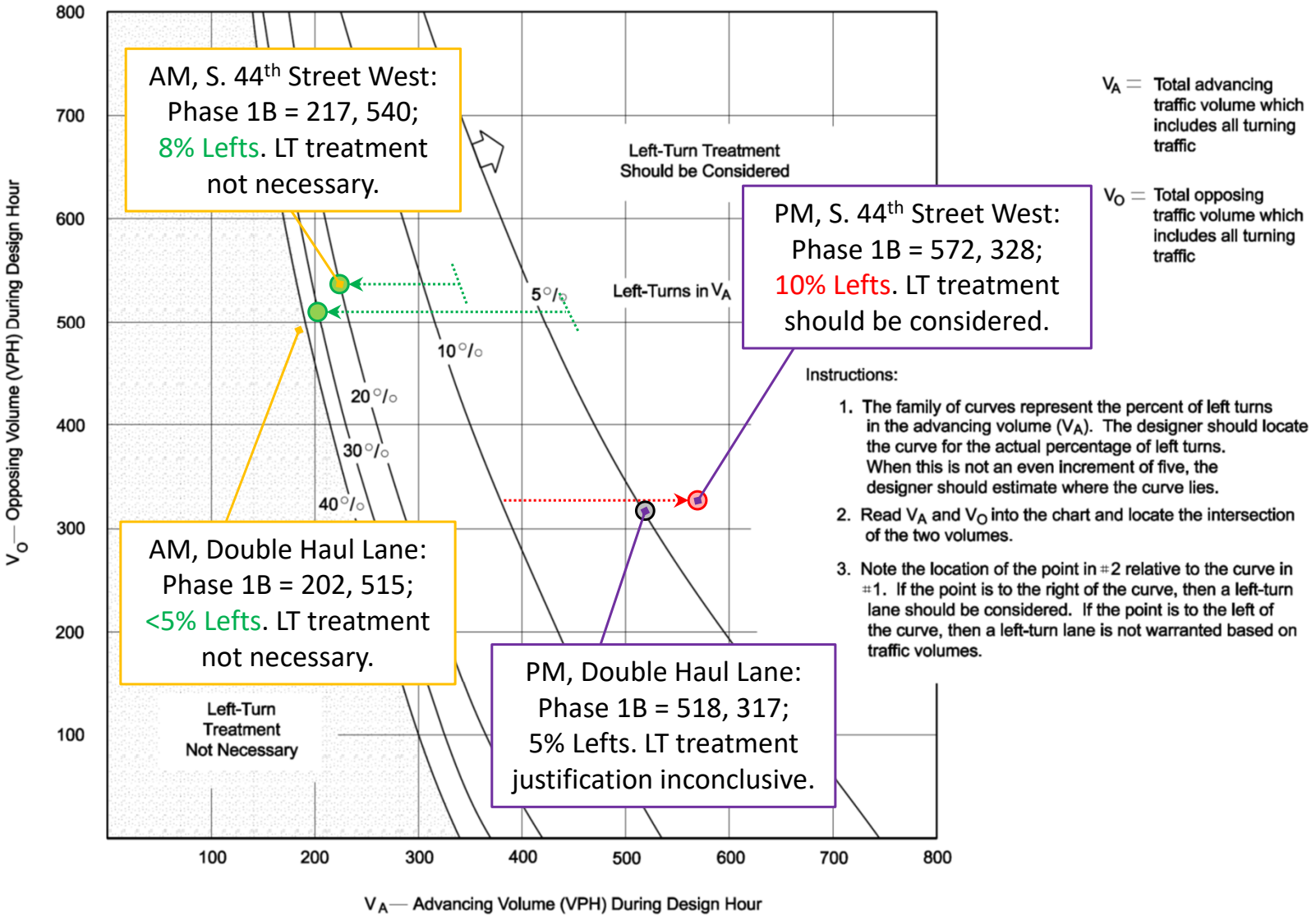
Appendix D: Auxiliary Turn Lane Analysis Charts

Exhibit D-1. 2027 Phase 1A Left Turn Lane Chart



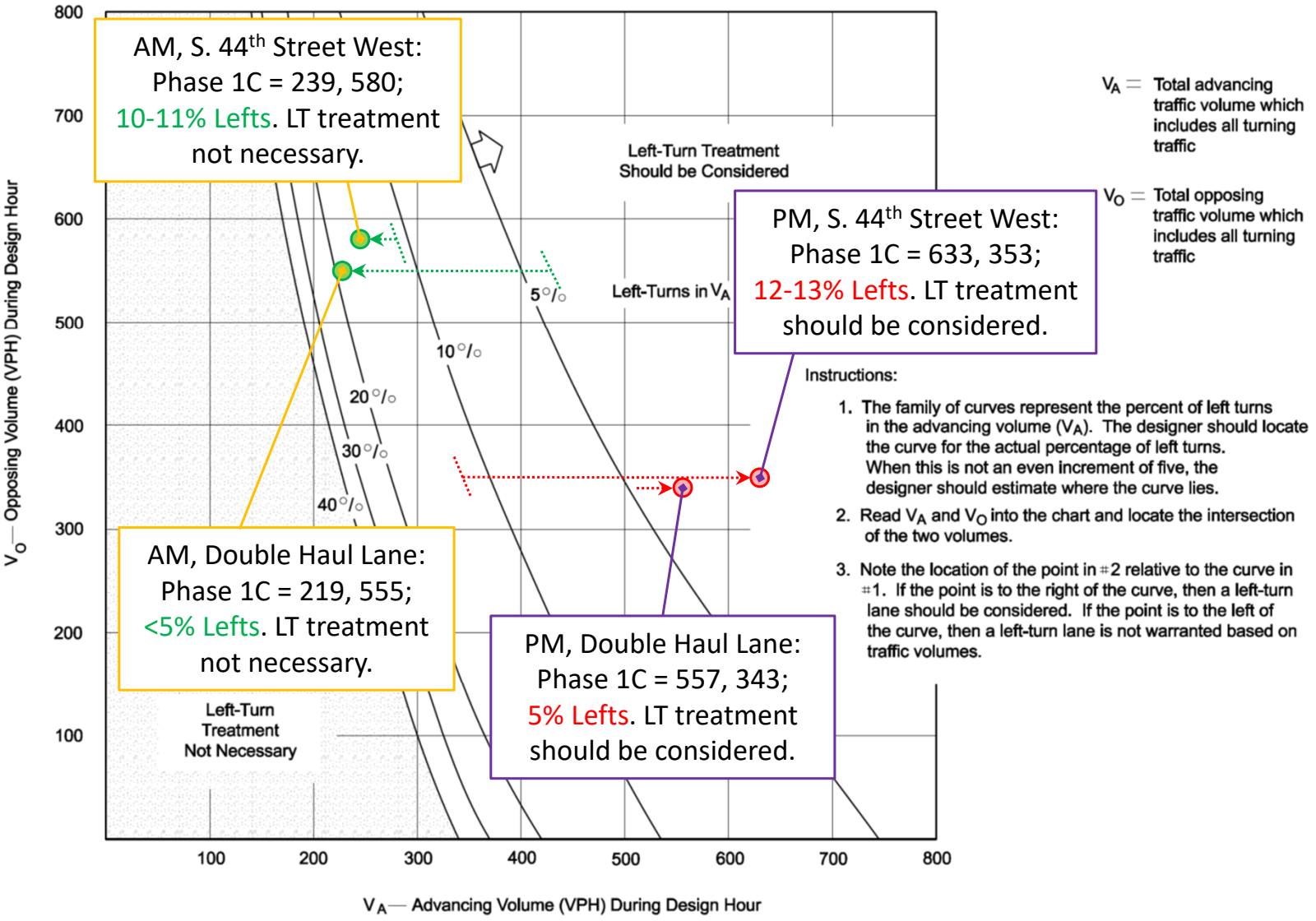
VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (45 MPH)

Exhibit D-2. 2029 Phase 1B Left Turn Lane Chart



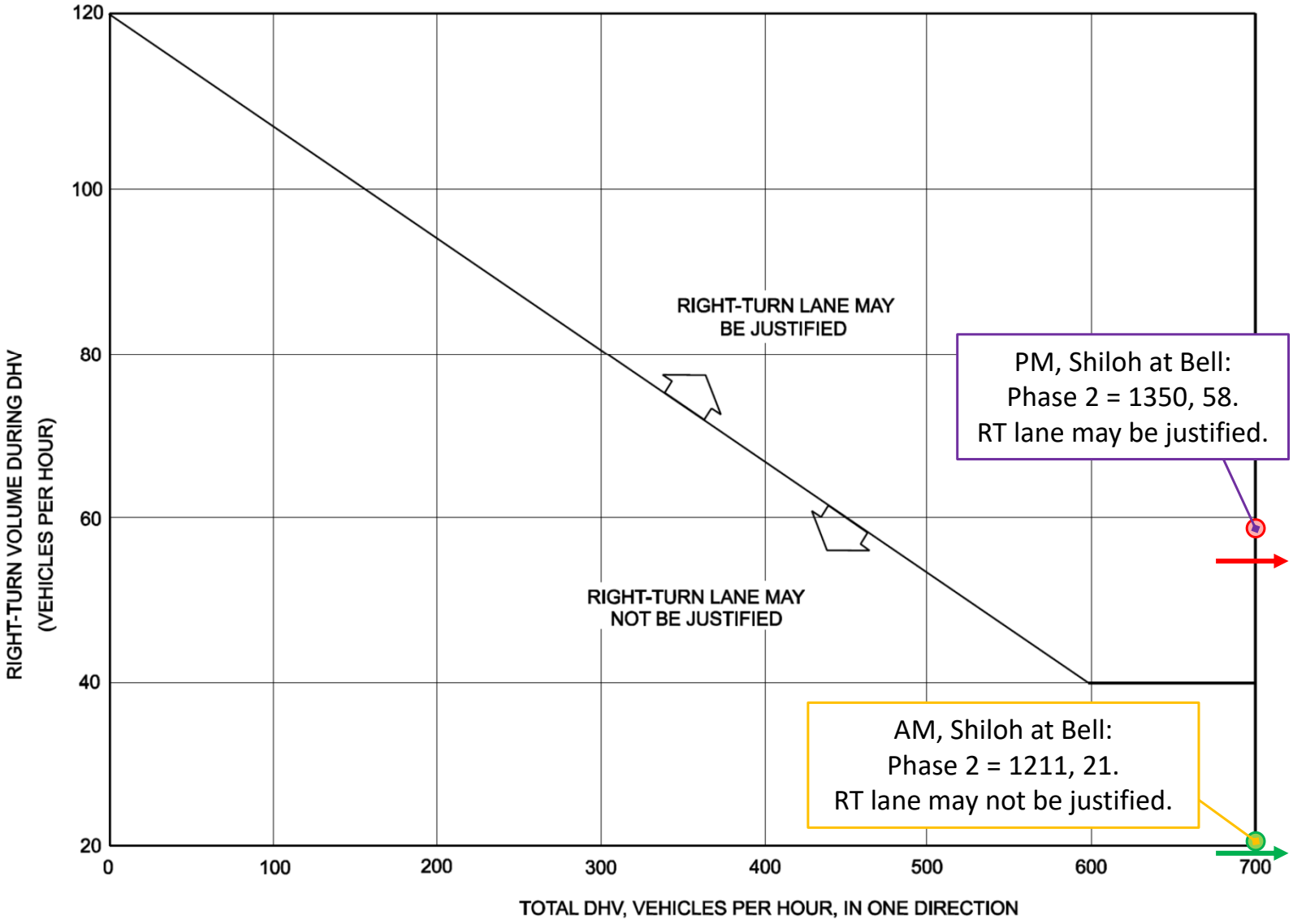
VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (45 MPH)

Exhibit D-3. 2031 Phase 1C Left Turn Lane Chart



VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (45 MPH)

Exhibit D-4. 2033 Phase 2 Right Turn Lane Chart



Note: For highways with a design speed below 50 mph (80 km/h) with a DHV < 300 and where right turns are > 40, an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Appendix E: 44th at Central Avenue Intersection Signal Warrant Summaries

Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave

Scenario: **Completion of Phase 1A in 2027**
Analysis Date: 8/13/2025 Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph Number of Approaches: 3

Traffic Volumes

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	471	452	395	354	370	373	312	263	275	255	304	207
Central Ave Westbound:	179	178	194	215	272	323	317	316	391	425	502	345
S 44th St W Northbound:	28	23	16	14	14	14	15	16	15	18	19	16
Total Entering Volume:	678	653	605	583	656	710	644	595	681	698	825	568
TEV Rank:	5	7	9	11	6	2	**8**	10	**4**	3	**1**	12
Use for:							Warrant 1		Warrant 2		Warrant 3	
Major, Both Directions:	650	630	589	569	642	696	629	579	666	680	806	552
Minor, Higher Direction:	28	23	16	14	14	14	15	16	15	18	19	16

Warrants

			Met?
1	Eight-Hour Vehicular Volume *(either condition)*	*Condition A: Large Volume of Intersecting Traffic*: Major (Both Dir.) Value 629, Minimum 350[c]; Minor (Higher Dir.) Value 15, Minimum 105[c]; Met? No. *or Condition B: Interruption of Continuous Traffic*: Major (Both Dir.) Value 629, Minimum 525[c]; Minor (Higher Dir.) Value 15, Minimum 53[c]; Met? No.	**No**
2	Four-Hour Vehicular Volume	*MUTCD Figure 4C-2 for speed over 40 mph*: Major (Both Dir.) Value 666, Minimum -; Minor (Higher Dir.) Value 15, Minimum 60; Met? No.	**No**
3	Peak Hour* *(either condition)*	*Condition A (must meet all three subconditions)*: 1. Veh-Hrs of Delay — Value 0.1, Minimum 4, Met? No; 2. Minor Volume — Value 19, Minimum 100, Met? No; 3. Total Ent. Volume — Value 825, Minimum 650, Met? Yes. *or Condition B (MUTCD Figure 4C-4)*: Major (Both Dir.) Value 806, Minimum N/A; Minor (Higher Dir.) Value 19, Minimum 75; Met? No.	**No**
4	Pedestrian Volume *(either criterion)*	*Criterion A: Four-hour (MUTCD Figure 4C-7)*: Major (Both Dir.) Value 666; Pedestrians Minimum; Met? n/a. *or Criterion B: One Hour (MUTCD Figure 4C-8)*: Major (Both Dir.) Value 806; Pedestrians Minimum; Met? n/a.	**Not Evaluated**
5	School Crossing	No students projected to cross the major street at this location.	**No**
6	Coordinated Signal System	Only one signal in the roadway network nearby.	**No**
7	Crash Experience ** Condition A not evaluated *(all conditions)*	*Condition B, 1-year Period (Table 4C-4)*: Angle+Ped Crashes Value n/a, Minimum 4; or Fatal+Injury Angle+Ped Value n/a, Minimum 3; Met? n/a. ***and*** *Condition C, 80% of Warrant 1 [Condition A]*: Major (Both Dir.) Value 629, Minimum 629; Minor (Higher Dir.) Minimum 15; Met? n/a. *or Condition B, 3-year Period (Table 4C-5)*: Angle+Ped Crashes Value n/a, Minimum 6; or Fatal+Injury Angle+Ped Value n/a, Minimum 4; Met? n/a. *or Condition C, 80% of Warrant 1 [Condition B]*: Major (Both Dir.) Value 629, Minimum 629; Minor (Higher Dir.) Minimum 15; Met? n/a. *or Condition C, 80% of Warrant 4*: Four Hour Ped; One Hour Ped; Value; Minimum; Met? n/a.	**Not Evaluated**
8	Roadway Network	Not an intersection of two or more major routes.	**No**
9	Intersection Near Grade Xing	No railroad grade crossing nearby.	**No**
		Warrants Met:	**0**
		Recommendation:	**No Signal**

Notes:

c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph

* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."

** No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave

Scenario: **Completion of Phase 1B in 2029**
Analysis Date: 8/13/2025 Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph Number of Approaches: 3

Traffic Volumes

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	506	486	425	381	399	401	336	283	296	275	328	223
Central Ave Westbound:	199	200	217	241	304	360	353	353	440	480	566	392
S 44th St W Northbound:	62	48	34	27	29	29	29	33	30	34	38	33
Total Entering Volume:	767	734	676	649	732	790	718	669	766	789	932	648
TEV Rank:	**4**	6	9	11	7	2	**8**	10	5	3	**1**	12
Use for:	Warrant 2						Warrant 1				Warrant 3	
Major, Both Directions:	705	686	642	622	703	761	689	636	736	755	894	615
Minor, Higher Direction:	62	48	34	27	29	29	29	33	30	34	38	33

Warrants

		Met?
1 Eight-Hour Vehicular Volume *(either condition)*	*Condition A: Large Volume of Intersecting Traffic* — Major (Both Dir.) Value: 689; Minimum: 350[c]; Minor (Higher Dir.) Value: 29; Minimum: 105[c]; Met? No *or Condition B: Interruption of Continuous Traffic* — Major (Both Dir.) Value: 689; Minimum: 525[c]; Minor (Higher Dir.) Value: 29; Minimum: 53[c]; Met? No	**No**
2 Four-Hour Vehicular Volume	*MUTCD Figure 4C-2 for speed over 40 mph* — Major (Both Dir.) Value: 705; Minimum: -; Minor (Higher Dir.) Value: 62; Minimum: 65; Met? Yes	**No**
3 Peak Hour* *(either condition)*	*Condition A (must meet all three subconditions)* 1. Veh-Hrs of Delay — Value: 0.1; Minimum: 4; Met? No 2. Minor Volume — Value: 38; Minimum: 100; Met? No 3. Total Ent. Volume — Value: 932; Minimum: 650; Met? Yes *or Condition B (MUTCD Figure 4C-4)* — Major (Both Dir.) Value: 894; Minimum: N/A; Minor (Higher Dir.) Value: 38; Minimum: 75; Met? No	**No**
4 Pedestrian Volume *(either criterion)*	*Criterion A: Four-hour (MUTCD Figure 4C-7)* — Major (Both Dir.) Value: 705; Minimum: ; Pedestrians Value: ; Minimum: ; Met? n/a *or Criterion B: One Hour (MUTCD Figure 4C-8)* — Major (Both Dir.) Value: 894; Minimum: ; Pedestrians Value: ; Minimum: ; Met? n/a	**Not Evaluated**
5 School Crossing	No students projected to cross the major street at this location.	**No**
6 Coordinated Signal System	Only one signal in the roadway network nearby.	**No**
7 Crash Experience ** Condition A not evaluated *(all conditions)*	*Condition B, 1-year Period (Table 4C-4)* — Angle+Ped Crashes Value: n/a; Minimum: 4; or Fatal+Injury Angle+Ped Value: n/a; Minimum: 3; Met? n/a ***and*** *Condition C, 80% of Warrant 1 [Condition A]* — Major (Both Dir.) Value: 689; Minimum: ; Minor (Higher Dir.) Value: 29; Minimum: ; Met? n/a *or Condition B, 3-year Period (Table 4C-5)* — Angle+Ped Crashes Value: n/a; Minimum: 6; or Fatal+Injury Angle+Ped Value: n/a; Minimum: 4; Met? n/a *or Condition C, 80% of Warrant 1 [Condition B]* — Major (Both Dir.) Value: 689; Minimum: ; Minor (Higher Dir.) Value: 29; Minimum: ; Met? n/a *or Condition C, 80% of Warrant 4* — Four Hour Ped Value: ; Minimum: ; One Hour Ped Value: ; Minimum: ; Met? n/a	**Not Evaluated**
8 Roadway Network	Not an intersection of two or more major routes.	**No**
9 Intersection Near Grade Xing	No railroad grade crossing nearby.	**No**
	Warrants Met:	**0**
	Recommendation:	**No Signal**

Notes:

c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph

* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."

** No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave

Scenario: **Completion of Phase 1C in 2031**
Analysis Date: 8/13/2025 Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph Number of Approaches: 3

Traffic Volumes

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	543	522	457	410	429	432	361	304	319	296	353	240
Central Ave Westbound:	219	221	239	266	335	396	388	390	487	532	626	436
S 44th St W Northbound:	87	68	48	38	41	41	41	46	42	48	54	47
Total Entering Volume:	849	811	744	714	805	869	790	740	848	876	1033	723
TEV Rank:	**4**	6	9	12	7	3	**8**	10	5	2	**1**	11
Use for:	Warrant 2						Warrant 1				Warrant 3	
Major, Both Directions:	762	743	696	676	764	828	749	694	806	828	979	676
Minor, Higher Direction:	87	68	48	38	41	41	41	46	42	48	54	47

Warrants

		Met?
1 Eight-Hour Vehicular Volume *(either condition)*	*Condition A: Large Volume of Intersecting Traffic* — Major (Both Dir.) Value 749, Minimum 350[c]; Minor (Higher Dir.) Value 41, Minimum 105[c]; Met? No. *or Condition B: Interruption of Continuous Traffic* — Major (Both Dir.) Value 749, Minimum 525[c]; Minor (Higher Dir.) Value 41, Minimum 53[c]; Met? No	**No**
2 Four-Hour Vehicular Volume	*MUTCD Figure 4C-2 for speed over 40 mph* — Major (Both Dir.) Value 762, Minimum -; Minor (Higher Dir.) Value 87, Minimum 60; Met? Yes	**Yes**
3 Peak Hour* *(either condition)*	*Condition A (must meet all three subconditions)*: 1. Veh-Hrs of Delay — Value 0.2, Minimum 4, Met? No; 2. Minor Volume — Value 54, Minimum 100, Met? No; 3. Total Ent. Volume — Value 1033, Minimum 650, Met? Yes. *or Condition B (MUTCD Figure 4C-4)* — Major (Both Dir.) Value 979, Minimum -; Minor (Higher Dir.) Value 54, Minimum 75; Met? No	**No**
4 Pedestrian Volume *(either criterion)*	*Criterion A: Four-hour (MUTCD Figure 4C-7)* — Major (Both Dir.) Value 762, Minimum -; Pedestrians Value -, Minimum -; Met? n/a. *or Criterion B: One Hour (MUTCD Figure 4C-8)* — Major (Both Dir.) Value 979, Minimum -; Pedestrians Value -, Minimum -; Met? n/a	**Not Evaluated**
5 School Crossing	No students projected to cross the major street at this location.	**No**
6 Coordinated Signal System	Only one signal in the roadway network nearby.	**No**
7 Crash Experience ** Condition A not evaluated *(all conditions)*	*Condition B, 1-year Period (Table 4C-4)* — Angle+Ped Crashes Value n/a, Minimum 4; or Fatal+Injury Angle+Ped Value n/a, Minimum 3; Met? n/a. *or Condition B, 3-year Period (Table 4C-5)* — Angle+Ped Crashes Value n/a, Minimum 6; or Fatal+Injury Angle+Ped Value n/a, Minimum 4; Met? n/a. ***and*** *Condition C, 80% of Warrant 1 [Condition A]* — Major (Both Dir.) Value 749, Minimum -; Minor (Higher Dir.) Value 41, Minimum -; Met? n/a. *or Condition C, 80% of Warrant 1 [Condition B]* — Major (Both Dir.) Value 749, Minimum -; Minor (Higher Dir.) Value 41, Minimum -; Met? n/a. *or Condition C, 80% of Warrant 4* — Four Hour Ped Value -, Minimum -; One Hour Ped Value -, Minimum -; Met? n/a	**Not Evaluated**
8 Roadway Network	Not an intersection of two or more major routes.	**No**
9 Intersection Near Grade Xing	No railroad grade crossing nearby.	**No**
	Warrants Met:	**1**
	Recommendation:	**No Signal**

Notes:

c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph

* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."

** No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave

Scenario: **Completion of Phase 2 in 2033**
Analysis Date: 8/13/2025 Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph Number of Approaches: 3

Traffic Volumes

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	610	596	527	481	500	503	431	366	389	369	430	306
Central Ave Westbound:	251	266	258	264	301	325	461	461	574	628	728	521
S 44th St W Northbound:	106	83	59	48	50	52	52	58	54	62	67	58
Total Entering Volume:	967	945	844	793	851	880	944	885	1017	1059	1225	885
TEV Rank:	**4**	5	11	12	10	9	6	7	3	2	**1**	**8**
Use for:	Warrant 2										Warrant 3	Warrant 1
Major, Both Directions:	861	862	785	745	801	828	892	828	963	997	1158	827
Minor, Higher Direction:	106	83	59	48	50	52	52	58	54	62	67	58

Warrants

		Met?
1 Eight-Hour Vehicular Volume *(either condition)*	*Condition A: Large Volume of Intersecting Traffic* — Major (Both Dir.) Value 827, Minimum 350[c]; Minor (Higher Dir.) Value 58, Minimum 105[c]; Met? No. *or Condition B: Interruption of Continuous Traffic* — Major (Both Dir.) Value 827, Minimum 525[c]; Minor (Higher Dir.) Value 58, Minimum 53[c]; Met? Yes	**Yes**
2 Four-Hour Vehicular Volume	*MUTCD Figure 4C-2 for speed over 40 mph* — Major (Both Dir.) Value 861, Minimum -; Minor (Higher Dir.) Value 106, Minimum 60; Met? Yes	**Yes**
3 Peak Hour* *(either condition)*	*Condition A (must meet all three subconditions)*: 1. Veh-Hrs of Delay — Value 0.3, Minimum 4; 2. Minor Volume — Value 67, Minimum 100; Met? No; 3. Total Ent. Volume — Value 1225, Minimum 650; Met? Yes. *or Condition B (MUTCD Figure 4C-4)* — Major (Both Dir.) Value 1158, Minimum -; Minor (Higher Dir.) Value 67, Minimum 75; Met? No	**No**
4 Pedestrian Volume *(either criterion)*	*Criterion A: Four-hour (MUTCD Figure 4C-7)* — Major (Both Dir.) Value 861, Minimum; Pedestrians Value, Minimum; Met? n/a. *or Criterion B: One Hour (MUTCD Figure 4C-8)* — Major (Both Dir.) Value 1158, Minimum; Pedestrians Value, Minimum; Met? n/a	**Not Evaluated**
5 School Crossing	No students projected to cross the major street at this location.	**No**
6 Coordinated Signal System	Only one signal in the roadway network nearby.	**No**
7 Crash Experience ** Condition A not evaluated *(all conditions)*	*Condition B, 1-year Period (Table 4C-4)* — Angle+Ped Crashes Value n/a, Minimum 4; or Fatal+Injury Angle+Ped Value n/a, Minimum 3; Met? n/a. *or Condition B, 3-year Period (Table 4C-5)* — Angle+Ped Crashes Value n/a, Minimum 6; or Fatal+Injury Angle+Ped Value n/a, Minimum 4; Met? n/a. ***and*** *Condition C, 80% of Warrant 1 [Condition A]* — Major (Both Dir.) Value 827, Minimum; Minor (Higher Dir.) Value 58, Minimum; Met? n/a. *or Condition C, 80% of Warrant 1 [Condition B]* — Major (Both Dir.) Value 827, Minimum; Minor (Higher Dir.) Value 58, Minimum; Met? n/a. *or Condition C, 80% of Warrant 4* — Four Hour Ped; One Hour Ped Value, Minimum; Met? n/a	**Not Evaluated**
8 Roadway Network	Not an intersection of two or more major routes.	**No**
9 Intersection Near Grade Xing	No railroad grade crossing nearby.	**No**
	Warrants Met:	**2**
	Recommendation:	**Consider Signal**

Notes:

c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph

* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."

** No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

Appendix F: Intersection Cost Participation Calculations

City of Billings Intersection Cost Participation Worksheet: Clearwater/44 West Phase 1A + Phase 2 Retail

1: Central at 48th

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	3	3	**10**	**10**
WB L	1	1	1	**1**	**1**
WB T	1	**5**	**5**	8	8
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	**0**	**0**	**2**	**2**
SB T	1	No project traffic			
NB L	1				
Project **Critical** Lane Volume			**5**		**13**
Critical Lane Capacity			1200		1200
% Increase			0.4%		1.1%
Max % Increase			1.1%		

2: Shiloh at Broadwater

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1	**2**	**2**	**6**	**6**
WB T	1	No project traffic			
EB L	1				
NB T	2	**19**	**10**	26	13
SB L	1	No project traffic			
SB T	2	12	6	**32**	**16**
NB L	1	No project traffic			
Project **Critical** Lane Volume			**12**		**22**
Critical Lane Capacity			1140		1140
% Increase			1.1%		1.9%
Max % Increase			1.9%		

3: Shiloh at Central

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	2	23	12	32	16
WB L	1	No project traffic			
WB T	2	**14**	**7**	**38**	**19**
EB L	1	**23**	**23**	**32**	**32**
NB T	2	No project traffic			
SB L	1				
SB T	2				
NB L	1	**14**	**14**	**38**	**38**
Project **Critical** Lane Volume			**44**		**89**
Critical Lane Capacity			1200		1200
% Increase			3.7%		7.4%
Max % Increase			7.4%		

5: Shiloh at Monad

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1				
WB T	1				
EB L	1				
NB T	2	**12**	**6**	**32**	**16**
SB L	1	**4**	**4**	**5**	**5**
SB T	2	19	10	26	13
NB L	1	No project traffic			
Project **Critical** Lane Volume			**10**		**21**
Critical Lane Capacity			1200		1200
% Increase			0.8%		1.8%
Max % Increase			1.8%		

6: West Central Ave Site Access (Double Haul Lane)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	**1**	**1**	**2**	**2**
WB L	1	**34**	**34**	**86**	**86**
WB T	1	2	2	1	1
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0				
SB T	0				
NB L	1	**6**	**6**	**10**	**10**
Project **Critical** Lane Volume			**41**		**98**
Critical Lane Capacity			1140		1140
% Increase			3.6%		8.6%
Max % Increase			8.6%		

7:East Central Ave Site Access (S. 44th St W.)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	**43**	**43**	**76**	**76**
WB L	1	**9**	**9**	**28**	**28**
WB T	1	34	34	86	86
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1				
SB T	1				
NB L	1	**2**	**2**	**1**	**1**
Project **Critical** Lane Volume			**54**		**105**
Critical Lane Capacity			1140		1140
% Increase			4.7%		9.2%
Max % Increase			9.2%		

City of Billings Intersection Cost Participation Worksheet: Clearwater Phase 1B

1: Central at 48th

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	1	1	**2**	**2**
WB L	1	No project traffic			
WB T	1	**2**	**2**	1	1
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	**0**	**0**	**1**	**1**
SB T	1	No project traffic			
NB L	1				
Project **Critical** Lane Volume			**2**		**3**
Critical Lane Capacity			1200		1200
% Increase			0.2%		0.3%
Max % Increase			0.3%		

2: Shiloh at Broadwater

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1	**0**	**0**	**2**	**2**
WB T	1	No project traffic			
EB L	1				
NB T	2	**7**	**4**	5	3
SB L	1	No project traffic			
SB T	2	2	1	**8**	**4**
NB L	1	No project traffic			
Project **Critical** Lane Volume			**4**		**6**
Critical Lane Capacity			1140		1140
% Increase			0.4%		0.5%
Max % Increase			0.5%		

3: Shiloh at Central

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	2	**9**	**5**	6	3
WB L	1	No project traffic			
WB T	2	3	2	**9**	**5**
EB L	1	9	9	**6**	**6**
NB T	2	No project traffic			
SB L	1				
SB T	2				
NB L	1	**3**	**3**	**9**	**9**
Project **Critical** Lane Volume			**14**		**20**
Critical Lane Capacity			1200		1200
% Increase			1.2%		1.7%
Max % Increase			1.7%		

5: Shiloh at Monad

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1				
WB T	1				
EB L	1				
NB T	2	2	1	**8**	**4**
SB L	1	1	1	**1**	**1**
SB T	2	**7**	**4**	5	3
NB L	1	No project traffic			
Project **Critical** Lane Volume			**4**		**5**
Critical Lane Capacity			1200		1200
% Increase			0.3%		0.4%
Max % Increase			0.4%		

6: West Central Ave Site Access (Double Haul Lane)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	0	0	**2**	**2**
WB L	1	No project traffic			
WB T	1	**1**	**1**	1	1
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0				
SB T	0				
NB L	1	**1**	**1**	**1**	**1**
Project **Critical** Lane Volume			**2**		**3**
Critical Lane Capacity			1140		1140
% Increase			0.2%		0.3%
Max % Increase			0.3%		

7:East Central Ave Site Access (S. 44th St W.)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1	**9**	**9**	**28**	**28**
WB T	1	No project traffic			
EB L	1				
NB T	1	No project traffic			
SB L	1				
SB T	1				
NB L	1	**1**	**1**	**1**	**1**
Project **Critical** Lane Volume			**10**		**29**
Critical Lane Capacity			1140		1140
% Increase			0.9%		2.5%
Max % Increase			2.5%		

City of Billings Intersection Cost Participation Worksheet: Clearwater Phase 1C

1: Central at 48th

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	1	1	**2**	**2**
WB L	1	0	0	**0**	**0**
WB T	1	**2**	**2**	1	1
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	**0**	**0**	**0**	**0**
SB T	1	No project traffic			
NB L	1				
Project **Critical** Lane Volume			**2**		**2**
Critical Lane Capacity			1200		1200
% Increase			0.2%		0.2%
Max % Increase			0.2%		

2: Shiloh at Broadwater

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1	**0**	**0**	**1**	**1**
WB T	1	No project traffic			
EB L	1				
NB T	2	**6**	**3**	4	2
SB L	1	No project traffic			
SB T	2	2	1	**6**	**3**
NB L	1	No project traffic			
Project **Critical** Lane Volume			**3**		**4**
Critical Lane Capacity			1140		1140
% Increase			0.3%		0.4%
Max % Increase			0.4%		

3: Shiloh at Central

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	2	7	4	5	3
WB L	1	No project traffic			
WB T	2	**2**	**1**	**8**	**4**
EB L	1	**7**	**7**	**5**	**5**
NB T	2	No project traffic			
SB L	1				
SB T	2				
NB L	1	**2**	**2**	**8**	**8**
Project **Critical** Lane Volume			**10**		**17**
Critical Lane Capacity			1200		1200
% Increase			0.8%		1.4%
Max % Increase			1.4%		

5: Shiloh at Monad

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1				
WB T	1				
EB L	1				
NB T	2	2	1	**6**	**3**
SB L	1	1	1	**1**	**1**
SB T	2	**6**	**3**	4	2
NB L	1	No project traffic			
Project **Critical** Lane Volume			**3**		**4**
Critical Lane Capacity			1200		1200
% Increase			0.3%		0.3%
Max % Increase			0.3%		

6: West Central Ave Site Access (Double Haul Lane)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	1	1	**2**	**2**
WB L	1	No project traffic			
WB T	1	**2**	**2**	1	1
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0				
SB T	0				
NB L	1	**0**	**0**	**0**	**0**
Project **Critical** Lane Volume			**2**		**2**
Critical Lane Capacity			1140		1140
% Increase			0.2%		0.2%
Max % Increase			0.2%		

7:East Central Ave Site Access (S. 44th St W.)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1	**7**	**7**	**23**	**23**
WB T	1	No project traffic			
EB L	1				
NB T	1	No project traffic			
SB L	1				
SB T	1				
NB L	1	**2**	**2**	**1**	**1**
Project **Critical** Lane Volume			**9**		**24**
Critical Lane Capacity			1140		1140
% Increase			0.8%		2.1%
Max % Increase			2.1%		

City of Billings Intersection Cost Participation Worksheet: Clearwater Phase 2 (residential only, no retail)

1: Central at 48th

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	1	2	2	**5**	**5**
WB L	1	1	1	**1**	**1**
WB T	1	**5**	**5**	3	3
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	**0**	**0**	**1**	**1**
SB T	1	No project traffic			
NB L	1				
Project **Critical** Lane Volume			**5**		**7**
Critical Lane Capacity			1200		1200
% Increase			0.4%		0.6%
Max % Increase			0.6%		

2: Shiloh at Broadwater

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	**1**	**1**	**4**	**4**
WB T	1	No project traffic			
EB L	1				
NB T	2	**16**	**8**	11	6
SB L	1	No project traffic			
SB T	2	5	3	**19**	**10**
NB L	1	No project traffic			
Project **Critical** Lane Volume			**9**		**14**
Critical Lane Capacity			1140		1140
% Increase			0.8%		1.2%
Max % Increase			1.2%		

3: Shiloh at Central

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	2	20	10	13	7
WB L	1	3	3	11	11
WB T	2	**3**	**2**	**11**	**6**
EB L	1	**20**	**20**	**13**	**13**
NB T	2	No project traffic			
SB L	1				
SB T	2	**4**	**2**	**14**	**7**
NB L	1	**4**	**4**	**14**	**14**
Project **Critical** Lane Volume			**28**		**40**
Critical Lane Capacity			1200		1200
% Increase			2.3%		3.3%
Max % Increase			3.3%		

5: Shiloh at Monad

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1				
WB T	1				
EB L	1				
NB T	2	5	3	**19**	**10**
SB L	1	3	3	**2**	**2**
SB T	2	**16**	**8**	11	6
NB L	1	No project traffic			
Project **Critical** Lane Volume			**8**		**12**
Critical Lane Capacity			1200		1200
% Increase			0.7%		1.0%
Max % Increase			1.0%		

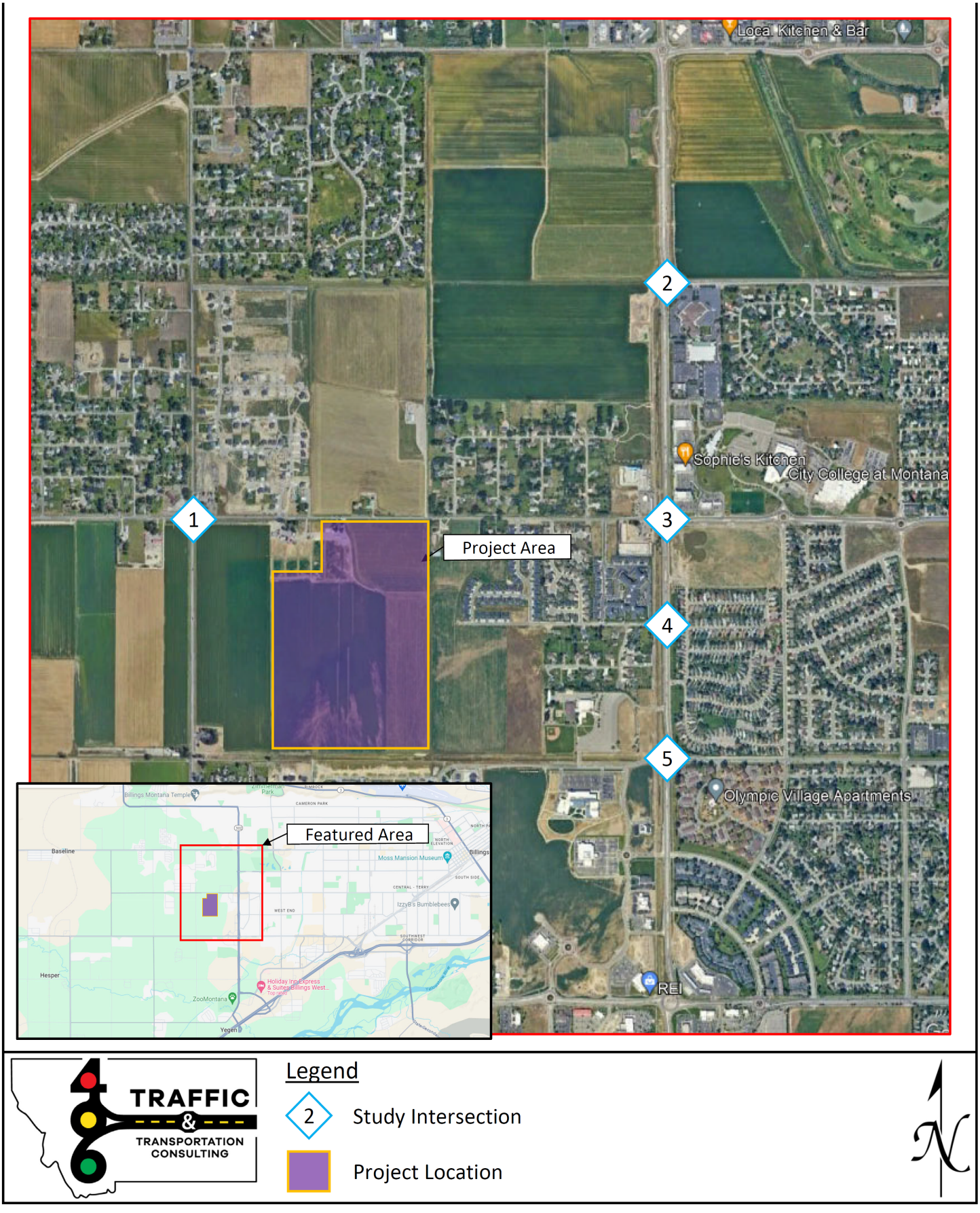
6: West Central Ave Site Access (Double Haul Lane)

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	1	**1**	**1**	**3**	**3**
WB L	1	**5**	**5**	**17**	**17**
WB T	1	3	3	2	2
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0				
SB T	0				
NB L	1	**4**	**4**	**3**	**3**
Project **Critical** Lane Volume			**10**		**23**
Critical Lane Capacity			1140		1140
% Increase			0.9%		2.0%
Max % Increase			2.0%		

7:East Central Ave Site Access (S. 44th St W.)

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	1	**20**	**20**	**13**	**13**
WB L	1	**5**	**5**	**17**	**17**
WB T	1	5	5	17	17
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1				
SB T	1				
NB L	1	**3**	**3**	**2**	**2**
Project **Critical** Lane Volume			**28**		**32**
Critical Lane Capacity			1140		1140
% Increase			2.5%		2.8%
Max % Increase			2.8%		

Exhibit 1. Overall Site Location and Study Intersections



Planning Board

Date:	06/23/2026
Title:	44 West Subdivision, 3rd Filing, Major Preliminary Plat - Public Hearing
Presented by:	David Green
Department:	Planning & Community Services
Presentation:	Yes

Information

RECOMMENDATION

Staff recommends the Planning Board recommend to City Council that the preliminary plat of 44 West Subdivision, 3rd Filing, be conditionally approved and the Findings of Fact adopted as presented in the staff report.

BACKGROUND (Consistency with Adopted Plans and Policies, if applicable)

On May 1, 2026, Performance Engineering applied for preliminary major plat approval for 44 West Subdivision, 3rd Filing. The proposed subdivision creates 23 lots for residential development. The subject property is generally located south of Central Avenue, and west of Twin Pines Townhomes. The property is zoned NX1 Mixed Residential 1 (1 to 4 units) for residential uses.

VARIANCES

No variances have been requested:

PROPOSED CONDITIONS OF APPROVAL

1. Minor changes may be made in the SIA and final documents, as requested by the Planning, Legal or Public Works Departments to clarify the documents and bring them into the standard acceptable format.
2. The final plat shall comply with all requirements of the City of Billings Subdivision Regulations, rules, regulations, policies, and resolutions of the City of Billings, and the laws and Administrative Rules of the State of Montana.

PROCEDURAL HISTORY

Pre-Application Meeting: April 2, 2026
Preliminary Plat application submitted to Planning Division: April 2, 2026
Departmental Review Meeting: May 14, 2026
Preliminary Plat Resubmittal: May 21, 2026
Planning Board Plat Review: June 9, 2026
Planning Board Public Hearing: June 23, 2026
Preliminary Plat to City Council: July 27, 2026
60 Working-Day Preliminary Plat Review period ends: July 28, 2026

PLAT INFORMATION

General Location: South of Central Avenue, and west of Twin Pines Townhomes
Legal Description: Being Lot 28, Block 2 of the 44 West Subdivision, 2nd Filing
Owner/Subdivider: McCall Development, Inc.
Engineer/Surveyor: Performance Engineering
Existing Zoning: NX1
Existing Land Use: Agricultural land
Proposed Land Use: Residential
Gross Area: ± 2.48 Acres
Lot Size:
Minimum: ± 4,400 square feet
Maximum: ± 6,502 square feet

Parkland Requirements: Parkland dedication requirement for this filing is 0.33 acres. Previous dedication with previous filings were greater than the required 2.36 Acres. Total parkland requirement to this point is 2.19 acres. The applicant will not be providing additional parkland with this submittal.

This subdivision is not subject to the Billings 2045 Land Use Plan and Future Land Use Map as it was submitted prior to adoption or effective dates of the new land use regulations. Incidentally, this request matches the Future Land Use Map designations for this area as Urban Residential Limited. Applications that will be subject to the new regulations, Plan and Map will be processed after July 1, 2026.

Traffic Impact Study

A traffic accessibility study has been completed for the 44 West Subdivision, 1st through 3rd Filings. All required intersection improvement contributions identified therein shall be completed by the Subdivider at the their expense. The percent of traffic contributions to the following intersections shall be in accordance with the traffic accessibility study which includes the 3rd filing:

a. S. 48th and Central – 0.20%
b. Shiloh and Broadwater – 0.40%
c. Shiloh and Central – 1.40%
d. Shiloh and Monad – 0.30%
e. Central and S 44th West – 2.10%

The cash contributions shall be based on the percent of traffic contributions to the intersections based on the total cost of an intersection as determined by City Engineering for the year in which the contribution is made. These cash contributions for the intersection improvement will be made prior to final plat approval.

A left turn lane on Central Avenue at the Double Haul Lane intersection is required to be constructed with this subdivision, 44 West Subdivision, 3rd Filing.

STAKEHOLDERS

At the Planning Board discussion meeting held June 9, 2026, staff gave a brief overview of the proposed subdivision. After the presentation, staff stood for any questions the board members might have. There were none. The board also had no questions for Mr. Craig Dalton, agent.

Stakeholder input will be received at a public hearing scheduled for this subdivision on June 23, 2026.

ALTERNATIVES

In accordance with state law, the City Council has 60 working days to act upon this major preliminary plat. The 60 working day review period for the proposed plat ends July 28, 2026. State and City subdivision regulations also require that preliminary plat be reviewed using specific criteria, as stated within this report. The City may not unreasonably restrict an owner's ability to develop land if the subdivider provides evidence that any identified adverse effects can be mitigated. Within the 60 working day review period, the City Council is required to:

1. Approve;
2. Conditionally Approve; or
3. Deny the Preliminary Plat

FISCAL EFFECTS

The preliminary plat of this subdivision will have no financial impact on the Planning Division.

SUMMARY

One of the purposes of the City's subdivision review process is to identify potential negative effects of property being subdivided. Negative effects that are identified become the subdivider's responsibility to mitigate. Various City departments, private service/utility providers and the affected school district/s, have reviewed this application and provided input on effects and mitigation. The Findings of Fact, which are presented as an attachment, discuss potential negative impacts of the subdivision and conditions of approval are recommended as measures to further mitigate any impacts. In this case, there were found to be minimal impacts from this proposed subdivision.

Attachments

Proposed Plat
Draft SIA
Findings of Fact
Traffic Study
TIS Studied Intersetions

PRELIMINARY PLAT OF

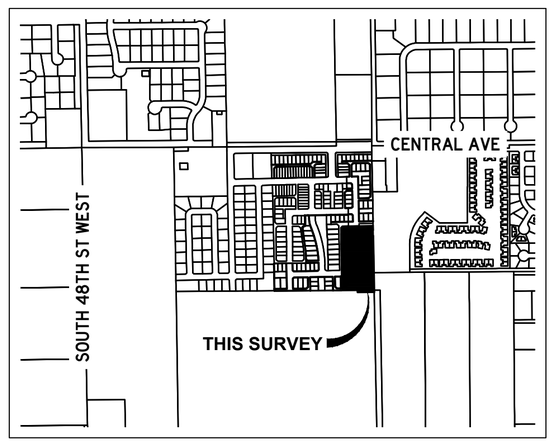
44 WEST SUBDIVISION, 3RD FILING

BEING LOT 28, BLOCK 2 OF THE 44 WEST SUBDIVISION, 2ND FILING
LOCATED IN THE NW1/4 OF SECTION 10, TOWNSHIP 01 SOUTH, RANGE 25
EAST, P.M.M., CITY OF BILLINGS, YELLOWSTONE COUNTY, MONTANA

PREPARED FOR : 44 WEST DEVELOPMENT, LLC

PREPARED BY : PERFORMANCE ENGINEERING, LLC

TOTAL AREA OF SUBDIVISION : ± 2.48 ACRES



VICINITY MAP
NOT TO SCALE

SITE DATA	
GROSS AREA	2.48 AC
NET AREA	1.08 AC
LOT COUNT	23
MAX. LOT AREA	6,502 SF
MIN. LOT AREA	4,400 SF
ZONING	NX1
PARKLAND DED.	0 SF

ADJOINING PROPERTY OWNER INFORMATION:

1. BROWN DEVELOPMENT, LLC
745 S 56TH STREET WEST
BILLINGS, MT 59106

2. 44 WEST DEVELOPMENT, LLC
1536 MULLOWNEY LANE, SUITE 100
BILLINGS, MT 59101

3. BRADLEY W HARDT
4620 CENTRAL AVENUE
BILLINGS, MT 59106

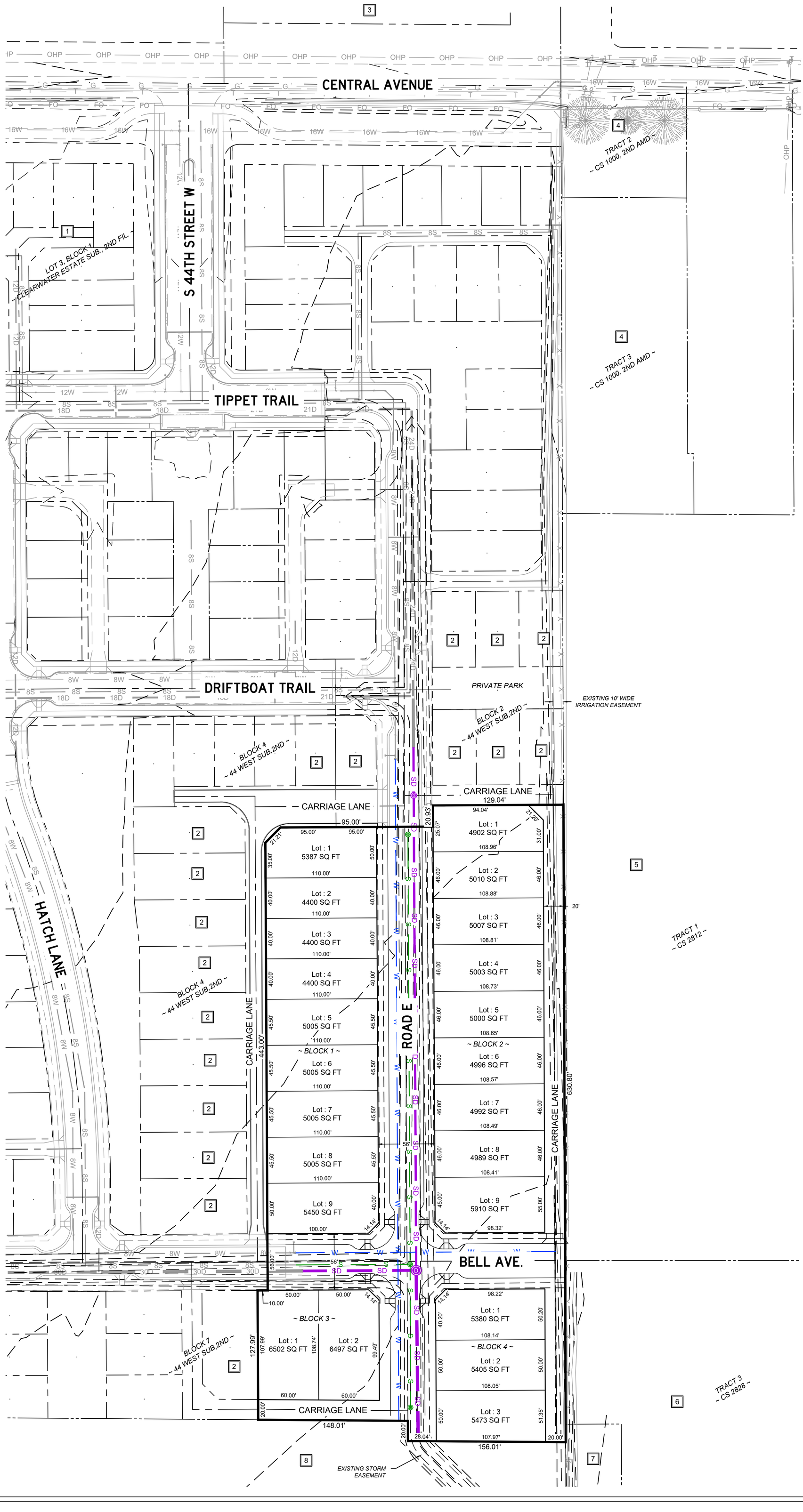
4. BRYAN KARL LEITZ
4420 CENTRAL AVENUE
BILLINGS, MT 59106

5. EDWARD L HOFMANN JR
4246 CENTRAL AVENUE
BILLINGS, MT 59106

6. JANET B BERGMAN REVOCABLE TRUST
1322 BROADWATER AVENUE
BILLINGS, MT 59102

7. DORN PROPERTIES AND HOMES, LLC
PO BOX 81524
BILLINGS, MT 59108

8. BRADLEY W & TAMMY JO HARDT
4620 CENTRAL AVENUE
BILLINGS, MT 59106



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SUBDIVISION IMPROVEMENTS AGREEMENT
&WAIVER OF RIGHT TO PROTEST FUTURE SPECIAL IMPROVEMENT DISTRICTS

44 West Subdivision, 3rd Filing

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(City of Billings)

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SUBDIVISION IMPROVEMENTS AGREEMENT & WAIVER OF RIGHT TO PROTEST FUTURE SPECIAL IMPROVEMENT DISTRICTS

44 West Subdivision, 3rd Filing

This agreement is made and entered into this ____ day of _____, 20__, by and between *44 West Development, LLC*, whose address for the purpose of this agreement is **1536 Mullowney Lane, Suite 100; Billings, Montana 59101**, hereinafter referred to as "Subdivider," and **CITY OF BILLINGS**, Billings, Montana, hereinafter referred to as "City."

WITNESSETH:

WHEREAS, the plat of *44 West Subdivision, 3rd Filing*, located in Yellowstone County, Montana was submitted to the Yellowstone County Board of Planning; and

WHEREAS, at a regular meeting conducted on _____ day of _____, 20__, the Board of Planning recommended conditional approval of a preliminary plat of *44 West Subdivision, 3rd Filing*; and

WHEREAS, at a regular meeting conducted on _____ day of _____, 20__, the City Council conditionally approved a preliminary plat of *44 West Subdivision, 3rd Filing*; and

WHEREAS, a Subdivision Improvements Agreement is required by the City prior to the approval of the final plat.

WHEREAS, the provisions of this agreement shall be effective and applicable to *44 West Subdivision, 3rd Filing* upon the filing of the final plat thereof in the office of the Clerk and Recorder of Yellowstone County, Montana. The Subdivision shall comply with all requirements of the City of Billings Subdivision Regulations, the rules, regulations, policies, and resolutions of the City of Billings, and the laws and administrative rules of the State of Montana.

THEREFORE, THE PARTIES TO THIS AGREEMENT, for and in consideration of the mutual promises herein contained and for other good and valuable consideration, do hereby agree as follows:

I. VARIANCES

A. Subdivider has requested, and the City hereby grants, the following variances by City Council from the strict interpretation of the City's Subdivision Regulations (Section 23.1101, BMCC):

1. No variances are requested.

II. PROPERTY CONDITIONS AND INFORMATION FOR LOT PURCHASERS

A. Lot owners will be required to construct that segment of the required sidewalk that fronts their property at the time of lot development. If sidewalk is not constructed within 5 years, the City has the right to construct the sidewalk and assess the property owners.

B. Lot owners should be aware that this subdivision is being built in close proximity to prime deer and antelope habitat and it is likely that homeowners will experience problems with damage to landscaped shrubs, flowers, and gardens. The Montana Fish, Wildlife, and Parks Department does not provide damage assistance unless there is damage to commercial crops and/or a threat to public health and safety.

C. Lot owners should be aware that soil characteristics within the area of this subdivision, as described in the 1972 Yellowstone County Soil Survey, indicate that there could be potential limitations for proposed construction on the lots, which may require a geotechnical survey prior to construction.

D. No water rights have been transferred to the lot owners. Irrigation ditches that exist on the perimeter of this development are for the benefit of other properties. Perimeter ditches and drains shall remain in place and shall not be altered by the Subdivider or subsequent owners.

E. There is attached hereto a Waiver waiving the right to protest the creation of the special improvement district or districts which by this reference is expressly incorporated herein and made as much a part hereof as though fully and completely set forth herein at this point. The Waiver will be filed with the plat, shall run with the land, and shall constitute the guarantee by the Subdivider and property owner or owners of the developments described herein. Said Waiver is effective upon filing and is not conditioned on the completion of the conditions set forth in this Agreement. The Subdivider and owner specifically agree that they are waiving valuable rights and do so voluntarily.

F. The subdivider and subsequent contractors/builders acknowledge that there is a Stormwater Pollution and Prevention Plan (SWPPP) filed with the City and the Montana Department of Environmental Quality (MDEQ). This SWPPP shall be adhered to during all phases of construction and shall be updated as required by MDEQ under the General Permit for Stormwater Discharges Associated with Construction Activity, Chapter 28, BMCC and the Billings Stormwater Management Manual.

G. Individual lot owners should be aware that Best Management Practices for stormwater control shall be required for new construction on lots. Best Management Practices are defined within Section 28-201, BMCC and detailed in the Billings Stormwater Management Manual.

III. TRANSPORTATION

A. Streets

- All internal access roads and site improvements within the subdivision will be in accordance with the City of Billings Site Development Ordinance, City Zoning Ordinance, the Stormwater Management Manual, and other applicable City codes, rules, and regulations.

- All internal streets to provide a 34-foot back of curb to back of curb street width. The street improvements will be completed by private contract or SID

- A traffic accessibility study has been completed for the *44 West Subdivision, 3rd Filing.* All required intersection improvement contributions identified therein shall be completed by the Subdivider at the Subdivider's expense. The percent of traffic contributions to the following intersections shall be in accordance with the traffic accessibility study:

    a. S. 48th and Central – 0.20%
    b. Shiloh and Broadwater – 0.40%
    c. Shiloh and Central – 1.40%
    d. Shiloh and Monad – 0.30%
    e. Central and 44th S West – 2.10%

  The cash contributions shall be based on the percent of traffic contributions to the intersections based on the total cost of an intersection as determined by City Engineering for the year in which the contribution is made. These cash contributions for the intersection improvement will be made prior to final plat approval.

- A left turn lane on Central Avenue at the Double Haul Lane intersection is required to be constructed with this subdivision.

B. Carriage Lanes

- All carriage lanes within the subdivision shall be built to grade with a satisfactory subbase, base course, and asphalt surface or concrete surface. All carriage lane approaches constructed with asphalt shall be replaced with concrete by the Subdivider at the time when home construction is complete. In the event asphalt approaches within the subdivision are not

replace with concrete within three years of the date of recording of the final plat, the City may construct the concrete approaches and assess the Subdivider for the costs associated with the approach construction. Carriage Lane pavement widths shall be 12 feet. No trees are allowed to be planted in Carriage Lane rights-of-way. In addition, no shrubs taller than two (2) feet are allowed to be planted in Carriage Lane rights-of-way.

C. Sidewalks

- Individual lot owners will be responsible for the construction of the sidewalks within public right-of-way or easements adjacent to or through their lot at the time of lot construction and shall be included in each building permit. The Subdivider shall construct sidewalk adjacent to private parks at the time of private park development.

- Sidewalks shall be 5-foot wide with a minimum 5-foot boulevard planting strip between the sidewalk and the curb with handicap ramps and aprons installed where necessary.

D. Street Lighting

- Street lighting will be installed by private contract or SID. A Street Light Maintenance District will be created in the future and is included in the waiver of right to protest.

E. Traffic Control Devices

- Street name signs for streets within the subdivision, or located immediately adjacent thereto, shall be furnished and installed in accordance with the specifications of the City of Billings Public Works and Fire Departments.

- No traffic signals are required within this subdivision.

- The Subdivider shall furnish and install all necessary traffic control devices in accordance with the Manual of Uniform Traffic Control Devices and approved by the City of Billings Public Works Department.

F. Access

- Access to the Subdivision will be provided by Tippet Trail, Driftboat Trail, and Bell Avenue. Carriage Lane access is also provided to all residential lots within the subdivision.

G. Billings Area Bikeway and Trail Master Plan

- The Subdivision is within the Billings Area Bikeway and Trail Master Plan. A 10-foot-wide multi-use trail was constructed as part of a previous filing along Central Avenue. No additional trail improvements are required.

H. Public Transit

- MET Transit provides services along Central Avenue with the closest stop at the intersection of Central Avenue and Shiloh Road, approximately 0.5 miles east of the Subdivision. No improvements are required to ensure public transit service.

IV. EMERGENCY SERVICE

Construction of buildings made of combustible materials shall have adequate fire apparatus access roads and water supply (fire hydrants) in place to allow for fire suppression requirements. Prior to the issuance of a building permit for construction using combustible materials (i.e. lumber, plywood, wood trusses, etc.), fire apparatus access roads and water supply requirements shall be provided in accordance with the International Fire Code as adopted by the City of Billings.

At a minimum, the following is required:

- An unobstructed gravel road or gravel road base must be within 150 feet of the furthest portion of a building under construction as measured along the approved route.
- The access roads are required to support fire apparatus vehicle loading (40 tons) during all weather conditions and shall be a minimum of twenty (20) feet wide.
- An operational fire hydrant shall be located within 600 feet of the furthest portion of a residence under construction or within 400 feet of the furthest portion of a commercial building under construction as measured along the access roads to the site.
- The above requirements do not alter or effect the current minimum subdivision requirements for fire apparatus access and water supply.

V. STORM DRAINAGE

All drainage improvements shall comply with the provisions set forth in Chapter 28, BMCC, and the Stormwater Management Manual in place at the time of development. Additionally, a comprehensive drainage study has been completed for the Monad Drain with requirements that superseded the Stormwater Management Manual. The *Comprehensive Drainage Plan for the Monad Drain* is on-file at the City Engineering Department. A complete stormwater management plan shall be submitted to the Engineering Division for review and approval at the time of development.

Stormwater drainage will discharge to a drainage ditch constructed as part of the 44 West Subdivision, 1st Filing private contract. The ditch conveys stormwater drainage south to a stormwater detention facility that is located within an off-site area on Tract 3, Certificate of Survey No. 3844. This detention facility has been sized to accept runoff generated from the *44 West Subdivision, 3rd Filing*. The detention facility will outfall to the Monad Drain as described in the *Comprehensive Drainage Plan for the Monad Drain.*

Per the *Comprehensive Drainage Plan for the Monad Drain*, construction of a dike and control structure within the drain will be required as part of a future subdivision of Tract 3 of Certificate of Survey No. 3844, or as determined necessary by City Engineering. These improvements are included as part of the Waiver of Right to Protest a Special Improvement District.

The HOA is responsible for participating in the maintenance of stormwater facilities directly associated with the treatment and detention of runoff produced by the Subdivision.

VI. UTILITIES

The Subdivision Improvements Agreement does not constitute an approval for extension of or connection to water mains and sanitary sewers. The property owner shall make application for extension/connection of water mains and sanitary sewers to the Public Works Department – Engineering Division. The extension/connection of/to water mains and sanitary sewers is subject to the approval of the applications and the conditions of approval. Applications shall be submitted for processing prior to the start of any construction and prior to review and approval of any project plans and specifications.

The Developer/Owner acknowledges that the subdivision shall be subject to the applicable System Development Fees in effect at the time new water and/or sanitary sewer service connections are made.

The design/installation of sanitary sewers and appurtenances, and water mains and appurtenances (fire hydrants, etc.) shall be in accordance with design standards, specifications, rules, regulations of and as approved by the City of Billings Public Works Department, Fire Department and the Montana Department of Environmental Quality.

A. Water

- The Subdivision is served by existing 8-inch water mains located in Road E and Bell Avenue.
- Water mains no less than 8 inches in diameter will be extended throughout the Subdivision. Mains shall be sized to accommodate future growth inside and outside of the Subdivision.

B. Sanitary Sewer

- Gravity sewer mains no less than 8 inches in diameter will be extended throughout the Subdivision. Mains shall be sized to accommodate future growth inside and outside of the Subdivision.

C. Power, Telephone, Gas, and Cable Television

- Private utility facilities currently exist to serve the subdivision. The private utility facilities will be installed within Carriage Lane right-of-way and by easements included on the plat, as requested by the utility companies, to provide routes to the Carriage Lanes.

VII. PARKS/OPEN SPACE

Section 76-3-621 of the Montana Code Annotated covers the park dedication requirement. Paragraph (1) calls for park area to be 11 percent of the land proposed to be subdivided into parcels of one-half acre or smaller. The required Parkland Dedication for the *44 West Subdivision, 3rd Filing* is 0.33 acres. Parkland dedications have been made in previous filings (2.36 acres) to meet the total 44 West Development's dedication requirements (2.19 acres). No additional parkland is being dedicated with this Subdivision.

This Subdivision will participate in the maintenance of the existing private parks in the 44 West Development via a Private HOA created by the Subdivider.

VIII. POSTAL DELIVERY

The Subdivider shall provide centralized delivery boxes with sufficient pullout to accommodate a mail carrier vehicle. The location of the boxes shall be reviewed and approved by the United States Postal Service.

IX. IRRIGATION

No water rights have been transferred to the lot owners. Irrigation ditches that exist on the perimeter of this development are for the benefit of other properties. Perimeter ditches and drains shall remain in place and shall not be altered by the Subdivider or subsequent owners.

X. SOILS/GEOTECHNICAL STUDY

A soils/geotechnical study has been performed for the subdivision. A copy of this report is included as part of the infrastructure permitting documents and made public record through the Engineering Department. Lot owners and contractors/builders are encouraged to review the report and its recommendations or complete a site-specific geotechnical investigation.

XI. PHASING OF IMPROVEMENTS

The Subdivision is not proposed to be constructed in phases.

XII. FINANCIAL GUARANTEES

Except as otherwise provided, Subdivider shall install and construct said required improvements with cash or by utilizing the mechanics of a private contract secured by letters of credit or a letter of commitment to lend funds from a commercial lender, or by SID. All engineering and legal work in connection with such improvements shall be paid by the contracting parties pursuant to said private contract, and the improvements shall be installed as approved by the City Engineer and Utility Department Manager.

XIII. LEGAL PROVISIONS APPLYING TO SUBDIVIDER

A. Subdivider agrees to guarantee all public improvements for a period of two (2) years from the date of final acceptance by the City of Billings.

B. The owners of the properties involved in this proposed Subdivision by signature subscribed herein below agree, consent, and shall be bound by the provisions of this Agreement.

C. The covenants, agreements, and all statements in this Agreement run with the land and apply to and shall be binding on the heirs, personal representatives, successors, assigns and transferees of the respective parties.

D. In the event it becomes necessary for either party to this Agreement to retain an attorney to enforce any of the terms or conditions of this Agreement or to give any notice required herein, then the prevailing party or the party giving notice shall be entitled to reasonable attorney fees and costs.

E. Any amendments or modifications of this Agreement or any provisions herein shall be made in writing and executed in the same manner as this original document and shall after execution become a part of this Agreement.

F. Subdivider shall comply with all applicable federal, state, and local statutes, ordinances, and administrative regulations during the performance and discharge of its obligations. Subdivider acknowledges and agrees that nothing contained herein shall relieve or exempt it from such compliance.

IN WITNESS WHEREOF, the parties hereto have set their hands and official seals on the date first above written.

"SUBDIVIDER" *44 West Development, LLC*

By: _____

Title: _____

STATE OF MONTANA)
: ss
County of Yellowstone)

On this ____ day of _____, 20__, before me, a Notary Public in and for the State of Montana, personally appeared _____, known to me to be the _____ of *44 West Development, LLC*, who executed the foregoing instrument and acknowledged to me that he/she executed the same.

_____
Notary Public in and for the State of Montana
Printed Name: _____
Residing at: _____
My commission expires: _____

This agreement is hereby approved and accepted by the City of Billings, this ____ day of _____, 20__.

"CITY"
CITY OF BILLINGS
MONTANA

By: _____
Mayor

Attest: _____
City Clerk

STATE OF MONTANA)
: ss
County of Yellowstone)

On this ____ day of _____, 20__, before me, a Notary Public in and for the State of Montana, personally appeared _____ and _____, known to me to be the Mayor and City Clerk, respectively, of the City of Billings, Montana, whose names are subscribed to the foregoing instrument in such capacity and acknowledged to me that they executed the same on behalf of the City of Billings, Montana.

_____
Notary Public in and for the State of Montana
Printed Name: _____
Residing at: _____
My commission expires: _____

Waiver of Right to Protest
FUTURE SPECIAL IMPROVEMENTS DISTRICTS

FOR VALUABLE CONSIDERATION, the undersigned, being the Subdivider and all of the owners of the hereinafter described real property, do hereby waive the right to protest the formation of one or more Special Improvement District(s) for a period of no more than twenty years from the recording of this waiver, for street light maintenance and energy, and for the construction of streets, street widening, sidewalks, survey monuments, street name signs, curb and gutter, street lights, driveways, traffic signals, and traffic control devices, parks and park maintenance, trails, sanitary sewer lines, water lines, storm drains (either within or outside the area), and other improvements which the City of Billings may require.

This Waiver and Agreement is independent from all other agreements and is supported by sufficient independent consideration to which the undersigned are parties, and shall run with the land and shall be binding upon the undersigned, their successors and assigns, and the same shall be recorded in the office of the County Clerk and Recorder of Yellowstone County, Montana.

This Waiver is in addition to any other recorded waiver related to the property described herein and is not intended to replace, supersede, or invalidate any such waiver.

The real property hereinabove mentioned is more particularly described as follows:

44 West Subdivision, 3rd Filing

Signed and dated this _____ day of _____, 20__.

44 West Development, LLC

By:_____

Title:_____

STATE OF MONTANA)
: ss
County of Yellowstone)

On this ____ day of _____, 20__, before me, a Notary Public in and for the State of Montana, personally appeared _____, known to me to be the _____ of *44 West Development, LLC*, who executed the foregoing instrument and acknowledged to me that he/she executed the same.

_____
Notary Public in and for the State of Montana
Printed Name: _____
Residing at: _____
My commission expires: _____

FINDINGS OF FACT

The Planning staff has prepared the Findings of Fact for the preliminary plat of 44 West Subdivision, 3rd Filing. These findings are based on the preliminary plat application and supplemental documents and address the review criteria required by the Montana Subdivision and Platting Act (76-3-608, MCA) and the Billings Subdivision Regulations (Section 23-303(H), BMCC).

A. What are the effects on agriculture, local services, the natural environment, wildlife, wildlife habitat, and public health, safety and welfare? [MCA 76-3-608 (3) (a) and BMCC 23-302.H.2.]

1. Effect on agriculture and agricultural water user facilities

The subject property has been used for agricultural purposes in the past. The Monad Drain is to the south of this proposed subdivision and is not part of the proposed area to be subdivided. Perimeter ditches and drains shall remain in place and not be altered by the subdivider or subsequent owners. The subdivision should not affect agricultural water users' facilities. With farming activity wildlife habitat has not been maintained. Perimeter areas are good for birds to hide in and smaller ungulates, such as deer.

2. Effect on local services

a. **Utilities** – Water service will be provided by the City of Billings. A 16-inch water main will be extended along Central Avenue for the proposed subdivision. 12-inch and 8-inch water lines will be provided within the proposed subdivision. 12-inch in the northern area and 8-inch throughout the majority of the subdivision. New individual services will be provided to all the lots, and new fire hydrants will be installed as required by the City Fire Department.

   Sanitary sewer service to the subdivision will be by an existing 10-inch sanitary sewer main located within the alleyway along the western boundary at the south end of the Subdivision. The Subdivider is responsible for extending an 8-inch gravity sewer main to Central Avenue via South 44th Street West to allow for future connections to the north of the Subdivision. Sewer lines within the subdivision shall be no smaller than 8-inches in diameter.

   The subdivider will install all new water lines and sewer lines in the local streets and individual services for each lot in accordance with design standards, specifications, rules, and regulations of the City of Billings Engineering/Public Works Department and MDEQ. This is outlined in the SIA under the heading 'VI. Utilities.'

   Private Utilities will be provided from existing facilities to the subdivision. The private utilities will be installed within the Carriage Lane right-of-way and by easements included on the plat, as requested by the utility companies, to provide routes to the Carriage Lanes.

   Stormwater – The storm drainage system for 44 West Subdivision, 3rd Filing, will consist of a curb and gutter surface collection and curb inlets that drain into storm drainage piping,

as well as surface conveyance. Stormwater drainage will discharge to a drainage ditch constructed as part of the 44 West Subdivision, 1st Filing private contract. The ditch conveys stormwater drainage south to a stormwater detention facility that is located within an off-site area on Tract 3, Certificate of Survey No. 3844. This detention facility has been sized to accept runoff generated from the 44 West Subdivision, 3rd Filing. The detention facility will outfall to the Monad Drain as described in the Comprehensive Drainage Plan for the Monad Drain. The Subdivision will be allowed to discharge stormwater into the Monad Drain as part of its stormwater management strategy. Complete information about the stormwater drainage plan is outlined in the SIA under the heading 'V. Storm Drainage.'

All drainage improvements shall satisfy the criteria set forth by the *City of Billings Stormwater Management Manual* and will be subject to review and approval by the City Engineering Department.

b. **Solid Waste** – The City of Billings will provide solid waste collection and disposal. The City's landfill has adequate capacity for this waste.

c. **Streets** – All internal streets within the subdivision shall be built to grade with a satisfactory subbase, base course, curb and gutter, and asphalt surface. All public roads will be built to provide a 34-foot back-to-back curb street width.

   All internal streets and carriage lanes will be built according to the standards of the City of Billings Public Works Department. Street improvements are included in the Waiver of Right to Protest Future Special Improvement Districts.

   The sidewalks will be installed by the respective lot owners on a lot-by-lot basis, as lots develop. Sidewalks along the street frontage shall be minimum 5-foot-wide and separated with a boulevard width not less than five feet. The developer will also install all ADA required ramps at the intersections within the proposed subdivision. The developer shall construct the 5-foot-wide boulevard sidewalk adjacent to private parks. This information is all in the SIA under the heading 'III. Transportation.'

Traffic Impact Study overview:

A traffic accessibility study has been completed for the 44 West Subdivision, 1st through 3rd Filings. All required intersection improvement contributions identified therein shall be completed by the Subdivider at the Subdivider's expense. The percent of traffic contributions to the following intersections shall be in accordance with the traffic accessibility study which includes the 3rd Filing:

a. S. 48th and Central – 0.20%
b. Shiloh and Broadwater – 0.40%
c. Shiloh and Central – 1.40%
d. Shiloh and Monad – 0.30%
e. Central and S 44th West – 2.10%

The cash contributions shall be based on the percent of traffic contributions to the intersections based on the total cost of an intersection as determined by City Engineering for the year in which the contribution is made. These cash contributions for the 44 West Subdivision, 3rd Filing, intersection improvement will be made prior to final plat approval.

A left turn lane on Central Avenue at the Double Haul Lane intersection is required to be constructed with this subdivision.

Street lighting is required for this subdivision. In the SIA the applicant has indicated that street lighting will be installed by private contract or SID. A Street Light Maintenance District will be created for operation and maintenance of the lighting at a future date and is included in the waiver of right to protest. This is outlined in the SIA under the heading 'III. Transportation, D. Street Lighting.'

d. **Emergency Services** – The Billings Police and Fire Departments will respond to emergencies within the proposed subdivision. The fire station that provides service for this area is Fire Station #7, is located at 1501 54th Street West. The subdivision is located within the ambulance service area of American Medical Response (AMR).

e. **Schools** – School District #2 provides service to students within this subdivision for elementary through high school. Big Sky for elementary school, capacity is shown as 394 with a current enrollment of 368. Ben Steele for middle school, capacity is shown as 750 with a current enrollment of 744. West for high school, capacity shown as 1731with current enrollment of 2133.

f. **Parks and Recreation** – This subdivision is required to provide 0.33 acres of parkland. The applicant will be providing no additional parkland. Parkland dedications have been made in previous filings (2.36 acres). To meet the total 44 West Development's dedication requirements to this point in the development is 2.19 acres. No additional parkland is being dedicated with this Subdivision, they have already met the requirements up to this point.

g. **Mail Delivery -** The developer shall coordinate with the United States Postal Service to determine the preferred type and location of mail delivery system for this subdivision. This requirement is outlined in the SIA under the heading 'VIII. Postal Delivery.'

h. **Phasing of Development** – This subdivision will not be developed in phases.

3. Effect on the natural environment

The subject property is currently vacant with the proposed use of residential development with a small portion of possible commercial development. The property is not located within a floodplain. During development, storm water pollution prevention best management practices are required to be used and monitored to prevent erosion on exposed ground. Overall, the effect on the natural environment should be minimal.

4. Effect on wildlife and wildlife habitat

There are no known endangered or threatened species on the property. There is a paragraph in the SIA that warns future lot owners of the presence of deer in the area, which may cause damage to their landscaping. This subdivision should have a minimal effect on wildlife and wildlife habitat.

5. Effect on public health, safety and welfare

There will be no significant impacts to public health, safety and welfare because of this subdivision.

B. Was an Environmental Assessment required? [(MCA 76-3-616 and BMCC 23-302.H.1.]

The proposed subdivision is exempt from the requirement for an Environmental Assessment pursuant to Section 76-3-616, MCA.

C. Does the subdivision conform to the City of Billings 2016 Growth Policy, the 2014 Transportation Plan, and the Billings Area Bikeway and Trail Master Plan? [BMCC 23-302.H.4.]

1. City of Billings 2016 Growth Policy

The proposed subdivision is consistent with the following goals of the Growth Policy:

> **Strong Neighborhoods (livable, safe, sociable and resilient neighborhoods):** Neighborhoods that are safe and attractive and provide essential services are much desired.
>
> **Home Base (healthy, safe and diverse housing options):** Planning and construction of interconnected sidewalks and trails are important to the economy and livability of Billings.
>
> **Essential Investments (relating public and private expenditures to public values)**: Planning and construction of safe and affordable interconnected sidewalks and trails are important to the economy and livability of Billings.
>
> Developed parks that provide recreation and active living opportunities are desirable for an attractive and healthy community.

3. 2023 Billings Urban Area Long Range Transportation Plan

The proposed subdivision adheres to the goals and objectives of the 2023 Transportation Plan and preserves the street network and street hierarchy specified in the plan.

4. Billings Area Bikeway and Trail Master Plan (BABTMP)

The proposed subdivision is within the Billings Area Bikeways and Trail Master Plan. There are no trails identified within the subdivision. There is a 10-foot-wide bike and pedestrian trail already built along the south side of Central Avenue. This was installed with previous filings of 44 West Subdivision. No additional improvements of this nature are anticipated.

D. Does the subdivision conform to the Montana Subdivision and Platting Act and to local subdivision regulations? [MCA 76-3-608 (3) (b) and BMCC 23-302.H.3.a.]

The proposed subdivision satisfies the requirements of the Montana Subdivision and Platting Act, and the design standards specified in the local subdivision regulations. The subdivider and the local government have complied with the subdivision review and approval procedures set forth in the local and state subdivision regulations.

E. Does the proposed subdivision conform to all requirements of the zoning in effect? [BMCC 23-302.H.3.e.]

The subject property is located within NX1 Mixed Residential 1 (1 to 4 units). The lot frontages conform to the requirements of this zone. Other building setbacks and structure specific requirements will be reviewed for compliance at the time of building permit review.

F. Does the proposed plat provide easements for the location and installation of any utilities? [MCA 76-3-608 (3) (c) and BMCC 23-302.H.3.b.]

The subdivider will provide utility easements as requested by private utility companies on the face of the plat.

G. Does the proposed plat provide legal and physical access to each parcel within the subdivision and notation of that access on the plat? [MCA 76-3-608 (3) (d) and BMCC 23-302.H.3.c.]

Legal and physical access to the subdivision will be provided by Central Avenue, South 44th Street West and Tippet Trail and Road E (temporary name). Carriage Lane access is also provided to residential lots within the subdivision.

CONCLUSIONS OF FINDINGS OF FACT

- The preliminary plat of 44 West Subdivision, 3rd Filing does not create any adverse impacts that warrant denial of the subdivision.

- The proposed subdivision conforms to several of the goals and policies of the 2016 Growth Policy and does not conflict with the Transportation or Bikeway/Trail Plans.

- The proposed subdivision complies with state and local subdivision regulations, local zoning, and sanitary requirements and provides legal and physical access to each lot.

- Any potential negative or adverse impacts will be mitigated with the proposed conditions of approval.

RECOMMENDATION

Staff proposes the Planning Board recommends to City Council that the preliminary plat of 44 West Subdivision, 3rd Filing, be conditionally approved and the Findings of Fact adopted as presented in the staff report.

Traffic Impact Study

Prepared for submittal to:

CITY OF Billings

for the project:

Clearwater/44 West Subdivision

on behalf of:

Performance Engineering
3412 Colton Blvd., Suite 202
Billings, MT 59102



by:

TRAFFIC & TRANSPORTATION CONSULTING

406 Traffic & Transportation Consulting
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PTOE #1185, certified in 2003

August 2025

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A: Original Raw Count Data for Intersections

B: Intersection Analysis Software Output

C: Estimated Future Traffic Volume Maps

D: Auxiliary Turn Lane Analysis Charts

E: 44th at Central Avenue Intersection Signal Warrant Summaries

F: Intersection Cost Participation Calculations

1 INTRODUCTION

This report documents the Traffic Impact Study (TIS) conducted for the Clearwater/44 West subdivision project in northwest Billings. This is a working title for the project. Some parts of the site could be marketed under a different name before final occupancy. The study was conducted by and under the direction of a Professional Traffic Operations Engineer and Montana-licensed PE with expertise and experience in traffic engineering.

1.1 PROJECT SITE AND STUDY AREA

The overall subdivision site is shown in **Exhibit 1** along with the intersections studied. The existing study intersections were identified during preapplication review with City of Billings staff as:

1. S. 48th Street West at Central Avenue
2. Shiloh Road at Broadwater Avenue
3. Shiloh Road at Central Avenue
4. Shiloh Road at Bell Avenue
5. Shiloh Road at Monad Road

From here forward in this report, existing intersections are generally referred to only by their distinguishing street names (e.g., “Shiloh at Central”) for the sake of brevity. The two new subdivision access points on Central Avenue, Double Haul Lane and S. 44th Street West, have been analyzed for all future scenarios that include project traffic. The site’s third access will be to existing Bell Avenue, which is expected to be extended west into the site to serve the final phase. The new western terminus of Bell will be built to accommodate a potential future connection to the property west of this site, but no such connection has been planned there at the time of this study. The east-west Bell Avenue alignment generally separates the subdivision site into northern and southern parts of similar size.

1.2 LAND USE AND PHASING

The site is currently agricultural land, though it was in the process of being cleared for construction at the time of this study. The subdivision’s proposed land uses will be almost exclusively residential, with 259 single-family detached homes and 125 attached ones. The latter will include 60 attached multi-story units (townhomes) and 65 “cottage” units that would be smaller units not directly classifiable as apartments. One commercial lot sized to support two 11,000 square-foot buildings will be situated near the northwest corner of the site, abutting Central Avenue and Double Haul Lane.

The project is divided into two logical phases. All 125 of the “attached” type of residential units are included in Phase 1 and are located on the northern part of the site. Phase 1 also includes about one half (131) of the total single-family detached units. Phase 2 includes the commercial parcel and all residential lots on the southern part of the site, which are for the remaining 128 single-family homes. Phase 1 is further divided into three sub-phases, termed A, B, and C for this study, to help identify when certain traffic impact mitigation improvements would be needed. The dwelling unit totals for each sub-phase are described later in this report, in the context of this sensitivity analysis. Bell Avenue access was only assumed to be available for Phase 2.

Because the site is generally rural, the types and locations of specific pathways or other facilities and connections for pedestrians and bicycles have not yet been identified. A brief examination of potential traffic calming needs indicated that some streets have long enough blocks that the need for such measures could arise. On-street parking is expected to be allowed throughout the site wherever street width and sight distance allow for it and such parking does not interfere with operations at the Central Avenue access intersections.

Exhibit 2 shows the Clearwater/44 West site plan on which the analysis here is based. It includes land use types, streets, alleys, access points, and parkland areas, as well as phasing. This site plan drawing is provided for illustrative purposes only. The full high-resolution drawing is submitted separately by the applicant.

Exhibit 1. Overall Site Location and Study Intersections

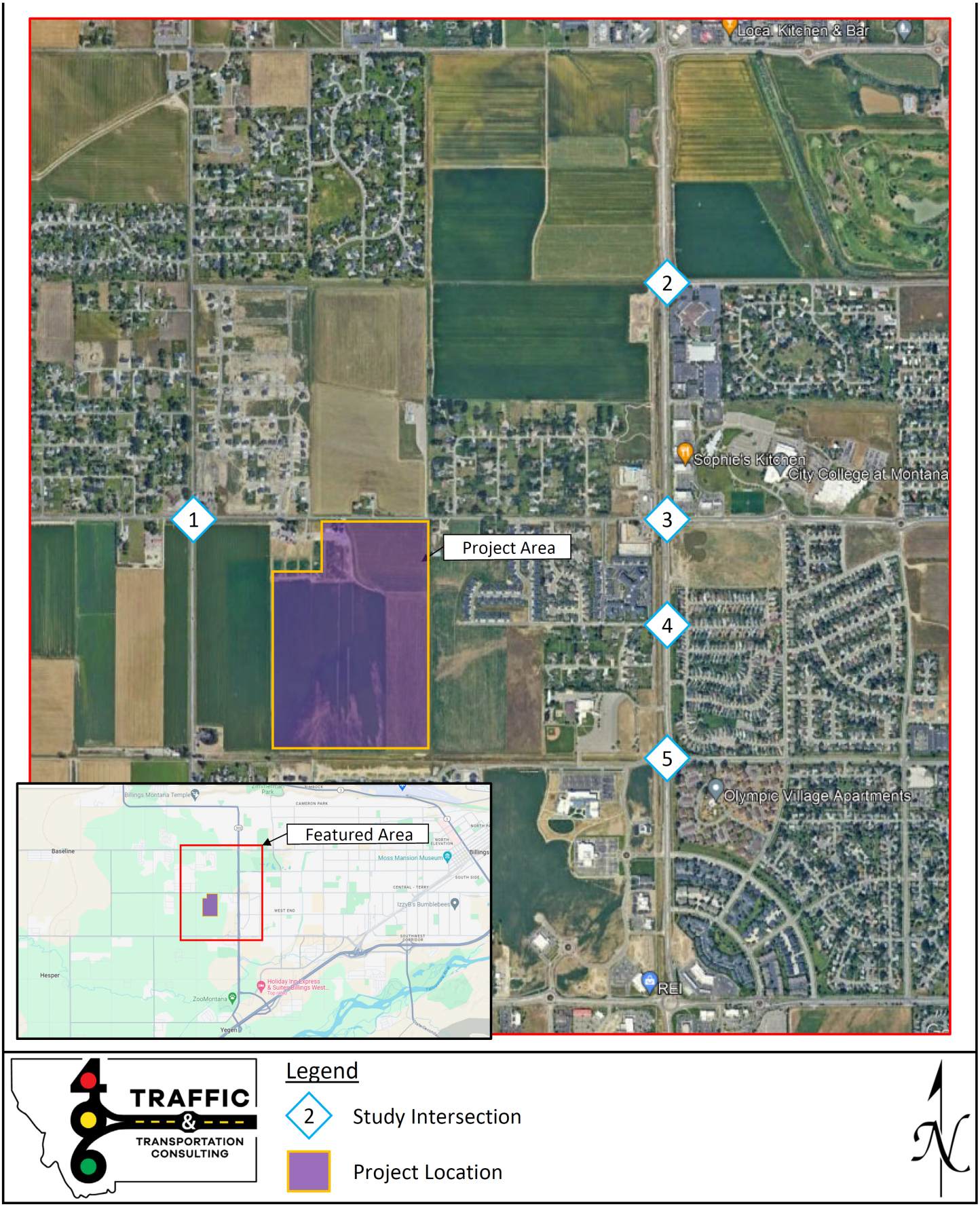
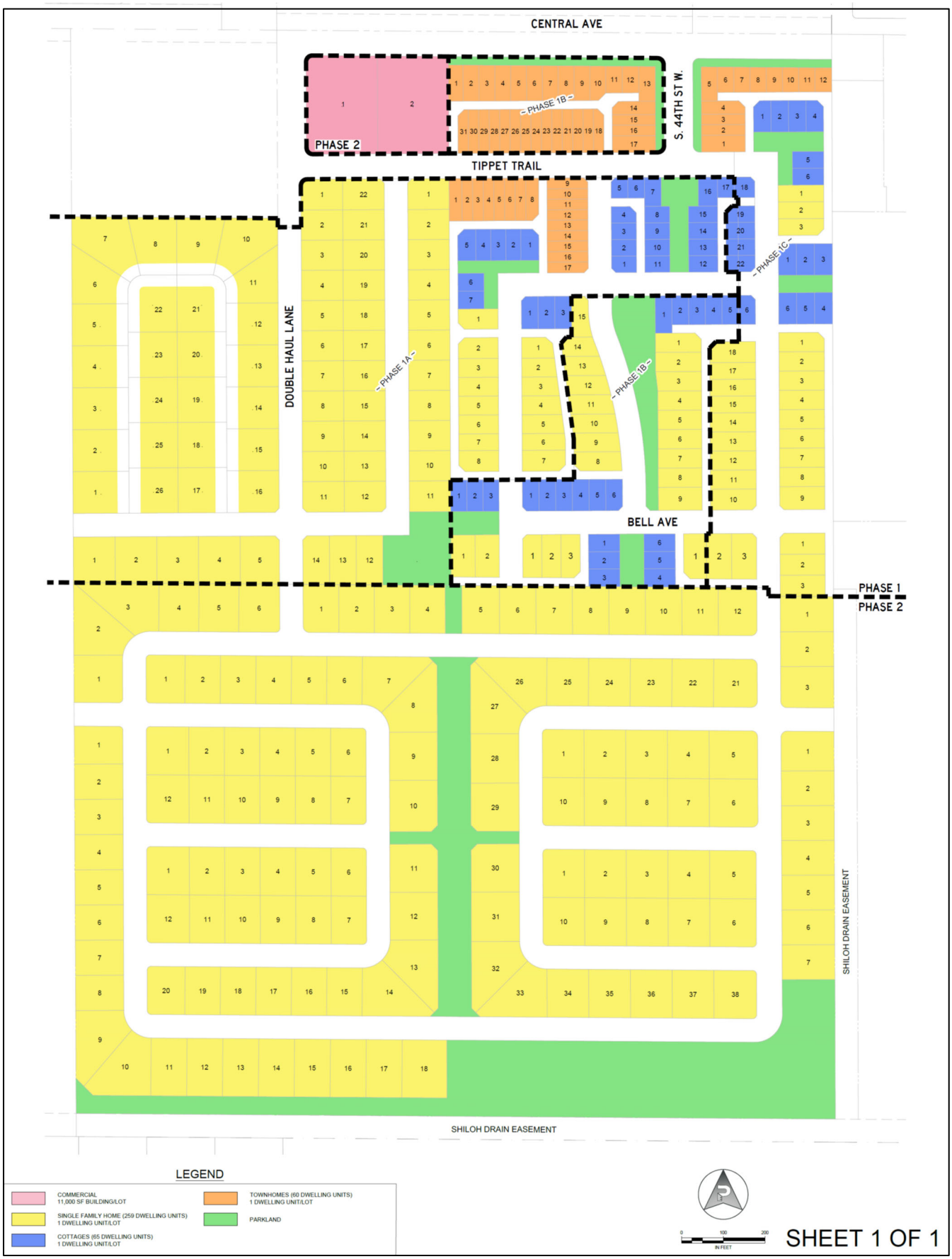


Exhibit 2. Site Plan and Phasing



Excerpted from: Performance Engineering concept site plan provided 7/17/2025

For analysis purposes, both Double Haul Lane and S. 44th Street West are assumed to have one northbound lane and one southbound lane at their intersections with Central, such that vehicles leaving the site waits in a single shared lane whether they are turning right or left.

1.3 Analysis Methods and References

Raw field traffic counts were gathered from other recent traffic study work in the area by Sanbell and provided to this project's applicant team. These raw counts were then adjusted slightly for this TIS based on both (a) recent traffic growth and (b) 2024 City of Billings annualization factors prior to their use in impact analysis.

Trip generation rates, or equations as applicable, are from the Institute of Transportation Engineers (ITE) Trip Generation suite's 11th edition, which was the most current available at the onset of this study. ITE trip generation data, when aggregated across enough varied sites, produce both simple average rates and best-fit equations, either linear or logarithmic, to help the analyst derive proper estimates for their situation. Equations are generally preferred over rates, especially for larger sites where trip generation per unit of land use can diminish with increasing project size. General ITE guidance calls for the use of the fitted curve equation when the data set for the land use type in question is comprised of studies from 20 or more separate sites and when the equation produces a correlation coefficient (R^2) of 0.75 or higher, with 1.0 being the best possible fit.

Operational performance was analyzed at the study intersections through the use of the industry-standard methods presented in the USDOT's Highway Capacity Manual (HCM), published in its modern form as Transportation Research Board Special Report 209. Synchro Studio 12 was employed as both a data repository and a capacity analysis tool, with reports for each intersection generated using Synchro's application of the assumptions of the HCM's 7th edition, the most recent available at the time of this study.

The HCM methodology for intersection capacity analysis produces delay estimates for each turning movement (or "lane group", when multiple turning movements operate from the same lane). These delay estimates are assigned Level of Service (LOS) grades that range from A (best) to F (worst), as indicated in **Exhibit 3**. It's also important to note that for unsignalized intersections with only side-street Stop sign control, LOS for the intersection is represented by the LOS for the worst lane group. "T" intersections with side-street stop control also fall under this category. All stop-controlled intersections in this study area, including the two new proposed accesses to Central, are "T" intersections, where the approach on the stem of the T, rather than a main street turning movement, contains the worst lane group.

Exhibit 3. LOS Definitions

LOS	Delay, seconds per vehicle
A	0 - 10.0
B	10.1 - 15.0
C	15.1 - 25.0
D	25.1 - 35.0
E	35.1 - 50.0
F	50.1 or more

Source: HCM 7th Edition

Operations impacts are determined by how peak hour LOS relates to acceptability standards. Billings employs a LOS standard of C or better. When LOS without the project is D or worse, an operations impact is usually defined when the project would increase delay.

In addition to intersection operations analysis, the need for auxiliary left- and right-turn lanes was examined as part of this study effort. These movements on arterial roadways at stop-controlled site access points with volumes that meet MDT criteria with respect to the department's guidelines indicated in Chapter 28 of its Traffic Engineering Manual. These auxiliary lanes would serve traffic entering the project site. Only locations with free-flowing traffic on the primary street are considered in this auxiliary lane analysis.

Potential mitigation of traffic impacts at the Central/44th intersection included the examination of traffic signal warrants according to the guidance in the Manual on Uniform Traffic Control Devices (MUTCD).

2 EXISTING AND BACKGROUND CONDITIONS

2.1 STREETS AND INTERSECTIONS

Shiloh Road, which also carries the designation of MT-302, is a north-south urban principal arterial according to the MDT (Montana Department of Transportation, and a principal arterial according to the 2023 Billings LRTP (Long Range Transportation Plan). It has two travel lanes in each direction and a speed limit of 45 mph in the study area. Shiloh Road has been a key facilitator of the city's westward expansion, with substantial residential and commercial growth having occurred adjacent to it in recent years. It is characterized by a series of roundabouts at intersections with several of western Billings's east-west arterials and collectors. It also provides access to Interstate 90 via Zoo Drive to the south. A raised median prevents left turns at many two-way stop-controlled intersections, including the one at Bell Avenue. Exclusive left-turn lanes exist at a few select site accesses and local streets. A sidewalk runs along the east side of the road, and a shared-use path called Shiloh Road Trail runs along the west side, much of it separated from the road by a large ditch. There are also two MET Transit bus stops on its east side between the Broadwater and Central roundabouts. These are not considered to be close enough to the project to site to provide meaningful transit access.

Central Avenue is an east-west road that is classified by the MDT as an urban collector to the west of Shiloh Road and as an urban principal arterial to the east of it. Accordingly, it has one travel lane in each direction to the west of Shiloh, and two travel lanes in each direction to the east of it. Its entire length from 64th St W to Montana Avenue is classified as a principal arterial in the 2023 Billings LRTP. It has a speed limit of 45 mph on both sides of Shiloh Road, but it becomes 50 mph to the west of 48th St W. It connects residential neighborhoods to many of western Billings' commercial centers. Central currently has no exclusive turning lanes or multimodal facilities to the west of Shiloh Road. However, the 2023 Billings LRTP shows that a shared-use path and/or trail are planned to be installed on Central Avenue to the west of Shiloh Road. There are also plans to expand Central Avenue to a three-lane cross-section to the west of Shiloh Road: one travel lane in each direction and a center left-turn lane.

48th Street W is a north-south local road according to the MDT, and a principal arterial according to the 2023 Billings LRTP. It has one travel lane in each direction, and its speed limit is 45 mph to the north of Central Avenue and 50 mph to the south of it. It links residences and agricultural properties on the western edges of Billings to the east-west routes that lead into the city, such as Central Avenue and King Avenue. No exclusive turning lanes or multimodal facilities currently exist on 48th in the study area.

Bell Avenue is an east-west local street according to both the MDT and the 2023 Billings LRTP. It has one travel lane in each direction and no posted speed limit. Currently, it provides access to Shiloh Road for a private senior living community and a few other residences. Its eastern terminus is at its intersection with Shiloh Road, where left turns are prohibited. Its western terminus is at a dead-end approximately 2300 feet to the west of this intersection, just past Big Pine Court. While three other streets that intersect Bell Avenue also lead to Central Avenue, these streets traverse private property. As such, Bell Avenue has no outlet for non-residents. The street has no exclusive turning lanes or bike infrastructure, but there is a sidewalk along most of its northern side, starting from the Shiloh Road Trail.

Monad Road is an east-west road that is classified by the MDT as an urban major collector to the east of Shiloh Road and as a local street to the west of it. The 2023 Billings LRTP classifies it as a minor arterial to the east of Shiloh Road, and it was planned to be a collector to the west of Shiloh Road at the time of the LRTP's publishing. West of Shiloh, it has one travel lane in each direction, as well as a center left-turn lane. East of Shiloh Road, it has one travel lane in each direction, but no center left-turn lane. Its speed limit is 35 mph to the east of Shiloh, but it does not have a speed limit posted on the west side. Monad Road connects many of western Billings' residential neighborhoods to the industrial areas near the railroad tracks and to north-south routes such as 32nd Street W and 24th Street W that lead to large commercial centers. It has exclusive right-turn lanes on the east and west legs of the roundabout at Shiloh Road, as well as an exclusive left-turn lane at

Henry Chapple Street. To the east of Shiloh Road, there are sidewalks, designated on-street parking, and unprotected bike lanes on both sides of the road. To the west of Shiloh, there is a shared-use path on much of the north side and a sidewalk on much of the south side of the street. There are also two nearby MET Transit bus stops on the south side of the road: one at Henry Chapple Street and the other at Hurdle Circle.

Broadwater Avenue is an east-west urban principal arterial according to the MDT, and a principal arterial according to the 2023 Billings LRTP. It has one travel lane in each direction and a speed limit of 35 mph in the study area. It serves as a link between residential neighborhoods in western Billings, some small commercial centers, and downtown Billings. Its eastern terminus is at its intersection with Division Street, 1st Ave N, and N 36th Street near downtown. Its western terminus is currently at a roundabout intersection with Shiloh Road. Currently, the roundabout's west leg only connects to two agricultural lots in active use, but the roundabout's infrastructure here has been built out in preparation for a potential westward extension of the road. 48th St W also intersects a road called Broadwater Avenue, but this local road segment is currently disconnected from the rest of the arterial network and is only accessible via 48th Street W. The arterial Broadwater Avenue has an exclusive westbound right-turn lane at the Shiloh roundabout. There is a shared-use path on the road's north side, and there is a sidewalk on the road's south side extending east.

Intersection traffic control currently comes in only three forms at the five existing study intersections: two-way stop control (TWSC), all-way stop control (AWSC), and roundabouts. Each leg of the three roundabouts has a crosswalk with a pedestrian refuge in the splitter island. Most of these crosswalks have solar-powered rectangular rapid flashing beacons. The intersection of Shiloh Road and Bell Avenue is considered two-way stop-controlled even though only one direction of traffic is stop-controlled. Only four movements are permitted at this intersection: northbound and southbound through movements and southbound and eastbound rights. Shiloh Road's center median prevents all left turns. The intersection of 48th Street and Central Avenue is all-way stop-controlled and is augmented with flashing red beacons facing all four directions, but it is projected to be upgraded to signalized control in 2026. **Exhibit 4** shows schematically the existing traffic control and lane arrangements at each existing intersection as well as posted speed limits on selected road segments as of the start of this study effort.

2.2 EXISTING TRAFFIC VOLUMES

Existing (2024) annualized volumes were estimated from raw field counts as described earlier in subsection 1.3 and are shown in **Exhibit 5**. These raw counts are provided in Appendix A.

2.3 HISTORIC GROWTH AND BACKGROUND CONDITION TRAFFIC

The "Background Condition" described here is represented by the volumes and intersection performance after multiple years of traffic growth assumed to occur during the permitting, construction, sales, and occupancy of the project. These steps are expected to be complete for Phase 1A in 2027. The resulting volumes and operating conditions form the basis for evaluating marginal intersection delay effects of traffic generated by this first phase of the Clearwater/44 West subdivision. Each new phase is projected to be completed two years before the last; Phase 1B in 2029, Phase 1C in 2031, and full buildout (Phase 2) in 2033. In order to estimate traffic growth without the project, average daily traffic volumes were gathered from selected MDT periodic data collection locations in the study area. The best and most logical data set available was represented by the four legs of the Shiloh intersection at Central. Data were recorded or estimated by MDT annually on each leg dating back at least 20 years. This historical traffic information is shown in the graph in **Exhibit 6**.

Counts from the most recent ten of these years were used to calculate the average annual growth rate in daily traffic for these four locations in aggregate, which was approximately 3.8% per year. This rate was then applied to the annualized peak hour intersection counts for each study year. Because the four phases of this project will be constructed sequentially and were not considered independent 'all-or-nothing' conditions at each two-year interval, each phase's traffic builds on that of the previous phase and each phase's traffic impacts were analyzed incrementally.

Exhibit 4. Existing Road and Intersection Basics

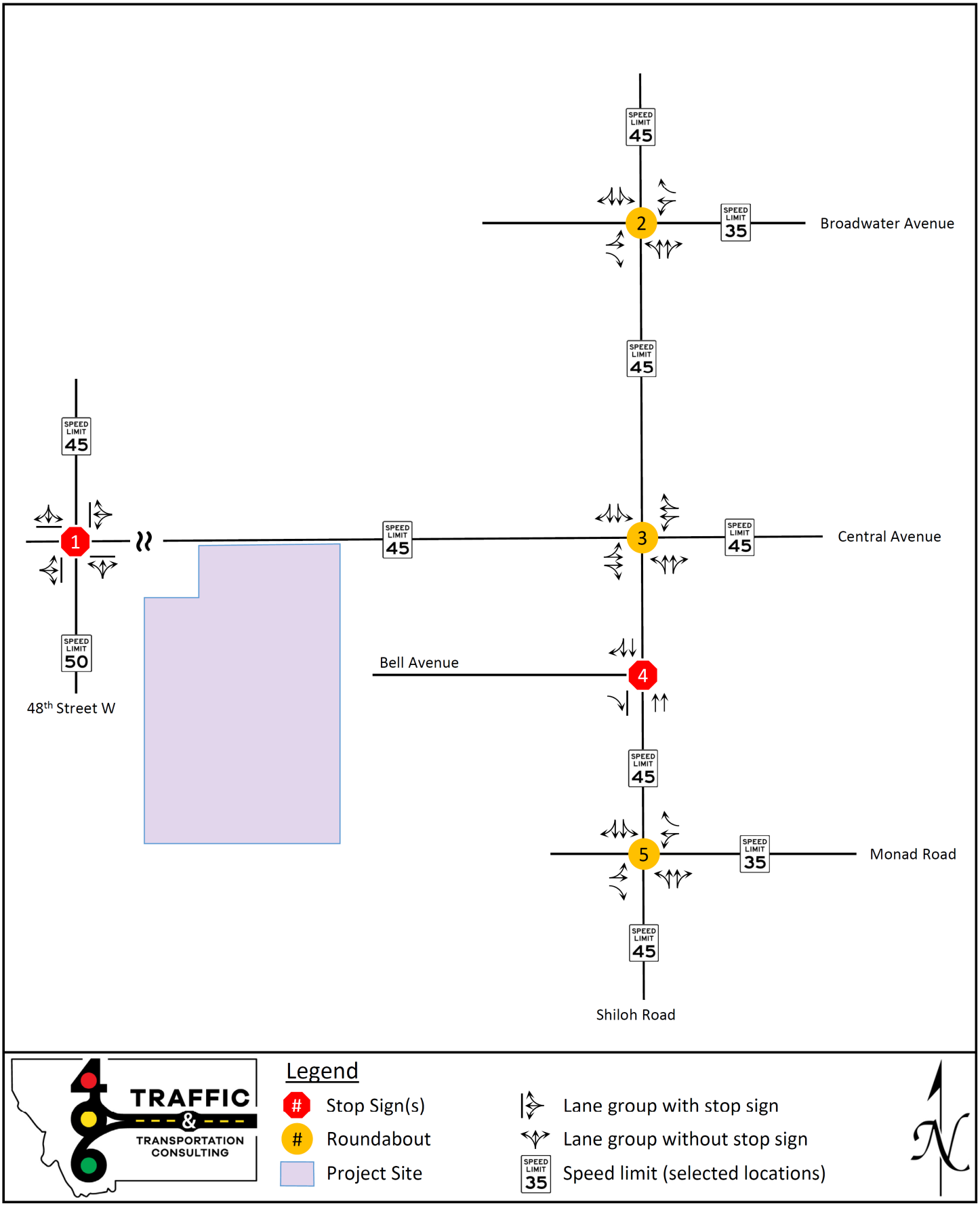


Exhibit 5. Existing Traffic Volumes

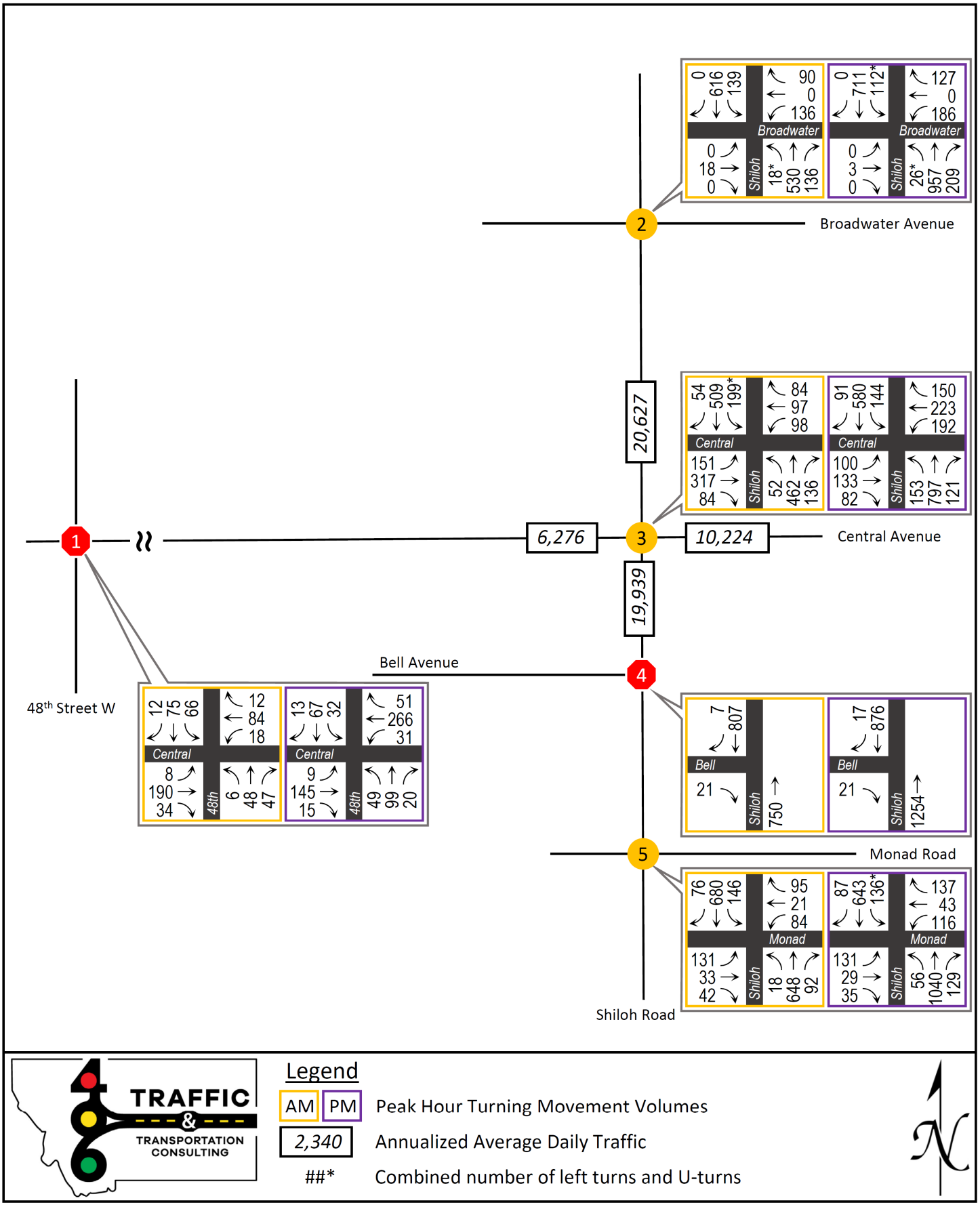
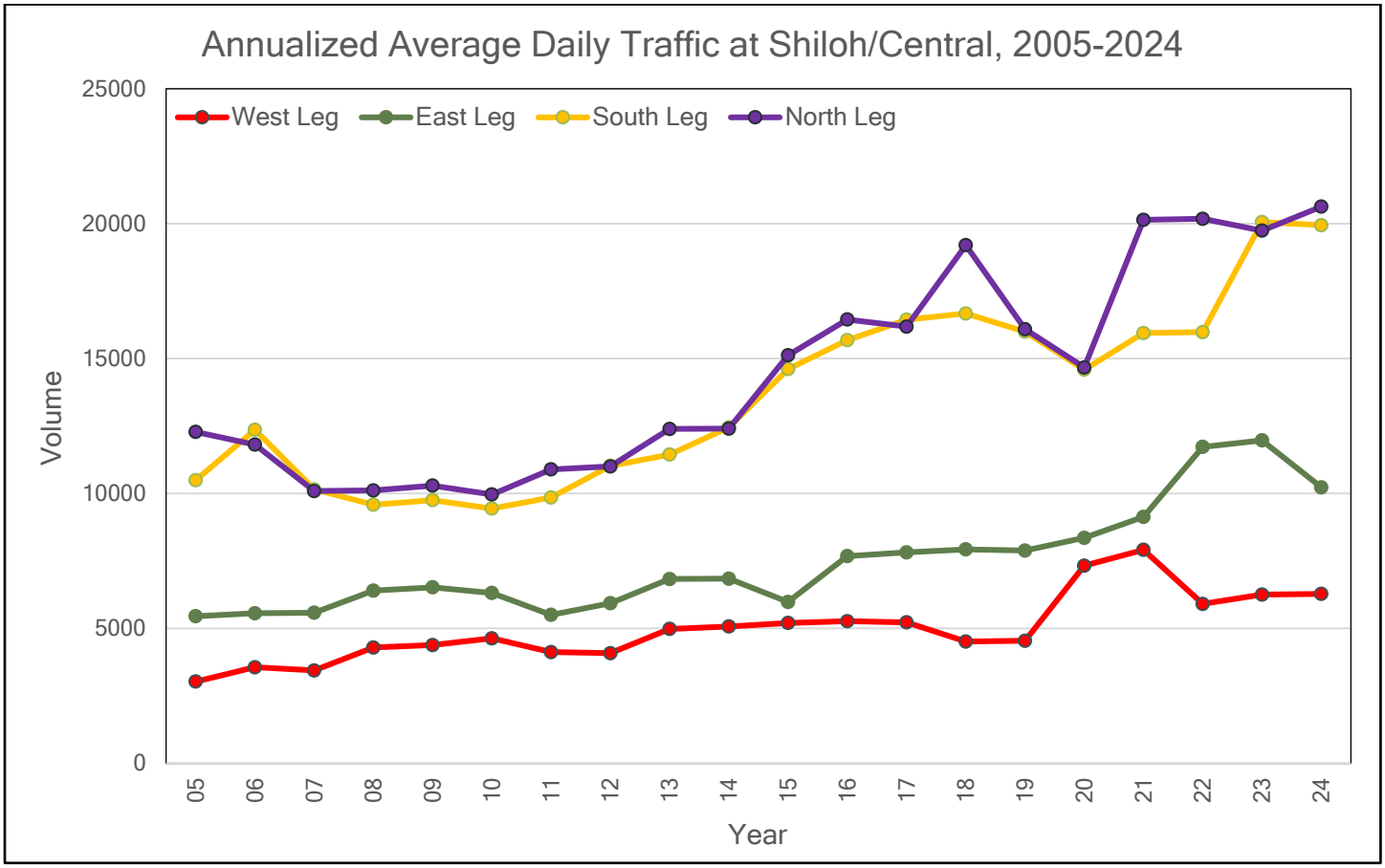


Exhibit 6. Historical Daily Traffic Volumes



2.4 Intersection Traffic Operations Without the Project

The existing and background peak hour intersection Level of Service (LOS) and delay results are shown in **Exhibit 7**. Analysis software results are provided in Appendix B.

Exhibit 7. Existing and Future Background Intersection LOS and Delay

	Intersection	Traffic Control	Peak Hour LOS (delay, in seconds/vehicle)
AM Peak Hour	1. 48th at Central	AWSC	A (9.6)
	2. Shiloh at Broadwater	Roundabout	A (6.0)
	3. Shiloh at Central	Roundabout	B (11.2)
	4. Shiloh at Bell	TWSC*	B (11.9)
	5. Shiloh at Monad	Roundabout	A (9.0)
PM Peak Hour	1. 48th at Central	AWSC	B (12.5)
	2. Shiloh at Broadwater	Roundabout	A (9.1)
	3. Shiloh at Central	Roundabout	B (13.6)
	4. Shiloh at Bell	TWSC*	B (12.2)
	5. Shiloh at Monad	Roundabout	B (10.0)

* *At Intersection 4, the worst lane group, which determines LOS, is Eastbound in both peak hours.*

The results in the table indicate that with 2024 annualized average traffic volume, all intersections operate at LOS B or better. Each roundabout has at least one approach that operates at LOS C in one or both peaks, but no approaches at LOS D or worse. Note that the only movement that must yield at Intersection 4 is eastbound Bell Avenue and that northbound traffic is not considered part of the intersection, due to the median present on Shiloh Road. At Intersection 5 in the PM peak, the delay estimate appears consistent with LOS A, but it is a rounded value that is actually just over 10.0 seconds so the software returns a LOS B result.

3 PROJECT TRIP GENERATION AND DISTRIBUTION

3.1 TRIP GENERATION

Trip generation rates, or equations as applicable, are from the Institute of Transportation Engineers (ITE) Trip Generation package's 11th edition. ITE trip generation data, when aggregated across enough varied sites, produce both simple average rates and best-fit equations, either linear or logarithmic, to help the analyst derive proper estimates for their situation. Equations are generally preferred over rates, especially for larger sites where trip generation per unit of land use can diminish with increasing project size.

Clearwater/44 West will consist almost entirely of residential land uses. Small parkland areas within the subdivision are designed and intended for use by residents and their guests, and will be similar to park spaces located in other residential areas around Billings. For that reason, they will not generate external traffic. The strip retail space in Phase 2, programmed for 22,000 square feet, has not had specific tenants or any sub-type(s) of retail use identified, but no drive-through activity is expected.

Three types of adjustments to trip generation were evaluated for this project. First, a discount is sometimes taken to reflect internal capture where multiple uses are present in a single project site. Second, a modal adjustment can be taken if a facility is clearly served by robust high-capacity transit and serves a clientele inclined to use transit to get there, or if the potential land use mix and walk/bike network are likely to lead to nonmotorized trips, either internal or external. Finally, some land uses such as gas stations or coffee shops attract trips that were already using the adjacent or nearby road network by virtue of improved convenience over a similar site that could have been used before. These are called "pass-by" and "diverted-linked" trips. Pass-by trips are those on streets bordering the site, while diverted-linked trips are those that might go slightly out of their way to stop at the establishment on their way to their destination.

The Phase 2 retail element is the only part of the site considered for these discounts. Due to the retail site's location, small size, and expected similarity to other sites along the Central Avenue corridor, only a small aggregate discount of the first two types was assumed here; it is not expected to support a use special enough or large enough to generate offsite multimodal or pass-by/diverted-linked trip activity. The estimated reduction in vehicle trip use for the on-site retail due to residents' use applied here is 10%. This reduction in retail vehicle trip use could take the form of subdivision residents (a) residents stopping at the on-site retail on their way to/from home, (b) choosing to drive to and from the on-site retail rather than a site farther away due to its proximity and convenience, or (c) choosing to walk or bike to and from the on-site retail for the same reason.

To arrive at phase-specific residential trip generation totals, the land use totals for the entire project (259 single family lots and 125 townhome or cottage lots) were first estimated, then the resulting trip totals were proportioned according to the amount of each home type in each phase. **Exhibit 8** shows trip generation details for each phase of the project.

Exhibit 8. Clearwater/44 West Trip Generation

		Daily	AM Peak Hour	PM Peak Hour
Full Project	ITE Land Use 210 – Single Family Detached Housing: X = 259 dwelling units			
	Equation	Ln(T) = 0.92(X) + 2.68	Ln(T) = 0.91(X) + 0.12	T = 0.60(X) - 3.93
	Peak hour in/out split		*25% / 75%*	*63% / 37%*
	Trips	2,422	177 (44 in / 133 out)	243 (153 in / 90 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 125 dwelling units (townhomes and "cottage" homes)			
	Equation	T = 7.62(X) - 50.48	T=0.52(X) - 5.70	T = 0.60(X) - 3.93
	Peak hour in/out split		*25% / 75%*	*59% / 41%*
	Trips	902	59 (15 in / 44 out)	71 (42 in / 29 out)
	ITE Land Use 822 – Strip Retail Plaza: X = 22 ksf (thousands of square feet)			
	Equation	T = 42.2(X) + 229.68	T = 2.36(X)	T = 6.59(X)
	Peak hour in/out split		*60% / 40%*	*50% / 50%*
	Gross retail trips	1,158	52 (31 in / 21 out)	145 (72 in / 73 out)
	Less 10% internal	-116	-5 (-3 in / -2 out)	-14 (-7 in / -7 out)
	Trips [net]	1,042	47 (28 in / 19 out)	131 (65 in, 66 out)
	Combined net trips, all uses:	**4,366**	**283 (87 in / 196 out)**	**445 (260 in / 185 out)**
by Phase		**Daily**	**AM Peak Hour**	**PM Peak Hour**
1A	ITE Land Use 210 – Single Family Detached Housing: X = 82 dwelling units			
	Trips	767	56 (14 in / 42 out)	77 (48 in / 29 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 44 dwelling units			
	Trips	317	21 (5 in / 16 out)	25 (15 in / 10 out)
	Phase 1A Total Trips	1,084	77 (19 in / 58 out)	102 (63 in / 39 out)
1B	ITE Land Use 210 – Single Family Detached Housing: X = 23 dwelling units			
	Trips	215	16 (4 in / 12 out)	22 (14 in / 8 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 51 dwelling units (townhomes and cottages)			
	Trips	368	24 (6 in / 18 out)	29 (17 in / 12 out)
	Phase 1B Total Trips	583	40 (10 in / 30 out)	51 (31 in / 20 out)
1C	ITE Land Use 210 – Single Family Detached Housing: X = 26 dwelling units			
	Trips	243	17 (4 in / 13 out)	24 (15 in / 9 out)
	ITE Land Use 215 – Single Family Attached Housing: X = 30 dwelling units (townhomes and "cottage" homes)			
	Trips	216	15 (4 in / 11 out)	17 (10 in / 7 out)
	Phase 1C Total Trips	459	32 (8 in / 24 out)	41 (25 in / 16 out)
2	Phase 2 – Single Family Detached Housing: X = 128 dwelling units			
	Trips	1,197	88 (22 in / 66 out)	120 (76 in / 44 out)
	ITE Land Use 822 – Strip Retail Plaza: X = 22 ksf (thousands of square feet)			
	Trips [net]	1,042	47 (28 in / 19 out)	131 (65 in, 66 out)
	Phase 2 Total Trips	2,239	135 (50 in / 85 out)	251 (141 in, 110 out)
	Combined net trips, all phases:	**4,366**	**283 (87 in / 196 out)**	**445 (260 in / 185 out)**

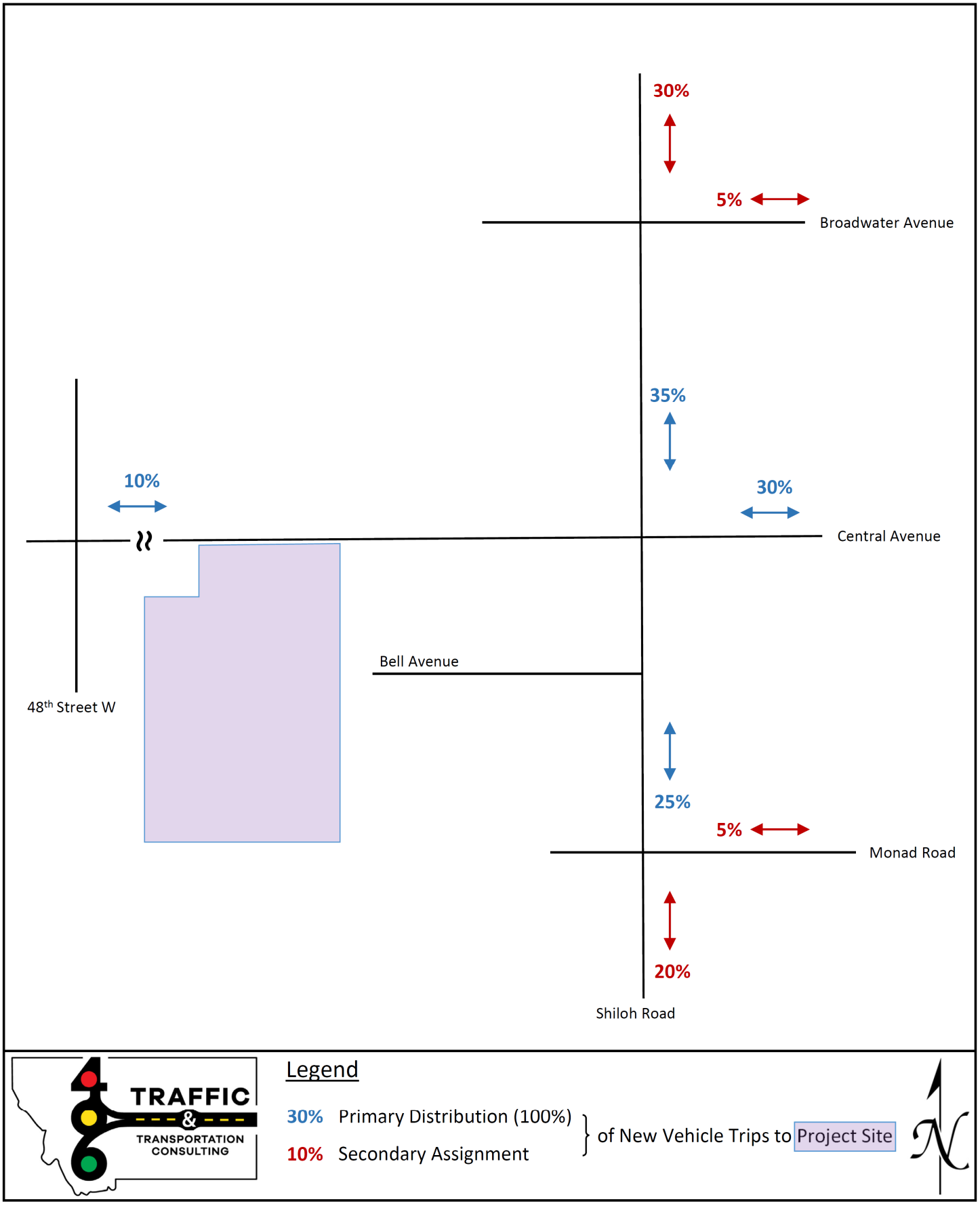
Source: Equations from ITE Trip Generation, 11th Edition.

3.2 TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution has been estimated for the streets surrounding the project site in percentages that add to 100%. Farther from the site, traffic eventually disperses in smaller percentages to/from other routes. Because there is no new information regarding a future developer's plan to connect Bell Avenue and/or the similar connection in Phase 2 to the neighborhood to the west, no Clearwater traffic was assumed to use either such connection. Trip distribution and large-scale assignment percentages are shown in **Exhibit 9**.

Note that the Shiloh median that blocks all left turns results in some differences in routing of in-out pairs once Bell becomes available for Phase 2 access to this site. For example, many residents leaving the site bound for the Shiloh/Monad intersection can turn right at the Shiloh/Bell intersection, but when they return to this site they must go north on Shiloh past Bell, then make a u-turn or left turn at the Shiloh/Central roundabout.

Exhibit 9. Trip Distribution Percentages for New Trips



Background traffic, project trips and total traffic reflected as peak hour intersection turning movement volumes and selected daily link volumes are shown in exhibits for each future phase-specific study year. Only the future traffic for the first phase (1A) is a true "without the project" estimate. Each subsequent phase's impact is assessed with the previous phase assumed to be open. As such, "Phase 2" conditions represent full project buildout. For the sake of report continuity, all 'future traffic volume' exhibits are provided in Appendix C.

4 CAPACITY ANALYSIS

The analysis results described in this section are organized by project phase order. Note again that project traffic by phase is additive such that, for example, Phase 1B also includes Phase 1A. Summaries of intersection capacity and auxiliary turn lane analysis results are provided for each phase in the study area when it's projected to be fully open. As with the existing condition, intersection capacity analysis software output results for the future conditions analyzed are provided in Appendix B. Turn lane warrant summaries for applicable situations are provided in Appendix D and summaries of MUTCD signal warrant analysis for Intersection 7 are provided by phase in Appendix E.

4.1 PHASE 1A

The peak hour intersection Level of Service (LOS) and delay results in 2027 with and without Clearwater/ 44 West subdivision Phase 1A traffic are shown in **Exhibit 10**.

Exhibit 10. Projected 2027 Intersection LOS and Delay: Phase 1A

	Intersection	Traffic Control	LOS (delay, in seconds/vehicle)	
			Background (Without Phase 1A)	With Phase 1A
AM Peak Hour	1. 48th at Central	Signal	A (6.2)	A (6.2)
	2. Shiloh at Broadwater	Roundabout	A (6.5)	A (6.6)
	3. Shiloh at Central	Roundabout	B (14.5)	C (15.9)
	4. Shiloh at Bell	TWSC*	B (12.6)	B (12.7)
	5. Shiloh at Monad	Roundabout	B (10.8)	B (10.9)
	6. Double Haul at Central	TWSC*	-	B (12.5)
	7. 44th at Central	TWSC*	-	B (12.6)
PM Peak Hour	1. 48th at Central	Signal	A (7.0)	A (7.0)
	2. Shiloh at Broadwater	Roundabout	B (11.0)	B (11.2)
	3. Shiloh at Central	Roundabout	C (18.9)	C (21.8)
	4. Shiloh at Bell	TWSC*	B (12.9)	B (13.0)
	5. Shiloh at Monad	Roundabout	B (12.5)	B (12.7)
	6. Double Haul at Central	TWSC*	-	B (11.3)
	7. 44th at Central	TWSC*	-	B (10.7)

* *Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.*

Both of the site accesses on Central would operate at LOS B in both 2027 peak hours. All intersections and both new site accesses would operate within the City's LOS standard of C or better in both peak hours. As a result of this finding, no additional control beyond a side-street (northbound) stop sign is considered necessary.

A simple look at 2027 Phase 1 turning volumes on Central made it clear that the potential need for auxiliary left turn lanes was worth examining, in accord with the MDT procedures described earlier in this report, in subsection 1.3. Right turn lane volumes at Intersections 6 and 7 would be too low (under 40 vph) for potential auxiliary turn lane consideration. Although left-turning volumes into the site will be higher in the PM peak due to the project's residential nature, conditions on the appropriate MDT left turn chart have been plotted for both peaks. While a westbound left turn auxiliary lane at Double Haul is not justified by Phase 1A traffic under the assumptions in this study, the potential case for such a lane at 44th appears to be inconclusive.

At Intersection 7, no signal warrants would be met under Phase 1A conditions.

4.2 PHASE 1B

The peak hour intersection Level of Service (LOS) and delay results in 2029 with and without Clearwater/44 West subdivision Phase 1B traffic are shown in **Exhibit 11**.

Exhibit 11. Projected 2029 Intersection LOS and Delay: Phase 1B

	Intersection	Traffic Control	LOS (delay, in seconds/vehicle) Without Phase 1B	With Phase 1B
AM Peak Hour	1. 48th at Central	Signal	A (6.4)	A (6.4)
	2. Shiloh at Broadwater	Roundabout	A (7.2)	A (7.2)
	3. Shiloh at Central	Roundabout	C (20.9)	C (22.4)
	4. Shiloh at Bell	TWSC*	B (13.2)	B (13.3)
	5. Shiloh at Monad	Roundabout	B (12.8)	B (13.0)
	6. Double Haul at Central	TWSC*	B (13.0)	B (13.1)
	7. 44th at Central	TWSC*	B (13.0)	B (13.6)
PM Peak Hour	1. 48th at Central	Signal	A (7.3)	A (7.3)
	2. Shiloh at Broadwater	Roundabout	B (13.1)	B (13.3)
	3. Shiloh at Central	Roundabout	D (31.1)	D (33.7)
	4. Shiloh at Bell	TWSC*	B (13.6)	B (13.6)
	5. Shiloh at Monad	Roundabout	C (15.5)	C (15.7)
	6. Double Haul at Central	TWSC*	B (11.7)	B (12.1)
	7. 44th at Central	TWSC*	B (11.0)	B (11.3)

* *Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.*

Both of the site accesses on Central would operate at LOS B in both 2029 peak hours. The 2029 study year marks the first time an intersection's peak LOS would exceed the City's standard (C or better), with the Shiloh intersection at Central projected operate at LOS D with or without Phase 1B traffic. In addition, each of the four approaches to the intersection would operate at the same LOS with or without Phase 1B traffic. The discussion of mitigating the LOS impact at this location is deferred to the next subsection, on Phase 1C.

With respect to auxiliary turn lanes at Intersections 6 and 7, as with 2027, the 2029 right turn lane volumes would remain too low for potential consideration. Although left-turning volumes into the site will be higher in the PM peak due to the project's residential nature, conditions on the appropriate MDT chart have been plotted for both peaks. A westbound left turn auxiliary lane at 44th would be justified by Phase 1B traffic, but the potential case for such a lane at Double Haul Lane appears to be inconclusive.

Note that the LOS results shown in Exhibit 11 above for the 44th intersection do not reflect the addition of a westbound left turn auxiliary lane, but that lane addition could be expected to result in a slight improvement in overall operations.

At Intersection 7, no signal warrants would be met under Phase 1B conditions.

4.2 PHASE 1C

The peak hour intersection Level of Service (LOS) and delay results in 2031 with and without Clearwater/44 West subdivision Phase 1C traffic are shown in **Exhibit 12**.

Exhibit 12. Projected 2031 Intersection LOS and Delay: Phase 1C

	Intersection	Traffic Control	LOS (delay, in seconds/vehicle) Without Phase 1C	With Phase 1C
AM Peak Hour	1. 48th at Central	Signal	A (6.6)	A (6.6)
	2. Shiloh at Broadwater	Roundabout	A (7.8)	A (7.8)
	3. Shiloh at Central	Roundabout	D (32.8)	E (35.3)
	4. Shiloh at Bell	TWSC*	B (13.9)	B (14.0)
	5. Shiloh at Monad	Roundabout	C (15.8)	C (15.9)
	6. Double Haul at Central	TWSC*	B (13.7)	B (13.7)
	7. 44th at Central	TWSC*	B (14.2)	B (15.0)
PM Peak Hour	1. 48th at Central	Signal	A (7.7)	A (7.7)
	2. Shiloh at Broadwater	Roundabout	C (16.5)	C (16.7)
	3. Shiloh at Central	Roundabout	F (54.2)	F (58.6)
	4. Shiloh at Bell	TWSC*	B (14.3)	B (14.4)
	5. Shiloh at Monad	Roundabout	C (20.6)	C (20.9)
	6. Double Haul at Central	TWSC*	B (12.5)	B (12.5)
	7. 44th at Central	TWSC*	B (11.6)	B (12.0)

* *Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.*

Both of the site accesses on Central would operate at LOS B in both 2031 peak hours. The Shiloh intersection at Central would remain the only intersection projected operate at LOS D or worse, and it would do so in both peaks with or without Phase 1C traffic. PM peak hour traffic would be expected to experience considerably higher delay than AM peak hour traffic, so the PM case is the one subject to the examination of potential mitigation to reduce projected delay.

To address future capacity deficiencies, a primary tool at roundabouts is the addition of a channelized right turn bypass lane on the approach(es) with the highest right-turning volumes. Such a bypass lane requires widening and would lengthen pedestrian crossings, as with the addition of a turn lane at any intersection. The westbound approach to Shiloh/Central would exhibit the longest delays and queues in the 2031 PM peak hour scenario, so it was the one examined for potential benefit. It also has the highest right-turn volume of the four approaches. Simple testing shows that addition of a bypass lane would reduce westbound delay by about 67%, which would be enough of an improvement to improve the overall intersection PM peak LOS (and delay) from the F (58.6) shown in Exhibit 12 above to E (40.0). Synchro's estimate of the 95th percentile westbound queue would be reduced by about half, from 17 vehicles in each lane to 9 in one lane and 8 in the other. While no site-oriented movements would benefit directly from the bypass lane because it carries no such trips, the secondary benefit makes it worth exploring further as an intersection delay impact mitigation action.

The projection of substandard operations at Shiloh/Central, even without Phase 1C traffic, echoes similar findings for other major Shiloh roundabouts from recent studies. Some of this congestion stems from the scarcity of east-west street network connections other than the major arterials that are generally a mile apart. To that end, a secondary, "bigger-picture" part of the overall solution could involve the westward extension of the east-west streets a half-mile north/south of Central (Broadwater and/or Monad) to help relieve the traffic burden on Grand, Central, and King. Examination of the complex and detailed effects of such extensions are well outside the scope of this project's mitigation analysis but still bear mentioning for general interest. The applicant team encourages the City to consider prioritizing, to the extent practicable, additional east-west connectivity between Shiloh and 48th with eventual functional extensions of Broadwater and/or Monad as additional land use changes occur along those alignments.

With respect to auxiliary turn lanes at Intersections 6 and 7, as with 2027 and 2029 the 2031 right turn lane volumes would remain too low for potential consideration. Although left-turning volumes into the site will be higher in the PM peak due to the project's residential nature, conditions on the appropriate MDT chart have been plotted for both peaks. Westbound left turn auxiliary lanes would be justified by Phase 1C traffic at both Double Haul Lane and 44th.

Note that the LOS results shown in Exhibit 12 above for the Double Haul and 44th intersections do not reflect the addition of westbound left turn auxiliary lanes, but that lane addition could be expected to result in a slight improvement in overall operations.

At Intersection 7, only the Four-Hour signal warrant would be met under Phase 1C conditions.

4.2 PHASE 2

The peak hour intersection Level of Service (LOS) and delay results in 2033 with and without Clearwater/44 West subdivision Phase 2 traffic are shown in **Exhibit 13**.

Exhibit 13. Projected 2033 Intersection LOS and Delay: Phase 2

	Intersection	Traffic Control	LOS (delay, in seconds/vehicle) Without Phase 2	With Phase 2
AM Peak Hour	1. 48th at Central	Signal	A (6.9)	A (6.9)
	2. Shiloh at Broadwater	Roundabout	A (8.5)	A (8.7)
	3. Shiloh at Central	Roundabout	F (58.5)	F (74.9)
	4. Shiloh at Bell	TWSC*	B (14.8)	C (15.6)
	5. Shiloh at Monad	Roundabout	C (21.1)	C (22.3)
	6. Double Haul at Central	TWSC*	B (14.4)	C (16.3)
	7. 44th at Central	TWSC*	C (15.8)	C (18.0)
PM Peak Hour	1. 48th at Central	Signal	A (8.2)	A (8.3)
	2. Shiloh at Broadwater	Roundabout	C (22.3)	C (24.6)
	3. Shiloh at Central	Roundabout	F (96.1)	F (144.6)
	4. Shiloh at Bell	TWSC*	C (15.2)	C (16.2)
	5. Shiloh at Monad	Roundabout	D (30.4)	D (33.5)
	6. Double Haul at Central	TWSC*	B (13.1)	B (14.8)
	7. 44th at Central	TWSC*	B (12.5)	B (14.8)

* *Worst lane group is Eastbound at Intersection 4 and Northbound at Intersections 6 and 7.*

In 2033, both of the site accesses on Central would operate at LOS B in the PM peak hour and at LOS C in the AM peak hour with or without the addition of Phase 2 traffic. The Shiloh intersection at Central would operate at LOS F in both peaks with or without Phase 2 traffic. Increasing background traffic also results in a projection that the Shiloh intersection at Monad would operate beyond the City's standard under the 2033 conditions examined, at LOS D, with or without Phase 2 traffic. At all roundabout intersections, PM peak hour traffic would be expected to experience considerably higher delay than AM peak hour traffic.

Mitigation of the Shiloh/Central condition would take the same form described for Phase 1C impacts, at least in concept: the eventual addition of a westbound right turn bypass lane. Testing with 2033 Phase 2 PM volumes indicates that addition of a bypass lane would reduce westbound delay by about 59%, which would be enough of an improvement to improve the overall intersection PM peak LOS (and delay) from the F (144.6) shown in Exhibit 13 above to F (105.9). Synchro's estimate of the 95th percentile westbound queue would be reduced by about 43%, from 29 vehicles per lane to 17. If additional delay mitigation is needed to reduce overall delay to pre-Phase 2 level [F (96.0)], a northbound right turn lane could also be considered.

No mitigations were tested for the LOS D condition at the Monad intersection.

With respect to auxiliary turn lanes at Intersections 6 and 7, as with previous phases the 2033 right turn lane volumes would remain too low for potential consideration. Because left turn lanes were justified by traffic from the previous phase, no new analysis of those lanes was conducted with the addition of Phase 2 traffic. The potential need for a right turn auxiliary lane was examined for the intersection of Shiloh at Bell, and this analysis indicated that PM peak hour traffic in Phase 2 would help to justify the addition of such a lane. As with previous phases, the LOS results shown in Exhibit 13 above do not reflect the addition of any auxiliary lanes.

At Intersection 7, the Four-Hour signal warrant would be met by a considerable margin under Phase 2 conditions, and the Eight-Hour warrant would be within the margin of estimating/forecasting uncertainty, with minor street volume slightly over the minimum threshold. With these two warrants technically met, a signal could be considered under 2033 conditions at this location. The project team recommends further monitoring of traffic volume conditions and consideration of future traffic to and from the property directly across Central to the north. That development project would create a new fourth leg (a southbound approach) to this intersection and was only in the early stages of planning/permitting at the time this TIS report was completed.

5 COST PARTICIPATION

The net new trips identified in this report were subject to examination under the City's arterial intersection cost participation program to the extent that they would travel through studied intersections. City staff also requested that the two project access intersections on Central be included even though they are effectively local streets (low-speed with parking and driveways, not connected to other major routes) rather than arterials. Critical traffic shares that drive intersection cost participation can be excluded if they fall below 2%, but project trips from all phases are considered together when evaluating such a possibility. Right turns are not considered in cost participation, so intersection 4 (Bell) was omitted here with the permission of City staff because the Shiloh Road median dictates that the intersection's only conflicting critical pairs involve right turns. Phase-specific project trips used in this calculation are documented in the traffic volume graphics provided in Appendix C.

The retail part of the site is scheduled to be developed in Phase 2 but it's located in the area covered by Phase 1A. Because that area is subject to a Subdivision Improvement Agreement that directly benefits the two future retail lots on the Phase 1 property, cost participation associated with retail trips was pulled forward from Phase 2 to Phase 1A.

Exhibit 14 shows the incremental intersection cost participation for the new trips associated and the cost share calculation with each project phase. As shown in the table, no intersections qualify for the "sub-2%" waiver when all phases are considered.

Exhibit 14. Intersection Cost Participation by Phase

	Phase				Project
Intersection	**1A**	**1B**	**1C**	**2**	**Total**
1. 48th at Central	1.1%	0.3%	0.2%	0.6%	2.2%
2. Shiloh at Broadwater	1.9%	0.5%	0.4%	1.2%	4.0%
3. Shiloh at Central	7.4%	1.7%	1.4%	3.3%	13.8%
5. Shiloh at Monad	1.8%	0.4%	0.3%	1.0%	3.5%
Arterial Intersection Subtotal:	**12.2%**	**2.9%**	**2.3%**	**6.1%**	**23.5%**
6. Double Haul at Central (Local)	8.6%	0.3%	0.2%	2.0%	11.1%
7. 44th at Central (Local)	9.2%	2.5%	2.1%	2.8%	16.6%
Total Participation:	**30.0%**	**5.7%**	**4.6%**	**10.9%**	**51.2%**

Note: each % represents the highest project critical-volume share of the two peak hours (AM or PM)

For all six intersections evaluated for cost participation in all phases, the PM peak hour critical-pair traffic volume would be equal to or greater than in the AM peak hour. It's important to note that more than half of the critical traffic shares indicated would occur at the two local intersections (6 and 7), both of which would operate within the City's LOS C standard in both peaks in all project phases. The details of these cost participation calculations are provided in Appendix F.

This concludes the Clearwater/44 West Subdivision TIS.

Appendix A: Original Raw Traffic Count Data for Intersections

Study Name **Central and 48th**
Start Date **8/8/2023**
Start Time **7:30 AM**
Type **Road**
Classification **Totals**

	48th Street Southbound				Central Avenue Westbound				48th Street Northbound				Central Avenue Eastbound			
Start Time	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM																
7:15 AM																
7:30 AM	3	13	19	0	3	27	2	0	18	9	2	0	5	62	1	0
7:45 AM	3	26	21	0	3	24	5	0	9	10	1	0	12	48	1	0
8:00 AM	4	19	12	0	3	17	5	0	10	13	3	0	10	44	2	0
8:15 AM	2	15	13	0	3	14	5	0	8	14	0	0	6	31	4	0
8:30 AM																
8:45 AM																
4:00 PM																
4:15 PM																
4:30 PM																
4:45 PM																
5:00 PM	1	15	6	0	14	70	7	0	7	23	9	0	5	38	1	0
5:15 PM	3	19	12	0	17	60	12	0	5	30	19	0	5	40	2	0
5:30 PM	4	18	5	0	8	69	6	0	6	20	10	0	2	32	4	0
5:45 PM	5	14	8	0	10	60	5	0	1	23	9	0	2	31	2	0

Study Name **Shiloh & Broadwater**
Start Date **3/7/2024**
Start Time **7:00 AM**
Type **Road**
Classification **Totals**

	Shiloh Road Southbound				Broadwater Avenue Westbound				Shiloh Road Northbound				Eastbound Approach Eastbound			
Start Time	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	0	111	22	0	17	0	8	0	23	52	0	0	0	1	0	0
7:15 AM	0	147	52	0	21	0	25	0	35	102	0	6	0	3	0	0
7:30 AM	0	182	63	0	18	0	33	0	28	122	0	2	0	4	0	0
7:45 AM	0	170	34	0	23	0	39	0	38	140	0	4	0	4	0	0
8:00 AM	0	131	22	0	26	0	29	0	39	143	0	6	0	6	0	0
8:15 AM	0	139	21	0	24	0	36	0	32	130	0	6	0	4	0	0
8:30 AM	0	133	23	0	18	0	28	0	42	137	0	5	0	3	0	0
8:45 AM	0	150	49	0	18	0	28	0	34	124	0	3	0	4	0	0
4:00 PM	0	143	17	0	33	0	42	0	27	244	0	5	0	2	0	0
4:15 PM	0	151	25	0	20	0	46	0	36	226	0	2	0	0	1	0
4:30 PM	0	151	31	0	21	0	38	0	50	238	2	2	0	0	0	0
4:45 PM	0	177	21	0	24	0	37	0	35	201	1	3	0	0	0	0
5:00 PM	0	169	23	0	40	0	56	0	56	281	0	8	0	3	0	0
5:15 PM	0	193	32	1	44	0	52	0	63	283	4	8	0	0	0	0
5:30 PM	0	179	35	1	20	0	43	0	57	202	1	1	0	0	0	0
5:45 PM	0	160	33	2	20	1	35	0	43	200	0	0	0	0	0	0

Study Name **Shiloh & Central**
Start Date **3/21/2024**
Start Time **7:00 AM**
Type **Road**
Classification **Totals**

	Shiloh Road Southbound				Central Avenue Westbound				Shiloh Road Northbound				Central Avenue Eastbound			
Start Time	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	6	74	22	0	7	13	15	0	19	66	9	1	19	51	15	0
7:15 AM	8	118	48	0	7	18	28	0	32	84	14	0	25	90	17	0
7:30 AM	16	128	69	1	18	25	29	0	41	96	15	0	22	112	36	0
7:45 AM	17	135	67	0	26	19	34	0	36	130	19	0	20	91	42	0
8:00 AM	7	116	32	0	29	25	17	0	33	114	10	0	21	76	37	0
8:15 AM	15	135	31	1	12	29	19	0	27	127	9	0	22	41	38	0
8:30 AM	9	98	29	0	15	30	21	0	26	146	10	0	16	30	31	0
8:45 AM	10	102	31	1	20	22	24	0	17	119	20	0	22	40	30	0
4:00 PM	19	127	37	0	23	51	45	0	35	168	24	0	21	29	27	0
4:15 PM	20	100	34	0	35	41	58	0	26	156	45	0	20	39	25	0
4:30 PM	23	127	35	0	38	50	62	0	30	163	47	0	21	26	27	0
4:45 PM	19	153	33	0	41	45	49	0	26	174	41	0	15	36	23	0
5:00 PM	26	152	34	0	38	63	48	0	31	235	32	0	21	46	23	0
5:15 PM	24	154	43	0	35	67	35	0	35	233	35	0	26	26	28	0
5:30 PM	17	142	35	0	40	74	46	0	32	148	35	0	14	32	27	0
5:45 PM	21	148	30	0	31	46	41	0	32	162	26	0	24	22	30	0

Study Name Shiloh & Bell
Start Date 5/18/2023
Start Time 7:00 AM
Type Road
Classification Totals

	Shiloh Road Southbound				n/a Westbound				Shiloh Road Northbound				Bell Avenue Eastbound			
Start Time	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	1	126		0						103	0	0	1		0	0
7:15 AM	0	186		0						111	0	0	2		0	0
7:30 AM	2	181		0						228	0	0	7		0	0
7:45 AM	2	239		0						213	0	0	7		0	0
8:00 AM	1	184		0						169	0	0	7		0	0
8:15 AM	3	233		0						167	0	0	1		0	0
8:30 AM	2	163		0						180	0	0	3		0	0
8:45 AM	6	174		0						169	0	0	5		0	0
4:00 PM	2	225		0						272	0	0	6		0	0
4:15 PM	4	224		0						262	0	0	3		0	0
4:30 PM	3	212		0						311	0	0	2		0	0
4:45 PM	5	212		0						307	0	0	7		0	0
5:00 PM	4	241		0						357	0	0	8		0	0
5:15 PM	5	243		0						324	0	0	4		0	0
5:30 PM	6	213		0						263	0	0	7		0	0
5:45 PM	6	219		0						254	0	0	2		0	0

Study Name Shiloh & Monad
Start Date 10/24/2023
Start Time 7:00 AM
Type Road
Classification Totals

	Shiloh Road Southbound				Monad Road Westbound				Shiloh Road Northbound				Monad Road Eastbound			
Start Time	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U	Right	Thru	Left	U
7:00 AM	6	126	12	0	8	7	12	0	16	67	5	0	10	5	12	0
7:15 AM	12	129	36	0	11	9	15	0	22	113	1	0	13	3	25	0
7:30 AM	9	138	32	0	24	3	22	0	29	175	5	0	17	14	33	0
7:45 AM	16	215	49	0	29	8	21	0	21	190	8	0	12	7	36	0
8:00 AM	23	181	23	0	18	2	22	0	23	142	1	0	9	10	24	0
8:15 AM	26	128	38	0	22	7	17	0	17	123	3	0	2	1	34	0
8:30 AM	12	150	42	5	17	1	15	0	16	111	2	1	5	2	24	0
8:45 AM	10	135	20	0	20	5	9	0	14	109	1	0	10	3	16	0
4:00 PM	16	166	26	0	30	6	21	0	33	210	10	0	12	8	23	0
4:15 PM	15	162	23	0	25	10	20	0	30	203	7	0	6	15	23	0
4:30 PM	21	174	35	0	37	12	29	0	22	233	9	0	8	9	41	0
4:45 PM	18	154	27	1	29	8	32	0	28	236	18	0	6	0	35	0
5:00 PM	16	138	44	0	29	15	27	0	35	277	12	0	9	10	31	0
5:15 PM	30	160	25	0	38	6	25	0	40	266	16	0	11	9	20	0
5:30 PM	19	180	23	0	37	8	34	0	34	183	13	0	9	7	31	0
5:45 PM	24	156	28	0	37	10	16	0	25	176	13	0	11	12	21	0

Appendix B: Intersection Analysis Software Output

Scenario sequence:

Existing

2027 Background

2027 Phase 1A

2029 Without Phase 1B

2029 Phase 1B

2031 Without Phase 1C

2031 Phase 1C

2033 Without Phase 2

2033 Phase 2 (Full project buildout)

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	188	33	18	83	12	6	47	46	66	75	12
Future Vol, veh/h	8	188	33	18	83	12	6	47	46	66	75	12
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	5	5	5	5	5	5	1	1	1
Mvmt Flow	9	211	37	20	93	13	7	53	52	74	84	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	10.2	9.1	8.8	9.7
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	3%	16%	43%
Vol Thru, %	47%	82%	73%	49%
Vol Right, %	46%	14%	11%	8%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	99	229	113	153
LT Vol	6	8	18	66
Through Vol	47	188	83	75
RT Vol	46	33	12	12
Lane Flow Rate	111	257	127	172
Geometry Grp	1	1	1	1
Degree of Util (X)	0.151	0.337	0.175	0.24
Departure Headway (Hd)	4.871	4.715	4.972	5.018
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	730	756	716	710
Service Time	2.946	2.777	3.045	3.088
HCM Lane V/C Ratio	0.152	0.34	0.177	0.242
HCM Control Delay, s/veh	8.8	10.2	9.1	9.7
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.5	1.5	0.6	0.9

Intersection	
Intersection Delay, s/veh	6.0
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	241	728	803
Demand Flow Rate, veh/h	0	243	742	811
Vehicles Circulating, veh/h	957	594	149	165
Vehicles Exiting, veh/h	19	297	808	672
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	6.1	5.7	6.1
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.601	0.399	0.470	0.530	0.470	0.530
Follow-Up Headway, s	1.000	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	3600	1420	1350	1420	1420	1420	1420	1420
B (Slope)	1.151e-3	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	146	97	349	393	381	430
Cap Entry Lane, veh/h	1196	629	782	857	1240	1240	1222	1222
Entry HV Adj Factor	1.000	1.000	0.993	0.990	0.980	0.981	0.991	0.990
Flow Entry, veh/h	0	0	145	96	342	386	378	426
Cap Entry, veh/h	1196	629	776	848	1215	1217	1211	1210
V/C Ratio	0.000	0.000	0.187	0.113	0.281	0.317	0.312	0.352
Control Delay, s/veh	3.0	5.7	6.6	5.4	5.5	5.9	5.9	6.3
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	0	1	1	1	2

Intersection	
Intersection Delay, s/veh	11.2
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	620	313	730	857
Demand Flow Rate, veh/h	632	322	753	866
Vehicles Circulating, veh/h	917	768	762	285
Vehicles Exiting, veh/h	234	747	787	805
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.6	8.0	13.7	7.6
Approach LOS	B	A	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.469	0.531	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	297	335	151	171	354	399	407	459
Cap Entry Lane, veh/h	581	651	666	739	670	743	1039	1115
Entry HV Adj Factor	0.981	0.981	0.973	0.969	0.970	0.970	0.990	0.990
Flow Entry, veh/h	291	329	147	166	343	387	403	454
Cap Entry, veh/h	570	639	648	717	649	721	1028	1103
V/C Ratio	0.511	0.514	0.227	0.231	0.529	0.537	0.392	0.412
Control Delay, s/veh	15.3	14.0	8.3	7.7	14.2	13.3	7.7	7.6
LOS	C	B	A	A	B	B	A	A
95th %tile Queue, veh	3	3	1	1	3	3	2	2

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	22	0	766	825	8
Future Vol, veh/h	0	22	0	766	825	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	25	0	861	927	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	468	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	547	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	547	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.89	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	547	-	-
HCM Lane V/C Ratio	-	0.045	-	-
HCM Ctrl Dly (s/v)	-	11.9	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	9.0
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	251	244	924	1100
Demand Flow Rate, veh/h	259	251	933	1111
Vehicles Circulating, veh/h	1122	985	386	154
Vehicles Exiting, veh/h	143	334	995	1082
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.0	9.3	9.2	7.6
Approach LOS	B	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.795	0.205	0.526	0.474	0.471	0.529	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	206	53	132	119	439	494	522	589
Cap Entry Lane, veh/h	481	547	545	615	999	999	1234	1234
Entry HV Adj Factor	0.970	0.962	0.971	0.975	0.989	0.991	0.990	0.990
Flow Entry, veh/h	200	51	128	116	434	490	517	583
Cap Entry, veh/h	466	526	530	599	989	991	1222	1221
V/C Ratio	0.428	0.097	0.242	0.194	0.439	0.494	0.423	0.477
Control Delay, s/veh	15.5	8.1	10.2	8.4	8.7	9.6	7.2	8.0
LOS	C	A	B	A	A	A	A	A
95th %tile Queue, veh	2	0	1	1	2	3	2	3

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	143	15	30	264	50	48	98	20	31	67	13
Future Vol, veh/h	9	143	15	30	264	50	48	98	20	31	67	13
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	1	1	1	0	0	0	0	0	0
Mvmt Flow	10	166	17	35	307	58	56	114	23	36	78	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	10.7	14.6	11.2	10.4
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	29%	5%	9%	28%
Vol Thru, %	59%	86%	77%	60%
Vol Right, %	12%	9%	15%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	166	167	344	111
LT Vol	48	9	30	31
Through Vol	98	143	264	67
RT Vol	20	15	50	13
Lane Flow Rate	193	194	400	129
Geometry Grp	1	1	1	1
Degree of Util (X)	0.305	0.293	0.567	0.209
Departure Headway (Hd)	5.692	5.44	5.099	5.82
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	629	658	708	614
Service Time	3.742	3.488	3.138	3.873
HCM Lane V/C Ratio	0.307	0.295	0.565	0.21
HCM Control Delay, s/veh	11.2	10.7	14.6	10.4
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	1.3	1.2	3.6	0.8

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	360	1370	946
Demand Flow Rate, veh/h	0	360	1370	955
Vehicles Circulating, veh/h	1169	1130	130	244
Vehicles Exiting, veh/h	30	370	1039	1246
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	13.6	9.0	7.6
Approach LOS	-	B	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.594	0.406	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	214	146	644	726	449	506
Cap Entry Lane, veh/h	461	526	477	543	1262	1262	1137	1137
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.991
Flow Entry, veh/h	0	0	214	146	644	726	445	501
Cap Entry, veh/h	461	526	477	543	1261	1262	1126	1127
V/C Ratio	0.000	0.000	0.448	0.269	0.510	0.575	0.395	0.445
Control Delay, s/veh	7.8	6.8	15.8	10.4	8.3	9.5	7.2	8.0
LOS	A	A	C	B	A	A	A	A
95th %tile Queue, veh	0	0	2	1	3	4	2	2

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	339	607	1152	877
Demand Flow Rate, veh/h	339	607	1152	886
Vehicles Circulating, veh/h	993	1130	408	611
Vehicles Exiting, veh/h	504	430	924	1126
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.3	19.9	12.1	12.6
Approach LOS	B	C	B	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.469	0.531	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	159	180	285	322	541	611	416	470
Cap Entry Lane, veh/h	541	611	477	543	927	1004	769	845
Entry HV Adj Factor	1.002	0.998	1.001	0.999	1.001	0.999	0.991	0.989
Flow Entry, veh/h	159	180	285	322	541	611	412	465
Cap Entry, veh/h	543	609	478	543	928	1003	762	835
V/C Ratio	0.294	0.295	0.597	0.593	0.583	0.609	0.541	0.556
Control Delay, s/veh	10.8	9.8	21.1	18.8	12.1	12.0	12.8	12.4
LOS	B	A	C	C	B	B	B	B
95th %tile Queue, veh	1	1	4	4	4	4	3	3

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	21	0	1280	896	17
Future Vol, veh/h	0	21	0	1280	896	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	23	0	1391	974	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	496	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	525	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	525	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.18	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	525	-	-
HCM Lane V/C Ratio	-	0.044	-	-
HCM Ctrl Dly (s/v)	-	12.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.1	-	-

Intersection	
Intersection Delay, s/veh	10.0
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	201	305	1263	893
Demand Flow Rate, veh/h	206	305	1263	902
Vehicles Circulating, veh/h	931	1268	310	222
Vehicles Exiting, veh/h	193	305	827	1351
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.8	14.1	11.1	7.1
Approach LOS	A	B	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.820	0.180	0.538	0.462	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	169	37	164	141	594	669	424	478
Cap Entry Lane, veh/h	573	644	420	483	1071	1071	1160	1160
Entry HV Adj Factor	0.979	0.973	1.000	1.000	0.999	1.001	0.990	0.991
Flow Entry, veh/h	165	36	164	141	594	669	420	473
Cap Entry, veh/h	561	626	420	483	1070	1072	1149	1149
V/C Ratio	0.295	0.057	0.390	0.292	0.555	0.625	0.365	0.412
Control Delay, s/veh	10.6	6.4	15.9	11.9	10.2	11.9	6.8	7.4
LOS	B	A	C	B	B	B	A	A
95th %tile Queue, veh	1	0	2	1	4	5	2	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	210	37	20	93	13	7	53	51	74	84	13
Future Volume (veh/h)	9	210	37	20	93	13	7	53	51	74	84	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	10	236	42	22	104	15	8	60	57	83	94	15
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	197	404	70	250	371	49	207	200	178	395	228	31
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	28	1398	243	133	1285	169	50	787	702	526	899	121
Grp Volume(v), veh/h	288	0	0	141	0	0	125	0	0	192	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1587	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	1.3	0.0	0.0	1.3	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.03		0.15	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	671	0	0	670	0	0	585	0	0	654	0	0
V/C Ratio(X)	0.43	0.00	0.00	0.21	0.00	0.00	0.21	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	2341	0	0	2198	0	0	2171	0	0	2205	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.0	0.0	0.0	5.4	0.0	0.0	6.0	0.0	0.0	6.2	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.4	0.0	0.0	5.6	0.0	0.0	6.1	0.0	0.0	6.4	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		288			141			125			192	
Approach Delay, s/veh		6.4			5.6			6.1			6.4	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	9.5	10.2	9.5	10.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	25.5	25.5	25.5
Max Q Clear Time (g_c+I1), s	3.3	4.9	4.0	3.3
Green Ext Time (p_c), s	0.5	1.4	0.9	0.6

Intersection Summary	
HCM 7th Control Delay, s/veh	6.2
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	6.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	269	813	862
Demand Flow Rate, veh/h	0	272	829	871
Vehicles Circulating, veh/h	1035	664	167	185
Vehicles Exiting, veh/h	21	332	868	751
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	6.9	6.3	6.6
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	164	108	390	439	409	462
Cap Entry Lane, veh/h	521	589	733	808	1220	1220	1200	1200
Entry HV Adj Factor	1.000	1.000	0.988	0.991	0.980	0.982	0.991	0.989
Flow Entry, veh/h	0	0	162	107	382	431	405	457
Cap Entry, veh/h	521	589	724	800	1196	1198	1189	1187
V/C Ratio	0.000	0.000	0.224	0.134	0.320	0.360	0.341	0.385
Control Delay, s/veh	6.9	6.1	7.5	5.9	6.0	6.5	6.3	6.8
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	0	1	2	2	2

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	694	349	816	955
Demand Flow Rate, veh/h	708	360	840	964
Vehicles Circulating, veh/h	1022	858	851	318
Vehicles Exiting, veh/h	260	833	879	900
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	20.2	9.3	18.5	8.7
Approach LOS	C	A	C	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.469	0.531	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	333	375	169	191	395	445	453	511
Cap Entry Lane, veh/h	527	596	613	685	617	689	1007	1084
Entry HV Adj Factor	0.980	0.981	0.972	0.969	0.970	0.971	0.990	0.990
Flow Entry, veh/h	326	368	164	185	383	432	449	506
Cap Entry, veh/h	516	584	596	664	599	669	998	1073
V/C Ratio	0.632	0.630	0.276	0.279	0.640	0.646	0.450	0.472
Control Delay, s/veh	21.3	19.2	9.7	8.9	19.3	17.9	8.8	8.7
LOS	C	C	A	A	C	C	A	A
95th %tile Queue, veh	4	4	1	1	5	5	2	3

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	25	0	856	922	9
Future Vol, veh/h	0	25	0	856	922	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	28	0	962	1036	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	523	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	504	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	504	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.57	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	504	-	-
HCM Lane V/C Ratio	-	0.056	-	-
HCM Ctrl Dly (s/v)	-	12.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	280	272	1033	1230
Demand Flow Rate, veh/h	288	280	1043	1242
Vehicles Circulating, veh/h	1255	1099	430	171
Vehicles Exiting, veh/h	158	374	1113	1208
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	18.7	11.1	11.0	8.7
Approach LOS	C	B	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.795	0.205	0.525	0.475	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	229	59	147	133	490	553	584	658
Cap Entry Lane, veh/h	426	489	491	558	960	960	1215	1215
Entry HV Adj Factor	0.972	0.966	0.974	0.970	0.991	0.990	0.990	0.991
Flow Entry, veh/h	223	57	143	129	486	548	578	652
Cap Entry, veh/h	414	472	478	541	952	951	1203	1204
V/C Ratio	0.538	0.121	0.299	0.238	0.510	0.576	0.480	0.541
Control Delay, s/veh	21.1	9.3	12.2	9.9	10.2	11.7	8.1	9.2
LOS	C	A	B	A	B	B	A	A
95th %tile Queue, veh	3	0	1	1	3	4	3	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	160	17	34	295	56	54	109	22	35	75	15
Future Volume (veh/h)	10	160	17	34	295	56	54	109	22	35	75	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	12	186	20	40	343	65	63	127	26	41	87	17
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	168	587	61	190	530	95	270	255	46	259	270	45
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	33	1484	153	76	1341	241	340	1075	194	298	1139	191
Grp Volume(v), veh/h	218	0	0	448	0	0	216	0	0	145	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1658	0	0	1608	0	0	1628	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.2	0.0	0.0	5.4	0.0	0.0	2.8	0.0	0.0	1.7	0.0	0.0
Prop In Lane	0.06		0.09	0.09		0.15	0.29		0.12	0.28		0.12
Lane Grp Cap(c), veh/h	815	0	0	816	0	0	571	0	0	574	0	0
V/C Ratio(X)	0.27	0.00	0.00	0.55	0.00	0.00	0.38	0.00	0.00	0.25	0.00	0.00
Avail Cap(c_a), veh/h	1867	0	0	1866	0	0	1828	0	0	1817	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.1	0.0	0.0	6.1	0.0	0.0	8.2	0.0	0.0	7.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.3	0.0	0.0	6.7	0.0	0.0	8.6	0.0	0.0	8.0	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		218			448			216			145	
Approach Delay, s/veh		5.3			6.7			8.6			8.0	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.3		14.2		10.3		14.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		4.8		4.2		3.7		7.4				
Green Ext Time (p_c), s		1.0		1.0		0.7		2.4				

Intersection Summary												
HCM 7th Control Delay, s/veh			7.0									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	11.0
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	402	1531	1057
Demand Flow Rate, veh/h	0	402	1531	1067
Vehicles Circulating, veh/h	1306	1262	145	272
Vehicles Exiting, veh/h	33	414	1161	1392
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	18.2	10.6	8.7
Approach LOS	-	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.595	0.405	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	239	163	720	811	501	566
Cap Entry Lane, veh/h	406	468	423	486	1245	1245	1109	1109
Entry HV Adj Factor	1.000	1.000	1.000	1.000	0.999	1.001	0.991	0.990
Flow Entry, veh/h	0	0	239	163	720	811	497	560
Cap Entry, veh/h	406	468	423	486	1244	1245	1099	1097
V/C Ratio	0.000	0.000	0.565	0.336	0.579	0.652	0.452	0.511
Control Delay, s/veh	8.9	7.7	21.8	12.8	9.7	11.4	8.2	9.2
LOS	A	A	C	B	A	B	A	A
95th %tile Queue, veh	0	0	3	1	4	5	2	3

Intersection	
Intersection Delay, s/veh	18.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	379	680	1287	980
Demand Flow Rate, veh/h	379	680	1287	990
Vehicles Circulating, veh/h	1110	1262	455	683
Vehicles Exiting, veh/h	563	480	1034	1259
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.7	31.8	15.7	16.6
Approach LOS	B	D	C	C

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	178	201	320	360	605	682	465	525
Cap Entry Lane, veh/h	486	553	423	486	888	965	720	795
Entry HV Adj Factor	1.001	0.999	0.999	1.001	1.000	1.000	0.991	0.989
Flow Entry, veh/h	178	201	320	360	605	682	461	519
Cap Entry, veh/h	487	552	422	486	888	965	713	786
V/C Ratio	0.366	0.364	0.757	0.741	0.681	0.707	0.646	0.661
Control Delay, s/veh	13.4	12.0	34.4	29.4	15.7	15.7	17.0	16.3
LOS	B	B	D	D	C	C	C	C
95th %tile Queue, veh	2	2	6	6	6	6	5	5

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	23	0	1430	1001	19
Future Vol, veh/h	0	23	0	1430	1001	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	25	0	1554	1088	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	554	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	481	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	481	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	481	-	-
HCM Lane V/C Ratio	-	0.052	-	-
HCM Ctrl Dly (s/v)	-	12.9	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	224	341	1411	997
Demand Flow Rate, veh/h	229	341	1411	1007
Vehicles Circulating, veh/h	1040	1417	347	248
Vehicles Exiting, veh/h	215	341	922	1510
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.8	18.7	14.2	8.0
Approach LOS	B	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.821	0.179	0.537	0.463	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	188	41	183	158	663	748	473	534
Cap Entry Lane, veh/h	519	587	367	426	1036	1036	1133	1133
Entry HV Adj Factor	0.980	0.976	1.000	1.000	1.000	1.000	0.990	0.989
Flow Entry, veh/h	184	40	183	158	663	748	468	528
Cap Entry, veh/h	508	572	367	426	1036	1035	1122	1121
V/C Ratio	0.363	0.070	0.499	0.371	0.640	0.722	0.417	0.471
Control Delay, s/veh	12.9	7.1	21.7	15.2	12.6	15.6	7.6	8.4
LOS	B	A	C	C	B	C	A	A
95th %tile Queue, veh	2	0	3	2	5	7	2	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	211	37	21	97	14	7	53	51	74	84	13
Future Volume (veh/h)	9	211	37	21	97	14	7	53	51	74	84	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	10	237	42	24	109	16	8	60	57	83	94	15
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	197	407	71	252	371	49	207	199	178	395	228	31
Arrive On Green	0.29	0.29	0.29	0.29	0.29	0.29	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	27	1399	243	139	1275	170	50	787	702	526	899	121
Grp Volume(v), veh/h	289	0	0	149	0	0	125	0	0	192	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1584	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	1.4	0.0	0.0	1.3	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.03		0.15	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	674	0	0	672	0	0	584	0	0	653	0	0
V/C Ratio(X)	0.43	0.00	0.00	0.22	0.00	0.00	0.21	0.00	0.00	0.29	0.00	0.00
Avail Cap(c_a), veh/h	2335	0	0	2189	0	0	2166	0	0	2200	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.0	0.0	0.0	5.5	0.0	0.0	6.0	0.0	0.0	6.2	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.4	0.0	0.0	5.6	0.0	0.0	6.2	0.0	0.0	6.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		289			149			125			192	
Approach Delay, s/veh		6.4			5.6			6.2			6.5	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	9.5	10.2	9.5	10.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	25.5	25.5	25.5
Max Q Clear Time (g_c+I1), s	3.3	4.9	4.0	3.4
Green Ext Time (p_c), s	0.5	1.4	0.9	0.7

Intersection Summary	
HCM 7th Control Delay, s/veh	6.2
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	6.6
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	270	831	902
Demand Flow Rate, veh/h	0	273	847	911
Vehicles Circulating, veh/h	1076	679	167	186
Vehicles Exiting, veh/h	21	335	909	766
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	7.0	6.4	6.8
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.604	0.396	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	165	108	398	449	428	483
Cap Entry Lane, veh/h	502	569	723	797	1220	1220	1199	1199
Entry HV Adj Factor	1.000	1.000	0.988	0.991	0.981	0.981	0.990	0.989
Flow Entry, veh/h	0	0	163	107	391	440	424	478
Cap Entry, veh/h	502	569	714	790	1197	1197	1187	1186
V/C Ratio	0.000	0.000	0.228	0.135	0.326	0.368	0.357	0.403
Control Delay, s/veh	7.2	6.3	7.7	5.9	6.1	6.6	6.5	7.1
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	0	1	2	2	2

Intersection	
Intersection Delay, s/veh	15.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	751	356	823	962
Demand Flow Rate, veh/h	766	367	847	971
Vehicles Circulating, veh/h	1022	884	889	332
Vehicles Exiting, veh/h	281	852	899	919
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	22.8	9.7	20.3	8.9
Approach LOS	C	A	C	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.469	0.531	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	360	406	172	195	398	449	456	515
Cap Entry Lane, veh/h	527	596	599	670	596	667	995	1071
Entry HV Adj Factor	0.980	0.980	0.973	0.968	0.971	0.971	0.991	0.990
Flow Entry, veh/h	353	398	167	189	387	436	452	510
Cap Entry, veh/h	517	584	583	648	579	648	986	1060
V/C Ratio	0.683	0.682	0.287	0.291	0.668	0.673	0.458	0.481
Control Delay, s/veh	24.1	21.7	10.1	9.3	21.2	19.6	9.0	8.9
LOS	C	C	B	A	C	C	A	A
95th %tile Queue, veh	5	5	1	1	5	5	2	3

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	25	0	862	939	9
Future Vol, veh/h	0	25	0	862	939	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	28	0	969	1055	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	533	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	497	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	497	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.68	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	497	-	-
HCM Lane V/C Ratio	-	0.057	-	-
HCM Ctrl Dly (s/v)	-	12.7	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	280	273	1039	1250
Demand Flow Rate, veh/h	288	281	1049	1262
Vehicles Circulating, veh/h	1275	1105	433	171
Vehicles Exiting, veh/h	158	377	1130	1215
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	19.3	11.2	11.1	8.8
Approach LOS	C	B	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.795	0.205	0.523	0.477	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	229	59	147	134	493	556	593	669
Cap Entry Lane, veh/h	418	480	488	555	958	958	1215	1215
Entry HV Adj Factor	0.972	0.966	0.974	0.970	0.991	0.991	0.990	0.990
Flow Entry, veh/h	223	57	143	130	488	551	587	662
Cap Entry, veh/h	406	464	476	538	949	948	1204	1203
V/C Ratio	0.548	0.123	0.301	0.241	0.515	0.581	0.488	0.550
Control Delay, s/veh	21.8	9.5	12.3	10.0	10.3	11.8	8.2	9.3
LOS	C	A	B	B	B	B	A	A
95th %tile Queue, veh	3	0	1	1	3	4	3	3

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	477	1	9	178	4	26
Future Vol, veh/h	477	1	9	178	4	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	536	1	10	200	4	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	537	0	757	537
Stage 1	-	-	-	-	537	-
Stage 2	-	-	-	-	220	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1031	-	376	544
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	816	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1031	-	371	544
Mov Cap-2 Maneuver	-	-	-	-	371	-
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	807	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.41	12.52
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	512	-	-	87	-
HCM Lane V/C Ratio	0.066	-	-	0.01	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

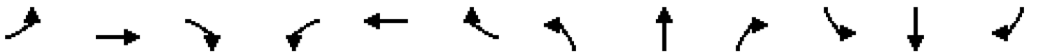
Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	502	1	9	185	2	26
Future Vol, veh/h	502	1	9	185	2	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	564	1	10	208	2	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	565	0	793	565
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	228	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1007	-	358	525
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	810	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1007	-	354	525
Mov Cap-2 Maneuver	-	-	-	-	354	-
Stage 1	-	-	-	-	569	-
Stage 2	-	-	-	-	801	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.4	12.57
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	507	-	-	84	-
HCM Lane V/C Ratio	0.062	-	-	0.01	-
HCM Ctrl Dly (s/v)	12.6	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	165	17	34	298	57	54	109	23	36	75	15
Future Volume (veh/h)	10	165	17	34	298	57	54	109	23	36	75	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	12	192	20	40	347	66	63	127	27	42	87	17
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	167	593	59	189	534	96	268	254	47	260	269	45
Arrive On Green	0.40	0.40	0.40	0.40	0.40	0.40	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	32	1490	149	75	1341	241	338	1070	200	304	1134	189
Grp Volume(v), veh/h	224	0	0	453	0	0	217	0	0	146	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1658	0	0	1608	0	0	1627	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.8	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.3	0.0	0.0	5.5	0.0	0.0	2.8	0.0	0.0	1.8	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.12	0.29		0.12
Lane Grp Cap(c), veh/h	819	0	0	819	0	0	569	0	0	574	0	0
V/C Ratio(X)	0.27	0.00	0.00	0.55	0.00	0.00	0.38	0.00	0.00	0.25	0.00	0.00
Avail Cap(c_a), veh/h	1855	0	0	1852	0	0	1814	0	0	1802	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.1	0.0	0.0	6.1	0.0	0.0	8.2	0.0	0.0	7.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.3	0.0	0.0	6.7	0.0	0.0	8.7	0.0	0.0	8.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		224			453			217			146	
Approach Delay, s/veh		5.3			6.7			8.7			8.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.3		14.3		10.3		14.3				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		4.8		4.3		3.8		7.5				
Green Ext Time (p_c), s		1.0		1.1		0.7		2.4				

Intersection Summary												
HCM 7th Control Delay, s/veh			7.0									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	11.2
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	406	1544	1075
Demand Flow Rate, veh/h	0	406	1544	1085
Vehicles Circulating, veh/h	1328	1273	145	276
Vehicles Exiting, veh/h	33	416	1183	1403
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	18.8	10.7	8.9
Approach LOS	-	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.599	0.401	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	243	163	726	818	510	575
Cap Entry Lane, veh/h	398	459	419	481	1245	1245	1105	1105
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.991
Flow Entry, veh/h	0	0	243	163	726	818	505	570
Cap Entry, veh/h	398	459	419	481	1244	1245	1094	1094
V/C Ratio	0.000	0.000	0.581	0.339	0.583	0.657	0.462	0.521
Control Delay, s/veh	9.0	7.8	22.7	13.0	9.8	11.5	8.4	9.4
LOS	A	A	C	B	A	B	A	A
95th %tile Queue, veh	0	0	4	1	4	5	2	3

Intersection	
Intersection Delay, s/veh	21.8
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	418	713	1307	1000
Demand Flow Rate, veh/h	418	713	1307	1010
Vehicles Circulating, veh/h	1110	1295	481	736
Vehicles Exiting, veh/h	636	493	1047	1272
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	13.5	38.6	17.2	19.3
Approach LOS	B	E	C	C

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.469	0.531	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	196	222	335	378	614	693	475	535
Cap Entry Lane, veh/h	486	553	410	472	867	943	686	760
Entry HV Adj Factor	1.002	0.998	1.000	1.000	1.000	1.000	0.990	0.991
Flow Entry, veh/h	196	222	335	378	614	693	470	530
Cap Entry, veh/h	487	552	410	472	868	943	679	753
V/C Ratio	0.403	0.402	0.817	0.800	0.708	0.735	0.693	0.704
Control Delay, s/veh	14.3	12.8	41.8	35.7	17.1	17.3	19.8	18.9
LOS	B	B	E	E	C	C	C	C
95th %tile Queue, veh	2	2	7	7	6	7	6	6

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	23	0	1449	1013	19
Future Vol, veh/h	0	23	0	1449	1013	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	25	0	1575	1101	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	561	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	476	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	476	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.98	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	476	-	-
HCM Lane V/C Ratio	-	0.052	-	-
HCM Ctrl Dly (s/v)	-	13	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.7
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	224	344	1427	1010
Demand Flow Rate, veh/h	229	344	1427	1021
Vehicles Circulating, veh/h	1054	1433	349	248
Vehicles Exiting, veh/h	215	343	934	1529
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.1	19.2	14.5	8.1
Approach LOS	B	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.821	0.179	0.532	0.468	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	188	41	183	161	671	756	480	541
Cap Entry Lane, veh/h	512	580	361	420	1034	1034	1133	1133
Entry HV Adj Factor	0.980	0.976	1.000	1.000	1.000	1.000	0.989	0.990
Flow Entry, veh/h	184	40	183	161	671	756	475	536
Cap Entry, veh/h	502	566	361	420	1033	1034	1121	1122
V/C Ratio	0.367	0.071	0.507	0.383	0.649	0.731	0.424	0.477
Control Delay, s/veh	13.1	7.2	22.3	15.7	12.9	16.0	7.7	8.5
LOS	B	A	C	C	B	C	A	A
95th %tile Queue, veh	2	0	3	2	5	7	2	3

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	287	4	28	455	3	17
Future Vol, veh/h	287	4	28	455	3	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	322	4	31	511	3	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	327	0	899	325
Stage 1	-	-	-	-	325	-
Stage 2	-	-	-	-	574	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1233	-	310	716
Stage 1	-	-	-	-	732	-
Stage 2	-	-	-	-	563	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1233	-	298	716
Mov Cap-2 Maneuver	-	-	-	-	298	-
Stage 1	-	-	-	-	732	-
Stage 2	-	-	-	-	543	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.46	11.32
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	592	-	-	104	-
HCM Lane V/C Ratio	0.038	-	-	0.026	-
HCM Ctrl Dly (s/v)	11.3	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

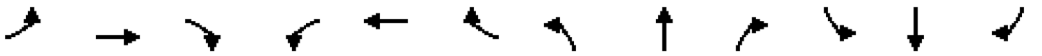
Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	302	2	28	482	1	17
Future Vol, veh/h	302	2	28	482	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	339	2	31	542	1	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	342	0	945	340
Stage 1	-	-	-	-	340	-
Stage 2	-	-	-	-	604	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1217	-	291	702
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	545	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1217	-	280	702
Mov Cap-2 Maneuver	-	-	-	-	280	-
Stage 1	-	-	-	-	721	-
Stage 2	-	-	-	-	525	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.44	10.74
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	648	-	-	99	-
HCM Lane V/C Ratio	0.031	-	-	0.026	-
HCM Ctrl Dly (s/v)	10.7	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	227	40	23	104	15	7	57	55	79	90	14
Future Volume (veh/h)	10	227	40	23	104	15	7	57	55	79	90	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	255	45	26	117	17	8	64	62	89	101	16
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	190	430	74	245	392	52	197	199	181	386	228	31
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	27	1401	242	135	1278	168	45	781	711	529	897	120
Grp Volume(v), veh/h	311	0	0	160	0	0	134	0	0	206	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1582	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	3.2	0.0	0.0	1.5	0.0	0.0	1.4	0.0	0.0	2.2	0.0	0.0
Prop In Lane	0.04		0.14	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	694	0	0	689	0	0	577	0	0	645	0	0
V/C Ratio(X)	0.45	0.00	0.00	0.23	0.00	0.00	0.23	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	2245	0	0	2100	0	0	2083	0	0	2111	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.1	0.0	0.0	5.5	0.0	0.0	6.2	0.0	0.0	6.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.5	0.0	0.0	5.6	0.0	0.0	6.4	0.0	0.0	6.8	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		311			160			134			206	
Approach Delay, s/veh		6.5			5.6			6.4			6.8	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.7		10.8		9.7		10.8				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.4		5.2		4.2		3.5				
Green Ext Time (p_c), s		0.6		1.5		1.0		0.8				

Intersection Summary												
HCM 7th Control Delay, s/veh			6.4									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	291	895	972
Demand Flow Rate, veh/h	0	294	913	982
Vehicles Circulating, veh/h	1160	731	180	201
Vehicles Exiting, veh/h	23	362	980	824
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	7.6	6.8	7.3
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.605	0.395	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	178	116	429	484	462	520
Cap Entry Lane, veh/h	464	530	689	763	1206	1206	1183	1183
Entry HV Adj Factor	1.000	1.000	0.989	0.991	0.981	0.980	0.989	0.991
Flow Entry, veh/h	0	0	176	115	421	474	457	515
Cap Entry, veh/h	464	530	681	756	1182	1182	1170	1172
V/C Ratio	0.000	0.000	0.258	0.152	0.356	0.401	0.391	0.440
Control Delay, s/veh	7.8	6.8	8.4	6.4	6.5	7.1	7.0	7.7
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	1	2	2	2	2

Intersection	
Intersection Delay, s/veh	20.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	804	384	887	1037
Demand Flow Rate, veh/h	820	395	914	1048
Vehicles Circulating, veh/h	1104	952	956	359
Vehicles Exiting, veh/h	303	918	968	988
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	32.0	10.9	27.7	10.0
Approach LOS	D	B	D	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	385	435	186	209	430	484	493	555
Cap Entry Lane, veh/h	489	556	562	632	560	630	970	1047
Entry HV Adj Factor	0.982	0.980	0.970	0.973	0.970	0.972	0.989	0.990
Flow Entry, veh/h	378	426	180	203	417	470	487	550
Cap Entry, veh/h	480	544	545	615	543	612	959	1037
V/C Ratio	0.787	0.783	0.331	0.331	0.768	0.768	0.508	0.530
Control Delay, s/veh	33.9	30.4	11.5	10.4	29.0	26.5	10.1	10.0
LOS	D	D	B	B	D	D	B	A
95th %tile Queue, veh	7	7	1	1	7	7	3	3

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	26	0	928	1010	10
Future Vol, veh/h	0	26	0	928	1010	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	29	0	1043	1135	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	573	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	468	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	468	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.21	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	468	-	-
HCM Lane V/C Ratio	-	0.062	-	-
HCM Ctrl Dly (s/v)	-	13.2	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	12.8
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	304	293	1119	1344
Demand Flow Rate, veh/h	313	302	1130	1357
Vehicles Circulating, veh/h	1372	1193	469	185
Vehicles Exiting, veh/h	170	406	1216	1310
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	25.6	12.9	13.0	9.8
Approach LOS	D	B	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.796	0.204	0.523	0.477	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	249	64	158	144	531	599	638	719
Cap Entry Lane, veh/h	382	442	450	515	927	927	1200	1200
Entry HV Adj Factor	0.970	0.969	0.969	0.972	0.991	0.990	0.990	0.991
Flow Entry, veh/h	242	62	153	140	526	593	632	712
Cap Entry, veh/h	371	429	437	501	918	918	1188	1189
V/C Ratio	0.652	0.145	0.351	0.280	0.573	0.646	0.532	0.599
Control Delay, s/veh	29.4	10.5	14.4	11.4	11.9	14.0	9.1	10.4
LOS	D	B	B	B	B	B	A	B
95th %tile Queue, veh	4	1	2	1	4	5	3	4

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	514	1	9	192	4	26
Future Vol, veh/h	514	1	9	192	4	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	578	1	10	216	4	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	579	0	814	578
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	236	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	995	-	347	515
Stage 1	-	-	-	-	561	-
Stage 2	-	-	-	-	803	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	995	-	343	515
Mov Cap-2 Maneuver	-	-	-	-	343	-
Stage 1	-	-	-	-	561	-
Stage 2	-	-	-	-	794	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.39	13.01
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	483	-	-	81	-
HCM Lane V/C Ratio	0.07	-	-	0.01	-
HCM Ctrl Dly (s/v)	13	-	-	8.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

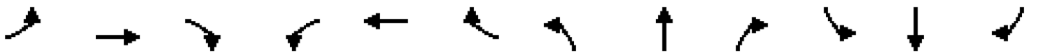
Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	539	1	9	199	2	26
Future Vol, veh/h	539	1	9	199	2	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	606	1	10	224	2	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	607	0	850	606
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	244	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	971	-	331	497
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	797	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	971	-	327	497
Mov Cap-2 Maneuver	-	-	-	-	327	-
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	787	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.38	13.04
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	479	-	-	78	-
HCM Lane V/C Ratio	0.066	-	-	0.01	-
HCM Ctrl Dly (s/v)	13	-	-	8.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	177	18	36	321	61	58	118	25	38	81	16
Future Volume (veh/h)	11	177	18	36	321	61	58	118	25	38	81	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	13	206	21	42	373	71	67	137	29	44	94	19
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	158	617	60	180	555	100	258	261	49	247	276	48
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	32	1492	146	73	1342	242	333	1075	200	293	1140	197
Grp Volume(v), veh/h	240	0	0	486	0	0	233	0	0	157	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1657	0	0	1608	0	0	1630	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.5	0.0	0.0	6.2	0.0	0.0	3.2	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.12	0.28		0.12
Lane Grp Cap(c), veh/h	836	0	0	835	0	0	567	0	0	571	0	0
V/C Ratio(X)	0.29	0.00	0.00	0.58	0.00	0.00	0.41	0.00	0.00	0.27	0.00	0.00
Avail Cap(c_a), veh/h	1747	0	0	1746	0	0	1709	0	0	1698	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.2	0.0	0.0	6.3	0.0	0.0	8.7	0.0	0.0	8.3	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.4	0.0	0.0	7.0	0.0	0.0	9.2	0.0	0.0	8.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		240			486			233			157	
Approach Delay, s/veh		5.4			7.0			9.2			8.5	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.8		15.3		10.8		15.3				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.2		4.5		4.0		8.2				
Green Ext Time (p_c), s		1.1		1.1		0.7		2.6				

Intersection Summary												
HCM 7th Control Delay, s/veh			7.3									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	13.1
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	437	1661	1155
Demand Flow Rate, veh/h	0	437	1661	1167
Vehicles Circulating, veh/h	1428	1370	156	297
Vehicles Exiting, veh/h	36	447	1272	1510
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	24.5	12.3	10.0
Approach LOS	-	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.597	0.403	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	261	176	781	880	548	619
Cap Entry Lane, veh/h	363	422	383	443	1232	1232	1084	1084
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.991	0.989
Flow Entry, veh/h	0	0	261	176	781	880	543	612
Cap Entry, veh/h	363	422	383	443	1232	1233	1074	1072
V/C Ratio	0.000	0.000	0.682	0.397	0.634	0.714	0.506	0.571
Control Delay, s/veh	9.9	8.5	30.7	15.4	11.0	13.4	9.3	10.6
LOS	A	A	D	C	B	B	A	B
95th %tile Queue, veh	0	0	5	2	5	7	3	4

Intersection	
Intersection Delay, s/veh	31.1
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	446	764	1406	1075
Demand Flow Rate, veh/h	446	764	1406	1086
Vehicles Circulating, veh/h	1195	1391	515	788
Vehicles Exiting, veh/h	679	530	1126	1367
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	16.1	63.5	22.3	25.7
Approach LOS	C	F	C	D

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	210	236	359	405	661	745	510	576
Cap Entry Lane, veh/h	450	514	375	435	841	917	654	727
Entry HV Adj Factor	0.998	1.002	1.000	1.000	1.000	1.000	0.991	0.990
Flow Entry, veh/h	210	236	359	405	661	745	505	570
Cap Entry, veh/h	449	515	376	435	840	917	648	719
V/C Ratio	0.467	0.459	0.956	0.930	0.786	0.813	0.780	0.793
Control Delay, s/veh	17.2	15.1	69.5	58.2	22.0	22.5	26.3	25.3
LOS	C	C	F	F	C	C	D	D
95th %tile Queue, veh	2	2	11	11	8	9	7	8

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	25	0	1559	1090	20
Future Vol, veh/h	0	25	0	1559	1090	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	27	0	1695	1185	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	603	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	447	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	447	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.58	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	447	-	-
HCM Lane V/C Ratio	-	0.061	-	-
HCM Ctrl Dly (s/v)	-	13.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	15.5
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	242	371	1535	1086
Demand Flow Rate, veh/h	247	371	1535	1097
Vehicles Circulating, veh/h	1132	1541	375	267
Vehicles Exiting, veh/h	232	369	1004	1645
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.1	24.7	18.2	8.9
Approach LOS	B	C	C	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.822	0.178	0.534	0.466	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	203	44	198	173	721	814	516	581
Cap Entry Lane, veh/h	476	542	327	383	1009	1009	1114	1114
Entry HV Adj Factor	0.982	0.977	1.000	1.000	1.001	0.999	0.989	0.991
Flow Entry, veh/h	199	43	198	173	721	814	510	576
Cap Entry, veh/h	468	530	327	383	1010	1009	1102	1103
V/C Ratio	0.426	0.081	0.605	0.452	0.714	0.806	0.463	0.522
Control Delay, s/veh	15.4	7.8	29.6	19.2	15.5	20.5	8.4	9.4
LOS	C	A	D	C	C	C	A	A
95th %tile Queue, veh	2	0	4	2	6	9	3	3

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	309	4	28	489	3	17
Future Vol, veh/h	309	4	28	489	3	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	347	4	31	549	3	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	352	0	962	349
Stage 1	-	-	-	-	349	-
Stage 2	-	-	-	-	612	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1207	-	284	694
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	541	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1207	-	273	694
Mov Cap-2 Maneuver	-	-	-	-	273	-
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	521	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.44	11.65
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	564	-	-	97	-
HCM Lane V/C Ratio	0.04	-	-	0.026	-
HCM Ctrl Dly (s/v)	11.7	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	324	2	28	516	1	17
Future Vol, veh/h	324	2	28	516	1	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	364	2	31	580	1	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	366	0	1008	365
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	643	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1192	-	267	680
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	524	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1192	-	256	680
Mov Cap-2 Maneuver	-	-	-	-	256	-
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	503	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.42	10.98
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	623	-	-	93	-
HCM Lane V/C Ratio	0.032	-	-	0.026	-
HCM Ctrl Dly (s/v)	11	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	228	40	23	106	16	7	57	55	79	90	14
Future Volume (veh/h)	10	228	40	23	106	16	7	57	55	79	90	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	256	45	26	119	18	8	64	62	89	101	16
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	190	431	74	244	392	54	197	199	181	385	228	31
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	27	1402	241	132	1274	175	45	781	712	529	897	120
Grp Volume(v), veh/h	312	0	0	163	0	0	134	0	0	206	0	0
Grp Sat Flow(s),veh/h/ln	1669	0	0	1582	0	0	1538	0	0	1546	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear(g_c), s	3.2	0.0	0.0	1.6	0.0	0.0	1.4	0.0	0.0	2.2	0.0	0.0
Prop In Lane	0.04		0.14	0.16		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	695	0	0	690	0	0	577	0	0	644	0	0
V/C Ratio(X)	0.45	0.00	0.00	0.24	0.00	0.00	0.23	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	2242	0	0	2097	0	0	2079	0	0	2107	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.0	0.0	0.0	5.5	0.0	0.0	6.3	0.0	0.0	6.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.5	0.0	0.0	5.6	0.0	0.0	6.5	0.0	0.0	6.8	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		312			163			134			206	
Approach Delay, s/veh		6.5			5.6			6.5			6.8	
Approach LOS		A			A			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		9.7		10.8		9.7		10.8				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.4		5.2		4.2		3.6				
Green Ext Time (p_c), s		0.6		1.5		1.0		0.8				
Intersection Summary												
HCM 7th Control Delay, s/veh			6.4									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	291	903	974
Demand Flow Rate, veh/h	0	294	921	984
Vehicles Circulating, veh/h	1162	738	180	201
Vehicles Exiting, veh/h	23	363	982	831
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	7.7	6.8	7.4
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.605	0.395	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	178	116	433	488	462	522
Cap Entry Lane, veh/h	464	529	685	758	1206	1206	1183	1183
Entry HV Adj Factor	1.000	1.000	0.989	0.991	0.980	0.981	0.991	0.989
Flow Entry, veh/h	0	0	176	115	424	479	458	516
Cap Entry, veh/h	464	529	677	752	1182	1182	1172	1170
V/C Ratio	0.000	0.000	0.260	0.153	0.359	0.405	0.391	0.441
Control Delay, s/veh	7.8	6.8	8.5	6.4	6.5	7.1	7.0	7.7
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	1	2	2	2	2

Intersection	
Intersection Delay, s/veh	22.4
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	834	388	890	1040
Demand Flow Rate, veh/h	851	399	917	1051
Vehicles Circulating, veh/h	1104	966	977	366
Vehicles Exiting, veh/h	313	928	978	999
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	35.1	11.1	29.6	10.2
Approach LOS	E	B	D	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	400	451	188	211	431	486	494	557
Cap Entry Lane, veh/h	489	556	555	625	550	619	964	1040
Entry HV Adj Factor	0.980	0.980	0.969	0.974	0.971	0.971	0.990	0.990
Flow Entry, veh/h	392	442	182	206	418	472	489	551
Cap Entry, veh/h	479	544	538	608	533	601	954	1030
V/C Ratio	0.818	0.812	0.339	0.338	0.784	0.785	0.512	0.535
Control Delay, s/veh	37.3	33.2	11.8	10.6	31.0	28.3	10.2	10.1
LOS	E	D	B	B	D	D	B	B
95th %tile Queue, veh	8	8	1	1	7	7	3	3

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	26	0	931	1019	10
Future Vol, veh/h	0	26	0	931	1019	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	29	0	1046	1145	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	578	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	464	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	464	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.28	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	464	-	-
HCM Lane V/C Ratio	-	0.063	-	-
HCM Ctrl Dly (s/v)	-	13.3	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	13.0
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	304	293	1122	1354
Demand Flow Rate, veh/h	313	302	1133	1367
Vehicles Circulating, veh/h	1382	1196	471	185
Vehicles Exiting, veh/h	170	408	1224	1313
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	26.1	13.0	13.1	9.9
Approach LOS	D	B	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.796	0.204	0.523	0.477	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	249	64	158	144	533	600	642	725
Cap Entry Lane, veh/h	379	439	449	514	925	925	1200	1200
Entry HV Adj Factor	0.970	0.969	0.969	0.972	0.990	0.991	0.991	0.990
Flow Entry, veh/h	242	62	153	140	528	595	636	717
Cap Entry, veh/h	367	425	435	499	916	917	1189	1188
V/C Ratio	0.658	0.146	0.352	0.280	0.576	0.649	0.535	0.604
Control Delay, s/veh	30.1	10.6	14.4	11.4	12.0	14.1	9.1	10.6
LOS	D	B	B	B	B	B	A	B
95th %tile Queue, veh	4	1	2	1	4	5	3	4

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	514	1	9	193	5	26
Future Vol, veh/h	514	1	9	193	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	578	1	10	217	6	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	579	0	815	578
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	237	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	995	-	347	515
Stage 1	-	-	-	-	561	-
Stage 2	-	-	-	-	802	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	995	-	343	515
Mov Cap-2 Maneuver	-	-	-	-	343	-
Stage 1	-	-	-	-	561	-
Stage 2	-	-	-	-	793	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.39	13.14
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	477	-	-	80	-
HCM Lane V/C Ratio	0.073	-	-	0.01	-
HCM Ctrl Dly (s/v)	13.1	-	-	8.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

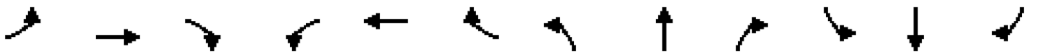
Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	539	1	18	199	3	53
Future Vol, veh/h	539	1	18	199	3	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	606	1	20	224	3	60

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	607	0	870	606
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	264	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	971	-	322	497
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	780	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	971	-	314	497
Mov Cap-2 Maneuver	-	-	-	-	314	-
Stage 1	-	-	-	-	544	-
Stage 2	-	-	-	-	762	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.73	13.59
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	482	-	-	149	-
HCM Lane V/C Ratio	0.131	-	-	0.021	-
HCM Ctrl Dly (s/v)	13.6	-	-	8.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	179	18	36	322	61	58	118	25	39	81	16
Future Volume (veh/h)	11	179	18	36	322	61	58	118	25	39	81	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	13	208	21	42	374	71	67	137	29	45	94	19
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	158	619	60	179	556	100	258	261	49	249	275	47
Arrive On Green	0.41	0.41	0.41	0.41	0.41	0.41	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	32	1494	145	73	1342	242	333	1076	200	299	1134	196
Grp Volume(v), veh/h	242	0	0	487	0	0	233	0	0	158	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1657	0	0	1609	0	0	1629	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.6	0.0	0.0	6.3	0.0	0.0	3.3	0.0	0.0	2.0	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.12	0.28		0.12
Lane Grp Cap(c), veh/h	837	0	0	835	0	0	567	0	0	571	0	0
V/C Ratio(X)	0.29	0.00	0.00	0.58	0.00	0.00	0.41	0.00	0.00	0.28	0.00	0.00
Avail Cap(c_a), veh/h	1746	0	0	1744	0	0	1707	0	0	1694	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.2	0.0	0.0	6.3	0.0	0.0	8.7	0.0	0.0	8.3	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.6	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.4	0.0	0.0	7.0	0.0	0.0	9.2	0.0	0.0	8.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		242			487			233			158	
Approach Delay, s/veh		5.4			7.0			9.2			8.5	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.8		15.4		10.8		15.4				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.3		4.6		4.0		8.3				
Green Ext Time (p_c), s		1.1		1.2		0.7		2.6				

Intersection Summary	
HCM 7th Control Delay, s/veh	7.3
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	13.3
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	439	1668	1164
Demand Flow Rate, veh/h	0	439	1668	1176
Vehicles Circulating, veh/h	1439	1376	156	299
Vehicles Exiting, veh/h	36	448	1283	1516
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	25.1	12.4	10.1
Approach LOS	-	D	B	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.599	0.401	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	263	176	784	884	553	623
Cap Entry Lane, veh/h	359	418	381	441	1232	1232	1082	1082
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.989	0.990
Flow Entry, veh/h	0	0	263	176	784	884	547	617
Cap Entry, veh/h	359	418	381	441	1232	1232	1070	1071
V/C Ratio	0.000	0.000	0.691	0.399	0.636	0.717	0.511	0.576
Control Delay, s/veh	10.0	8.6	31.5	15.5	11.1	13.5	9.4	10.7
LOS	B	A	D	C	B	B	A	B
95th %tile Queue, veh	0	0	5	2	5	7	3	4

Intersection	
Intersection Delay, s/veh	33.7
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	465	775	1416	1084
Demand Flow Rate, veh/h	465	775	1416	1095
Vehicles Circulating, veh/h	1195	1407	527	809
Vehicles Exiting, veh/h	709	536	1133	1373
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	16.7	70.2	23.6	28.0
Approach LOS	C	F	C	D

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	219	246	364	411	666	750	515	580
Cap Entry Lane, veh/h	450	514	370	429	831	907	641	714
Entry HV Adj Factor	0.998	1.002	1.001	0.999	0.999	1.001	0.990	0.991
Flow Entry, veh/h	219	246	364	411	666	750	510	575
Cap Entry, veh/h	449	515	370	429	831	908	635	707
V/C Ratio	0.487	0.478	0.984	0.957	0.801	0.827	0.803	0.812
Control Delay, s/veh	17.8	15.6	76.7	64.4	23.3	23.8	28.7	27.3
LOS	C	C	F	F	C	C	D	D
95th %tile Queue, veh	3	3	11	11	9	10	8	9

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	25	0	1568	1096	20
Future Vol, veh/h	0	25	0	1568	1096	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	27	0	1704	1191	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	607	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	445	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	445	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.62	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	445	-	-
HCM Lane V/C Ratio	-	0.061	-	-
HCM Ctrl Dly (s/v)	-	13.6	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	15.7
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	242	373	1543	1092
Demand Flow Rate, veh/h	247	373	1543	1103
Vehicles Circulating, veh/h	1138	1549	376	267
Vehicles Exiting, veh/h	232	370	1009	1655
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.2	25.1	18.5	9.0
Approach LOS	B	D	C	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.822	0.178	0.531	0.469	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	203	44	198	175	725	818	518	585
Cap Entry Lane, veh/h	474	540	325	381	1009	1009	1114	1114
Entry HV Adj Factor	0.982	0.977	1.000	1.000	1.000	1.000	0.991	0.989
Flow Entry, veh/h	199	43	198	175	725	818	513	579
Cap Entry, veh/h	465	527	325	381	1009	1008	1103	1102
V/C Ratio	0.428	0.082	0.610	0.460	0.719	0.811	0.465	0.525
Control Delay, s/veh	15.6	7.8	30.0	19.6	15.7	20.9	8.4	9.4
LOS	C	A	D	C	C	C	A	A
95th %tile Queue, veh	2	0	4	2	6	9	3	3

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	311	6	28	490	4	17
Future Vol, veh/h	311	6	28	490	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	349	7	31	551	4	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	356	0	966	353
Stage 1	-	-	-	-	353	-
Stage 2	-	-	-	-	613	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1203	-	282	691
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	540	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1203	-	272	691
Mov Cap-2 Maneuver	-	-	-	-	272	-
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	520	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.44	12.05
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	534	-	-	97	-
HCM Lane V/C Ratio	0.044	-	-	0.026	-
HCM Ctrl Dly (s/v)	12.1	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

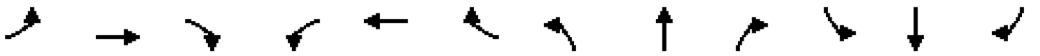
Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	324	4	56	516	2	35
Future Vol, veh/h	324	4	56	516	2	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	364	4	63	580	2	39

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	369	0	1072	366
Stage 1	-	-	-	-	366	-
Stage 2	-	-	-	-	706	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1190	-	244	679
Stage 1	-	-	-	-	701	-
Stage 2	-	-	-	-	490	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1190	-	225	679
Mov Cap-2 Maneuver	-	-	-	-	225	-
Stage 1	-	-	-	-	701	-
Stage 2	-	-	-	-	451	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.8	11.31
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	612	-	-	176	-
HCM Lane V/C Ratio	0.068	-	-	0.053	-
HCM Ctrl Dly (s/v)	11.3	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	246	43	24	114	18	8	61	60	86	97	16
Future Volume (veh/h)	10	246	43	24	114	18	8	61	60	86	97	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	276	48	27	128	20	9	69	67	97	109	18
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	179	453	77	232	411	58	189	205	186	377	234	32
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	23	1408	239	124	1276	181	45	782	710	528	891	124
Grp Volume(v), veh/h	335	0	0	175	0	0	145	0	0	224	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1581	0	0	1537	0	0	1543	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Cycle Q Clear(g_c), s	3.7	0.0	0.0	1.7	0.0	0.0	1.6	0.0	0.0	2.6	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	710	0	0	701	0	0	580	0	0	643	0	0
V/C Ratio(X)	0.47	0.00	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.35	0.00	0.00
Avail Cap(c_a), veh/h	2130	0	0	1989	0	0	1973	0	0	1995	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.2	0.0	0.0	5.6	0.0	0.0	6.5	0.0	0.0	6.8	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.7	0.0	0.0	5.7	0.0	0.0	6.7	0.0	0.0	7.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		335			175			145			224	
Approach Delay, s/veh		6.7			5.7			6.7			7.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.2		11.5		10.2		11.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.6		5.7		4.6		3.7				
Green Ext Time (p_c), s		0.7		1.7		1.1		0.8				

Intersection Summary												
HCM 7th Control Delay, s/veh			6.6									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	312	968	1047
Demand Flow Rate, veh/h	0	315	987	1058
Vehicles Circulating, veh/h	1248	792	193	214
Vehicles Exiting, veh/h	24	388	1055	893
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	8.4	7.3	8.0
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	190	125	464	523	497	561
Cap Entry Lane, veh/h	428	492	651	724	1191	1191	1169	1169
Entry HV Adj Factor	1.000	1.000	0.989	0.992	0.980	0.981	0.991	0.990
Flow Entry, veh/h	0	0	188	124	455	513	492	555
Cap Entry, veh/h	428	492	645	718	1168	1169	1158	1157
V/C Ratio	0.000	0.000	0.292	0.173	0.389	0.439	0.425	0.480
Control Delay, s/veh	8.4	7.3	9.3	6.9	7.0	7.7	7.5	8.4
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	1	2	2	2	3

Intersection	
Intersection Delay, s/veh	32.8
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	892	417	956	1116
Demand Flow Rate, veh/h	910	430	985	1127
Vehicles Circulating, veh/h	1184	1035	1045	392
Vehicles Exiting, veh/h	335	995	1049	1073
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	55.8	12.8	44.8	11.5
Approach LOS	F	B	E	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	428	482	202	228	463	522	530	597
Cap Entry Lane, veh/h	454	519	521	589	516	584	941	1018
Entry HV Adj Factor	0.980	0.981	0.971	0.970	0.970	0.970	0.989	0.990
Flow Entry, veh/h	419	473	196	221	449	507	524	591
Cap Entry, veh/h	445	509	506	572	501	567	931	1008
V/C Ratio	0.942	0.929	0.388	0.387	0.897	0.894	0.563	0.587
Control Delay, s/veh	59.8	52.3	13.5	12.2	47.1	42.8	11.5	11.4
LOS	F	F	B	B	E	E	B	B
95th %tile Queue, veh	11	11	2	2	10	11	4	4

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	29	0	1001	1095	10
Future Vol, veh/h	0	29	0	1001	1095	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	33	0	1125	1230	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	621	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	435	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	435	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.94	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	435	-	-
HCM Lane V/C Ratio	-	0.075	-	-
HCM Ctrl Dly (s/v)	-	13.9	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	15.8
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	325	317	1205	1455
Demand Flow Rate, veh/h	335	327	1216	1469
Vehicles Circulating, veh/h	1485	1283	504	199
Vehicles Exiting, veh/h	183	437	1316	1411
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	37.1	15.2	15.7	11.2
Approach LOS	E	C	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.797	0.203	0.523	0.477	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	267	68	171	156	572	644	690	779
Cap Entry Lane, veh/h	344	402	415	477	898	898	1185	1185
Entry HV Adj Factor	0.972	0.971	0.971	0.968	0.990	0.991	0.991	0.990
Flow Entry, veh/h	259	66	166	151	566	638	684	771
Cap Entry, veh/h	335	390	403	462	889	890	1174	1173
V/C Ratio	0.775	0.169	0.412	0.327	0.637	0.717	0.582	0.657
Control Delay, s/veh	43.5	11.9	17.1	13.2	14.1	17.2	10.2	12.0
LOS	E	B	C	B	B	C	B	B
95th %tile Queue, veh	6	1	2	1	5	6	4	5

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	553	1	9	208	5	26
Future Vol, veh/h	553	1	9	208	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	621	1	10	234	6	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	622	0	876	622
Stage 1	-	-	-	-	622	-
Stage 2	-	-	-	-	254	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	958	-	319	487
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	958	-	316	487
Mov Cap-2 Maneuver	-	-	-	-	316	-
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	779	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.36	13.72
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	448	-	-	75	-
HCM Lane V/C Ratio	0.078	-	-	0.011	-
HCM Ctrl Dly (s/v)	13.7	-	-	8.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

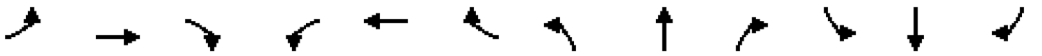
Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	578	1	18	214	3	53
Future Vol, veh/h	578	1	18	214	3	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	649	1	20	240	3	60

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	651	0	931	650
Stage 1	-	-	-	-	650	-
Stage 2	-	-	-	-	281	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	936	-	296	469
Stage 1	-	-	-	-	520	-
Stage 2	-	-	-	-	767	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	936	-	289	469
Mov Cap-2 Maneuver	-	-	-	-	289	-
Stage 1	-	-	-	-	520	-
Stage 2	-	-	-	-	748	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.69	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	454	-	-	140	-
HCM Lane V/C Ratio	0.139	-	-	0.022	-
HCM Ctrl Dly (s/v)	14.2	-	-	8.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	192	19	39	346	66	62	127	27	42	87	17
Future Volume (veh/h)	12	192	19	39	346	66	62	127	27	42	87	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	14	223	22	45	402	77	72	148	31	49	101	20
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	149	644	61	171	576	105	248	268	49	241	282	48
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	31	1496	142	73	1339	243	333	1078	199	303	1136	192
Grp Volume(v), veh/h	259	0	0	524	0	0	251	0	0	170	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1655	0	0	1609	0	0	1631	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	7.3	0.0	0.0	3.8	0.0	0.0	2.3	0.0	0.0
Prop In Lane	0.05		0.08	0.09		0.15	0.29		0.12	0.29		0.12
Lane Grp Cap(c), veh/h	854	0	0	852	0	0	565	0	0	571	0	0
V/C Ratio(X)	0.30	0.00	0.00	0.62	0.00	0.00	0.44	0.00	0.00	0.30	0.00	0.00
Avail Cap(c_a), veh/h	1631	0	0	1629	0	0	1595	0	0	1582	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.4	0.0	0.0	6.6	0.0	0.0	9.3	0.0	0.0	8.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.7	0.0	0.0	0.5	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.8	0.0	0.0	0.7	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.6	0.0	0.0	7.3	0.0	0.0	9.8	0.0	0.0	9.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		259			524			251			170	
Approach Delay, s/veh		5.6			7.3			9.8			9.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		11.5		16.6		11.5		16.6				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.8		4.9		4.3		9.3				
Green Ext Time (p_c), s		1.2		1.2		0.8		2.8				

Intersection Summary												
HCM 7th Control Delay, s/veh			7.7									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	16.5
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	473	1797	1254
Demand Flow Rate, veh/h	0	473	1797	1267
Vehicles Circulating, veh/h	1550	1482	170	322
Vehicles Exiting, veh/h	39	485	1380	1633
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	36.4	14.8	11.5
Approach LOS	-	E	B	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.598	0.402	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	283	190	845	952	595	672
Cap Entry Lane, veh/h	324	380	345	403	1217	1217	1059	1059
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.991	0.989
Flow Entry, veh/h	0	0	283	190	845	952	589	665
Cap Entry, veh/h	324	380	345	403	1216	1217	1049	1048
V/C Ratio	0.000	0.000	0.820	0.472	0.695	0.783	0.562	0.634
Control Delay, s/veh	11.1	9.5	48.0	19.0	12.9	16.6	10.5	12.4
LOS	B	A	E	C	B	C	B	B
95th %tile Queue, veh	0	0	7	2	6	9	4	5

Intersection	
Intersection Delay, s/veh	54.2
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	496	833	1522	1166
Demand Flow Rate, veh/h	496	833	1522	1178
Vehicles Circulating, veh/h	1287	1512	566	867
Vehicles Exiting, veh/h	758	576	1217	1478
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	20.7	125.6	34.6	42.9
Approach LOS	C	F	D	E

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	233	263	392	441	715	807	554	624
Cap Entry Lane, veh/h	413	475	336	393	802	878	608	680
Entry HV Adj Factor	1.001	1.000	0.999	1.001	1.000	1.000	0.989	0.990
Flow Entry, veh/h	233	263	392	441	715	807	548	618
Cap Entry, veh/h	413	475	336	393	802	877	601	673
V/C Ratio	0.564	0.553	1.167	1.123	0.892	0.919	0.911	0.918
Control Delay, s/veh	22.2	19.3	137.2	115.3	33.5	35.6	44.0	42.0
LOS	C	C	F	F	D	E	E	E
95th %tile Queue, veh	3	3	16	16	12	14	11	12

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	0	1686	1179	22
Future Vol, veh/h	0	27	0	1686	1179	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	29	0	1833	1282	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	653	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	415	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	415	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14.34	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	415	-	-
HCM Lane V/C Ratio	-	0.071	-	-
HCM Ctrl Dly (s/v)	-	14.3	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	20.6
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	260	401	1660	1175
Demand Flow Rate, veh/h	266	401	1660	1187
Vehicles Circulating, veh/h	1225	1666	405	288
Vehicles Exiting, veh/h	250	399	1085	1780
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	17.2	34.8	25.2	10.0
Approach LOS	C	D	D	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.823	0.177	0.531	0.469	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	219	47	213	188	780	880	558	629
Cap Entry Lane, veh/h	437	501	292	345	982	982	1093	1093
Entry HV Adj Factor	0.978	0.979	1.000	1.000	1.000	1.000	0.990	0.990
Flow Entry, veh/h	214	46	213	188	780	880	552	623
Cap Entry, veh/h	428	491	292	345	983	982	1082	1082
V/C Ratio	0.501	0.094	0.731	0.546	0.794	0.896	0.511	0.576
Control Delay, s/veh	19.1	8.6	43.3	25.0	20.1	29.7	9.3	10.6
LOS	C	A	E	D	C	D	A	B
95th %tile Queue, veh	3	0	5	3	9	13	3	4

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	334	6	28	528	4	17
Future Vol, veh/h	334	6	28	528	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	375	7	31	593	4	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	382	0	1035	379
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	656	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1176	-	257	668
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1176	-	247	668
Mov Cap-2 Maneuver	-	-	-	-	247	-
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	496	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.41	12.49
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	504	-	-	91	-
HCM Lane V/C Ratio	0.047	-	-	0.027	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

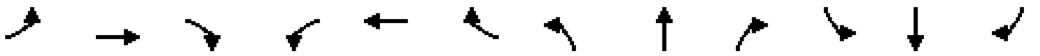
Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	347	4	56	554	2	35
Future Vol, veh/h	347	4	56	554	2	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	390	4	63	622	2	39

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	394	0	1140	392
Stage 1	-	-	-	-	392	-
Stage 2	-	-	-	-	748	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1164	-	222	657
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	468	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1164	-	204	657
Mov Cap-2 Maneuver	-	-	-	-	204	-
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.76	11.61
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	586	-	-	165	-
HCM Lane V/C Ratio	0.071	-	-	0.054	-
HCM Ctrl Dly (s/v)	11.6	-	-	8.3	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	247	43	24	116	18	8	61	60	86	97	16
Future Volume (veh/h)	10	247	43	24	116	18	8	61	60	86	97	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	11	278	48	27	130	20	9	69	67	97	109	18
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	179	456	77	231	414	58	188	205	186	376	233	32
Arrive On Green	0.32	0.32	0.32	0.32	0.32	0.32	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	23	1410	238	122	1281	179	45	782	710	528	891	124
Grp Volume(v), veh/h	337	0	0	177	0	0	145	0	0	224	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1581	0	0	1537	0	0	1543	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
Cycle Q Clear(g_c), s	3.7	0.0	0.0	1.8	0.0	0.0	1.7	0.0	0.0	2.6	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	712	0	0	703	0	0	579	0	0	642	0	0
V/C Ratio(X)	0.47	0.00	0.00	0.25	0.00	0.00	0.25	0.00	0.00	0.35	0.00	0.00
Avail Cap(c_a), veh/h	2125	0	0	1985	0	0	1968	0	0	1990	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.2	0.0	0.0	5.6	0.0	0.0	6.5	0.0	0.0	6.8	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.7	0.0	0.0	5.7	0.0	0.0	6.7	0.0	0.0	7.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		337			177			145			224	
Approach Delay, s/veh		6.7			5.7			6.7			7.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.2		11.5		10.2		11.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.7		5.7		4.6		3.8				
Green Ext Time (p_c), s		0.7		1.7		1.1		0.9				

Intersection Summary												
HCM 7th Control Delay, s/veh			6.6									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	312	977	1050
Demand Flow Rate, veh/h	0	315	996	1061
Vehicles Circulating, veh/h	1251	799	193	214
Vehicles Exiting, veh/h	24	390	1058	900
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	8.4	7.4	8.0
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	190	125	468	528	499	562
Cap Entry Lane, veh/h	427	490	647	720	1191	1191	1169	1169
Entry HV Adj Factor	1.000	1.000	0.989	0.992	0.981	0.981	0.989	0.991
Flow Entry, veh/h	0	0	188	124	459	518	494	557
Cap Entry, veh/h	427	490	640	714	1169	1168	1156	1158
V/C Ratio	0.000	0.000	0.294	0.174	0.393	0.443	0.427	0.481
Control Delay, s/veh	8.4	7.3	9.4	7.0	7.0	7.7	7.5	8.4
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	1	1	2	2	2	3

Intersection	
Intersection Delay, s/veh	35.3
Intersection LOS	E

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	916	419	959	1118
Demand Flow Rate, veh/h	934	432	988	1129
Vehicles Circulating, veh/h	1184	1046	1061	397
Vehicles Exiting, veh/h	342	1003	1057	1081
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	61.1	13.0	47.9	11.6
Approach LOS	F	B	E	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	439	495	203	229	464	524	531	598
Cap Entry Lane, veh/h	454	519	516	584	509	576	937	1013
Entry HV Adj Factor	0.981	0.981	0.971	0.971	0.971	0.970	0.989	0.991
Flow Entry, veh/h	431	485	197	222	451	508	525	592
Cap Entry, veh/h	445	509	501	566	494	559	927	1004
V/C Ratio	0.966	0.954	0.394	0.392	0.912	0.909	0.567	0.590
Control Delay, s/veh	65.1	57.5	13.7	12.4	50.2	45.8	11.7	11.6
LOS	F	F	B	B	F	E	B	B
95th %tile Queue, veh	12	12	2	2	11	11	4	4

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	29	0	1003	1102	10
Future Vol, veh/h	0	29	0	1003	1102	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	33	0	1127	1238	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	625	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	433	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	433	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	433	-	-
HCM Lane V/C Ratio	-	0.075	-	-
HCM Ctrl Dly (s/v)	-	14	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	15.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	325	317	1207	1464
Demand Flow Rate, veh/h	335	327	1218	1478
Vehicles Circulating, veh/h	1494	1285	506	199
Vehicles Exiting, veh/h	183	439	1323	1413
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	38.0	15.3	15.9	11.2
Approach LOS	E	C	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.797	0.203	0.523	0.477	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	267	68	171	156	572	646	695	783
Cap Entry Lane, veh/h	342	399	414	476	896	896	1185	1185
Entry HV Adj Factor	0.972	0.971	0.971	0.968	0.991	0.990	0.990	0.991
Flow Entry, veh/h	259	66	166	151	567	640	688	776
Cap Entry, veh/h	332	387	402	461	888	887	1173	1174
V/C Ratio	0.782	0.171	0.413	0.328	0.638	0.721	0.587	0.661
Control Delay, s/veh	44.6	12.1	17.2	13.2	14.1	17.4	10.3	12.1
LOS	E	B	C	B	B	C	B	B
95th %tile Queue, veh	6	1	2	1	5	6	4	5

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	554	1	9	210	5	26
Future Vol, veh/h	554	1	9	210	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	622	1	10	236	6	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	624	0	879	623
Stage 1	-	-	-	-	623	-
Stage 2	-	-	-	-	256	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	958	-	318	486
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	787	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	958	-	314	486
Mov Cap-2 Maneuver	-	-	-	-	314	-
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	777	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.36	13.74
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	447	-	-	74	-
HCM Lane V/C Ratio	0.078	-	-	0.011	-
HCM Ctrl Dly (s/v)	13.7	-	-	8.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

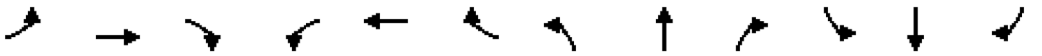
Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	578	2	25	214	5	75
Future Vol, veh/h	578	2	25	214	5	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	649	2	28	240	6	84

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	652	0	947	651
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	297	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	935	-	290	469
Stage 1	-	-	-	-	519	-
Stage 2	-	-	-	-	754	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	935	-	280	469
Mov Cap-2 Maneuver	-	-	-	-	280	-
Stage 1	-	-	-	-	519	-
Stage 2	-	-	-	-	728	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.94	14.99
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	450	-	-	188	-
HCM Lane V/C Ratio	0.2	-	-	0.03	-
HCM Ctrl Dly (s/v)	15	-	-	9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	194	19	39	347	66	62	127	27	42	87	17
Future Volume (veh/h)	12	194	19	39	347	66	62	127	27	42	87	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	14	226	22	45	403	77	72	148	31	49	101	20
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	149	646	60	171	577	105	248	268	49	241	282	48
Arrive On Green	0.43	0.43	0.43	0.43	0.43	0.43	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	31	1499	140	73	1339	243	333	1078	199	303	1136	192
Grp Volume(v), veh/h	262	0	0	525	0	0	251	0	0	170	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1655	0	0	1609	0	0	1631	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	0.0	0.0	7.3	0.0	0.0	3.8	0.0	0.0	2.3	0.0	0.0
Prop In Lane	0.05		0.08	0.09		0.15	0.29		0.12	0.29		0.12
Lane Grp Cap(c), veh/h	855	0	0	853	0	0	565	0	0	570	0	0
V/C Ratio(X)	0.31	0.00	0.00	0.62	0.00	0.00	0.44	0.00	0.00	0.30	0.00	0.00
Avail Cap(c_a), veh/h	1630	0	0	1627	0	0	1593	0	0	1580	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.4	0.0	0.0	6.6	0.0	0.0	9.3	0.0	0.0	8.8	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.7	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.0	0.8	0.0	0.0	0.7	0.0	0.0	0.5	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.6	0.0	0.0	7.3	0.0	0.0	9.9	0.0	0.0	9.1	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		262			525			251			170	
Approach Delay, s/veh		5.6			7.3			9.9			9.1	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		11.5		16.6		11.5		16.6				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		5.8		4.9		4.3		9.3				
Green Ext Time (p_c), s		1.2		1.3		0.8		2.8				

Intersection Summary												
HCM 7th Control Delay, s/veh			7.7									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	16.7
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	474	1802	1261
Demand Flow Rate, veh/h	0	474	1802	1274
Vehicles Circulating, veh/h	1558	1486	170	323
Vehicles Exiting, veh/h	39	486	1388	1637
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	37.0	14.9	11.6
Approach LOS	-	E	B	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.599	0.401	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	284	190	847	955	599	675
Cap Entry Lane, veh/h	322	378	344	401	1217	1217	1058	1058
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.989	0.990
Flow Entry, veh/h	0	0	284	190	847	955	593	668
Cap Entry, veh/h	322	378	344	401	1216	1217	1047	1048
V/C Ratio	0.000	0.000	0.825	0.473	0.696	0.785	0.566	0.638
Control Delay, s/veh	11.2	9.5	49.0	19.1	12.9	16.7	10.7	12.5
LOS	B	A	E	C	B	C	B	B
95th %tile Queue, veh	0	0	7	2	6	9	4	5

Intersection	
Intersection Delay, s/veh	58.6
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	514	842	1531	1175
Demand Flow Rate, veh/h	514	842	1531	1187
Vehicles Circulating, veh/h	1287	1527	578	885
Vehicles Exiting, veh/h	785	582	1223	1484
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	21.6	135.9	37.2	47.4
Approach LOS	C	F	E	E

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	242	272	396	446	720	811	558	629
Cap Entry Lane, veh/h	413	475	331	388	793	869	598	669
Entry HV Adj Factor	0.998	1.002	0.999	1.001	0.999	1.001	0.990	0.990
Flow Entry, veh/h	242	272	396	446	720	811	552	623
Cap Entry, veh/h	412	476	331	388	793	869	592	663
V/C Ratio	0.586	0.572	1.195	1.150	0.908	0.933	0.933	0.940
Control Delay, s/veh	23.3	20.0	148.0	125.2	36.1	38.2	48.4	46.4
LOS	C	C	F	F	E	E	E	E
95th %tile Queue, veh	4	4	17	17	12	14	12	13

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	27	0	1694	1184	22
Future Vol, veh/h	0	27	0	1694	1184	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	29	0	1841	1287	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	655	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	413	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	413	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14.38	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	413	-	-
HCM Lane V/C Ratio	-	0.071	-	-
HCM Ctrl Dly (s/v)	-	14.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.2	-	-

Intersection	
Intersection Delay, s/veh	20.9
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	260	402	1667	1180
Demand Flow Rate, veh/h	266	402	1667	1192
Vehicles Circulating, veh/h	1230	1673	406	288
Vehicles Exiting, veh/h	250	400	1089	1788
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	17.3	35.3	25.7	10.0
Approach LOS	C	E	D	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.823	0.177	0.530	0.470	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	219	47	213	189	783	884	560	632
Cap Entry Lane, veh/h	435	499	290	342	981	981	1093	1093
Entry HV Adj Factor	0.978	0.979	1.000	1.000	1.001	0.999	0.991	0.990
Flow Entry, veh/h	214	46	213	189	783	884	555	626
Cap Entry, veh/h	426	488	290	342	982	981	1082	1081
V/C Ratio	0.503	0.094	0.735	0.552	0.798	0.901	0.513	0.578
Control Delay, s/veh	19.2	8.6	44.1	25.5	20.4	30.4	9.3	10.7
LOS	C	A	E	D	C	D	A	B
95th %tile Queue, veh	3	0	5	3	9	13	3	4

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	336	7	28	529	4	17
Future Vol, veh/h	336	7	28	529	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	378	8	31	594	4	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	385	0	1039	381
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	657	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1173	-	256	666
Stage 1	-	-	-	-	690	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1173	-	245	666
Mov Cap-2 Maneuver	-	-	-	-	245	-
Stage 1	-	-	-	-	690	-
Stage 2	-	-	-	-	495	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.41	12.53
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	502	-	-	90	-
HCM Lane V/C Ratio	0.047	-	-	0.027	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	347	6	79	554	3	49
Future Vol, veh/h	347	6	79	554	3	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	390	7	89	622	3	55

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	397	0	1193	393
Stage 1	-	-	-	-	393	-
Stage 2	-	-	-	-	800	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1162	-	206	656
Stage 1	-	-	-	-	682	-
Stage 2	-	-	-	-	442	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1162	-	182	656
Mov Cap-2 Maneuver	-	-	-	-	182	-
Stage 1	-	-	-	-	682	-
Stage 2	-	-	-	-	391	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.04	12.03
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	570	-	-	225	-
HCM Lane V/C Ratio	0.102	-	-	0.076	-
HCM Ctrl Dly (s/v)	12	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.2	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	265	46	26	124	19	8	66	64	92	105	17
Future Volume (veh/h)	11	265	46	26	124	19	8	66	64	92	105	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	12	298	52	29	139	21	9	74	72	103	118	19
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	171	476	81	222	434	59	178	210	191	365	241	33
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	23	1408	240	120	1285	176	41	783	714	522	899	122
Grp Volume(v), veh/h	362	0	0	189	0	0	155	0	0	240	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1580	0	0	1538	0	0	1543	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
Cycle Q Clear(g_c), s	4.2	0.0	0.0	2.0	0.0	0.0	1.9	0.0	0.0	2.9	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.46	0.43		0.08
Lane Grp Cap(c), veh/h	727	0	0	716	0	0	579	0	0	639	0	0
V/C Ratio(X)	0.50	0.00	0.00	0.26	0.00	0.00	0.27	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	2018	0	0	1882	0	0	1870	0	0	1887	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.4	0.0	0.0	5.7	0.0	0.0	6.8	0.0	0.0	7.1	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.9	0.0	0.0	5.8	0.0	0.0	7.0	0.0	0.0	7.5	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		362			189			155			240	
Approach Delay, s/veh		6.9			5.8			7.0			7.5	
Approach LOS		A			A			A			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		10.6		12.2		10.6		12.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		3.9		6.2		4.9		4.0				
Green Ext Time (p_c), s		0.7		1.8		1.2		0.9				

Intersection Summary												
HCM 7th Control Delay, s/veh			6.9									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	337	1049	1129
Demand Flow Rate, veh/h	0	340	1070	1140
Vehicles Circulating, veh/h	1345	859	208	233
Vehicles Exiting, veh/h	28	419	1137	966
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	9.4	8.0	8.8
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.603	0.397	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	205	135	503	567	536	604
Cap Entry Lane, veh/h	392	453	613	684	1175	1175	1149	1149
Entry HV Adj Factor	1.000	1.000	0.990	0.993	0.980	0.980	0.990	0.990
Flow Entry, veh/h	0	0	203	134	493	556	531	598
Cap Entry, veh/h	392	453	607	679	1152	1152	1137	1138
V/C Ratio	0.000	0.000	0.335	0.197	0.428	0.482	0.467	0.526
Control Delay, s/veh	9.2	8.0	10.6	7.6	7.6	8.4	8.2	9.2
LOS	A	A	B	A	A	A	A	A
95th %tile Queue, veh	0	0	1	1	2	3	3	3

Intersection	
Intersection Delay, s/veh	58.5
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	977	449	1031	1207
Demand Flow Rate, veh/h	996	463	1062	1219
Vehicles Circulating, veh/h	1280	1122	1139	425
Vehicles Exiting, veh/h	364	1079	1137	1160
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	107.9	15.3	83.1	13.6
Approach LOS	F	C	F	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	468	528	218	245	499	563	573	646
Cap Entry Lane, veh/h	416	478	481	547	473	539	913	989
Entry HV Adj Factor	0.981	0.981	0.968	0.971	0.971	0.971	0.990	0.990
Flow Entry, veh/h	459	518	211	238	485	547	567	640
Cap Entry, veh/h	408	469	466	531	460	524	904	980
V/C Ratio	1.125	1.104	0.453	0.448	1.054	1.044	0.628	0.653
Control Delay, s/veh	114.6	102.0	16.3	14.4	87.1	79.5	13.6	13.6
LOS	F	F	C	B	F	F	B	B
95th %tile Queue, veh	17	17	2	2	15	16	5	5

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	31	0	1080	1184	11
Future Vol, veh/h	0	31	0	1080	1184	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	35	0	1213	1330	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	671	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	403	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	403	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	14.77	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	403	-	-
HCM Lane V/C Ratio	-	0.086	-	-
HCM Ctrl Dly (s/v)	-	14.8	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

Intersection	
Intersection Delay, s/veh	21.1
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	351	341	1299	1574
Demand Flow Rate, veh/h	362	351	1312	1590
Vehicles Circulating, veh/h	1607	1384	546	213
Vehicles Exiting, veh/h	196	474	1423	1522
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	62.4	18.4	20.5	13.0
Approach LOS	F	C	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.796	0.204	0.521	0.479	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	288	74	183	168	617	695	747	843
Cap Entry Lane, veh/h	308	362	378	438	864	864	1170	1170
Entry HV Adj Factor	0.970	0.973	0.972	0.970	0.989	0.991	0.990	0.990
Flow Entry, veh/h	279	72	178	163	610	688	740	834
Cap Entry, veh/h	299	352	367	425	855	856	1159	1158
V/C Ratio	0.936	0.204	0.484	0.384	0.714	0.804	0.639	0.721
Control Delay, s/veh	75.0	13.8	21.1	15.6	17.6	23.0	11.6	14.3
LOS	F	B	C	C	C	C	B	B
95th %tile Queue, veh	9	1	3	2	6	9	5	7

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	596	1	9	225	5	26
Future Vol, veh/h	596	1	9	225	5	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	670	1	10	253	6	29

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	671	0	943	670
Stage 1	-	-	-	-	670	-
Stage 2	-	-	-	-	273	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	920	-	291	457
Stage 1	-	-	-	-	508	-
Stage 2	-	-	-	-	773	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	920	-	288	457
Mov Cap-2 Maneuver	-	-	-	-	288	-
Stage 1	-	-	-	-	508	-
Stage 2	-	-	-	-	763	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.34	14.41
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	417	-	-	69	-
HCM Lane V/C Ratio	0.083	-	-	0.011	-
HCM Ctrl Dly (s/v)	14.4	-	-	9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

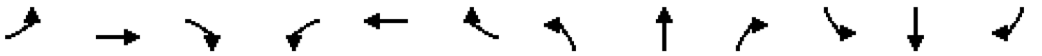
Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	620	2	25	229	5	75
Future Vol, veh/h	620	2	25	229	5	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	697	2	28	257	6	84

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	699	0	1011	698
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	313	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	898	-	265	441
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	741	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	898	-	256	441
Mov Cap-2 Maneuver	-	-	-	-	256	-
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	714	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.9	15.84
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	422	-	-	177	-
HCM Lane V/C Ratio	0.213	-	-	0.031	-
HCM Ctrl Dly (s/v)	15.8	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	208	21	42	373	71	67	137	29	45	93	18
Future Volume (veh/h)	13	208	21	42	373	71	67	137	29	45	93	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	15	242	24	49	434	83	78	159	34	52	108	21
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	139	670	64	163	598	109	239	273	51	230	292	48
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	31	1495	142	75	1334	242	336	1070	202	302	1144	190
Grp Volume(v), veh/h	281	0	0	566	0	0	271	0	0	181	0	0
Grp Sat Flow(s),veh/h/ln	1668	0	0	1652	0	0	1608	0	0	1635	0	0
Q Serve(g_s), s	0.0	0.0	0.0	2.3	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.3	0.0	0.0	8.6	0.0	0.0	4.4	0.0	0.0	2.7	0.0	0.0
Prop In Lane	0.05		0.09	0.09		0.15	0.29		0.13	0.29		0.12
Lane Grp Cap(c), veh/h	872	0	0	869	0	0	563	0	0	570	0	0
V/C Ratio(X)	0.32	0.00	0.00	0.65	0.00	0.00	0.48	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	1507	0	0	1504	0	0	1472	0	0	1462	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.5	0.0	0.0	7.0	0.0	0.0	10.0	0.0	0.0	9.4	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.8	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	1.1	0.0	0.0	0.9	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.7	0.0	0.0	7.8	0.0	0.0	10.7	0.0	0.0	9.7	0.0	0.0
LnGrp LOS	A			A			B			A		
Approach Vol, veh/h		281			566			271			181	
Approach Delay, s/veh		5.7			7.8			10.7			9.7	
Approach LOS		A			A			B			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.2		18.1		12.2		18.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		6.4		5.3		4.7		10.6				
Green Ext Time (p_c), s		1.3		1.4		0.9		3.0				

Intersection Summary												
HCM 7th Control Delay, s/veh			8.2									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	22.3
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	508	1937	1354
Demand Flow Rate, veh/h	0	508	1937	1368
Vehicles Circulating, veh/h	1673	1597	181	346
Vehicles Exiting, veh/h	41	521	1492	1759
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	60.2	18.6	13.5
Approach LOS	-	F	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.600	0.400	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	305	203	910	1027	643	725
Cap Entry Lane, veh/h	290	342	311	365	1204	1204	1036	1036
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.990
Flow Entry, veh/h	0	0	305	203	910	1027	636	718
Cap Entry, veh/h	290	342	311	365	1205	1204	1026	1026
V/C Ratio	0.000	0.000	0.982	0.556	0.756	0.853	0.620	0.699
Control Delay, s/veh	12.4	10.5	84.1	24.3	15.3	21.5	12.2	14.7
LOS	B	B	F	C	C	C	B	B
95th %tile Queue, veh	0	0	10	3	8	11	4	6

Intersection	
Intersection Delay, s/veh	96.1
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	546	903	1646	1261
Demand Flow Rate, veh/h	546	903	1646	1274
Vehicles Circulating, veh/h	1385	1638	617	946
Vehicles Exiting, veh/h	835	625	1314	1595
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	28.4	222.9	61.1	80.2
Approach LOS	D	F	F	F

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	257	289	424	479	774	872	599	675
Cap Entry Lane, veh/h	378	437	299	353	765	840	565	635
Entry HV Adj Factor	0.999	1.001	1.001	0.999	1.000	1.000	0.990	0.990
Flow Entry, veh/h	257	289	424	479	774	872	593	668
Cap Entry, veh/h	377	438	299	353	765	841	560	629
V/C Ratio	0.681	0.661	1.417	1.358	1.011	1.038	1.059	1.062
Control Delay, s/veh	31.0	26.1	239.3	208.4	58.6	63.2	81.8	78.9
LOS	D	D	F	F	F	F	F	F
95th %tile Queue, veh	5	5	23	23	18	20	17	18

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	29	0	1821	1273	24
Future Vol, veh/h	0	29	0	1821	1273	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	32	0	1979	1384	26

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	705	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	384	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	384	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	15.22	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	384	-	-
HCM Lane V/C Ratio	-	0.082	-	-
HCM Ctrl Dly (s/v)	-	15.2	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

Intersection	
Intersection Delay, s/veh	30.4
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	281	432	1793	1268
Demand Flow Rate, veh/h	287	432	1793	1280
Vehicles Circulating, veh/h	1321	1800	436	309
Vehicles Exiting, veh/h	268	429	1172	1923
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	21.7	54.7	39.3	11.4
Approach LOS	C	F	E	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.819	0.181	0.530	0.470	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	235	52	229	203	843	950	602	678
Cap Entry Lane, veh/h	400	462	258	307	955	955	1072	1072
Entry HV Adj Factor	0.979	0.981	1.000	1.000	1.000	1.000	0.990	0.991
Flow Entry, veh/h	230	51	229	203	843	950	596	672
Cap Entry, veh/h	392	453	258	307	955	955	1061	1062
V/C Ratio	0.587	0.113	0.888	0.660	0.883	0.995	0.562	0.632
Control Delay, s/veh	24.3	9.5	72.1	35.1	28.6	48.7	10.5	12.2
LOS	C	A	F	E	D	E	B	B
95th %tile Queue, veh	4	0	8	4	12	19	4	5

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	362	7	28	569	4	17
Future Vol, veh/h	362	7	28	569	4	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	407	8	31	639	4	19

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	415	0	1113	411
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	702	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1144	-	231	641
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	491	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1144	-	221	641
Mov Cap-2 Maneuver	-	-	-	-	221	-
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	470	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.39	13.05
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	84	-
HCM Lane V/C Ratio	0.05	-	-	0.027	-
HCM Ctrl Dly (s/v)	13.1	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	373	6	79	594	3	49
Future Vol, veh/h	373	6	79	594	3	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	419	7	89	667	3	55

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	426	0	1267	422
Stage 1	-	-	-	-	422	-
Stage 2	-	-	-	-	845	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1133	-	186	631
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	421	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1133	-	163	631
Mov Cap-2 Maneuver	-	-	-	-	163	-
Stage 1	-	-	-	-	661	-
Stage 2	-	-	-	-	369	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.99	12.45
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	542	-	-	211	-
HCM Lane V/C Ratio	0.108	-	-	0.078	-
HCM Ctrl Dly (s/v)	12.5	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.3	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	268	46	27	130	20	8	66	65	93	105	17
Future Volume (veh/h)	11	268	46	27	130	20	8	66	65	93	105	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1682	1682	1682	1682	1682	1682	1736	1736	1736
Adj Flow Rate, veh/h	12	301	52	30	146	22	9	74	73	104	118	19
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	5	5	5	5	5	5	1	1	1
Cap, veh/h	170	479	81	221	437	60	177	208	193	365	240	33
Arrive On Green	0.34	0.34	0.34	0.34	0.34	0.34	0.27	0.27	0.27	0.27	0.27	0.27
Sat Flow, veh/h	23	1410	238	119	1286	176	40	778	719	525	895	122
Grp Volume(v), veh/h	365	0	0	198	0	0	156	0	0	241	0	0
Grp Sat Flow(s),veh/h/ln	1671	0	0	1581	0	0	1537	0	0	1542	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Cycle Q Clear(g_c), s	4.2	0.0	0.0	2.1	0.0	0.0	1.9	0.0	0.0	2.9	0.0	0.0
Prop In Lane	0.03		0.14	0.15		0.11	0.06		0.47	0.43		0.08
Lane Grp Cap(c), veh/h	730	0	0	718	0	0	578	0	0	638	0	0
V/C Ratio(X)	0.50	0.00	0.00	0.28	0.00	0.00	0.27	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	2007	0	0	1872	0	0	1859	0	0	1876	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	6.4	0.0	0.0	5.7	0.0	0.0	6.8	0.0	0.0	7.2	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	6.9	0.0	0.0	5.9	0.0	0.0	7.1	0.0	0.0	7.6	0.0	0.0
LnGrp LOS	A			A			A			A		
Approach Vol, veh/h		365			198			156			241	
Approach Delay, s/veh		6.9			5.9			7.1			7.6	
Approach LOS		A			A			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	10.7	12.3	10.7	12.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	25.5	25.5	25.5
Max Q Clear Time (g_c+I1), s	3.9	6.2	4.9	4.1
Green Ext Time (p_c), s	0.7	1.8	1.2	1.0

Intersection Summary	
HCM 7th Control Delay, s/veh	6.9
HCM 7th LOS	A

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	340	1078	1143
Demand Flow Rate, veh/h	0	343	1100	1154
Vehicles Circulating, veh/h	1362	883	208	236
Vehicles Exiting, veh/h	28	425	1154	990
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	9.7	8.2	8.9
Approach LOS	-	A	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.606	0.394	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	208	135	517	583	542	612
Cap Entry Lane, veh/h	386	446	599	670	1175	1175	1146	1146
Entry HV Adj Factor	1.000	1.000	0.990	0.993	0.980	0.980	0.991	0.990
Flow Entry, veh/h	0	0	206	134	507	571	537	606
Cap Entry, veh/h	386	446	593	665	1152	1152	1135	1134
V/C Ratio	0.000	0.000	0.347	0.201	0.440	0.496	0.473	0.534
Control Delay, s/veh	9.3	8.1	11.0	7.8	7.8	8.6	8.4	9.4
LOS	A	A	B	A	A	A	A	A
95th %tile Queue, veh	0	0	2	1	2	3	3	3

Intersection	
Intersection Delay, s/veh	74.9
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1041	466	1049	1223
Demand Flow Rate, veh/h	1062	480	1080	1235
Vehicles Circulating, veh/h	1287	1170	1198	460
Vehicles Exiting, veh/h	408	1108	1151	1190
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	137.0	16.9	108.8	14.9
Approach LOS	F	C	F	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	499	563	226	254	508	572	580	655
Cap Entry Lane, veh/h	413	475	460	525	448	513	884	960
Entry HV Adj Factor	0.980	0.980	0.968	0.972	0.971	0.972	0.991	0.990
Flow Entry, veh/h	489	552	219	247	493	556	575	648
Cap Entry, veh/h	405	466	446	510	435	499	876	950
V/C Ratio	1.208	1.184	0.491	0.484	1.133	1.115	0.656	0.682
Control Delay, s/veh	144.4	130.5	18.1	15.9	114.6	103.7	14.9	14.9
LOS	F	F	C	C	F	F	B	B
95th %tile Queue, veh	20	21	3	3	18	18	5	6

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	51	0	1095	1190	21
Future Vol, veh/h	0	51	0	1095	1190	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	57	0	1230	1337	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	680	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	398	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	398	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	15.56	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	398	-	-
HCM Lane V/C Ratio	-	0.144	-	-
HCM Ctrl Dly (s/v)	-	15.6	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.5	-	-

Intersection	
Intersection Delay, s/veh	22.3
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	351	345	1315	1607
Demand Flow Rate, veh/h	362	355	1328	1623
Vehicles Circulating, veh/h	1640	1400	552	213
Vehicles Exiting, veh/h	196	480	1450	1542
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	69.0	19.0	21.5	13.5
Approach LOS	F	C	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.796	0.204	0.515	0.485	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	288	74	183	172	624	704	763	860
Cap Entry Lane, veh/h	299	352	372	432	859	859	1170	1170
Entry HV Adj Factor	0.970	0.973	0.972	0.971	0.990	0.990	0.990	0.990
Flow Entry, veh/h	279	72	178	167	618	697	755	852
Cap Entry, veh/h	290	343	362	419	851	850	1158	1158
V/C Ratio	0.964	0.210	0.491	0.398	0.726	0.819	0.652	0.735
Control Delay, s/veh	83.1	14.3	21.6	16.1	18.2	24.4	12.0	14.9
LOS	F	B	C	C	C	C	B	B
95th %tile Queue, veh	10	1	3	2	7	9	5	7

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	597	6	39	228	12	62
Future Vol, veh/h	597	6	39	228	12	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	671	7	44	256	13	70

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	678	0	1018	674
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	344	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	914	-	263	454
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	718	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	914	-	248	454
Mov Cap-2 Maneuver	-	-	-	-	248	-
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	678	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.33	16.33
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	401	-	-	263	-
HCM Lane V/C Ratio	0.208	-	-	0.048	-
HCM Ctrl Dly (s/v)	16.3	-	-	9.1	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0.2	-

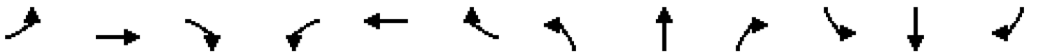
Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	656	3	30	259	8	94
Future Vol, veh/h	656	3	30	259	8	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	737	3	34	291	9	106

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	740	0	1097	739
Stage 1	-	-	-	-	739	-
Stage 2	-	-	-	-	358	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	866	-	236	417
Stage 1	-	-	-	-	472	-
Stage 2	-	-	-	-	707	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	866	-	225	417
Mov Cap-2 Maneuver	-	-	-	-	225	-
Stage 1	-	-	-	-	472	-
Stage 2	-	-	-	-	674	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.97	17.97
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	391	-	-	187	-
HCM Lane V/C Ratio	0.293	-	-	0.039	-
HCM Ctrl Dly (s/v)	18	-	-	9.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	1.2	-	-	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	218	21	44	381	73	67	137	31	47	93	18
Future Volume (veh/h)	13	218	21	44	381	73	67	137	31	47	93	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1723	1723	1723	1736	1736	1736	1750	1750	1750	1750	1750	1750
Adj Flow Rate, veh/h	15	253	24	51	443	85	78	159	36	55	108	21
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	1	1	1	0	0	0	0	0	0
Cap, veh/h	136	683	62	162	604	110	235	271	54	232	287	47
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	29	1503	137	77	1330	242	333	1063	212	319	1128	186
Grp Volume(v), veh/h	292	0	0	579	0	0	273	0	0	184	0	0
Grp Sat Flow(s),veh/h/ln	1670	0	0	1649	0	0	1608	0	0	1633	0	0
Q Serve(g_s), s	0.0	0.0	0.0	2.5	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.5	0.0	0.0	9.0	0.0	0.0	4.6	0.0	0.0	2.8	0.0	0.0
Prop In Lane	0.05		0.08	0.09		0.15	0.29		0.13	0.30		0.11
Lane Grp Cap(c), veh/h	881	0	0	876	0	0	559	0	0	567	0	0
V/C Ratio(X)	0.33	0.00	0.00	0.66	0.00	0.00	0.49	0.00	0.00	0.32	0.00	0.00
Avail Cap(c_a), veh/h	1480	0	0	1474	0	0	1444	0	0	1431	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.6	0.0	0.0	7.0	0.0	0.0	10.2	0.0	0.0	9.6	0.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.9	0.0	0.0	0.7	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	1.2	0.0	0.0	1.0	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	5.8	0.0	0.0	7.9	0.0	0.0	10.9	0.0	0.0	9.9	0.0	0.0
LnGrp LOS	A			A			B			A		
Approach Vol, veh/h		292			579			273			184	
Approach Delay, s/veh		5.8			7.9			10.9			9.9	
Approach LOS		A			A			B			A	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		12.4		18.5		12.4		18.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		25.5		25.5		25.5		25.5				
Max Q Clear Time (g_c+I1), s		6.6		5.5		4.8		11.0				
Green Ext Time (p_c), s		1.3		1.4		0.9		3.1				

Intersection Summary												
HCM 7th Control Delay, s/veh			8.3									
HCM 7th LOS			A									

Intersection	
Intersection Delay, s/veh	24.6
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	0	516	1974	1394
Demand Flow Rate, veh/h	0	516	1974	1408
Vehicles Circulating, veh/h	1721	1628	181	354
Vehicles Exiting, veh/h	41	527	1540	1790
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	70.8	19.7	14.5
Approach LOS	-	F	C	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.500	0.500	0.607	0.393	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	0	0	313	203	928	1046	662	746
Cap Entry Lane, veh/h	277	329	302	356	1204	1204	1029	1029
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	0.990	0.990
Flow Entry, veh/h	0	0	313	203	928	1046	655	739
Cap Entry, veh/h	277	329	302	356	1204	1205	1018	1019
V/C Ratio	0.000	0.000	1.037	0.570	0.770	0.868	0.643	0.725
Control Delay, s/veh	13.0	10.9	100.2	25.6	16.1	22.9	12.9	15.9
LOS	B	B	F	D	C	C	B	C
95th %tile Queue, veh	0	0	12	3	8	12	5	7

Intersection	
Intersection Delay, s/veh	144.6
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	636	969	1691	1306
Demand Flow Rate, veh/h	636	969	1691	1319
Vehicles Circulating, veh/h	1431	1718	686	1057
Vehicles Exiting, veh/h	945	659	1381	1630
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	43.0	313.7	92.6	136.1
Approach LOS	E	F	F	F

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	LT	TR	LT	TR
Assumed Moves	LT	TR	LT	TR	LT	TR	LT	TR
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	299	337	455	514	795	896	620	699
Cap Entry Lane, veh/h	362	421	278	330	718	793	511	578
Entry HV Adj Factor	1.000	1.000	1.001	0.999	1.000	1.000	0.990	0.990
Flow Entry, veh/h	299	337	455	514	795	896	614	692
Cap Entry, veh/h	362	421	278	329	718	793	505	573
V/C Ratio	0.826	0.801	1.637	1.559	1.107	1.130	1.214	1.209
Control Delay, s/veh	47.3	39.1	334.7	295.1	89.6	95.2	139.2	133.3
LOS	E	E	F	F	F	F	F	F
95th %tile Queue, veh	7	7	28	30	23	26	23	25

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	42	0	1863	1292	58
Future Vol, veh/h	0	42	0	1863	1292	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	2	2
Mvmt Flow	0	46	0	2025	1404	63

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	734	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	367	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	367	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	16.19	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	367	-	-
HCM Lane V/C Ratio	-	0.124	-	-
HCM Ctrl Dly (s/v)	-	16.2	-	-
HCM Lane LOS	-	C	-	-
HCM 95th %tile Q(veh)	-	0.4	-	-

Intersection	
Intersection Delay, s/veh	33.5
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	1	1
Adj Approach Flow, veh/h	281	439	1829	1301
Demand Flow Rate, veh/h	287	439	1829	1314
Vehicles Circulating, veh/h	1355	1836	441	309
Vehicles Exiting, veh/h	268	434	1201	1966
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	23.1	60.9	44.0	11.8
Approach LOS	C	F	E	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	R	LT	TR	LT	TR
Assumed Moves	LT	R	LT	R	LT	TR	LT	TR
RT Channelized								
Lane Util	0.819	0.181	0.522	0.478	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.544	4.544	4.544	4.544
A (Intercept)	1350	1420	1350	1420	1420	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.101e-4	9.101e-4	9.101e-4	9.101e-4
Entry Flow, veh/h	235	52	229	210	860	969	618	696
Cap Entry Lane, veh/h	388	449	249	298	951	951	1072	1072
Entry HV Adj Factor	0.979	0.981	1.000	1.000	1.000	1.000	0.990	0.991
Flow Entry, veh/h	230	51	229	210	860	969	612	690
Cap Entry, veh/h	380	440	249	298	950	951	1061	1062
V/C Ratio	0.605	0.116	0.918	0.704	0.905	1.019	0.577	0.649
Control Delay, s/veh	26.0	9.8	80.1	39.9	31.6	55.0	10.8	12.7
LOS	D	A	F	E	D	F	B	B
95th %tile Queue, veh	4	0	8	5	13	20	4	5

Intersection	
Int Delay, s/veh	1.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	366	16	84	573	11	69
Future Vol, veh/h	366	16	84	573	11	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	411	18	94	644	12	78

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	429	0	1253	420
Stage 1	-	-	-	-	420	-
Stage 2	-	-	-	-	833	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1130	-	190	633
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	427	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1130	-	165	633
Mov Cap-2 Maneuver	-	-	-	-	165	-
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	371	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	1.08	14.83
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	456	-	-	230	-
HCM Lane V/C Ratio	0.197	-	-	0.084	-
HCM Ctrl Dly (s/v)	14.8	-	-	8.5	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.3	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	425	10	65	650	7	62
Future Vol, veh/h	425	10	65	650	7	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	478	11	73	730	8	70

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	489	0	1360	483
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	876	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1074	-	164	583
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	407	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1074	-	145	583
Mov Cap-2 Maneuver	-	-	-	-	145	-
Stage 1	-	-	-	-	620	-
Stage 2	-	-	-	-	361	-

Approach	EB	WB	NB
HCM Ctrl Dly, s/v	0	0.78	14.75
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	446	-	-	164	-
HCM Lane V/C Ratio	0.174	-	-	0.068	-
HCM Ctrl Dly (s/v)	14.8	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.6	-	-	0.2	-

Appendix C: Estimated Future Traffic Volume Maps

Exhibit C-1. 2027 Background Traffic

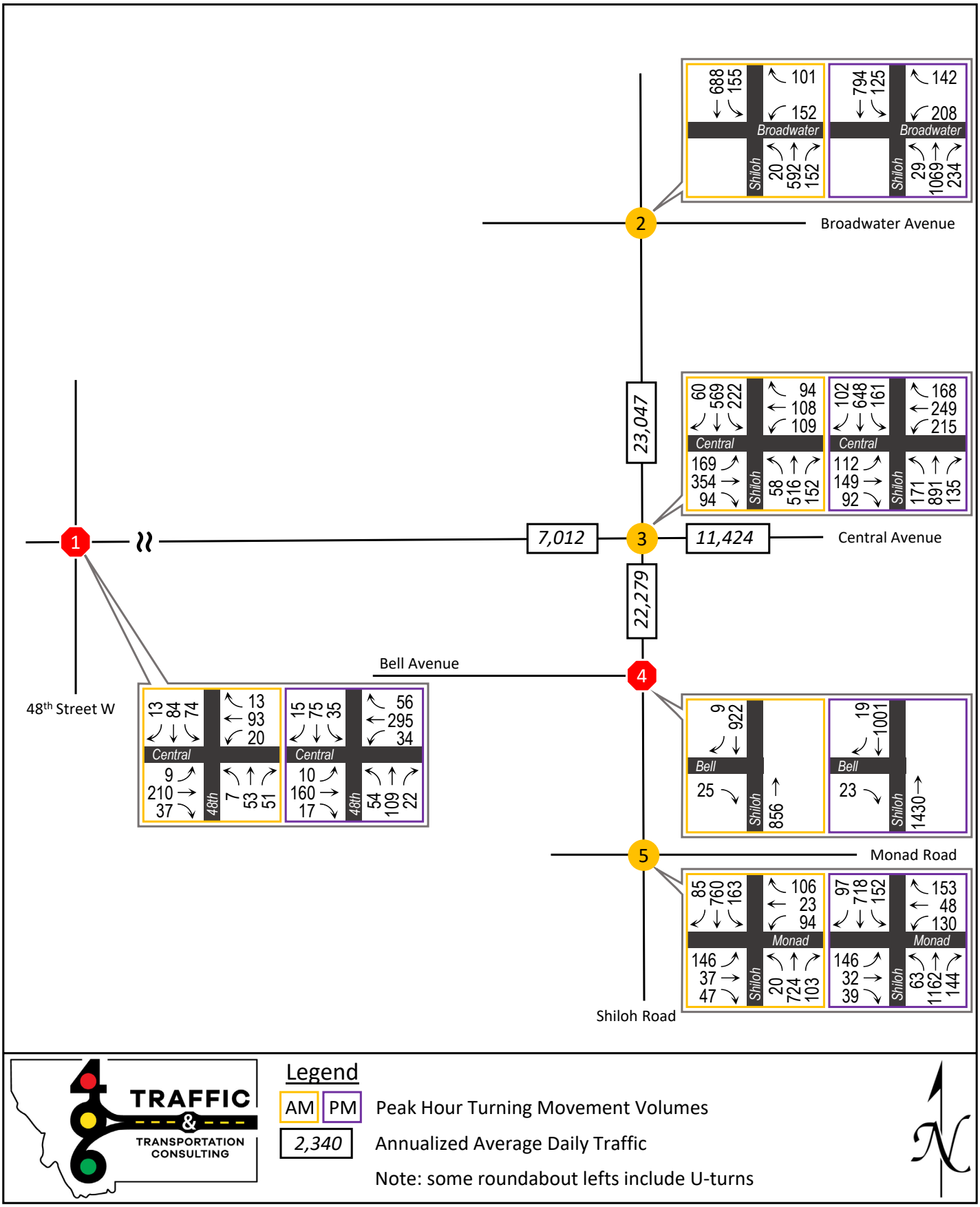


Exhibit C-2. 2027 Phase 1A Project Trips

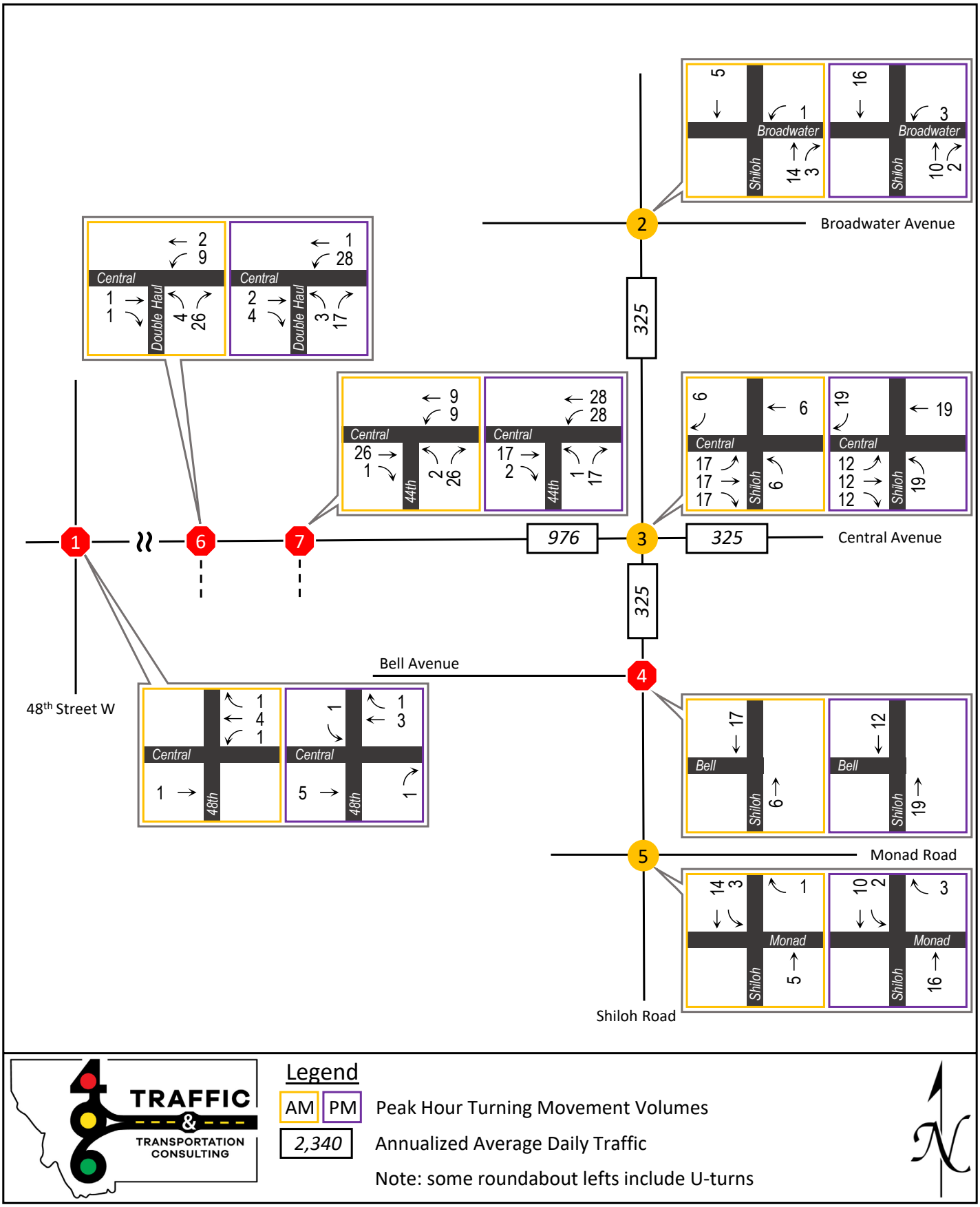


Exhibit C-3. 2027 Phase 1A Total Traffic

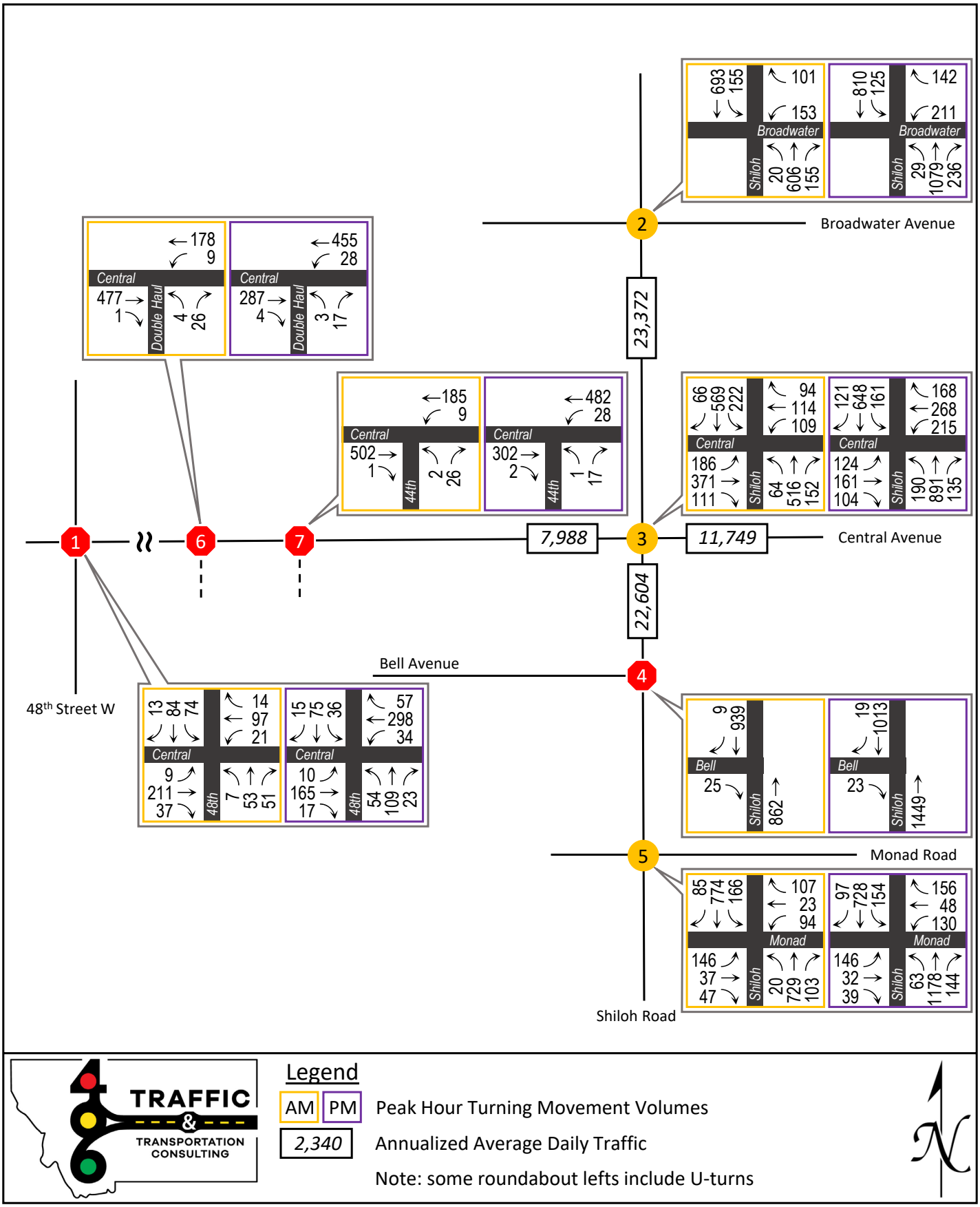


Exhibit C-4. 2029 Traffic Without Phase 1B

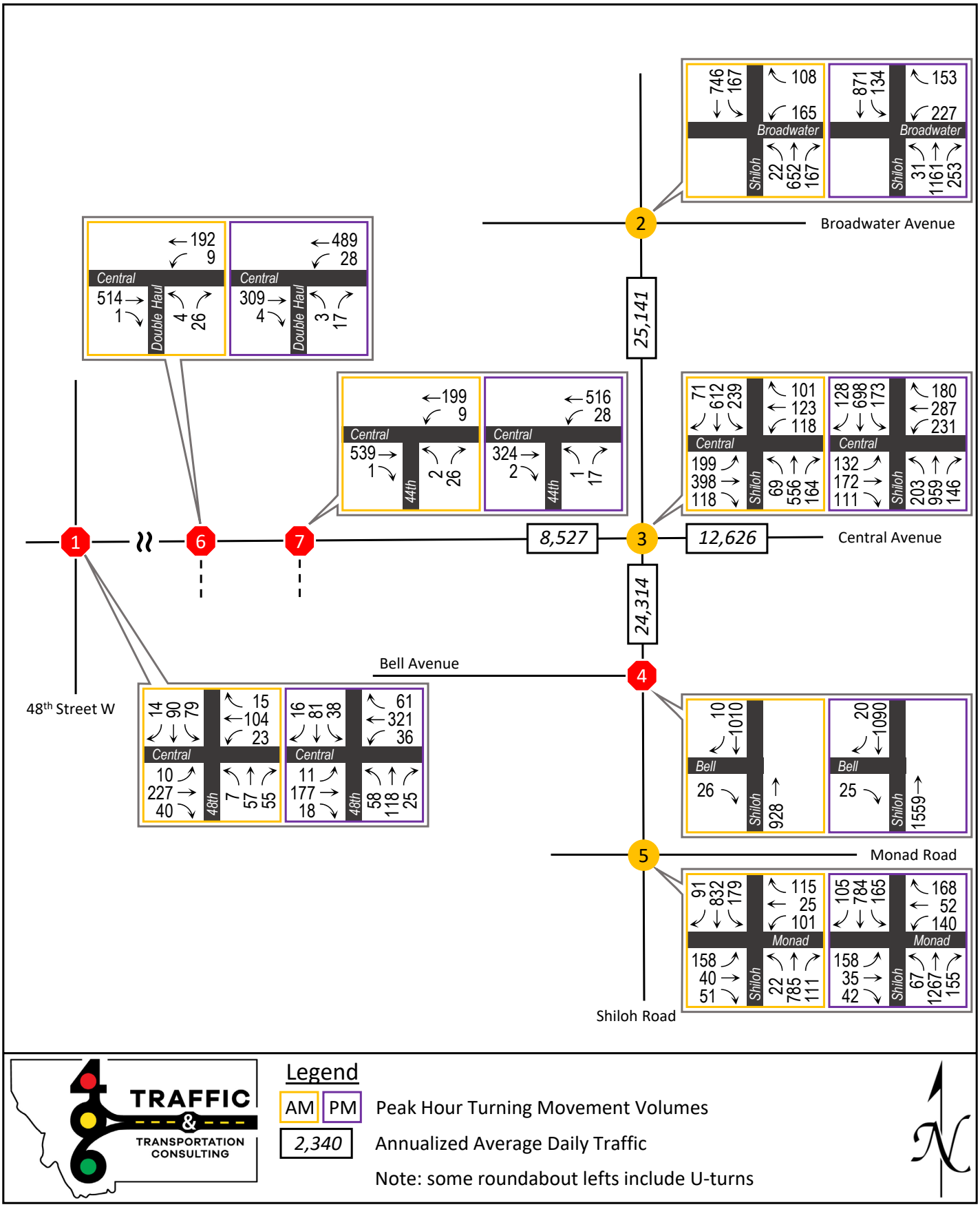


Exhibit C-5. 2029 Phase 1B Project Trips

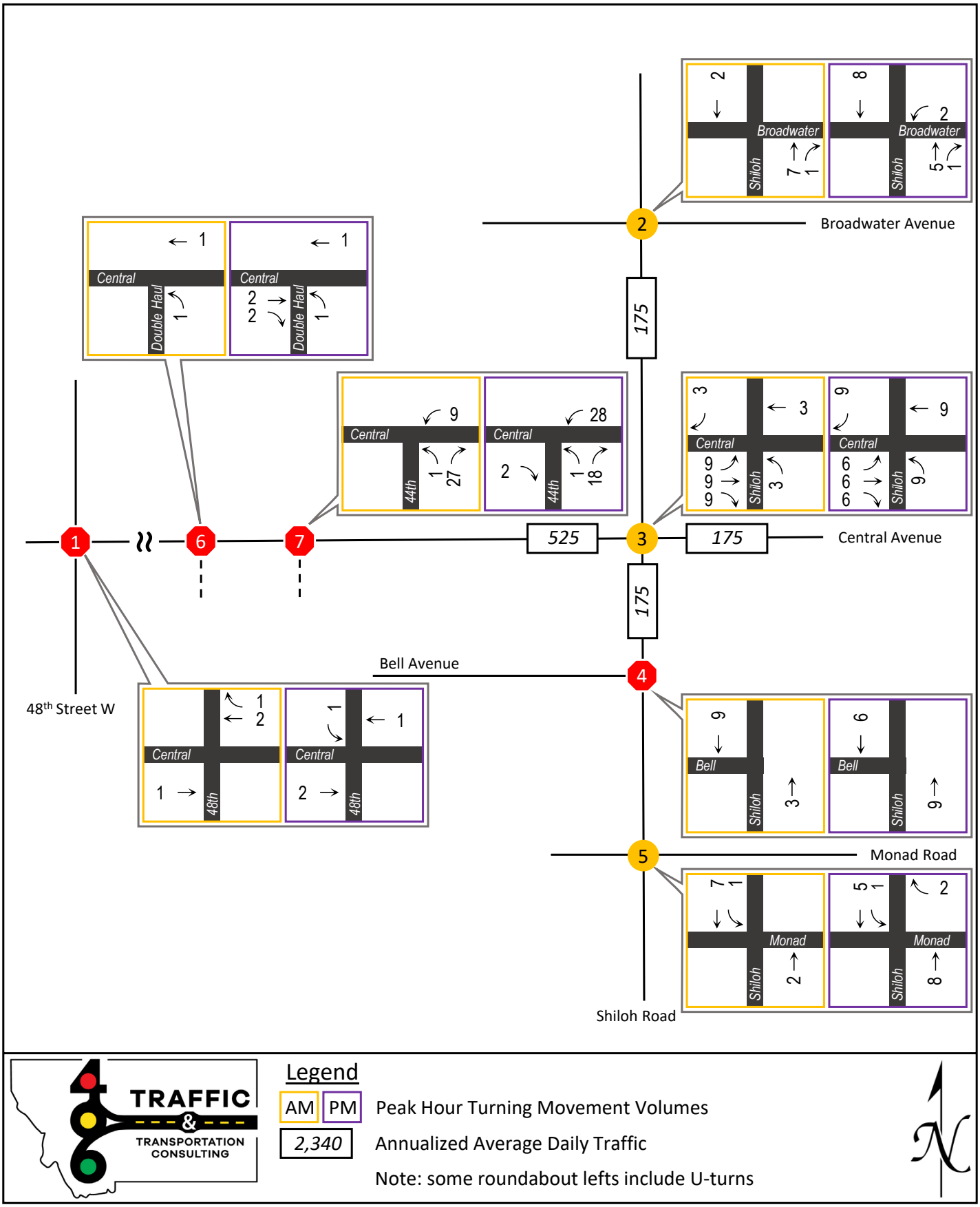


Exhibit C-6. 2029 Phase 1B Total Traffic

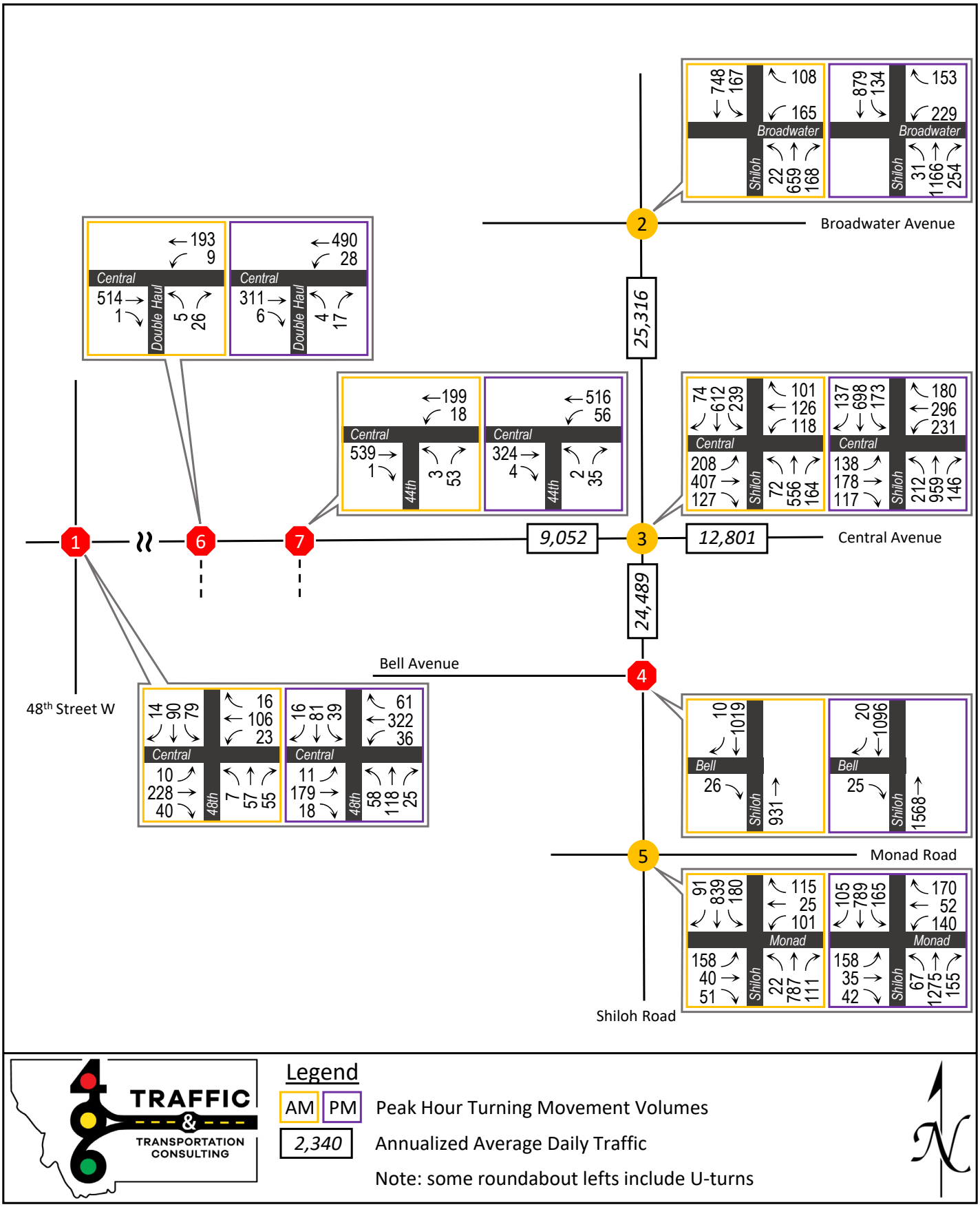


Exhibit C-7. 2031 Traffic Without Phase 1C

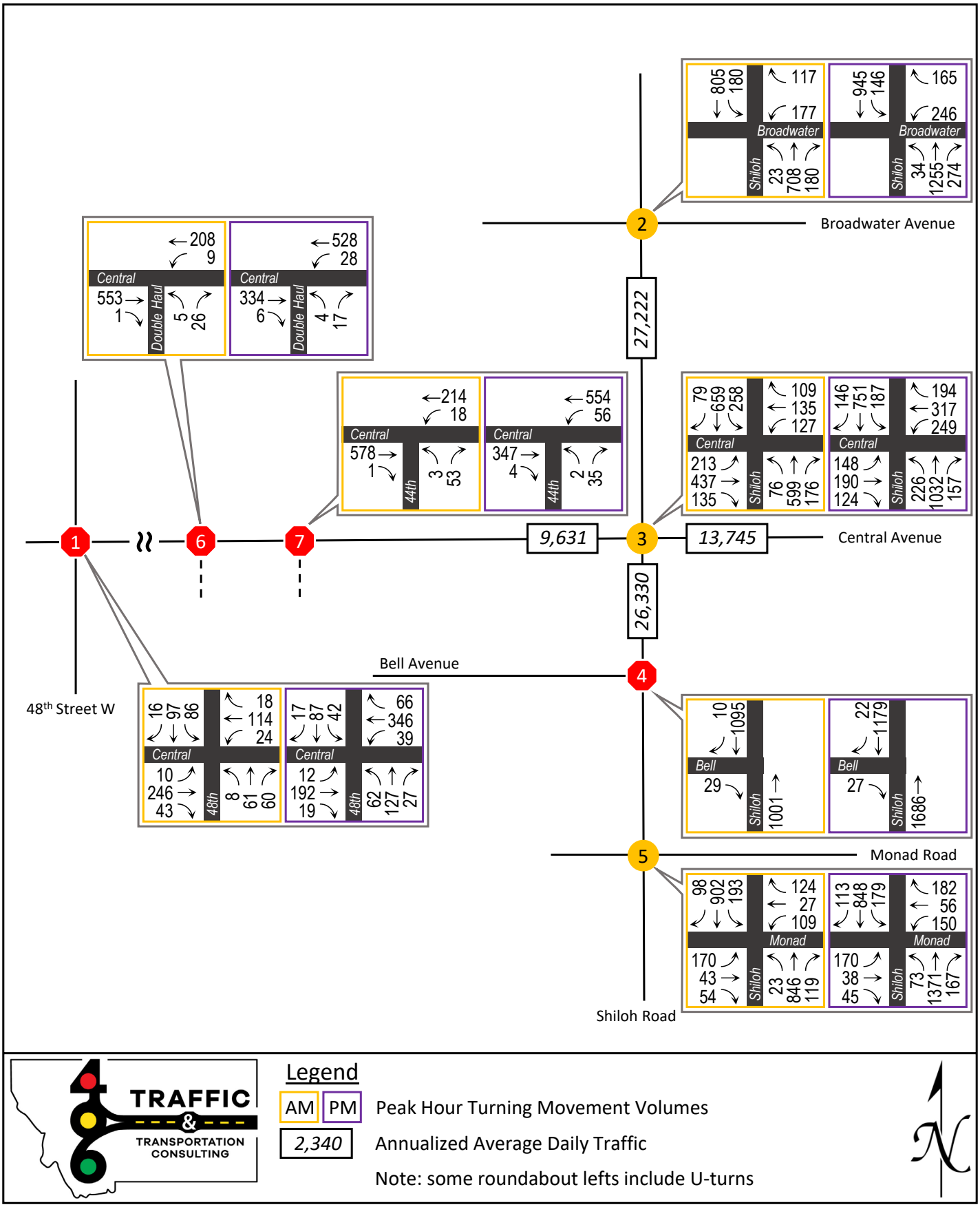


Exhibit C-8. 2031 Phase 1C Project Trips

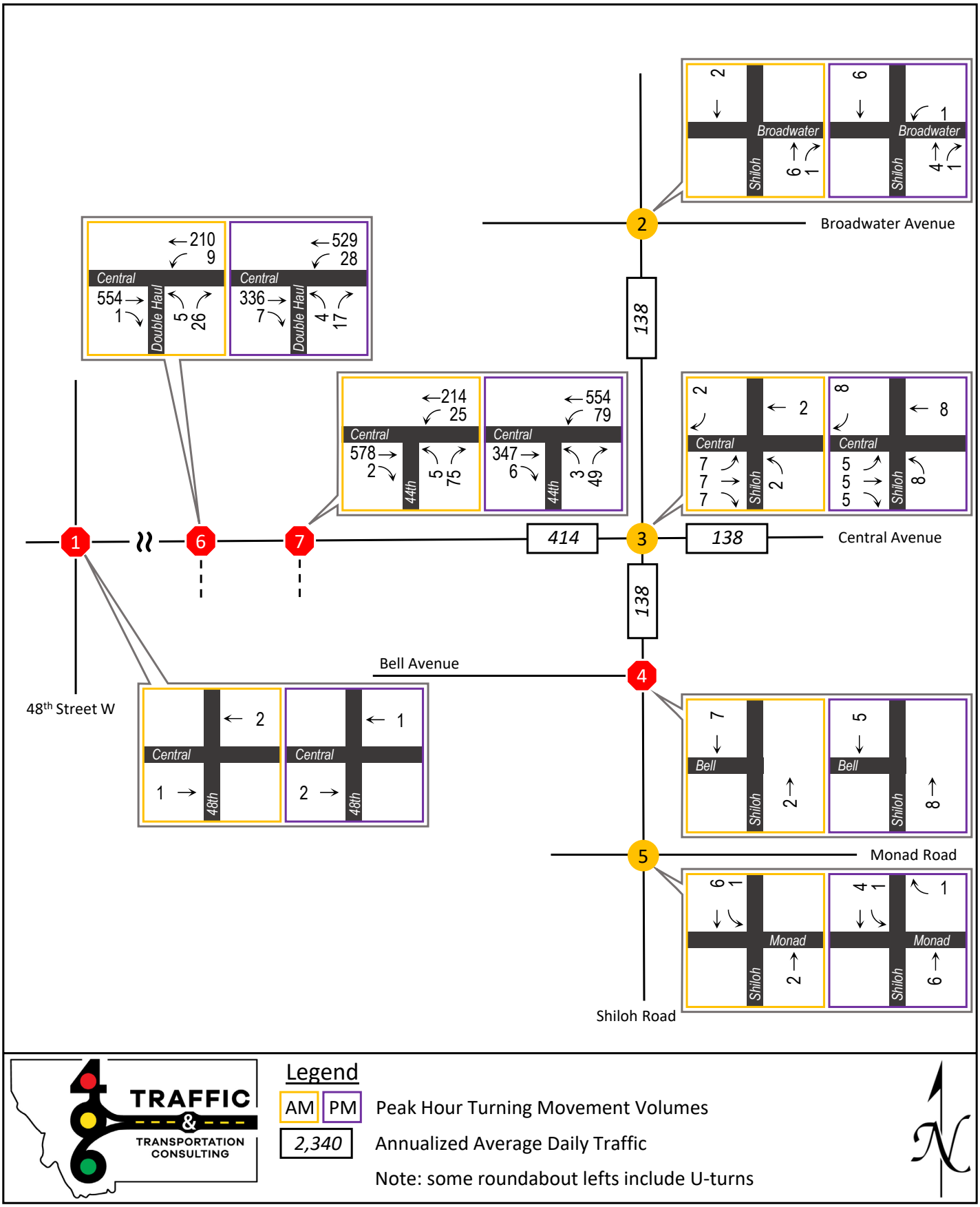


Exhibit C-9. 2031 Phase 1C Total Traffic

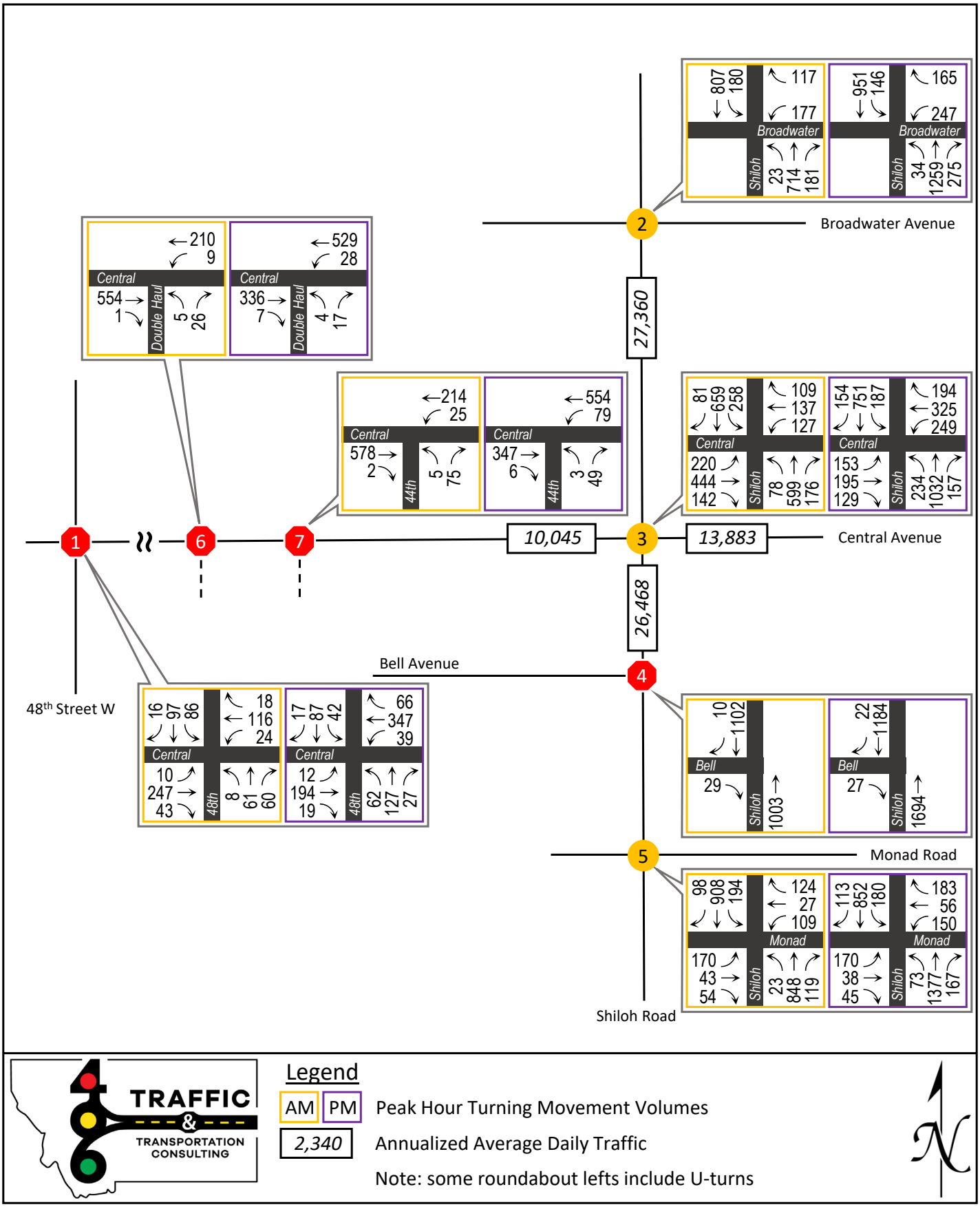


Exhibit C-10. 2033 Traffic Without Phase 2

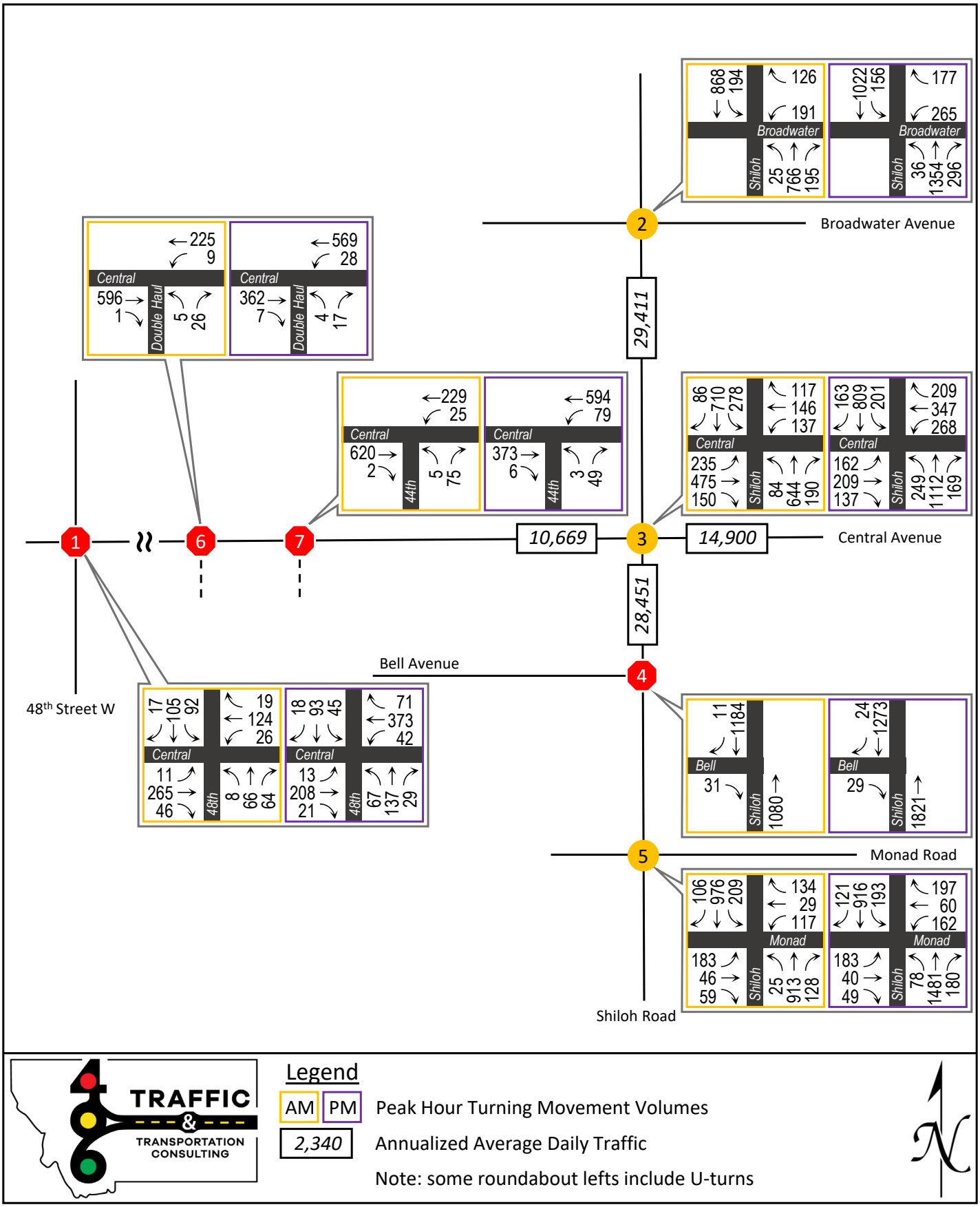


Exhibit C-11. 2033 Phase 2 Project Trips

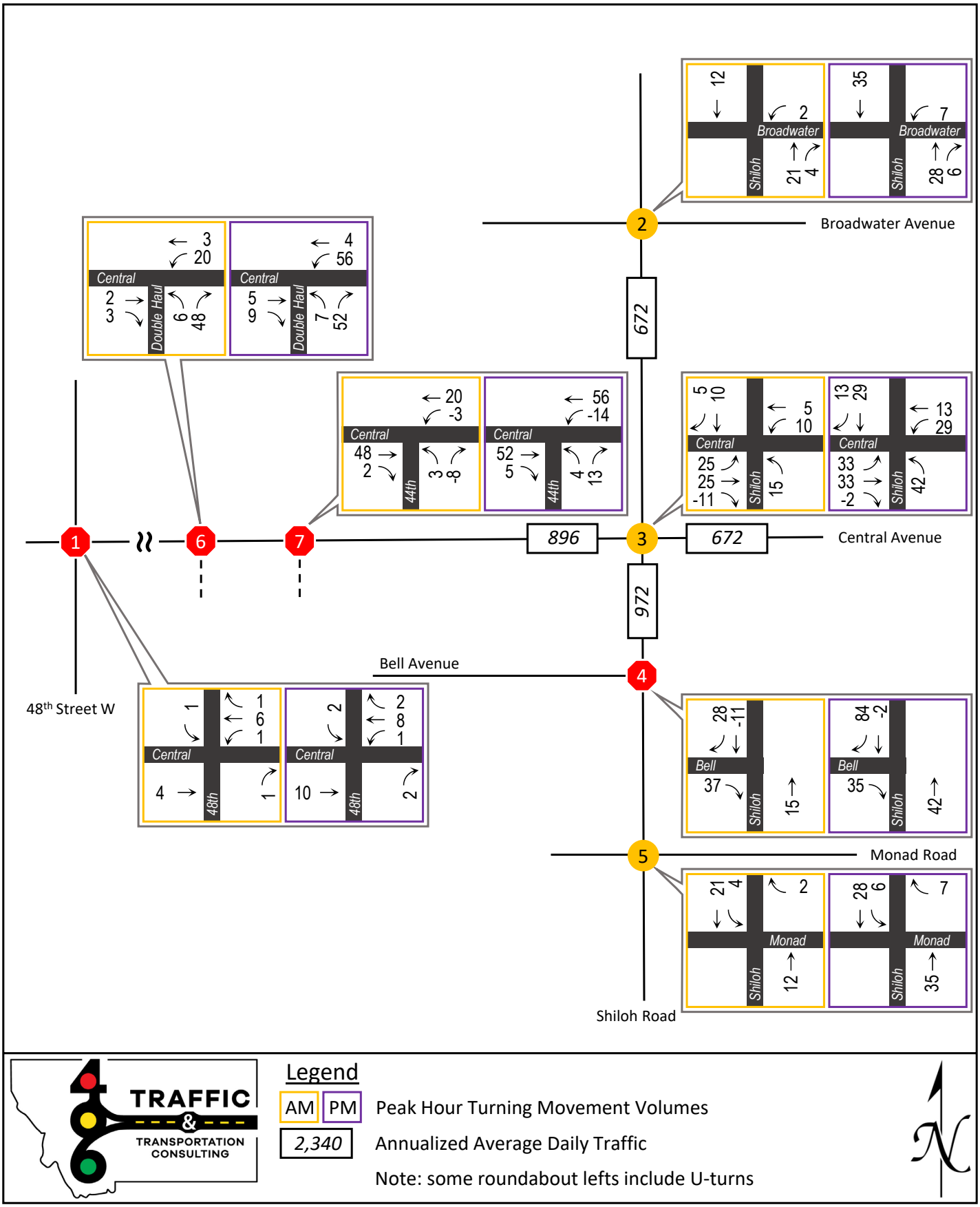
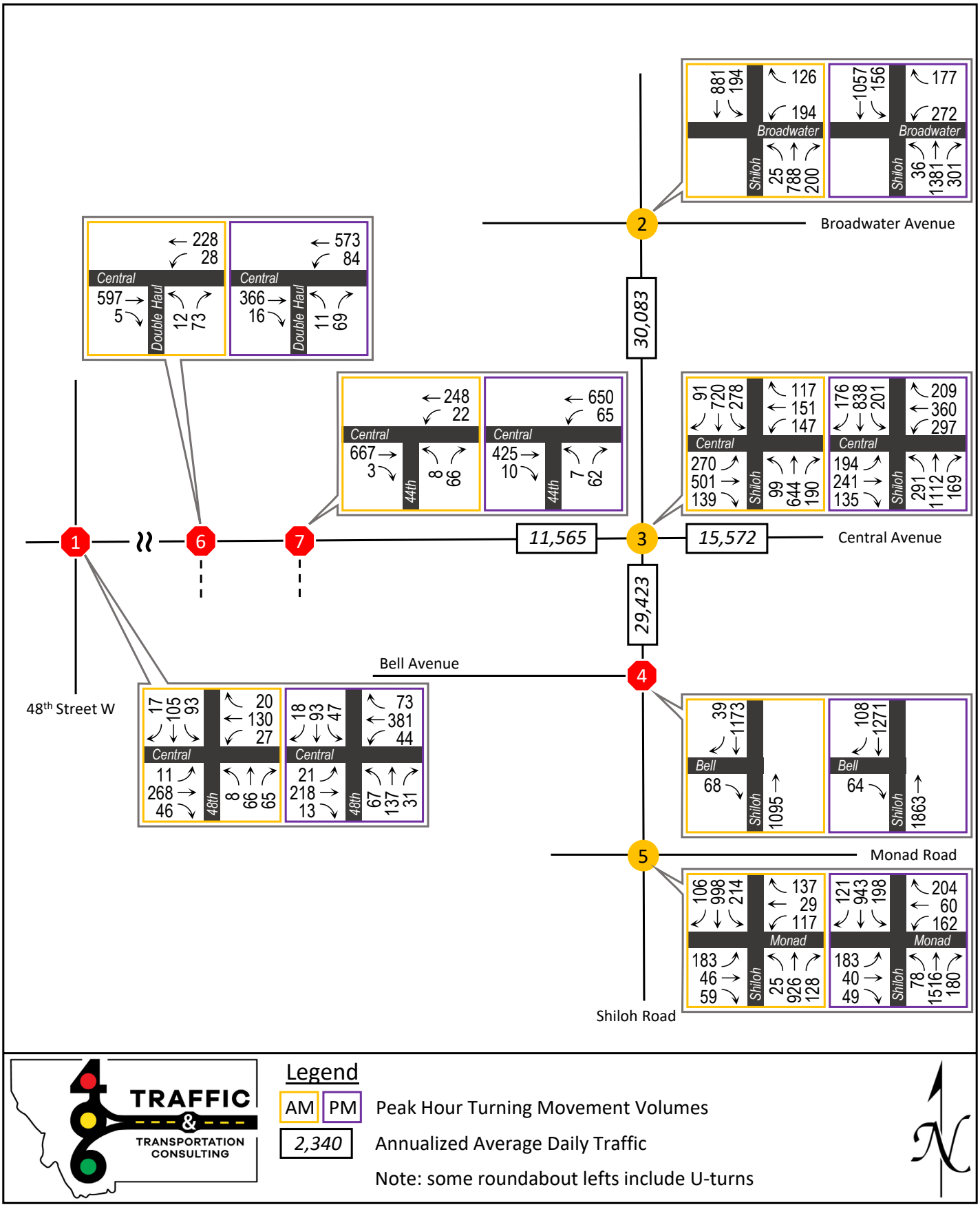
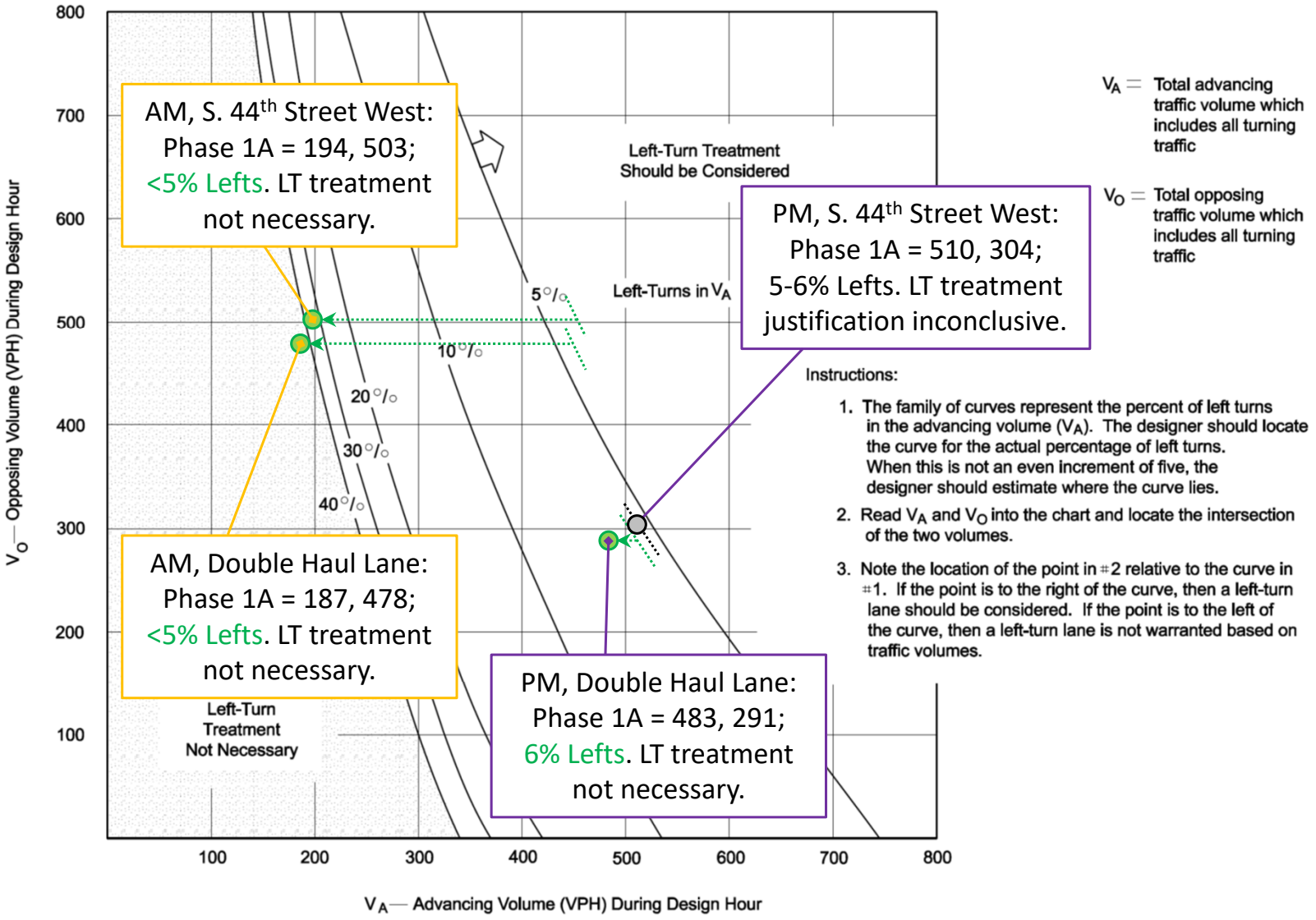


Exhibit C-12. 2033 Total Traffic with Phase 2 (Full project buildout)



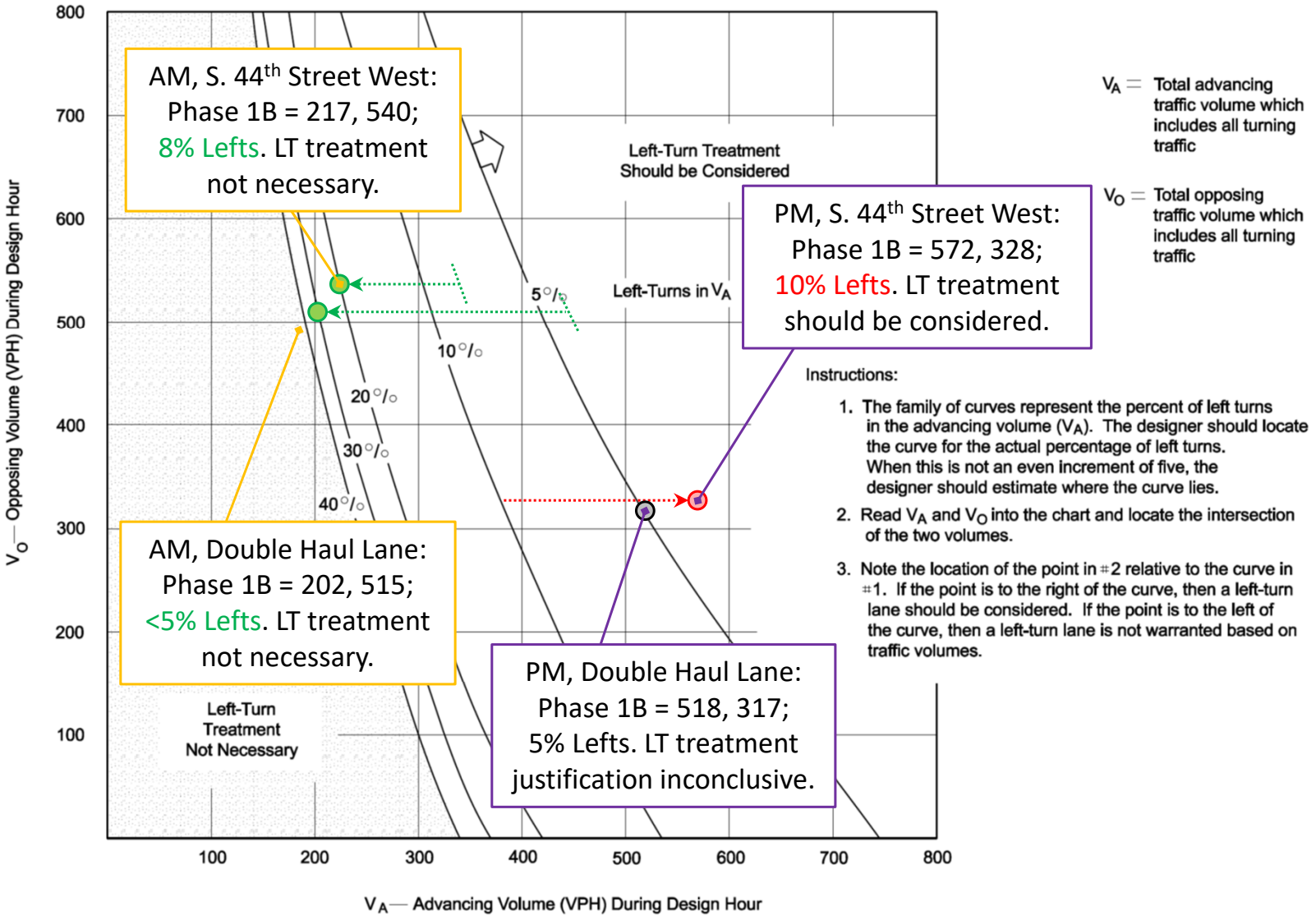
Appendix D: Auxiliary Turn Lane Analysis Charts

Exhibit D-1. 2027 Phase 1A Left Turn Lane Chart



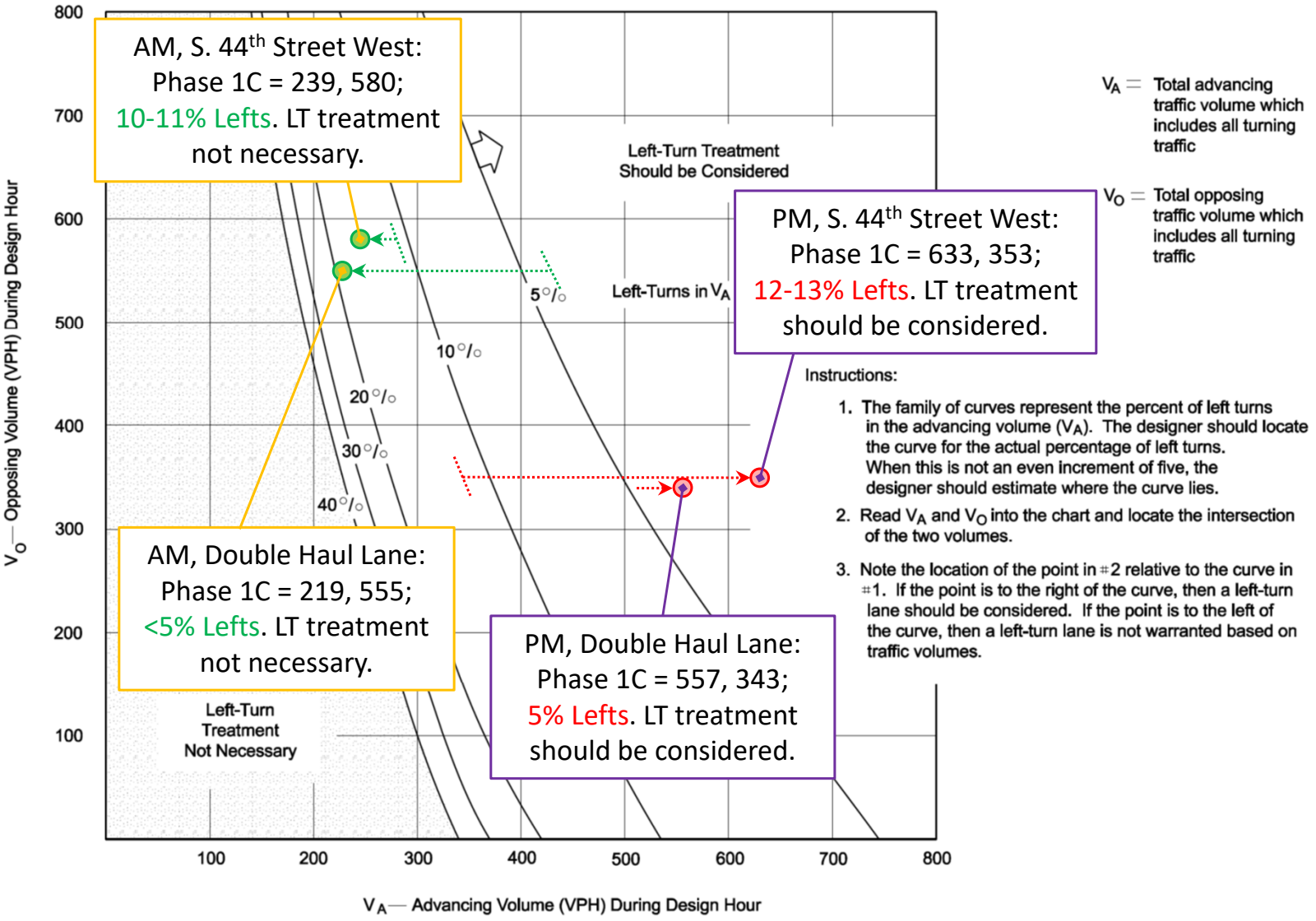
VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (45 MPH)

Exhibit D-2. 2029 Phase 1B Left Turn Lane Chart



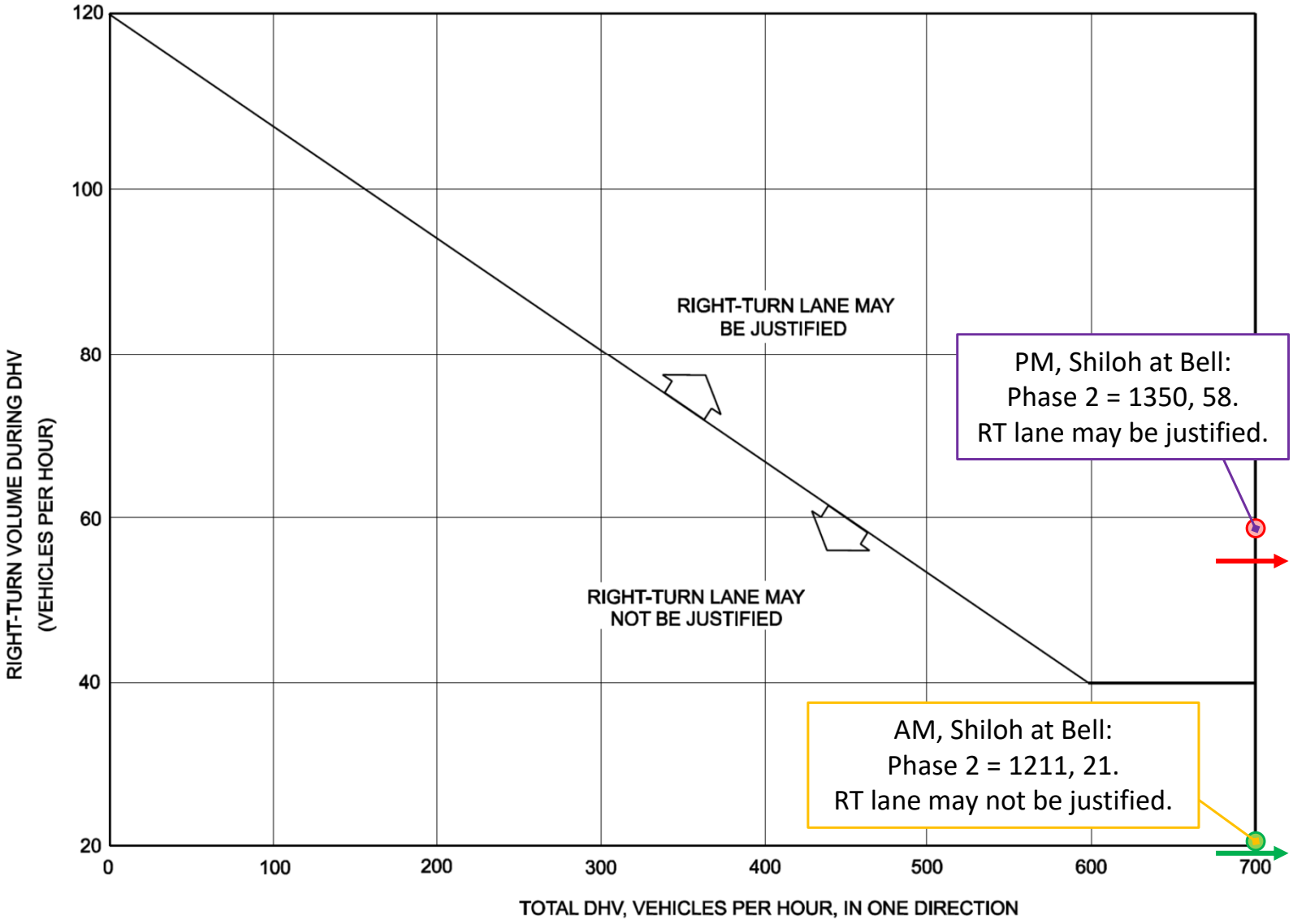
VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (45 MPH)

Exhibit D-3. 2031 Phase 1C Left Turn Lane Chart



VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (45 MPH)

Exhibit D-4. 2033 Phase 2 Right Turn Lane Chart



Note: For highways with a design speed below 50 mph (80 km/h) with a DHV < 300 and where right turns are > 40, an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Appendix E: 44th at Central Avenue Intersection Signal Warrant Summaries

Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave

Scenario: **Completion of Phase 1A in 2027**
Analysis Date: 8/13/2025 Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph Number of Approaches: 3

Traffic Volumes

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	471	452	395	354	370	373	312	263	275	255	304	207
Central Ave Westbound:	179	178	194	215	272	323	317	316	391	425	502	345
S 44th St W Northbound:	28	23	16	14	14	14	15	16	15	18	19	16
Total Entering Volume:	678	653	605	583	656	710	644	595	681	698	825	568
TEV Rank:	5	7	9	11	6	2	**8**	10	**4**	3	**1**	12
Use for:							Warrant 1		Warrant 2		Warrant 3	
Major, Both Directions:	650	630	589	569	642	696	629	579	666	680	806	552
Minor, Higher Direction:	28	23	16	14	14	14	15	16	15	18	19	16

Warrants

			Met?
1	Eight-Hour Vehicular Volume *(either condition)*	*Condition A: Large Volume of Intersecting Traffic*: Major (Both Dir.) Value 629, Minimum 350[c]; Minor (Higher Dir.) Value 15, Minimum 105[c]; Met? No. *or Condition B: Interruption of Continuous Traffic*: Major (Both Dir.) Value 629, Minimum 525[c]; Minor (Higher Dir.) Value 15, Minimum 53[c]; Met? No.	**No**
2	Four-Hour Vehicular Volume	*MUTCD Figure 4C-2 for speed over 40 mph*: Major (Both Dir.) Value 666, Minimum -; Minor (Higher Dir.) Value 15, Minimum 60; Met? No.	**No**
3	Peak Hour* *(either condition)*	*Condition A (must meet all three subconditions)*: 1. Veh-Hrs of Delay — Value 0.1, Minimum 4, Met? No; 2. Minor Volume — Value 19, Minimum 100, Met? No; 3. Total Ent. Volume — Value 825, Minimum 650, Met? Yes. *or Condition B (MUTCD Figure 4C-4)*: Major (Both Dir.) Value 806, Minimum N/A; Minor (Higher Dir.) Value 19, Minimum 75; Met? No.	**No**
4	Pedestrian Volume *(either criterion)*	*Criterion A: Four-hour (MUTCD Figure 4C-7)*: Major (Both Dir.) Value 666; Pedestrians Minimum; Met? n/a. *or Criterion B: One Hour (MUTCD Figure 4C-8)*: Major (Both Dir.) Value 806; Pedestrians Minimum; Met? n/a.	**Not Evaluated**
5	School Crossing	No students projected to cross the major street at this location.	**No**
6	Coordinated Signal System	Only one signal in the roadway network nearby.	**No**
7	Crash Experience ** Condition A not evaluated *(all conditions)*	*Condition B, 1-year Period (Table 4C-4)*: Angle+Ped Crashes Value n/a, Minimum 4; or Fatal+Injury Angle+Ped Value n/a, Minimum 3; Met? n/a. ***and*** *Condition C, 80% of Warrant 1 [Condition A]*: Major (Both Dir.) Value 629, Minimum 629; Minor (Higher Dir.) Minimum 15; Met? n/a. *or Condition B, 3-year Period (Table 4C-5)*: Angle+Ped Crashes Value n/a, Minimum 6; or Fatal+Injury Angle+Ped Value n/a, Minimum 4; Met? n/a. *or Condition C, 80% of Warrant 1 [Condition B]*: Major (Both Dir.) Value 629, Minimum 629; Minor (Higher Dir.) Minimum 15; Met? n/a. *or Condition C, 80% of Warrant 4*: Four Hour Ped; One Hour Ped; Value; Minimum; Met? n/a.	**Not Evaluated**
8	Roadway Network	Not an intersection of two or more major routes.	**No**
9	Intersection Near Grade Xing	No railroad grade crossing nearby.	**No**
		Warrants Met:	**0**
		Recommendation:	**No Signal**

Notes:

c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph

* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."

** No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave

Scenario: **Completion of Phase 1B in 2029**
Analysis Date: 8/13/2025 Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph Number of Approaches: 3

Traffic Volumes

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	506	486	425	381	399	401	336	283	296	275	328	223
Central Ave Westbound:	199	200	217	241	304	360	353	353	440	480	566	392
S 44th St W Northbound:	62	48	34	27	29	29	29	33	30	34	38	33
Total Entering Volume:	767	734	676	649	732	790	718	669	766	789	932	648
TEV Rank:	**4**	6	9	11	7	2	**8**	10	5	3	**1**	12
Use for:	Warrant 2						Warrant 1				Warrant 3	
Major, Both Directions:	705	686	642	622	703	761	689	636	736	755	894	615
Minor, Higher Direction:	62	48	34	27	29	29	29	33	30	34	38	33

Warrants

		Met?
1 Eight-Hour Vehicular Volume *(either condition)*	*Condition A: Large Volume of Intersecting Traffic* — Major (Both Dir.) Value: 689; Minimum: 350[c]; Minor (Higher Dir.) Value: 29; Minimum: 105[c]; Met? No *or Condition B: Interruption of Continuous Traffic* — Major (Both Dir.) Value: 689; Minimum: 525[c]; Minor (Higher Dir.) Value: 29; Minimum: 53[c]; Met? No	**No**
2 Four-Hour Vehicular Volume	*MUTCD Figure 4C-2 for speed over 40 mph* — Major (Both Dir.) Value: 705; Minimum: -; Minor (Higher Dir.) Value: 62; Minimum: 65; Met? Yes	**No**
3 Peak Hour* *(either condition)*	*Condition A (must meet all three subconditions)* 1. Veh-Hrs of Delay — Value: 0.1; Minimum: 4; Met? No 2. Minor Volume — Value: 38; Minimum: 100; Met? No 3. Total Ent. Volume — Value: 932; Minimum: 650; Met? Yes *or Condition B (MUTCD Figure 4C-4)* — Major (Both Dir.) Value: 894; Minimum: N/A; Minor (Higher Dir.) Value: 38; Minimum: 75; Met? No	**No**
4 Pedestrian Volume *(either criterion)*	*Criterion A: Four-hour (MUTCD Figure 4C-7)* — Major (Both Dir.) Value: 705; Minimum: ; Pedestrians Value: ; Minimum: ; Met? n/a *or Criterion B: One Hour (MUTCD Figure 4C-8)* — Major (Both Dir.) Value: 894; Minimum: ; Pedestrians Value: ; Minimum: ; Met? n/a	**Not Evaluated**
5 School Crossing	No students projected to cross the major street at this location.	**No**
6 Coordinated Signal System	Only one signal in the roadway network nearby.	**No**
7 Crash Experience ** Condition A not evaluated *(all conditions)*	*Condition B, 1-year Period (Table 4C-4)* — Angle+Ped Crashes Value: n/a; Minimum: 4; or Fatal+Injury Angle+Ped Value: n/a; Minimum: 3; Met? n/a ***and*** *Condition C, 80% of Warrant 1 [Condition A]* — Major (Both Dir.) Value: 689; Minimum: ; Minor (Higher Dir.) Value: 29; Minimum: ; Met? n/a *or Condition B, 3-year Period (Table 4C-5)* — Angle+Ped Crashes Value: n/a; Minimum: 6; or Fatal+Injury Angle+Ped Value: n/a; Minimum: 4; Met? n/a *or Condition C, 80% of Warrant 1 [Condition B]* — Major (Both Dir.) Value: 689; Minimum: ; Minor (Higher Dir.) Value: 29; Minimum: ; Met? n/a *or Condition C, 80% of Warrant 4* — Four Hour Ped Value: ; Minimum: ; One Hour Ped Value: ; Minimum: ; Met? n/a	**Not Evaluated**
8 Roadway Network	Not an intersection of two or more major routes.	**No**
9 Intersection Near Grade Xing	No railroad grade crossing nearby.	**No**
	Warrants Met:	**0**
	Recommendation:	**No Signal**

Notes:

c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph

* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."

** No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave

Scenario: **Completion of Phase 1C in 2031**
Analysis Date: 8/13/2025 Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph Number of Approaches: 3

Traffic Volumes

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	543	522	457	410	429	432	361	304	319	296	353	240
Central Ave Westbound:	219	221	239	266	335	396	388	390	487	532	626	436
S 44th St W Northbound:	87	68	48	38	41	41	41	46	42	48	54	47
Total Entering Volume:	849	811	744	714	805	869	790	740	848	876	1033	723
TEV Rank:	**4**	6	9	12	7	3	**8**	10	5	2	**1**	11
Use for:	Warrant 2						Warrant 1				Warrant 3	
Major, Both Directions:	762	743	696	676	764	828	749	694	806	828	979	676
Minor, Higher Direction:	87	68	48	38	41	41	41	46	42	48	54	47

Warrants

		Met?
1 Eight-Hour Vehicular Volume *(either condition)*	*Condition A: Large Volume of Intersecting Traffic* — Major (Both Dir.) Value 749, Minimum 350[c]; Minor (Higher Dir.) Value 41, Minimum 105[c]; Met? No. *or Condition B: Interruption of Continuous Traffic* — Major (Both Dir.) Value 749, Minimum 525[c]; Minor (Higher Dir.) Value 41, Minimum 53[c]; Met? No	**No**
2 Four-Hour Vehicular Volume	*MUTCD Figure 4C-2 for speed over 40 mph* — Major (Both Dir.) Value 762, Minimum -; Minor (Higher Dir.) Value 87, Minimum 60; Met? Yes	**Yes**
3 Peak Hour* *(either condition)*	*Condition A (must meet all three subconditions)*: 1. Veh-Hrs of Delay — Value 0.2, Minimum 4, Met? No; 2. Minor Volume — Value 54, Minimum 100, Met? No; 3. Total Ent. Volume — Value 1033, Minimum 650, Met? Yes. *or Condition B (MUTCD Figure 4C-4)* — Major (Both Dir.) Value 979, Minimum -; Minor (Higher Dir.) Value 54, Minimum 75; Met? No	**No**
4 Pedestrian Volume *(either criterion)*	*Criterion A: Four-hour (MUTCD Figure 4C-7)* — Major (Both Dir.) Value 762, Minimum -; Pedestrians Value -, Minimum -; Met? n/a. *or Criterion B: One Hour (MUTCD Figure 4C-8)* — Major (Both Dir.) Value 979, Minimum -; Pedestrians Value -, Minimum -; Met? n/a	**Not Evaluated**
5 School Crossing	No students projected to cross the major street at this location.	**No**
6 Coordinated Signal System	Only one signal in the roadway network nearby.	**No**
7 Crash Experience ** Condition A not evaluated *(all conditions)*	*Condition B, 1-year Period (Table 4C-4)* — Angle+Ped Crashes Value n/a, Minimum 4; or Fatal+Injury Angle+Ped Value n/a, Minimum 3; Met? n/a. *or Condition B, 3-year Period (Table 4C-5)* — Angle+Ped Crashes Value n/a, Minimum 6; or Fatal+Injury Angle+Ped Value n/a, Minimum 4; Met? n/a. ***and*** *Condition C, 80% of Warrant 1 [Condition A]* — Major (Both Dir.) Value 749, Minimum -; Minor (Higher Dir.) Value 41, Minimum -; Met? n/a. *or Condition C, 80% of Warrant 1 [Condition B]* — Major (Both Dir.) Value 749, Minimum -; Minor (Higher Dir.) Value 41, Minimum -; Met? n/a. *or Condition C, 80% of Warrant 4* — Four Hour Ped Value -, Minimum -; One Hour Ped Value -, Minimum -; Met? n/a	**Not Evaluated**
8 Roadway Network	Not an intersection of two or more major routes.	**No**
9 Intersection Near Grade Xing	No railroad grade crossing nearby.	**No**
	Warrants Met:	**1**
	Recommendation:	**No Signal**

Notes:

c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph

* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."

** No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

Traffic Signal Needs Analysis Summary: S 44th St W at Central Ave

Scenario: **Completion of Phase 2 in 2033**
Analysis Date: 8/13/2025 Conducted by: 406 Traffic & Transportation Consulting
Major Street: Central Ave (E/W), 1 moving lane per direction Minor Street: S 44th St W (N/S), 1 moving lane per direction
Speed Limit: 45 mph Number of Approaches: 3

Traffic Volumes

Hour:	1	2	3	4	5	6	7	8	9	10	11	12
Start Time:	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Central Ave Eastbound:	610	596	527	481	500	503	431	366	389	369	430	306
Central Ave Westbound:	251	266	258	264	301	325	461	461	574	628	728	521
S 44th St W Northbound:	106	83	59	48	50	52	52	58	54	62	67	58
Total Entering Volume:	967	945	844	793	851	880	944	885	1017	1059	1225	885
TEV Rank:	**4**	5	11	12	10	9	6	7	3	2	**1**	**8**
Use for:	Warrant 2										Warrant 3	Warrant 1
Major, Both Directions:	861	862	785	745	801	828	892	828	963	997	1158	827
Minor, Higher Direction:	106	83	59	48	50	52	52	58	54	62	67	58

Warrants

		Met?
1 Eight-Hour Vehicular Volume *(either condition)*	*Condition A: Large Volume of Intersecting Traffic* — Major (Both Dir.) Value 827, Minimum 350[c]; Minor (Higher Dir.) Value 58, Minimum 105[c]; Met? No. *or Condition B: Interruption of Continuous Traffic* — Major (Both Dir.) Value 827, Minimum 525[c]; Minor (Higher Dir.) Value 58, Minimum 53[c]; Met? Yes	**Yes**
2 Four-Hour Vehicular Volume	*MUTCD Figure 4C-2 for speed over 40 mph* — Major (Both Dir.) Value 861, Minimum -; Minor (Higher Dir.) Value 106, Minimum 60; Met? Yes	**Yes**
3 Peak Hour* *(either condition)*	*Condition A (must meet all three subconditions)*: 1. Veh-Hrs of Delay — Value 0.3, Minimum 4; 2. Minor Volume — Value 67, Minimum 100; Met? No; 3. Total Ent. Volume — Value 1225, Minimum 650; Met? Yes. *or Condition B (MUTCD Figure 4C-4)* — Major (Both Dir.) Value 1158, Minimum -; Minor (Higher Dir.) Value 67, Minimum 75; Met? No	**No**
4 Pedestrian Volume *(either criterion)*	*Criterion A: Four-hour (MUTCD Figure 4C-7)* — Major (Both Dir.) Value 861, Minimum; Pedestrians Value, Minimum; Met? n/a. *or Criterion B: One Hour (MUTCD Figure 4C-8)* — Major (Both Dir.) Value 1158, Minimum; Pedestrians Value, Minimum; Met? n/a	**Not Evaluated**
5 School Crossing	No students projected to cross the major street at this location.	**No**
6 Coordinated Signal System	Only one signal in the roadway network nearby.	**No**
7 Crash Experience ** Condition A not evaluated *(all conditions)*	*Condition B, 1-year Period (Table 4C-4)* — Angle+Ped Crashes Value n/a, Minimum 4; or Fatal+Injury Angle+Ped Value n/a, Minimum 3; Met? n/a. *or Condition B, 3-year Period (Table 4C-5)* — Angle+Ped Crashes Value n/a, Minimum 6; or Fatal+Injury Angle+Ped Value n/a, Minimum 4; Met? n/a. ***and*** *Condition C, 80% of Warrant 1 [Condition A]* — Major (Both Dir.) Value 827, Minimum; Minor (Higher Dir.) Value 58, Minimum; Met? n/a. *or Condition C, 80% of Warrant 1 [Condition B]* — Major (Both Dir.) Value 827, Minimum; Minor (Higher Dir.) Value 58, Minimum; Met? n/a. *or Condition C, 80% of Warrant 4* — Four Hour Ped; One Hour Ped Value, Minimum; Met? n/a	**Not Evaluated**
8 Roadway Network	Not an intersection of two or more major routes.	**No**
9 Intersection Near Grade Xing	No railroad grade crossing nearby.	**No**
	Warrants Met:	**2**
	Recommendation:	**Consider Signal**

Notes:

c: Warrant 1 minimum values used for "70%" to account to reflect major-street speed over 40 mph

* Warrant 3, Peak Hour, is indicated by the MUTCD as follows: "This signal warrant should be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."

** No trial of alternatives with observance and enforcement has been attempted for crash reduction at this location.

Appendix F: Intersection Cost Participation Calculations

City of Billings Intersection Cost Participation Worksheet: Clearwater/44 West Phase 1A + Phase 2 Retail

1: Central at 48th

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	3	3	**10**	**10**
WB L	1	1	1	**1**	**1**
WB T	1	**5**	**5**	8	8
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	**0**	**0**	**2**	**2**
SB T	1	No project traffic			
NB L	1				
Project **Critical** Lane Volume			**5**		**13**
Critical Lane Capacity			1200		1200
% Increase			0.4%		1.1%
Max % Increase			1.1%		

2: Shiloh at Broadwater

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1	**2**	**2**	**6**	**6**
WB T	1	No project traffic			
EB L	1				
NB T	2	**19**	**10**	26	13
SB L	1	No project traffic			
SB T	2	12	6	**32**	**16**
NB L	1	No project traffic			
Project **Critical** Lane Volume			**12**		**22**
Critical Lane Capacity			1140		1140
% Increase			1.1%		1.9%
Max % Increase			1.9%		

3: Shiloh at Central

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	2	23	12	32	16
WB L	1	No project traffic			
WB T	2	**14**	**7**	**38**	**19**
EB L	1	**23**	**23**	**32**	**32**
NB T	2	No project traffic			
SB L	1				
SB T	2				
NB L	1	**14**	**14**	**38**	**38**
Project **Critical** Lane Volume			**44**		**89**
Critical Lane Capacity			1200		1200
% Increase			3.7%		7.4%
Max % Increase			7.4%		

5: Shiloh at Monad

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1				
WB T	1				
EB L	1				
NB T	2	**12**	**6**	**32**	**16**
SB L	1	**4**	**4**	**5**	**5**
SB T	2	19	10	26	13
NB L	1	No project traffic			
Project **Critical** Lane Volume			**10**		**21**
Critical Lane Capacity			1200		1200
% Increase			0.8%		1.8%
Max % Increase			1.8%		

6: West Central Ave Site Access (Double Haul Lane)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	**1**	**1**	**2**	**2**
WB L	1	**34**	**34**	**86**	**86**
WB T	1	2	2	1	1
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0				
SB T	0				
NB L	1	**6**	**6**	**10**	**10**
Project **Critical** Lane Volume			**41**		**98**
Critical Lane Capacity			1140		1140
% Increase			3.6%		8.6%
Max % Increase			8.6%		

7:East Central Ave Site Access (S. 44th St W.)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	**43**	**43**	**76**	**76**
WB L	1	**9**	**9**	**28**	**28**
WB T	1	34	34	86	86
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1				
SB T	1				
NB L	1	**2**	**2**	**1**	**1**
Project **Critical** Lane Volume			**54**		**105**
Critical Lane Capacity			1140		1140
% Increase			4.7%		9.2%
Max % Increase			9.2%		

City of Billings Intersection Cost Participation Worksheet: Clearwater Phase 1B

1: Central at 48th

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	1	1	**2**	**2**
WB L	1	No project traffic			
WB T	1	**2**	**2**	1	1
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	**0**	**0**	**1**	**1**
SB T	1	No project traffic			
NB L	1				
Project **Critical** Lane Volume			**2**		**3**
Critical Lane Capacity			1200		1200
% Increase			0.2%		0.3%
Max % Increase			0.3%		

2: Shiloh at Broadwater

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1	**0**	**0**	**2**	**2**
WB T	1	No project traffic			
EB L	1				
NB T	2	**7**	**4**	5	3
SB L	1	No project traffic			
SB T	2	2	1	**8**	**4**
NB L	1	No project traffic			
Project **Critical** Lane Volume			**4**		**6**
Critical Lane Capacity			1140		1140
% Increase			0.4%		0.5%
Max % Increase			0.5%		

3: Shiloh at Central

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	2	**9**	**5**	6	3
WB L	1	No project traffic			
WB T	2	3	2	**9**	**5**
EB L	1	9	9	**6**	**6**
NB T	2	No project traffic			
SB L	1				
SB T	2				
NB L	1	**3**	**3**	**9**	**9**
Project **Critical** Lane Volume			**14**		**20**
Critical Lane Capacity			1200		1200
% Increase			1.2%		1.7%
Max % Increase			1.7%		

5: Shiloh at Monad

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1				
WB T	1				
EB L	1				
NB T	2	2	1	**8**	**4**
SB L	1	1	1	**1**	**1**
SB T	2	**7**	**4**	5	3
NB L	1	No project traffic			
Project **Critical** Lane Volume			**4**		**5**
Critical Lane Capacity			1200		1200
% Increase			0.3%		0.4%
Max % Increase			0.4%		

6: West Central Ave Site Access (Double Haul Lane)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	0	0	**2**	**2**
WB L	1	No project traffic			
WB T	1	**1**	**1**	1	1
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0				
SB T	0				
NB L	1	**1**	**1**	**1**	**1**
Project **Critical** Lane Volume			**2**		**3**
Critical Lane Capacity			1140		1140
% Increase			0.2%		0.3%
Max % Increase			0.3%		

7:East Central Ave Site Access (S. 44th St W.)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1	**9**	**9**	**28**	**28**
WB T	1	No project traffic			
EB L	1				
NB T	1	No project traffic			
SB L	1				
SB T	1				
NB L	1	**1**	**1**	**1**	**1**
Project **Critical** Lane Volume			**10**		**29**
Critical Lane Capacity			1140		1140
% Increase			0.9%		2.5%
Max % Increase			2.5%		

City of Billings Intersection Cost Participation Worksheet: Clearwater Phase 1C

1: Central at 48th

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	1	1	**2**	**2**
WB L	1	0	0	**0**	**0**
WB T	1	**2**	**2**	1	1
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	**0**	**0**	**0**	**0**
SB T	1	No project traffic			
NB L	1				
Project **Critical** Lane Volume			**2**		**2**
Critical Lane Capacity			1200		1200
% Increase			0.2%		0.2%
Max % Increase			0.2%		

2: Shiloh at Broadwater

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1	**0**	**0**	**1**	**1**
WB T	1	No project traffic			
EB L	1				
NB T	2	**6**	**3**	4	2
SB L	1	No project traffic			
SB T	2	2	1	**6**	**3**
NB L	1	No project traffic			
Project **Critical** Lane Volume			**3**		**4**
Critical Lane Capacity			1140		1140
% Increase			0.3%		0.4%
Max % Increase			0.4%		

3: Shiloh at Central

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	2	7	4	5	3
WB L	1	No project traffic			
WB T	2	**2**	**1**	**8**	**4**
EB L	1	**7**	**7**	**5**	**5**
NB T	2	No project traffic			
SB L	1				
SB T	2				
NB L	1	**2**	**2**	**8**	**8**
Project **Critical** Lane Volume			**10**		**17**
Critical Lane Capacity			1200		1200
% Increase			0.8%		1.4%
Max % Increase			1.4%		

5: Shiloh at Monad

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1				
WB T	1				
EB L	1				
NB T	2	2	1	**6**	**3**
SB L	1	1	1	**1**	**1**
SB T	2	**6**	**3**	4	2
NB L	1	No project traffic			
Project **Critical** Lane Volume			**3**		**4**
Critical Lane Capacity			1200		1200
% Increase			0.3%		0.3%
Max % Increase			0.3%		

6: West Central Ave Site Access (Double Haul Lane)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	1	1	**2**	**2**
WB L	1	No project traffic			
WB T	1	**2**	**2**	1	1
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0				
SB T	0				
NB L	1	**0**	**0**	**0**	**0**
Project **Critical** Lane Volume			**2**		**2**
Critical Lane Capacity			1140		1140
% Increase			0.2%		0.2%
Max % Increase			0.2%		

7:East Central Ave Site Access (S. 44th St W.)

Lane Group (**critical**)	Lanes	AM Peak Hour Vproject	AM Peak Hour Per Lane	PM Peak Hour Vproject	PM Peak Hour Per Lane
EB T	1	No project traffic			
WB L	1	**7**	**7**	**23**	**23**
WB T	1	No project traffic			
EB L	1				
NB T	1	No project traffic			
SB L	1				
SB T	1				
NB L	1	**2**	**2**	**1**	**1**
Project **Critical** Lane Volume			**9**		**24**
Critical Lane Capacity			1140		1140
% Increase			0.8%		2.1%
Max % Increase			2.1%		

City of Billings Intersection Cost Participation Worksheet: Clearwater Phase 2 (residential only, no retail)

1: Central at 48th

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	1	2	2	**5**	**5**
WB L	1	1	1	**1**	**1**
WB T	1	**5**	**5**	3	3
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1	**0**	**0**	**1**	**1**
SB T	1	No project traffic			
NB L	1				
Project **Critical** Lane Volume			**5**		**7**
Critical Lane Capacity			1200		1200
% Increase			0.4%		0.6%
Max % Increase			0.6%		

2: Shiloh at Broadwater

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1	**1**	**1**	**4**	**4**
WB T	1	No project traffic			
EB L	1				
NB T	2	**16**	**8**	11	6
SB L	1	No project traffic			
SB T	2	5	3	**19**	**10**
NB L	1	No project traffic			
Project **Critical** Lane Volume			**9**		**14**
Critical Lane Capacity			1140		1140
% Increase			0.8%		1.2%
Max % Increase			1.2%		

3: Shiloh at Central

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	2	20	10	13	7
WB L	1	3	3	11	11
WB T	2	**3**	**2**	**11**	**6**
EB L	1	**20**	**20**	**13**	**13**
NB T	2	No project traffic			
SB L	1				
SB T	2	**4**	**2**	**14**	**7**
NB L	1	**4**	**4**	**14**	**14**
Project **Critical** Lane Volume			**28**		**40**
Critical Lane Capacity			1200		1200
% Increase			2.3%		3.3%
Max % Increase			3.3%		

5: Shiloh at Monad

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	1	No project traffic			
WB L	1				
WB T	1				
EB L	1				
NB T	2	5	3	**19**	**10**
SB L	1	3	3	**2**	**2**
SB T	2	**16**	**8**	11	6
NB L	1	No project traffic			
Project **Critical** Lane Volume			**8**		**12**
Critical Lane Capacity			1200		1200
% Increase			0.7%		1.0%
Max % Increase			1.0%		

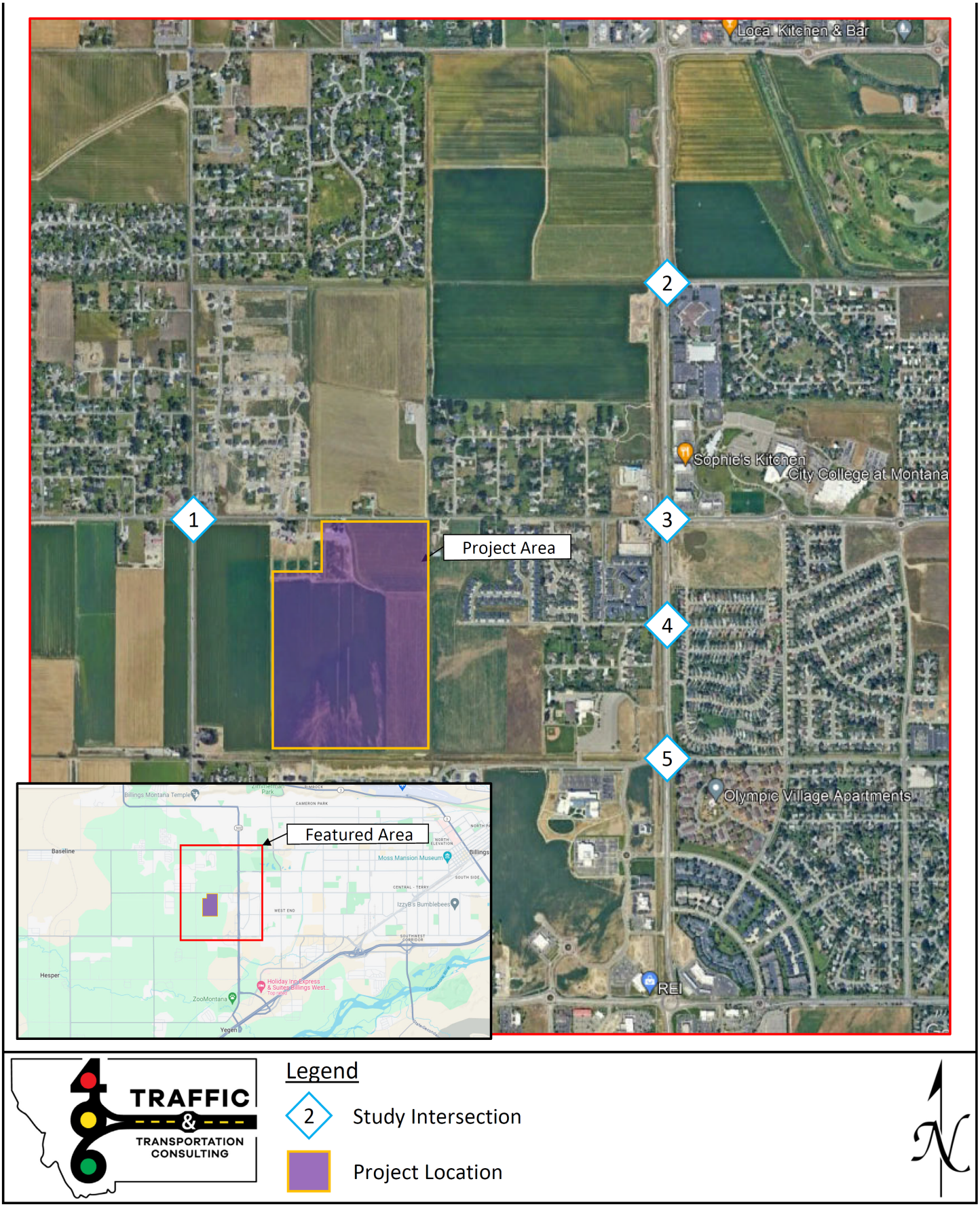
6: West Central Ave Site Access (Double Haul Lane)

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	1	**1**	**1**	**3**	**3**
WB L	1	**5**	**5**	**17**	**17**
WB T	1	3	3	2	2
EB L	0	No project traffic			
NB T	0	No project traffic			
SB L	0				
SB T	0				
NB L	1	**4**	**4**	**3**	**3**
Project **Critical** Lane Volume			**10**		**23**
Critical Lane Capacity			1140		1140
% Increase			0.9%		2.0%
Max % Increase			2.0%		

7:East Central Ave Site Access (S. 44th St W.)

Lane Group		AM Peak Hour		PM Peak Hour	
(**critical**)	Lanes	Vproject	Per Lane	Vproject	Per Lane
EB T	1	**20**	**20**	**13**	**13**
WB L	1	**5**	**5**	**17**	**17**
WB T	1	5	5	17	17
EB L	1	No project traffic			
NB T	1	No project traffic			
SB L	1				
SB T	1				
NB L	1	**3**	**3**	**2**	**2**
Project **Critical** Lane Volume			**28**		**32**
Critical Lane Capacity			1140		1140
% Increase			2.5%		2.8%
Max % Increase			2.8%		

Exhibit 1. Overall Site Location and Study Intersections



Planning Board

Date:	06/23/2026
Title:	Shop House Acres Subdivision, County Major Preliminary Plat - Public Hearing
Presented by:	David Green
Department:	Planning & Community Services
Presentation:	Yes

Information

RECOMMENDATION

Staff recommends the Planning Board recommend to Board of County Commissioners that the preliminary plat of Shop House Acres Subdivision be conditionally approved, variances accepted, and the Findings of Fact adopted as presented in the staff report.

BACKGROUND (Consistency with Adopted Plans and Policies, if applicable)

On May 1, 2026, IMEG, for Levi Britton, applied for preliminary major plat approval of Shop House Acres Subdivision. The subdivision will create 49 lots for residential/commercial development. The subject property is generally located west of South 80th Street West, south of Wisner Avenue which is south of King Avenue West. Tax ID D00207. This parcel of land is outside county zoning. These lots will be for shop buildings for businesses and hobby shops. There will be cisterns and septic available at each lot should the lot purchaser want to include a single bedroom dwelling unit with the shop. Shop World 406 LLC, located south of Monad Road and east of Eggebrecht Lane is another example of shops with some of them having water and septic on the lot.

VARIANCES

One variance is requested:
The applicant has requested a variance from Section 4.6.B.1, of the Yellowstone County Subdivision Regulations, which outlines a connection to undeveloped / underdeveloped land surrounding proposed subdivisions. The maximum distance between those connections is 600 feet.

Staff is recommending approval of the variance request. Further explanation and analysis can be found in Attachment A.

PROPOSED CONDITIONS OF APPROVAL

1. To protect public health and safety, prior to final plat approval, the applicant will receive approval from the MDEQ for the proposed water systems, septic systems and the proposed storm water management.
2. To provide a maintenance mechanism for the new sections of public roads with the subdivision and to protect public health and safety, prior to final plat approval, the applicant will petition to create an RSID for the future maintenance of the public roads.
3. To protect public health and safety with proper consideration given to road conditions and site distance, prior to final plat approval, the applicant will provide analysis from a professional engineer that site distance, in accordance with AASHTO, has been met for the proposed access locations. Failure to obtain safe site distances per the engineering analysis will require relocation of the entrances to the subdivision. Public Works must review and approve the intersection locations prior to final plat approval.
4. To protect public health and safety with proper fire suppression, prior to final plat approval, the applicant will submit construction drawings of the dry hydrant system to Laurel Fire Department for review and approval. Once installed, the applicant will request the Laurel Fire Department test the system to ensure it works correctly and get a sign off from Laurel Fire Department. The applicant will also create an RSID for the dry hydrant system. The applicant will also coordinate with the Laurel Fire Department, and provide a Knox Box to obtain access to structures behind the gate should there be a fire inside the subdivision.
5. To minimize the effects on local service, prior to final plat approval, the applicant will coordinate with the USPS for locating and providing the correct amount of space for safely delivering the mail to the residents.
6. To minimize effects on the natural environment, prior to final plat approval a weed management plan and property inspection shall be completed by the County Weed Department.
7. Minor changes may be made in the SIA and final documents, as requested by the Planning, Legal or Public Works Departments to clarify the documents and bring them into the standard acceptable format.
8. The final plat shall comply with all requirements of the Yellowstone County Subdivision Regulations, rules, regulations, policies, and resolutions of Yellowstone County, and the laws and Administrative Rules of the State of Montana.

PROCEDURAL HISTORY

Pre-Application Meeting: January 29, 2026
Preliminary Plat application submitted to Planning Division: May 1, 2026
Departmental Review Meeting: May 14, 2026
Preliminary Plat Resubmittal: May 21, 2026
Planning Board Plat Review: June 9, 2026
Planning Board Public Hearing: June 23, 2026
Preliminary Plat to Board of County Commissioners: July 21, 2026
60 Working-Day Preliminary Plat Review period ends: July 28, 2026

PLAT INFORMATION
General Location: South 80th Street West, south of Wisner Avenue which is south of King Avenue West
Legal Description: Located in Section 14, Township 1S, Range 24E or more specifically: S14, T01 S, R24 E, N2N2E2SE4 N1/2N1/2E1/2SE 14-1S-24. Tax ID D00207.
Owner/Subdivider: Las Palmas LLC, Levi Britton
Engineer/Surveyor: IMEG
Existing Zoning: Outside of zoning
Existing Land Use: Grazing land
Proposed Land Use: Residential & Commercial
Gross Area: ± 19.78 Acres
Lot Size:
Minimum: ± 14,841 square feet
Maximum: ± 48,907 square feet
Parkland Requirements: Subdivision regulations require a dedication of 7.93 acres. The applicant is providing a cash-in-lieu contribution for parkland.

TRAFFIC IMPACT STUDY (TIS)
The net new trips identified in this report are subject to examination under Yellowstone County's cost participation program to the extent that they impact travel at studied intersections. Cost participation, according to the TIS submitted, is not required because the impacts from the subdivision will have very minimal effect on existing studied intersections. Table 9, below, shows the warrants for intersection improvements.

Table 9: Signal Warrant Analysis Summary

Traffic Signal Warrants			Warrant 1, Eight-Hour Vehicular Volume	Warrant 2, Four-Hour Vehicular Volume	Warrant 3, Peak Hour	Warrant 4, Pedestrian Volume	Warrant 5, School Crossing	Warrant 6, Coordinated Signal System	Warrant 7, Crash History	Warrant 8, Roadway Network	Warrant 9, Intersection Near a Grade Crossing
2026	Intersection 1	King Avenue West & South 80th St. West	No	No	No	No	No	No	No	No	No
2031			No	No	No	No	No	No	No	No	No
2026	Intersection 2	Hesper Road & South 80th St. West	No	No	No	No	No	No	No	No	No
2031			No	No	No	No	No	No	No	No	No

Analysis of the existing traffic volumes, lane configurations, and the impacts due to the projected traffic growth and proposed development result in the following general conclusions:

- The preceding analysis demonstrates that the Shop House Acres development will not generate significant nor impactful volume of new trips at the intersections studied.
- The studied existing intersections and proposed access locations will operate at or above an LOS of "B", exceeding any minimum requirement of an LOS specified in the Appendix E of the Road Design Manual produced by the Montana Department of Transportation.
- No auxiliary turn lanes are warranted for the intersections and access locations discussed in this report.
- Vertical sight obstruction is present for traffic performing left-turn movements onto South 80th Street West from the North Access location of the development.
- The existing intersections do not warrant any further analysis for signal considerations, as no consideration warrants are met.

County Public works requested further analysis of the entry points, access separations, and site distances.

STAKEHOLDERS
Staff gave a brief presentation about the proposed subdivision to the Planning Board at the June 9, 2026, discussion meeting. After the presentation, staff stood for any questions that the Planning Board may have concerning the subdivision. One board member asked the reason for public roads turning to private. Staff responded that Yellowstone County requires the dry hydrants to be on public roads. Also, they need to have some queuing space for the vehicle to get

off S 80th St W before coming to the gate. Board member Staley asked if a condition could be added. He stated that because of the electronic gate requirement, the fire department needs to have a Knox box to be able to access the structures behind the gate in case of a fire. Staff recommended that condition #4 be modified to include the requirement for a Knox box for the Laurel Fire Department. Matt Suek, agent, stood to answer questions. Board member Stephenson asked if they have heard anything from surrounding property owners. Mr. Suek stated he had not heard anything from surrounding neighbors. There were no other questions from the board.

Stakeholder input will be received at a public hearing scheduled for this subdivision on June 23, 2026.

ALTERNATIVES

In accordance with state law, the Board of County Commissioners has 60 working days to act upon this major preliminary plat. The 60 working day review period for the proposed plat ends on July 28, 2026. State and County subdivision regulations also require that preliminary plats be reviewed using specific criteria, as stated within this report. The County may not unreasonably restrict an owner's ability to develop land if the subdivider provides evidence that any identified adverse effects can be mitigated. Within the 60 working day review period, the Board of County Commissioners is required to:

1. Approve;
2. Conditionally Approve; or
3. Deny the Preliminary Plat

FISCAL EFFECTS

The preliminary plat of this subdivision will have no financial impact on the Planning Division.

SUMMARY

The purpose of the County’s subdivision review process is to identify potential negative effects of property being subdivided. When negative effects are identified it is the subdivider’s responsibility to mitigate those effects. Various County departments, private service/utility providers and the affected school district(s), have reviewed this application and provided input on effects and mitigation. The Findings of Fact, which are presented as an attachment, discuss potential negative impacts of the subdivision and conditions of approval are recommended as measures to further mitigate any impacts. In this case, there were found to be some impacts from this proposed subdivision.

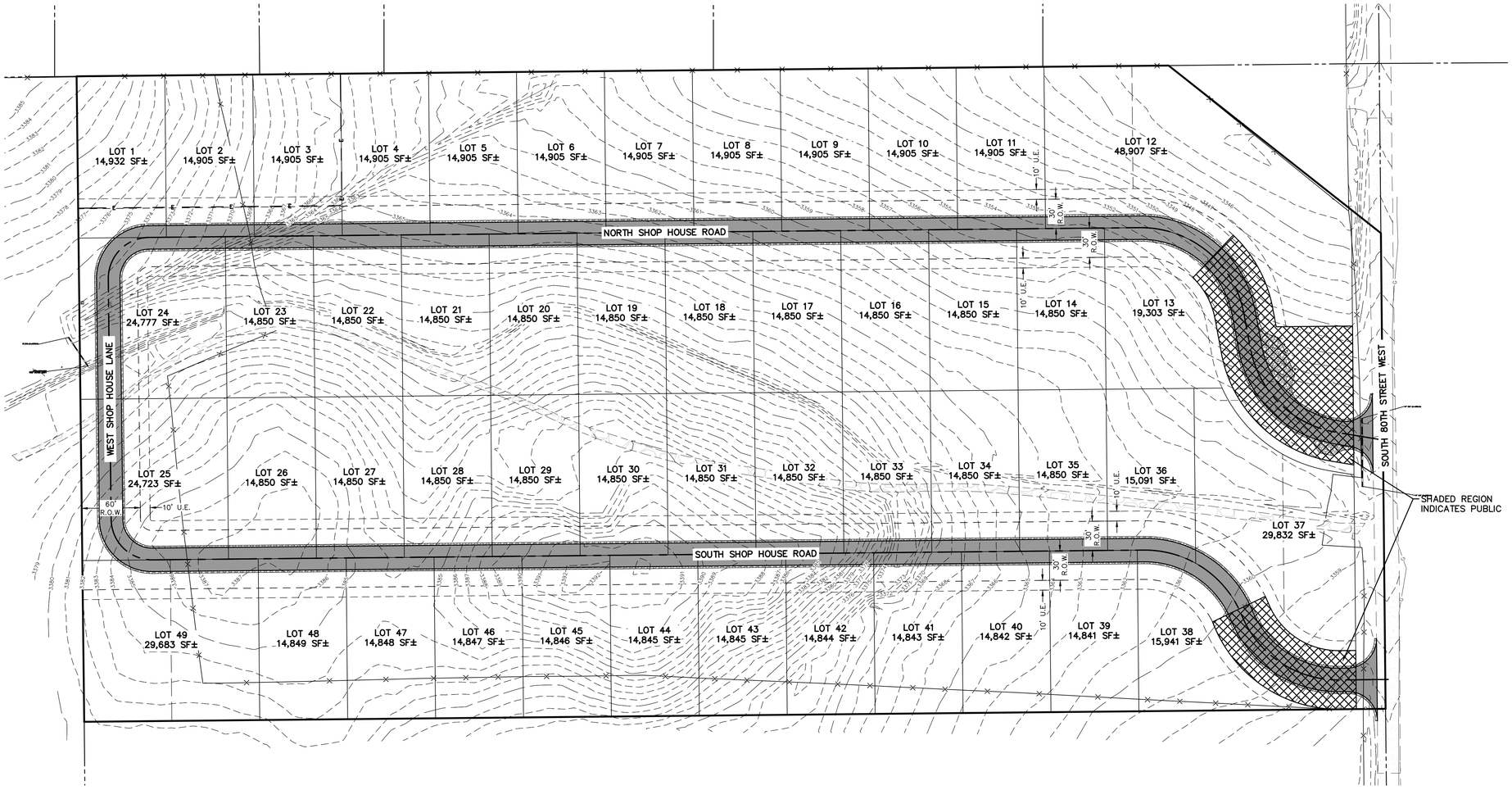
Attachments

Proposed Plat
Draft SIA
Findings of Fact
Variance request from applicant
Attachment A - Staff variance review
Traffic Study

PRELIMINARY PLAT OF

SHOP HOUSE ACRES SUBDIVISION

LOCATED IN N1/2, SE1/4, SE1/4 SECTION 14, TOWNSHIP 1 SOUTH, RANGE 24 EAST, P.M.M., YELLOWSTONE COUNTY, MONTANA



0 60 120

SCALE IN FEET

BASIS OF BEARING
STATE PLANE MONTANA – ZONE 2500
GROUND (TRUE) DISTANCES

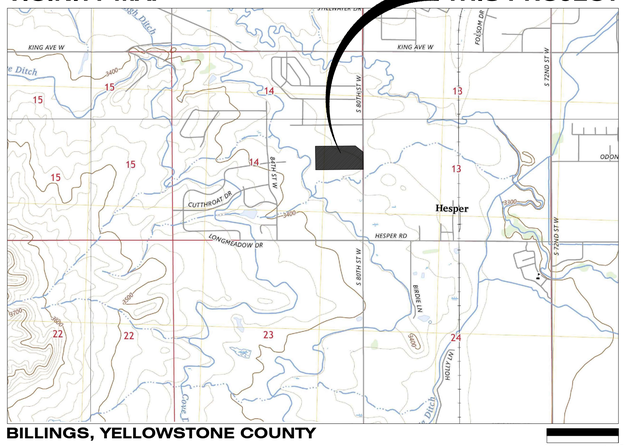
RECORD OWNER:
LAS PALMAS, L.L.C.

SUBDIVIDER:
LAS PALMAS, L.L.C.

DATE:
APRIL, 2026

TOTAL SUBDIVISION AREA:
19.78 ACRES (GROSS)
18.48 ACRES (NET)

VICINITY MAP



BILLINGS, YELLOWSTONE COUNTY

SITE DATA

NUMBER OF LOTS	49
MAXIMUM LOT AREA	48,907 SF
MINIMUM LOT AREA	14,841 SF
AREA OF OPEN SPACE	NA
LINEAR FEET OF STREETS	3,056 LF
NET ACREAGE	18.77 AC
GROSS ACREAGE	19.78 AC
EXISTING ZONING	UNZONED
PROPOSED ZONING	UNZONED
EXISTING LAND USE	AGRICULTURAL
PROPOSED LAND USE	COMMERCIAL

LEGEND

(E) = EXISTING
(P) = PROPOSED
R/W OR R.O.W. = RIGHT-OF-WAY
U.E. = UTILITY EASEMENT
= CISTERN WITH 50' CISTERN ISOLATION ZONE
= DRAINFIELD
= (E) SURVEY BOUNDARY
E = (E) UNDERGROUND ELETRIC
= (E) CHAIN LINK FENCE
100 = (E) CONTOUR
= (P) PROPERTY LINE
= (P) CENTERLINE
= (P) EASEMENT LINE
= (P) R.O.W. LINE
= (P) SANITARY SEWER
= (P) WATER LINE

PROJECT LOCATION

SECTION 14, TOWNSHIP 1 SOUTH, RANGE 24 EAST, P.M.M. OF YELLOWSTONE COUNTY, MONTANA

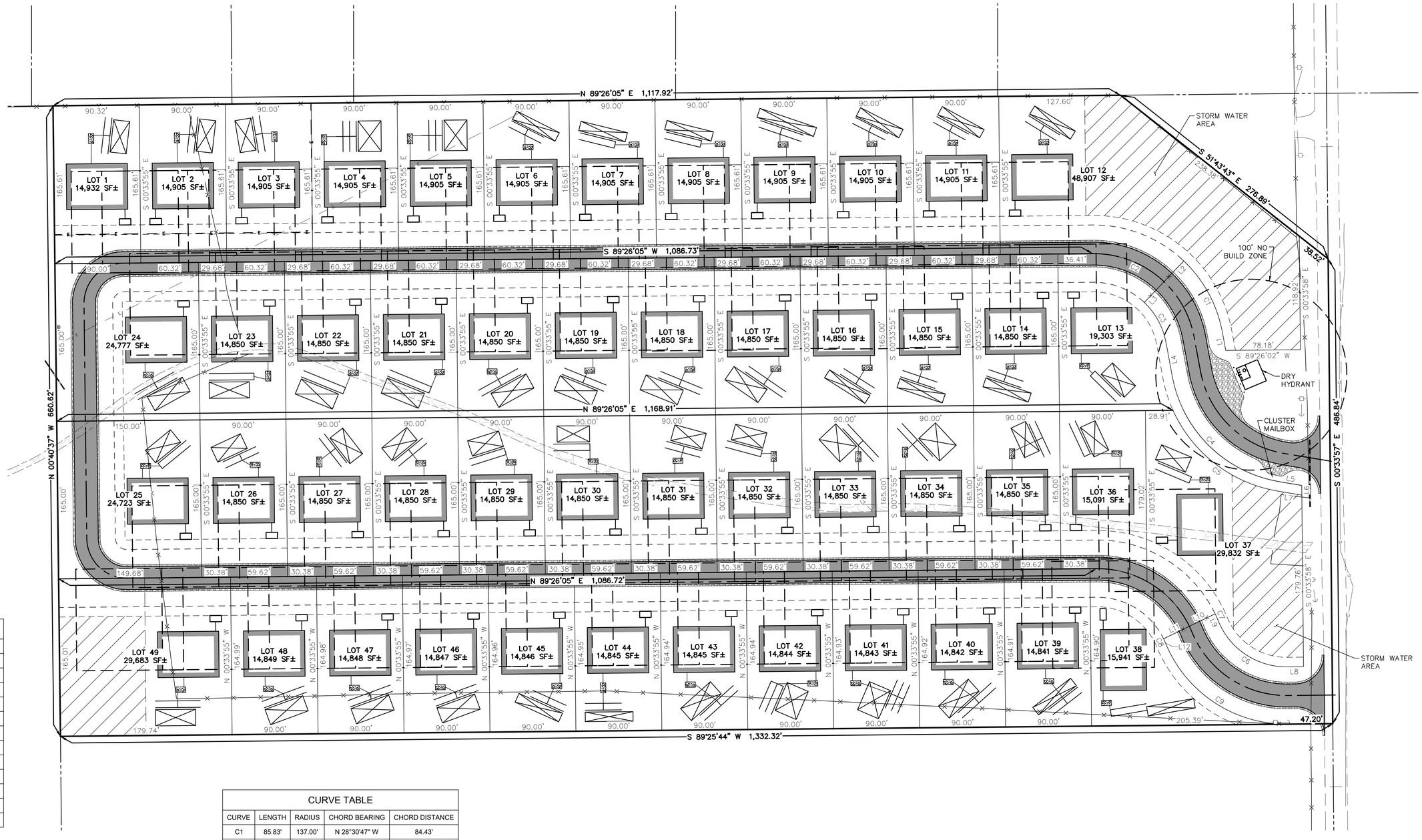
1/4	SEC.	T.	R.
	14	1S	24E

PREPARED BY:
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FAX: 406.721.5224
www.imegcorp.com
IMEG PROJECT NO. 25006765

PRELIMINARY PLAT OF

SHOP HOUSE ACRES SUBDIVISION

LOCATED IN N1/2, SE1/4, SE1/4 SECTION 14, TOWNSHIP 1 SOUTH, RANGE 24 EAST, P.M.M., YELLOWSTONE COUNTY, MONTANA



LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 10°33'55" W	19.88'
L2	S 43°32'21" W	30.00'
L3	S 43°32'21" W	30.00'
L4	S 10°33'55" E	36.67'
L5	S 80°33'55" E	23.58'
L6	S 00°33'58" E	10.15'
L7	S 80°33'55" E	25.35'
L8	S 89°25'44" W	17.05'
L9	N 23°02'04" W	2.93'
L10	S 64°11'07" W	30.00'
L11	S 64°11'07" W	30.00'
L12	S 23°02'05" E	2.96'

CURVE TABLE				
CURVE	LENGTH	RADIUS	CHORD BEARING	CHORD DISTANCE
C1	85.83'	137.00'	N 28°30'47" W	84.43'
C2	82.36'	107.00'	S 68°30'47" E	80.35'
C3	48.24'	77.00'	S 28°30'47" E	47.46'
C4	167.38'	137.00'	S 45°33'55" E	157.16'
C5	144.49'	147.00'	S 52°24'26" E	138.74'
C6	90.72'	77.00'	N 56°49'05" W	85.56'
C7	6.65'	136.99'	N 24°25'29" W	6.65'
C8	3.74'	77.00'	S 24°25'29" E	3.74'
C9	161.28'	136.89'	S 56°47'15" E	152.12'

50 0 50 100

SCALE IN FEET

LEGEND

(E) = EXISTING
(P) = PROPOSED
R/W OR R.O.W. = RIGHT-OF-WAY
U.E. = UTILITY EASEMENT
= CISTERN WITH 50' CISTERN ISOLATION ZONE
= DRAINFIELD

= (E) SURVEY BOUNDARY
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= (P) CENTERLINE
= (P) EASEMENT LINE
= (P) R.O.W. LINE
= (P) SANITARY SEWER
= (P) WATER LINE

1/4	SEC.	T.	R.
	14	1S	24E

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IMEG PROJECT NO. 25006765

SUBDIVISION IMPROVEMENTS AGREEMENT

SHOP HOUSE ACRES SUBDIVISION

IMEG #25006765

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SUBDIVISION IMPROVEMENTS AGREEMENT
SHOP HOUSE ACRES SUBDIVISION

This agreement is made and entered into this_____ day of_____ , 20____, by and between *Levi Britton,* whose address for the purpose of this agreement is 941 S 84th St. W, Billings, Montana, 59106, hereinafter referred to as "Subdivider," and YELLOWSTONE COUNTY, Montana, hereinafter referred to as "County."

WITNESSETH:

WHEREAS, at a regular meeting conducted on_____ day of_____, 20____, the Board of Planning recommended conditional approval of a preliminary plat of *Shop House Acres Subdivision,* and

WHEREAS, at a regular meeting conducted on _____ day of_____, 20___, the Yellowstone County Board of County Commissioners conditionally approved a preliminary plat of *Shop House Acres Subdivision,* and

WHEREAS, a Subdivision Improvements Agreement is required by the County prior to the approval of the final plat.

WHEREAS, the provisions of this agreement shall be effective and applicable to *Shop House Acres Subdivision* upon the filing of the final plat thereof in the office of the Clerk and Recorder of Yellowstone County, Montana. The Subdivision shall comply with all requirements of the Yellowstone County Subdivision Regulations, the rules, regulations, policies, and resolutions of Yellowstone County, and the laws and administrative rules of the State of Montana.

THEREFORE, THE PARTIES TO THIS AGREEMENT, for and in consideration of the mutual promises herein contained and for other good and valuable consideration, do hereby agree as follows:

I. VARIANCES

A. One Variance has been requested related to connectivity to adjacent parcels to allow only one connection to the property to the west and one to the south due to topography and ditch constraints of the property to the south.

II. CONDITIONS THAT RUN WITH THE LAND

A. Lot owners should be aware that this subdivision is being built adjacent to open agricultural areas and contains wildlife migratory routes. Consequently, owners are advised that wildlife indigenous to the prairies or cultivated crops are found on the property, may impact the developed property, and interface with domestic animals, residents, and visitors. Owners may also experience problems with damage to landscaped shrubs, flowers, and gardens/ Any impacts associated with wildlife and damage is the responsibility of the lot owners.

B. Lot owners should be aware that soil characteristics within the area of this subdivision, as described in the 1972 Yellowstone County Soil Survey, indicate that there could be potential

limitations for proposed construction on the lots, which may require a geotechnical survey prior to construction.

C. No water rights have been transferred to the lot owners. If irrigation ditches exist on the perimeter of this development, they will be preserved for the benefit of other properties. Any existing perimeter ditches and drains shall remain in place and shall not be altered by the Subdivider or subsequent owners.

D. There is attached hereto a Waiver waiving the right to protest the creation of the special improvement district or districts which by this reference is expressly incorporated herein and made as much a part hereof as though fully and completely set forth herein at this point. The Waiver will be filed with the plat, shall run with the land, and shall constitute the guarantee by the Subdivider and property owner or owners of the developments described herein. Said Waiver is effective upon filing and is not conditioned on the completion of the conditions set forth in this Agreement. The Subdivider and owner specifically agree that they are waiving valuable rights and do so voluntarily.

E. The property is not located within a FEMA designated floodplain or floodway. Please see the FEMA Floodplain Map 30111C1240E.

F. Culverts, associated drainage swales, and storm ponds shall not be filled in or altered by the subdivider or subsequent lot owners.

G. When required by road improvements, all fences and irrigation ditches in the public right- of-way adjacent to this subdivision shall be removed or relocated outside of the public right-of-way and any relocation outside of the public right-of-way shall be subject to securing and recording easements.

H. Future maintenance of all public (or common) improvements shall be done through one (1) or more Homeowners Association (HOA) or RSID(s) created as part of the SIA for this subdivision.

I. The Subdivider will obtain two Access Permits from County Public Works prior to any construction on any lot withing the subdivision. The application will include a site plan showing the desired location of the accesses and show that it meets the requirements outlined by the DEQ storm water requirements for the subdivision. Failure to do so will result in the Subdivider removing what has been installed and locating the access in an approved location at the Subdividers expense.

Future lot owners inside the subdivision will all access their property from the private road network, and a County Public Works Access permit will not be required.

III. TRANSPORTATION

The subdivider agrees to guarantee all improvements for a period of one (1) year from the date of final acceptance by Yellowstone County.

A. Streets & Roads

All public and private roads within the **Shop House Acres Subdivision** will be constructed as **24-foot-wide paved asphalt streets** with **2-foot gravel shoulders** within **60-foot-wide rights-of-way and Easements**. All public streets will be located in the rights-of-way and will be dedicated for public use and maintained through one or more Rural Special Improvement Districts (RSIDs) established at the time of final plat approval. All private internal driving areas will be located in the easement and will be maintained by the Shop House Acres HOA.

The internal public and private road network includes the following:

- North Shop House Road — A primary access road entering the subdivision from South 80th Street West, serving as a main east-west corridor through the development. A portion of this road shall be public to accommodate for the public dry fire hydrant and mailboxes. A gate will be installed at the transition from Public to Private Road.

- West Shop House Lane — An interior north-south local private road providing access within the subdivision.

- South Shop House Road — A primary access private road entering the subdivision from South 80th Street West, serving as a main east-west corridor through the development. A gate will be installed at the approach to 80th Street as this is a private road.

All roads will be constructed to Yellowstone County standards for cross-section, drainage, grading, and sight distance. Traffic control signs and intersection markings will comply with the Manual on Uniform Traffic Control Devices (MUTCD) and Yellowstone County Public Works requirements.

All public and private roads have been designed to County specifications, with appropriate centerline geometry, ROW dedication, easement, and stormwater grading considerations. Intersections will be built with sight distance and safety requirements in compliance with MUTCD and Yellowstone County design standards.

B. Traffic Control Devices

The Shop House Acres Subdivision will include the installation of regulatory traffic control signage at key intersections to ensure safe vehicular movement and compliance with County and MUTCD standards. Based on the internal street network layout and projected traffic flow, a total of two stop signs will be installed within the subdivision at the two proposed access locations.

Stop sign locations will include, but are not limited to, the following intersections:

1. North Shop House Road & South 80th Street West (stop for exiting traffic)
2. South Shop House Road & South 80th Street West (stop for exiting traffic)

All signage will be fabricated and installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and Yellowstone County specifications. The subdivider shall install signage concurrent with each phase of roadway construction to ensure functionality upon completion of each new segment of the road network.

Final placement and quantity of stop signs will be subject to Yellowstone County Public Works review and approval at the time of engineering plan submittal.

C. Access

- There will be two accesses for the proposed subdivision, one from North Shop House Road and one from South Shop House Road. Each approach will have 60’ right-of-way/easement.

- All lots within the subdivision shall be accessed using the internal private road network. Approximately, the first 137’ of North Shop House Circle shall be public for the use of the public 30,000-gallon dry hydrant tank and cluster mailbox.

D. Billings Area Bikeways and Trail Master Plan (BABTMP)

The BABTMP does not intersect with this property.

IV. EMERGENCY SERVICE

Emergency services for the Shop House Acres Subdivision will be provided by regional agencies serving unincorporated Yellowstone County. Fire protection infrastructure will be integrated into the subdivision as required under Yellowstone County Subdivision Regulations and applicable fire code guidance.

Fire Protection:

Fire protection for the subdivision will be provided by the Laurel Fire Department. To support fire suppression needs, one 30,000-gallon dry hydrant tank will be installed within the subdivision. The hydrant is depicted on the preliminary plat and will be accessible to fire response vehicles. The tank will be designed and installed per County and fire authority requirements, and ongoing maintenance will be the responsibility of the subdivision’s RSID.

Law Enforcement:

Law enforcement services will be provided by the Yellowstone County Sheriff's Office, which has jurisdiction over unincorporated areas of the county.

Emergency Medical Services:

Ambulance services will be provided by American Medical Response (AMR). AMR Billings has been serving Yellowstone County since 1994, offering both emergency and non-emergency medical transport services.

All emergency service providers have been notified of the proposed subdivision during preliminary plat review. The subdivision’s road widths, intersection design, and emergency vehicle turnaround provisions have been developed to comply with fire department access standards and ensure continuous emergency response capability throughout development.

V. Storm Drainage

Stormwater management for the Shop House Acres Subdivision will be addressed through a combination of private detention ponds and conveyance swales. These systems are designed to safely accommodate runoff generated by both impervious surfaces (e.g., roads and driveways) and graded lot areas while protecting downstream properties, infrastructure, and natural drainage corridors.

A stormwater management plan will be developed in accordance with Section 4.7 of the Yellowstone County Subdivision Regulations and Montana DEQ Circular DEQ-8. The plan will include the construction of regional stormwater retention ponds, strategically located within the subdivision, defined on the preliminary plat. These facilities will capture, retain, and treat roadway runoff and conveyances from common infrastructure prior to controlled release into natural drainages or swales. Stormwater retention shall be provided on Lots 12, 37, and 49. The Subdivider acknowledges that the lot lying within the stormwater detention area will not be available for construction or sale.

All stormwater facilities, including the regional pond and appurtenant conveyance infrastructure, will:

- Be constructed to meet or exceed MDEQ performance standards,
- Be reviewed and approved by MDEQ (or its authorized designee) prior to final plat approval,
- Be sized based on rational method or hydrologic modeling as outlined in the approved Storm Pond Design Report,
- Include emergency overflows and sediment forebays where required.

Final construction drawings and storm drainage reports will be submitted for County and DEQ review as part of the public infrastructure approval process. Operation and long-term maintenance of regional drainage facilities will be the responsibility of the subdivision's RSID or HOA, as defined in the covenants and the final plat filing.

VI. Utilities

A. Water Supply

Each lot within the Shop House Acres Subdivision will be served by an individual cistern system, which will be supplied by a licensed local water service provider. These systems are designed to comply with Section 4.9 of the Yellowstone County Subdivision Regulations, ensuring that all water supply provisions meet the necessary health and safety standards. Approval from the Montana Department of Environmental Quality (MDEQ) will be obtained for these systems and included with the final plat filing. Maintenance of the cisterns will be the responsibility of the individual lot owners.

B. Sanitary Sewer

Wastewater treatment for the subdivision will be managed through individual septic systems installed on each lot. These systems will be designed and constructed in accordance with Section 4.8 of the Yellowstone County Subdivision Regulations and the standards set forth in Montana DEQ Circular DEQ-4. Approval from the MDEQ will be secured prior to the final plat approval, and documentation of such approval will be included in the final plat submission. Each lot owner will be responsible for the operation and maintenance of their respective septic system.

C. Power, Telephone, Gas, and Cable Television

Electricity, telephone, natural gas, and cable television services will be extended to each lot within the subdivision. These utilities will be installed within the utility easements designated on the final plat. The easements are designed to meet the requirements of the utility providers and will be

coordinated with them during the development process to ensure proper installation and service delivery.

D. Solid Waste Disposal

Solid waste collection and disposal services will be provided by licensed local waste disposal companies operating within Yellowstone County. Each property owner will be responsible for arranging for their own solid waste pickup services. Disposal of solid waste will be conducted in accordance with the standards set forth by the Montana Department of Environmental Quality (MDEQ) and the Yellowstone City-County Health Department, ensuring that all waste is managed in an environmentally responsible manner.

VII. Parks & Open Space

Since each unit can having living quarters these lots will be classified as residential. Because of this parkland dedication is required for the residential lots. The subdivider will be providing cash in lieu of the parkland. For the parkland dedication calculation, the development includes approximately 15.75 acres of residential lots less than 0.5 acres, which require 11% parkland dedication. The development also includes approximately 1.86 acres of residential lots between 0.5 acre and 1 acre, which require 7.5% parkland dedication. Lastly, the development includes approximately 1.12 acres of residential lots between 1 acre and 3 acres, which require 5% parkland dedication. Based on the parkland dedication calculation, approximately 1.93 acres of parkland dedication will be required and paid as cash in lieu of parkland.

VIII. Irrigation

There are no irrigation systems, irrigation districts, or water rights associated with the land comprising the Shop House Acres Subdivision. As such, no irrigation infrastructure will be installed, and no water rights will be transferred as part of the subdivision process.

The subdivision has been designed to function without a centralized or individual irrigation supply. Lot owners will not be obligated to install or maintain irrigated lawns, and no requirement for turf or landscape irrigation will be imposed through the subdivision covenants.

IX. Weed Management

The Subdivider and all future lot owners shall be responsible for the control and management of noxious weeds within the Shop House Acres Subdivision, consistent with the current Yellowstone County Noxious Weed List and in accordance with Section 7-22-2152, MCA.

Requirements

The following measures will be implemented:

- A Weed Management Plan shall be submitted to the Yellowstone County Weed Department for review and approval. This plan will identify existing noxious weed species present on the site and outline specific control methods, herbicide usage (if applicable), mechanical or cultural treatment, and maintenance timelines.
- The Weed Management Plan shall be kept current and updated as necessary, particularly prior to the start of construction in any new phase of development. The cost of weed

management shall be borne by the individual property owner or responsible development entity.

- A Revegetation Plan shall also be submitted as part of the overall weed management strategy. This plan will identify seed mix recommendations to promote the establishment of native or low-maintenance species for soil stabilization and long-term weed suppression. Recommendations may be obtained from the Yellowstone County Weed Department and are subject to modification based on a required pre-development site inspection.

Enforcement of weed control will be consistent with County policies, and ongoing compliance will be the responsibility of each owner of record. Failure to adhere to the approved plan may result in enforcement action under County weed ordinances.

X. Soils / Geotechnical Study

No formal geotechnical investigation or site-wide soils analysis has been conducted by the Subdivider for the Shop House Acres Subdivision. Soil conditions across the subdivision are expected to vary due to the property's natural topography and geological setting. As a result, subsurface conditions—including soil bearing capacity, frost susceptibility, shrink-swell potential, and groundwater levels—may differ significantly between lots.

Individual lot owners are strongly encouraged to conduct site-specific geotechnical evaluations prior to initiating any structural construction. These evaluations should be performed by a qualified professional geotechnical engineer to determine the appropriate foundation design and to assess the need for any soil stabilization, drainage enhancements, or specialized construction techniques.

XI. Phasing of Improvements

The Shop House Acres Subdivision will not be a phased construction development. However, in accordance with MCA 76-3-617(4), the Subdivider shall notify the governing body a minimum of 30 days prior to the commencement of any infrastructure construction.

XII. Financial Guarantees

The Subdivider shall be responsible for the design, installation, and construction of all required public improvements in each phase of the Shop House Acres Subdivision. Improvements include, but are not limited to: roads, stormwater drainage, fire protection systems, and utility infrastructure. All such improvements shall be constructed under private contract and designed by a licensed professional civil engineer registered in the State of Montana.

All improvements must be completed prior to final plat approval, unless a financial guarantee is provided in accordance with the procedures set forth in Chapter 5 of the Yellowstone County Subdivision Regulations.

If improvements are not fully constructed at the time of final plat, the Subdivider shall provide the County with a monetary security in an amount equal to 125% of the estimated cost of the uncompleted improvements. Acceptable forms of financial security include:

- An irrevocable letter of credit from a federally insured financial institution,
- A performance bond issued by a licensed surety company,
- An escrow agreement, or

- Any other method approved by the Yellowstone County Planning Board and Board of County Commissioners.

The cost estimate shall be prepared and sealed by a Montana-licensed professional engineer and reviewed by the County Engineer or designee. All financial instruments shall remain in effect until the County has verified that improvements have been satisfactorily completed and accepted for public use.

Upon completion of the improvements, the Subdivider's engineer shall submit to the Yellowstone County Public Works Department:

- A sealed, certified statement of completion,
- As-built drawings, and
- Any required post-construction certifications pursuant to Section 4.6.C of the Yellowstone County Subdivision Regulations.

The Subdivider shall also guarantee all installed public improvements for a period of one (1) year following final acceptance by the County.

XIII. LEGAL PROVISIONS

A. Subdivider agrees to guarantee all public improvements for a period of one year from the date of final acceptance by Yellowstone County.

B. The owners of the properties involved in this proposed Subdivision by signature subscribed herein below agree, consent, and shall be bound by the provisions of this Agreement.

C. The covenants, agreements, and all statements in this Agreement apply to and shall be binding on the heirs, personal representatives, successors and assigns of the respective parties.

D. In the event it becomes necessary for either party to this Agreement to retain an attorney to enforce any of the terms or conditions of this Agreement or to give any notice required herein, then the prevailing party or the party giving notice shall be entitled to reasonable attorney fees and costs.

E. Any amendments or modifications of this Agreement or any provisions herein shall be made in writing and executed in the same manner as this original document and shall after execution become a part of this Agreement.

F. Subdivider shall comply with all applicable federal, state, and local statutes, ordinances, and administrativeregulations during the performance and discharge of its obligations. Subdivider acknowledges and agrees that nothing contained herein shall relieve or exempt it from such compliance.

G. Subdivider agrees to create any required (or expansion of existing) RSID(s) for future maintenance of all public (or common) constructed improvements prior to final plat approval.

IN WITNESS WHEREOF, the parties hereto have set their hands and official seals on the date first above written.

"SUBDIVIDER" *Levi Britton*

_____
Levi Britton

STATE OF _____)
: ss
County of _____)

On this_____day of_____, 20____, before me, a Notary Public in and for the State of _____, personally appeared Levi Britton, *(Subdivider),* who executed the foregoing instrument and acknowledged to me that they executed the same.

SS _____

This agreement is hereby approved and accepted by Yellowstone County, this_____day of _____, 20____

"COUNTY"
COUNTY OF YELLOWSTONE
MONTANA

County of Yellowstone
Board of County Commissioners

By:_____
Mark Morse, Chairman

_____
Mike Waters, Commissioner

_____
Chris White, Commissioner

Attest:_____
Jeff Martin, County Clerk and Recorder

STATE OF MONTANA)
: ss
County of Yellowstone)

On this_____day of_____, 20____, before me, a Notary Public in and for the State of Montana, personally appeared Mark Morse, Mike Waters, Chris White and Jeff Martin, known to me to be the Board of County Commissioners and the County Clerk and Recorder, respectively, of Yellowstone County, Montana, whose names are subscribed to the foregoing instrument in such capacity and acknowledged to me that they executed the same on behalf of Yellowstone County, Montana.

SS _____

Waiver of Right to Protest

FOR VALUABLE CONSIDERATION, the undersigned, being the Subdivider and all of the owners of the hereinafter described real property, do hereby waive the right to protest the formation of one or more Rural Special Improvement Districts (RSID's), for a period of no more than twenty years from the recording of this waiver, which Yellowstone County may require.

This Waiver and Agreement is independent from all other agreements and is supported by sufficient independent consideration to which the undersigned are parties, and shall run with the land and shall be binding upon the undersigned, their successors and assigns, and the same shall be recorded in the office of the County Clerk and Recorder of Yellowstone County, Montana.

The real property hereinabove mentioned is more particularly described as follows:

Shop House Acres Subdivision

Signed and dated this_____day of_____, 20____.

_____

Levi Britton

STATE OF _____)
: ss
County of _____)

On this____day of_____, 20____, before me, a Notary Public in and for the State of _____, personally appeared Levi Britton, the person who executed the forgoing instrument and acknowledged to me that he executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial Seal the day and year hereinabove written.

SS_____

FINDINGS OF FACT

The City-County Planning Division staff prepared the Findings of Fact for Shop House Acres Subdivision. These findings are based on the preliminary plat application and supplemental documents addressing the review criteria required by the Montana Subdivision and Platting Act (76-3-608, MCA) and the Yellowstone County Subdivision Regulations (YCSR).

A. What are the effects on agriculture, local services, the natural environment, wildlife and wildlife habitat and public health and safety (76-3-608 (3) (a) MCA) (Section 3.2 (H) (2) YCSR)

1. Effect on agriculture and agricultural water users' facilities

The subject property has been used for grazing purposes. No water rights or shares will be transferred to individual lot owners. Irrigation ditches that exist on the perimeter of this development are for the benefit of other properties. Perimeter ditches and drains shall remain in place and shall not be altered by the subdivider or subsequent owners. There will be no effect on the water users downstream from this property.

2. Effect on local services

a. **Water** – The proposed subdivision is not located within any public water district. Each lot within the Shop House Acres Subdivision will be served by an individual cistern system, which will be supplied by a licensed local water service provider. The operation and maintenance of the water system will be the responsibility of individual lot owners. Water systems will be installed meeting the requirements outlined in Section 4.9 of the Yellowstone County Subdivision Regulations and the MDEQ. **(Condition #1)**

b. **Septic -** The proposed subdivision is not located within any public sewer district. Wastewater treatment for the subdivision will be managed through individual septic systems installed on each lot. The wastewater disposal systems will be submitted to and approved by Montana Department of Environmental Quality. These systems shall be located and installed as approved by Montana Department of Environmental Quality, or its designee. Septic systems will be installed meeting the requirements outlined in Section 4.8 of the Yellowstone County Subdivision Regulations and the MDEQ. **(Condition #1)** The operation and maintenance of the septic system will be the responsibility of individual lot owners.

All private utilities, power, telephone, gas and cable television will be installed in the public and private right of way or easements identified on the plat.

c. **Streets and roads** – Access to the Subdivision shall be from proposed approaches from South 80th Street West. A portion of the north entry will be public and will accommodate the 30,000-gallon dry hydrant system. It will also accommodate the Central Box Units (CBU) from the USPS with enough space for safe mail delivery and retrieval. A portion of the south entry road into the subdivision will also be public. The requirement for electronic gates on private roads will require a section of the entry roads

to be public and long enough to get vehicles off of South 80th Street West to avoid traffic problems.

Roads within the subdivision will be private roads and will be built to the County standard paved surface road. Both the public and private roads will be in a 60-foot-wide rights of way. Both will be built with a 24-foot paved surface and 2-foot gravel shoulders on each side. An RSID will be created to maintain the public road portion. The HOA will be responsible for the private road system inside the subdivision. **(Condition #2)**

County Public Works requested additional analysis of the site distance for the entries to the proposed subdivision because of the hill on the southern side of the development. Site distances are a concern for safety getting into and out of the subdivision. County Public Works is asking for information from a professional engineer, referencing AASHTO standards to provide analysis of site distances and access locations to the subdivision. **(Condition #3)**

Traffic Study - The net new trips identified in this report are subject to examination under Yellowstone County's cost participation program to the extent that they would travel through studied intersections. Cost participation, according to the TIS submitted, is not required because the impacts from the subdivision will have very minimal effect on existing studied intersections. Table 9, below, shows the warrants for intersection improvements.

Table 9: Signal Warrant Analysis Summary

Traffic Signal Warrants			Warrant 1, Eight-Hour Vehicular Volume	Warrant 2, Four-Hour Vehicular Volume	Warrant 3, Peak Hour	Warrant 4, Pedestrian Volume	Warrant 5, School Crossing	Warrant 6, Coordinated Signal System	Warrant 7, Crash History	Warrant 8, Roadway Network	Warrant 9, Intersection Near a Grade Crossing
2026	Intersection 1	King Avenue West & South 80th St. West	No	No	No	No	No	No	No	No	No
2031			No	No	No	No	No	No	No	No	No
2026	Intersection 2	Hesper Road & South 80th St. West	No	No	No	No	No	No	No	No	No
2031			No	No	No	No	No	No	No	No	No

Traffic Study Conclusion

Analysis of the existing traffic volumes, lane configurations, and the impacts due to the projected traffic growth and proposed development result in the following general conclusions:

- The preceding analysis demonstrates that the Shop House Acres development will not generate significant nor impactful volume of new trips at the intersections studied.
- The studied existing intersections and proposed access locations will operate at or above an LOS of "B", exceeding any minimum requirement of an LOS specified in the Appendix E of the Road Design Manual produced by the Montana Department of Transportation.
- No auxiliary turn lanes are warranted for the intersections and access locations discussed in this report.

- Vertical sight obstruction is present for traffic performing left-turn movements onto South 80th Street West from the North Access location of the development.
- The existing intersections do not warrant any further analysis for signal considerations.

d. **Fire and Police services** – The property is within the Laurel Fire Service Area boundary. The subdivision will have a dry hydrant tank installed alongside the road, North Shop House Road, on the north entry, as shown on the plat. The applicant will submit drawings for the tank to the Laurel Fire Department for review and approval. When the tank is installed the applicant will have the system tested and signed off by the Laurel Fire Department. The applicant will provide a Knox Box at both electric gates into the subdivision. The Knox Box will be coordinated with the Laurel Fire Department to ensure they have access to the internal private roads. **(Condition #4)**

The Yellowstone County Sheriff's Department will provide law enforcement services to this subdivision.

e. **Solid Waste disposal** – The Billings Landfill has capacity for solid waste disposal. Solid waste will be collected and disposed of by a private garbage collection company. Each lot owner will be responsible for arranging for collection.

f. **Storm water drainage** – Stormwater management for the Shop House Acres Subdivision will be addressed through a combination of private detention ponds and conveyance swales. These systems are designed to safely accommodate runoff generated by both impervious surfaces (e.g., roads and driveways) and graded lot areas while protecting downstream properties, infrastructure, and natural drainage corridors. Proposed storm water drainage shall be submitted to the MDEQ for review and approval prior to final plat. All proposed stormwater systems shall meet the requirements of Section 4.7 of Yellowstone County Subdivision Regulation's and the requirements of MDEQ. **(Condition #1)**

g. **School facilities** – The proposed subdivision is located within Elder Grove School District for K through 8. Elder Grove School responded that at the Elementary School has a capacity of 550 with recent enrollment at 500. The Middle School capacity is 300 with a recent enrollment of 250. West High School will provide school for grades 9 through 12. West High School capacity is shown as 1731with current enrollment of 2133.

h. **Parks and recreation** – Parkland dedication is required for this subdivision. They are required to provide 1.93 acres of parkland. The applicant is proposing to provide a cash in lieu contribution to satisfy the requirement of parkland.

i. **Postal Service –** The applicant will be required to coordinate with the USPS to ensure the space they are proposing is a safe location for the postal worker to deliver the mail and the residents to retrieve their mail. The applicant is currently showing the location on the north entrance where the road is a public road. **(Condition #5)**

j. **Historic features** – No known historic or cultural assets exist on the site.

k. **Phasing of Development** - The applicant is proposing to develop this subdivision without doing phases.

3. Effects on the natural environment

The development will use noxious weed control measures to prevent the spread of noxious weeds to adjacent developed or agricultural land. As required by County Subdivision Regulations Section 4.15 all county subdivisions are required to apply for and obtain a weed management plan with the County Weed Department. Any subdivision that has an existing Weed Management Plan is required to get an updated Weed Management Plan. A weed management plan will be completed and a copy will be submitted with final plat. **(Condition #6)**

There are no apparent or known natural hazards on the property.

4. Effects on wildlife and wildlife habitat

The area being defined is an area with greater than one-mile of buffer-zone from the proposed subdivision. As such, not all information provided pertain specifically to the subdivision.

The U.S. Fish and Wildlife Services online Information for Planning and Consultation (IPaC) tool was assessed that no critical habitats are within the subdivision. The IPaC tool also listed endangered species that are potentially affected by activities in this located, including the monarch butterfly and Suckley's Cuckoo Bumble Bee. There are Bald Eagles and/or Golden Eagles within the project area and they shall be protected under the Bald and Golden Eagle Protection Act. There are additionally eight species of migratory birds that could be present in the area. Lastly, subdivision development is typically located in areas of existing agricultural disturbance, and the more valuable riparian vegetation and habitat within the subdivision will be mostly preserved. In conclusion, no 'key' wildlife areas are known to exist in the subdivision.

Based on the available data and site analysis, no notable concerns requiring mitigation have been identified at this time.

There are no known endangered or threatened species on the property. A paragraph in the 'Conditions that Run with the Land' section of the SIA warns future lot owners of the likely presence of wildlife in the area and their potential to damage residential landscaping.

5. Effects on public health and safety

Plans and designs for the water and septic system will be reviewed and approved by MDEQ prior building construction on each lot to ensure public health and safety.

Fire and emergency services are provided for this proposed subdivision from Laurel Fire Department and the Yellowstone County Sheriff's department.

B. Was an environmental assessment required? If yes, what, if any, significant adverse impacts were identified? (76-3-603 MCA) (Chapter 9, YCSR)

A summary of impacts was required for this subdivision pursuant Section 9.2 of the County Subdivision Regulations.

C. Does the subdivision conform to the Yellowstone County 2008 Growth Policy, the 2018 Urban Area Transportation Plan and the Billings Area Bikeway and Trail Master Plan Update? [BMCC 23-302.H.4.]

1. **Yellowstone County - 2008 Growth Policy**

The subdivision is consistent with the following goals of the Growth Policy:

- Goal: Predictable land use decisions that are consistent with neighborhood character and land use patterns. (p. 6)

The subdivision is consistent with the type of commercial development to the north on King Avenue West. There is also some large lot residential to the north.

- Goal: Controlled weed populations. (p. 9)

The developer shall complete a weed management plan and shall provide a re-vegetation plan for any ground disturbed by development.

2. 2023 Billings Urban Area Long Range Transportation Plan

The subject property maintains the road study area of the Transportation Plan. As proposed, the internal streets are neighborhood streets associated with this subdivision.

3. Billings Area Bikeway and Trail Master Plan (BABTMP)

This subdivision is outside the BABTMP boundaries for trails. This subdivision will not be required to install any trails.

D. Does the subdivision conform to the Montana Subdivision and Platting Act (MSPA) and to local subdivision regulations? [MCA 76-3-608 (3) (b) and Section 3.2 (3) (a) YCSR]

The proposed subdivision meets the requirements of the MSPA and the YCSR. The subdivider and the local government have complied with the subdivision review and approval procedures that are set forth by local and state subdivision regulations.

E. Does the subdivision conform to sanitary requirements? [Section 4.8 (C) and 4.9 (C), YCSR]

The subdivision must receive approval from the MDEQ prior to any building construction on each lot. The new parcels will be connected to the subdivision community septic system. This system will be approved by MDEQ before final plat.

F. Does the proposed subdivision meet any applicable Zoning Requirements? [Section 3.2 (H) (3) (e), YCSR]

The proposed subdivision is outside the County Zoning Jurisdiction.

G. Does the subdivision provide for necessary planned utilities? [MCA 76-3-608 (3) (c) and Section 3.2 (H) (3) (b), YCSR]

The applicant will coordinate with private utility companies to provide the required easements.

H. Does the proposed subdivision provide for Legal and Physical Access to all lots? [MCA 76-3-608 (3) (d) and Section 3.2 (H) (3) (c) (d), YCSR]

Legal and physical access will be provided from South 80th Street West. Access to each lot will be from the internal roads of the subdivision.

CONCLUSIONS OF FINDINGS OF FACT

- This subdivision does not create adverse impacts that warrant denial of the subdivision.
- Impacts to agriculture, agriculture water user facilities, local services, public health and safety, the natural environment, and wildlife should be minimal, and can be mitigated by reasonable conditions of final plat approval.
- The subdivision conforms to some of the goals of the Growth Policy.
- The applicant has complied with the MSPA and YCSR processes and the subdivision conforms to the law requirements.

RECOMMENDATION

Staff recommends to the Planning Board that they forward a recommendation of conditional approval to the Board of County Commissioners for the preliminary plat of Shop House Acres Subdivision, approve the variance request and adopt the Findings of Fact as presented in the staff report.

PRELIMINARY SUBDIVISION VARIANCE APPLICATION

SECTION 11.1 VARIANCE (76-3-506), MCA

PLANNING DIVISION
2825 3RD AVENUE NORTH, 4TH FLOOR
BILLINGS, MONTANA 59101

PHONE: (406)247-8676 **FAX: (406) 657-8327**

PROJECT# PZ-26-00013

PROPERTY INFORMATION	
Primary Parcel/Legal Description (C/S, Subdivision, Lot, Block)	**Property Tax ID**
S14, T1S, R24E, P.M.M of Yellowstone County, Montana	000D002070
General Location	Approximately 3000' south of the intersection of S 80th Street West and King Ave West

CLASSIFICATION: (CHECK ONE)

	City Major (6 or more lots)		**City Minor (5 lots or fewer)**		**City Subsequent Minor (Reviewed as aa minor)**		**City Expedited**
✓	**County Major (6 or more lots)**		**County Minor (5 lots or fewer)**		**County Subsequent Minor (Reviewed as a major)**		**County Expedited**

ATTRIBUTES

Gross Area (Acres)	19.78 acres	Net Area (Acres)	18.48 acres	Number of Lot(s)	49
Lot Size Maximum (Square Feet)	48,907 SF	Lot Size Minimum (Square Feet)	14,841 SF		

APPLICANT/SURVEYOR INFORMATION

PROPERTY OWNER:

E-mail Address	yellowstonecontractors@yahoo.com	Mobile Phone	406-690-6633	Home Phone	
Mailing Address (City, State, Zip)	49660 Hammer Dam Rd. Ronan, MT 59864				

AGENT/SURVEYOR:

E-mail Address	Kolten.L.Knatterud@IMEGcorp.com	Mobile Phone		Business Phone	406-248-9000
Mailing Address City, State, Zip	550 N 31st St #111, Billings, MT 59101				

A. Variance(s) Requested

List and Attach Variance Request application and Variance Request criteria answers per Chapter 11. 1.A.1-5. **Each requested variance shall be deemed a separate application, to be processed concurrently with the preliminary plat. A variance review fee must accompany all applications for variances.**

A variance is being pursued to relieve the applicant from the requirement to provide street right-of-way within the proposed subdivision, to the boundary lines of the tract to be developed.

B. **Facts of Hardship:** Provide a **separate written statement** describing the facts of hardship upon which the request for variance is based.

I declare that I am the owner of record of the above-described property, and have examined all statements and information contained herein, and all attached exhibits, and to the best of my knowledge and belief, the information is true and correct.

Owner of Record **Date**

Owner Under Contract **Date**

PRELIMINARY SUBDIVISION VARIANCE APPLICATION
SECTION 11.1 VARIANCE (76-3-506), MCA
PLANNING DIVISION
2825 3RD AVENUE NORTH, 4TH FLOOR
BILLINGS, MONTANA 59101
PHONE: (406)247-8676 FAX: (406) 657-8327 **PROJECT#**

Article 23-1100. ADMINISTRATIVE PROVISIONS

Section 23-1101. Variances.

The City Council or Yellowstone County Board of County Commissioners may grant reasonable variances from the design and improvement standards of these Regulations when strict compliance would result in undue hardship and the result would not negatively affect public health and safety. The granting of a variance shall not have the effect of nullifying the intent and purpose of these Regulations or justifying submission of an incomplete application. The City Council or Board of County Commissioners may not approve a variance that would permit structures within the 100-year floodplain, as defined in 76-5-101, MCA.

A. Requesting a Variance. The subdivider shall include with the submission of the variance request, a written statement describing the facts of hardship upon which the request for the variance is based. Each requested variance shall be deemed a separate application, for which a fee shall be required. Information addressing each of the following findings shall accompany the application. The Planning Board shall review the submitted findings and make a recommendation to the City Council or Yellowstone County Board of County Commissioners.

The governing Board shall not approve variances unless the subdivider has demonstrated that the request satisfies the following findings:

1. The granting of the variance will not be detrimental to the public health, safety, or general welfare or injurious to other adjoining properties;

2. Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, an undue hardship to the owner would result if the strict letter of the regulation was enforced;

3. The variance will not result in an increase in taxpayer burden;

4. The variance will not in any manner place the subdivision in nonconformance with any adopted zoning regulations or Growth Policy; and

5. The subdivider must prove that the alternative design is equally effective and the objectives of the improvements are satisfied.

B. In granting variances, the Governing Body may require conditions of approval that will, in their judgment, secure the objectives of these Regulations.

C. When any such variance is granted, the motion of approval of the proposed subdivision shall contain a statement describing the variance and the facts and conditions upon which the issuance of the variance is based.

D. An application for a variance is not necessary where Planned Neighborhood Developments are proposed, as modifications to the standards and requirements of these Regulations may be approved by the governing body.

Variance Request #1 – Street Right-of-Way

Section 4.6.B.1 Relation to Undeveloped Areas: When a proposed subdivision adjoins undeveloped land, streets within the proposed subdivision shall be arranged to allow access to the adjoining undeveloped land. Street right-of-way within the proposed subdivision shall be provided to the boundary lines of the tract to be developed, unless prevented by topography or other physical conditions.

A variance is being pursued to relieve the applicant from the required access spacing of 600 feet for connections to adjacent parcels and to allow the proposed subdivision to provide one access connection to the property located immediately south of the subject property.

The proposed subdivision will also provide roadway connections to the adjacent property located to the south and west through the proposed internal road network. Therefore, the applicant is not requesting relief from the requirement to provide access to adjacent parcels. The variance request is specifically related to the required spacing of those access connections and the number of access points provided to the property located to the south and west.

There is existing marshy, shallow groundwater on the property located immediately south of the subject property, which limits the practicality of providing multiple access points along the southern boundary. The 133-acre parcel located south and west of the subject property also has multiple alternative access opportunities from S. 80th Street West, Hesper Road, and S. 84th Street West. Additionally, the proposed subdivision will include an approach along the southern boundary, with a portion dedicated as public right-of-way to provide access to the southern parcel. The property immediately north of the subject property also has existing access from S. 80th Street West.

Due to the physical site constraints and the multiple alternative access opportunities available to the adjacent parcel, the applicant is requesting a variance from the required access spacing and to allow only one access connection to the property located immediately south of the subject property.

1. The granting of the variance will not be detrimental to the public health, safety, or general welfare or injurious to other adjoining properties;

The granting of the variance will not be detrimental to public health, safety, or general welfare, nor will it be injurious to adjoining properties. Shop House Acres Subdivision proposes two new access points onto S. 80th Street West from the tract to be developed. These access points will provide safe access to the subdivision roadways for all 49 proposed lots. The variance will not be injurious to adjoining properties, as they have several alternative access opportunities, as noted above.

2. Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, an undue hardship to the owner would result if the strict letter of the regulation was enforced;

Undue hardship to the owner would result if the strict letter of the regulation were enforced, as there is existing marshy, shallow groundwater on the property located immediately south of the subject property. This is a physical and topographical condition unique to the property. The approach located in the southeast corner of the subject property will provide a portion of public right-of-way on the southern boundary line that can also serve as access to the property located immediately south of the subject property.

3. The variance will not result in an increase in taxpayer burden;

An increase in taxpayer burden will not result from approving this variance. The subdivider proposes to construct the proposed roadways within Shop House Acres. If the property located to the south and west is developed at a future time, there are existing alternative access opportunities on the existing surrounding roadways.

4. The variance will not in any manner place the subdivision in nonconformance with any adopted zoning regulations or Growth Policy; and

Approving this variance will not place the subdivision in nonconformance with the growth policy. The property is unzoned so approving the variance will not place the subdivision in nonconformance with any adopted zoning regulations.

5. The subdivider must prove that the alternative design is equally effective and the objectives of the improvements are satisfied.

The alternative design proposed for Shop House Acres is equally effective as it is proposed to connect with existing roadways to the east. The lot to the south and west already has opportunities to connect to the south, east and west.

Variance Request
Shop House Acres Subdivision
Attachment A

Shop House Acres is a proposed major subdivision in Yellowstone County. The applicant has requested a variance from Section 4.6.B.1, of the Yellowstone County Subdivision Regulations, which outlines connection to undeveloped / under developed land surrounding proposed subdivisions. The maximum distance between those connections is 600 feet.

This variance is being pursued to limit the number of connections to the south. One connection could be made with the entry/exit on the south in the public right of way area. The southern entrance has a section of it that is public right of way. Part of that road right of way is immediately adjacent to the property line, providing a future connection. The south border would require two connections at one every 600 feet.

The applicant is specifically requesting one connection to the south stating that the land to the south is marshy and has a high-water table.

In correspondence with County Public Works staff received the following email after requesting their input about the variance request.

Dave, summary as follows:

- They will seek a variance for connectivity to the south.
- They will include language to allow future connection to the west in the SIA – the right of way is immediately adjacent to the property line. No variance needed for west connection.

Monica Plecker, AICP
Public Works Director

1. The granting of the variance will not be detrimental to the public health, safety, or general welfare or injurious to other adjoining properties.

The granting of this variance will not be detrimental to public health, safety, or the general welfare of adjoining properties. The point of multiple internal connections to adjacent property is to allow movement of people through developments without having to go out onto arterial roads to get to another property in the subdivision next to them. One connection to the south and west will help accomplish that goal.

2. Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, an undue hardship to the owner would result if the strict letter of the regulation was enforced.

According to the applicant's agent, the land very near the south border of this project is marshy and has shallow groundwater on the property. This would make development difficult to accomplish. A portion of the right of way for the southern access, to the subdivision, runs along the southern property line. This would allow a future connection to the south. With the land conditions on the southern property, one connection to the proposed subdivision would be acceptable. County Public Works is supportive of the variance request. To the north is a large lot residential subdivision. All the lots to the north of this proposed subdivision have been developed. The subdivision to the north, Homestead Acres, recorded October of 2020, received a variance to not provide a connection to its south from the Board of County Commissioners.

3. The variance will not result in an increase in taxpayer burden.

The granting of this variance would not increase taxpayer burden.

4. The variance will not in any manner place the subdivision in nonconformance with any adopted zoning regulations or Growth Policy.

The granting of this variance would not put this proposed subdivision in nonconformance with any adopted County zoning. They are outside of the County zoning jurisdiction.

5. The subdivider must prove that the alternative design is equally effective, and the objectives of the improvements are satisfied.

The option of the single connection to the south and a connection to the west will work for future connections to other subdivisions that may come along in the future.

Shop House Acres Major Subdivision

Traffic Impact Study

Yellowstone Contractors

IMEG #25006765.00



March 17, 2026

Prepared By:
IMEG Corp
Matthew Holbrook, E.I.
Brad Lange, P.E., P.T.O.E.

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Traffic Impact Study

For the
Shop House Acres Major Subdivision

Prepared for:
Yellowstone Contractors & Yellowstone County

IMEG #25006765.00

March 17, 2026

1 EXECUTIVE SUMMARY and INTRODUCTION

1.1 Executive Summary

The Shop House Acres development involves the construction of 55 individual lots for the building of private use shop buildings with a residential living quarter on each lot, which are intended to be serviced by individual cisterns and septic systems. This development will be traversed through construction of a private roadway throughout the development that will provide circular movement and two access locations to South 80th Street West. The proposed development is estimated to generate a total of 108 Peak Hour Trips, 48 AM trips and 60 PM trips. Through the analysis of these additional trips on the surrounding intersections, it has been concluded that negligible impacts will be made to King Avenue West & South 80th Street West and Hesper Road & South 80th Street West.

1.2 Purpose

The purpose of this Traffic Impact Study (TIS) is to determine the operational impact that the proposed Shop House Acres development traffic will have on the surrounding major intersections and to recommend modifications, if required, that will allow the major intersections and access drives to function adequately as the population grows. The proposed development will have two (2) access locations to South 80th Street West, which will have impacts to King Avenue West, to the north, and Hesper Road, to the south.

This TIS focuses solely on Shop House Acres development. This TIS does not take into consideration any other proposed or future residential, commercial, or industrial developments in the surrounding area. Future developments will need to prepare a separate traffic study. At the time of this study, there are no known developments in the vicinity to be considered as part of this study.

1.3 Objective

To evaluate the necessary intersections identified by Yellowstone County Public Works and the development impacts, IMEG performed the following initial tasks:

- Evaluated current traffic volumes, collected for 24 hours in 15-minute intervals and 1-hour intervals at the following intersections:
    - King Avenue West & South 80th Street West (Intersection 1)

  - Hesper Road & South 80th Street West (Intersection 2)
- Reviewed the proposed Shop House Acres Major Subdivision site development plan, see Appendix A.
- Utilized the ITE Trip Generation Manual, 12th Edition, see Appendix D, to determine the number of AM and PM trips generated by the proposed development.
- Assigned trip distribution to the development traffic to determine entering and existing volume. Generated trips will not increase by the growth factor. Refer to Appendix B for a summary of those traffic movements.
- Researched and collected traffic data and other background information from Montana Department of Transportation (MDT).
- Seasonally adjusted and calculated traffic data using the Highway Capacity Software (HCS), Version 2026 for the following scenarios:
  - Existing 2026 AM and PM peak hour traffic using the existing lane geometry at the studied intersections. See Appendix C.
  - Projected 2031 AM and PM peak hour background traffic operational capacity, see Appendix C, using existing lane geometry at the studied intersections.
  - Projected 2031 AM and PM peak hour total traffic operational capacity, see Appendix C, using existing lane geometry.

2 EXISTING CONDITIONS

2.1 Study Roadway(s)

The following roadways describe the intersections that are to be analyzed as part of this study. See Figure 1 for the intersection study areas and Figure 2 for the Montana Department of Transportation roadway classifications.

2.1.1 King Avenue West

King Avenue West is classified by Montana Department of Transportation (MDT) as a "Major Collector" roadway with no additional classification set by either the City of Billings or Yellowstone County. King Avenue West is a paved rural county roadway consisting of one (1) 12-foot lane for each travel direction (east/west), followed by a 2-foot gravel shoulder. This configuration is consistent with the Yellowstone County Standard Drawing #100 for a typical paved road. In the reasonable vicinity of the study area along King Avenue West, there are no crosswalks, sidewalks, bike lanes, curbs, or street illuminations. The posted speed for King Avenue West is 60 mph in this area.

2.1.2 Hesper Road

Hesper Road is classified by Montana Department of Transportation (MDT) as a "Local" roadway with no additional classification set by either the City of Billings or Yellowstone County. Hesper Road is a paved rural county roadway consisting of one (1) 12-foot lane for each travel direction (east/west), followed by a 2-foot gravel shoulder. This configuration is consistent with the Yellowstone County Standard Drawing #100 for a

typical paved road. In the reasonable vicinity of the study area along Hesper Road, there are no crosswalks, sidewalks, bike lanes, curbs, or street illuminations. The posted speed for Hesper Road is 45 mph in this area.

2.1.3 South 80th Street West

South 80th Street West (80th Street) is classified by Montana Department of Transportation (MDT) as a "Local" roadway with no additional classification set by either the City of Billings or Yellowstone County. 80th Street is a paved rural county roadway consisting of one (1) 12-foot lane for each travel direction (east/west), followed by a 2-foot gravel shoulder. This configuration is consistent with the Yellowstone County Standard Drawing #100 for a typical paved road. In the reasonable vicinity of the study area along 80th Street, there are no crosswalks, sidewalks, bike lanes, curbs, or street illuminations. It should be noted that in the proposed development vicinity there is a vertical grade change worth of vertical sight evaluation, which is discussed later in this report. The posted speed for 80th Street is 50 mph in this area.

2.2 Study Intersection(s)

The following describes the intersections that are analyzed as part of this study. The intersection study areas are shown in Figure 1.

2.2.1 Intersection 1 – King Avenue West & South 80th Street West

The intersection has four approach legs and is stop-controlled in the north and south directions. Being a rural county road, there are no crosswalks, sidewalks, bike lanes, or intersection illuminations.

Traffic data for this intersection was collected on February 12th, 2026. From the collected traffic data, it was determined that the AM peak hour for the intersection was between 7:15 and 8:15, while the PM peak hour was between 4:15 and 5:15.

2.2.2 Intersection 2 – Hesper Road & South 80th Street West

The intersection has four approach legs and is stop-controlled in the north and south directions. Being a rural county road, there are no crosswalks, sidewalks, bike lanes, or intersection illuminations.

Traffic data for this intersection was collected on February 12th, 2026. From the collected traffic data, it was determined that the AM peak hour for the intersection was between 7:00 and 8:00, while the PM peak hour was between 4:45 and 5:45.

2.3 Study Area Land Uses

The proposed development is currently surrounded by single-family residential neighborhoods to the north and west. Immediately to the east and south is agricultural farmland.

2.4 2026 Existing Site Conditions

The existing lane configurations and Peak Hour turning movement volumes are shown in Figure 3. IMEG collected the existing traffic data using Miovision cameras on Thursday, February 12 for 24 hours beginning at 12:00am. MDT seasonal adjustment

factors were applied to the recorded traffic counts, to which were then entered into Highway Capacity Software (HCS), Version 2026, to evaluate the current level of service. The Two-Way Stop Control (TWSC) module was used to determine the operational capacity of each leg and the intersections studied. A summary of the results for each intersection can be seen in Table 1 as well as Appendix C. The 2024 MDT seasonal adjustment factors can also be found in Appendix G with the collected Miovision data found in Appendix H.

2.5 Pedestrian and Bicycle Considerations

There are currently no bicycle or pedestrian considerations as the study performed is located within a rural county setting with no sidewalks or bike lanes provided along the various segments of the roads studied.

Table 1: 2026 Existing Traffic Peak Hour Capacity Analysis Summary

No.	Intersection	Approach	2026 Existing Traffic Peak Hour Capacity Analysis Summary					
			AM PEAK HOUR			PM PEAK HOUR		
			Approach Delay (sec/veh)	Approach LOS	95th % Queue (veh)	Approach Delay (sec/veh)	Approach LOS	95th % Queue (veh)
Intersection Control			*Two-Way Stop Control (NB/SB)*					
1	King Avenue West & South 80th Street West	EB	0.3	A	0.0	0.8	A	0.0
		WB	1.7	A	0.0	1.6	A	0.1
		NB	9.4	A	0.2	10.2	B	0.2
		SB	11.5	B	0.8	11.4	B	0.4
Intersection Control			*Two-Way Stop Control (NB/SB)*					
2	Hesper Road & South 80th Street West	EB	2.0	A	0.1	2.3	A	0.0
		WB	0.9	A	0.0	0.9	A	0.0
		NB	9.7	A	0.1	9.7	A	0.2
		SB	9.5	A	0.1	9.5	A	0.3

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SHOP HOUSE ACRES MAJOR SUBDIVSION

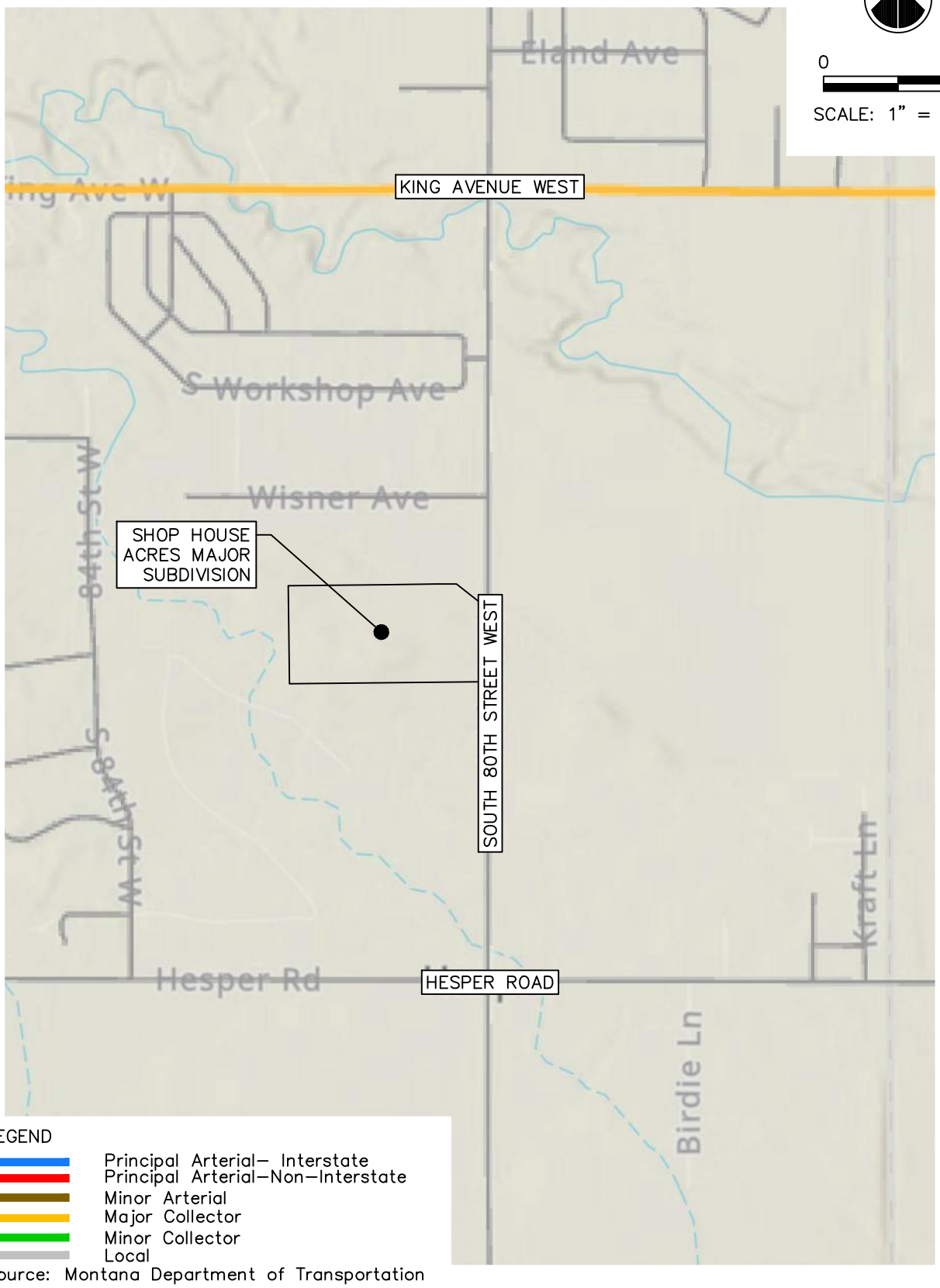
BILLINGS, MONTANA

TRAFFIC IMPACT STUDY INTERSECTION LOCATION OVERVIEW

EXHIBIT

FIG - 1

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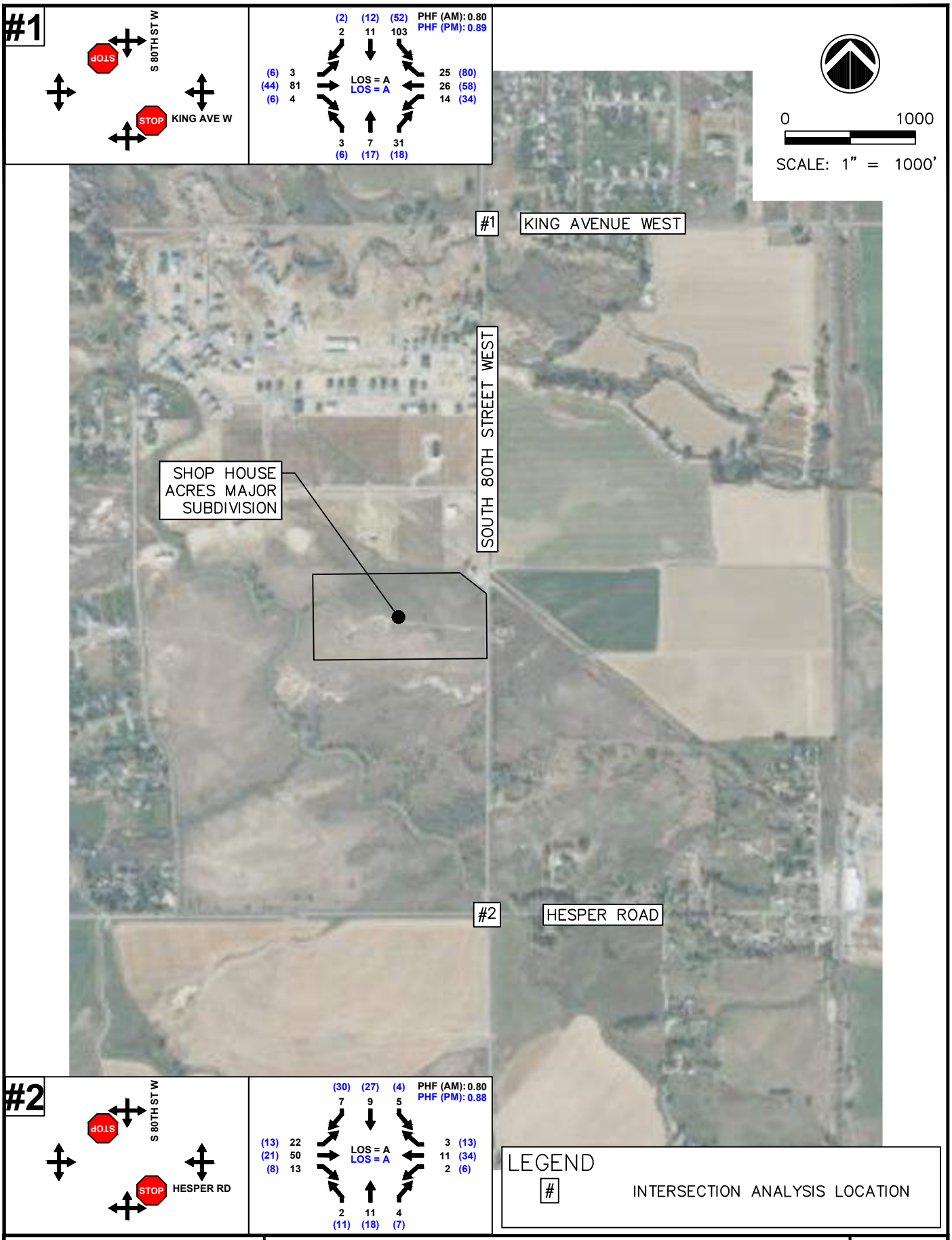
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BILLINGS, MONTANA

ROADWAY FUNCTIONAL CLASSIFICATION
MONTANA DEPARTMENT OF TRANSPORTATION

EXHIBIT

FIG - 2



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2026 BACKGROUND TURNING MOVEMENTS

EXHIBIT

FIG - 3

2.6 Development Considerations

2.6.1 Crash Data

IMEG reached out to MDT on February 16, 2026 requesting additional information for historical crash data in the vicinity of the study area. MDT provided historical crash data for the two (2) existing intersections within this study for the years between 2020-2024.

The purpose of this section is to document the number of crashes, rank the severity of crashes, and quantify the overall intersection crash rates of studied intersections that have data available. The crash information provided herein is intended to identify intersections with crash characteristics that may warrant further studies. General crash characteristics were evaluated along with potential causes based on the information provided by MDT. This information covers the minimum five-year time period from 2020 to 2024 as stated in the Yellowstone County Subdivision Regulations, Section 4.6.C.4.B.2 adopted February 5, 2019. Appendix I contains the crash records provided by the Montana Department of Transportation. Table 2 shows the total number of crashes at each intersection.

To calculate the crash rate for the intersections described above, the commonly accepted crash rate equation from *Intersection Safety – A Manual for Local Rural Road Owners* produced by the U.S. Department of Transportation Federal Highway Administration was used to quantify each intersections safety on a proportional basis. This method used is due to the varying volume of traffic each intersection experiences. The following equation expresses an intersections number of crashes per every million vehicles:

$$\boldsymbol{Intersection\ Crash\ Rate} = \frac{(Total\ \#\ of\ Crashes)(1{,}000{,}000\ Vehicles)}{(AADT\ Entering\ the\ Intersection)(Analysis\ Time\ Period)(365)}$$

To calculate the severity index and rate for each of the studied intersections, the following Montana Department of Transportation equations were used:

$$\boldsymbol{MDT\ Severity\ Index} = \frac{(8 * Incap.\ \&\ F) + (3 * Non - Incap.\ \&\ PI) + (1 * PDO\ \&\ U)}{Total\ Crashes}$$

$$\boldsymbol{Severity\ Rate} = (Crash\ Rate)(MDT\ Severity\ Index)$$

Where:

F = Fatal
PI = Possible Injury
Incap. = Incapacitated
PDO = Property Damage Only
U = Unknown

Table 2: Intersection Crashes in the Five-Year Period

INTERSECTION		# CRASHES
King Avenue West & South 80th Street West	U-2W	1
Hesper Road & South 80th Street West	U-2W	2
U-2W=Unsignalized Intersection Two-Way Stop Controlled		

Table 3 ranks the number of crashes against the annual average daily traffic (AADT) (provided by MDT's "MS2" traffic count software) entering each intersection, expressed as crashes per million entering vehicles (MEV). The Intersection Crash Rate formula was used to determine the intersection rate, expressed in MEV. It is to note that the AADT utilized for each intersection was calculated by adding up the total AADT from 2021 to 2025 and dividing by five. Since each roadway is a "2-way" road, the final AADT was then divided by two to determine a 50/50 split for AADT entering the intersection. For the data obtained at the intersection of King Ave. West & South 80th Street West, MDT Traffic Count Station 56-4-015 was used to determine AADT. For the data obtained at the intersection of Hesper Road & South 80th Street West, MDT Traffic Count Station 088451Y was used to determine AADT.

Table 4 illustrates a detailed look at the crashes to determine the MDT "severity index rating." The severity index is a ratio that shows where the most sever types of crashes occur. Crashes were put into five categories of severity: property damage, possible injury crash, minor injury crash, serious injury crash, and fatal injury crash. The severity index rating is then determined using the MDT Severity Index equation. Also shown is the severity rate, which uses the Severity Rate equation by multiplying the Crash Rate by the MDT Severity Index.

Table 3: Intersection Crash Rate

INTERSECTION		# CRASHES	VOLUME*	CRASH RATE
King Avenue West & South 80th Street West	U-2W	1	1,914	**0.29**
Hesper Road & South 80th Street West	U-2W	2	579	**1.89**
U-2W=Unsignalized Intersection Two-Way Stop Controlled				

Table 4: MDT Severity Index and Rate

INTERSECTION	PROPERTY DAMAGE ONLY OR UNKNOWN	POSSIBLE INJURY	MINOR INJURY	SERIOUS INJURY	FATAL INJURY	SEVERITY INDEX	SERVERITY RATE
King Avenue West & South 80th Street West	0	0	1	0	0	3.00	**0.86**
Hesper Road & South 80th Street West	1	1	0	0	0	2.00	**3.79**

2.6.2 Approach Site Triangles

To determine sufficient driver clear vision for the development approaches, the proposed site conditions, features, and structures were evaluated using the following sight distance equation:

$$b = 1.47 V_{major} t_g$$

Where:

b = length of leg of sight triangle along the major road (ft)

V_{major} = design speed of major road (mph)

t_g = travel time to reach and clear the major road (sec)

The following intersections were evaluated as follows:

1. King Avenue West & South 80th Street West
    a. Greenbook Case B – Section 9.5.3.1 (Stop control on Minor Road)
2. Hesper Road & South 80th Street West
    a. Greenbook Case B – Section 9.5.3.1 (Stop control on Minor Road)
3. Development North Access "N"
    a. Greenbook Case B – Section 9.5.3.1 (Stop control on Minor Road)
4. Development South Access "S"
    a. Greenbook Case B – Section 9.5.3.1 (Stop control on Minor Road)

The time gap chosen for these intersections were both, "Passenger Car" & "Single-Unit Truck" as vertical sight clearance was a concern for the North Access. The determination was made for a "Single-Unit Truck" in lieu of a "Combination Truck" was based on the understanding of intended development use and anticipated traffic. Additionally, the decision point for each case was based on the conservate assumption that vehicles typically stop 18-feet back from the edge of the major travel lane, as recommended in *AASHTO A Policy on Highway Geometric Design and Streets (2018), 7th Edition "The Greenbook".* Furthermore, vertical sight clearance was considered for both a passenger car line of sight, 3.50', as well as a truck's line of sight, 7.60', for the development approaches following the assumed approaching object height of 3.50' along the sight triangle alignment. Figures for these calculations can be found in Appendix J. During this analysis, it was identified that a vehicle, truck and car, making a left turn from the North Approach will experience a visual impairment due to the hill crest of South 80th Street West located immediately to the south of the approach. No other development movements were identified as being impaired through this analysis.

3 PROJECTED TRAFFIC – TRIP GENERATION AND DISTRIBUTION

3.1 Roadway Traffic Forecast

A 0.84% and 4.51% growth factor was utilized for the traffic calculations at King Avenue West and Hesper Road, respectively. These growth rates are based on current demographic trends and MDT Historical count data for adjacent roadways. Beginning with the opening year of 2031 this growth factor will be used to project the peak hour turning movement volumes.

The annualized growth factor was determined using the equation:

$$Growth\ Rate = \left(\frac{P_{final}}{P_{initial}}\right)^{\frac{1}{n}} - 1$$

Where:

P = Population final/initial

n = Number of Years

Using the annualized growth rate equation above as well as the population data provided by Montana's Department of Transportation AADT counts, the following information was used to identify the growth rates used:

King Avenue West			Hesper Road		
MDT Rout:	S-532		MDT Rout:	L-56-526	
MDT Classification:	RMA_RMC_345		MDT Classification:	RMA_RMC_345	
MDT Functional Class:	Major Collector		MDT Functional Class:	Local	
Traffic Count Site:	56-4-015		Traffic Count Site:	088451Y	
AADT Year	AADT Count	AADT Annual Growth	AADT Year	AADT Count	AADT Annual Growth
2025	1956	-6%	2025	667	1%
2024	2082	14%	2024	651	25%
2023	1833	1%	2023	522	1%
2022	1822	-3%	2022	519	-3%
2021	1876	197%	2021	535	9%
Annualized Growth Rate:		**0.84%**	**Annualized Growth Rate:**		**4.51%**

3.1.1 Proposed Development Site

Shop House Acres development is currently addressed as 1248 South 80th Street West, Billings, MT and is located in Section 14, Township 01 North, Range 24 East, Yellowstone County, Montana. There is currently no zoning in this area. If the land use changes in the future, a new traffic impact study will be required by the future developer. The development is bound by the existing Home Stead Acres Subdivision and Shop World Subdivision to the north, Tanglewood Estates Subdivision to the west, and agricultural farmland to the south and east.

To estimate trip generation for the development, land use codes from the Institute of Transportation Engineers (ITE) were applied. Specifically, ITE Code 210 – Single-Family Detached Housing as this seems the most relevant and applicable code to use during IMEG's meeting with the County Public Works department on February 11th, 2026. The site plan, provided in Appendix A, illustrates the proposed 55-lot development area and Figure 4 illustrating access to the site.

3.2 2031 Trip Distribution

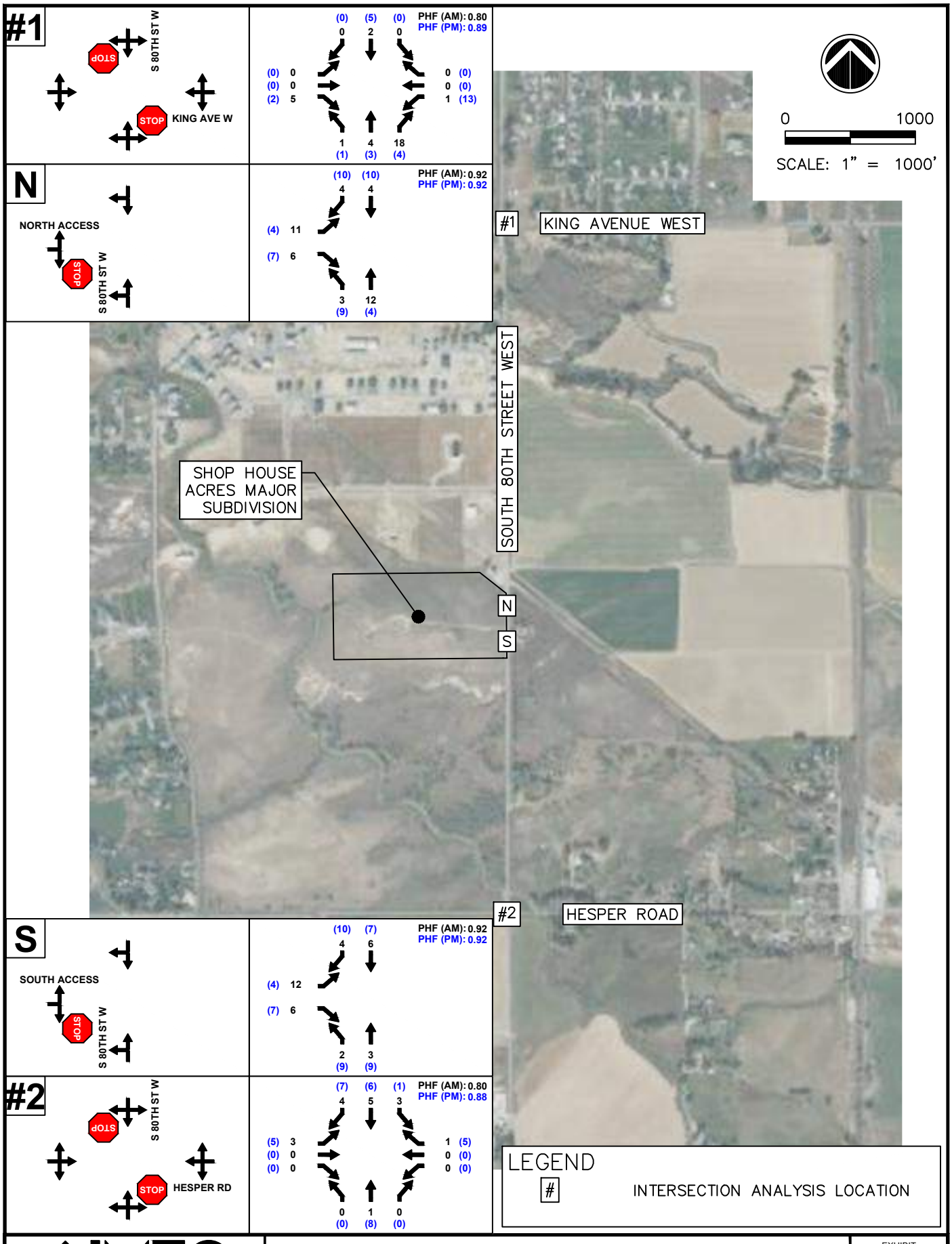
There are two (2) proposed access locations for the development that will both be accessed of South 80th Street West. It is assumed that the development's trips will utilize existing patterns that were recorded with the 2026 background traffic data. The existing traffic movements indicate the following distribution at the developments access locations:

AM Distribution		PM Distribution	
Right-Turn$_{Entry}$	52%	Right-Turn$_{Entry}$	54%
Right-Turn$_{Exit}$	34%	Right-Turn$_{Exit}$	60%
Left-Turn$_{Entry}$	48%	Left-Turn$_{Entry}$	46%
Left-Turn$_{Exit}$	66%	Left-Turn$_{Exit}$	40%

This assumption is believed to be reasonable as the proposed development is assumed to follow existing traffic and driver's habits. Figure 4 shows the generated trip assignments for both the AM and PM peak hours. A summary of the trips generated can be found in Table 5. ITE Trip Generation Worksheets are shown in Appendix E.

Table 5: 2024 Trip Movement Summary

2031 Trip Generation – Shop House Acres										
Time Period	Land Use	ITE Code	Variable	Quantity	Avg Rate	Fitted Curve	Trips In	Trips Out	% Enter	% Exit
AM	Single-Family Detached Housing	210	Dwelling Units	55	41	48	13	35	27	73
PM	Single-Family Detached Housing	210	Dwelling Units	55	53	60	38	22	63	37
					Totals	**108**	**51**	**57**		



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SHOP HOUSE ACRES MAJOR SUBDIVSION

BILLINGS, MONTANA

2031 DEVELOPMENT TURNING MOVEMENTS

EXHIBIT

FIG - 4

4 TRAFFIC OPERATIONAL ANALYSIS

4.1 Analysis Description

Traffic volumes provide a general view of where the traffic is coming and going through the intersection. The concept of Level of Service (LOS) is to take the traffic volumes and then provide an overall operational analysis of the intersection or each leg of the intersection based on travel delay.

For unsignalized intersections, the LOS is expressed in terms of the weighted average control delay of the overall intersection or by approach. LOS has a range of LOS "A" (best) to LOS "F" (worst). Table 6 shows the Level of Service definitions and delay for both signalized and unsignalized intersections.

Table 6: Level of Service Definitions

Level of Service	Signalized Intersection Control Delay (sec/veh)	All-way Stop, Two-Way Stop, and Roundabout Intersection Control Delay (sec/veh)
A	≤= 10	≤= 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55-80	> 35 - 50
F	> 80; Volume Exceeds Capacity	> 50; Volume Exceeds Capacity
Source: Highway Capacity Manual 7th Edition		

LOS "C" is typically considered an acceptable level of service, although exceptions could be made in specific cases. In *Appendix E* of the Road Design Manual produced by the Montana Department of Transportation the minimum LOS for an Urban Collector Road is a grade "D", with no specified minimum grade for Local Roads.

If the intersection LOS exceeds (worse) these study goals, it demonstrates operational or capacity related needs to be addressed for any potential improvements

4.2 2031 Capacity and Level of Service

A capacity analysis was performed for the projected 2031 background traffic volumes based on the respective growth rates as discussed in section 3.1 for the same lane configuration used for the existing 2026 capacity analysis. See Figure 5 for 2031 background movements. Table 7 summarizes the Highway Capacity Software (HCS) results, which can also be found in Appendix C.

4.3 2031 Projected Traffic Capacity plus Development Traffic

A capacity analysis was performed for the 2031 total traffic volumes using the existing lane configurations for the intersection study locations. 2031 is the anticipated year that the development will be fully built and occupied. The 2026 traffic volumes were increased by the previously mentioned growth factors discussed in section 3.1 with the additional development traffic identified in section 3.2. See Figure 6 below for 2031 total movements. Table 8 summarizes the Highway Capacity Software (HCS) results, which can also be found in Appendix C.

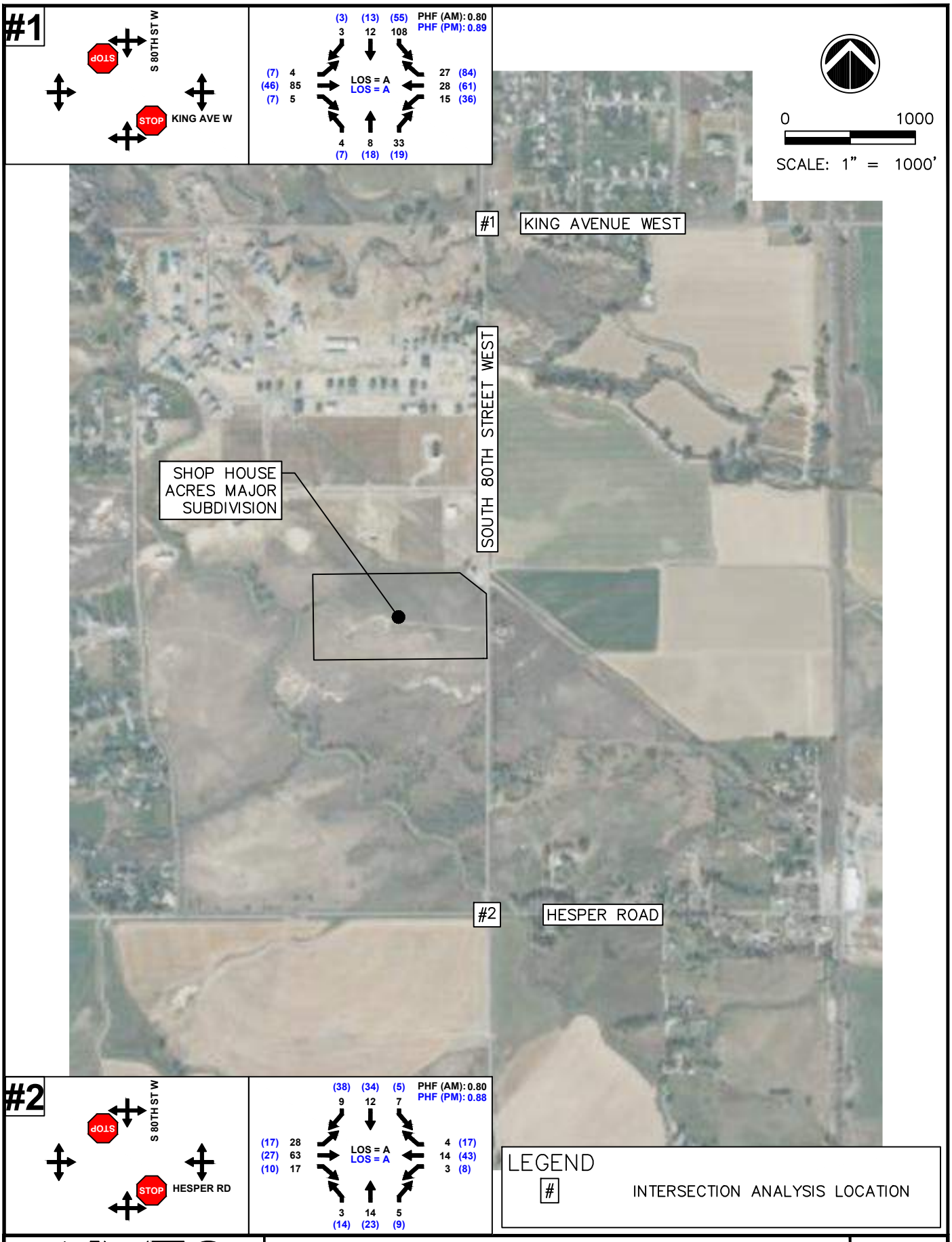
Table 7: 2031 Background Traffic Peak Hour Capacity Analysis Summary

No.	Intersection	Approach	2031 Background Traffic Peak Hour Capacity Analysis Summary					
			AM PEAK HOUR			PM PEAK HOUR		
			Approach Delay (sec/veh)	Approach LOS	95th % Queue (veh)	Approach Delay (sec/veh)	Approach LOS	95th % Queue (veh)
Intersection Control			*Two-Way Stop Control (NB/SB)*					
1	King Avenue West & South 80th Street West	EB	0.3	A	0.0	0.9	A	0.0
		WB	1.7	A	0.0	1.6	A	0.1
		NB	9.5	A	0.2	10.3	B	0.2
		SB	11.9	B	0.9	11.7	B	0.4
Intersection Control			Two-Way Stop Control (NB/SB)					
2	Hesper Road & South 80th Street West	EB	2.0	A	0.1	2.4	A	0.0
		WB	1.1	A	0.0	0.9	A	0.0
		NB	10.0	B	0.1	10.1	B	0.2
		SB	9.8	A	0.1	9.8	A	0.3

Table 8: 2031 Future Capacity Analysis Summary Plus Development Traffic

No.	Intersection	Approach	2031 Future Capacity Analysis Summary Plus Development Traffic					
			AM PEAK HOUR			PM PEAK HOUR		
			Approach Delay (sec/veh)	Approach LOS	95th % Queue (veh)	Approach Delay (sec/veh)	Approach LOS	95th % Queue (veh)
Intersection Control			*Two-Way Stop Control (NB/SB)*					
1	King Avenue West & South 80th Street West	EB	0.3	A	0.0	0.9	A	0.0
		WB	1.8	A	0.0	2.1	A	0.1
		NB	9.7	A	0.3	10.6	B	0.3
		SB	12.4	B	0.9	12.3	B	0.5
Intersection Control			*Two-Way Stop Control (NB/SB)*					
2	Hesper Road & South 80th Street West	EB	2.2	A	0.1	2.8	A	0.0
		WB	1.0	A	0.0	0.8	A	0.0
		NB	10.1	B	0.1	10.4	B	0.3
		SB	10.0	B	0.2	9.9	A	0.4
Intersection Control			One-Way Stop Control (EB)					
3	Development North Approach	EB	8.9	A	0.1	9.1	A	0.0
		WB						
		NB	0.4	A	0.0	1.0	A	0.0
		SB	-	-	-	-	-	-
Intersection Control			One-Way Stop Control (EB)					
4	Development South Approach	EB	8.9	A	0.1	9.1	A	0.0
		WB						
		NB	0.3	A	0.0	0.9	A	0.0
		SB	-	-	-	-	-	-

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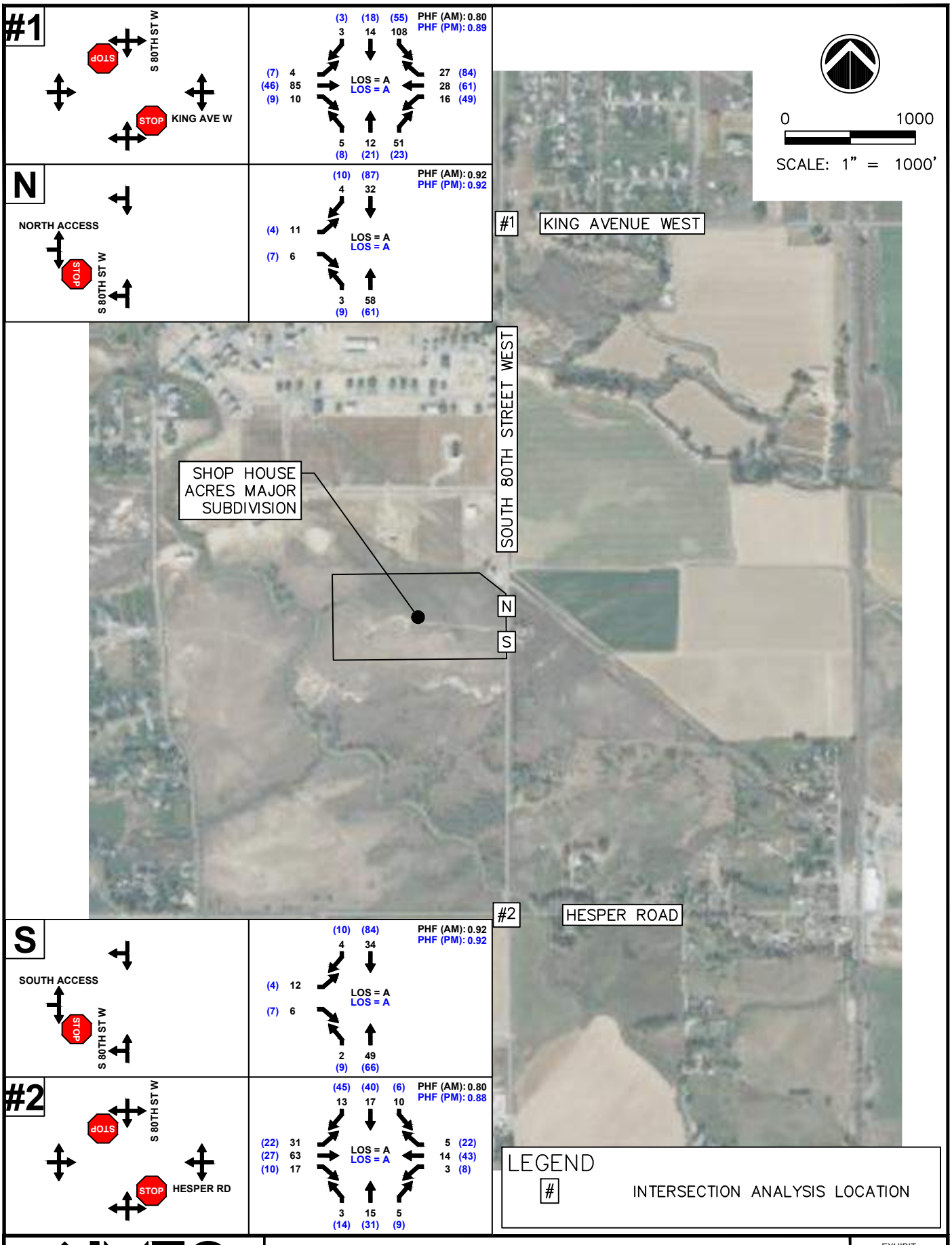
BILLINGS, MONTANA

2031 BACKGROUND TURNING MOVEMENTS

EXHIBIT

FIG - 5

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2031 TOTAL TURNING MOVEMENTS

EXHIBIT

FIG - 6

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5 ADDITIONAL TRAFFIC OPERATIONAL ANALYSIS

5.1.1 Traffic Signal Warrant Analysis

A traffic signal warrant analysis was performed by using the Highway Capacity Software (HCS) MUTCD Warrants function. Meeting a signal warrant is an indication that the intersection could be considered for the installation of traffic signals. Table 9 below summarizes the signal warrant calculations, taking into account seasonally adjusted traffic counts, pedestrian movements, and articulated trucks for each hour between 7:00 am and 6:00pm for both the existing 2026 traffic and the 2031 total traffic. Additional signal warrant analysis information can be found in Appendix E.

Table 9: Signal Warrant Analysis Summary

Traffic Signal Warrants			Warrant 1, Eight-Hour Vehicular Volume	Warrant 2, Four-Hour Vehicular Volume	Warrant 3, Peak Hour	Warrant 4, Pedestrian Volume	Warrant 5, School Crossing	Warrant 6, Coordinated Signal System	Warrant 7, Crash History	Warrant 8, Roadway Network	Warrant 9, Intersection Near a Grade Crossing
2026	Intersection 1	King Avenue West & South 80th St. West	No	No	No	No	No	No	No	No	No
2031			No	No	No	No	No	No	No	No	No
2026	Intersection 2	Hesper Road & South 80th St. West	No	No	No	No	No	No	No	No	No
2031			No	No	No	No	No	No	No	No	No

5.1.2 Right-Turn Lane Analysis

For this analysis, the existing two (2) Intersections, #1 & #2, as well as the proposed two (2) development access locations, "N" & "S", were considered for the need for an auxiliary right-turn lane for the free-flowing legs of the intersection based on the criteria outlined in Chapter 28.4 of the Engineering Traffic Manual (2007), which can be found in Appendix F. Although neither of the existing intersections nor the proposed access locations warrant the need for any further considerations, Table 10 summarizes each of the TWSC intersections and the decisions warranting further design considerations for an auxiliary right-turn.

5.1.3 Left-Turn Lane Analysis

For this analysis, the existing two (2) Intersections, #1 & #2, as well as the proposed two (2) development access locations, "N" & "S", were considered for the need for an auxiliary left-turn lane for the free-flowing legs of the intersection based on the criteria outlined in Chapter 28.4 of the Engineering Traffic Manual (2007), which can be found in Appendix F. Although neither of the existing intersections nor the proposed access locations warrant the need for any further considerations, Table 10 summarizes each of the TWSC intersections and the decisions warranting further design considerations for an auxiliary left-turn lane.

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Table 10: Auxiliary Turn-Lane Summary

Auxiliary Turn-Lane Warrants			Northbound Left		Northbound Right		Southbound Left		Southbound Right		Eastbound Left		Eastbound Right		Westbound Left		Westbound Right	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
$2026_{Existing}$	Intersection 1	King Avenue West & South 80th St. West	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
$2031_{Existing}$			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2031_{Total}			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
$2026_{Existing}$	Intersection 2	Hesper Road & South 80th St. West	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
$2031_{Existing}$			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2031_{Total}			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
$2026_{Existing}$	Intersection N	Development North Access & South 80th St. West	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
$2031_{Existing}$			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2031_{Total}			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
$2026_{Existing}$	Intersection S	Development South Access & South 80th St. West	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
$2031_{Existing}$			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2031_{Total}			NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

6 IMPACT MITIGATION FINANCIAL CONTRIBUTION ANALYSIS

This analysis follows the requirements outlined in the Yellowstone County Subdivision Regulations, Section 4.6.C.4.B.8. Following the "Vegas Method" it was concluded that King Avenue West at South 80th Street West is projected to increase by 1.58% and Hesper Road at South 80th Street West is projected to increase by 1.17%. With both intersections not meeting or exceeding the minimum contribution threshold of 2.00% in growth, the developer for Shop House Acres is not required to participate in the financial cost share for either intersection. A detailed calculation and summary of this data is presented in Appendix K.

7 CONCLUSION

Analysis of the existing traffic volumes, lane configurations, and the impacts due to the projected traffic growth and proposed development result in the following general conclusions:

- The preceding analysis demonstrates that the Shop House Acres development will not generate significant nor impactful volume of new trips at the intersections studied.
- The studied existing intersections and proposed access locations will operate at or above an LOS of "B", exceeding any minimum requirement of an LOS specified in the *Appendix E* of the Road Design Manual produced by the Montana Department of Transportation.
- No auxiliary turn lanes are warranted for the intersections and access locations discussed in this report.

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- Vertical sight obstruction is present for traffic performing left-turn movements onto South 80th Street West from the North Access location of the development.
- The existing intersections do not warrant any further analysis for signal considerations as no considerations warrants are met.

8 RECOMMENDATIONS

Based on the data presented during this study, it is recommended that:

- Due to the vertical sight obstruction of the hill on South 80th Street West, it is recommended that a "Hill Blocks View" and an advisory speed sign of 30mph be placed along South 80th Street West for the north-bound traffic as identified by the intersection sight distance (ISD) limitations shown Figures J-3 & J-4 in Appendix J.
    - "Hill Block View" - Reference figure 2C-5, sign W7-6 from the Manual of Uniform Traffic Control Devices, 11th edition.
    - Advisory Speed Sign - Reference figure 2C-1, sign W13-1P from the Manual of Uniform Traffic Control Devices, 11th edition.
- Any additional improvements shall be designed in accordance with MTD and Yellowstone County standards and comply with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).
- Any future development(s) of the current property or surrounding properties shall perform a new traffic impact study.

9 REFERENCES

- *Montana Department of Transportation (MDT)*
- *Manual on Uniform Traffic Control Devices, 11th edition*
- *ITE Trip Generation Manual, 12th edition*
- *Highway Capacity Software (HCS), Version 2026*
- *AASHTO A Policy on Highway Geometric Design and Streets (2018), 7th Edition*
- *Intersection Safety – A Manual for Local Rural Road Owners*

Shop House Acres Major Subdivision

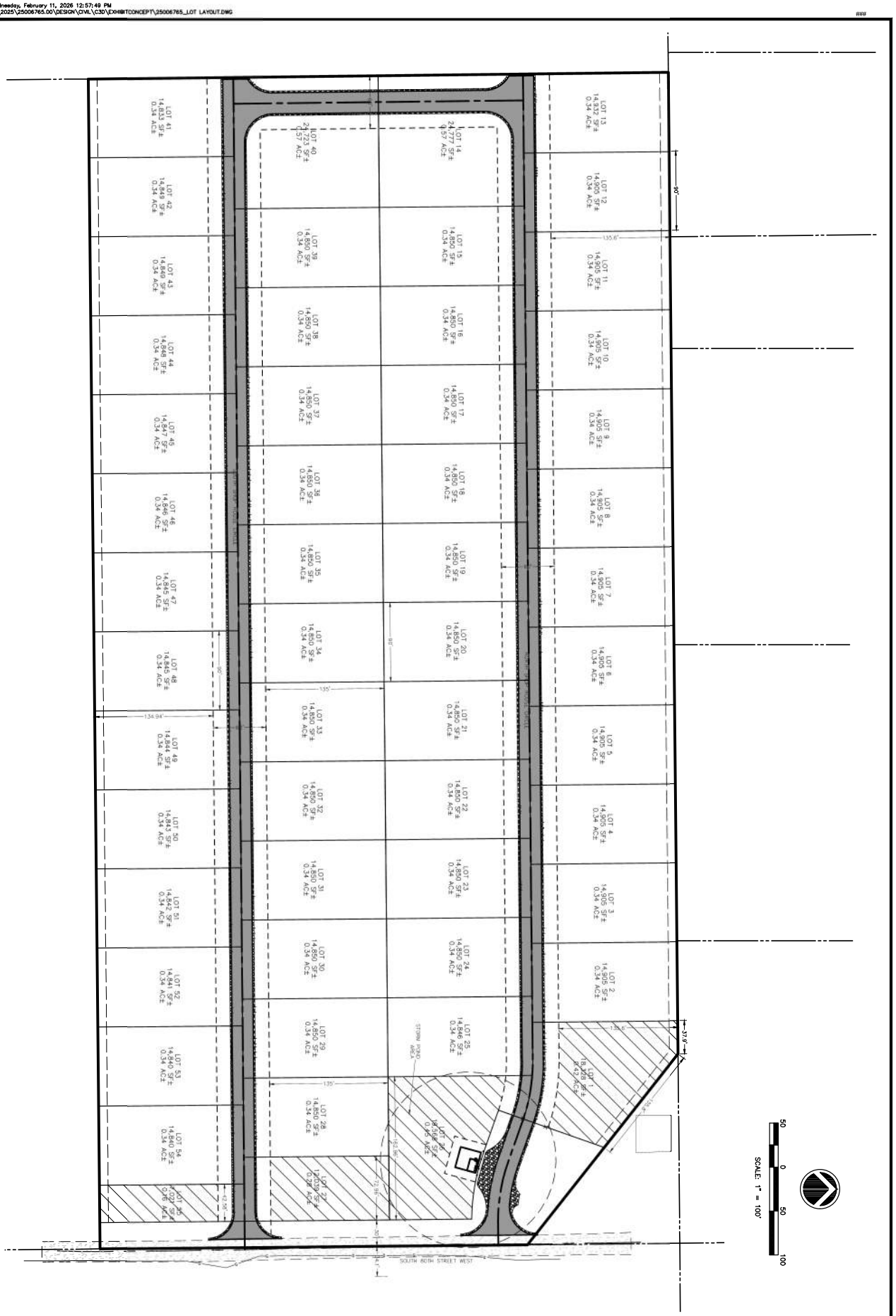
Traffic Impact Study

APPENDIX A

Site Plan

Wednesday, February 11, 2026 12:57:49 PM
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###



Sheet 1 of 1	EXH1	IMEG Project No. 25006765	SHOP HOUSE ACRES SUBDIVISION YELLOWSTONE COUNTY MONTANA PRELIMINARY LOT LAYOUT	IMEG 550 NORTH 31ST STREET SUITE 111 BILLINGS, MT 59101 PH: 406.248.9000 www.imegcorp.com	REVISIONS No. DESCRIPTION DATE ####
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		Drawing Number:			
		Field Book No:			
		Drawn By: GW			
		Checked By: ST			
		Approved By: KK			
		Date: 12/30/2025			

Shop House Acres Major Subdivision

Traffic Impact Study

APPENDIX B

Traffic Volume Data and Lane Assignment Volumes

Background AM & PM Peak Hour Traffic Volumes

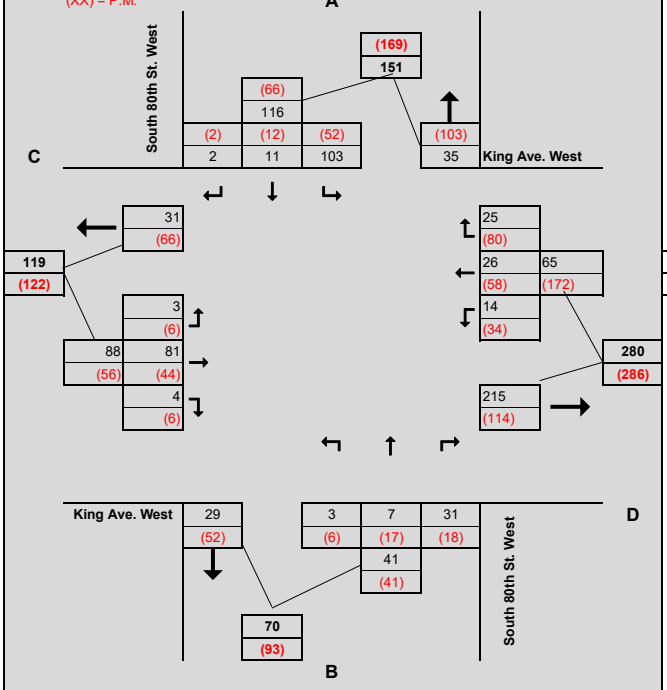
Forecasted by: IMEG
Phone: 406-248-9000

AM Peak Hour: 7:15 AM — AM PHF: 0.80
PM Peak Hour: 4:15 PM — PM PHF: 0.89
Date Traffic Collected: 2/12/2026
Date Calculated: 2/20/2026

Shop House Acres Major Subdivision
Project No: 25006765.00
Route: King Ave. West & South 80th St. West
County: Yellowstone State: Montana
City of: Billings

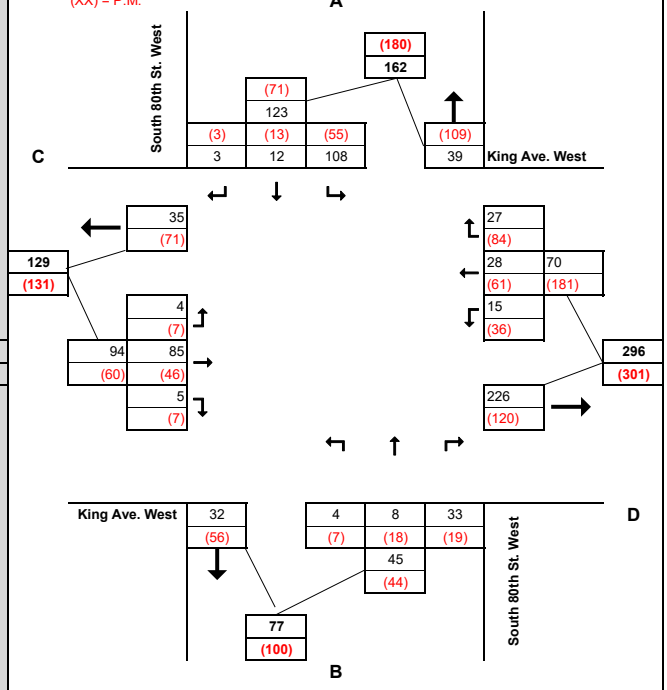
XX = A.M.
(XX) = P.M.

Existing Year: 2026



XX = A.M.
(XX) = P.M.

Full Build Year: 2031



Total AM & PM Peak Hour Traffic Volumes

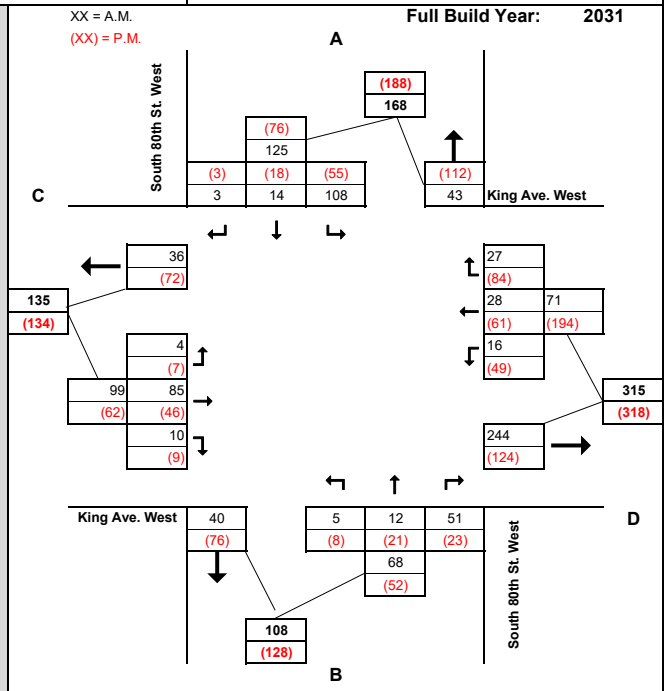
Forecasted by: IMEG
Phone: 406-248-9000

AM Peak Hour: 7:15 AM — AM PHF: 0.80
PM Peak Hour: 4:15 PM — PM PHF: 0.89

Shop House Acres Major Subdivision
Project No: 25006765.00
Route: King Ave. West & South 80th St. West
County: Yellowstone State: Montana
City of: Billings

XX = A.M.
(XX) = P.M.

Full Build Year: 2031



Background AM & PM Peak Hour Traffic Volumes

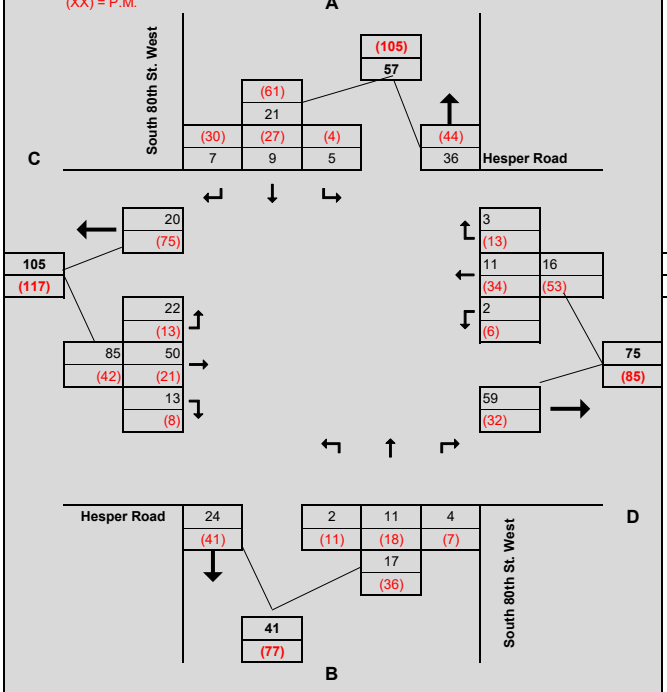
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Phone: 406-248-9000

AM Peak Hour: 7:00 AM
PM Peak Hour: 4:45 PM
AM PHF: 0.80
PM PHF: 0.88
Date Traffic Collected: 2/12/2026
Date Calculated: 2/20/2026

Shop House Acres Major Subdivision
Project No: 25006765.00
Route: Hesper Road & South 80th St. West
County: Yellowstone State: Montana
City of: Billings

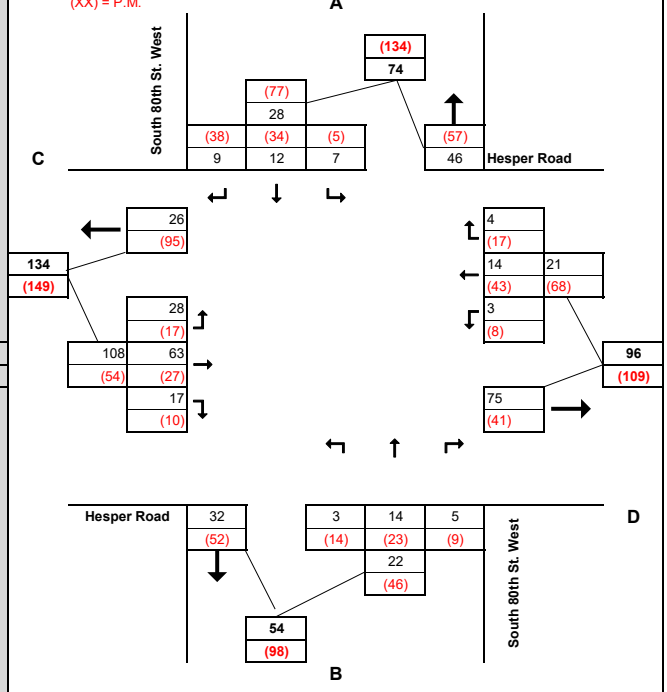
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Existing Year: 2026



XX = A.M.
(XX) = P.M.

Full Build Year: 2031



Total AM & PM Peak Hour Traffic Volumes

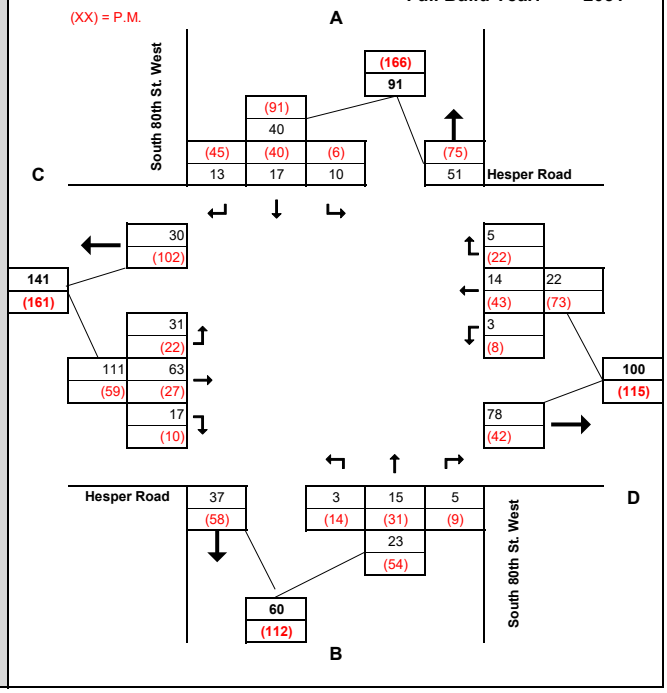
Forecasted by: IMEG
Phone: 406-248-9000

AM Peak Hour: 7:00 AM
PM Peak Hour: 4:45 PM
AM PHF: 0.80
PM PHF: 0.88

Shop House Acres Major Subdivision
Project No: 25006765.00
Route: Hesper Road & South 80th St. West
County: Yellowstone State: Montana
City of: Billings

XX = A.M.
(XX) = P.M.

Full Build Year: 2031



Background AM & PM Peak Hour Traffic Volumes

Shop House Acres Major Subdivision

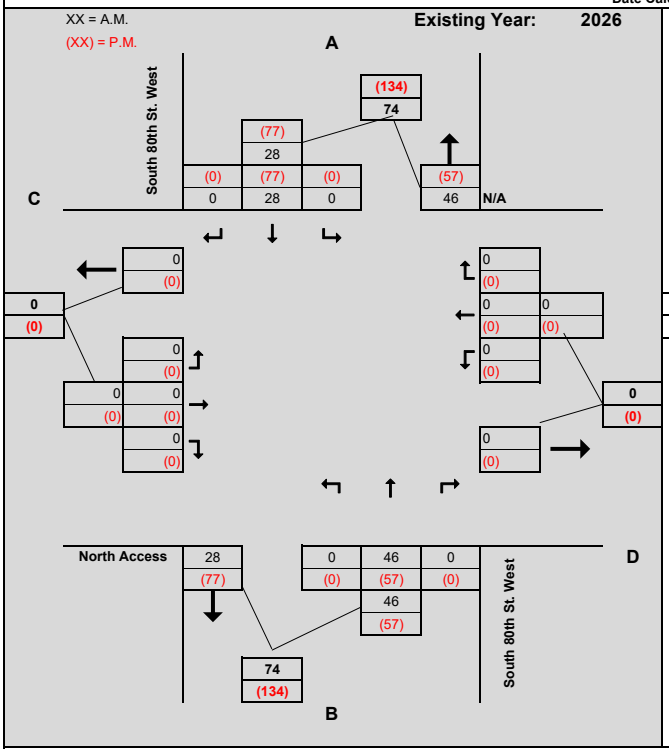
Forecasted by: IMEG
Phone: 406-248-9000

AM Peak Hour: 7:00 AM — AM PHF: 0.92
PM Peak Hour: 4:45 PM — PM PHF: 0.92
Date Traffic Collected:
Date Calculated: 2/20/2026

Project No: 25006765.00
Route: North Access & South 80th St. West
County: Yellowstone — State: Montana
City of: Billings

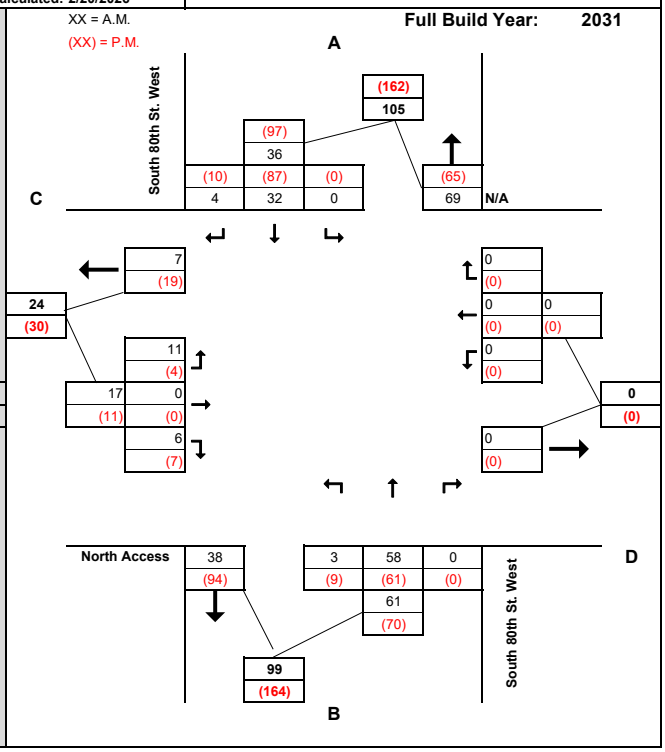
XX = A.M.
(XX) = P.M.

Existing Year: 2026



XX = A.M.
(XX) = P.M.

Full Build Year: 2031



Background AM & PM Peak Hour Traffic Volumes

Shop House Acres Major Subdivision

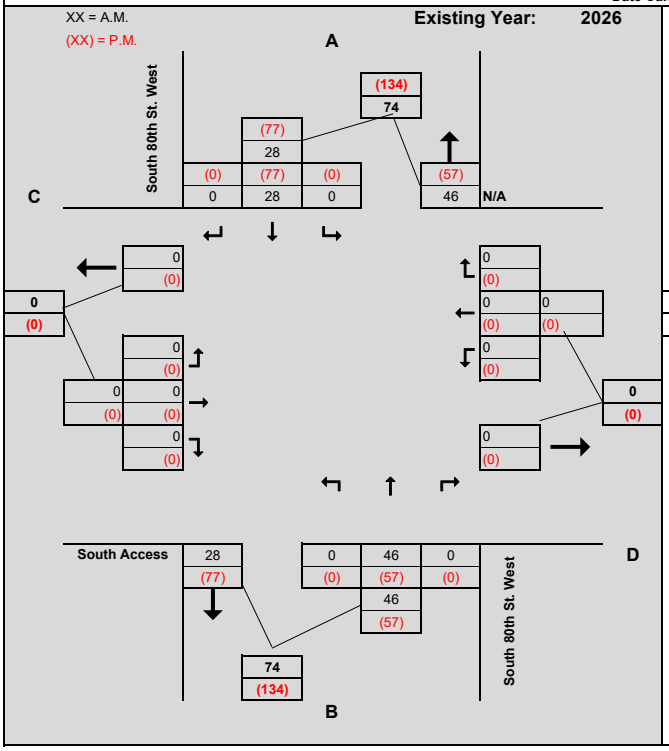
Forecasted by: IMEG
Phone: 406-248-9000

AM Peak Hour: 7:00 AM AM PHF: 0.92
PM Peak Hour: 4:45 PM PM PHF: 0.92
Date Traffic Collected:
Date Calculated: 2/20/2026

Project No: 25006765.00
Route: South Access & South 80th St. West
County: Yellowstone State: Montana
City of: Billings

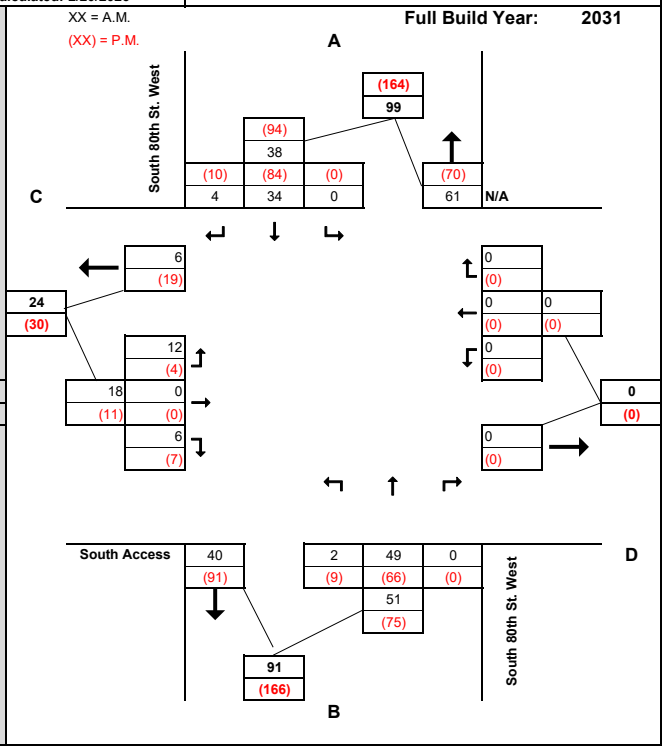
XX = A.M.
(XX) = P.M.

Existing Year: 2026



XX = A.M.
(XX) = P.M.

Full Build Year: 2031



Shop House Acres Major Subdivision

Traffic Impact Study

APPENDIX C

Intersection Capacity Analysis

for

2026 Background Traffic
&
2031 Population Growth of Background Traffic
&
2031 Total Traffic

HCS Two-Way Stop-Control Report

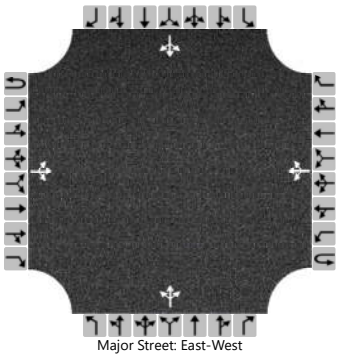
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2026 Background_AM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	King Ave West & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	King Ave West
North/South Street	South 80th St West
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		3	81	4		14	26	25		3	7	31		103	11	2
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		4				18					51				145	
Capacity, c (veh/h)		1552				1497					876				697	
v/c Ratio		0.00				0.01					0.06				0.21	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.2				0.8	
95% Queue Length, Q_{95} (ft)		0.0				0.0					5.0				20.0	
Control Delay (s/veh)		7.3	0.0	0.0		7.4	0.1	0.1			9.4				11.5	
Level of Service (LOS)		A	A	A		A	A	A			A				B	
Approach Delay (s/veh)	0.3				1.7				9.4				11.5			
Approach LOS	A				A				A				B			

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HCS Two-Way Stop-Control Report

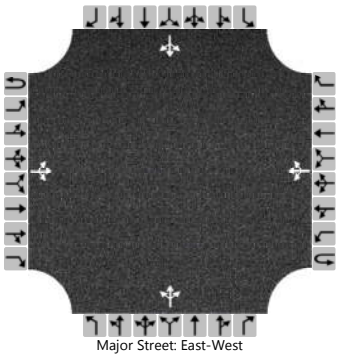
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2026 Background_PM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	King Ave West & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	King Ave West
North/South Street	South 80th St West
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		6	44	6		34	58	80		6	17	18		52	12	2
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		7				38					46				74	
Capacity, c (veh/h)		1437				1561					743				636	
v/c Ratio		0.00				0.02					0.06				0.12	
95% Queue Length, Q_{95} (veh)		0.0				0.1					0.2				0.4	
95% Queue Length, Q_{95} (ft)		0.0				2.5					5.0				10.0	
Control Delay (s/veh)		7.5	0.0	0.0		7.4	0.2	0.2			10.2				11.4	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	0.8				1.6				10.2				11.4			
Approach LOS	A				A				B				B			

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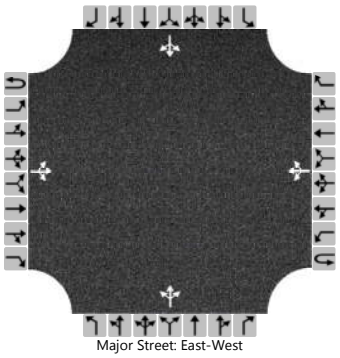
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2026 Background_AM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	Hesper Road & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	Hesper Road
North/South Street	South 80th St West
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		22	50	13		2	11	3		2	11	4		5	9	7
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		28				3					21				26	
Capacity, c (veh/h)		1613				1532					787				829	
v/c Ratio		0.02				0.00					0.03				0.03	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.1				0.1	
95% Queue Length, Q_{95} (ft)		2.5				0.0					2.5				2.5	
Control Delay (s/veh)		7.3	0.1	0.1		7.4	0.0	0.0			9.7				9.5	
Level of Service (LOS)		A	A	A		A	A	A			A				A	
Approach Delay (s/veh)	2.0				0.9				9.7				9.5			
Approach LOS	A				A				A				A			

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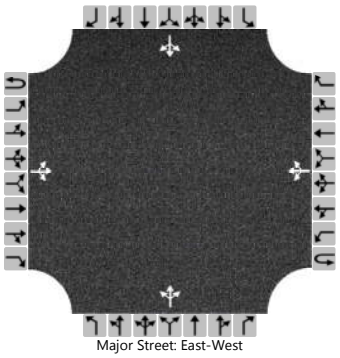
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2026 Background_PM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	Hesper Road & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	Hesper Road
North/South Street	South 80th St West
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		13	21	8		6	34	13		11	18	7		4	27	30
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		15				7					41				69	
Capacity, c (veh/h)		1565				1592					800				877	
v/c Ratio		0.01				0.00					0.05				0.08	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.2				0.3	
95% Queue Length, Q_{95} (ft)		0.0				0.0					5.0				7.5	
Control Delay (s/veh)		7.3	0.1	0.1		7.3	0.0	0.0			9.7				9.5	
Level of Service (LOS)		A	A	A		A	A	A			A				A	
Approach Delay (s/veh)	2.3				0.9				9.7				9.5			
Approach LOS	A				A				A				A			

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HCS Two-Way Stop-Control Report

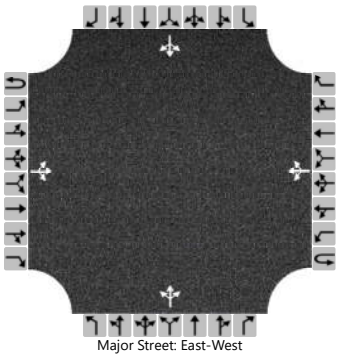
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Background_AM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	King Ave West & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	King Ave West
North/South Street	South 80th St West
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		4	85	5		15	28	27		4	8	33		108	12	3
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				19					56				154	
Capacity, c (veh/h)		1545				1490					859				678	
v/c Ratio		0.00				0.01					0.07				0.23	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.2				0.9	
95% Queue Length, Q_{95} (ft)		0.0				0.0					5.0				22.5	
Control Delay (s/veh)		7.3	0.0	0.0		7.4	0.1	0.1			9.5				11.9	
Level of Service (LOS)		A	A	A		A	A	A			A				B	
Approach Delay (s/veh)	0.3				1.7				9.5				11.9			
Approach LOS	A				A				A				B			

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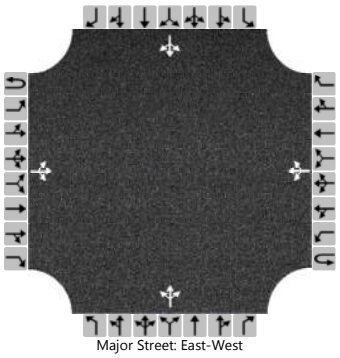
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Background_PM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	King Ave West & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	King Ave West
North/South Street	South 80th St West
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		7	46	7		36	61	84		7	18	19		55	13	3
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		8				40					49				80	
Capacity, c (veh/h)		1428				1557					727				620	
v/c Ratio		0.01				0.03					0.07				0.13	
95% Queue Length, Q_{95} (veh)		0.0				0.1					0.2				0.4	
95% Queue Length, Q_{95} (ft)		0.0				2.5					5.0				10.0	
Control Delay (s/veh)		7.5	0.0	0.0		7.4	0.2	0.2			10.3				11.7	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	0.9				1.6				10.3				11.7			
Approach LOS	A				A				B				B			

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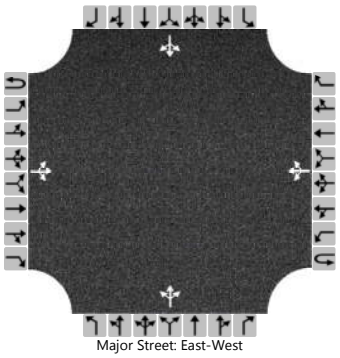
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Background_AM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	Hesper Road & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	Hesper Road
North/South Street	South 80th St West
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		28	63	17		3	14	4		3	14	5		7	12	9
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		35				4					28				35	
Capacity, c (veh/h)		1606				1505					744				784	
v/c Ratio		0.02				0.00					0.04				0.04	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.1				0.1	
95% Queue Length, Q_{95} (ft)		2.5				0.0					2.5				2.5	
Control Delay (s/veh)		7.3	0.2	0.2		7.4	0.0	0.0			10.0				9.8	
Level of Service (LOS)		A	A	A		A	A	A			B				A	
Approach Delay (s/veh)	2.0				1.1				10.0				9.8			
Approach LOS	A				A				B				A			

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HCS Two-Way Stop-Control Report

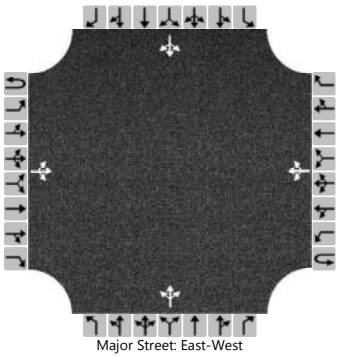
General Information

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Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Background_PM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	Hesper Road & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	Hesper Road
North/South Street	South 80th St West
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		17	27	10		8	43	17		14	23	9		5	34	38
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		19				9					52				88	
Capacity, c (veh/h)		1546				1580					755				845	
v/c Ratio		0.01				0.01					0.07				0.10	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.2				0.3	
95% Queue Length, Q_{95} (ft)		0.0				0.0					5.0				7.5	
Control Delay (s/veh)		7.4	0.1	0.1		7.3	0.0	0.0			10.1				9.8	
Level of Service (LOS)		A	A	A		A	A	A			B				A	
Approach Delay (s/veh)	2.4				0.9				10.1				9.8			
Approach LOS	A				A				B				A			

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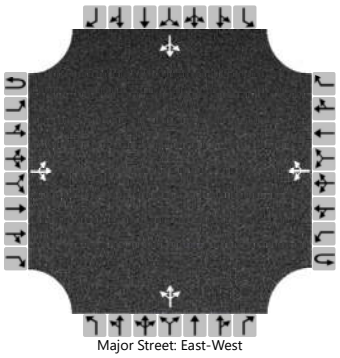
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Total_AM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	King Ave West & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	King Ave West
North/South Street	South 80th St West
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		4	85	10		16	28	27		5	12	51		108	14	3
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		5				20					85				156	
Capacity, c (veh/h)		1545				1482					858				640	
v/c Ratio		0.00				0.01					0.10				0.24	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.3				1.0	
95% Queue Length, Q_{95} (ft)		0.0				0.0					7.5				25.0	
Control Delay (s/veh)		7.3	0.0	0.0		7.5	0.1	0.1			9.7				12.4	
Level of Service (LOS)		A	A	A		A	A	A			A				B	
Approach Delay (s/veh)	0.3				1.8				9.7				12.4			
Approach LOS	A				A				A				B			

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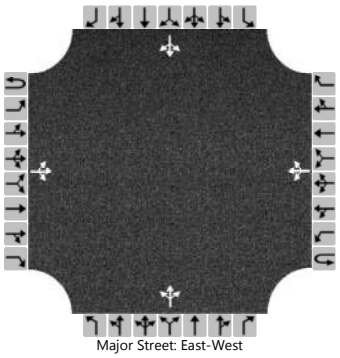
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Total_PM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	King Ave West & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	King Ave West
North/South Street	South 80th St West
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		7	46	9		49	61	84		8	21	23		55	18	3
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		8				55					58				85	
Capacity, c (veh/h)		1428				1554					703				580	
v/c Ratio		0.01				0.04					0.08				0.15	
95% Queue Length, Q_{95} (veh)		0.0				0.1					0.3				0.5	
95% Queue Length, Q_{95} (ft)		0.0				2.5					7.5				12.5	
Control Delay (s/veh)		7.5	0.0	0.0		7.4	0.3	0.3			10.6				12.3	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	0.9				2.1				10.6				12.3			
Approach LOS	A				A				B				B			

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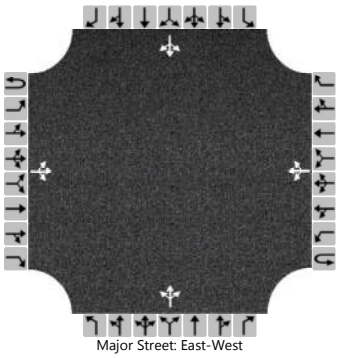
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Total_AM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	Hesper Road & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	Hesper Road
North/South Street	South 80th St West
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		31	63	17		3	14	5		3	15	5		10	17	13
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		39				4					29				50	
Capacity, c (veh/h)		1604				1505					731				776	
v/c Ratio		0.02				0.00					0.04				0.06	
95% Queue Length, Q_{95} (veh)		0.1				0.0					0.1				0.2	
95% Queue Length, Q_{95} (ft)		2.5				0.0					2.5				5.0	
Control Delay (s/veh)		7.3	0.2	0.2		7.4	0.0	0.0			10.1				10.0	
Level of Service (LOS)		A	A	A		A	A	A			B				A	
Approach Delay (s/veh)	2.2				1.0				10.1				10.0			
Approach LOS	A				A				B				A			

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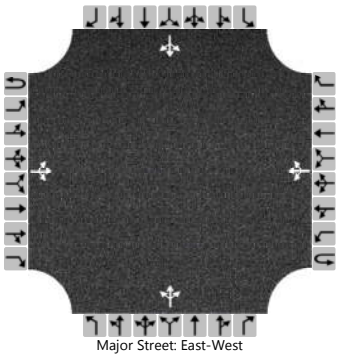
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Total_PM
Intersection Orientation	East-West
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	Hesper Road & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	Hesper Road
North/South Street	South 80th St West
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes


Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		22	27	10		8	43	22		14	31	9		6	40	45
Percent Heavy Vehicles (%)		0				0				0	0	0		0	0	0
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.10				4.10				7.10	6.50	6.20		7.10	6.50	6.20
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.20				2.20				3.50	4.00	3.30		3.50	4.00	3.30

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		25				9					61				103	
Capacity, c (veh/h)		1539				1580					727				832	
v/c Ratio		0.02				0.01					0.08				0.12	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.3				0.4	
95% Queue Length, Q_{95} (ft)		0.0				0.0					7.5				10.0	
Control Delay (s/veh)		7.4	0.1	0.1		7.3	0.0	0.0			10.4				9.9	
Level of Service (LOS)		A	A	A		A	A	A			B				A	
Approach Delay (s/veh)	2.8				0.8				10.4				9.9			
Approach LOS	A				A				B				A			

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HCS Two-Way Stop-Control Report

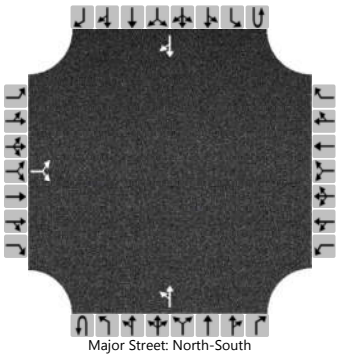
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Total_AM
Intersection Orientation	North-South
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	North Access & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	North Access
North/South Street	South 80th St West
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		11		6						3	58				32	4
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			18							3						
Capacity, c (veh/h)			941							1584						
v/c Ratio			0.02							0.00						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
95% Queue Length, Q_{95} (ft)			2.5							0.0						
Control Delay (s/veh)			8.9							7.3	0.0					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)		8.9								0.4						
Approach LOS		A								A						

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HCS Two-Way Stop-Control Report

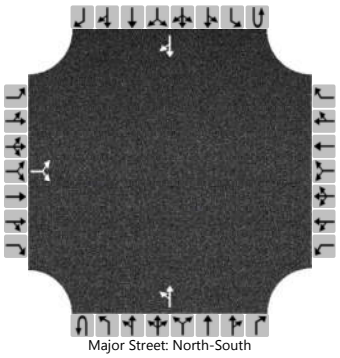
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Total_PM
Intersection Orientation	North-South
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	North Access & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	North Access
North/South Street	South 80th St West
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		4		7						9	61				87	10
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			12							10						
Capacity, c (veh/h)			897							1498						
v/c Ratio			0.01							0.01						
95% Queue Length, Q_{95} (veh)			0.0							0.0						
95% Queue Length, Q_{95} (ft)			0.0							0.0						
Control Delay (s/veh)			9.1							7.4	0.1					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)		9.1								1.0						
Approach LOS		A								A						

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HCS Two-Way Stop-Control Report

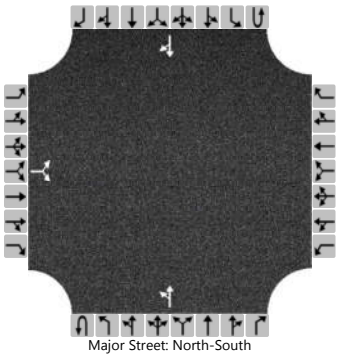
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Total_AM
Intersection Orientation	North-South
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	South Access & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	South Access
North/South Street	South 80th St West
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		12		6						2	49				34	4
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			20							2						
Capacity, c (veh/h)			946							1581						
v/c Ratio			0.02							0.00						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
95% Queue Length, Q_{95} (ft)			2.5							0.0						
Control Delay (s/veh)			8.9							7.3	0.0					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)		8.9								0.3						
Approach LOS		A								A						

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HCS Two-Way Stop-Control Report

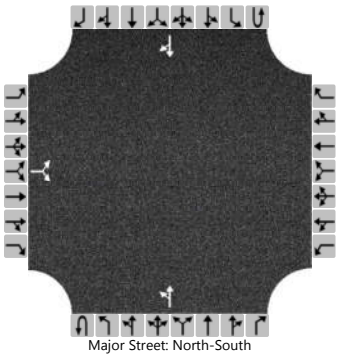
General Information

Analyst	MJH
Agency/Co.	IMEG
Date Performed	2/23/2026
Analysis Year	2026
Time Analyzed	2031 Total_PM
Intersection Orientation	North-South
Project Description	Shop House Acres Major Subd.

Site Information

Intersection	South Access & South 80th St West
Jurisdiction	Yellowstone County
East/West Street	South Access
North/South Street	South 80th St West
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		4		7						9	66				84	10
Percent Heavy Vehicles (%)		0		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.40		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.50		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			12							10						
Capacity, c (veh/h)			898							1503						
v/c Ratio			0.01							0.01						
95% Queue Length, Q_{95} (veh)			0.0							0.0						
95% Queue Length, Q_{95} (ft)			0.0							0.0						
Control Delay (s/veh)			9.1							7.4	0.1					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)		9.1								0.9						
Approach LOS		A								A						

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Shop House Acres Major Subdivision

Traffic Impact Study

APPENDIX D

ITE Trip Generation Worksheets, 12th Edition

Single-Family Detached Housing
(210)

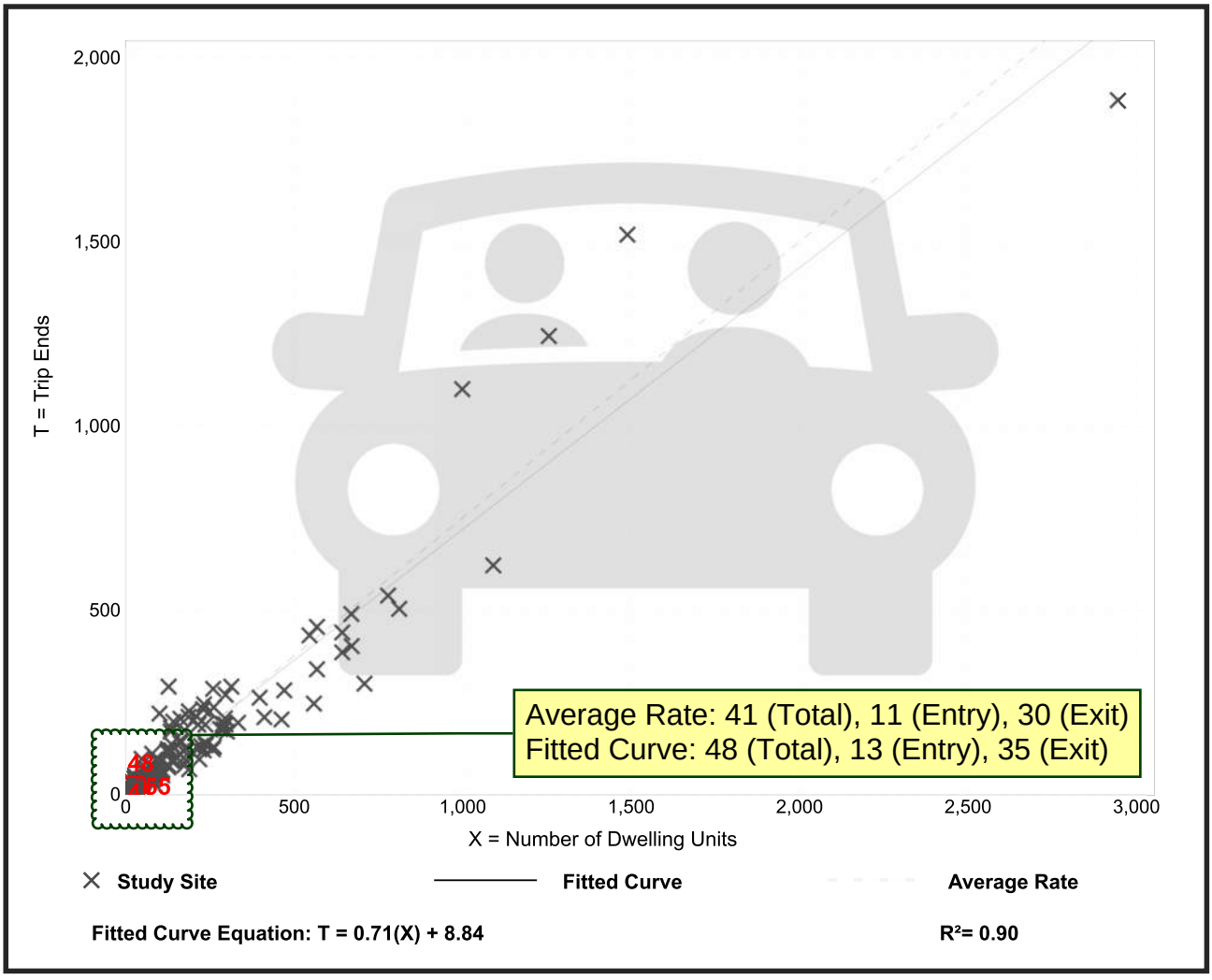
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
AM Peak Hour of Generator

Setting/Location: **General Urban/Suburban**
Number of Studies: 132
Avg. Num. of Dwelling Units: 232
Directional Distribution: 27% entering, 73% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.75	0.32 - 2.27	0.26

Data Plot and Equation



Trip Gen Manual, 12th Edition ● Institute of Transportation Engineers

Single-Family Detached Housing
(210)

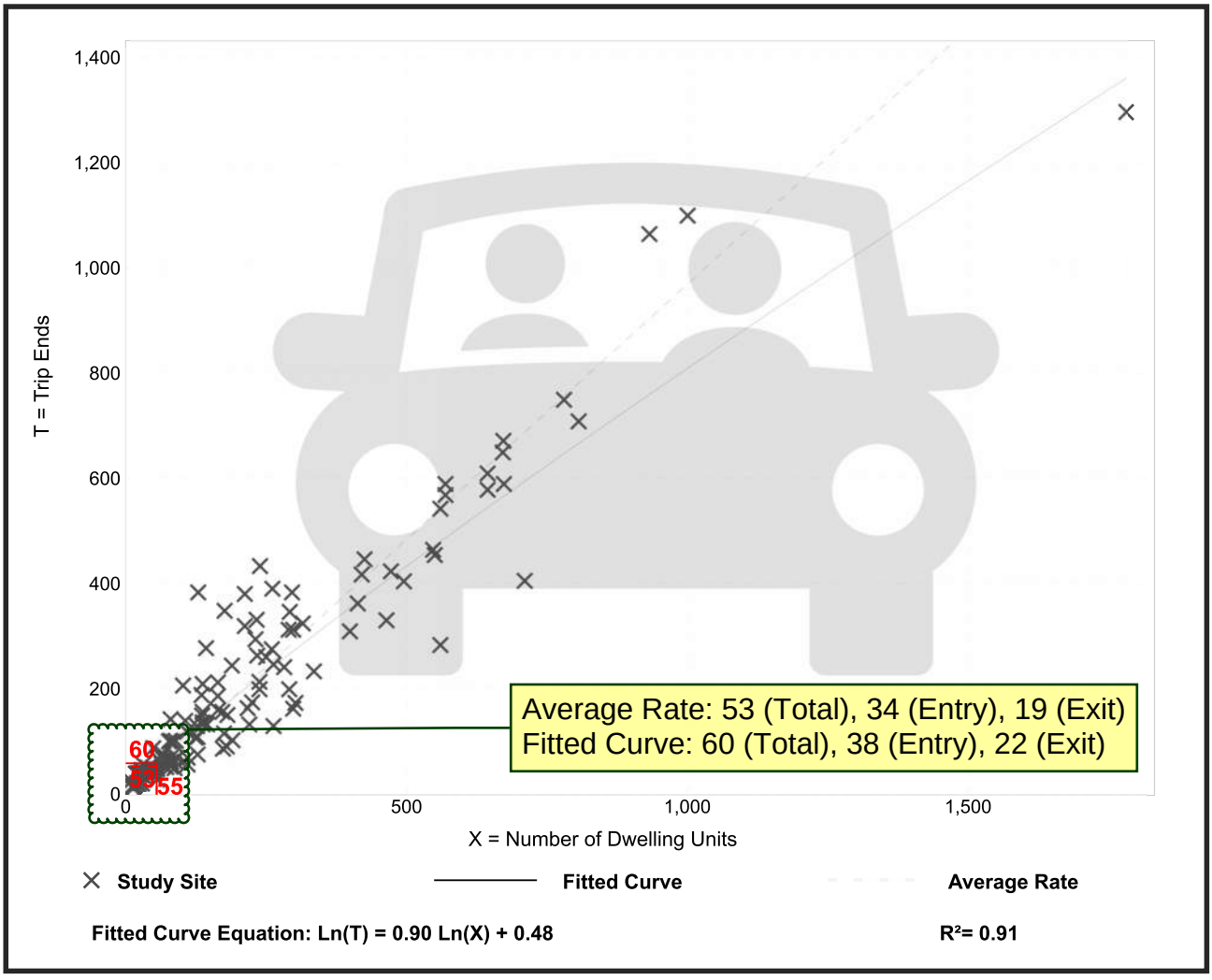
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
PM Peak Hour of Generator

Setting/Location: **General Urban/Suburban**
Number of Studies: 138
Avg. Num. of Dwelling Units: 214
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.97	0.49 - 2.98	0.32

Data Plot and Equation



Trip Gen Manual, 12th Edition ● Institute of Transportation Engineers

Land Use: 210
Single-Family Detached Housing

Description

A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.

Specialized Land Use

Data have been submitted for several single-family detached housing developments with homes that are commonly referred to as patio homes. A patio home is a detached housing unit that is located on a small lot with little (or no) front or back yard. In some subdivisions, communal maintenance of outside grounds is provided for the patio homes. The three patio home sites total 299 dwelling units with overall weighted average trip generation rates of 5.35 vehicle trips per dwelling unit for weekday, 0.26 for the AM adjacent street peak hour, and 0.47 for the PM adjacent street peak hour. These patio home rates, based on a small sample of sites, are lower than those for single-family detached housing (Land Use 210), lower than those for single-family attached housing (Land Use 215), and higher than those for senior adult housing—single-family (Land Use 251). (Source 1008)

Additional Data

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Alabama, Arizona, British Columbia (CAN), California, Delaware, Illinois, Kentucky, Massachusetts, Minnesota, Montana, New Jersey, New York, North Carolina, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Vermont, and West Virginia.

Source Numbers

356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 869, 903, 925, 936, 1005, 1007, 1008, 1010, 1033, 1066, 1077, 1078, 1079, 1204, 1221, 1225, 1236, 1251, 1265, 1267

Shop House Acres Major Subdivision

Traffic Impact Study

APPENDIX E

Traffic Signal Warrant Analysis

HCS Warrants Report

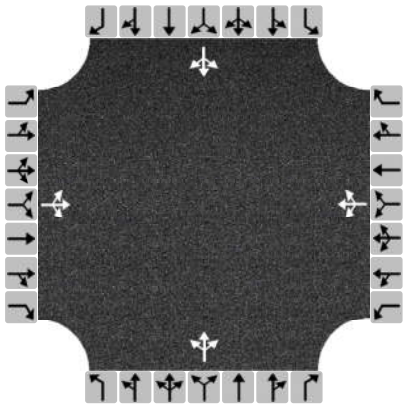
Project Information

Analyst	MJH	Date	2/24/2026
Agency	IMEG	Analysis Year	2026
Jurisdiction	Yellowstone County	Time Period Analyzed	2026 Background
Units	U.S. Customary	MUTCD Method	MUTCD 11 (2023)
Project Description	Shop House Acres Major Subd. - Intersection #1) King Ave. West & South 80th St. West		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7:00	Coordinated Signal System	No
Major Street Speed (mi/h)	0	Nearest Signal (ft)	0
Adequate Trials of Crash Exp. Alt.	No		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	0	1	0	0	1	0
Lane Usage		LTR			LTR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	2	42	3	19	38	43	4	7	18	44	7	2
Pedestrian median refuge available	No			No			No			No		
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay Averages (s/veh)	0.5			1.6			9.3			10.4		
Delay Averages (veh-hrs)	0.0			0.0			0.1			0.2		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	1

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	0

Volume Summary

Hours	Major Volume (veh/h)	Minor Volume (veh/h)	Total Volume (veh/h)	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (80%)	4A ** (100%)	4B ** (100%)
7:00 - 8:00	141	111	288	0	0	No	No	No	No	No	No	No	No	No
8:00 - 9:00	126	45	201	0	0	No	No	No	No	No	No	No	No	No
9:00 - 10:00	117	43	181	0	0	No	No	No	No	No	No	No	No	No
10:00 - 11:00	109	56	195	0	0	No	No	No	No	No	No	No	No	No
11:00 - 12:00	152	44	233	0	0	No	No	No	No	No	No	No	No	No
12:00 - 13:00	149	50	218	0	0	No	No	No	No	No	No	No	No	No
13:00 - 14:00	149	50	218	0	0	No	No	No	No	No	No	No	No	No
14:00 - 15:00	142	56	230	0	0	No	No	No	No	No	No	No	No	No
15:00 - 16:00	196	50	280	0	0	No	No	No	No	No	No	No	No	No
16:00 - 17:00	214	57	306	0	0	No	No	No	No	No	No	No	No	No
17:00 - 18:00	191	58	295	0	0	No	No	No	No	No	No	No	No	No
18:00 - 19:00	115	23	156	0	0	No	No	No	No	No	No	No	No	No
Total	1801	643	2801	0	0	0	0	0	0	0	0	0	0	0

** Warrant 4 should not be applied where the nearest traffic signal or stop-sign control is < 300 ft, unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Pedestrian Volume

15th % pedestrian speed < 3.5 ft/s		Pedestrian refuge present?	EB		WB	

Hours	Major Street Vehicular Volume (veh/h)			Major Street Pedestrian Volume (ped/h)			4A ** (100%)	4B ** (100%)
	EB	WB	Total	EB	WB	Total		
7:00 - 8:00	92	49	141	0	0	0	No	No
8:00 - 9:00	57	69	126	0	0	0	No	No
9:00 - 10:00	44	73	117	0	0	0	No	No
10:00 - 11:00	39	70	109	0	0	0	No	No
11:00 - 12:00	52	100	152	0	0	0	No	No
12:00 - 13:00	47	102	149	0	0	0	No	No
13:00 - 14:00	47	102	149	0	0	0	No	No
14:00 - 15:00	42	100	142	0	0	0	No	No
15:00 - 16:00	51	145	196	0	0	0	No	No
16:00 - 17:00	63	151	214	0	0	0	No	No
17:00 - 18:00	26	165	191	0	0	0	No	No
18:00 - 19:00	21	94	115	0	0	0	No	No
Totals	581	1220	1801	0	0	0	0	0

** Warrant 4 should not be applied where the nearest traffic signal or stop-sign control is < 300 ft, unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- more critical minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- more critical minor approach) --or--	
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- more critical minor approach)	
Warrant 2: Four-Hour Vehicular Volume	

Four-Hour Vehicular Volume (Both major approaches --and-- more critical minor approach)	
Warrant 3: Peak Hour	
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- more critical minor approach)	
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. Peak-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported Crash History --and--	
B1. Angle Crashes and Pedestrian Crashes within a 1-year Period (All Severities)	
B2. Angle Crashes and Pedestrian Crashes within a 1-year Period (Fatal-and-Injury)	
B3. Angle Crashes and Pedestrian Crashes within a 3-year Period (All Severities)	
B4. Angle Crashes and Pedestrian Crashes within a 3-year Period (Fatal-and-Injury)	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

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HCS Warrants Report

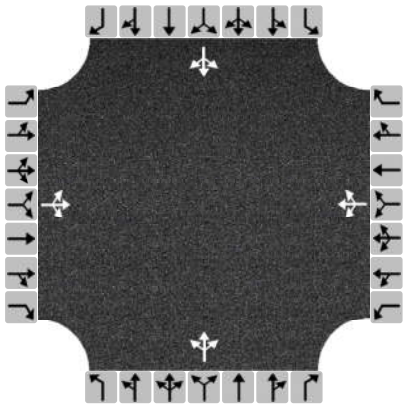
Project Information

Analyst	MJH	Date	2/24/2026
Agency	IMEG	Analysis Year	2026
Jurisdiction	Yellowstone County	Time Period Analyzed	2031 Background
Units	U.S. Customary	MUTCD Method	MUTCD 11 (2023)
Project Description	Shop House Acres Major Subd. - Intersection #1) King Ave. West & South 80th St. West		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7:00	Coordinated Signal System	No
Major Street Speed (mi/h)	0	Nearest Signal (ft)	0
Adequate Trials of Crash Exp. Alt.	No		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	0	1	0	0	1	0
Lane Usage		LTR			LTR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	2	43	3	21	40	45	4	8	19	45	7	2
Pedestrian median refuge available	No			No			No			No		
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay Averages (s/veh)	0.5			1.6			9.3			10.5		
Delay Averages (veh-hrs)	0.0			0.0			0.1			0.2		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	1

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	0

Volume Summary

Hours	Major Volume (veh/h)	Minor Volume (veh/h)	Total Volume (veh/h)	Peds/h	Gaps/h	1A (100%)	1A (80%)	1B (100%)	1B (80%)	2 (100%)	3A (100%)	3B (80%)	4A ** (100%)	4B ** (100%)
7:00 - 8:00	147	115	299	0	0	No	No	No	No	No	No	No	No	No
8:00 - 9:00	131	47	209	0	0	No	No	No	No	No	No	No	No	No
9:00 - 10:00	121	45	188	0	0	No	No	No	No	No	No	No	No	No
10:00 - 11:00	113	58	202	0	0	No	No	No	No	No	No	No	No	No
11:00 - 12:00	159	46	243	0	0	No	No	No	No	No	No	No	No	No
12:00 - 13:00	162	44	240	0	0	No	No	No	No	No	No	No	No	No
13:00 - 14:00	156	52	228	0	0	No	No	No	No	No	No	No	No	No
14:00 - 15:00	147	58	238	0	0	No	No	No	No	No	No	No	No	No
15:00 - 16:00	204	52	292	0	0	No	No	No	No	No	No	No	No	No
16:00 - 17:00	223	59	318	0	0	No	No	No	No	No	No	No	No	No
17:00 - 18:00	199	60	307	0	0	No	No	No	No	No	No	No	No	No
18:00 - 19:00	120	24	163	0	0	No	No	No	No	No	No	No	No	No
Total	1882	660	2927	0	0	0	0	0	0	0	0	0	0	0

** Warrant 4 should not be applied where the nearest traffic signal or stop-sign control is < 300 ft, unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Pedestrian Volume

15th % pedestrian speed < 3.5 ft/s		Pedestrian refuge present?	EB		WB	

Hours	Major Street Vehicular Volume (veh/h)			Major Street Pedestrian Volume (ped/h)			4A ** (100%)	4B ** (100%)
	EB	WB	Total	EB	WB	Total		
7:00 - 8:00	96	51	147	0	0	0	No	No
8:00 - 9:00	59	72	131	0	0	0	No	No
9:00 - 10:00	45	76	121	0	0	0	No	No
10:00 - 11:00	40	73	113	0	0	0	No	No
11:00 - 12:00	54	105	159	0	0	0	No	No
12:00 - 13:00	42	120	162	0	0	0	No	No
13:00 - 14:00	49	107	156	0	0	0	No	No
14:00 - 15:00	43	104	147	0	0	0	No	No
15:00 - 16:00	53	151	204	0	0	0	No	No
16:00 - 17:00	65	158	223	0	0	0	No	No
17:00 - 18:00	27	172	199	0	0	0	No	No
18:00 - 19:00	22	98	120	0	0	0	No	No
Totals	595	1287	1882	0	0	0	0	0

** Warrant 4 should not be applied where the nearest traffic signal or stop-sign control is < 300 ft, unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- more critical minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- more critical minor approach) --or--	
80% Vehicular --and-- Interruption Volumes (Both major approaches --and-- more critical minor approach)	
Warrant 2: Four-Hour Vehicular Volume	

Four-Hour Vehicular Volume (Both major approaches --and-- more critical minor approach)	
Warrant 3: Peak Hour	
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- more critical minor approach)	
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. Peak-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported Crash History --and--	
B1. Angle Crashes and Pedestrian Crashes within a 1-year Period (All Severities)	
B2. Angle Crashes and Pedestrian Crashes within a 1-year Period (Fatal-and-Injury)	
B3. Angle Crashes and Pedestrian Crashes within a 3-year Period (All Severities)	
B4. Angle Crashes and Pedestrian Crashes within a 3-year Period (Fatal-and-Injury)	
C. 80% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

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HCS Warrants Report

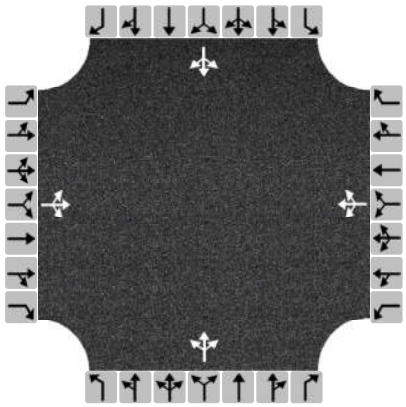
Project Information

Analyst	MJH	Date	2/24/2026
Agency	IMEG	Analysis Year	2026
Jurisdiction	Yellowstone County	Time Period Analyzed	2026 Background
Units	U.S. Customary	MUTCD Method	MUTCD 11 (2023)
Project Description	Shop House Acres Major Subd. - Intersection #2) Hesper Rd. & South 80th St. West		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7:00	Coordinated Signal System	No
Major Street Speed (mi/h)	45	Nearest Signal (ft)	0
Adequate Trials of Crash Exp. Alt.	No		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	0	1	0	0	1	0
Lane Usage		LTR			LTR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	8	18	10	2	15	6	4	14	3	3	14	11
Pedestrian median refuge available	No			No			No			No		
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay Averages (s/veh)	1.9			0.8			9.4			9.2		
Delay Averages (veh-hrs)	0.0			0.0			0.1			0.1		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	5

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	0

Volume Summary

Hours	Major Volume (veh/h)	Minor Volume (veh/h)	Total Volume (veh/h)	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A ** (70%)	4B ** (70%)
7:00 - 8:00	95	20	129	0	0	No	No	No	No	No	No	No	No	No
8:00 - 9:00	57	26	101	0	0	No	No	No	No	No	No	No	No	No
9:00 - 10:00	36	22	78	0	0	No	No	No	No	No	No	No	No	No
10:00 - 11:00	98	29	148	0	0	No	No	No	No	No	No	No	No	No
11:00 - 12:00	44	28	99	0	0	No	No	No	No	No	No	No	No	No
12:00 - 13:00	43	32	95	0	0	No	No	No	No	No	No	No	No	No
13:00 - 14:00	42	24	81	0	0	No	No	No	No	No	No	No	No	No
14:00 - 15:00	46	29	97	0	0	No	No	No	No	No	No	No	No	No
15:00 - 16:00	61	36	124	0	0	No	No	No	No	No	No	No	No	No
16:00 - 17:00	74	43	149	0	0	No	No	No	No	No	No	No	No	No
17:00 - 18:00	97	54	182	0	0	No	No	No	No	No	No	No	No	No
18:00 - 19:00	29	25	70	0	0	No	No	No	No	No	No	No	No	No
Total	722	368	1353	0	0	0	0	0	0	0	0	0	0	0

** Warrant 4 should not be applied where the nearest traffic signal or stop-sign control is < 300 ft, unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Pedestrian Volume

15th % pedestrian speed < 3.5 ft/s		Pedestrian refuge present?	EB		WB	

Hours	Major Street Vehicular Volume (veh/h)			Major Street Pedestrian Volume (ped/h)			4A ** (70%)	4B ** (70%)
	EB	WB	Total	EB	WB	Total		
7:00 - 8:00	82	13	95	0	0	0	No	No
8:00 - 9:00	38	19	57	0	0	0	No	No
9:00 - 10:00	22	14	36	0	0	0	No	No
10:00 - 11:00	84	14	98	0	0	0	No	No
11:00 - 12:00	21	23	44	0	0	0	No	No
12:00 - 13:00	21	22	43	0	0	0	No	No
13:00 - 14:00	21	21	42	0	0	0	No	No
14:00 - 15:00	28	18	46	0	0	0	No	No
15:00 - 16:00	28	33	61	0	0	0	No	No
16:00 - 17:00	33	41	74	0	0	0	No	No
17:00 - 18:00	44	53	97	0	0	0	No	No
18:00 - 19:00	16	13	29	0	0	0	No	No
Totals	438	284	722	0	0	0	0	0

** Warrant 4 should not be applied where the nearest traffic signal or stop-sign control is < 300 ft, unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- more critical minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- more critical minor approach) --or--	
56% Vehicular --and-- Interruption Volumes (Both major approaches --and-- more critical minor approach)	
Warrant 2: Four-Hour Vehicular Volume	

Four-Hour Vehicular Volume (Both major approaches --and-- more critical minor approach)	
Warrant 3: Peak Hour	
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- more critical minor approach)	
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. Peak-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported Crash History --and--	
B1. Angle Crashes and Pedestrian Crashes within a 1-year Period (All Severities)	
B2. Angle Crashes and Pedestrian Crashes within a 1-year Period (Fatal-and-Injury)	
B3. Angle Crashes and Pedestrian Crashes within a 3-year Period (All Severities)	
B4. Angle Crashes and Pedestrian Crashes within a 3-year Period (Fatal-and-Injury)	
C. 56% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

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HCS Warrants Report

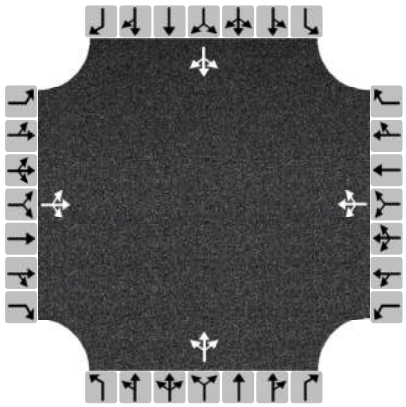
Project Information

Analyst	MJH	Date	2/24/2026
Agency	IMEG	Analysis Year	2026
Jurisdiction	Yellowstone County	Time Period Analyzed	2031 Background
Units	U.S. Customary	MUTCD Method	MUTCD 11 (2023)
Project Description	Shop House Acres Major Subd. - Intersection #2) Hesper Rd. & South 80th St. West		

General

Major Street Direction	East-West	Population < 10,000	No
Starting Time Interval	7:00	Coordinated Signal System	No
Major Street Speed (mi/h)	45	Nearest Signal (ft)	0
Adequate Trials of Crash Exp. Alt.	No		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	1	0	0	1	0	0	1	0	0	1	0
Lane Usage		LTR			LTR			LTR			LTR	
Vehicle Volumes Averages (veh/h)	10	22	6	2	18	7	5	17	4	4	18	14
Pedestrian median refuge available	No			No			No			No		
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay Averages (s/veh)	1.9			0.8			9.5			9.3		
Delay Averages (veh-hrs)	0.0			0.0			0.1			0.1		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	5

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	0
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	0

Volume Summary

Hours	Major Volume (veh/h)	Minor Volume (veh/h)	Total Volume (veh/h)	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A ** (70%)	4B ** (70%)
7:00 - 8:00	117	25	159	0	0	No	No	No	No	No	No	No	No	No
8:00 - 9:00	70	32	124	0	0	No	No	No	No	No	No	No	No	No
9:00 - 10:00	44	28	97	0	0	No	No	No	No	No	No	No	No	No
10:00 - 11:00	46	36	108	0	0	No	No	No	No	No	No	No	No	No
11:00 - 12:00	55	35	124	0	0	No	No	No	No	No	No	No	No	No
12:00 - 13:00	53	40	117	0	0	No	No	No	No	No	No	No	No	No
13:00 - 14:00	52	30	100	0	0	No	No	No	No	No	No	No	No	No
14:00 - 15:00	56	36	120	0	0	No	No	No	No	No	No	No	No	No
15:00 - 16:00	76	45	155	0	0	No	No	No	No	No	No	No	No	No
16:00 - 17:00	92	54	185	0	0	No	No	No	No	No	No	No	No	No
17:00 - 18:00	121	67	227	0	0	No	No	No	No	No	No	No	No	No
18:00 - 19:00	34	31	85	0	0	No	No	No	No	No	No	No	No	No
Total	816	459	1601	0	0	0	0	0	0	0	0	0	0	0

** Warrant 4 should not be applied where the nearest traffic signal or stop-sign control is < 300 ft, unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Pedestrian Volume

15th % pedestrian speed < 3.5 ft/s		Pedestrian refuge present?	EB		WB	

Hours	Major Street Vehicular Volume (veh/h)			Major Street Pedestrian Volume (ped/h)			4A ** (70%)	4B ** (70%)
	EB	WB	Total	EB	WB	Total		
7:00 - 8:00	102	15	117	0	0	0	No	No
8:00 - 9:00	47	23	70	0	0	0	No	No
9:00 - 10:00	27	17	44	0	0	0	No	No
10:00 - 11:00	29	17	46	0	0	0	No	No
11:00 - 12:00	27	28	55	0	0	0	No	No
12:00 - 13:00	26	27	53	0	0	0	No	No
13:00 - 14:00	26	26	52	0	0	0	No	No
14:00 - 15:00	34	22	56	0	0	0	No	No
15:00 - 16:00	35	41	76	0	0	0	No	No
16:00 - 17:00	41	51	92	0	0	0	No	No
17:00 - 18:00	55	66	121	0	0	0	No	No
18:00 - 19:00	19	15	34	0	0	0	No	No
Totals	468	348	816	0	0	0	0	0

** Warrant 4 should not be applied where the nearest traffic signal or stop-sign control is < 300 ft, unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- more critical minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- more critical minor approach) --or--	
56% Vehicular --and-- Interruption Volumes (Both major approaches --and-- more critical minor approach)	
Warrant 2: Four-Hour Vehicular Volume	

Four-Hour Vehicular Volume (Both major approaches --and-- more critical minor approach)	
Warrant 3: Peak Hour	
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- more critical minor approach)	
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. Peak-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported Crash History --and--	
B1. Angle Crashes and Pedestrian Crashes within a 1-year Period (All Severities)	
B2. Angle Crashes and Pedestrian Crashes within a 1-year Period (Fatal-and-Injury)	
B3. Angle Crashes and Pedestrian Crashes within a 3-year Period (All Severities)	
B4. Angle Crashes and Pedestrian Crashes within a 3-year Period (Fatal-and-Injury)	
C. 56% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

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Shop House Acres Major Subdivision

Traffic Impact Study

APPENDIX F

Turn-Lane Warrant Analysis

2026 Existing Traffic Volumes - Right Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary									
Intersection	Approach	AM				PM			
		Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)	Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)
King Ave. West & South 80th St. West	WB	65	25	90	N	172	80	90	N
	EB	88	4	90	N	56	6	90	N

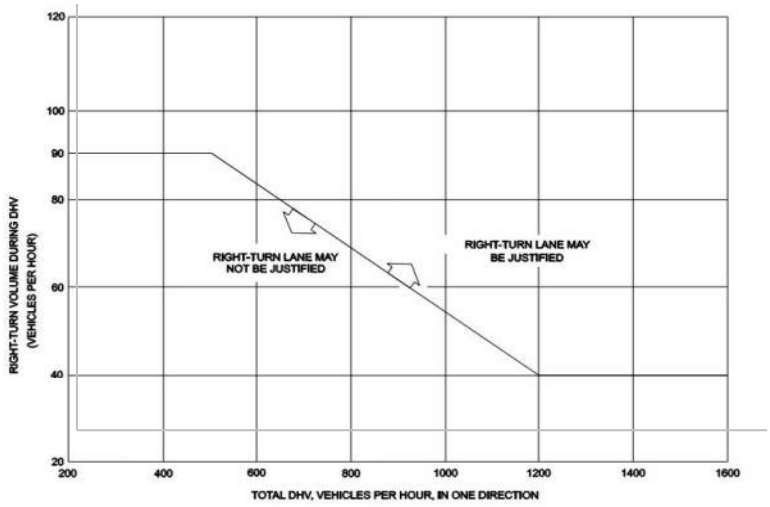
2026 Existing Traffic Volumes - Left Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary										
Intersection	Approach	AM					PM			
		Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)	Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)
King Ave. West & South 80th St. West	WB	65	14	21.5%	88	N	172	34	19.8%	56	N
	EB	88	3	3.4%	65	N	56	6	10.7%	172	N

2031 Existing Traffic Volumes - Right Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary									
Intersection	Approach	AM				PM			
		Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)	Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)
King Ave. West & South 80th St. West	WB	70	27	90	N	181	84	90	N
	EB	94	5	90	N	60	7	90	N

2031 Existing Traffic Volumes - Left Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary										
Intersection	Approach	AM					PM			
		Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)	Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)
King Ave. West & South 80th St. West	WB	70	15	21.4%	94	N	181	36	19.9%	60	N
	EB	94	4	4.3%	70	N	60	7	11.7%	181	N

2031 Total Traffic Volumes - Right Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary									
Intersection	Approach	AM				PM			
		Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)	Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)
King Ave. West & South 80th St. West	WB	71	27	90	N	194	84	90	N
	EB	99	10	90	N	62	9	90	N

2031 Total Traffic Volumes - Left Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary										
Intersection	Approach	AM					PM			
		Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)	Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)
King Ave. West & South 80th St. West	WB	71	16	22.5%	99	N	194	49	25.3%	62	N
	EB	99	4	4.0%	71	N	62	7	11.3%	194	N



Note: Figure is only applicable on highways with a design speed of 50 mph (80 km/h) or greater.

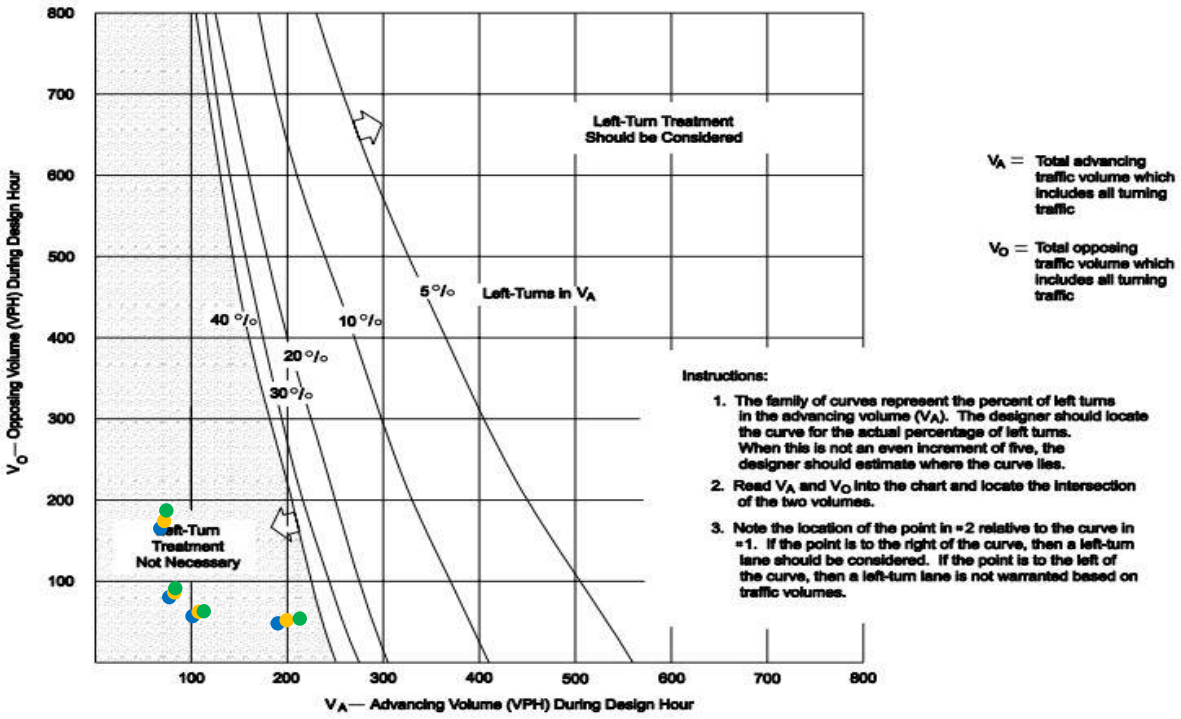
GUIDELINES FOR RIGHT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 4-LANE HIGHWAYS

Figure 28.4B

King Ave. West & South 80th St. West

2026 BACKGROUND TRAFFIC
2031 BACKGROUND TRAFFIC
2031 TOTAL TRAFFIC

Note: Points outside the limits of the chart are not plotted and need to be verified if a right-turn may be needed



VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (60 MPH) (US Customary)

Figure 28.4C

King Ave. West & South 80th St. West

2026 BACKGROUND TRAFFIC
2031 BACKGROUND TRAFFIC
2031 TOTAL TRAFFIC

Note: Points outside the limits of the chart are not plotted and are assumed to indicate a left-turn may be needed

2026 Existing Traffic Volumes - Right Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary									
Intersection	Approach	AM				PM			
		Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)	Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)
Hesper Road & South 80th St. West	WB	16	3	118	N	53	13	113	N
	EB	85	13	109	N	42	8	114	N

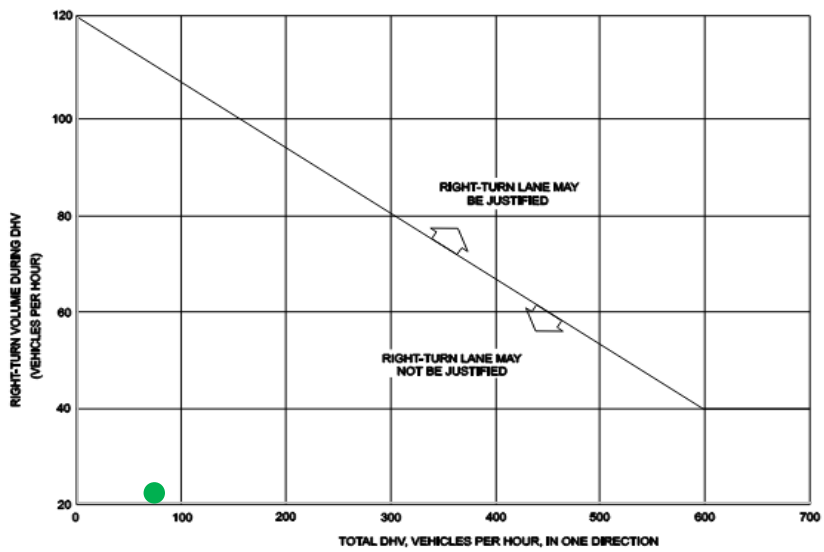
2026 Existing Traffic Volumes - Left Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary										
Intersection	Approach	AM					PM				
		Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)	Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)
Hesper Road & South 80th St. West	WB	16	2	12.5%	85	N	53	6	11.3%	42	N
	EB	85	22	25.9%	16	N	42	13	31.0%	53	N

2031 Existing Traffic Volumes - Right Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary									
Intersection	Approach	AM				PM			
		Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)	Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)
Hesper Road & South 80th St. West	WB	21	4	117	N	68	17	111	N
	EB	108	17	106	N	54	10	113	N

2031 Existing Traffic Volumes - Left Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary										
Intersection	Approach	AM					PM				
		Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)	Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)
Hesper Road & South 80th St. West	WB	21	3	14.3%	108	N	68	8	11.8%	54	N
	EB	108	28	25.9%	21	N	54	17	31.5%	68	N

2031 Total Traffic Volumes - Right Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary									
Intersection	Approach	AM				PM			
		Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)	Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)
Hesper Road & South 80th St. West	WB	22	5	117	N	73	22	110	N
	EB	111	17	105	N	59	10	112	N

2031 Total Traffic Volumes - Left Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary										
Intersection	Approach	AM					PM				
		Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)	Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)
Hesper Road & South 80th St. West	WB	22	3	13.6%	111	N	73	8	11.0%	59	N
	EB	111	31	27.9%	22	N	59	22	37.3%	73	N

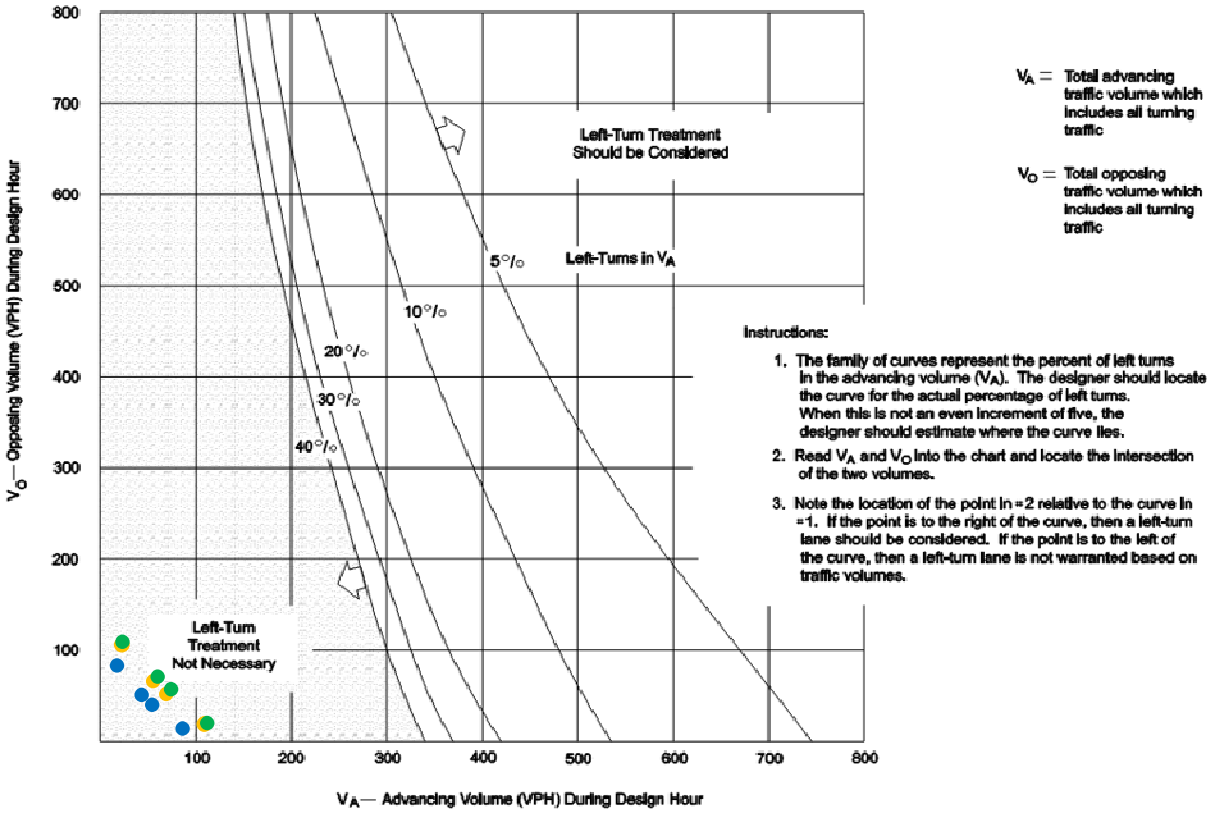


Note: For highways with a design speed below 50 mph (80 km/h) with a DHV < 300 and where right turns are > 40, an adjustment should be used. To read the vertical axis of the chart, subtract 20 from the actual number of right turns.

Hesper Road & South 80th St. West

2026 BACKGROUND TRAFFIC
2031 BACKGROUND TRAFFIC
2031 TOTAL TRAFFIC

Note: Points outside the limits of the chart are not plotted and need to be verified if a right-turn may be needed



VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (45 MPH)
(US Customary)

Figure 28.4F

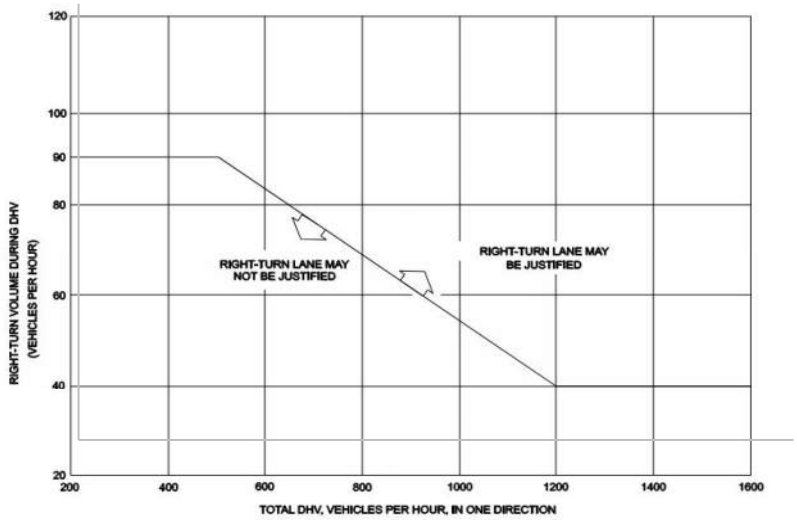
Hesper Road & South 80th St. West

2026 BACKGROUND TRAFFIC
2031 BACKGROUND TRAFFIC
2031 TOTAL TRAFFIC

Note: Points outside the limits of the chart are not plotted and are assumed to indicate a left-turn may be needed

2031 Total Traffic Volumes - Right Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary									
Intersection	Approach	AM				PM			
		Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)	Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)
North Access & South 80th St. West	NB	61	0	90	N	70	0	90	N
	SB	36	4	90	N	97	10	90	N

2031 Total Traffic Volumes - Left Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary											
Intersection	Approach	AM					PM				
		Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)	Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)
North Access & South 80th St. West	NB	61	3	4.9%	36	N	70	9	12.9%	97	N
	SB	36	0	0.0%	61	N	97	0	0.0%	70	N



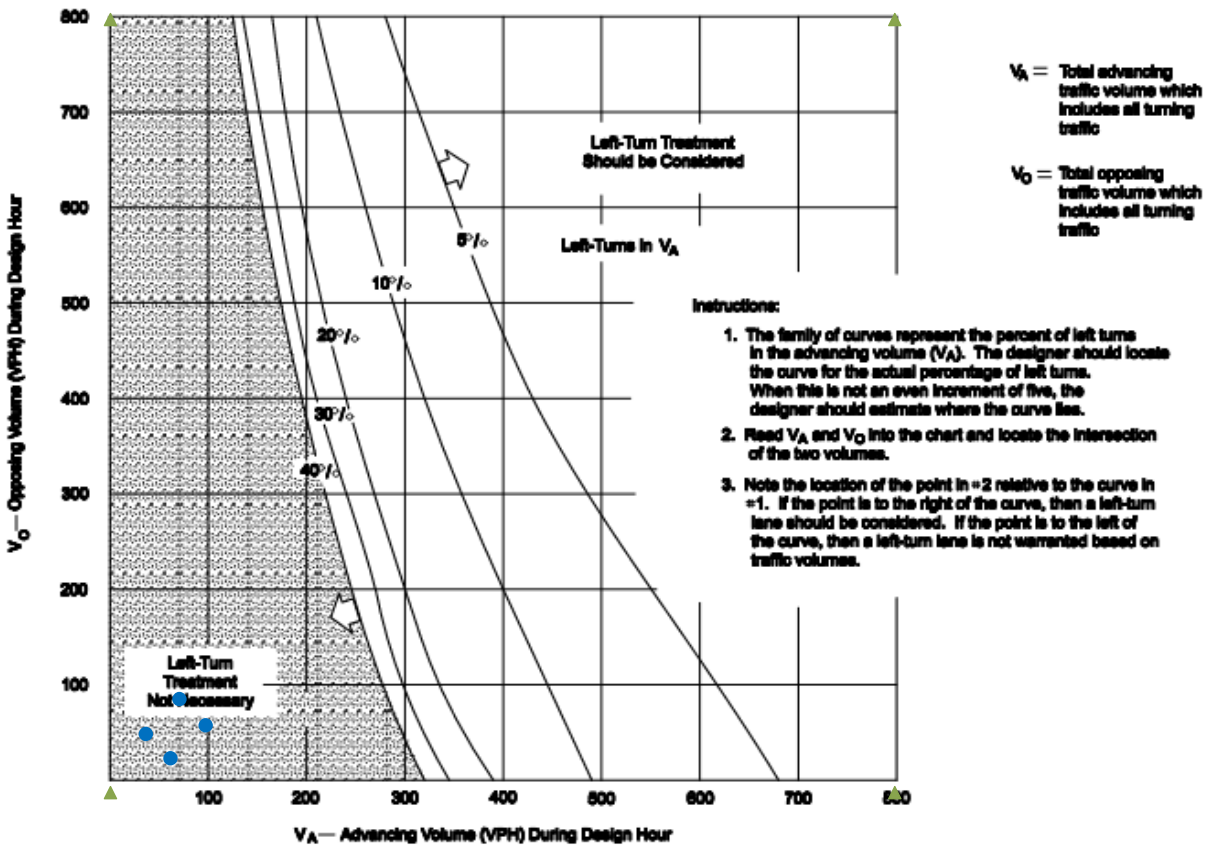
Note: Figure is only applicable on highways with a design speed of 50 mph (80 km/h) or greater.

GUIDELINES FOR RIGHT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 4-LANE HIGHWAYS

Figure 28.4B

North Access & South 80th St. West

2031 TOTAL TRAFFIC [redacted] Note: Points outside the limits of the chart are not plotted and need to be verified if a right-turn may be needed



VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (50 MPH) (US Customary)

Figure 28.4E

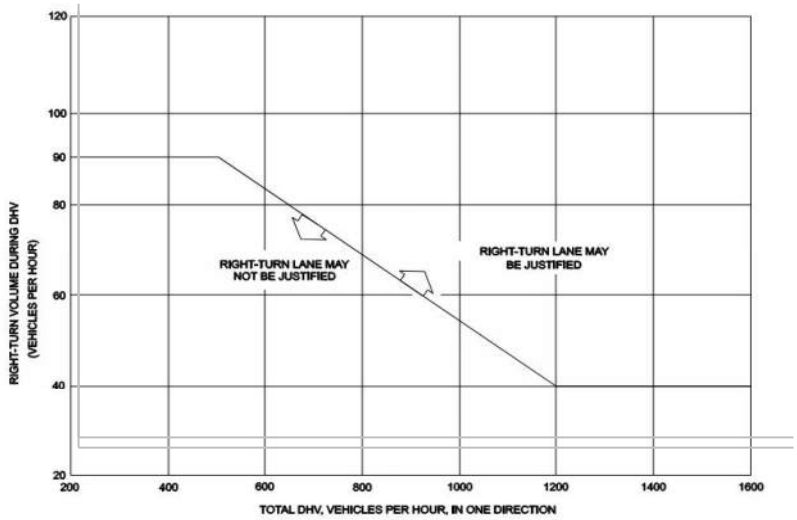
North Access & South 80th St. West

2031 TOTAL TRAFFIC [redacted]

Note: Points outside the limits of the chart are not plotted and are assumed to indicate a left-turn may be needed

2031 Total Traffic Volumes - Right Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary									
Intersection	Approach	AM				PM			
		Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)	Total DHV	RT Vol During DHV	Required RT Vol for Warranted Lane	Warranted RT Lane (Y/N)
South Access & South 80th St. West	NB	51	0	90	N	75	0	90	N
	SB	38	4	90	N	94	10	90	N

2031 Total Traffic Volumes - Left Turn Lanes at Unsignalized Intersections on 2-Lane Highways Summary											
Intersection	Approach	AM					PM				
		Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)	Va = Tot Advancing Traffic Vol	Va(L) = Tot LT vol in advancing traffic	% LT in Va	Vo = Tot opposing traffic Vol	Warranted LT Lane (Y/N)
South Access & South 80th St. West	NB	51	2	3.9%	38	N	75	9	12.0%	94	N
	SB	38	0	0.0%	51	N	94	0	0.0%	75	N



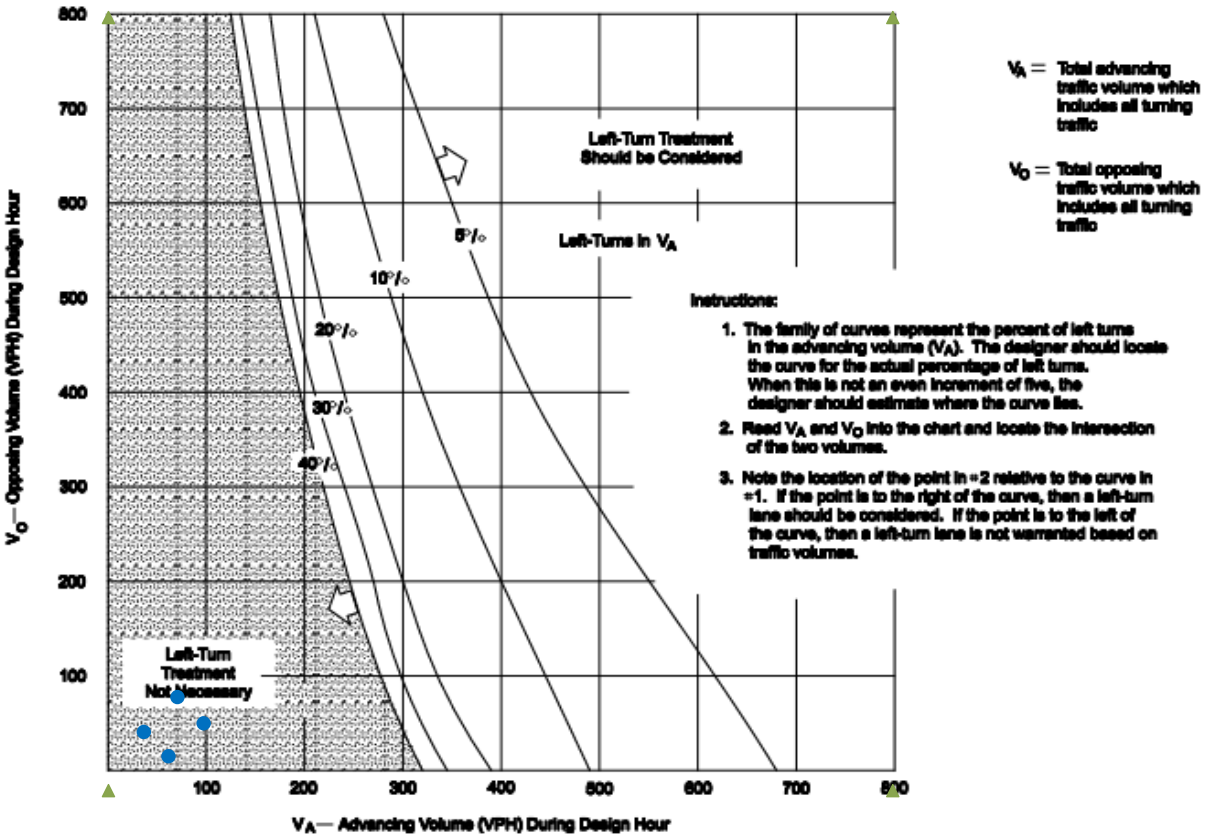
Note: Figure is only applicable on highways with a design speed of 50 mph (80 km/h) or greater.

GUIDELINES FOR RIGHT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 4-LANE HIGHWAYS

Figure 28.4B

South Access & South 80th St. West

2031 TOTAL TRAFFIC [redacted] Note: Points outside the limits of the chart are not plotted and need to be verified if a right-turn may be needed



VOLUME GUIDELINES FOR LEFT-TURN LANES AT UNSIGNALIZED INTERSECTIONS ON 2-LANE HIGHWAYS (50 MPH)
(US Customary)

Figure 28.4E

South Access & South 80th St. West

2031 TOTAL TRAFFIC

Note: Points outside the limits of the chart are not plotted and are assumed to indicate a left-turn may be needed

Shop House Acres Major Subdivision

Traffic Impact Study

APPENDIX G

2024 Montana Department of Transportation

Seasonal Adjustment Factors

&

Appendix E of the Road Design Manual Produced by MDT

Montana Department of Transportation

Seasonal Factors By Day and Month for 1/1/2024 - 12/31/2024

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
REC_MA	Jan	2.436	2.279	2.183	2.374	2.395	2.105	2.203
	Feb	2.307	2.139	2.327	2.363	1.973	1.77	1.911
	Mar	1.847	1.852	1.818	1.708	1.664	1.499	1.741
	Apr	1.298	1.429	1.425	1.433	1.338	1.107	1.34
	May	0.917	0.923	1.036	1.102	1.01	0.822	0.919
	Jun	0.568	0.768	0.766	0.7	0.64	0.551	0.607
	Jul	0.452	0.589	0.612	0.573	0.552	0.471	0.477
	Aug	0.538	0.695	0.751	0.722	0.643	0.55	0.552
	Sep	0.646	0.726	0.813	0.807	0.774	0.665	0.672
	Oct	0.935	1.146	1.125	1.064	1.031	0.887	1.022
	Nov	1.694	1.704	1.694	1.601	1.647	1.419	1.56
	Dec	2.021	2.154	2.156	2.179	1.862	1.702	1.832

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
REC_PA	Jan	2.574	2.17	2.187	2.204	2.226	2.081	2.312
	Feb	2.047	2.052	2.159	1.995	1.867	1.641	1.816
	Mar	1.917	1.964	2.084	1.907	1.835	1.621	1.836
	Apr	1.482	1.566	1.595	1.633	1.554	1.413	1.441
	May	0.881	0.923	0.974	1.066	0.949	0.809	0.859
	Jun	0.622	0.684	0.676	0.636	0.605	0.558	0.632
	Jul	0.522	0.559	0.573	0.55	0.543	0.501	0.521
	Aug	0.58	0.616	0.652	0.645	0.598	0.555	0.567
	Sep	0.658	0.682	0.7	0.711	0.68	0.619	0.661
	Oct	1.003	1.138	1.119	1.109	1.081	0.9	0.969
	Nov	2.084	1.961	2.105	1.869	2.049	1.653	1.926
	Dec	2.165	2.105	2.151	2.383	2.011	1.809	2.004

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
RMA_RMC_12	Jan	1.841	1.546	1.474	1.442	1.492	1.436	1.606
	Feb	1.624	1.46	1.48	1.459	1.319	1.186	1.341
	Mar	1.396	1.269	1.269	1.202	1.155	1.05	1.256
	Apr	1.203	1.121	1.123	1.13	1.056	0.963	1.124
	May	1.001	0.968	0.993	1.008	0.939	0.819	0.927
	Jun	0.802	0.876	0.888	0.834	0.802	0.708	0.809
	Jul	0.713	0.771	0.803	0.745	0.722	0.683	0.711
	Aug	0.79	0.851	0.871	0.838	0.78	0.69	0.759
	Sep	0.862	0.857	0.898	0.887	0.826	0.739	0.837
	Oct	1.015	1.02	0.999	0.979	0.938	0.827	0.98
	Nov	1.277	1.15	1.128	1.066	1.137	0.973	1.156
	Dec	1.454	1.336	1.357	1.412	1.236	1.127	1.337

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
RMA_RMC_345	Jan	2.107	1.429	1.165	1.188	1.183	1.23	1.74
	~~Feb~~	~~1.8~~	~~1.212~~	~~1.19~~	~~1.187~~	1.123	1.144	1.483
	Mar	1.981	1.211	1.082	1.057	1.062	1.104	1.511
	Apr	1.437	1.008	0.965	0.98	0.933	0.926	1.209
	May	1.226	0.916	0.859	0.84	0.849	0.812	0.991
	Jun	1.173	0.785	0.852	0.772	0.744	0.773	1.029
	Jul	1.198	0.804	0.791	0.796	0.824	0.812	1.056
	Aug	1.185	0.852	0.829	0.792	0.786	0.774	1.043
	Sep	1.321	0.941	0.857	0.869	0.836	0.824	1.094
	Oct	1.291	0.853	0.868	0.848	0.834	0.814	1.08
	Nov	1.473	0.946	0.95	0.943	0.967	0.907	1.249
	Dec	1.738	1.117	1.193	1.214	1.087	1.021	1.319

Seasonal Factors By Day and Month for 1/1/2024 - 12/31/2024

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
RPA_1	**Jan**	2.093	1.571	1.428	1.47	1.564	1.462	1.822
	Feb	1.747	1.4	1.367	1.351	1.267	1.15	1.443
	Mar	1.496	1.281	1.244	1.183	1.151	1.065	1.34
	Apr	1.241	1.134	1.123	1.125	1.059	0.944	1.119
	May	1.029	0.978	0.98	1.004	0.923	0.775	0.946
	Jun	0.808	0.867	0.873	0.827	0.776	0.684	0.825
	Jul	0.67	0.723	0.763	0.71	0.692	0.619	0.688
	Aug	0.769	0.786	0.834	0.786	0.726	0.657	0.764
	Sep	0.889	0.879	0.89	0.882	0.833	0.729	0.843
	Oct	1.091	1.039	1.016	0.994	0.932	0.835	1.027
	Nov	1.436	1.177	1.162	1.087	1.205	1.035	1.27
	Dec	1.536	1.277	1.302	1.405	1.208	1.108	1.422

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
RPA_2	**Jan**	1.677	1.412	1.266	1.26	1.263	1.261	1.445
	Feb	1.537	1.285	1.31	1.29	1.191	1.113	1.355
	Mar	1.275	1.193	1.153	1.085	1.05	0.973	1.148
	Apr	1.139	1.099	1.11	1.109	1.046	0.95	1.082
	May	1.029	0.986	1.002	1.011	0.937	0.82	0.944
	Jun	0.862	0.926	0.907	0.846	0.822	0.741	0.847
	Jul	0.829	0.861	0.867	0.821	0.836	0.769	0.842
	Aug	0.859	0.901	0.905	0.879	0.832	0.731	0.842
	Sep	0.928	0.911	0.937	0.919	0.858	0.752	0.837
	Oct	0.938	1.003	1.002	0.934	0.913	0.784	0.876
	Nov	1.172	1.101	1.068	0.992	1.059	0.932	1.08
	Dec	1.297	1.226	1.27	1.287	1.145	1.047	1.139

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
RPA_3	**Jan**	2.024	1.567	1.385	1.717	1.573	1.462	1.729
	Feb	1.777	1.445	1.537	1.573	1.323	1.174	1.431
	Mar	1.46	1.258	1.256	1.154	1.102	1.055	1.363
	Apr	1.165	1.054	1.101	1.19	1.011	0.881	1.104
	May	1.009	0.925	1.015	1.029	0.911	0.783	0.94
	Jun	0.804	0.845	0.887	0.822	0.749	0.705	0.859
	Jul	0.729	0.746	0.786	0.742	0.78	0.701	0.82
	Aug	0.794	0.786	0.856	0.844	0.748	0.685	0.828
	Sep	0.932	0.879	0.908	0.924	0.84	0.752	0.884
	Oct	1.031	0.96	0.998	0.96	0.88	0.795	0.976
	Nov	1.219	1.076	1.145	1.012	1.102	0.966	1.179
	Dec	1.354	1.283	1.345	1.415	1.16	1.037	1.244

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
RPA_45	**Jan**	1.825	1.565	1.335	1.385	1.438	1.394	1.719
	Feb	1.604	1.369	1.377	1.366	1.28	1.204	1.456
	Mar	1.535	1.307	1.185	1.112	1.091	1.047	1.378
	Apr	1.261	1.097	1.066	3.263	0.994	0.924	1.234
	May	1.008	0.937	0.955	0.967	0.883	0.812	0.956
	Jun	0.86	0.875	0.905	0.858	0.801	0.781	0.913
	Jul	0.808	0.814	0.831	0.792	0.81	0.755	0.867
	Aug	0.865	0.845	0.864	0.842	0.801	0.729	0.881
	Sep	0.935	0.875	0.871	0.877	0.826	0.744	0.892
	Oct	0.969	0.918	0.911	0.896	0.85	0.756	0.964
	Nov	1.18	1.059	1.082	0.982	1.074	0.925	1.122
	Dec	1.378	1.323	1.31	1.361	1.161	1.046	1.222

Seasonal Factors By Day and Month for 1/1/2024 - 12/31/2024

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
RURAL INNER INTERSTATE	**Jan**	1.643	1.477	1.38	1.381	1.379	1.336	1.496
	Feb	1.385	1.383	1.388	1.368	1.251	1.143	1.319
	Mar	1.145	1.243	1.208	1.146	1.059	0.984	1.105
	Apr	1.034	1.434	1.086	1.106	1	0.904	0.984
	May	0.965	0.992	1.032	1.032	0.927	0.799	0.889
	Jun	0.796	0.927	0.927	0.864	0.795	0.716	0.84
	Jul	0.716	1.025	0.832	0.843	0.781	0.712	0.767
	Aug	0.759	0.869	0.887	0.841	0.78	0.702	0.78
	Sep	0.861	0.896	0.938	0.912	0.852	0.736	0.807
	Oct	0.906	1.019	1.019	0.964	0.918	0.786	0.908
	Nov	1.135	1.224	1.17	0.995	1.23	0.986	1.052
	Dec	1.226	1.307	1.328	1.344	1.164	1.033	1.07

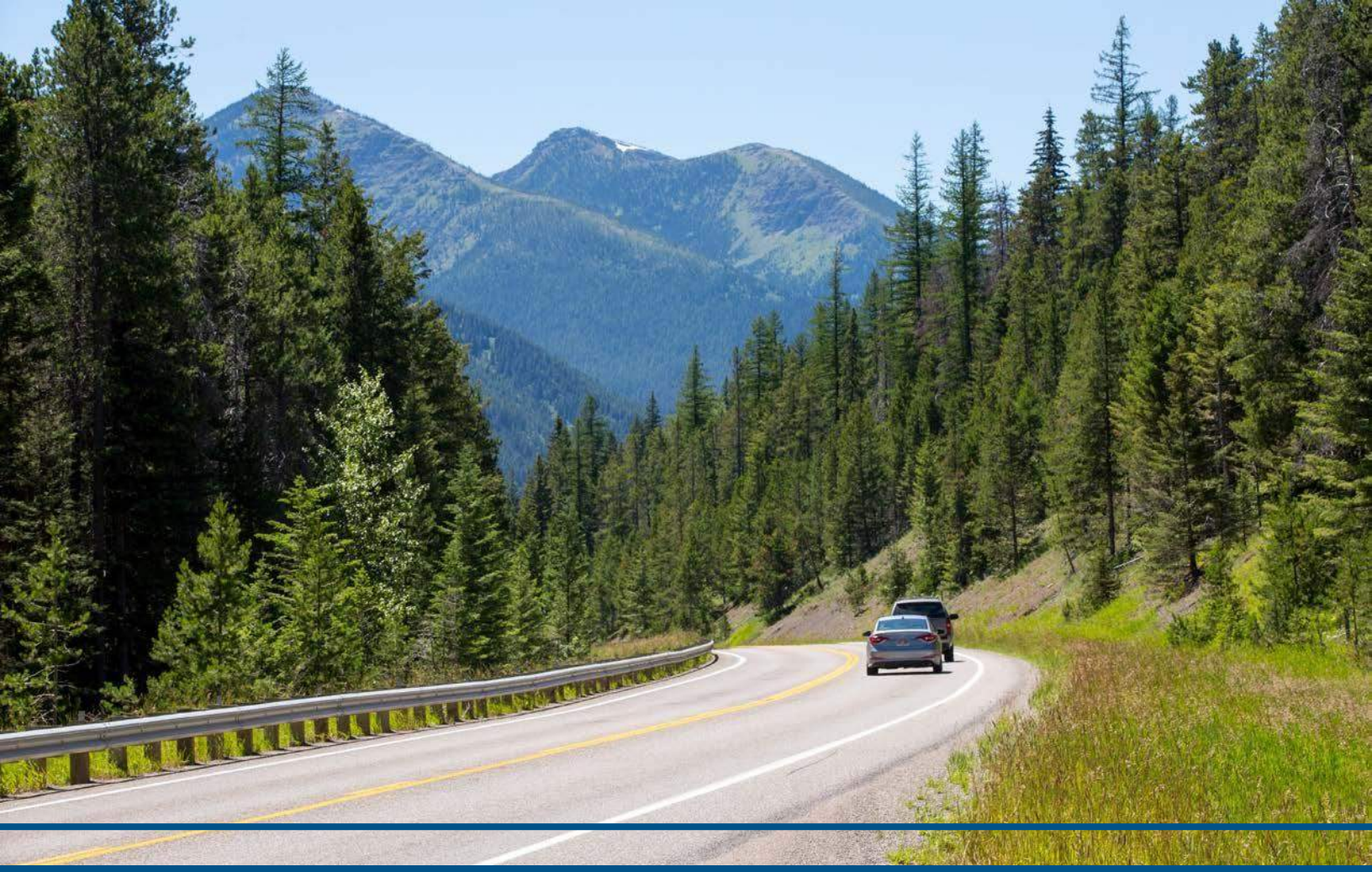
Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
RURAL OUTER INTERSTATE	**Jan**	1.63	1.514	1.413	1.422	1.48	1.418	1.558
	Feb	1.438	1.405	1.418	1.338	1.251	1.199	1.348
	Mar	1.229	1.26	1.216	1.138	1.052	1.004	1.166
	Apr	1.08	1.081	1.088	1.075	1.011	0.936	1.092
	May	0.961	0.953	1.019	0.995	0.909	0.824	0.994
	Jun	0.825	0.874	0.917	0.849	0.795	0.745	0.854
	Jul	0.721	0.769	0.821	0.761	0.792	0.732	0.78
	Aug	0.77	0.823	0.861	0.819	0.755	0.717	0.803
	Sep	0.895	0.898	0.935	0.918	0.857	0.8	0.921
	Oct	0.954	1.006	1.026	0.982	0.914	0.84	1.019
	Nov	1.193	1.218	1.188	1.096	1.222	1.033	1.134
	Dec	1.213	1.357	1.413	1.499	1.222	1.116	1.202

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
UI	**Jan**	1.777	1.344	1.146	1.155	1.192	1.191	1.457
	Feb	1.581	1.207	1.179	1.176	1.107	1.074	1.291
	Mar	1.456	1.124	1.067	1.01	0.994	0.945	1.175
	Apr	1.256	1.011	0.975	0.971	0.935	0.888	1.093
	May	1.17	1.004	0.976	0.958	0.922	0.841	1.031
	Jun	1.03	0.908	0.889	0.842	0.822	0.801	0.963
	Jul	0.974	0.825	0.824	0.794	0.859	0.804	0.943
	Aug	1.015	0.861	0.858	0.836	0.847	0.777	0.95
	Sep	1.124	0.93	0.894	0.889	0.847	0.802	0.963
	Oct	1.158	0.954	0.925	0.898	0.882	0.824	1.03
	Nov	1.368	1.045	1.009	0.973	1.067	0.961	1.173
	Dec	1.381	1.101	1.112	1.177	1.023	0.953	1.139

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
UPA	**Jan**	1.801	1.213	1.037	1.037	1.083	1.086	1.431
	Feb	1.62	1.079	1.016	1.01	1.006	0.962	1.241
	Mar	1.534	1.021	0.976	0.949	0.946	0.916	1.204
	Apr	1.388	0.95	0.915	0.912	0.893	0.871	1.098
	May	1.307	0.997	0.896	0.893	0.876	0.831	1.065
	Jun	1.217	0.896	0.863	0.847	0.837	0.822	1.039
	Jul	1.204	0.861	0.841	0.827	0.908	0.856	1.064
	Aug	1.223	0.889	0.867	0.85	0.836	0.824	1.055
	Sep	1.298	0.98	0.886	0.88	0.864	0.837	1.067
	Oct	1.348	0.953	0.905	0.896	0.888	0.858	1.096
	Nov	1.485	0.986	0.943	0.94	1.063	0.949	1.235
	Dec	1.529	1.002	1.013	1.111	0.979	0.933	1.217

Seasonal Factors By Day and Month for 1/1/2024 - 12/31/2024

Seasonal Factors								
Group	**Month**	**Sunday**	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
UMA_UC	**Jan**	1.765	1.187	1.005	1.005	1.03	1.057	1.47
	Feb	1.677	1.112	1.031	1.02	0.998	0.994	1.368
	Mar	1.594	1.02	0.969	0.957	0.969	0.966	1.299
	Apr	1.356	0.915	0.874	0.882	0.869	0.878	1.146
	May	1.241	0.922	0.847	0.841	0.839	0.813	1.048
	Jun	1.219	0.895	0.847	0.819	0.818	0.848	1.069
	Jul	1.256	0.877	0.845	0.842	0.917	0.898	1.148
	Aug	1.257	0.905	0.874	0.861	0.851	0.866	1.132
	Sep	1.321	0.947	0.861	0.855	0.845	0.842	1.11
	Oct	1.321	0.917	0.88	0.872	0.87	0.872	1.16
	Nov	1.51	0.969	0.933	0.934	1.034	0.98	1.315
	Dec	1.552	1.022	1.03	1.109	0.998	0.962	1.293



ROAD DESIGN MANUAL

September 2016

MONTANA
MDT
DEPARTMENT OF TRANSPORTATION

Appendix E

Level of Service Criteria

The design team should coordinate with the Traffic and Safety Bureau for all traffic operational analyses conducted for the project and additional traffic operational information that may be needed for the design. The objective of conducting traffic operations analyses is to design the highway mainline and intersections to accommodate the selected design hourly volume (DHV) at the selected level of service (LOS). Appendix E provides the minimum LOS Criteria for various types of facilities. The detailed calculations, highway factors and methodologies are presented in the *Highway Capacity Manual* (*HCM*). During the analysis, the design service volume (or flow rate) of the facility is calculated. For various types of highway facilities, the *HCM* documents the measures of effectiveness that should be used in capacity analyses to determine level of service. For each facility type, the *HCM* provides the analytical tools necessary to calculate the numerical value of its respective measure of effectiveness. Additional design criteria for each facility type are presented in the *MDT Geometric Design Standards.*

Type of Facility	Level of Service Targets
Rural	
Freeways (NHS — Interstate)	B
Principal Arterials (NHS — Non-Interstate)	Level/Rolling: B; Mountainous: C
Minor Arterials	Level/Rolling: B; Mountainous: C
Collector Roads	C
Urban	
Freeways (NHS — Interstate)	B
Principal Arterials (NHS — Non-Interstate)	C
Minor Arterials	C
Collector Roads	D

Shop House Acres Major Subdivision

Traffic Impact Study

APPENDIX H

Miovision Data – Peak Hour Movement

&

Miovision Data – Hourly Counts

King Ave & 80th St W - TMC

Thu Feb 12, 2026
Full Length (12 AM-12 AM (+1))
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377917, Location: 45.755208, -108.720208

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US

Leg	80th St W						King Ave						80th St W						King Ave						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2026-02-12 12:00AM	0	0	0	0	**0**	0	0	0	1	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
12:15AM	0	0	0	0	**0**	0	0	0	1	0	**1**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**2**
12:30AM	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
12:45AM	0	0	0	0	**0**	0	1	1	0	0	**2**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	**3**
Hourly Total	0	0	0	0	**0**	0	1	2	2	0	**5**	0	0	1	0	0	**1**	0	0	1	0	0	**1**	0	**7**
1:00AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
1:15AM	0	0	0	0	**0**	0	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
1:30AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
1:45AM	0	0	0	0	**0**	0	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
Hourly Total	0	0	0	0	**0**	0	2	0	0	0	**2**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**2**
2:00AM	0	0	0	0	**0**	0	0	0	1	0	**1**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**2**
2:15AM	0	0	0	0	**0**	0	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
2:30AM	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**2**
2:45AM	0	0	0	0	**0**	0	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
Hourly Total	0	0	0	0	**0**	0	2	1	1	0	**4**	0	0	0	0	0	**0**	0	0	2	0	0	**2**	0	**6**
3:00AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
3:15AM	0	0	1	0	**1**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**2**
3:30AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**1**
3:45AM	0	0	2	0	**2**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	4	0	0	**4**	0	**6**
Hourly Total	0	0	3	0	**3**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	5	0	0	**5**	0	**9**
4:00AM	0	0	3	0	**3**	0	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**5**
4:15AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	1	0	0	0	**1**	0	0	1	0	0	**1**	0	**2**
4:30AM	0	1	1	0	**2**	0	0	0	0	0	**0**	0	1	0	0	0	**1**	0	0	0	0	0	**0**	0	**3**
4:45AM	0	0	1	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	3	0	0	**3**	0	**4**
Hourly Total	0	1	5	0	**6**	0	1	0	0	0	**1**	0	2	0	0	0	**2**	0	0	5	0	0	**5**	0	**14**
5:00AM	0	0	3	0	**3**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**3**
5:15AM	0	0	4	0	**4**	0	0	2	0	0	**2**	0	0	0	0	0	**0**	0	0	4	0	0	**4**	0	**10**
5:30AM	0	0	4	0	**4**	0	1	0	0	0	**1**	0	1	0	0	0	**1**	0	0	2	0	0	**2**	0	**8**
5:45AM	0	0	10	0	**10**	0	3	0	1	0	**4**	0	1	1	0	0	**2**	0	0	3	0	0	**3**	0	**19**
Hourly Total	0	0	21	0	**21**	0	4	2	1	0	**7**	0	2	1	0	0	**3**	0	0	9	0	0	**9**	0	**40**
6:00AM	0	2	14	0	**16**	0	3	2	1	0	**6**	0	0	1	0	0	**1**	0	0	8	0	0	**8**	0	**31**
6:15AM	0	1	6	1	**8**	0	4	3	1	0	**8**	0	0	0	1	0	**1**	0	1	8	0	0	**9**	0	**26**
6:30AM	0	2	10	0	**12**	0	1	3	2	0	**6**	0	7	1	0	0	**8**	0	0	12	0	0	**12**	0	**38**
6:45AM	0	1	10	0	**11**	0	5	3	3	0	**11**	0	2	1	0	0	**3**	0	1	15	0	0	**16**	0	**41**
Hourly Total	0	6	40	1	**47**	0	13	11	7	0	**31**	0	9	3	1	0	**13**	0	2	43	0	0	**45**	0	**136**
7:00AM	0	1	12	0	**13**	0	4	3	4	0	**11**	0	4	1	1	0	**6**	0	0	20	0	0	**20**	0	**50**
7:15AM	0	1	28	0	**29**	0	3	1	3	0	**7**	0	8	2	0	0	**10**	0	1	23	0	0	**24**	0	**70**
7:30AM	0	4	36	0	**40**	0	4	5	1	0	**10**	0	10	1	1	0	**12**	0	1	20	1	0	**22**	0	**84**
7:45AM	0	3	14	0	**17**	0	7	7	2	0	**16**	0	2	1	1	0	**4**	0	0	16	0	0	**16**	0	**53**
Hourly Total	0	9	90	0	**99**	0	18	16	10	0	**44**	0	24	5	3	0	**32**	0	2	79	1	0	**82**	0	**257**
8:00AM	0	1	13	0	**14**	0	8	10	6	0	**24**	0	7	2	0	0	**9**	0	1	13	1	0	**15**	0	**62**
8:15AM	0	3	7	0	**10**	0	7	4	2	0	**13**	0	1	2	0	0	**3**	0	1	17	0	0	**18**	0	**44**
8:30AM	0	4	6	0	**10**	0	3	4	0	0	**7**	0	9	0	1	0	**10**	0	0	16	0	0	**16**	0	**43**
8:45AM	0	0	6	0	**6**	0	7	8	3	0	**18**	0	3	1	1	0	**5**	0	0	1	1	0	**2**	0	**31**
Hourly Total	0	8	32	0	**40**	0	25	26	11	0	**62**	0	20	5	2	0	**27**	0	2	47	2	0	**51**	0	**180**
9:00AM	2	0	8	0	**10**	0	5	7	4	0	**16**	0	2	2	0	0	**4**	0	0	12	1	0	**13**	0	**43**
9:15AM	0	0	9	0	**9**	0	3	7	1	0	**11**	0	1	0	0	0	**1**	0	2	5	2	0	**9**	0	**30**
9:30AM	2	1	6	0	**9**	0	7	11	4	0	**22**	0	8	1	0	0	**9**	0	1	6	1	0	**8**	0	**48**
9:45AM	0	2	9	0	**11**	0	9	5	2	0	**16**	0	4	1	0	0	**5**	0	1	7	1	0	**9**	0	**41**
Hourly Total	4	3	32	0	**39**	0	24	30	11	0	**65**	0	15	4	0	0	**19**	0	4	30	5	0	**39**	0	**162**
10:00AM	2	0	12	0	**14**	0	6	4	3	0	**13**	0	1	0	2	0	**3**	0	1	9	0	0	**10**	0	**40**
10:15AM	1	1	10	0	**12**	0	4	4	5	0	**13**	0	6	1	2	0	**9**	0	1	4	0	0	**5**	0	**39**
10:30AM	0	2	6	0	**8**	0	7	5	7	0	**19**	0	6	1	1	0	**8**	0	1	12	0	0	**13**	0	**48**
10:45AM	0	3	13	0	**16**	0	4	4	9	0	**17**	0	4	2	1	0	**7**	0	0	6	1	0	**7**	0	**47**
Hourly Total	3	6	41	0	**50**	0	21	17	24	0	**62**	0	17	4	6	0	**27**	0	3	31	1	0	**35**	0	**174**
11:00AM	1	0	12	0	**13**	0	7	12	3	0	**22**	0	4	2	4	0	**10**	0	1	12	1	0	**14**	0	**59**
11:15AM	1	0	9	0	**10**	0	7	9	3	0	**19**	0	5	2	0	0	**7**	0	1	6	1	0	**8**	0	**44**
11:30AM	0	3	6	0	**9**	0	10	13	5	0	**28**	0	4	0	2	0	**6**	0	1	12	1	0	**14**	0	**57**

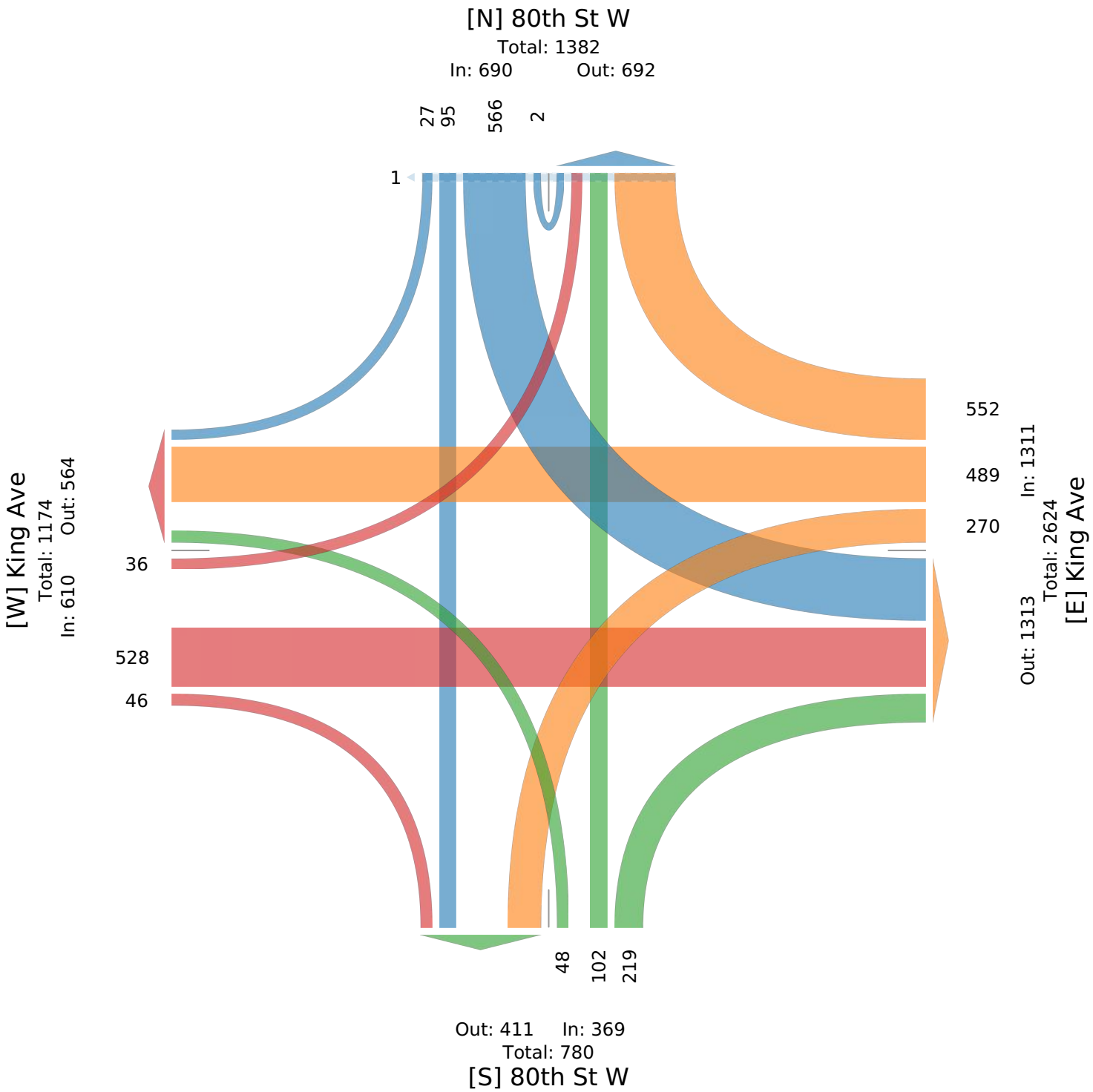
Leg	80th St W						King Ave						80th St W						King Ave						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
11:45AM	1	1	6	0	**8**	0	8	7	5	0	**20**	0	8	1	0	0	**9**	0	2	7	1	0	**10**	0	**47**
Hourly Total	3	4	33	0	**40**	0	32	41	16	0	**89**	0	21	5	6	0	**32**	0	5	37	4	0	**46**	0	**207**
12:00PM	1	4	6	0	**11**	0	8	11	9	0	**28**	0	5	2	0	0	**7**	0	0	9	0	0	**9**	0	**55**
12:15PM	0	1	11	0	**12**	0	12	11	3	0	**26**	0	2	5	0	0	**7**	0	0	9	0	0	**9**	0	**54**
12:30PM	1	1	3	0	**5**	0	7	5	6	0	**18**	0	5	3	0	0	**8**	0	1	6	0	0	**7**	0	**38**
12:45PM	2	2	7	0	**11**	0	13	13	4	0	**30**	0	2	2	3	0	**7**	0	1	8	2	0	**11**	0	**59**
Hourly Total	4	8	27	0	**39**	0	40	40	22	0	**102**	0	14	12	3	0	**29**	0	2	32	2	0	**36**	0	**206**
1:00PM	1	1	9	0	**11**	0	6	7	4	0	**17**	0	6	0	0	0	**6**	0	1	7	1	0	**9**	0	**43**
1:15PM	1	4	8	0	**13**	0	8	9	5	0	**22**	0	1	1	1	0	**3**	0	1	12	1	0	**14**	0	**52**
1:30PM	0	2	9	0	**11**	0	12	7	3	0	**22**	0	2	2	2	0	**6**	0	0	11	0	0	**11**	0	**50**
1:45PM	2	0	8	0	**10**	0	16	10	4	0	**30**	0	3	0	0	0	**3**	0	0	8	0	0	**8**	0	**51**
Hourly Total	4	7	34	0	**45**	0	42	33	16	0	**91**	0	12	3	3	0	**18**	0	2	38	2	0	**42**	0	**196**
2:00PM	0	1	9	0	**10**	0	8	7	7	0	**22**	0	4	2	2	0	**8**	0	0	4	2	0	**6**	0	**46**
2:15PM	0	4	9	0	**13**	0	11	9	3	0	**23**	0	6	7	1	0	**14**	0	0	10	1	0	**11**	0	**61**
2:30PM	0	4	9	0	**13**	0	14	6	1	0	**21**	0	2	0	3	0	**5**	0	1	10	0	0	**11**	0	**50**
2:45PM	0	1	13	0	**14**	0	13	4	6	0	**23**	0	1	0	0	0	**1**	0	2	7	1	0	**10**	0	**48**
Hourly Total	0	10	40	0	**50**	0	46	26	17	0	**89**	0	13	9	6	0	**28**	0	3	31	4	0	**38**	0	**205**
3:00PM	0	1	9	0	**10**	0	10	7	6	0	**23**	0	5	4	0	0	**9**	0	0	15	1	0	**16**	0	**58**
3:15PM	0	4	8	0	**12**	0	10	11	5	0	**26**	0	3	2	3	0	**8**	0	1	8	0	0	**9**	0	**55**
3:30PM	0	2	8	0	**10**	0	23	20	6	0	**49**	0	4	1	1	0	**6**	0	0	6	0	0	**6**	0	**71**
3:45PM	3	3	7	0	**13**	1	10	12	9	0	**31**	0	4	4	0	0	**8**	0	0	13	2	0	**15**	0	**67**
Hourly Total	3	10	32	0	**45**	1	53	50	26	0	**129**	0	16	11	4	0	**31**	0	1	42	3	0	**46**	0	**251**
4:00PM	0	1	8	0	**9**	0	11	14	5	0	**30**	0	6	3	0	0	**9**	0	2	9	2	0	**13**	0	**61**
4:15PM	1	0	9	0	**10**	0	22	15	4	0	**41**	0	4	4	0	0	**8**	0	1	12	2	0	**15**	0	**74**
4:30PM	0	3	14	0	**17**	0	14	12	6	0	**32**	0	7	2	2	0	**11**	0	1	11	2	0	**14**	0	**74**
4:45PM	0	4	11	0	**15**	0	13	12	6	0	**31**	0	3	1	0	0	**4**	0	2	11	1	0	**14**	0	**64**
Hourly Total	1	8	42	0	**51**	0	60	53	21	0	**134**	0	20	10	2	0	**32**	0	6	43	7	0	**56**	0	**273**
5:00PM	0	3	12	0	**15**	0	22	12	14	0	**48**	0	2	8	3	0	**13**	0	1	5	0	0	**6**	0	**82**
5:15PM	0	4	14	0	**18**	0	11	15	6	0	**32**	0	6	3	2	0	**11**	0	2	5	0	0	**7**	0	**68**
5:30PM	0	0	11	0	**11**	0	19	14	10	0	**43**	0	8	3	0	0	**11**	0	3	4	0	0	**7**	0	**72**
5:45PM	2	1	5	1	**9**	0	12	7	5	0	**24**	0	3	1	2	0	**6**	0	1	2	0	0	**3**	0	**42**
Hourly Total	2	8	42	1	**53**	0	64	48	35	0	**147**	0	19	15	7	0	**41**	0	7	16	0	0	**23**	0	**264**
6:00PM	0	0	4	0	**4**	0	12	9	1	0	**22**	0	2	0	0	0	**2**	0	0	5	1	0	**6**	0	**34**
6:15PM	0	1	6	0	**7**	0	9	9	2	0	**20**	0	3	1	2	0	**6**	0	1	0	0	0	**1**	0	**34**
6:30PM	0	1	4	0	**5**	0	6	12	3	0	**21**	0	2	2	0	0	**4**	0	1	8	0	0	**9**	0	**39**
6:45PM	0	0	5	0	**5**	0	9	9	3	0	**21**	0	5	0	0	0	**5**	0	0	2	1	0	**3**	0	**34**
Hourly Total	0	2	19	0	**21**	0	36	39	9	0	**84**	0	12	3	2	0	**17**	0	2	15	2	0	**19**	0	**141**
7:00PM	1	1	3	0	**5**	0	11	8	3	0	**22**	0	0	1	1	0	**2**	0	0	3	0	0	**3**	0	**32**
7:15PM	0	0	3	0	**3**	0	6	6	5	0	**17**	0	1	2	1	0	**4**	0	0	6	0	0	**6**	0	**30**
7:30PM	0	0	3	0	**3**	0	10	6	0	0	**16**	0	0	0	0	0	**0**	0	1	1	1	0	**3**	0	**22**
7:45PM	0	2	4	0	**6**	0	4	4	4	0	**12**	0	0	2	0	0	**2**	0	0	0	0	0	**0**	0	**20**
Hourly Total	1	3	13	0	**17**	0	31	24	12	0	**67**	0	1	5	2	0	**8**	0	1	10	1	0	**12**	0	**104**
8:00PM	0	1	4	0	**5**	0	2	2	3	0	**7**	0	0	1	0	0	**1**	0	1	2	0	0	**3**	0	**16**
8:15PM	0	0	2	0	**2**	0	7	4	4	0	**15**	0	0	1	0	0	**1**	0	0	3	0	0	**3**	0	**21**
8:30PM	0	0	0	0	**0**	0	3	3	5	0	**11**	0	0	1	0	0	**1**	0	1	2	0	0	**3**	0	**15**
8:45PM	1	0	0	0	**1**	0	4	2	1	0	**7**	0	0	3	0	0	**3**	0	0	0	0	0	**0**	0	**11**
Hourly Total	1	1	6	0	**8**	0	16	11	13	0	**40**	0	0	6	0	0	**6**	0	2	7	0	0	**9**	0	**63**
9:00PM	0	0	1	0	**1**	0	4	2	2	0	**8**	0	1	0	0	0	**1**	0	0	1	0	0	**1**	0	**11**
9:15PM	0	0	4	0	**4**	0	3	5	4	0	**12**	0	0	0	1	0	**1**	0	0	0	1	0	**1**	0	**18**
9:30PM	0	0	2	0	**2**	0	4	1	3	0	**8**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**11**
9:45PM	0	1	1	0	**2**	0	3	2	2	0	**7**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**9**
Hourly Total	0	1	8	0	**9**	0	14	10	11	0	**35**	0	1	0	1	0	**2**	0	0	2	1	0	**3**	0	**49**
10:00PM	0	0	2	0	**2**	0	2	3	0	0	**5**	0	1	0	0	0	**1**	0	1	1	1	0	**3**	0	**11**
10:15PM	0	0	2	0	**2**	0	1	0	2	0	**3**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**5**
10:30PM	0	0	0	0	**0**	0	2	0	1	0	**3**	0	0	0	0	0	**0**	0	1	1	0	0	**2**	0	**5**
10:45PM	0	0	0	0	**0**	0	2	1	1	0	**4**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**4**
Hourly Total	0	0	4	0	**4**	0	7	4	4	0	**15**	0	1	0	0	0	**1**	0	2	2	1	0	**5**	0	**25**
11:00PM	1	0	1	0	**2**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**3**
11:15PM	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
11:30PM	0	0	1	0	**1**	0	0	2	1	0	**3**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**4**
11:45PM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**1**
Hourly Total	1	0	2	0	**3**	0	0	4	1	0	**5**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**9**
Total	27	95	566	2	**690**	1	552	489	270	0	**1311**	0	219	102	48	0	**369**	0	46	528	36	0	**610**	0	**2980**
% Approach	3.9%	13.8%	82.0%	0.3%	**-**	-	42.1%	37.3%	20.6%	0%	**-**	-	59.3%	27.6%	13.0%	0%	**-**	-	7.5%	86.6%	5.9%	0%	**-**	-	-
% Total	0.9%	3.2%	19.0%	0.1%	**23.2%**	-	18.5%	16.4%	9.1%	0%	**44.0%**	-	7.3%	3.4%	1.6%	0%	**12.4%**	-	1.5%	17.7%	1.2%	0%	**20.5%**	-	-
Motorcycles	0	0	1	0	**1**	-	0	4	0	0	**4**	-	0	1	1	0	**2**	-	0	2	0	0	**2**	-	9

Leg	80th St W						King Ave						80th St W						King Ave						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	**Int**
% Motorcycles	0%	0%	0.2%	0%	**0.1%**	-	0%	0.8%	0%	0%	**0.3%**	-	0%	1.0%	2.1%	0%	**0.5%**	-	0%	0.4%	0%	0%	**0.3%**	-	0.3%
Lights	23	91	543	2	**659**	-	526	451	259	0	**1236**	-	212	100	46	0	**358**	-	44	498	34	0	**576**	-	2829
% Lights	85.2%	95.8%	95.9%	100%	**95.5%**	-	95.3%	92.2%	95.9%	0%	**94.3%**	-	96.8%	98.0%	95.8%	0%	**97.0%**	-	95.7%	94.3%	94.4%	0%	**94.4%**	-	94.9%
Single-Unit Trucks	3	2	14	0	**19**	-	14	21	6	0	**41**	-	5	1	1	0	**7**	-	2	15	2	0	**19**	-	86
% Single-Unit Trucks	11.1%	2.1%	2.5%	0%	**2.8%**	-	2.5%	4.3%	2.2%	0%	**3.1%**	-	2.3%	1.0%	2.1%	0%	**1.9%**	-	4.3%	2.8%	5.6%	0%	**3.1%**	-	2.9%
Articulated Trucks	0	0	2	0	**2**	-	3	8	1	0	**12**	-	2	0	0	0	**2**	-	0	8	0	0	**8**	-	24
% Articulated Trucks	0%	0%	0.4%	0%	**0.3%**	-	0.5%	1.6%	0.4%	0%	**0.9%**	-	0.9%	0%	0%	0%	**0.5%**	-	0%	1.5%	0%	0%	**1.3%**	-	0.8%
Buses	1	1	2	0	**4**	-	5	5	4	0	**14**	-	0	0	0	0	**0**	-	0	5	0	0	**5**	-	23
% Buses	3.7%	1.1%	0.4%	0%	**0.6%**	-	0.9%	1.0%	1.5%	0%	**1.1%**	-	0%	0%	0%	0%	**0%**	-	0%	0.9%	0%	0%	**0.8%**	-	0.8%
Bicycles on Road	0	1	4	0	**5**	-	4	0	0	0	**4**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	9
% Bicycles on Road	0%	1.1%	0.7%	0%	**0.7%**	-	0.7%	0%	0%	0%	**0.3%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.3%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

King Ave & 80th St W - TMC
Thu Feb 12, 2026
Full Length (12 AM-12 AM (+1))
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377917, Location: 45.755208, -108.720208

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US



King Ave & 80th St W - TMC

Thu Feb 12, 2026
Full Length (12 AM-12 AM (+1))
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377917, Location: 45.755208, -108.720208

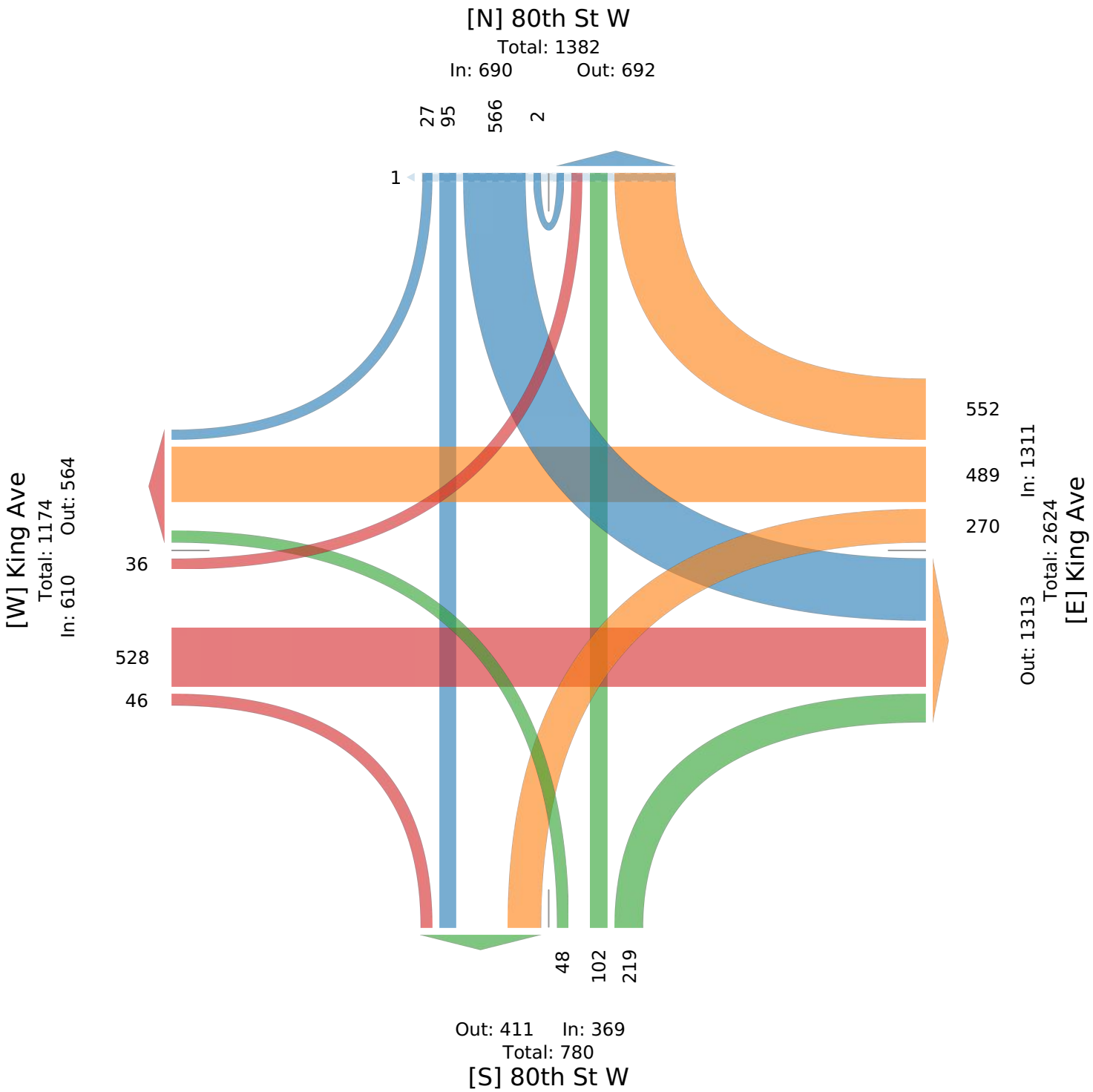
Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US

Leg	80th St W						King Ave						80th St W						King Ave						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2026-02-12 12:00AM	0	0	0	0	**0**	0	1	2	2	0	**5**	0	0	1	0	0	**1**	0	0	1	0	0	**1**	0	**7**
1:00AM	0	0	0	0	**0**	0	2	0	0	0	**2**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**2**
2:00AM	0	0	0	0	**0**	0	2	1	1	0	**4**	0	0	0	0	0	**0**	0	0	2	0	0	**2**	0	**6**
3:00AM	0	0	3	0	**3**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	5	0	0	**5**	0	**9**
4:00AM	0	1	5	0	**6**	0	1	0	0	0	**1**	0	2	0	0	0	**2**	0	0	5	0	0	**5**	0	**14**
5:00AM	0	0	21	0	**21**	0	4	2	1	0	**7**	0	2	1	0	0	**3**	0	0	9	0	0	**9**	0	**40**
6:00AM	0	6	40	1	**47**	0	13	11	7	0	**31**	0	9	3	1	0	**13**	0	2	43	0	0	**45**	0	**136**
7:00AM	0	9	90	0	**99**	0	18	16	10	0	**44**	0	24	5	3	0	**32**	0	2	79	1	0	**82**	0	**257**
8:00AM	0	8	32	0	**40**	0	25	26	11	0	**62**	0	20	5	2	0	**27**	0	2	47	2	0	**51**	0	**180**
9:00AM	4	3	32	0	**39**	0	24	30	11	0	**65**	0	15	4	0	0	**19**	0	4	30	5	0	**39**	0	**162**
10:00AM	3	6	41	0	**50**	0	21	17	24	0	**62**	0	17	4	6	0	**27**	0	3	31	1	0	**35**	0	**174**
11:00AM	3	4	33	0	**40**	0	32	41	16	0	**89**	0	21	5	6	0	**32**	0	5	37	4	0	**46**	0	**207**
12:00PM	4	8	27	0	**39**	0	40	40	22	0	**102**	0	14	12	3	0	**29**	0	2	32	2	0	**36**	0	**206**
1:00PM	4	7	34	0	**45**	0	42	33	16	0	**91**	0	12	3	3	0	**18**	0	2	38	2	0	**42**	0	**196**
2:00PM	0	10	40	0	**50**	0	46	26	17	0	**89**	0	13	9	6	0	**28**	0	3	31	4	0	**38**	0	**205**
3:00PM	3	10	32	0	**45**	1	53	50	26	0	**129**	0	16	11	4	0	**31**	0	1	42	3	0	**46**	0	**251**
4:00PM	1	8	42	0	**51**	0	60	53	21	0	**134**	0	20	10	2	0	**32**	0	6	43	7	0	**56**	0	**273**
5:00PM	2	8	42	1	**53**	0	64	48	35	0	**147**	0	19	15	7	0	**41**	0	7	16	0	0	**23**	0	**264**
6:00PM	0	2	19	0	**21**	0	36	39	9	0	**84**	0	12	3	2	0	**17**	0	2	15	2	0	**19**	0	**141**
7:00PM	1	3	13	0	**17**	0	31	24	12	0	**67**	0	1	5	2	0	**8**	0	1	10	1	0	**12**	0	**104**
8:00PM	1	1	6	0	**8**	0	16	11	13	0	**40**	0	0	6	0	0	**6**	0	2	7	0	0	**9**	0	**63**
9:00PM	0	1	8	0	**9**	0	14	10	11	0	**35**	0	1	0	1	0	**2**	0	0	2	1	0	**3**	0	**49**
10:00PM	0	0	4	0	**4**	0	7	4	4	0	**15**	0	1	0	0	0	**1**	0	2	2	1	0	**5**	0	**25**
11:00PM	1	0	2	0	**3**	0	0	4	1	0	**5**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**9**
Total	27	95	566	2	**690**	1	552	489	270	0	**1311**	0	219	102	48	0	**369**	0	46	528	36	0	**610**	0	**2980**
% Approach	3.9%	13.8%	82.0%	0.3%	**-**	-	42.1%	37.3%	20.6%	0%	**-**	-	59.3%	27.6%	13.0%	0%	**-**	-	7.5%	86.6%	5.9%	0%	**-**	-	-
% Total	0.9%	3.2%	19.0%	0.1%	**23.2%**	-	18.5%	16.4%	9.1%	0%	**44.0%**	-	7.3%	3.4%	1.6%	0%	**12.4%**	-	1.5%	17.7%	1.2%	0%	**20.5%**	-	-
Motorcycles	0	0	1	0	**1**	-	0	4	0	0	**4**	-	0	1	1	0	**2**	-	0	2	0	0	**2**	-	9
% Motorcycles	0%	0%	0.2%	0%	**0.1%**	-	0%	0.8%	0%	0%	**0.3%**	-	0%	1.0%	2.1%	0%	**0.5%**	-	0%	0.4%	0%	0%	**0.3%**	-	0.3%
Lights	23	91	543	2	**659**	-	526	451	259	0	**1236**	-	212	100	46	0	**358**	-	44	498	34	0	**576**	-	2829
% Lights	85.2%	95.8%	95.9%	100%	**95.5%**	-	95.3%	92.2%	95.9%	0%	**94.3%**	-	96.8%	98.0%	95.8%	0%	**97.0%**	-	95.7%	94.3%	94.4%	0%	**94.4%**	-	94.9%
Single-Unit Trucks	3	2	14	0	**19**	-	14	21	6	0	**41**	-	5	1	1	0	**7**	-	2	15	2	0	**19**	-	86
% Single-Unit Trucks	11.1%	2.1%	2.5%	0%	**2.8%**	-	2.5%	4.3%	2.2%	0%	**3.1%**	-	2.3%	1.0%	2.1%	0%	**1.9%**	-	4.3%	2.8%	5.6%	0%	**3.1%**	-	2.9%
Articulated Trucks	0	0	2	0	**2**	-	3	8	1	0	**12**	-	2	0	0	0	**2**	-	0	8	0	0	**8**	-	24
% Articulated Trucks	0%	0%	0.4%	0%	**0.3%**	-	0.5%	1.6%	0.4%	0%	**0.9%**	-	0.9%	0%	0%	0%	**0.5%**	-	0%	1.5%	0%	0%	**1.3%**	-	0.8%
Buses	1	1	2	0	**4**	-	5	5	4	0	**14**	-	0	0	0	0	**0**	-	0	5	0	0	**5**	-	23
% Buses	3.7%	1.1%	0.4%	0%	**0.6%**	-	0.9%	1.0%	1.5%	0%	**1.1%**	-	0%	0%	0%	0%	**0%**	-	0%	0.9%	0%	0%	**0.8%**	-	0.8%
Bicycles on Road	0	1	4	0	**5**	-	4	0	0	0	**4**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	9
% Bicycles on Road	0%	1.1%	0.7%	0%	**0.7%**	-	0.7%	0%	0%	0%	**0.3%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.3%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

King Ave & 80th St W - TMC
Thu Feb 12, 2026
Full Length (12 AM-12 AM (+1))
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377917, Location: 45.755208, -108.720208

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US



King Ave & 80th St W - TMC

Thu Feb 12, 2026
AM Peak (7:15 AM - 8:15 AM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377917, Location: 45.755208, -108.720208

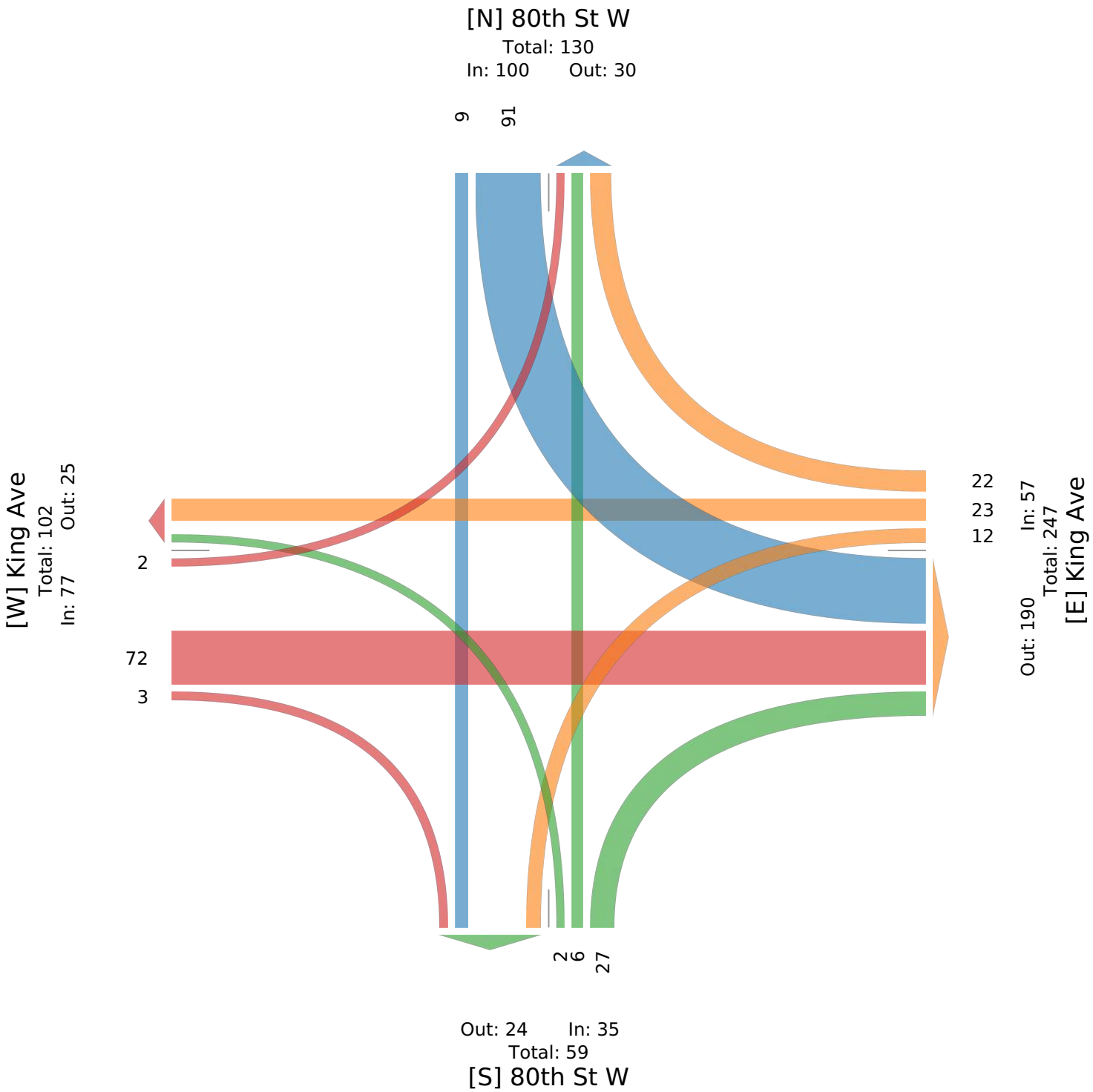
Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US

Leg	80th St W						King Ave						80th St W						King Ave						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2026-02-12 7:15AM	0	1	28	0	**29**	0	3	1	3	0	**7**	0	8	2	0	0	**10**	0	1	23	0	0	**24**	0	**70**
7:30AM	0	4	36	0	**40**	0	4	5	1	0	**10**	0	10	1	1	0	**12**	0	1	20	1	0	**22**	0	**84**
7:45AM	0	3	14	0	**17**	0	7	7	2	0	**16**	0	2	1	1	0	**4**	0	0	16	0	0	**16**	0	**53**
8:00AM	0	1	13	0	**14**	0	8	10	6	0	**24**	0	7	2	0	0	**9**	0	1	13	1	0	**15**	0	**62**
Total	0	9	91	0	**100**	0	22	23	12	0	**57**	0	27	6	2	0	**35**	0	3	72	2	0	**77**	0	**269**
% Approach	0%	9.0%	91.0%	0%	**-**	-	38.6%	40.4%	21.1%	0%	**-**	-	77.1%	17.1%	5.7%	0%	**-**	-	3.9%	93.5%	2.6%	0%	**-**	-	-
% Total	0%	3.3%	33.8%	0%	**37.2%**	-	8.2%	8.6%	4.5%	0%	**21.2%**	-	10.0%	2.2%	0.7%	0%	**13.0%**	-	1.1%	26.8%	0.7%	0%	**28.6%**	-	-
PHF	-	0.563	0.632	-	**0.625**	-	0.688	0.575	0.500	-	**0.594**	-	0.675	0.750	0.500	-	**0.729**	-	0.750	0.783	0.500	-	**0.802**	-	0.801
Motorcycles	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Motorcycles	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Lights	0	8	90	0	**98**	-	21	22	12	0	**55**	-	27	6	2	0	**35**	-	3	66	2	0	**71**	-	259
% Lights	0%	88.9%	98.9%	0%	**98.0%**	-	95.5%	95.7%	100%	0%	**96.5%**	-	100%	100%	100%	0%	**100%**	-	100%	91.7%	100%	0%	**92.2%**	-	96.3%
Single-Unit Trucks	0	0	0	0	**0**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	3	0	0	**3**	-	4
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	0%	4.3%	0%	0%	**1.8%**	-	0%	0%	0%	0%	**0%**	-	0%	4.2%	0%	0%	**3.9%**	-	1.5%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	1
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	1.4%	0%	0%	**1.3%**	-	0.4%
Buses	0	1	1	0	**2**	-	1	0	0	0	**1**	-	0	0	0	0	**0**	-	0	2	0	0	**2**	-	5
% Buses	0%	11.1%	1.1%	0%	**2.0%**	-	4.5%	0%	0%	0%	**1.8%**	-	0%	0%	0%	0%	**0%**	-	0%	2.8%	0%	0%	**2.6%**	-	1.9%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

King Ave & 80th St W - TMC
Thu Feb 12, 2026
AM Peak (7:15 AM - 8:15 AM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377917, Location: 45.755208, -108.720208

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US



King Ave & 80th St W - TMC

Thu Feb 12, 2026
Midday Peak (11:30 AM - 12:30 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377917, Location: 45.755208, -108.720208

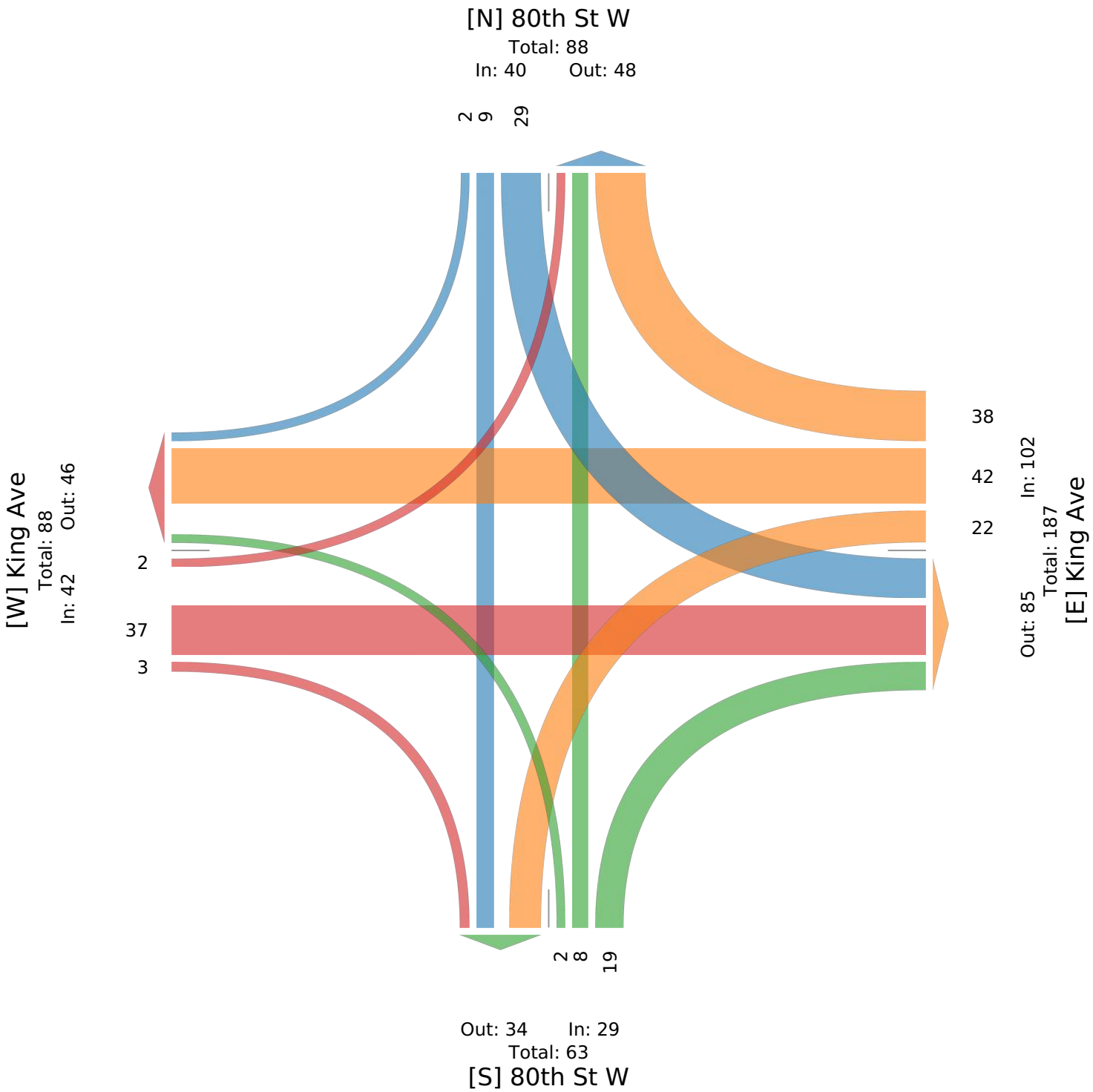
Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US

Leg	80th St W						King Ave						80th St W						King Ave						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2026-02-12 11:30AM	0	3	6	0	**9**	0	10	13	5	0	**28**	0	4	0	2	0	**6**	0	1	12	1	0	**14**	0	**57**
11:45AM	1	1	6	0	**8**	0	8	7	5	0	**20**	0	8	1	0	0	**9**	0	2	7	1	0	**10**	0	**47**
12:00PM	1	4	6	0	**11**	0	8	11	9	0	**28**	0	5	2	0	0	**7**	0	0	9	0	0	**9**	0	**55**
12:15PM	0	1	11	0	**12**	0	12	11	3	0	**26**	0	2	5	0	0	**7**	0	0	9	0	0	**9**	0	**54**
Total	2	9	29	0	**40**	0	38	42	22	0	**102**	0	19	8	2	0	**29**	0	3	37	2	0	**42**	0	**213**
% Approach	5.0%	22.5%	72.5%	0%	**-**	-	37.3%	41.2%	21.6%	0%	**-**	-	65.5%	27.6%	6.9%	0%	**-**	-	7.1%	88.1%	4.8%	0%	**-**	-	-
% Total	0.9%	4.2%	13.6%	0%	**18.8%**	-	17.8%	19.7%	10.3%	0%	**47.9%**	-	8.9%	3.8%	0.9%	0%	**13.6%**	-	1.4%	17.4%	0.9%	0%	**19.7%**	-	-
PHF	0.500	0.563	0.659	-	**0.833**	-	0.792	0.808	0.611	-	**0.911**	-	0.594	0.400	0.250	-	**0.806**	-	0.375	0.771	0.500	-	**0.750**	-	0.934
Motorcycles	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Motorcycles	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Lights	0	9	27	0	**36**	-	36	38	21	0	**95**	-	19	8	2	0	**29**	-	3	34	2	0	**39**	-	199
% Lights	0%	100%	93.1%	0%	**90.0%**	-	94.7%	90.5%	95.5%	0%	**93.1%**	-	100%	100%	100%	0%	**100%**	-	100%	91.9%	100%	0%	**92.9%**	-	93.4%
Single-Unit Trucks	2	0	1	0	**3**	-	2	2	1	0	**5**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	9
% Single-Unit Trucks	100%	0%	3.4%	0%	**7.5%**	-	5.3%	4.8%	4.5%	0%	**4.9%**	-	0%	0%	0%	0%	**0%**	-	0%	2.7%	0%	0%	**2.4%**	-	4.2%
Articulated Trucks	0	0	1	0	**1**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	2	0	0	**2**	-	4
% Articulated Trucks	0%	0%	3.4%	0%	**2.5%**	-	0%	2.4%	0%	0%	**1.0%**	-	0%	0%	0%	0%	**0%**	-	0%	5.4%	0%	0%	**4.8%**	-	1.9%
Buses	0	0	0	0	**0**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1
% Buses	0%	0%	0%	0%	**0%**	-	0%	2.4%	0%	0%	**1.0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.5%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

King Ave & 80th St W - TMC
Thu Feb 12, 2026
Midday Peak (11:30 AM - 12:30 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377917, Location: 45.755208, -108.720208

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US



King Ave & 80th St W - TMC

Thu Feb 12, 2026
PM Peak (4:15 PM - 5:15 PM) - Overall Peak Hour
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377917, Location: 45.755208, -108.720208

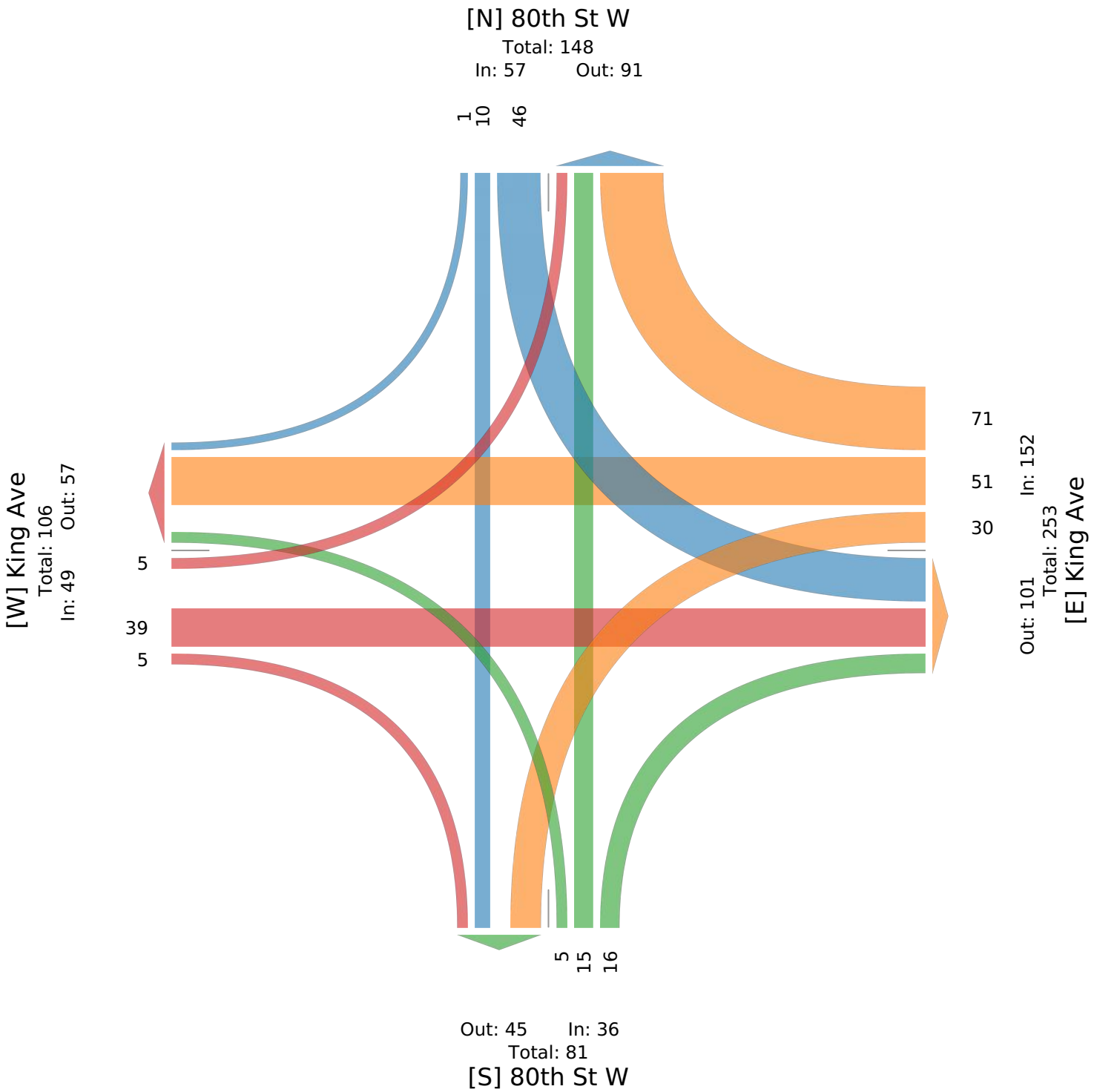
Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US

Leg / Direction	80th St W Southbound						King Ave Westbound						80th St W Northbound						King Ave Eastbound						
Time	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	**Int**
2026-02-12 4:15PM	1	0	9	0	**10**	0	22	15	4	0	**41**	0	4	4	0	0	**8**	0	1	12	2	0	**15**	0	**74**
4:30PM	0	3	14	0	**17**	0	14	12	6	0	**32**	0	7	2	2	0	**11**	0	1	11	2	0	**14**	0	**74**
4:45PM	0	4	11	0	**15**	0	13	12	6	0	**31**	0	3	1	0	0	**4**	0	2	11	1	0	**14**	0	**64**
5:00PM	0	3	12	0	**15**	0	22	12	14	0	**48**	0	2	8	3	0	**13**	0	1	5	0	0	**6**	0	**82**
Total	1	10	46	0	**57**	0	71	51	30	0	**152**	0	16	15	5	0	**36**	0	5	39	5	0	**49**	0	**294**
% Approach	1.8%	17.5%	80.7%	0%	**-**	-	46.7%	33.6%	19.7%	0%	**-**	-	44.4%	41.7%	13.9%	0%	**-**	-	10.2%	79.6%	10.2%	0%	**-**	-	-
% Total	0.3%	3.4%	15.6%	0%	**19.4%**	-	24.1%	17.3%	10.2%	0%	**51.7%**	-	5.4%	5.1%	1.7%	0%	**12.2%**	-	1.7%	13.3%	1.7%	0%	**16.7%**	-	-
PHF	0.250	0.625	0.821	-	**0.838**	-	0.773	0.850	0.536	-	**0.776**	-	0.571	0.469	0.417	-	**0.692**	-	0.625	0.813	0.625	-	**0.817**	-	0.887
Motorcycles	0	0	0	0	**0**	-	0	3	0	0	**3**	-	0	1	0	0	**1**	-	0	1	0	0	**1**	-	5
% Motorcycles	0%	0%	0%	0%	**0%**	-	0%	5.9%	0%	0%	**2.0%**	-	0%	6.7%	0%	0%	**2.8%**	-	0%	2.6%	0%	0%	**2.0%**	-	1.7%
Lights	1	10	44	0	**55**	-	68	47	29	0	**144**	-	16	13	5	0	**34**	-	5	35	5	0	**45**	-	278
% Lights	100%	100%	95.7%	0%	**96.5%**	-	95.8%	92.2%	96.7%	0%	**94.7%**	-	100%	86.7%	100%	0%	**94.4%**	-	100%	89.7%	100%	0%	**91.8%**	-	94.6%
Single-Unit Trucks	0	0	2	0	**2**	-	0	0	1	0	**1**	-	0	1	0	0	**1**	-	0	1	0	0	**1**	-	5
% Single-Unit Trucks	0%	0%	4.3%	0%	**3.5%**	-	0%	0%	3.3%	0%	**0.7%**	-	0%	6.7%	0%	0%	**2.8%**	-	0%	2.6%	0%	0%	**2.0%**	-	1.7%
Articulated Trucks	0	0	0	0	**0**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	2.0%	0%	0%	**0.7%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.3%
Buses	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	2	0	0	**2**	-	2
% Buses	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	5.1%	0%	0%	**4.1%**	-	0.7%
Bicycles on Road	0	0	0	0	**0**	-	3	0	0	0	**3**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	3
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	4.2%	0%	0%	0%	**2.0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	1.0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

King Ave & 80th St W - TMC
Thu Feb 12, 2026
PM Peak (4:15 PM - 5:15 PM) - Overall Peak Hour
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377917, Location: 45.755208, -108.720208

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US



Hesper Rd & 80th St W - TMC

Thu Feb 12, 2026
Full Length (12 AM-12 AM (+1))
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377915, Location: 45.740713, -108.720232

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US

Leg	80th St W						Hesper Rd						80th St W						Hesper Rd						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2026-02-12 12:00AM	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
12:15AM	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
12:30AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
12:45AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	**1**
Hourly Total	2	0	0	0	**2**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	**3**
1:00AM	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
1:15AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
1:30AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
1:45AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
Hourly Total	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
2:00AM	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
2:15AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
2:30AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
2:45AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
Hourly Total	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
3:00AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
3:15AM	0	0	0	0	**0**	0	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
3:30AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	1	0	0	0	**1**	0	**1**
3:45AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	1	0	0	0	**1**	0	0	0	0	0	**0**	0	**1**
Hourly Total	0	0	0	0	**0**	0	1	0	0	0	**1**	0	1	0	0	0	**1**	0	1	0	0	0	**1**	0	**3**
4:00AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
4:15AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**1**
4:30AM	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	**2**
4:45AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**1**
Hourly Total	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	2	0	0	**2**	0	**4**
5:00AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**1**
5:15AM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**1**
5:30AM	0	1	1	0	**2**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	3	1	0	**4**	0	**6**
5:45AM	0	2	0	0	**2**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	7	1	0	**8**	0	**11**
Hourly Total	0	3	1	0	**4**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	12	2	0	**14**	0	**19**
6:00AM	0	2	1	0	**3**	0	2	4	0	0	**6**	0	0	0	0	0	**0**	0	0	6	0	0	**6**	0	**15**
6:15AM	1	2	0	0	**3**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	1	4	1	0	**6**	0	**10**
6:30AM	0	1	1	0	**2**	0	0	0	0	0	**0**	0	0	1	1	0	**2**	0	1	13	5	0	**19**	0	**23**
6:45AM	1	3	1	0	**5**	0	1	4	0	0	**5**	0	0	2	0	0	**2**	0	2	9	1	0	**12**	0	**24**
Hourly Total	2	8	3	0	**13**	0	3	9	0	0	**12**	0	0	3	1	0	**4**	0	4	32	7	0	**43**	0	**72**
7:00AM	4	0	0	0	**4**	0	1	1	1	0	**3**	0	1	4	0	0	**5**	0	1	14	3	0	**18**	0	**30**
7:15AM	0	1	0	0	**1**	0	0	2	0	0	**2**	0	1	1	0	0	**2**	0	3	5	6	0	**14**	0	**19**
7:30AM	1	6	0	0	**7**	0	0	0	0	0	**0**	0	0	4	1	0	**5**	0	2	14	9	0	**25**	0	**37**
7:45AM	1	1	4	0	**6**	0	1	6	0	1	**8**	0	1	0	0	0	**1**	0	5	11	1	0	**17**	0	**32**
Hourly Total	6	8	4	0	**18**	0	2	9	1	1	**13**	0	3	9	1	0	**13**	0	11	44	19	0	**74**	0	**118**
8:00AM	2	2	1	0	**5**	0	1	2	0	0	**3**	0	0	3	2	0	**5**	0	1	5	2	0	**8**	0	**21**
8:15AM	1	4	2	0	**7**	0	0	3	0	0	**3**	0	2	5	0	0	**7**	0	3	3	1	0	**7**	0	**24**
8:30AM	0	8	0	0	**8**	0	6	0	1	0	**7**	0	0	3	1	0	**4**	0	1	4	7	0	**12**	0	**31**
8:45AM	1	2	1	0	**4**	0	0	4	0	0	**4**	0	0	1	0	0	**1**	0	4	1	2	0	**7**	0	**16**
Hourly Total	4	16	4	0	**24**	0	7	9	1	0	**17**	0	2	12	3	0	**17**	0	9	13	12	0	**34**	0	**92**
9:00AM	1	0	2	0	**3**	0	1	2	1	0	**4**	0	0	3	3	0	**6**	0	0	5	1	0	**6**	0	**19**
9:15AM	0	3	0	0	**3**	0	2	2	0	1	**5**	0	0	0	0	0	**0**	0	1	6	2	0	**9**	0	**17**
9:30AM	2	4	1	0	**7**	0	0	1	0	0	**1**	0	0	5	1	0	**6**	0	0	0	1	0	**1**	0	**15**
9:45AM	1	6	0	0	**7**	0	0	3	1	0	**4**	0	1	5	0	0	**6**	0	0	4	0	0	**4**	0	**21**
Hourly Total	4	13	3	0	**20**	0	3	8	2	1	**14**	0	1	13	4	0	**18**	0	1	15	4	0	**20**	0	**72**
10:00AM	0	1	0	0	**1**	0	0	3	1	0	**4**	0	1	1	1	0	**3**	0	0	3	2	0	**5**	0	**13**
10:15AM	1	2	1	0	**4**	0	1	2	0	0	**3**	0	2	7	1	0	**10**	0	0	1	1	0	**2**	0	**19**
10:30AM	4	6	2	0	**12**	0	1	1	0	0	**2**	0	0	2	0	0	**2**	0	4	2	4	0	**10**	0	**26**
10:45AM	3	3	3	0	**9**	0	2	2	0	0	**4**	0	0	4	0	0	**4**	0	1	1	2	0	**4**	0	**21**
Hourly Total	8	12	6	0	**26**	0	4	8	1	0	**13**	0	3	14	2	0	**19**	0	5	7	9	0	**21**	0	**79**
11:00AM	1	4	1	0	**6**	0	4	3	1	0	**8**	0	2	4	0	0	**6**	0	2	1	1	0	**4**	0	**24**
11:15AM	3	3	0	0	**6**	0	1	3	2	0	**6**	0	1	4	2	0	**7**	0	2	3	0	0	**5**	0	**24**
11:30AM	3	3	2	0	**8**	0	1	1	0	0	**2**	0	2	3	1	0	**6**	0	2	5	1	0	**8**	0	**24**
11:45AM	1	3	1	0	**5**	0	1	1	2	0	**4**	0	1	3	1	0	**5**	0	0	1	1	0	**2**	0	**16**

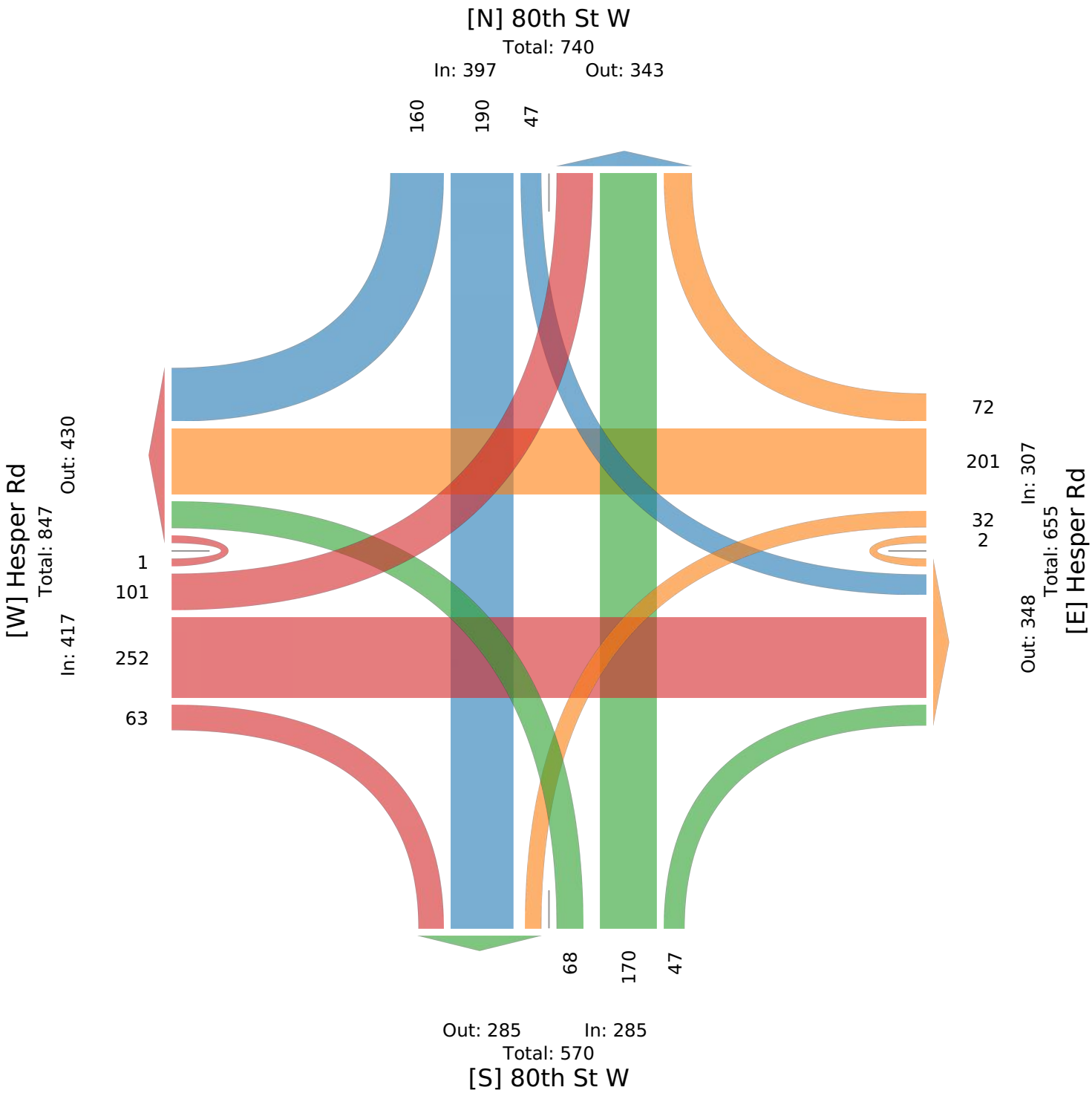
Leg	80th St W						Hesper Rd						80th St W						Hesper Rd						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
Hourly Total	8	13	4	0	**25**	0	7	8	5	0	**20**	0	6	14	4	0	**24**	0	6	10	3	0	**19**	0	**88**
12:00PM	4	5	4	0	**13**	0	2	0	1	0	**3**	0	0	3	0	0	**3**	0	1	4	1	0	**6**	0	**25**
12:15PM	2	2	0	0	**4**	0	3	6	1	0	**10**	0	1	3	0	0	**4**	0	1	2	0	0	**3**	0	**21**
12:30PM	4	2	1	0	**7**	0	1	0	0	0	**1**	0	0	4	1	0	**5**	0	1	3	4	0	**8**	0	**21**
12:45PM	0	4	0	0	**4**	0	2	2	2	0	**6**	0	1	4	1	0	**6**	0	0	2	0	0	**2**	0	**18**
Hourly Total	10	13	5	0	**28**	0	8	8	4	0	**20**	0	2	14	2	0	**18**	0	3	11	5	0	**19**	0	**85**
1:00PM	2	5	2	0	**9**	0	1	4	1	0	**6**	0	0	2	0	0	**2**	0	0	1	2	0	**3**	0	**20**
1:15PM	3	2	0	0	**5**	0	1	2	0	0	**3**	0	1	2	0	0	**3**	0	1	2	0	0	**3**	0	**14**
1:30PM	1	2	1	0	**4**	0	1	3	0	0	**4**	0	4	1	2	0	**7**	0	0	5	3	0	**8**	0	**23**
1:45PM	3	1	0	0	**4**	0	1	4	1	0	**6**	0	0	1	0	0	**1**	0	0	3	2	0	**5**	0	**16**
Hourly Total	9	10	3	0	**22**	0	4	13	2	0	**19**	0	5	6	2	0	**13**	0	1	11	7	0	**19**	0	**73**
2:00PM	0	5	0	0	**5**	0	0	2	0	0	**2**	0	1	6	0	0	**7**	0	1	6	1	0	**8**	0	**22**
2:15PM	2	4	1	0	**7**	0	2	2	0	0	**4**	0	0	4	2	0	**6**	0	2	2	0	0	**4**	0	**21**
2:30PM	2	4	1	0	**7**	0	3	2	0	0	**5**	0	2	3	1	0	**6**	0	0	8	0	0	**8**	0	**26**
2:45PM	3	2	2	0	**7**	0	0	4	1	0	**5**	0	0	1	0	0	**1**	0	1	4	1	0	**6**	0	**19**
Hourly Total	7	15	4	0	**26**	0	5	10	1	0	**16**	0	3	14	3	0	**20**	0	4	20	2	0	**26**	0	**88**
3:00PM	3	2	0	0	**5**	0	2	3	0	0	**5**	0	0	6	1	0	**7**	0	0	5	4	0	**9**	0	**26**
3:15PM	4	5	2	0	**11**	0	3	5	0	0	**8**	0	0	2	1	0	**3**	0	1	4	1	0	**6**	0	**28**
3:30PM	3	5	1	0	**9**	0	0	6	1	0	**7**	0	0	6	1	0	**7**	0	1	6	1	0	**8**	0	**31**
3:45PM	6	1	0	0	**7**	0	1	8	0	0	**9**	0	0	3	4	0	**7**	0	1	1	0	0	**2**	0	**25**
Hourly Total	16	13	3	0	**32**	0	6	22	1	0	**29**	0	0	17	7	0	**24**	0	3	16	6	0	**25**	0	**110**
4:00PM	2	7	1	0	**10**	0	1	4	1	0	**6**	0	0	5	3	0	**8**	0	1	6	3	0	**10**	0	**34**
4:15PM	4	3	0	0	**7**	0	0	6	1	0	**7**	0	1	4	1	0	**6**	0	0	3	2	0	**5**	0	**25**
4:30PM	4	4	1	0	**9**	0	5	10	1	0	**16**	0	1	2	2	0	**5**	0	2	4	2	0	**8**	0	**38**
4:45PM	7	5	1	0	**13**	0	0	5	2	0	**7**	0	2	5	3	0	**10**	0	1	6	0	0	**7**	0	**37**
Hourly Total	17	19	3	0	**39**	0	6	25	5	0	**36**	0	4	16	9	0	**29**	0	4	19	7	0	**30**	0	**134**
5:00PM	8	6	1	0	**15**	0	9	12	0	0	**21**	0	1	0	2	0	**3**	0	4	3	1	0	**8**	0	**47**
5:15PM	6	10	1	0	**17**	0	0	5	1	0	**6**	0	1	5	1	0	**7**	0	1	4	5	0	**10**	0	**40**
5:30PM	5	3	0	0	**8**	0	2	8	2	0	**12**	0	2	6	3	0	**11**	0	1	5	5	0	**11**	0	**42**
5:45PM	5	3	0	0	**8**	0	1	7	1	0	**9**	0	2	3	1	0	**6**	0	2	5	3	0	**10**	0	**33**
Hourly Total	24	22	2	0	**48**	0	12	32	4	0	**48**	0	6	14	7	0	**27**	0	8	17	14	0	**39**	0	**162**
6:00PM	2	0	0	0	**2**	0	0	2	1	0	**3**	0	1	0	2	0	**3**	0	0	4	0	0	**4**	0	**12**
6:15PM	2	2	0	0	**4**	0	0	2	1	0	**3**	0	1	2	2	0	**5**	0	0	3	1	0	**4**	0	**16**
6:30PM	3	1	1	0	**5**	0	1	4	0	0	**5**	0	4	3	2	0	**9**	0	1	5	0	0	**6**	0	**25**
6:45PM	3	1	0	0	**4**	0	0	1	0	0	**1**	0	1	3	1	0	**5**	0	0	0	1	0	**1**	0	**11**
Hourly Total	10	4	1	0	**15**	0	1	9	2	0	**12**	0	7	8	7	0	**22**	0	1	12	2	0	**15**	0	**64**
7:00PM	1	3	0	0	**4**	0	1	2	0	0	**3**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**7**
7:15PM	4	1	0	0	**5**	0	0	3	0	0	**3**	0	0	3	3	0	**6**	0	0	1	2	0	**3**	0	**17**
7:30PM	1	2	0	0	**3**	0	0	7	1	0	**8**	0	1	0	0	0	**1**	0	0	2	0	0	**2**	0	**14**
7:45PM	4	1	1	0	**6**	0	0	5	0	0	**5**	0	0	1	0	0	**1**	0	0	2	0	0	**2**	0	**14**
Hourly Total	10	7	1	0	**18**	0	1	17	1	0	**19**	0	1	4	3	0	**8**	0	0	5	2	0	**7**	0	**52**
8:00PM	1	2	0	0	**3**	0	0	2	0	0	**2**	0	1	1	1	0	**3**	0	0	1	0	0	**1**	0	**9**
8:15PM	4	0	0	0	**4**	0	0	1	0	0	**1**	0	0	1	2	0	**3**	0	0	2	0	0	**2**	0	**10**
8:30PM	3	2	0	0	**5**	0	0	2	0	0	**2**	0	0	1	1	0	**2**	0	0	1	0	0	**1**	0	**10**
8:45PM	1	2	0	0	**3**	0	1	1	0	0	**2**	0	1	3	2	0	**6**	0	1	0	0	0	**1**	0	**12**
Hourly Total	9	6	0	0	**15**	0	1	6	0	0	**7**	0	2	6	6	0	**14**	0	1	4	0	0	**5**	0	**41**
9:00PM	2	0	0	0	**2**	0	1	0	0	0	**1**	0	0	2	1	0	**3**	0	0	1	0	0	**1**	0	**7**
9:15PM	2	1	0	0	**3**	0	0	0	0	0	**0**	0	0	1	1	0	**2**	0	0	0	0	1	**1**	0	**6**
9:30PM	3	2	0	0	**5**	0	0	3	1	0	**4**	0	0	0	1	0	**1**	0	1	0	0	0	**1**	0	**11**
9:45PM	3	1	0	0	**4**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**5**
Hourly Total	10	4	0	0	**14**	0	1	4	1	0	**6**	0	0	3	3	0	**6**	0	1	1	0	1	**3**	0	**29**
10:00PM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	1	0	**1**	0	0	0	0	0	**0**	0	**1**
10:15PM	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	**2**
10:30PM	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
10:45PM	1	1	0	0	**2**	0	0	2	0	0	**2**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**4**
Hourly Total	2	2	0	0	**4**	0	0	2	0	0	**2**	0	0	0	1	0	**1**	0	0	1	0	0	**1**	0	**8**
11:00PM	0	0	0	0	**0**	0	0	1	1	0	**2**	0	1	0	0	0	**1**	0	0	0	0	0	**0**	0	**3**
11:15PM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	2	0	**2**	0	0	0	0	0	**0**	0	**2**
11:30PM	1	1	0	0	**2**	0	0	0	0	0	**0**	0	0	0	1	0	**1**	0	0	0	0	0	**0**	0	**3**
11:45PM	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**0**
Hourly Total	1	1	0	0	**2**	0	0	1	1	0	**2**	0	1	0	3	0	**4**	0	0	0	0	0	**0**	0	**8**
Total	160	190	47	0	**397**	0	72	201	32	2	**307**	0	47	170	68	0	**285**	0	63	252	101	1	**417**	0	**1406**
% Approach	40.3%	47.9%	11.8%	0%	**-**	-	23.5%	65.5%	10.4%	0.7%	**-**	-	16.5%	59.6%	23.9%	0%	**-**	-	15.1%	60.4%	24.2%	0.2%	**-**	-	-
% Total	11.4%	13.5%	3.3%	0%	**28.2%**	-	5.1%	14.3%	2.3%	0.1%	**21.8%**	-	3.3%	12.1%	4.8%	0%	**20.3%**	-	4.5%	17.9%	7.2%	0.1%	**29.7%**	-	-
Motorcycles	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	1
% Motorcycles	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0.6%	0%	0%	**0.4%**	-	0%	0%	0%	0%	**0%**	-	0.1%

Leg	80th St W						Hesper Rd						80th St W						Hesper Rd						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	**Int**
Lights	156	183	43	0	**382**	-	70	192	31	2	**295**	-	45	169	67	0	**281**	-	62	241	98	1	**402**	-	1360
% Lights	97.5%	96.3%	91.5%	0%	**96.2%**	-	97.2%	95.5%	96.9%	100%	**96.1%**	-	95.7%	99.4%	98.5%	0%	**98.6%**	-	98.4%	95.6%	97.0%	100%	**96.4%**	-	96.7%
Single-Unit Trucks	2	6	2	0	**10**	-	2	7	0	0	**9**	-	0	0	1	0	**1**	-	0	7	3	0	**10**	-	30
% Single-Unit Trucks	1.3%	3.2%	4.3%	0%	**2.5%**	-	2.8%	3.5%	0%	0%	**2.9%**	-	0%	0%	1.5%	0%	**0.4%**	-	0%	2.8%	3.0%	0%	**2.4%**	-	2.1%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1	0	0	0	**1**	-	1
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	1.6%	0%	0%	0%	**0.2%**	-	0.1%
Buses	2	1	2	0	**5**	-	0	2	1	0	**3**	-	2	0	0	0	**2**	-	0	4	0	0	**4**	-	14
% Buses	1.3%	0.5%	4.3%	0%	**1.3%**	-	0%	1.0%	3.1%	0%	**1.0%**	-	4.3%	0%	0%	0%	**0.7%**	-	0%	1.6%	0%	0%	**1.0%**	-	1.0%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Hesper Rd & 80th St W - TMC
Thu Feb 12, 2026
Full Length (12 AM-12 AM (+1))
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377915, Location: 45.740713, -108.720232

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US



Hesper Rd & 80th St W - TMC

Thu Feb 12, 2026
Full Length (12 AM-12 AM (+1))
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377915, Location: 45.740713, -108.720232

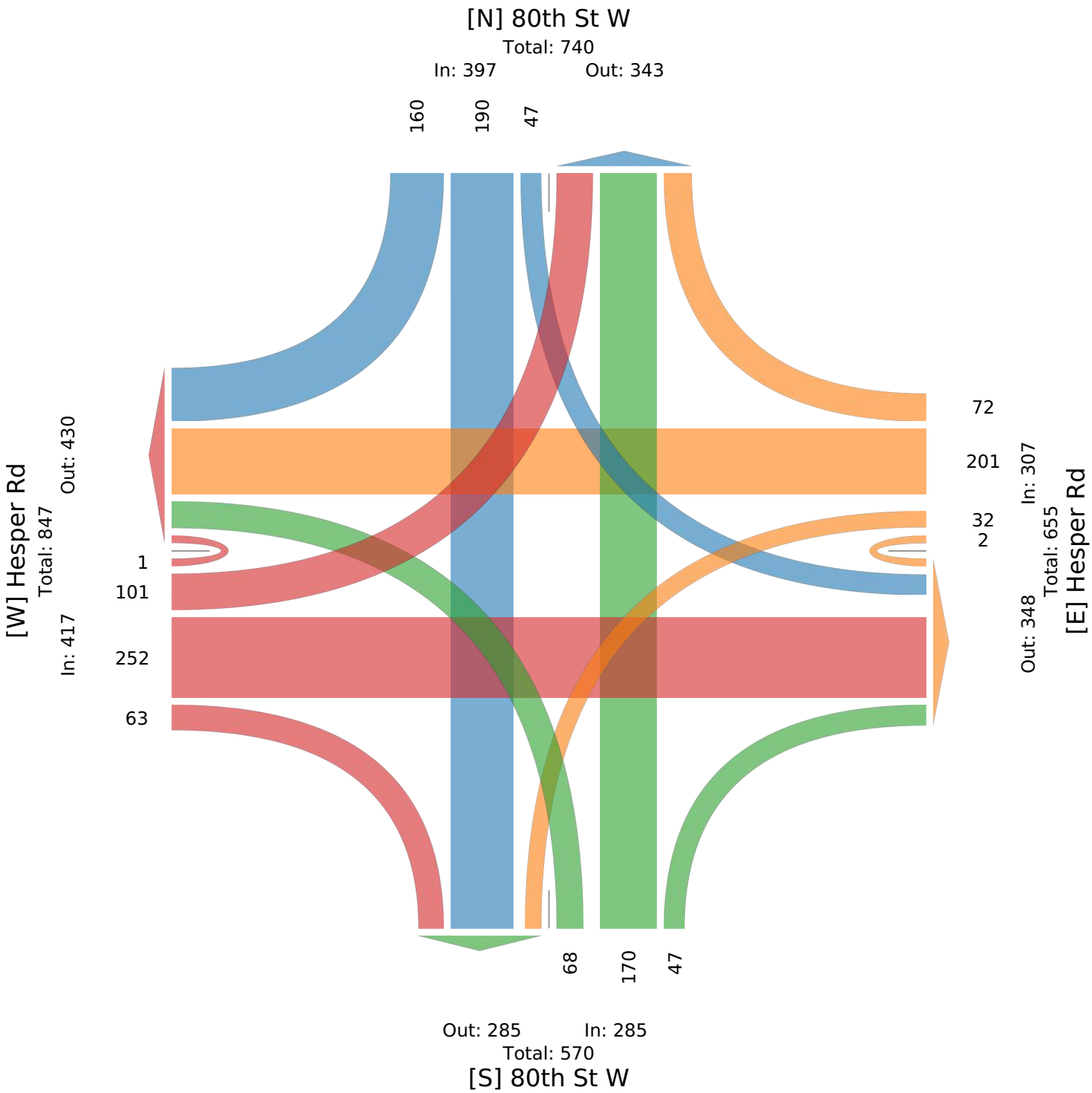
Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US

Leg	80th St W						Hesper Rd						80th St W						Hesper Rd						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	R	T	L	U	App	Ped*	Int
2026-02-12 12:00AM	2	0	0	0	**2**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	**3**
1:00AM	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
2:00AM	1	0	0	0	**1**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	0	0	0	0	**0**	0	**1**
3:00AM	0	0	0	0	**0**	0	1	0	0	0	**1**	0	1	0	0	0	**1**	0	1	0	0	0	**1**	0	**3**
4:00AM	0	1	0	0	**1**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	2	0	0	**2**	0	**4**
5:00AM	0	3	1	0	**4**	0	0	0	0	0	**0**	0	0	1	0	0	**1**	0	0	12	2	0	**14**	0	**19**
6:00AM	2	8	3	0	**13**	0	3	9	0	0	**12**	0	0	3	1	0	**4**	0	4	32	7	0	**43**	0	**72**
7:00AM	6	8	4	0	**18**	0	2	9	1	1	**13**	0	3	9	1	0	**13**	0	11	44	19	0	**74**	0	**118**
8:00AM	4	16	4	0	**24**	0	7	9	1	0	**17**	0	2	12	3	0	**17**	0	9	13	12	0	**34**	0	**92**
9:00AM	4	13	3	0	**20**	0	3	8	2	1	**14**	0	1	13	4	0	**18**	0	1	15	4	0	**20**	0	**72**
10:00AM	8	12	6	0	**26**	0	4	8	1	0	**13**	0	3	14	2	0	**19**	0	5	7	9	0	**21**	0	**79**
11:00AM	8	13	4	0	**25**	0	7	8	5	0	**20**	0	6	14	4	0	**24**	0	6	10	3	0	**19**	0	**88**
12:00PM	10	13	5	0	**28**	0	8	8	4	0	**20**	0	2	14	2	0	**18**	0	3	11	5	0	**19**	0	**85**
1:00PM	9	10	3	0	**22**	0	4	13	2	0	**19**	0	5	6	2	0	**13**	0	1	11	7	0	**19**	0	**73**
2:00PM	7	15	4	0	**26**	0	5	10	1	0	**16**	0	3	14	3	0	**20**	0	4	20	2	0	**26**	0	**88**
3:00PM	16	13	3	0	**32**	0	6	22	1	0	**29**	0	0	17	7	0	**24**	0	3	16	6	0	**25**	0	**110**
4:00PM	17	19	3	0	**39**	0	6	25	5	0	**36**	0	4	16	9	0	**29**	0	4	19	7	0	**30**	0	**134**
5:00PM	24	22	2	0	**48**	0	12	32	4	0	**48**	0	6	14	7	0	**27**	0	8	17	14	0	**39**	0	**162**
6:00PM	10	4	1	0	**15**	0	1	9	2	0	**12**	0	7	8	7	0	**22**	0	1	12	2	0	**15**	0	**64**
7:00PM	10	7	1	0	**18**	0	1	17	1	0	**19**	0	1	4	3	0	**8**	0	0	5	2	0	**7**	0	**52**
8:00PM	9	6	0	0	**15**	0	1	6	0	0	**7**	0	2	6	6	0	**14**	0	1	4	0	0	**5**	0	**41**
9:00PM	10	4	0	0	**14**	0	1	4	1	0	**6**	0	0	3	3	0	**6**	0	1	1	0	1	**3**	0	**29**
10:00PM	2	2	0	0	**4**	0	0	2	0	0	**2**	0	0	0	1	0	**1**	0	0	1	0	0	**1**	0	**8**
11:00PM	1	1	0	0	**2**	0	0	1	1	0	**2**	0	1	0	3	0	**4**	0	0	0	0	0	**0**	0	**8**
Total	160	190	47	0	**397**	0	72	201	32	2	**307**	0	47	170	68	0	**285**	0	63	252	101	1	**417**	0	**1406**
% Approach	40.3%	47.9%	11.8%	0%	**-**	-	23.5%	65.5%	10.4%	0.7%	**-**	-	16.5%	59.6%	23.9%	0%	**-**	-	15.1%	60.4%	24.2%	0.2%	**-**	-	-
% Total	11.4%	13.5%	3.3%	0%	**28.2%**	-	5.1%	14.3%	2.3%	0.1%	**21.8%**	-	3.3%	12.1%	4.8%	0%	**20.3%**	-	4.5%	17.9%	7.2%	0.1%	**29.7%**	-	-
Motorcycles	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	1
% Motorcycles	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0.6%	0%	0%	**0.4%**	-	0%	0%	0%	0%	**0%**	-	0.1%
Lights	156	183	43	0	**382**	-	70	192	31	2	**295**	-	45	169	67	0	**281**	-	62	241	98	1	**402**	-	1360
% Lights	97.5%	96.3%	91.5%	0%	**96.2%**	-	97.2%	95.5%	96.9%	100%	**96.1%**	-	95.7%	99.4%	98.5%	0%	**98.6%**	-	98.4%	95.6%	97.0%	100%	**96.4%**	-	96.7%
Single-Unit Trucks	2	6	2	0	**10**	-	2	7	0	0	**9**	-	0	0	1	0	**1**	-	0	7	3	0	**10**	-	30
% Single-Unit Trucks	1.3%	3.2%	4.3%	0%	**2.5%**	-	2.8%	3.5%	0%	0%	**2.9%**	-	0%	0%	1.5%	0%	**0.4%**	-	0%	2.8%	3.0%	0%	**2.4%**	-	2.1%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1	0	0	0	**1**	-	1
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	1.6%	0%	0%	0%	**0.2%**	-	0.1%
Buses	2	1	2	0	**5**	-	0	2	1	0	**3**	-	2	0	0	0	**2**	-	0	4	0	0	**4**	-	14
% Buses	1.3%	0.5%	4.3%	0%	**1.3%**	-	0%	1.0%	3.1%	0%	**1.0%**	-	4.3%	0%	0%	0%	**0.7%**	-	0%	1.6%	0%	0%	**1.0%**	-	1.0%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Hesper Rd & 80th St W - TMC
Thu Feb 12, 2026
Full Length (12 AM-12 AM (+1))
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377915, Location: 45.740713, -108.720232

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US



Hesper Rd & 80th St W - TMC

Thu Feb 12, 2026
AM Peak (7 AM - 8 AM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377915, Location: 45.740713, -108.720232

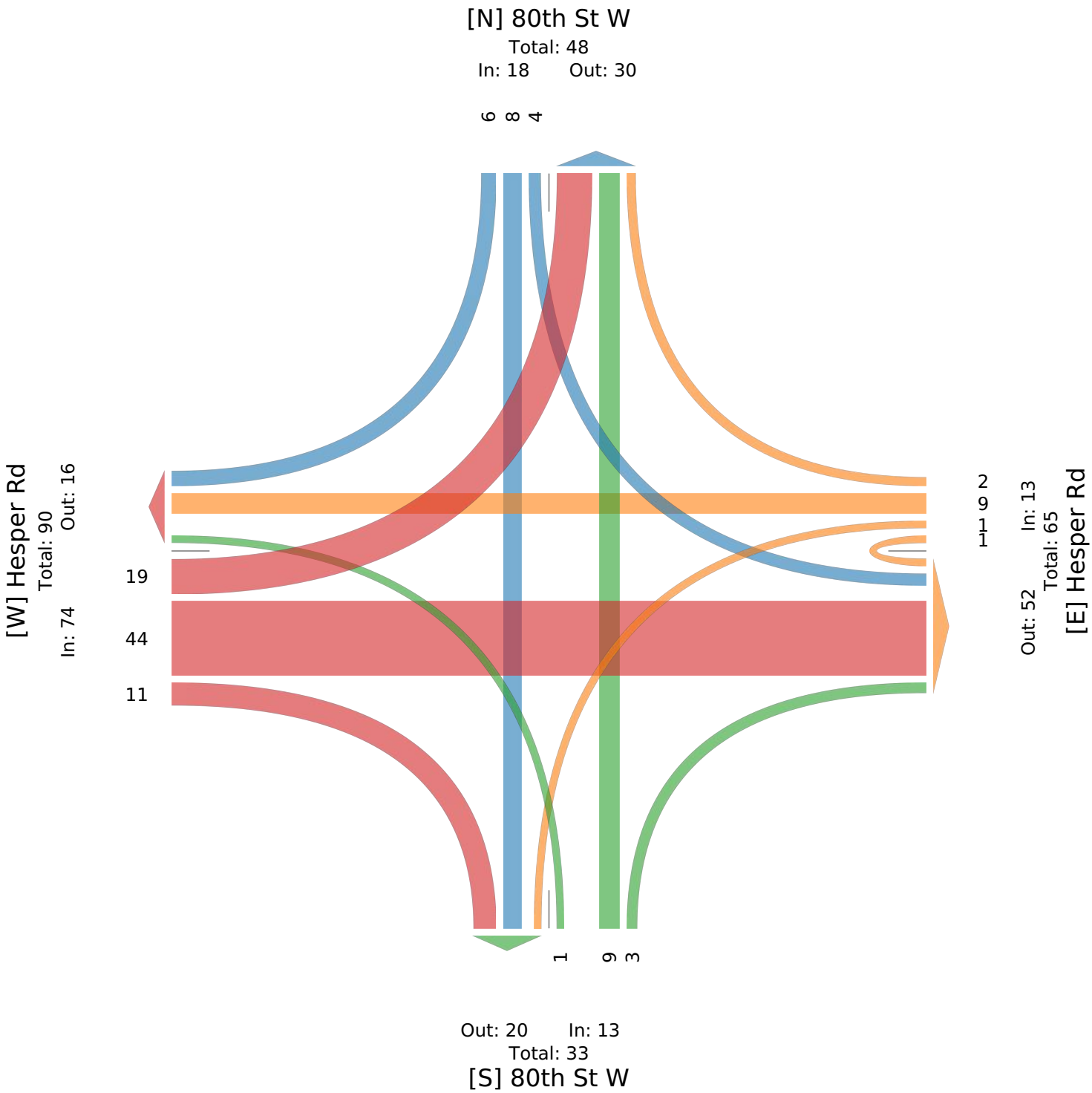
Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US

Leg	80th St W						Hesper Rd						80th St W						Hesper Rd						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	**Int**
2026-02-12 7:00AM	4	0	0	0	**4**	0	1	1	1	0	**3**	0	1	4	0	0	**5**	0	1	14	3	0	**18**	0	**30**
7:15AM	0	1	0	0	**1**	0	0	2	0	0	**2**	0	1	1	0	0	**2**	0	3	5	6	0	**14**	0	**19**
7:30AM	1	6	0	0	**7**	0	0	0	0	0	**0**	0	0	4	1	0	**5**	0	2	14	9	0	**25**	0	**37**
7:45AM	1	1	4	0	**6**	0	1	6	0	1	**8**	0	1	0	0	0	**1**	0	5	11	1	0	**17**	0	**32**
Total	6	8	4	0	**18**	0	2	9	1	1	**13**	0	3	9	1	0	**13**	0	11	44	19	0	**74**	0	**118**
% Approach	33.3%	44.4%	22.2%	0%	**-**	-	15.4%	69.2%	7.7%	7.7%	**-**	-	23.1%	69.2%	7.7%	0%	**-**	-	14.9%	59.5%	25.7%	0%	**-**	-	-
% Total	5.1%	6.8%	3.4%	0%	**15.3%**	-	1.7%	7.6%	0.8%	0.8%	**11.0%**	-	2.5%	7.6%	0.8%	0%	**11.0%**	-	9.3%	37.3%	16.1%	0%	**62.7%**	-	-
PHF	0.375	0.333	0.250	-	**0.643**	-	0.500	0.375	0.250	0.250	**0.406**	-	0.750	0.563	0.250	-	**0.650**	-	0.550	0.786	0.528	-	**0.740**	-	0.797
Motorcycles	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Motorcycles	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Lights	6	8	2	0	**16**	-	2	8	1	1	**12**	-	3	9	1	0	**13**	-	11	43	19	0	**73**	-	114
% Lights	100%	100%	50.0%	0%	**88.9%**	-	100%	88.9%	100%	100%	**92.3%**	-	100%	100%	100%	0%	**100%**	-	100%	97.7%	100%	0%	**98.6%**	-	96.6%
Single-Unit Trucks	0	0	1	0	**1**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	1
% Single-Unit Trucks	0%	0%	25.0%	0%	**5.6%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0.8%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	1	0	**1**	-	0	1	0	0	**1**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	3
% Buses	0%	0%	25.0%	0%	**5.6%**	-	0%	11.1%	0%	0%	**7.7%**	-	0%	0%	0%	0%	**0%**	-	0%	2.3%	0%	0%	**1.4%**	-	2.5%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Hesper Rd & 80th St W - TMC
Thu Feb 12, 2026
AM Peak (7 AM - 8 AM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377915, Location: 45.740713, -108.720232

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US



Hesper Rd & 80th St W - TMC

Thu Feb 12, 2026
Midday Peak (11:15 AM - 12:15 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377915, Location: 45.740713, -108.720232

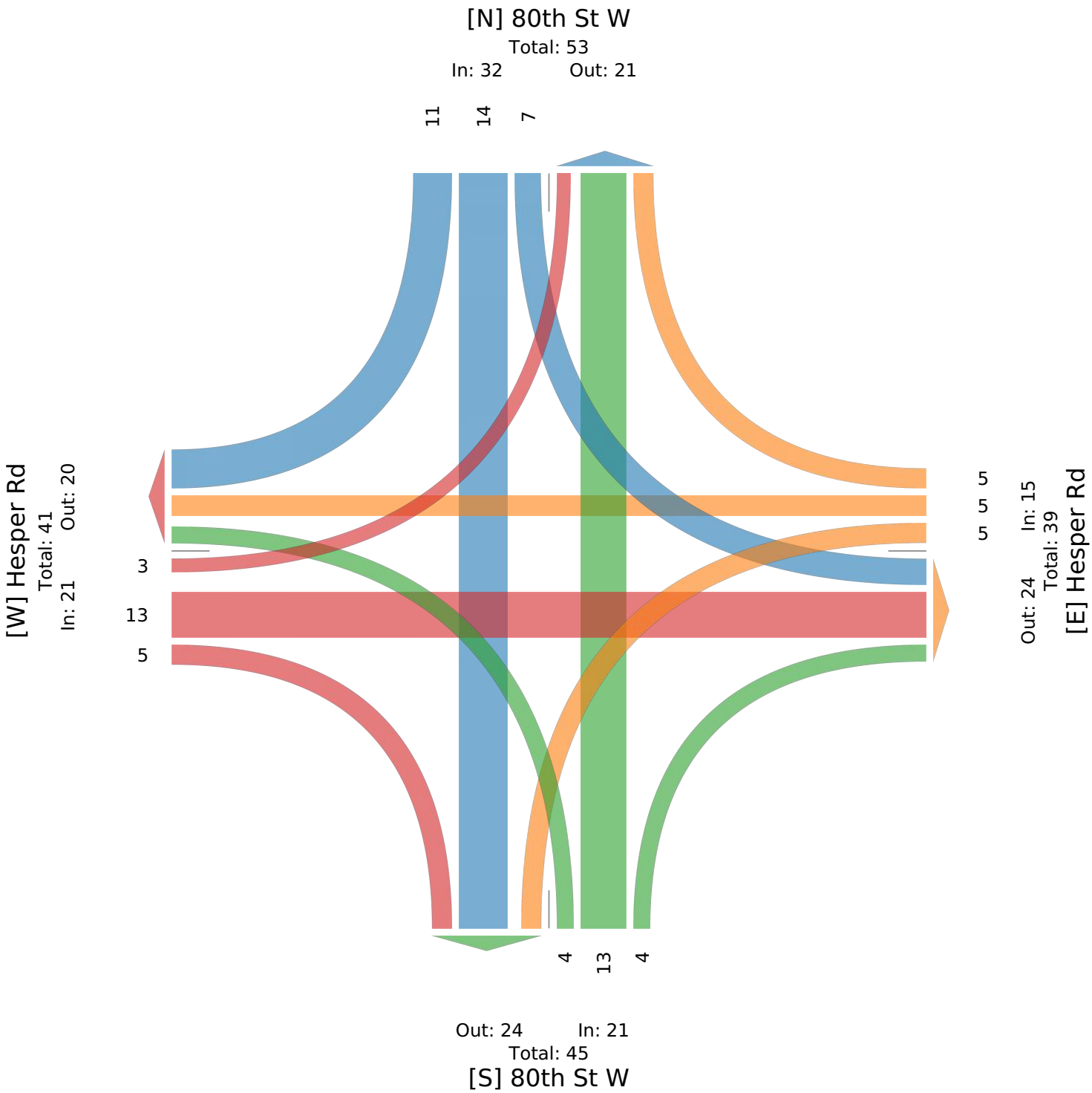
Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US

Leg	80th St W						Hesper Rd						80th St W						Hesper Rd						
Direction	Southbound						Westbound						Northbound						Eastbound						
Time	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	**Int**
2026-02-12 11:15AM	3	3	0	0	**6**	0	1	3	2	0	**6**	0	1	4	2	0	**7**	0	2	3	0	0	**5**	0	**24**
11:30AM	3	3	2	0	**8**	0	1	1	0	0	**2**	0	2	3	1	0	**6**	0	2	5	1	0	**8**	0	**24**
11:45AM	1	3	1	0	**5**	0	1	1	2	0	**4**	0	1	3	1	0	**5**	0	0	1	1	0	**2**	0	**16**
12:00PM	4	5	4	0	**13**	0	2	0	1	0	**3**	0	0	3	0	0	**3**	0	1	4	1	0	**6**	0	**25**
Total	11	14	7	0	**32**	0	5	5	5	0	**15**	0	4	13	4	0	**21**	0	5	13	3	0	**21**	0	**89**
% Approach	34.4%	43.8%	21.9%	0%	**-**	-	33.3%	33.3%	33.3%	0%	**-**	-	19.0%	61.9%	19.0%	0%	**-**	-	23.8%	61.9%	14.3%	0%	**-**	-	**-**
% Total	12.4%	15.7%	7.9%	0%	**36.0%**	-	5.6%	5.6%	5.6%	0%	**16.9%**	-	4.5%	14.6%	4.5%	0%	**23.6%**	-	5.6%	14.6%	3.4%	0%	**23.6%**	-	**-**
PHF	0.688	0.700	0.438	-	**0.615**	-	0.625	0.417	0.625	-	**0.625**	-	0.500	0.813	0.500	-	**0.750**	-	0.625	0.650	0.750	-	**0.656**	-	0.890
Motorcycles	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Motorcycles	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Lights	11	14	7	0	**32**	-	5	5	5	0	**15**	-	4	13	4	0	**21**	-	5	12	3	0	**20**	-	88
% Lights	100%	100%	100%	0%	**100%**	-	100%	100%	100%	0%	**100%**	-	100%	100%	100%	0%	**100%**	-	100%	92.3%	100%	0%	**95.2%**	-	98.9%
Single-Unit Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	1	0	0	**1**	-	1
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	7.7%	0%	0%	**4.8%**	-	1.1%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Buses	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Hesper Rd & 80th St W - TMC
Thu Feb 12, 2026
Midday Peak (11:15 AM - 12:15 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377915, Location: 45.740713, -108.720232

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US



Hesper Rd & 80th St W - TMC

Thu Feb 12, 2026
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377915, Location: 45.740713, -108.720232

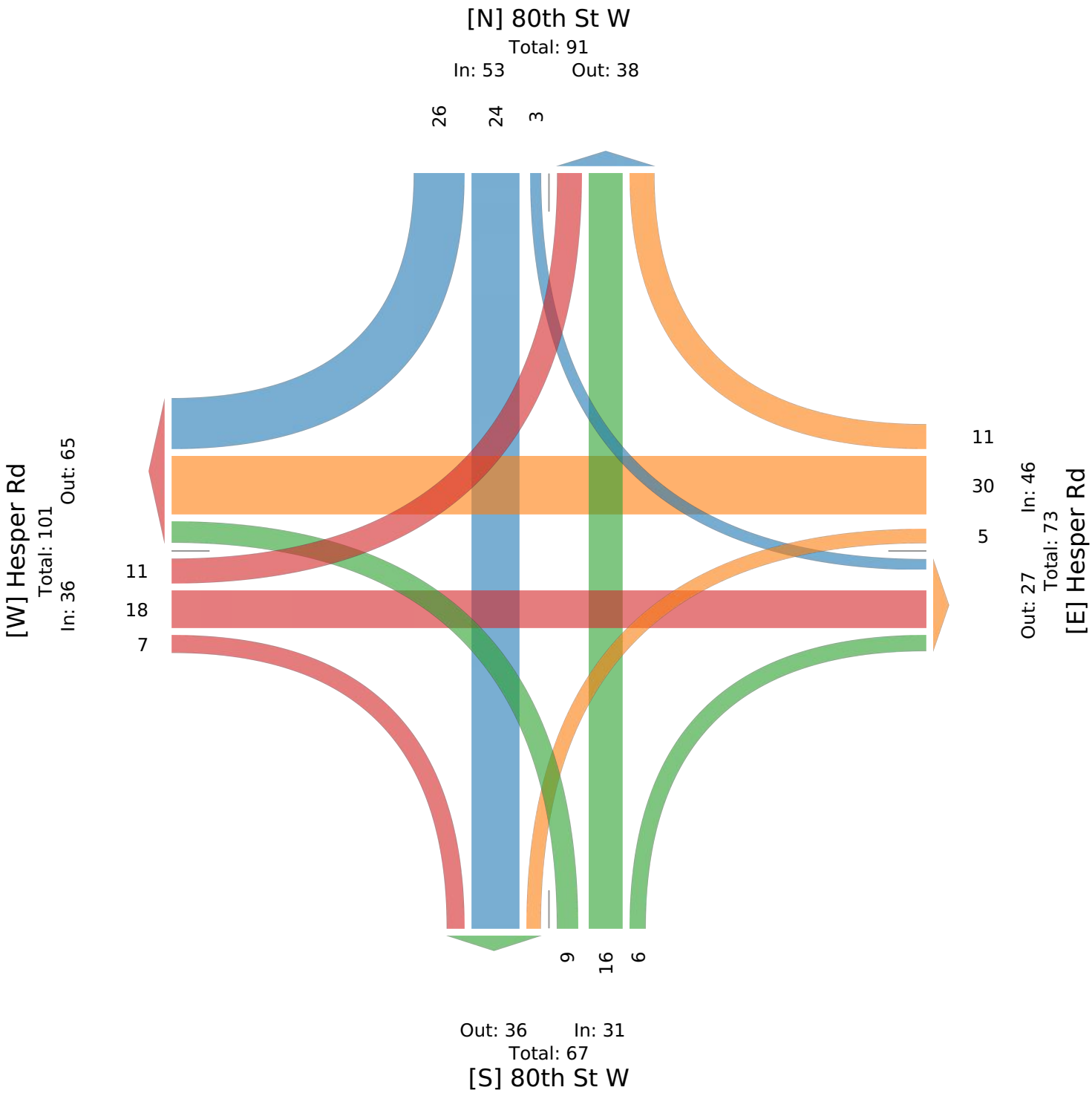
Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US

Leg / Direction	80th St W Southbound						Hesper Rd Westbound						80th St W Northbound						Hesper Rd Eastbound						
Time	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	R	T	L	U	**App**	Ped*	**Int**
2026-02-12 4:45PM	7	5	1	0	**13**	0	0	5	2	0	**7**	0	2	5	3	0	**10**	0	1	6	0	0	**7**	0	**37**
5:00PM	8	6	1	0	**15**	0	9	12	0	0	**21**	0	1	0	2	0	**3**	0	4	3	1	0	**8**	0	**47**
5:15PM	6	10	1	0	**17**	0	0	5	1	0	**6**	0	1	5	1	0	**7**	0	1	4	5	0	**10**	0	**40**
5:30PM	5	3	0	0	**8**	0	2	8	2	0	**12**	0	2	6	3	0	**11**	0	1	5	5	0	**11**	0	**42**
Total	26	24	3	0	**53**	0	11	30	5	0	**46**	0	6	16	9	0	**31**	0	7	18	11	0	**36**	0	**166**
% Approach	49.1%	45.3%	5.7%	0%	**-**	-	23.9%	65.2%	10.9%	0%	**-**	-	19.4%	51.6%	29.0%	0%	**-**	-	19.4%	50.0%	30.6%	0%	**-**	-	**-**
% Total	15.7%	14.5%	1.8%	0%	**31.9%**	-	6.6%	18.1%	3.0%	0%	**27.7%**	-	3.6%	9.6%	5.4%	0%	**18.7%**	-	4.2%	10.8%	6.6%	0%	**21.7%**	-	**-**
PHF	0.813	0.600	0.750	-	**0.779**	-	0.306	0.625	0.625	-	**0.548**	-	0.750	0.667	0.750	-	**0.705**	-	0.438	0.750	0.550	-	**0.818**	-	0.883
Motorcycles	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Motorcycles	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Lights	26	24	3	0	**53**	-	11	30	5	0	**46**	-	6	16	9	0	**31**	-	7	18	11	0	**36**	-	166
% Lights	100%	100%	100%	0%	**100%**	-	100%	100%	100%	0%	**100%**	-	100%	100%	100%	0%	**100%**	-	100%	100%	100%	0%	**100%**	-	100%
Single-Unit Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Single-Unit Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Articulated Trucks	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Buses	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Bicycles on Road	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

Hesper Rd & 80th St W - TMC
Thu Feb 12, 2026
PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1377915, Location: 45.740713, -108.720232

Provided by: IMEG Corp.
401 E. State Street, 4th Floor,
Rockford, IL, 61104, US



Shop House Acres Major Subdivision

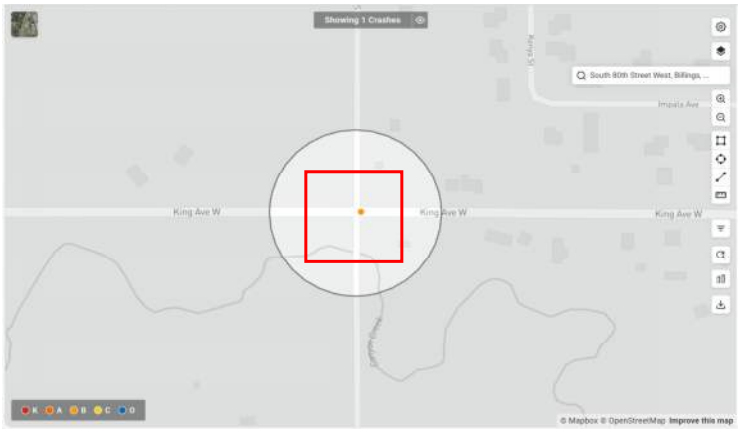
Traffic Impact Study

APPENDIX I

Intersection Crash Data (2020-2024)

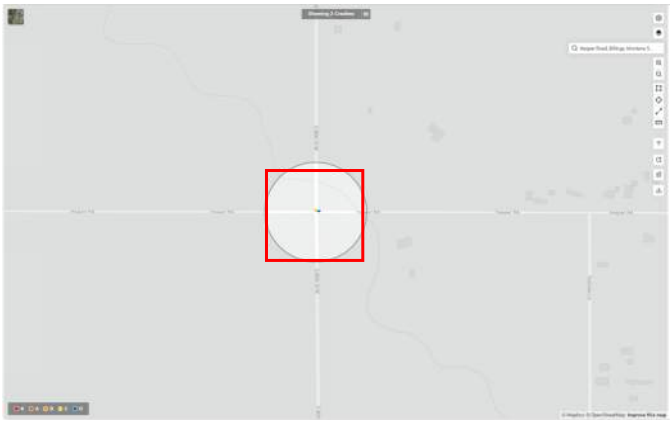
King Avenue West & South 80th Street West

Crash Record Number	Crash Date	Collision Type	Road Surface Condition	Crash Injury Severity	Type A Inj Crash?	Type B Inj Crash?	Type C Inj Crash?	Fatal Crash?
50197108	2/3/2024	Right Angle	Dry	Suspected Minor Injury	No	No	Yes	No



Hesper Road & South 80th Street West

Crash Record Number	Crash Date	Collision Type	Road Surface Condition	Crash Injury Severity	Type A Inj Crash?	Type B Inj Crash?	Type C Inj Crash?	Fatal Crash?
50144597	6/10/2024	Right Angle	Dry	No apparent Injury (property damage only crash)	No	No	No	No
50179153	9/23/2022	Right Angle	Dry	Possible injury crash	No	No	Yes	No



KABCO Injury Classification Scale and Definitions

STATE	INJURY CODES	CONVERSION	DEFINITIONS / INSTRUCTIONS / NOTES	SOURCE	LOCATION
MONTANA	???? to Present		*Documentation not available, years unknown.*	**MT Crash Investigator's Report Instruction Manual**	codes found on Manual pg19 *(PDF pg24).*
	0 – No Injury	O		15 INJURY CLASSIFICATION	
	1 – Possible Injury	C	Possible injury: A possible injury is any injury reported or claimed which is not a fatal injury, incapacitating injury, non-incapacitating evident injury.	15 INJURY CLASSIFICATION	
	2 – Non-incapacitating Evident Injury	B	Nonincapacitating evident injury: A nonincapacitating evident injury is any injury, other than a fatal injury or an incapacitating injury, which is evident to observers at the scene of the accident in which the injury occurred.	15 INJURY CLASSIFICATION	
	3 – Incapacitating Injury	A	Incapacitating injury: An incapacitating injury is any injury, other than a fatal injury, which prevents the injured person from walking, driving or normally continuing the activities the person was capable of performing before the injury occurred.	15 INJURY CLASSIFICATION	
	4 – Fatal Injury	K	Fatal Injury: A fatal injury is any injury that results in death. If any injury results in death within 30 days after the road vehicle accident in which the injury occurred, the injury classification should be changed to fatal injury.	15 INJURY CLASSIFICATION	
	5 – Injury, Severity Unknown			15 INJURY CLASSIFICATION	
	6 – Died Prior to Accident			15 INJURY CLASSIFICATION	
	9 – Unknown	U		15 INJURY CLASSIFICATION	

Found at: https://safety.fhwa.dot.gov/hsip/spm/conversion_tbl/pdfs/kabco_ctable_by_state.pdf

Shop House Acres Major Subdivision

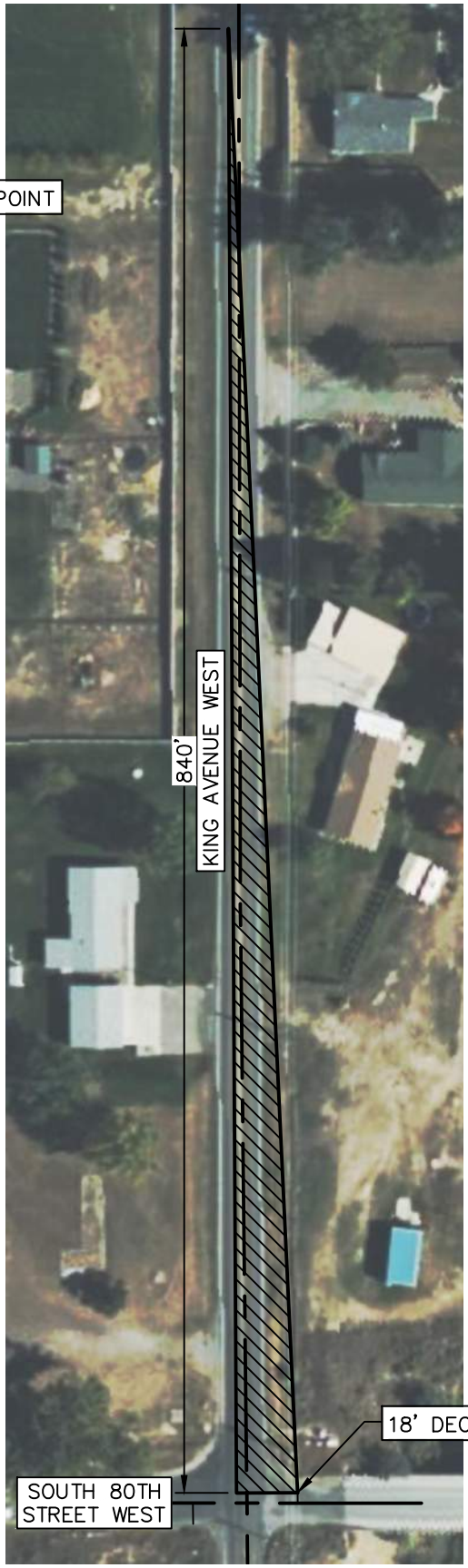
Traffic Impact Study

APPENDIX J

Intersection Sight Distance Figures



SOUTH 80TH ST. WEST NB–RIGHT TURN



SOUTH 80TH ST. WEST NB–LEFT TURN

0 100

SCALE: 1" = 100'

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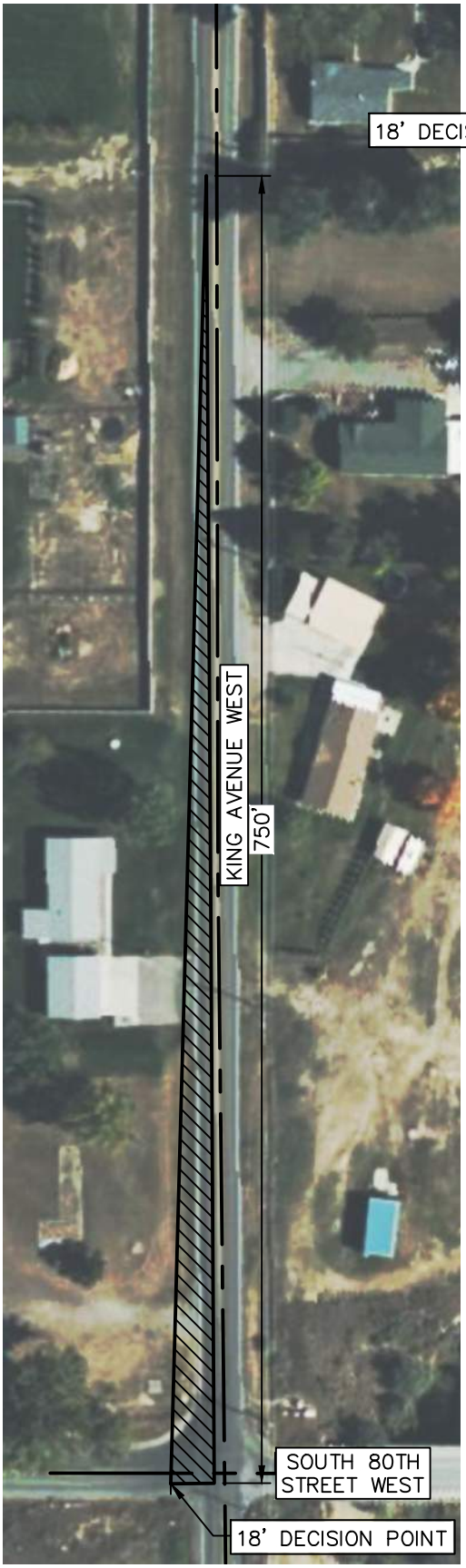
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BILLINGS, MONTANA

INTERSECTION #1 NB SIGHT DISTANCE

EXHIBIT

J - 1



SOUTH 80TH ST. WEST SB–RIGHT TURN



SOUTH 80TH ST. WEST SB–LEFT TURN

0 100

SCALE: 1" = 100'

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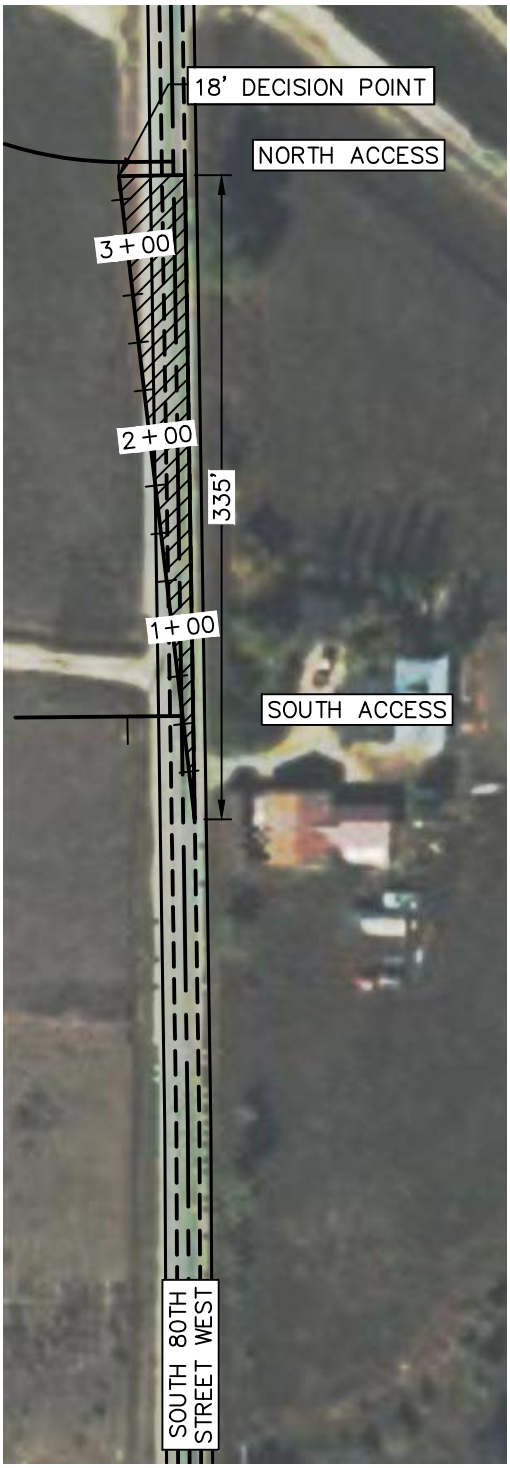
INTERSECTION #1 SB SIGHT DISTANCE

EXHIBIT

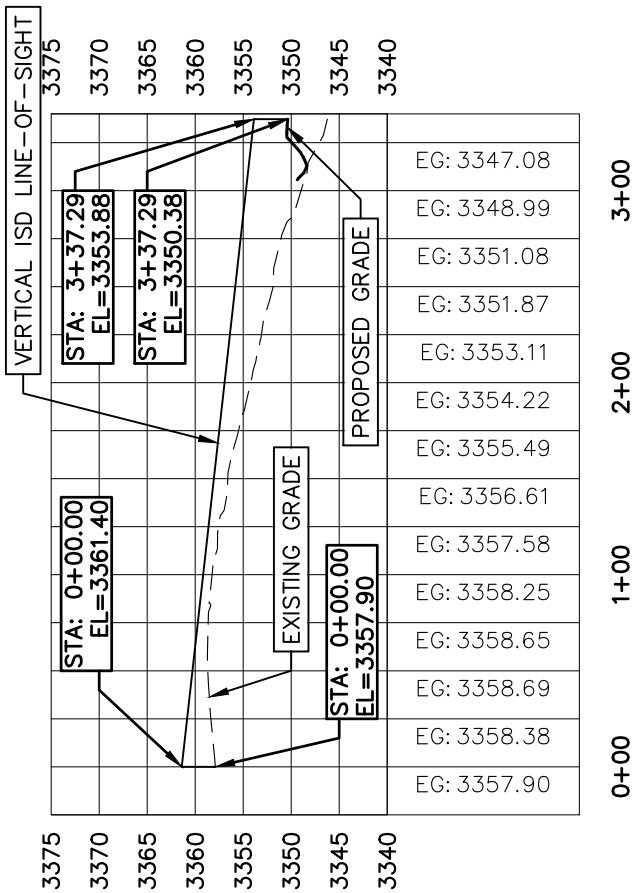
J - 2

0 100

SCALE: 1" = 100'



NORTH ACCESS LEFT TURN – CAR



NORTH ACCESS LEFT TURN – CAR PROFILE

SOUTH 80TH STREET WEST
POSTED SPEED=50MPH

ISD=1.47(SPEED [MPH]])(TIME GAP)
TIME GAP (CAR)[SEC.] = 7.5
DRIVER EYE HEIGHT = 3.5'
OBJECT HEIGHT = 3.5'

ISD (POSTED) = 550'
ISD (ADVISORY) = 335' = 30MPH

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BILLINGS, MONTANA

NORTH ACCESS LT-CAR SIGHT DISTANCE

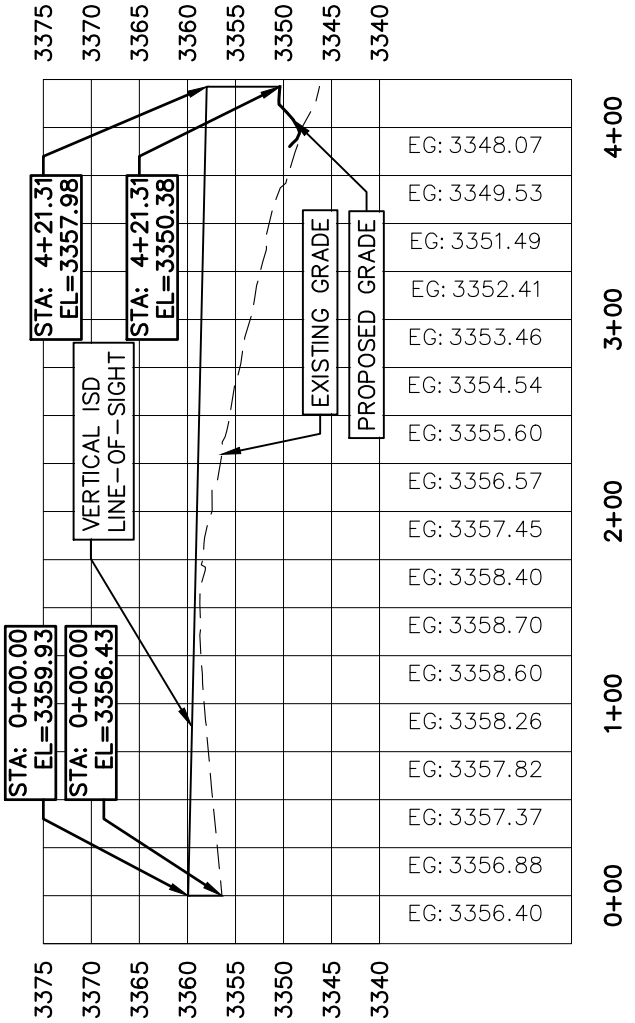
EXHIBIT

J - 3

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NORTH ACCESS LEFT TURN – TRUCK



SOUTH 80TH STREET WEST
POSTED SPEED=50MPH

ISD=1.47(SPEED [MPH]])(TIME GAP)
TIME GAP (TRUCK)[SEC.] = 9.5
DRIVER EYE HEIGHT = 7.6'
OBJECT HEIGHT = 3.5'

ISD (POSTED) = 700'
ISD (ADVISORY) = 420' = 30MOH

NORTH ACCESS LEFT TURN – TRUCK PROFILE

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NORTH ACCESS LT-TRUCK SIGHT DISTANCE

EXHIBIT
J - 4

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SOUTH 80TH STREET WEST
POSTED SPEED=50MPH

ISD=1.47(SPEED [MPH]])(TIME GAP)
TIME GAP (CAR)[SEC.] = 6.5
DRIVER EYE HEIGHT = 3.5'
OBJECT HEIGHT = 3.5'

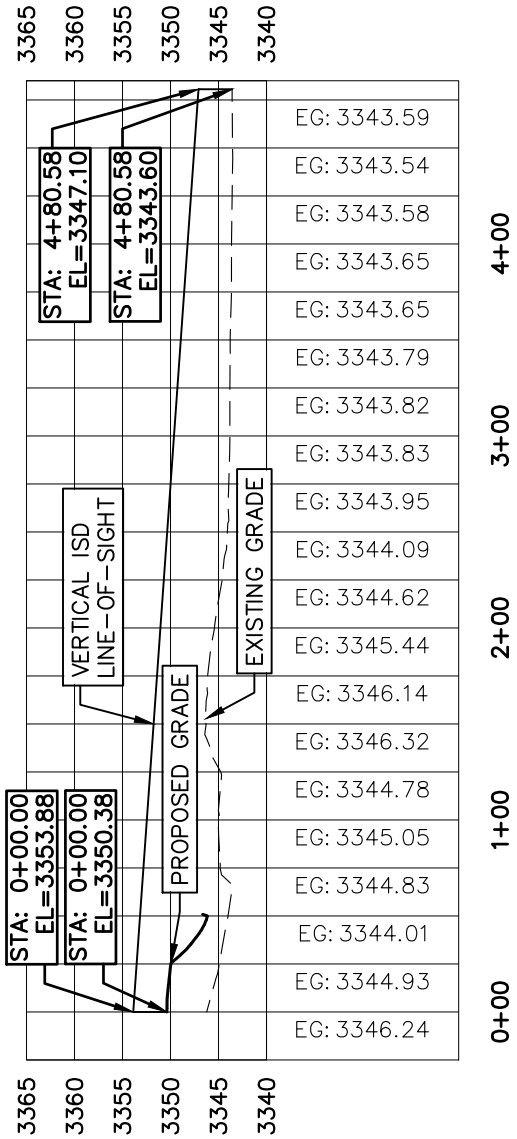
ISD (POSTED) = 480'

0 100

SCALE: 1" = 100'



NORTH ACCESS RIGHT TURN – CAR



NORTH ACCESS RIGHT TURN – CAR PROFILE

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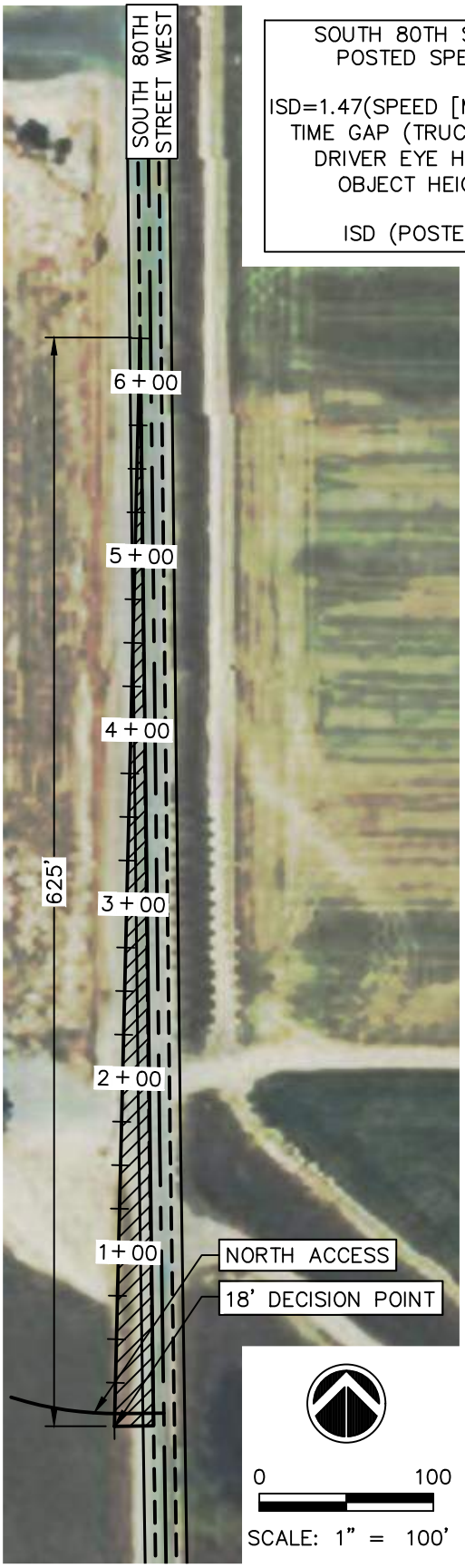
BILLINGS, MONTANA

NORTH ACCESS RT-CAR SIGHT DISTANCE

EXHIBIT

J - 5

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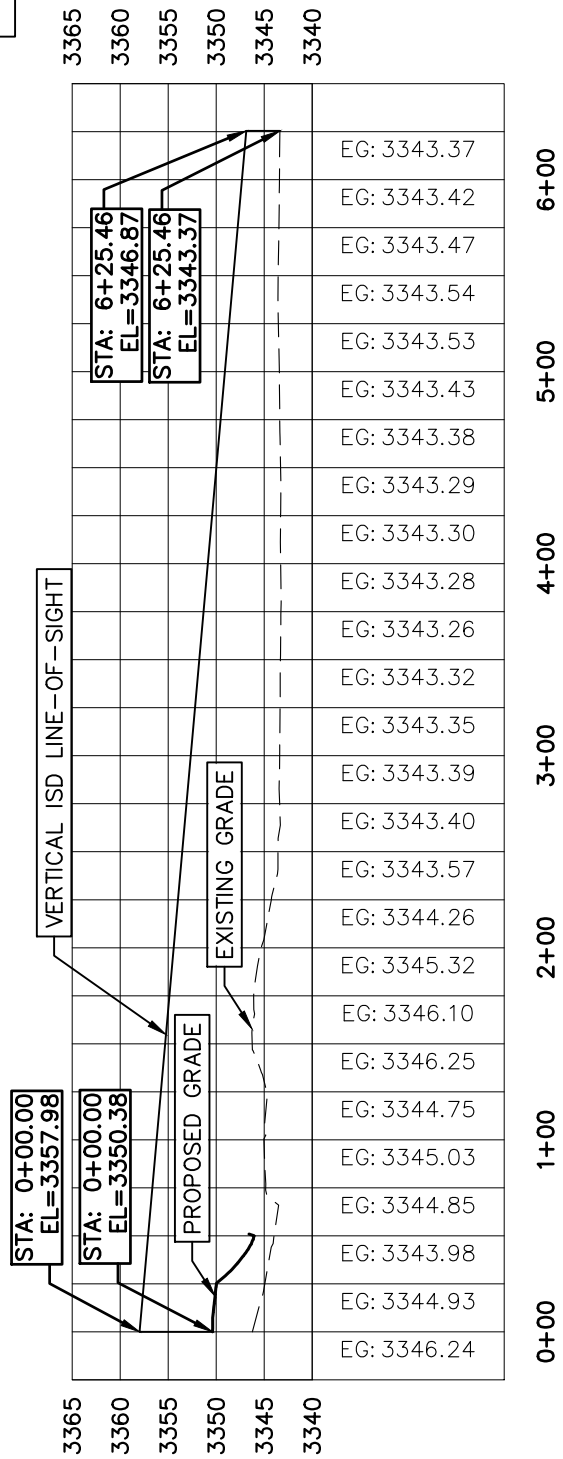


SOUTH 80TH STREET WEST
POSTED SPEED=50MPH

ISD=1.47(SPEED [MPH]])(TIME GAP)
TIME GAP (TRUCK)[SEC.] = 8.5
DRIVER EYE HEIGHT = 7.6'
OBJECT HEIGHT = 3.5'

ISD (POSTED) = 625'

NORTH ACCESS RIGHT TURN – TRUCK



NORTH ACCESS RIGHT TURN – TRUCK PROFILE

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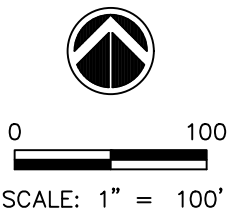
BILLINGS, MONTANA

NORTH ACCESS RT-TRUCK SIGHT DISTANCE

EXHIBIT

J - 6

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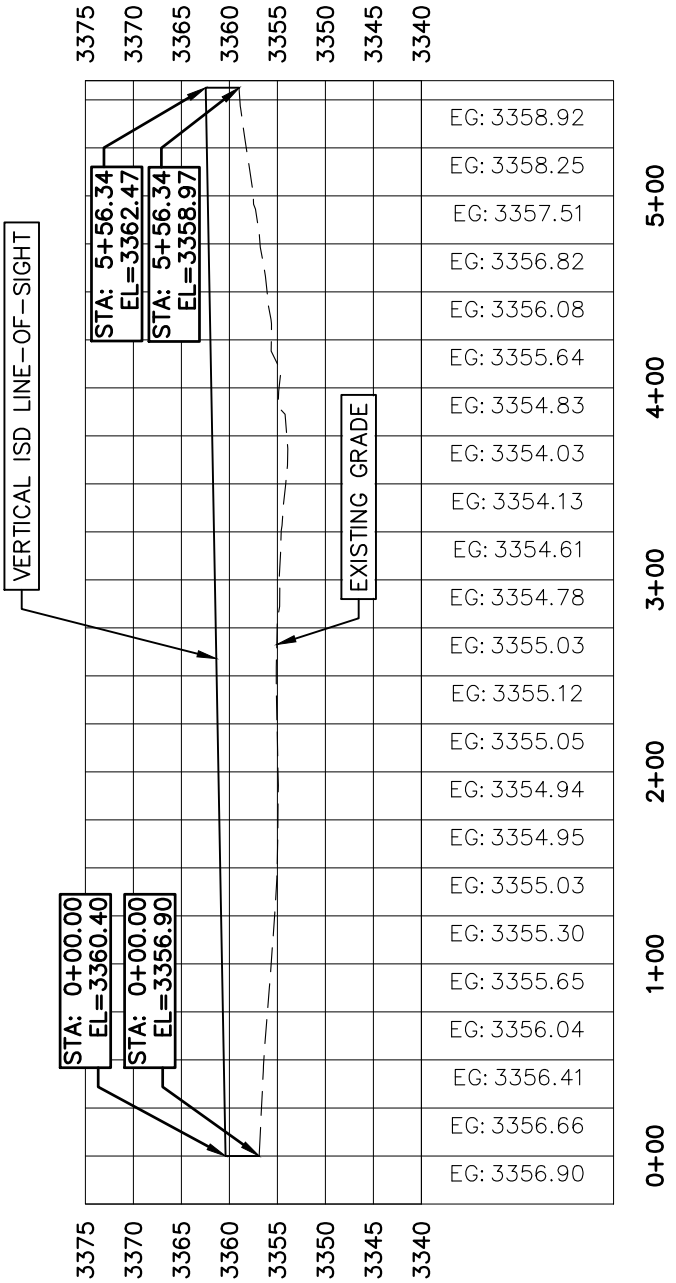
SOUTH 80TH STREET WEST
POSTED SPEED=50MPH

ISD=1.47(SPEED [MPH]])(TIME GAP)
TIME GAP (CAR)[SEC.] = 7.5
DRIVER EYE HEIGHT = 3.5'
OBJECT HEIGHT = 3.5'

ISD (POSTED) = 550'



SOUTH ACCESS LEFT TURN – CAR



SOUTH ACCESS LEFT TURN – CAR PROFILE

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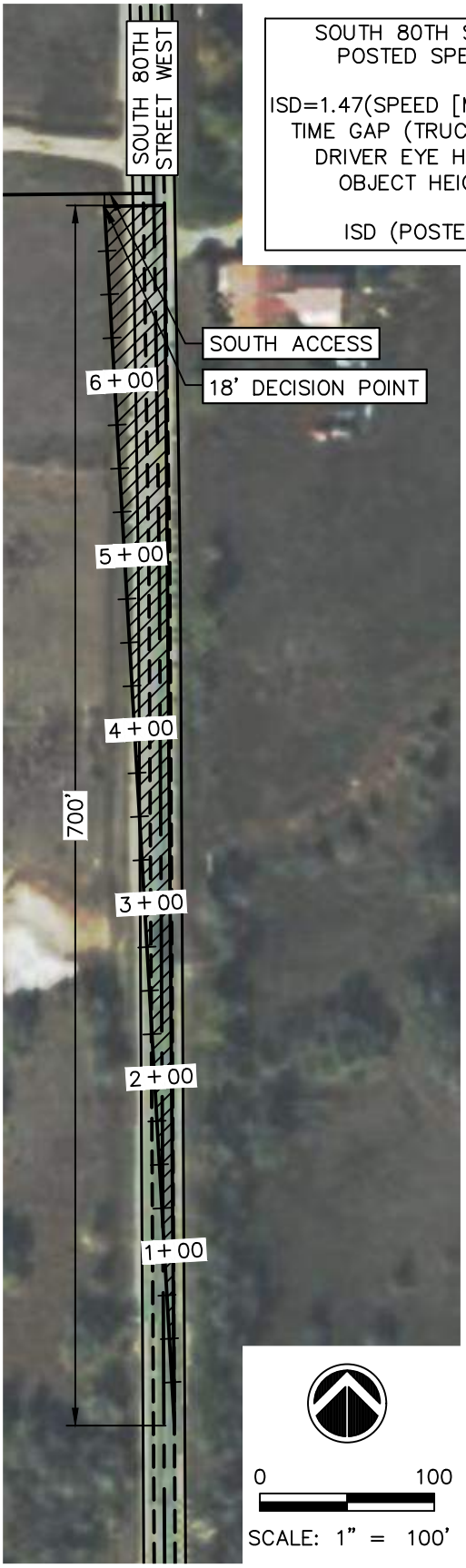
SHOP HOUSE ACRES MAJOR SUBDIVSION

BILLINGS, MONTANA

SOUTH ACCESS LT-CAR SIGHT DISTANCE

EXHIBIT
J - 7

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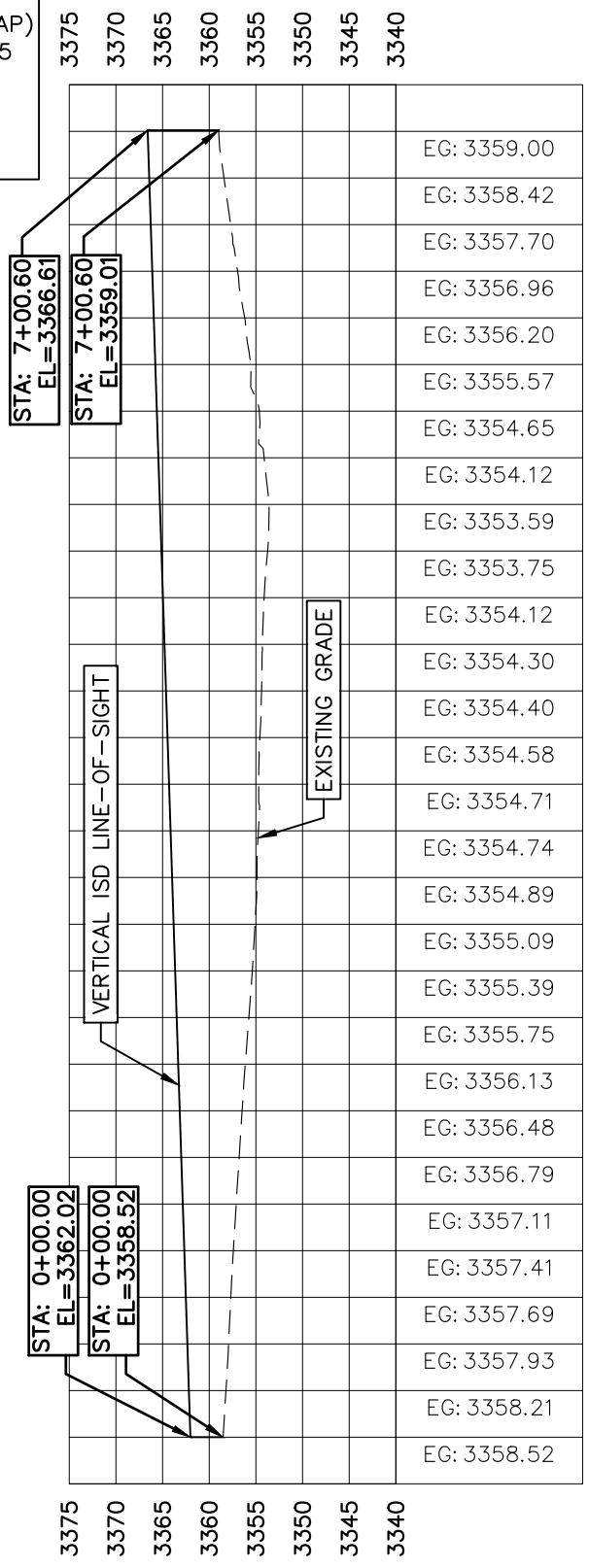


SOUTH 80TH STREET WEST
POSTED SPEED=50MPH

ISD=1.47(SPEED [MPH]])(TIME GAP)
TIME GAP (TRUCK)[SEC.] = 9.5
DRIVER EYE HEIGHT = 7.6'
OBJECT HEIGHT = 3.5'

ISD (POSTED) = 700'

SOUTH ACCESS LEFT TURN – TRUCK



SOUTH ACCESS LEFT TURN – TRUCK PROFILE

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SOUTH ACCESS LT-TRUCK SIGHT DISTANCE

EXHIBIT
J - 8

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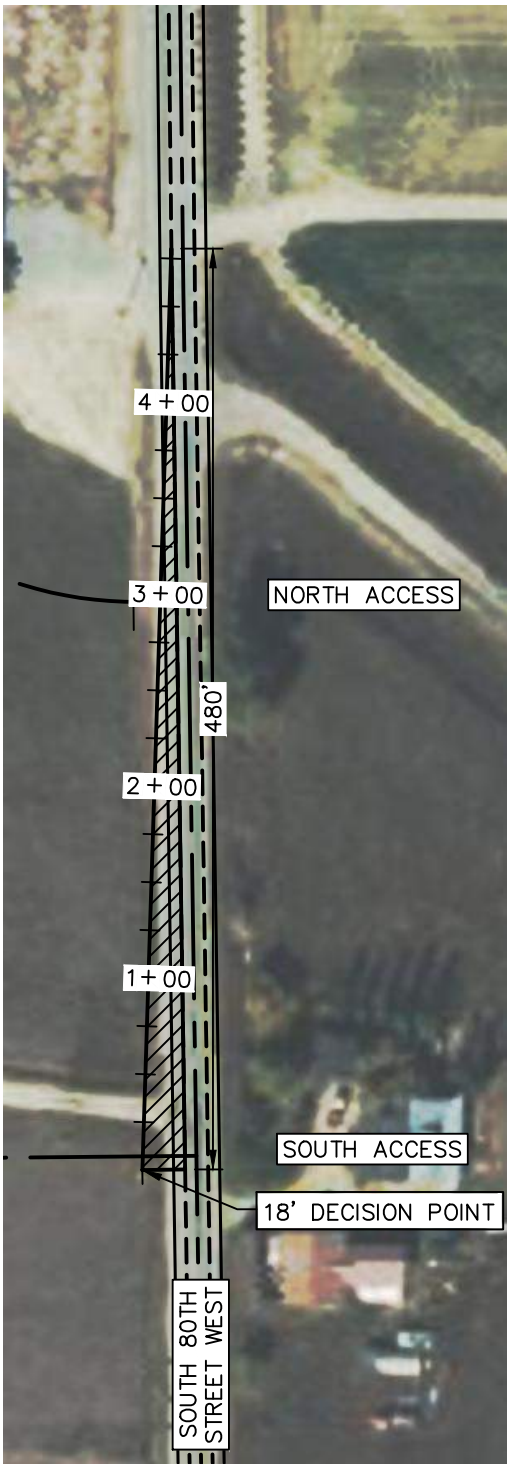
SOUTH 80TH STREET WEST
POSTED SPEED=50MPH

ISD=1.47(SPEED [MPH]])(TIME GAP)
TIME GAP (CAR)[SEC.] = 6.5
DRIVER EYE HEIGHT = 3.5'
OBJECT HEIGHT = 3.5'

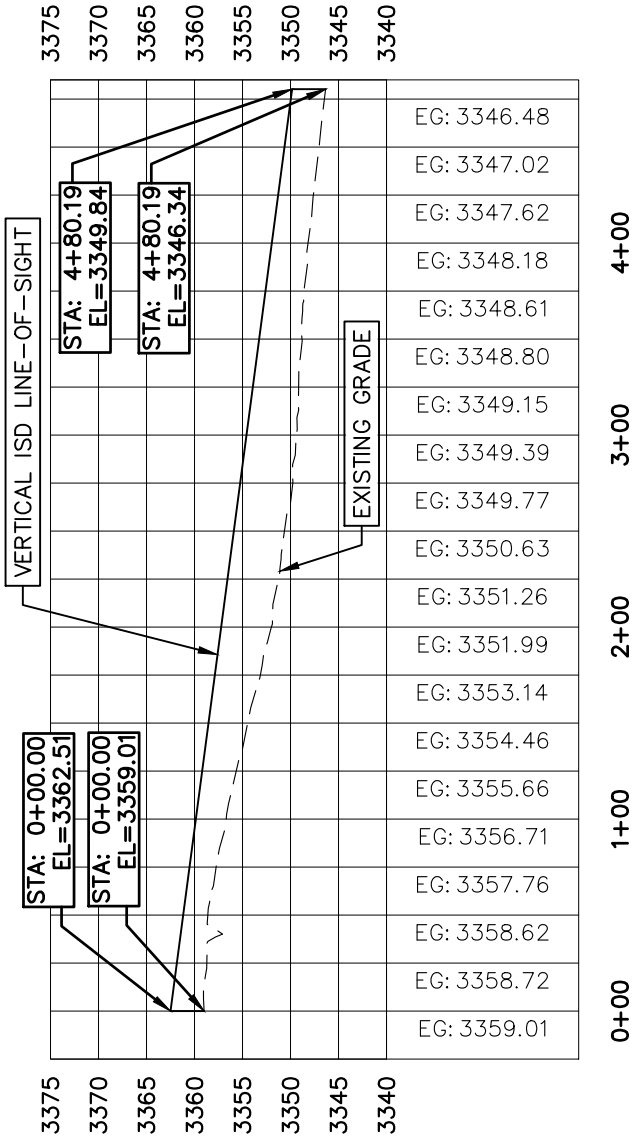
ISD (POSTED) = 480'

0 100

SCALE: 1" = 100'



SOUTH ACCESS RIGHT TURN – CAR



SOUTH ACCESS RIGHT TURN – CAR PROFILE

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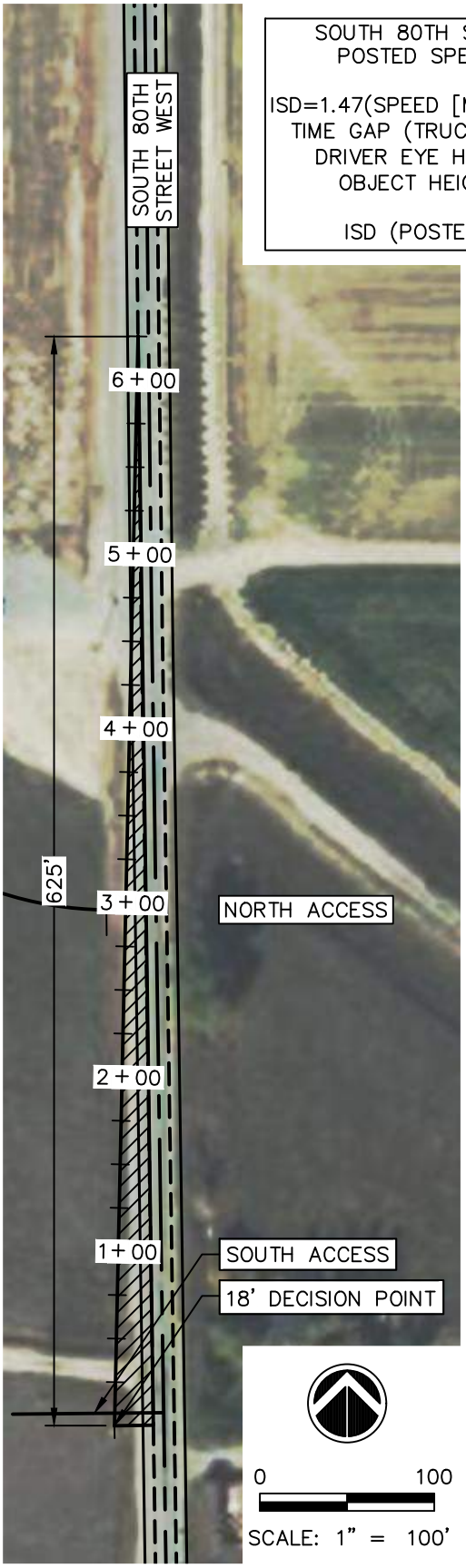
SHOP HOUSE ACRES MAJOR SUBDIVSION

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SOUTH ACCESS RT-CAR SIGHT DISTANCE

EXHIBIT

J - 9

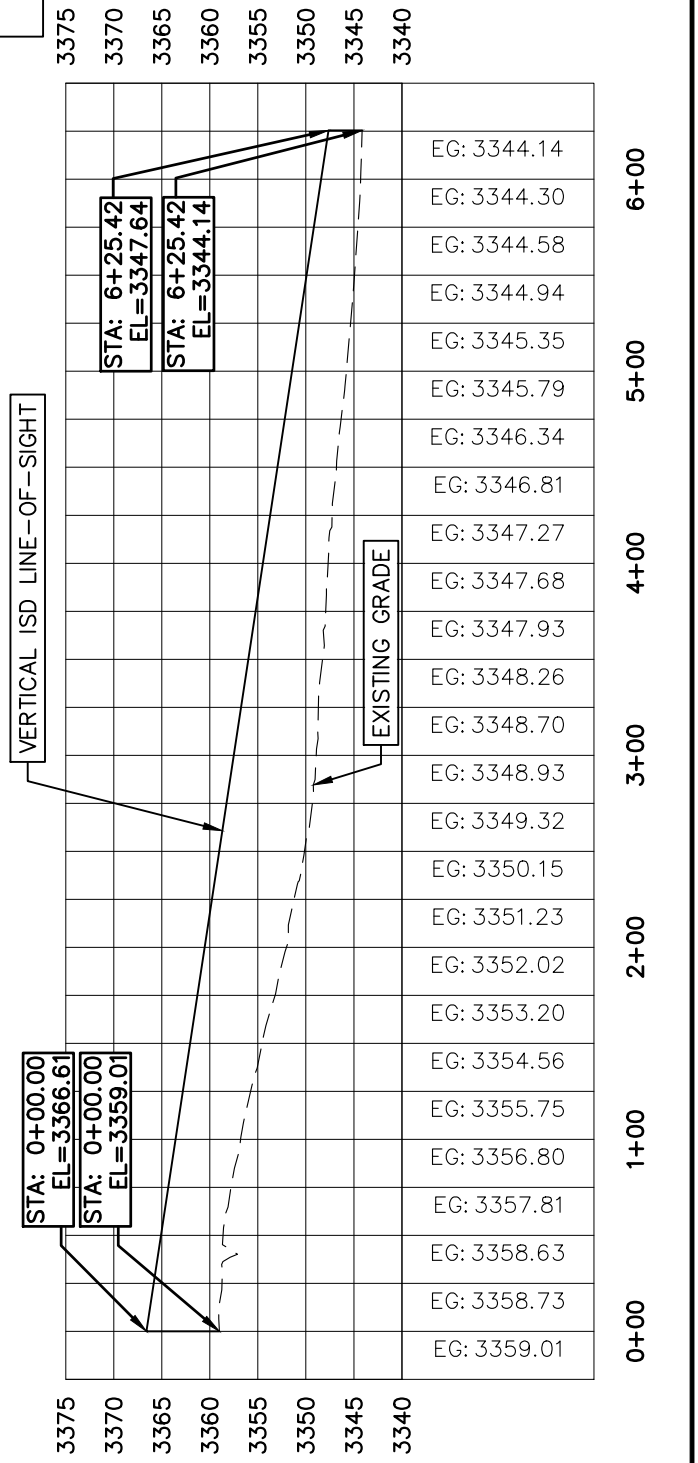


SOUTH 80TH STREET WEST
POSTED SPEED=50MPH

ISD=1.47(SPEED [MPH]])(TIME GAP)
TIME GAP (TRUCK)[SEC.] = 8.5
DRIVER EYE HEIGHT = 7.6'
OBJECT HEIGHT = 3.5'

ISD (POSTED) = 625'

SOUTH ACCESS LEFT TURN – TRUCK



SOUTH ACCESS LEFT TURN – TRUCK PROFILE

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SOUTH ACCESS LT-TRUCK SIGHT DISTANCE

EXHIBIT
J - 10

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SOUTH 80TH ST. WEST NB–RIGHT TURN



SOUTH 80TH ST. WEST NB–LEFT TURN

0 100

SCALE: 1" = 100'

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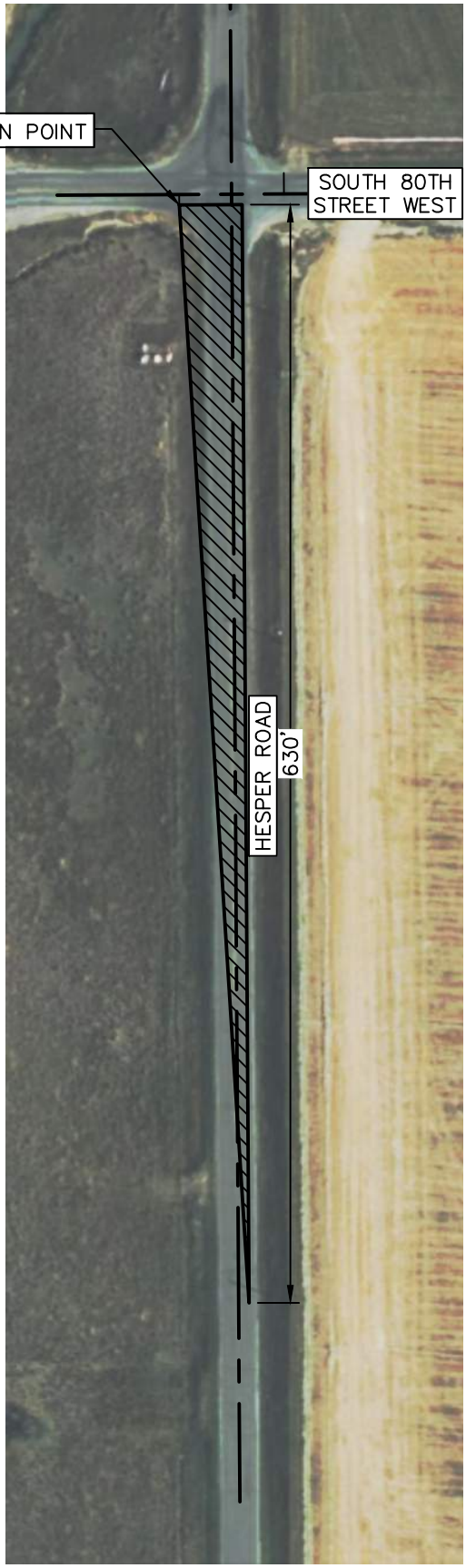
INTERSECTION #2 NB SIGHT DISTANCE

EXHIBIT

J - 7



SOUTH 80TH ST. WEST SB–RIGHT TURN



SOUTH 80TH ST. WEST SB–LEFT TURN

0 100

SCALE: 1" = 100'

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INTERSECTION #2 SB SIGHT DISTANCE

EXHIBIT

J - 8

Shop House Acres Major Subdivision

Traffic Impact Study

APPENDIX K

Cost Participation

Intersection Cost Contribution
Project: Shop House Acres Major Subdivision
Prepared by: IMEG Corp.
Revised: 02/16/2026

Full Build Year: 2031

Intersection	Percent	Cost of Intersection	Contribution by Intersection
#1) King Ave. West & South 80th St. West	1.58%	$ 500,000	N/A
#2) Hesper Road & South 80th St West	1.17%	$ 500,000	N/A
		Total	**$ -**

Intersection:		**King Ave. West & South 80th St. West**				
Conditions:		**Existing 4-leg rual intersection with "STOP" signs controlling both the north and south legs of the intersection (South 80th St. West)**				
Approach		**AM Peak**		**PM Peak**		
		Mvmt Vol.	**Lane Vol.**	**Mvmt Vol.**	**Lane Vol.**	**Number of Lanes**
NB	**T**	4	4	3	3	1
	L	1	1	1	1	1
SB	**T**	2	2	5	5	1
	L	0	0	0	0	1
EB	**T**	0	0	0	0	1
	L	0	0	0	0	1
WB	**T**	0	0	0	0	1
	L	1	1	13	13	1
Critical Lane Sum Increase:			**5**		**19**	
Critical Lane Sum:			**1200**		**1200**	<--- 1200 for 4-leg intersection
Peak Hour %:			**0.4%**		**1.6%**	1140 for 3-leg intersection
Highest %:				**1.58%**		

Intersection:		**Hesper Road & South 80th St West**				
Conditions:		**Existing 4-leg rual intersection with "STOP" signs controlling both the north and south legs of the intersection (South 80th St. West)**				
Approach		**AM Peak**		**PM Peak**		
		Mvmt Vol.	**Lane Vol.**	**Mvmt Vol.**	**Lane Vol.**	**Number of Lanes**
NB	**T**	1	1	8	8	1
	L	0	0	0	0	1
SB	**T**	5	5	6	6	1
	L	3	3	1	1	1
EB	**T**	0	0	0	0	1
	L	3	3	5	5	1
WB	**T**	0	0	0	0	1
	L	0	0	0	0	1
Critical Lane Sum Increase:			**8**		**14**	
Critical Lane Sum:			**1200**		**1200**	<--- 1200 for 4-leg intersection
Peak Hour %:			**0.7%**		**1.2%**	1140 for 3-leg intersection
Highest %:				**1.17%**		