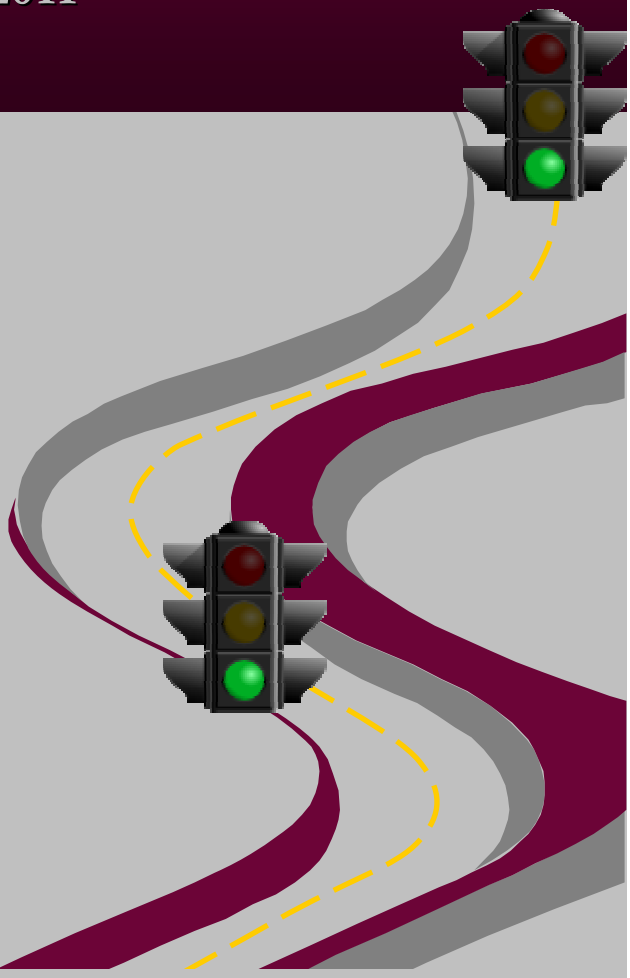
TRAFFIC IMPACT STUDY

IHOP Restaurant

Brownsburg, Indiana

August 12, 2011



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I certify that this TRAFFIC IMPACT STUDY has been prepared by me or under my immediate supervision and that I have experience and training in the field of traffic and transportation engineering.

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VS Engineering, Inc.

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EXECUTIVE SUMMARY

A. Study Purpose and Objectives

The purpose of this study is to assess traffic impacts that a proposed IHOP restaurant will have on operations of the surrounding roadways within the study area. In doing this, the following study objectives were identified and completed.

- Analyze the AM and PM peak traffic periods for existing year 2011 conditions
- Analyze the AM and PM peak traffic periods for existing year 2011 traffic plus site traffic generated by the development at full build-out.
- Analyze the AM and PM peak traffic periods for future year 2021 traffic plus site traffic generated by the development at full build-out.
- Assess impact of traffic generated by the proposed development in the study area.
- Formulate recommendations for roadway or intersection improvements to minimize traffic impacts by the proposed development on adjacent roadways.

B. Site Location and Study Area

The proposed restaurant will be located in the existing Northfield Commons development, on the south side of Northfield Drive and just west of SR 267 (across from Walmart). The restaurant will be constructed west of the existing Firestone building (refer to the location map and site plan on pages 5 and 6 respectively). The study area included analysis for the three intersections below.

- Northfield Drive at Northfield Commons West Entrance/Walmart Middle Entrance
- Northfield Drive at Northfield Commons Main Entrance/Walmart East Entrance (McNees Way)
- Northfield Drive at SR 267

C. Proposed Development

The proposed development will consist of a 4,656 square foot building. No additional entrances are proposed as traffic accessing the restaurant will utilize the existing Northfield Commons entrances.

D. Capacity Analysis

Analysis was completed for each of the following scenarios in order to determine the impact traffic generated by the proposed development will have on operations of the adjacent roadway and intersections.

- Year 2011 Existing Traffic Volumes
- Year 2011 Combined Existing Traffic Volumes Plus Site Traffic Volumes
- Year 2021 Combined Background Traffic Volumes Plus Site Traffic Volumes (Background traffic projected at 3% annual growth)

This study also evaluates access type at the Northfield Commons West Entrance/Walmart Middle Entrance, where both currently operate as full access. The capacity analyses completed, along with field observations, assisted in determining if the entrances should remain full access or be restricted to right-in/right-out movements only. Therefore, all of the capacity analyses for existing and future traffic conditions at the study intersections included the following two alternatives.

- ✓ ***Alternative 1**: Full access at the Northfield Commons West Entrance/Walmart Middle Entrance.*

- ✓ ***Alternative 2**: Right-in/Right-out access at the Northfield Commons West Entrance/Walmart Middle Entrance.*

E. Recommendations Summary

- ♦ **Northfield Dr. at Northfield Commons West Ent./Walmart Middle Ent.**

- ✓ The exiting left-turn movement from Northfield Commons will operate at LOS "E" with the addition of site traffic from the IHOP restaurant (36.7 seconds of delay, which is just over the LOS "D" threshold of 35 seconds). This amount of peak hour delay is reasonable for a stop controlled approach to a higher volume thoroughfare such as Northfield Drive.
- ✓ During observation of the intersection at off-peak times of the day, the exiting left-turn movements were being made with minimal delay (the adjacent signal at McNees Way provided gaps in mainline Northfield Drive traffic).
- ✓ During peak traffic periods when left-turn movements exiting Northfield Commons and Walmart are more difficult to make, motorists have the option to use the signalized main entrance (McNees Way) to access Northfield Drive safely.
- ✓ Restricting turning movements at the two entrances will divert additional traffic to McNees Way, resulting in additional delay at the main entrance.
- ✓ It is recommended that the entrances remain full access. Future traffic volumes should be monitored and if accidents become an issue, operations should be re-evaluated at that time.
- ✓ Clearing of the trees and shrubs located just west of the Northfield Commons entrance is recommended. This will provide a better line of sight for exiting vehicles and improve safety.
- ✓ It is recommended to reconfigure the exiting lanes of the Northfield Commons entrance to include a dedicated left-turn lane and a through/right lane. This will provide for better alignment with the Walmart entrance and improve safety for those vehicles exiting Northfield Commons and crossing Northfield Drive.
- ✓ Recommend restriping the Walmart entrance to provide a dedicated left-turn lane and a through/right-turn lane to better delineate the proper lane configuration to motorists (current striping does not indicate a through movement).

- **Northfield Dr. at Northfield Commons Main Ent./Walmart East Ent.**

✓ All turning movements will operate at LOS "C" or better with the addition of site traffic from the restaurant. No improvements are necessary as a result of the proposed IHOP.

✓ If the Walmart middle entrance is restricted to right-in/right-out in the future, a significant number of exiting left-turn movements will be added to the southbound approach at the main entrance. The restricted area on this approach could be reconfigured to allow for exiting dual left-turn lanes if determined to be necessary. The entering radius on the approach would also need to be reconstructed to properly accommodate truck turning movements without conflicting with the exiting left-turn lane (this was identified in a design evaluation of the entrance completed by others).

- **Northfield Drive at SR 267**

✓ Traffic generated by the IHOP restaurant is estimated to increase overall delay at the intersection by less than one second.

✓ No improvements are necessary to accommodate traffic generated by the proposed IHOP.

Traffic generated from the proposed IHOP restaurant will have negligible impact on operations within the study area. The improvements made to Northfield Drive between SR 267 and the area of White Lick Creek provide enough capacity to accommodate the IHOP traffic, as well as additional background traffic growth in the future.

I. Introduction

A 4,656 square foot IHOP Restaurant is proposed for construction within the Northfield Commons development, west of the existing Firestone building. Northfield Commons is located on the south side of Northfield Drive, just west of SR 267 in Brownsburg, Indiana. Please refer to a location map of the study area and proposed site plan exhibit on pages 6 and 7 respectively. VS Engineering, Inc. (VSE) has completed this Traffic Impact Study for the proposed restaurant on behalf of the Town of Brownsburg.

Purpose of Report

The purpose of this study is to determine and analyze the impact that the proposed development will have on traffic operations for the roadways and intersections within the study area. Recommendations for roadway and intersection improvements that will minimize traffic impacts due to the proposed development, based on full build-out traffic projections for the site, will be made as part of the study.

Study Objectives

- To analyze the AM and PM peak traffic periods for existing year 2011 conditions
- To analyze the AM and PM peak traffic periods for existing year 2011 conditions with estimated traffic generated by the proposed development at full build-out.
- To analyze the AM and PM peak traffic periods for future year 2021 conditions with estimated traffic generated by the proposed development at full build-out.
- To evaluate and make recommendations regarding the type of access that should be permitted at the Northfield Commons West Entrance/Walmart Middle Entrance. Specifically, the entrances will be analyzed as both full access (Alternative 1) and right-in/right-out access (Alternative 2).
- Determine the impact of traffic generated by the proposed development within the study area using standard traffic engineering methodology.
- Provide recommendations for roadway and intersections improvements that will result in satisfactory traffic operations and/or enhance public safety within the study area once the development is complete. Recommendations may include items such as modifications to existing lane configurations, intersection control, site access locations and roadway and intersection geometrics.

Existing and future traffic operations were analyzed for the AM and PM peak hours at the following intersections as part of the study:

- ✓ Northfield Drive at Northfield Commons West Entrance/Walmart Middle Entrance
- ✓ Northfield Drive at Northfield Commons Main Entrance/Walmart East Entrance (McNees Way)
- ✓ Northfield Drive at SR 267

A location map of the study area and proposed site plan for the development are shown on the next two pages.

FIGURE 1

LOCATION MAP

STUDY INTERSECTIONS

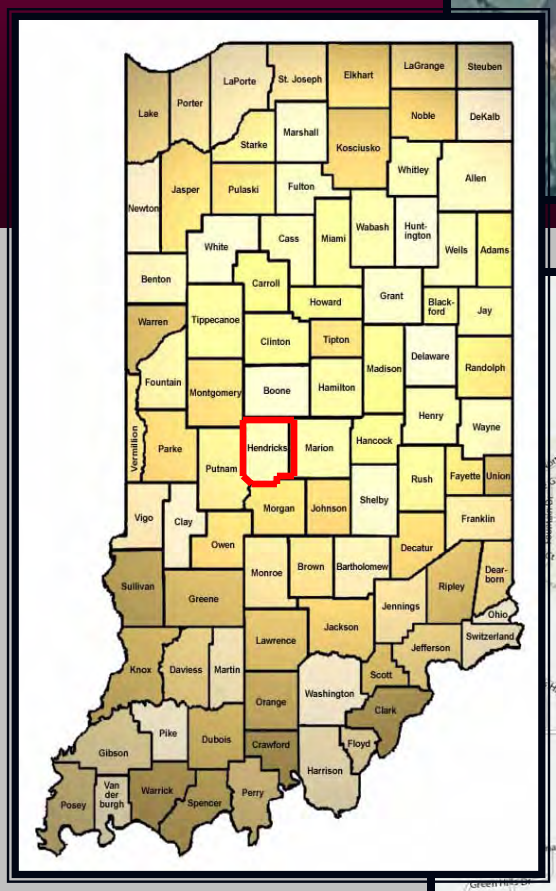
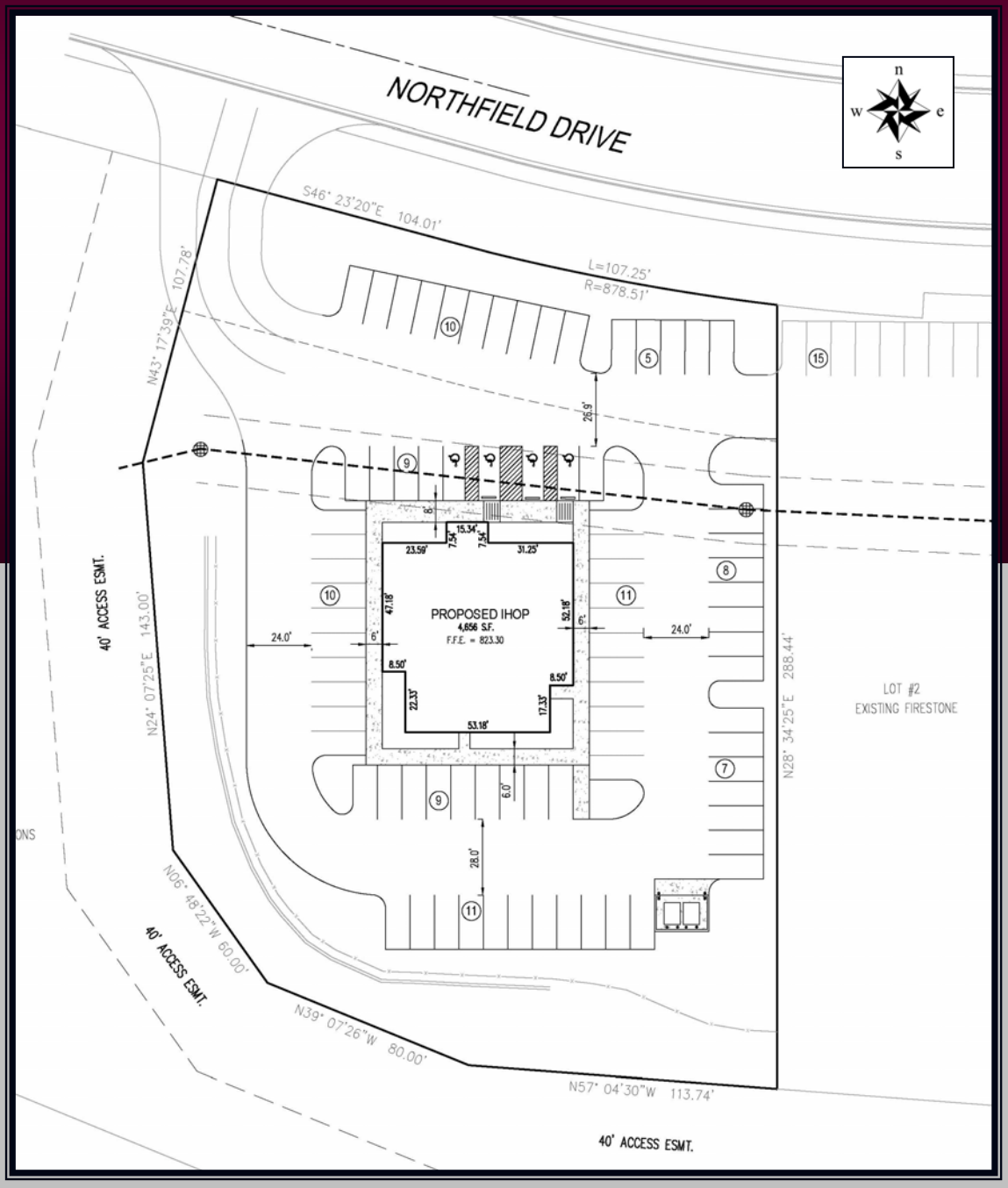


FIGURE 2
SITE PLAN



II. Study Description

Updated manual turning movement counts were conducted on July 26, 2011 during the AM and PM peak hours at the study intersections. These volumes were used to analyze the existing year 2011 peak hour operations at each intersection. The anticipated site trips expected to be generated by the proposed IHOP restaurant were then calculated according to the *ITE Trip Generation Manual, 8th Edition*[1]. The projected site trips were combined with the existing traffic volumes in order to evaluate what traffic operations will be like once the restaurant opens.

A horizon year of 2021 was also analyzed to determine any future traffic operational problems that may be present within the study area due to background traffic growth. In order to project existing year 2011 traffic volumes out to year 2021, an annual growth rate was estimated based on review of historical traffic data and existing studies previously completed by the Town. A 3% annual growth rate was determined to be reasonable and is consistent with information shown in the Town's 2020 Thoroughfare Plan. Using the 3% growth rate, existing traffic volumes were then forecasted up to year 2021 background traffic volumes and combined with the projected trips to be generated by the site.

With the traffic projections complete, capacity analyses were conducted to determine the level of impact the development would have on traffic operations at the study intersections. Capacity analyses were completed for existing and future conditions during the AM and PM peak hours. Recommendations for improvements were then finalized on the basis of the capacity analysis results and field observations.

This study also specifically addresses access type at the Northfield Commons West Entrance/Walmart Middle Entrance. Currently both entrances operate as full access. The capacity analyses completed at this intersection were intended to determine if the entrances should remain full access or be restricted to right-in/right-out movements only. Therefore, all of the capacity analyses for existing and future traffic conditions at the study intersections included the following two alternatives.

- ✓ ***Alternative 1****: Full access at the Northfield Commons West Entrance/Walmart Middle Entrance.*

- ✓ ***Alternative 2****: Right-in/Right-out access at the Northfield Commons West Entrance/Walmart Middle Entrance.*

III. Proposed Development

The proposed development will consist of a high-turnover (sit-down) restaurant. Traffic generated by the restaurant will access the site via two existing entrances along Northfield Drive. No additional entrances are proposed as part of the development. Table 1 lists the ITE land use category, building size and trip generation rates that were utilized in calculating the total trips the site is projected to generate at full build-out.

TABLE 1

LAND USE DESCRIPTION	ITE LAND USE CODE	SIZE	AM PEAK HOUR RATE	PM PEAK HOUR RATE
High-Turnover (Sit-Down) Restaurant	932	4,656 Sq. Ft.	11.52*	11.15*

*Average Trip Generation Rate is Per 1000 Sq. Ft. of Gross Floor Area

IV. Existing Area Conditions

The immediate area that surrounds the proposed site is primarily commercial with a mix of retail, restaurants, banks, etc. Northfield Drive was recently improved from the intersection of SR 267 to just west of White Lick Creek, near Brownsburg Station. The improvements expanded this section of Northfield Drive from a two-lane to four-lane section with auxiliary lanes to address existing capacity issues along the corridor. As a result, the pavement condition is excellent along the frontage of Northfield Commons and is rated a "9" according to the Pavement Surface Evaluation and Rating (PASER) system (scale of 1-10 with "10" being new pavement).

A 48-hour volume count was also conducted along this section of Northfield Drive. The Average Daily Traffic (ADT) volume calculated from the count was 13,668 vehicles per day.

Northfield Dr. at Northfield Commons West Ent./Walmart Middle Ent.

The intersection currently operates as a two-way stop, with the Northfield Commons entrance and Walmart entrance stopping for Northfield Drive traffic. Northfield Drive is signed as 30 mph in the vicinity of the intersection. The existing lane configuration at the intersection is as follows:

- **Eastbound Approach**
  - Through/Left-turn lane
  - Through/Right-turn Lane

- **Northbound Approach**
  - Through/Left-turn Lane
  - Dedicated Right-turn Lane

- **Westbound Approach**
  - Through/Left-turn lane
  - Through/Right-turn Lane

- **Southbound Approach**
  - Dedicated Left-turn Lane
  - Through/Right-turn Lane

It should be noted that the southbound approach exiting Walmart is striped as a dedicated left-turn lane and a dedicated right-turn lane, with no through movement indicated. It is likely that the striping was never modified once the Northfield Commons entrance was constructed. This may create some confusion and/or safety concerns for any vehicles wanting to exit Walmart and cross over Northfield Drive into the Northfield Commons development.

Northfield Dr. at Northfield Commons Main Ent./ Walmart East Ent.

The intersection currently operates as a signalized intersection. The existing lane configuration at the intersection is as follows:

- **Eastbound Approach**
  - Dedicated Left-turn Lane
  - Through Lane
  - Through/Right-turn Lane

- **Northbound Approach**
  - Dedicated Left-turn Lane
  - Through/Right-turn Lane

- **Westbound Approach**
  - Dedicated Left-turn Lane
  - Two Through Lanes
  - Dedicated Right-turn Lane

- **Southbound Approach**
  - Dedicated Left-turn Lane
  - Through/Right-turn Lane

Northfield Dr. at SR 267

The intersection currently operates as a signalized intersection. The existing lane configuration at the intersection is as follows:

- **Eastbound Approach**
  - Dedicated Dual Left-turn Lanes
  - Through Lane
  - Through/Right-turn Lane

- **Northbound Approach**
  - Dedicated Left-turn Lane
  - Two Through Lanes
  - Dedicated Right-turn Lane with Overlap Phase

- **Westbound Approach**
  - Dedicated Left-turn Lane
  - Through Lane
  - Dedicated Right-turn Lane with Overlap Phase

- **Southbound Approach**
  - Dedicated Left-turn Lane
  - Two Through Lanes
  - Dedicated Right-turn Lane with Overlap Phase

V. Projected Traffic

Growth Rate & Background Traffic Projections

In order to analyze future traffic conditions for the 2021 horizon year, a background traffic growth rate had to be established. The annual growth rate is estimated based on historical traffic data if available and information contained in other studies previously completed by the Town. Based on review of the Northfield Drive Corridor Study and the Town's 2020 Thoroughfare Plan, a background traffic growth rate of 3% was estimated to be appropriate and was utilized in forecasting existing traffic out to year 2021.

Proposed Site Traffic Projections

Trip Generation is the process of estimating the number of trips a new development will create, which is a critical component of determining the impact a site will have on traffic operations of adjacent roadways. The *ITE Trip Generation Manual*[1] is an accepted source that was utilized to conduct trip generation calculations and is based on historical traffic data for each specific land use.

Trips generated by a proposed development are classified as either pass-by trips or non pass-by trips. ***Pass-by Trips*** are trips that are made as intermediate stops on the way from a point of origin to a destination. These trips are made by vehicles "passing by" the site on an adjacent roadway, with the intention of continuing in route to a primary destination.

Non Pass-by Trips are any trips that are made specifically for the purpose of visiting a new development. These trips are typically made from a point of origin to the new development and then return to the point of origin.

Once the site generated trips have been calculated, the ***Trip Distribution*** method was used to allocate the new trips among all potential arrival and departure routes around the development. For this study, the trip distribution is based on existing traffic flow patterns within the vicinity of the proposed development during the AM and PM peak hours.

Trip Assignment is the procedure of applying the trip distribution percentages to the site generated trips in order to "assign" the new trips to the road network within the study area.

The trip generation is shown below in Table 2. Trip distribution and assignment results are located in Appendix A and B for each Alternative.

TABLE 2
TRIP GENERATION

Land Use Code	Land Use Description	Size (Sq. Ft.)	AM Peak Hour of Adjacent Street Traffic		PM Peak Hour of Adjacent Street Traffic		Number of Trips Generated					
			% ENTERING	% EXITING	% ENTERING	% EXITING	AM TOTAL	AM ENTERING	AM EXITING	PM TOTAL	PM ENTERING	PM EXITING
932	High-Turnover (Sit-Down) Restaurant	4,656	52%	48%	59%	41%	54	28	26	52	31	21
	High-Turnover (Sit-Down) Restaurant Pass-by Trips				43%					22	13	9
	TOTAL TRIPS GENERATED						54	28	26	52	31	21
	TOTAL PASS-BY TRIPS GENERATED						N/A	N/A	N/A	22	13	9
	TOTAL NON PASS-BY TRIPS GENERATED						54	28	26	30	18	12

- **Combined Background Plus Site Traffic**

The combination of year 2021 background traffic and the total site generated traffic were utilized to determine the overall impact the proposed development and annual traffic growth will have on traffic operations within the study area. The existing, background, site generated and combined traffic volumes for both the full access and right-in/right-out alternatives are shown in Appendix A and B respectively.

VI. Capacity Analysis

Capacity analyses are conducted to assess the Level of Service (LOS) of roadways or intersections under different traffic flow characteristics. LOS is divided into six categories based on the amount of vehicular delay and is designated with letters "A" through "F." LOS "A" represents the best operating conditions when traffic flows freely with minimal delay, while LOS "F" results in excessive vehicular delay and the worst operating conditions.

SYNCHRO 7[2] traffic analysis software was used to conduct capacity analyses for each existing intersection and proposed entrance location. The software follows the capacity analysis criteria described in the *Highway Capacity Manual*[3] and provides LOS data for each overall intersection as well as individual turning movements. The capacity analysis output sheets are located in Appendix C and D for Alternatives 1 and 2 respectively.

Table 3 identifies ranges of average vehicular delay associated with each LOS for signalized intersections.

TABLE 3

SIGNALIZED INTERSECTION LEVEL OF SERVICE	
LOS	**AVERAGE VEHICULAR DELAY (Seconds/Vehicle)**
A (Desirable)	**< 10.0**
B (Desirable)	**>10.0 – 20.0**
C (Desirable)	**>20.0 – 35.0**
D (Acceptable)	**>35.0 – 55.0**
E (Unsatisfactory)	**>55.0 – 80.0**
F (Unsatisfactory)	**> 80.0**

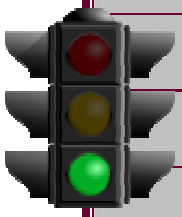


Table 4 shows the *Highway Capacity Manual*[3] LOS designations for unsignalized intersections.

TABLE 4

UNSIGNALIZED INTERSECTION LEVEL OF SERVICE	
LOS	**AVERAGE VEHICULAR DELAY (Seconds/Vehicle)**
A (Desirable)	**< 10.0**
B (Desirable)	**>10.0 – 15.0**
C (Desirable)	**>15.0 – 25.0**
D (Acceptable)	**>25.0 – 35.0**
E (Undesirable)	**>35.0 – 50.0**
F (Unsatisfactory)	**> 50.0**

Capacity analyses were completed for both Alternatives 1 and 2 during the AM and PM peak hours for the following scenarios:

- ✓ Year 2011 Existing Traffic Volumes
- ✓ Year 2011 Combined Existing Traffic Volumes Plus Site Traffic Volumes
- ✓ Year 2021 Combined Background Traffic Volumes Plus Site Traffic Volumes

A summary of the level of service results from all of the capacity analyses for each scenario are located in Appendix E.

VII. Conclusions and Recommendations

Based on the capacity analysis results for each traffic scenario analyzed as part of this study, the following conclusions and recommendations have been made to minimize traffic impacts due to trips generated by the proposed development and future traffic growth in the study area.

- **Northfield Dr. at Northfield Commons West Ent./Walmart Middle Ent.**

The LOS of the northbound left-turn movement exiting Northfield Commons is currently "D" during the PM peak hour and drops to LOS "E" (36.7 seconds of delay) with the added site traffic volumes. The estimated vehicular delay of 36.7 seconds per vehicle is just over the 35 second threshold to remain LOS "D". Unsatisfactory levels of service for left-turn movements are common with stop controlled entrances along a higher volume roadway such as Northfield Drive; however in many cases the left-turn movements operate satisfactory for most of the off-peak times of day, as observed at this intersection. It should also be noted that during peak traffic periods, motorists who want to make left-turn movements from the Northfield Commons development have the option to utilize the signal at the main entrance for easier and safer access to Northfield Drive.

The exiting left-turn movements from Walmart are higher in volume and are already operating at LOS "E" during the PM peak hour. Both exiting left-turn movements from Northfield Commons and Walmart will drop to LOS "F" in year 2021 due to general background traffic growth. The unsatisfactory left-turn movements at both entrances can be eliminated if the entrances are restricted to right-in/right-out movements only; however, this will add delay to the left-turn movements at the signalized main entrance to Northfield Commons and Walmart.

At this time, it is recommended that both the Northfield Commons west entrance and the Walmart entrance remain full access. Restricting turn movements at the entrances will unnecessarily add volume and delay to the adjacent signalized intersection. The minimal increase in traffic volumes due to trips generated by the IHOP restaurant will have a negligible impact on operations at this intersection.

As traffic volumes on Northfield Drive continue to grow in the future or if accidents become an issue at this location, it is recommended to re-evaluate operations at that time.

Several measures can be taken to enhance safety at the intersection at this time. The photo on the right is taken from the approximate

location of a driver's eye for a vehicle stopped and waiting to exit the Northfield Commons development. Currently, the sight distance is obstructed by the trees and shrubbery located to the west of the entrance. It is recommended that this area be trimmed back to better clear the line of sight for vehicles exiting onto Northfield Drive.

Additionally, the through movement exiting Northfield Commons aligns with the existing left-turn lane from the Walmart entrance (as depicted by the yellow arrow on the photo to the right). It is recommended that the exiting lanes of the Northfield Commons entrance be reconfigured as a dedicated left-turn lane and a through/right-turn lane to minimize conflicts between opposing drivers. The through/right-turn lane will then align with the entering lane at the Walmart entrance, improving safety for vehicles making crossing movements.

The Walmart entrance at this intersection should also be restriped to provide a dedicated left-turn lane and a through/right-turn lane. This will also improve safety by properly delineating to drivers which lane allows for a through movement, as currently the approach is striped as only a left and right-turn lane.

- **Northfield Dr. at Northfield Commons Main Ent./Walmart East Ent.**

All turning movements are currently operating satisfactorily in both the AM and PM peak hours. Turning movements at the intersection will continue to operate at LOS "C" or better with the addition of the site trips generated once the IHOP restaurant opens. It should be noted that if the Walmart middle entrance is restricted to right-in/right-out at some point in the future, a significant number of left-turn movements will be added to the southbound approach (pictured on the right). This resulted in several turning movements operating at LOS "D" for the Alternative 2, year 2021 analysis. As volumes and delay continue to increase for this movement, the existing restricted area could be reconfigured for use as a second exiting left-turn lane; however, the entering radius at the approach would need to be reconstructed to enable trucks to

properly make the movement without encroaching upon the exiting left-turn lane (as identified in a design evaluation of the entrance completed by others).

- **Northfield Drive at SR 267**

  The westbound and southbound through movements are currently operating at LOS "D" during the PM peak hour, with all other turn movements operating at LOS "C" or better. The minimal site traffic that will be added by the IHOP restaurant increases overall delay at the intersection by less than a second. The recently completed improvements on the west approach of Northfield Drive at SR 267 have significantly improved traffic operations at the intersection compared to year 2007 operations at the time the Northfield Drive Corridor Study was completed.

Overall, generated site trips anticipated by the proposed IHOP restaurant are not significant compared to existing traffic volumes on Northfield Drive and based on the capacity analyses completed will have little impact on operations at the study intersections. The recent improvements made to Northfield Drive west of SR 267 added sufficient capacity to accommodate traffic generated by the IHOP restaurant, as well as additional background traffic growth in the future.

REFERENCES

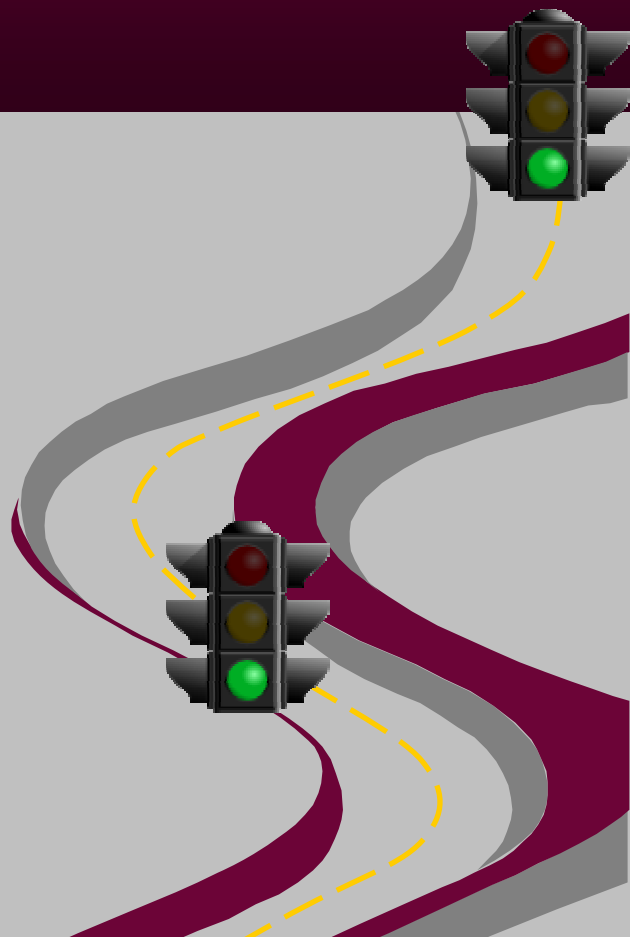
1. ***Trip Generation Manual*****,** 8th Edition, Institute of Transportation Engineers, Washington, D.C., 2008.

2. **SYNCHRO Software**, Version 7, TrafficWare

3. ***Highway Capacity Manual 2000***, Transportation Research Board, National Research Council, Washington, D.C.

APPENDIX A

FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE



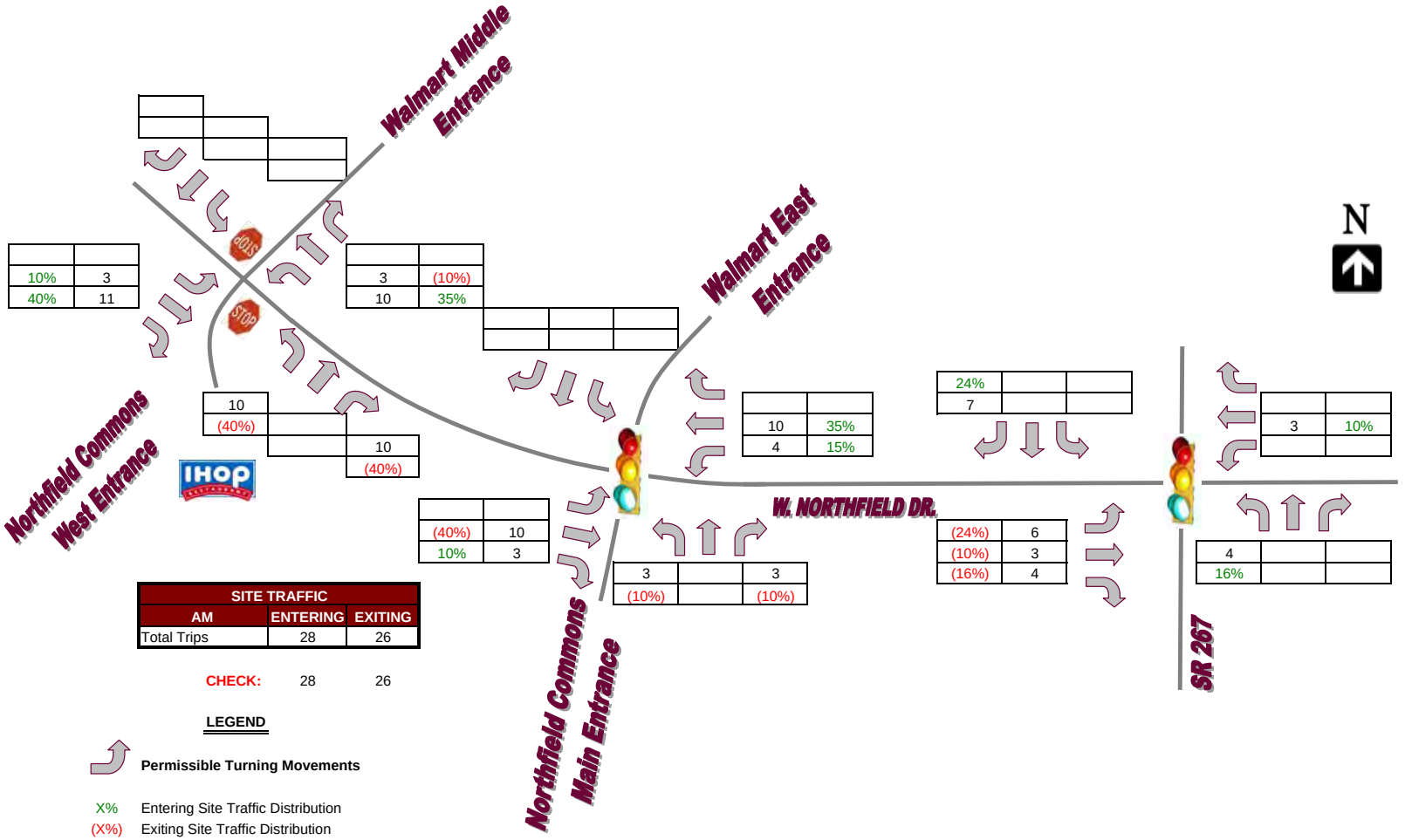
ALTERNATIVE 1
TRAFFIC VOLUMES

VS ENGINEERING, INC.
Civil • Structural • Transportation • Environmental

YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)

FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE

TRIP DISTRIBUTION & ASSIGNMENT



SITE TRAFFIC		
AM	ENTERING	EXITING
Total Trips	28	26

CHECK: 28 26

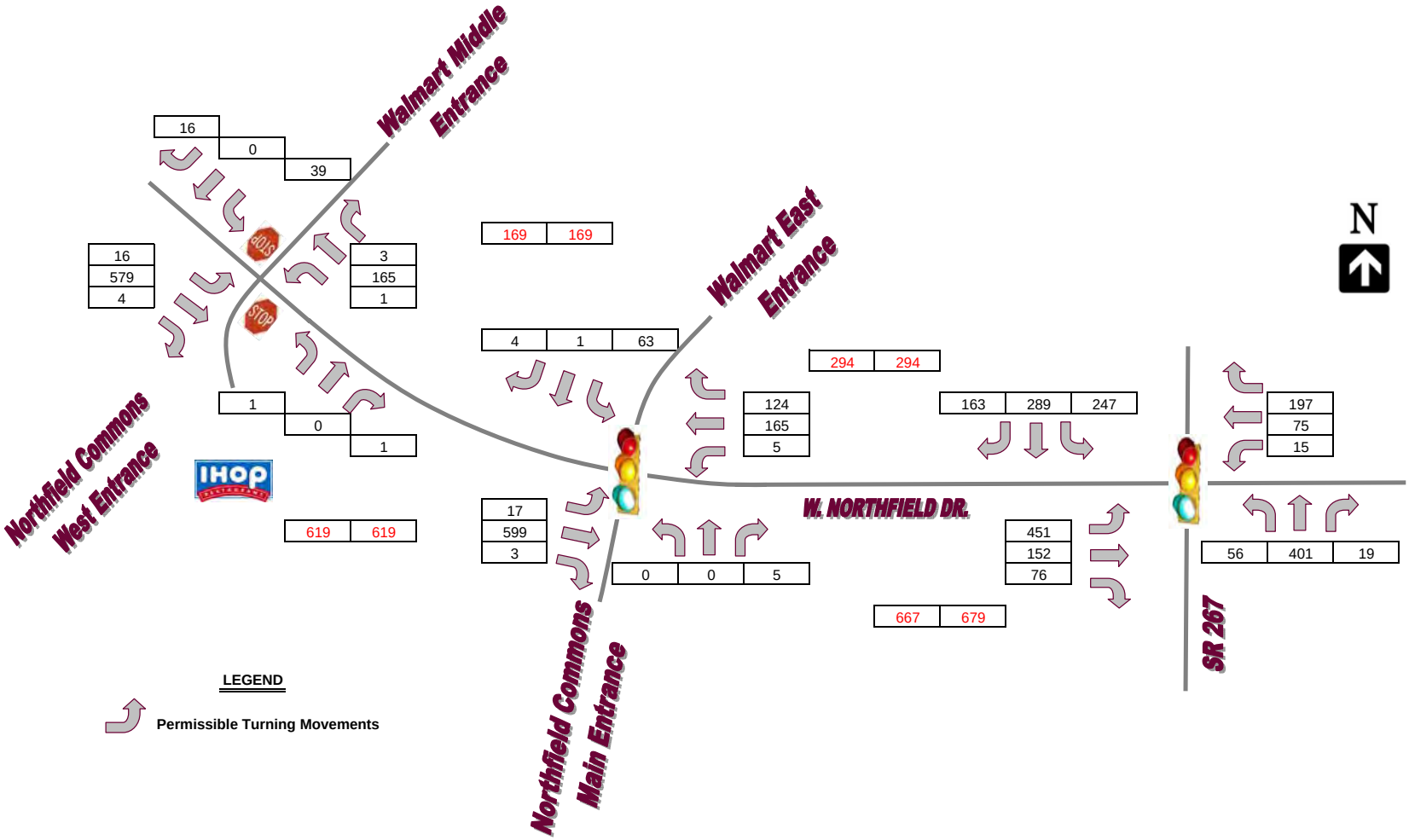
LEGEND

Permissible Turning Movements

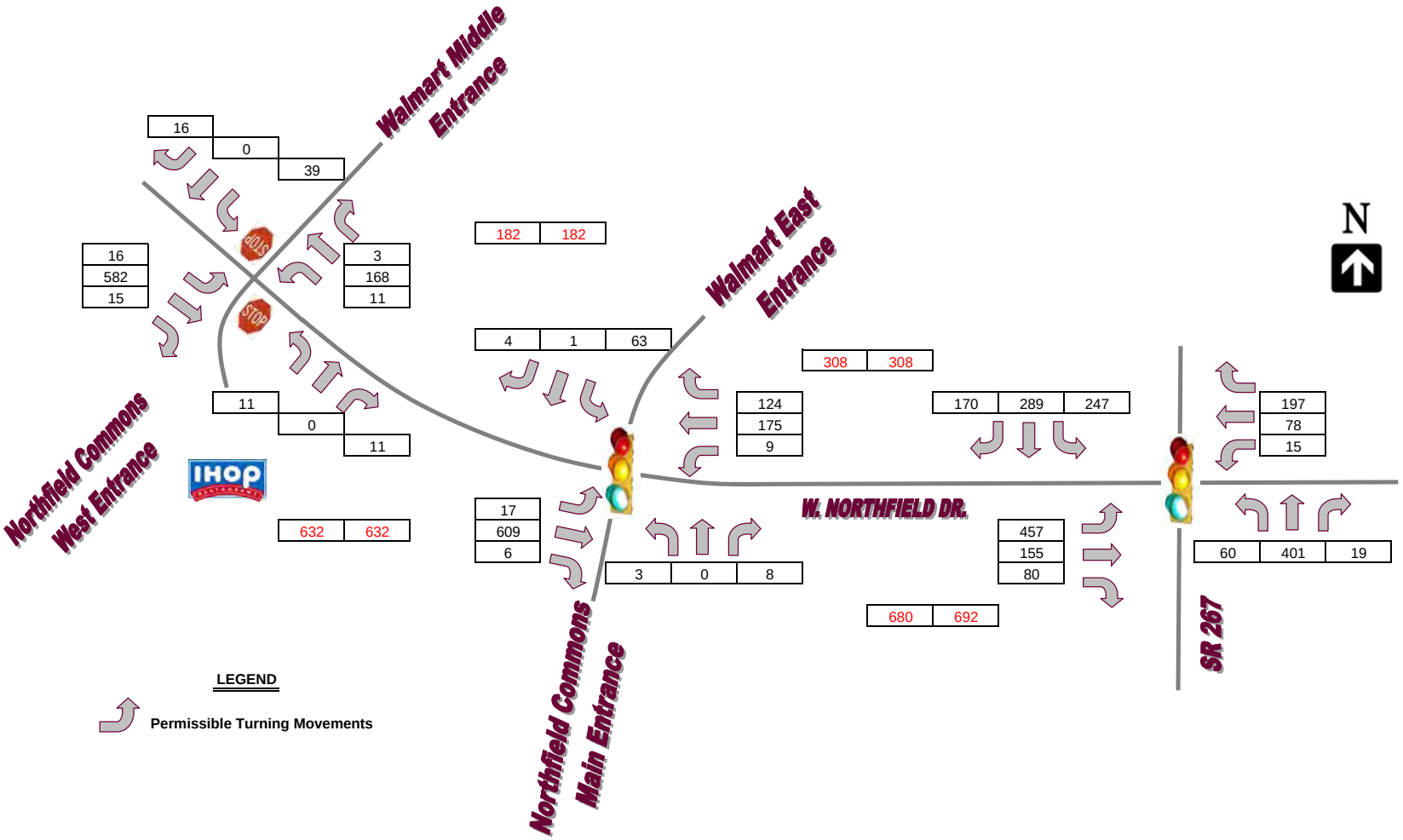
X% Entering Site Traffic Distribution

(X%) Exiting Site Traffic Distribution

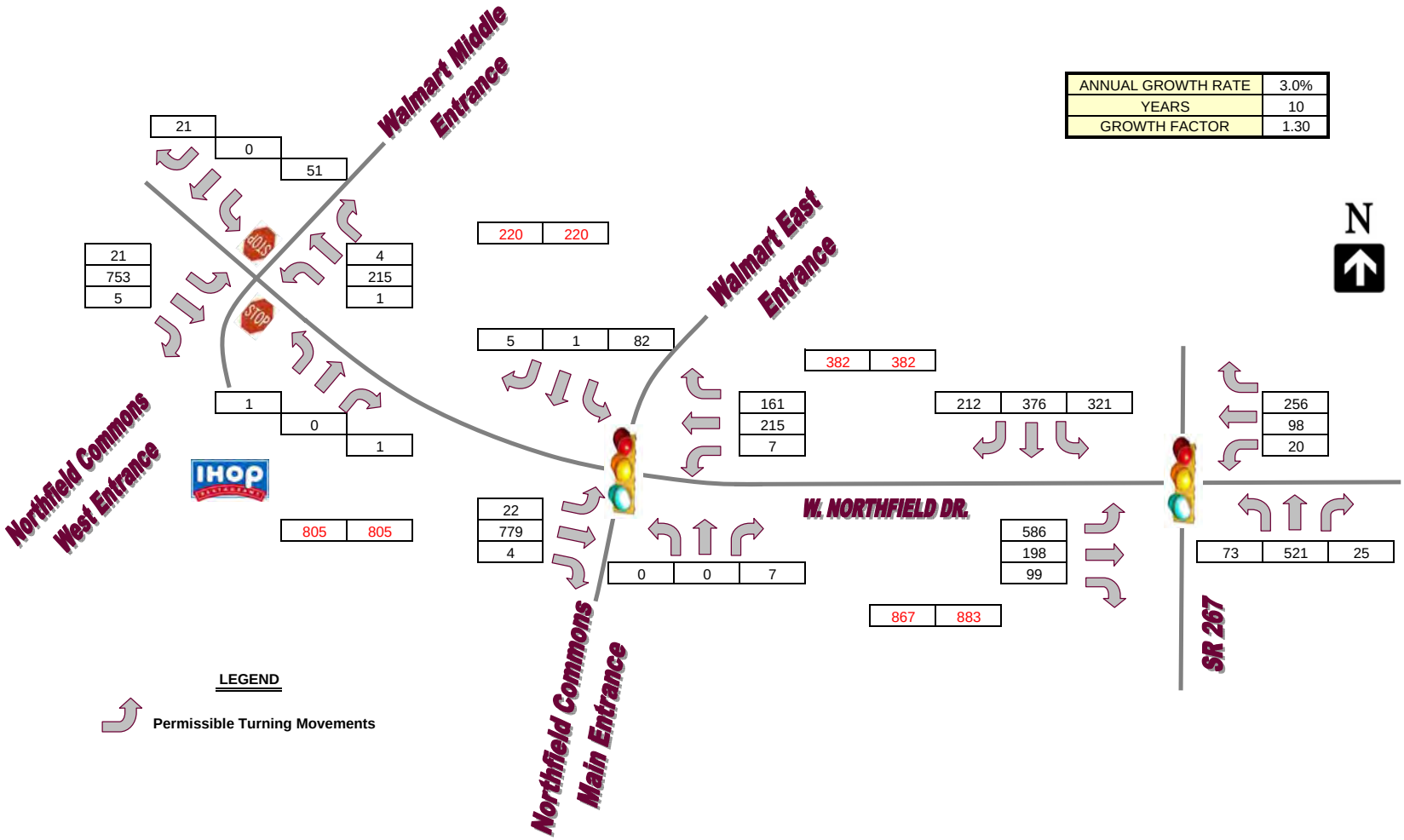
YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE



YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE

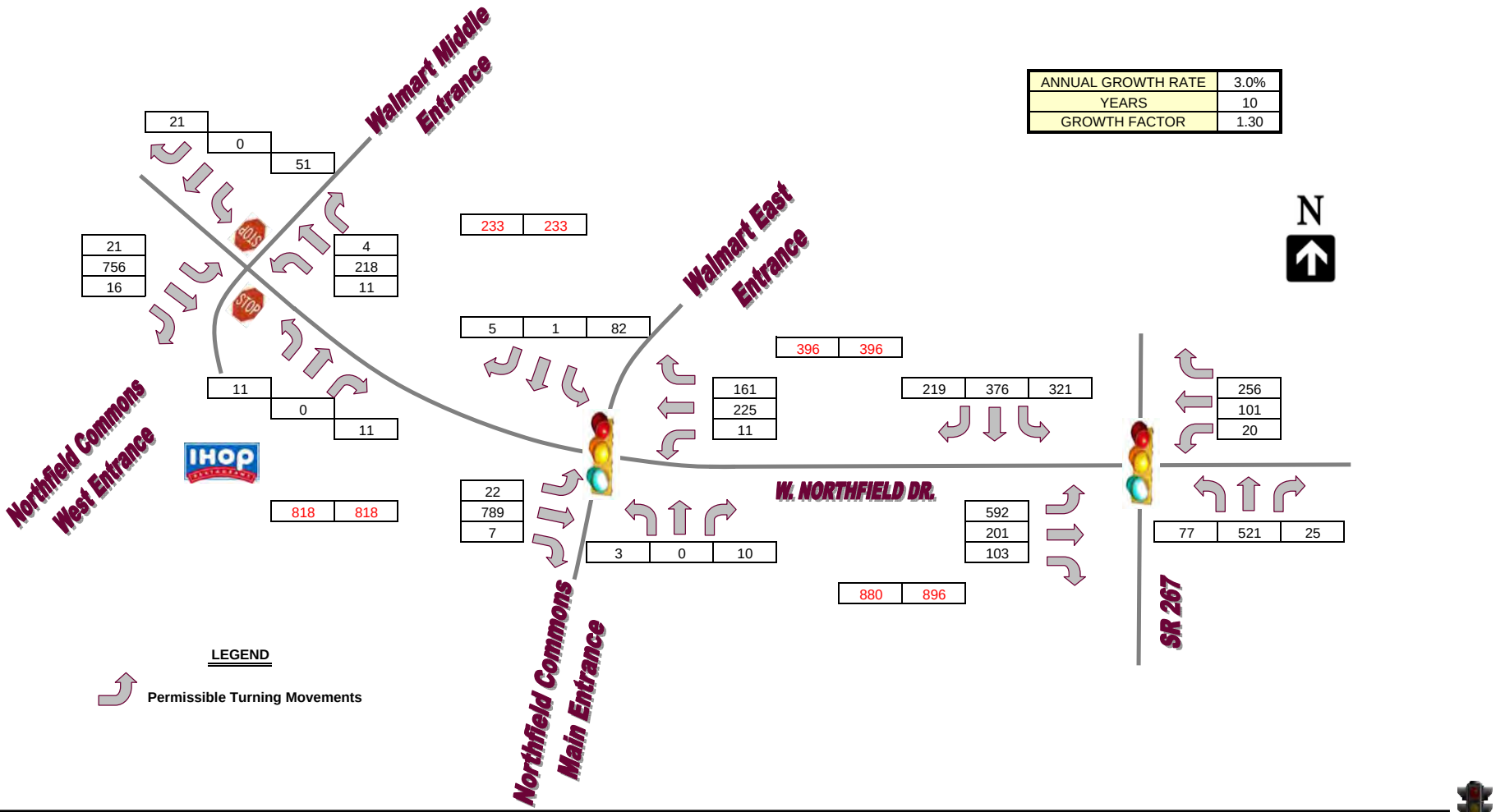


YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE

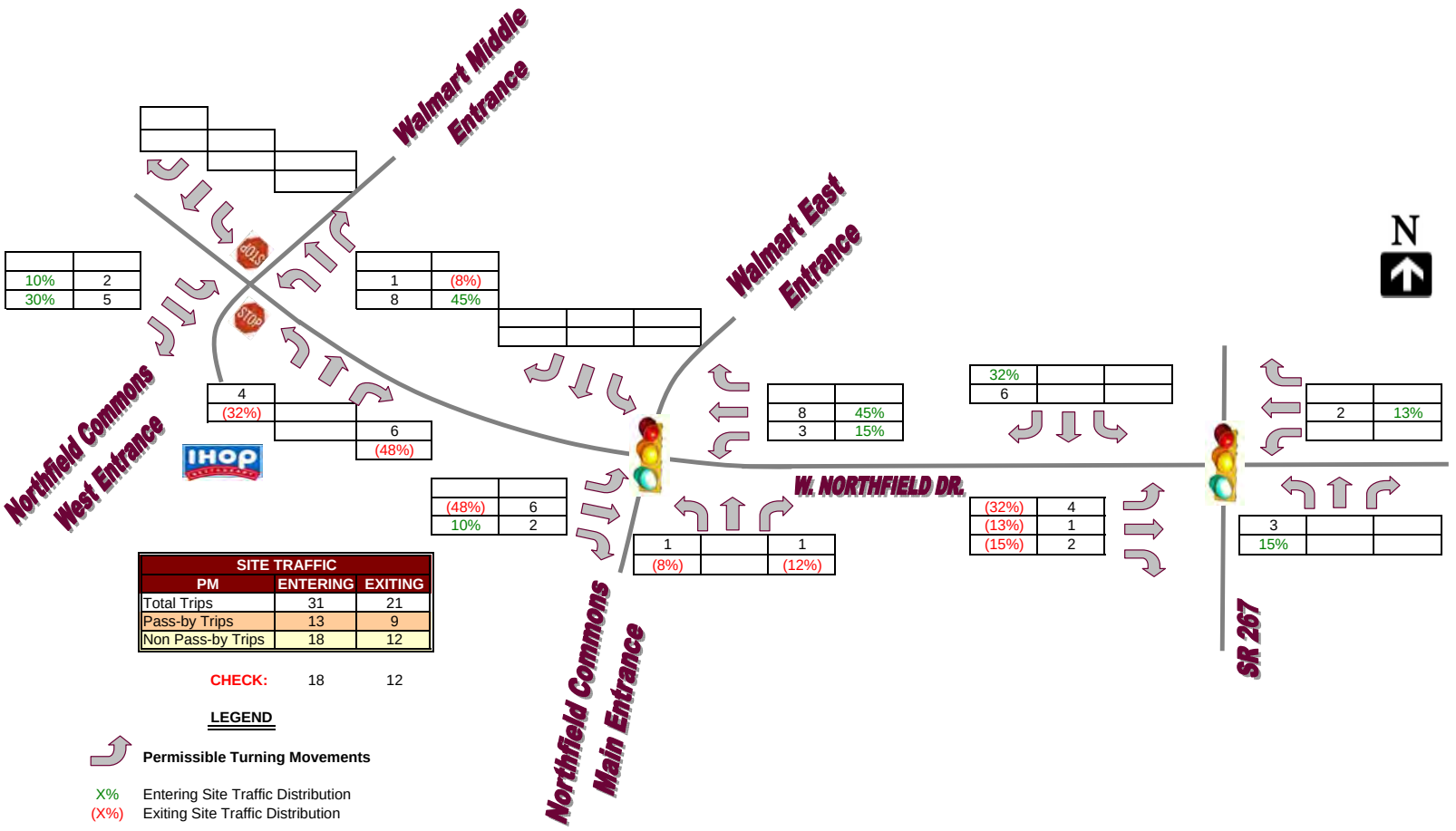


ANNUAL GROWTH RATE	3.0%
YEARS	10
GROWTH FACTOR	1.30

YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE



PM PEAK HOUR - NON PASS-BY SITE TRAFFIC (ALTERNATE 1)
FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE
TRIP DISTRIBUTION & ASSIGNMENT



SITE TRAFFIC		
PM	ENTERING	EXITING
Total Trips	31	21
Pass-by Trips	13	9
Non Pass-by Trips	18	12

CHECK: 18 12

LEGEND

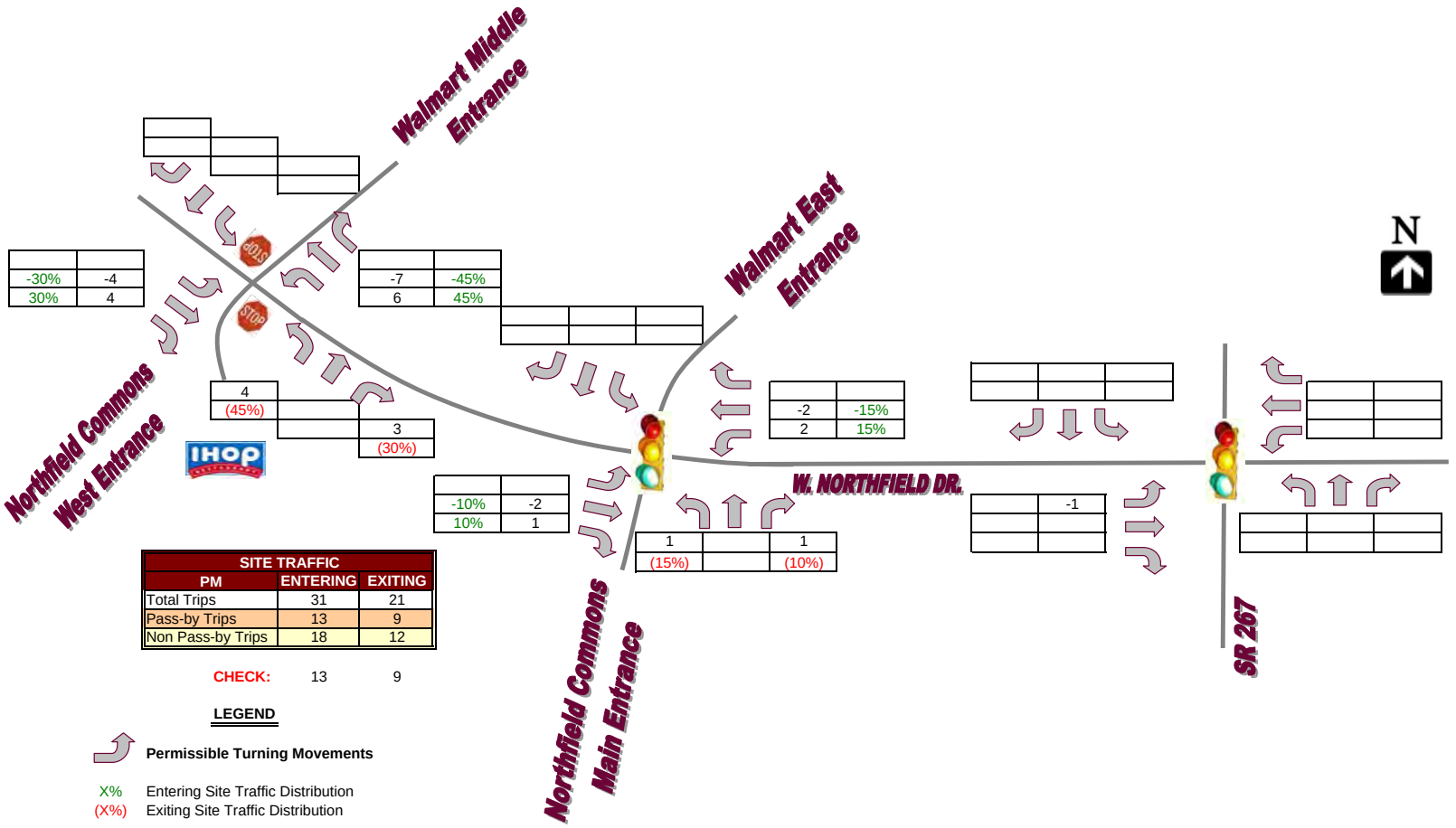
Permissible Turning Movements

X% Entering Site Traffic Distribution
(X%) Exiting Site Traffic Distribution

PM PEAK HOUR - PASS-BY SITE TRAFFIC (ALTERNATE 1)

FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE

TRIP DISTRIBUTION & ASSIGNMENT



SITE TRAFFIC		
PM	ENTERING	EXITING
Total Trips	31	21
Pass-by Trips	13	9
Non Pass-by Trips	18	12

CHECK: 13 9

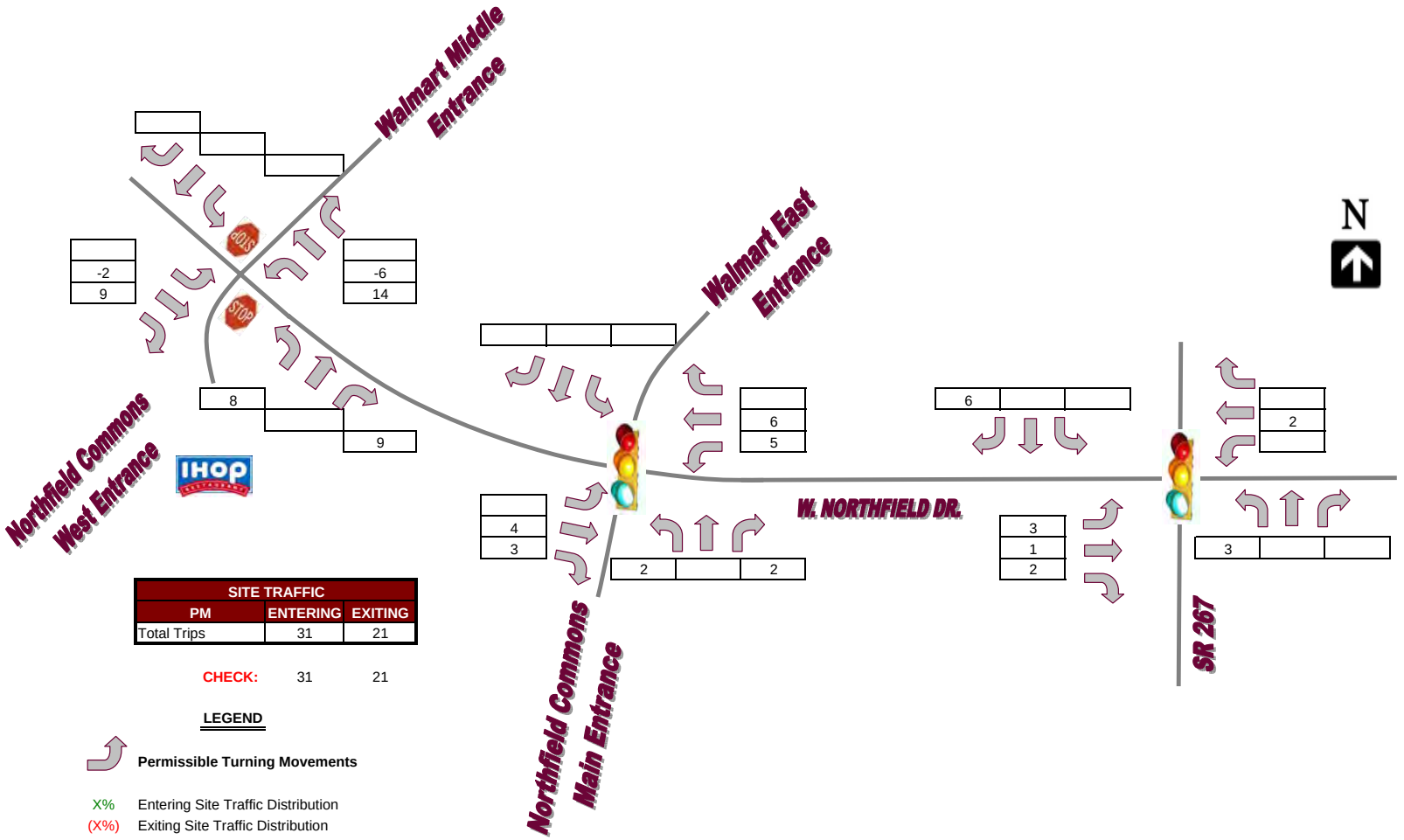
LEGEND

Permissible Turning Movements

X% Entering Site Traffic Distribution

(X%) Exiting Site Traffic Distribution

YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE



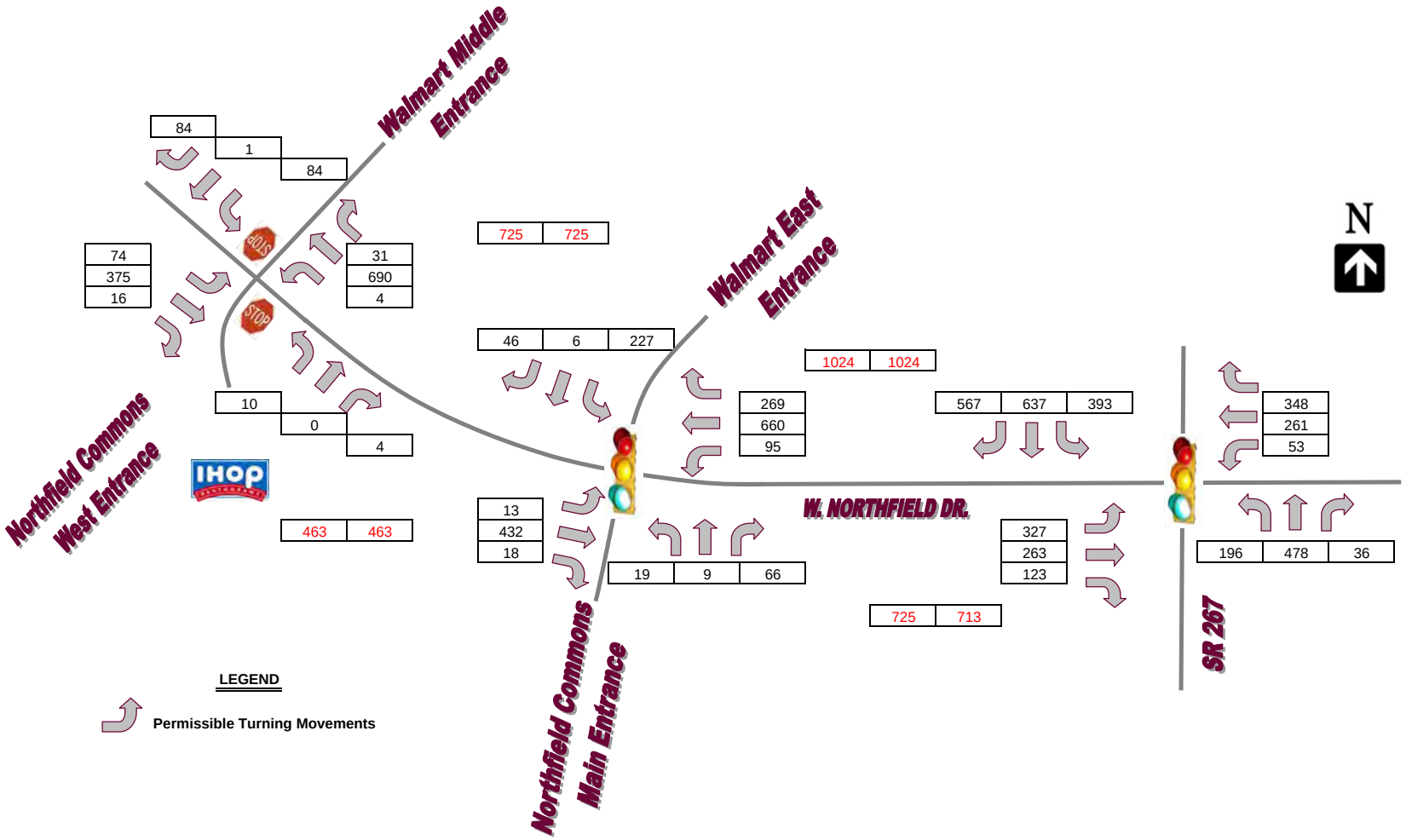
SITE TRAFFIC		
PM	ENTERING	EXITING
Total Trips	31	21
CHECK:	31	21

LEGEND

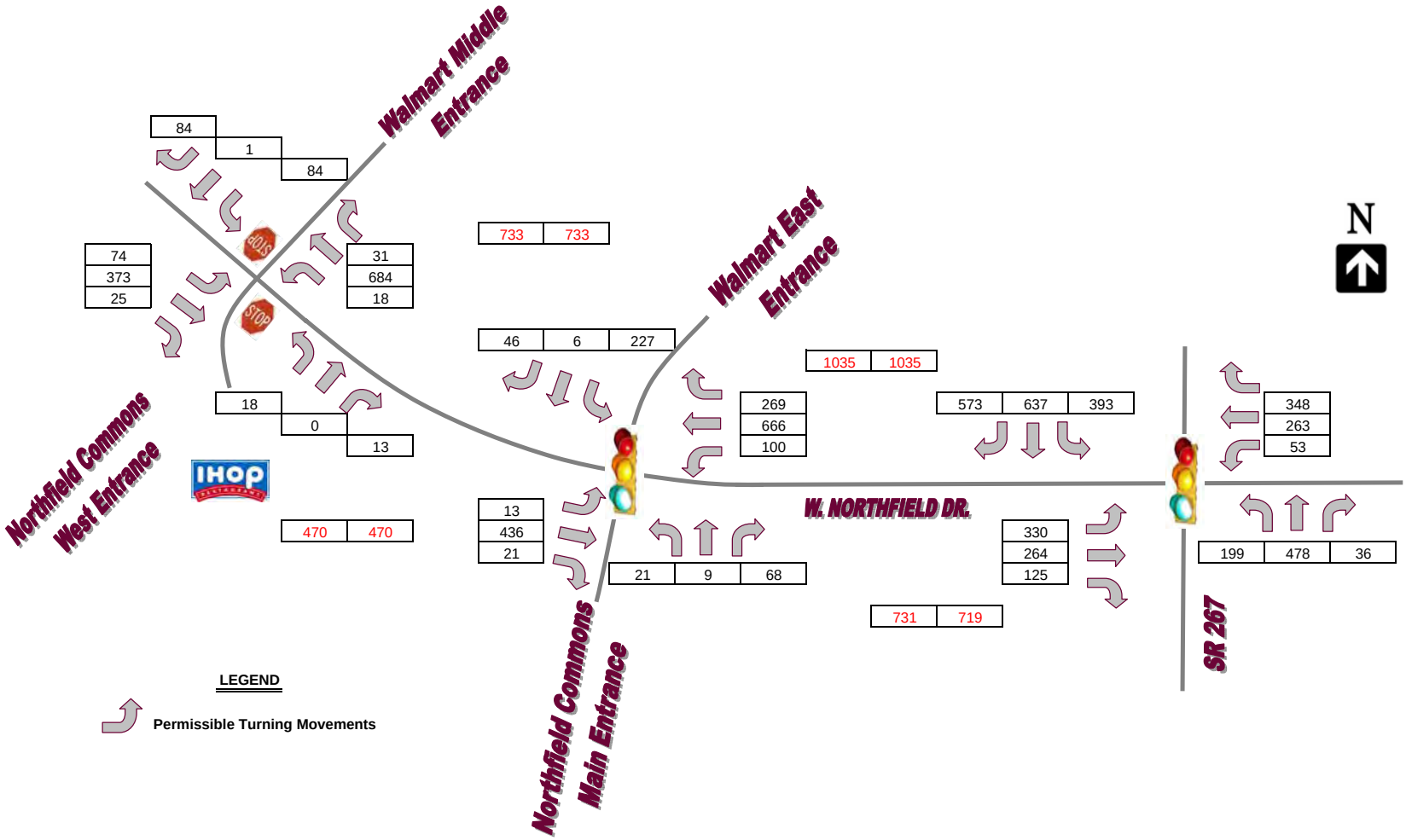
Permissible Turning Movements

X% Entering Site Traffic Distribution
(X%) Exiting Site Traffic Distribution

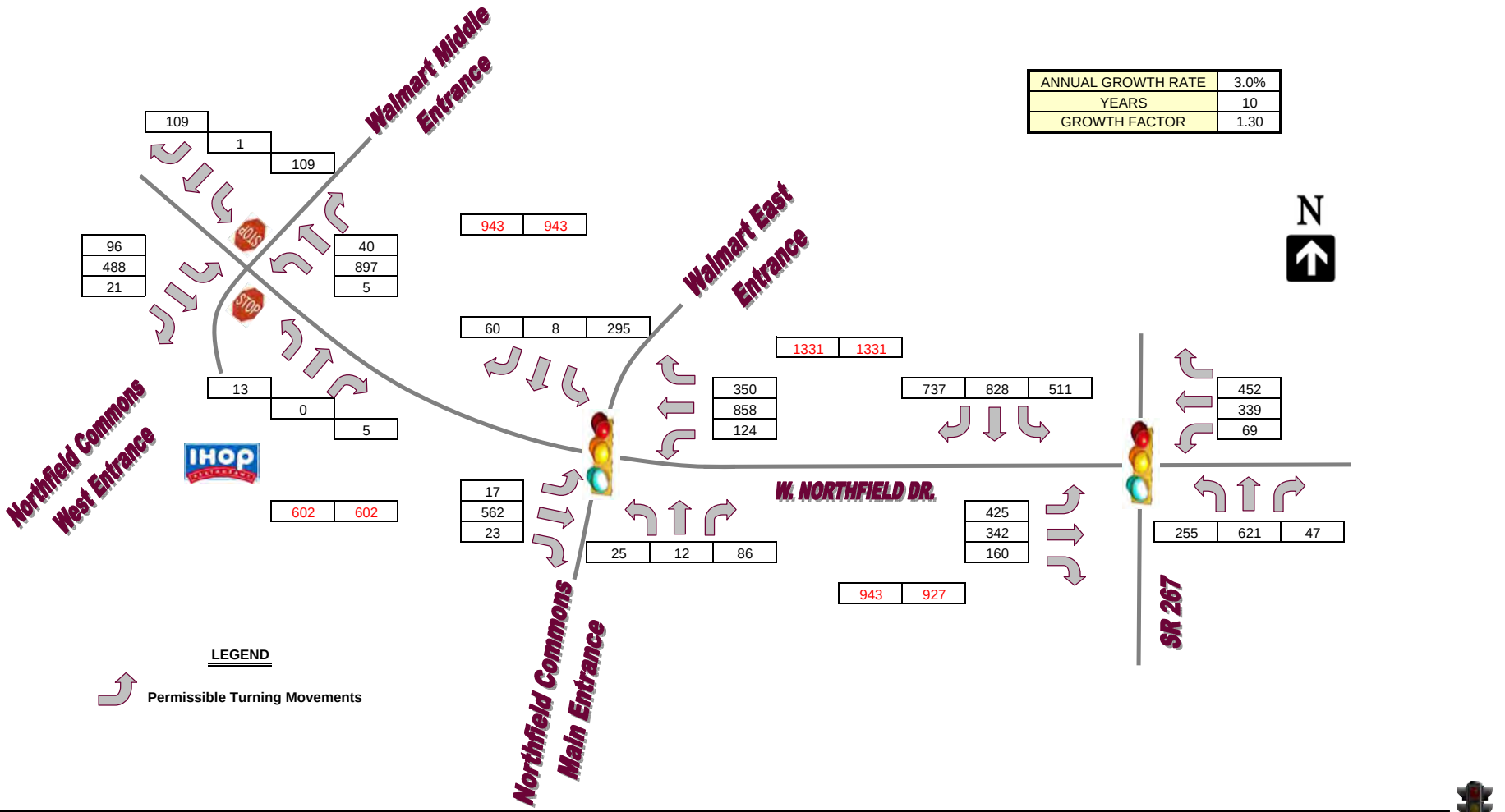
YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE



YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE

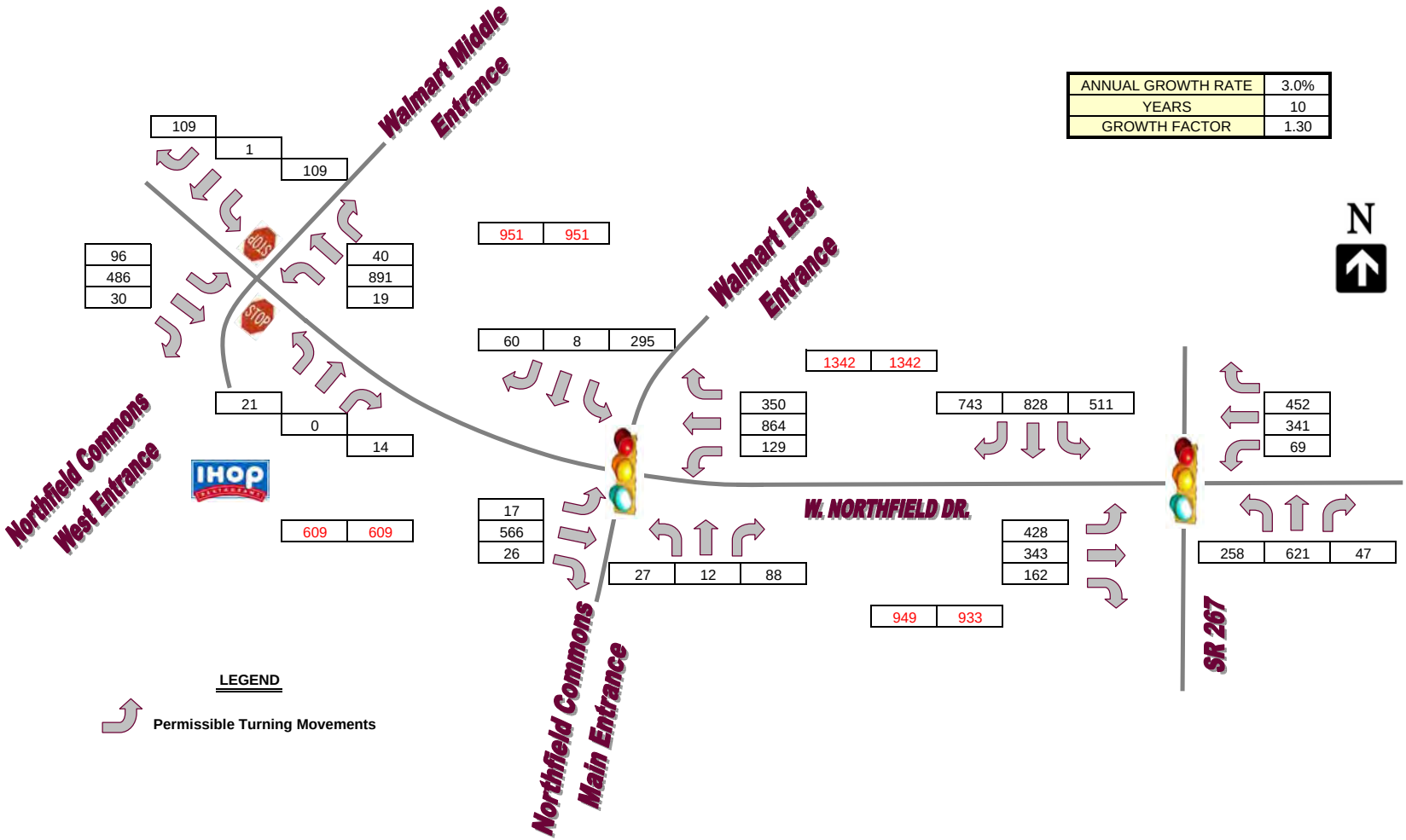


YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE



ANNUAL GROWTH RATE	3.0%
YEARS	10
GROWTH FACTOR	1.30

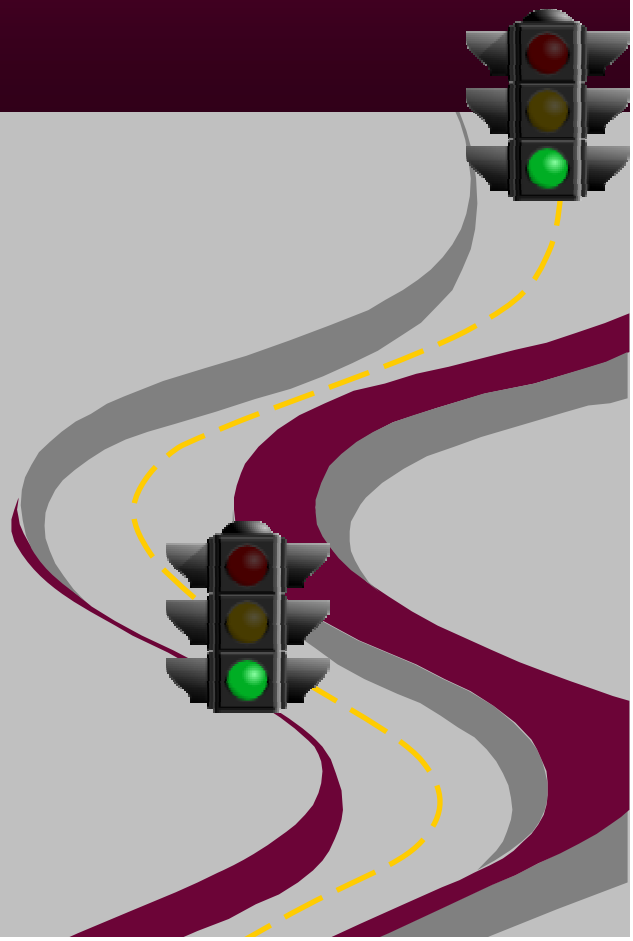
YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE



ANNUAL GROWTH RATE	3.0%
YEARS	10
GROWTH FACTOR	1.30

APPENDIX B

RIGHT-IN/RIGHT OUT AT NORTHFIELD COMMONS WEST ENTRANCE



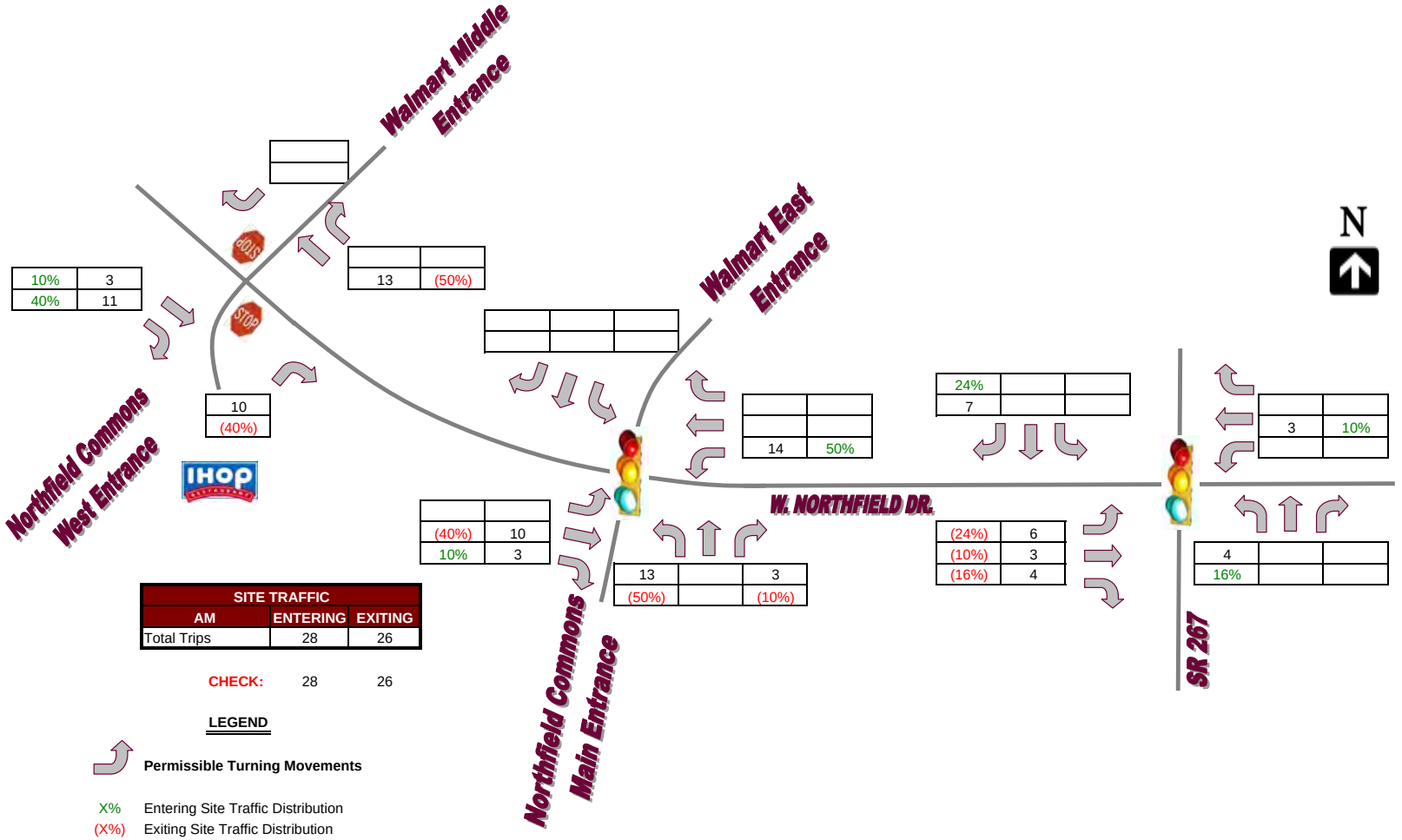
ALTERNATIVE 2
TRAFFIC VOLUMES

VS ENGINEERING, INC.
Civil • Structural • Transportation • Environmental

YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)

RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE

TRIP DISTRIBUTION & ASSIGNMENT



SITE TRAFFIC		
AM	ENTERING	EXITING
Total Trips	28	26
CHECK:	28	26

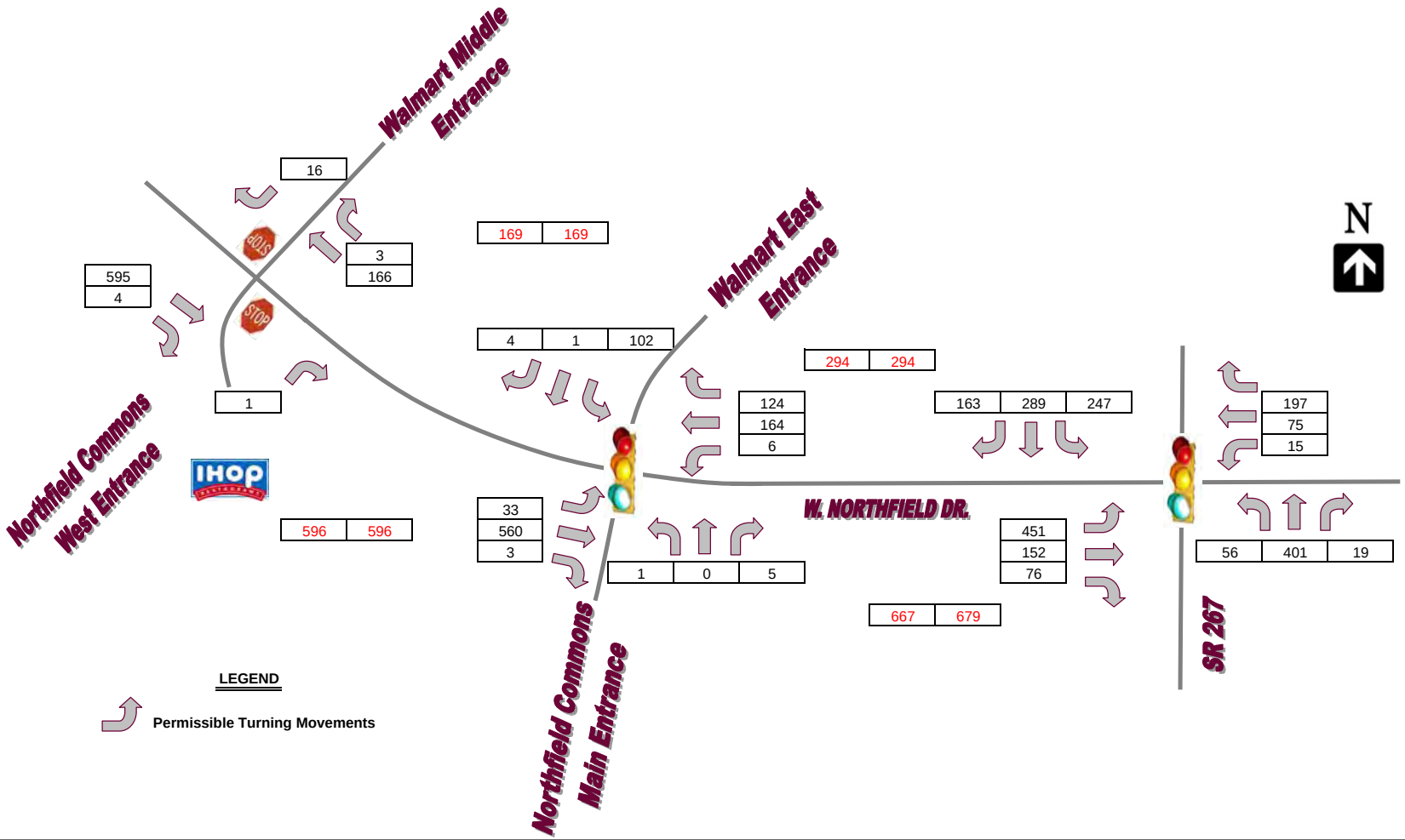
LEGEND

Permissible Turning Movements

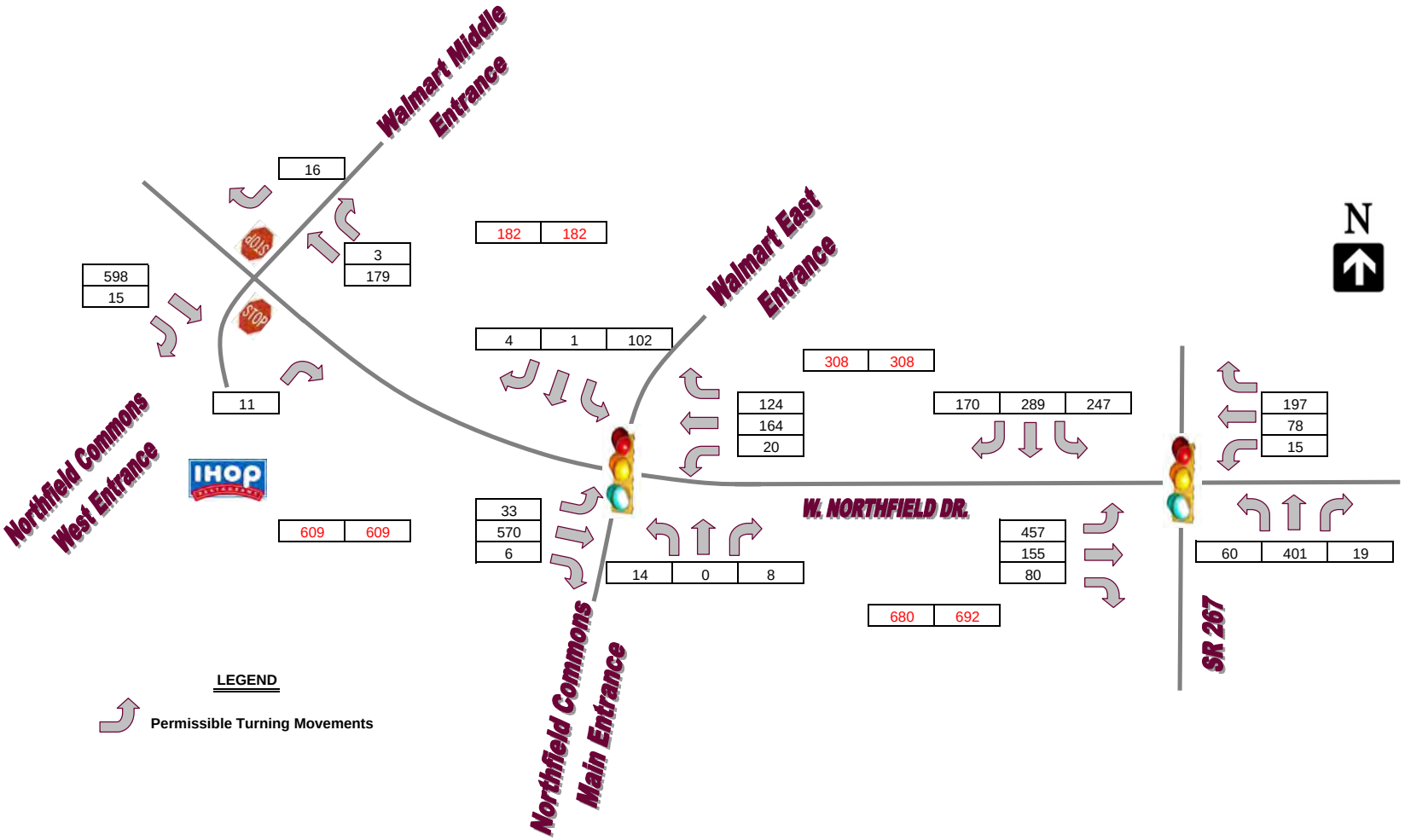
X% Entering Site Traffic Distribution

(X%) Exiting Site Traffic Distribution

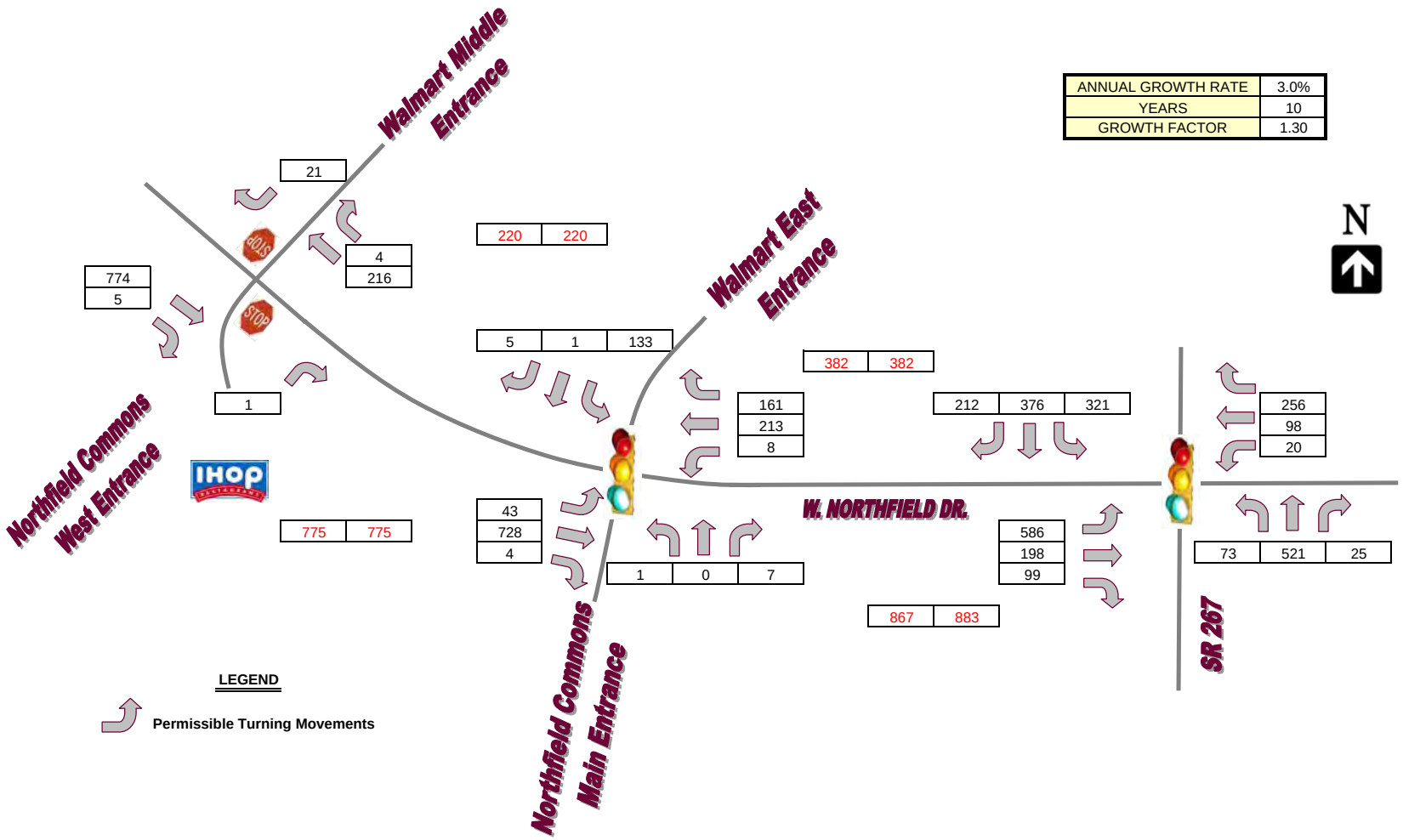
YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE



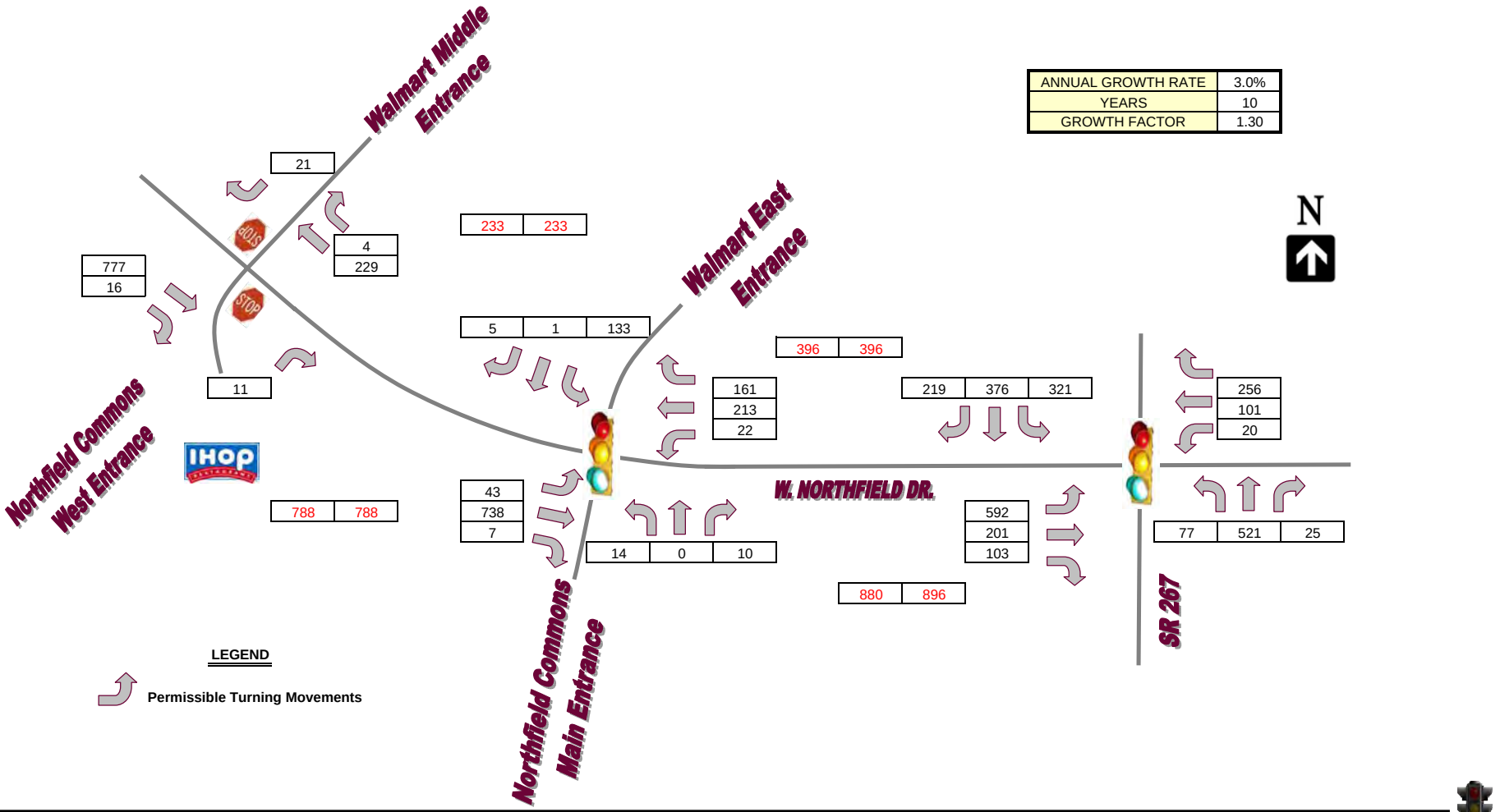
YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE



YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE



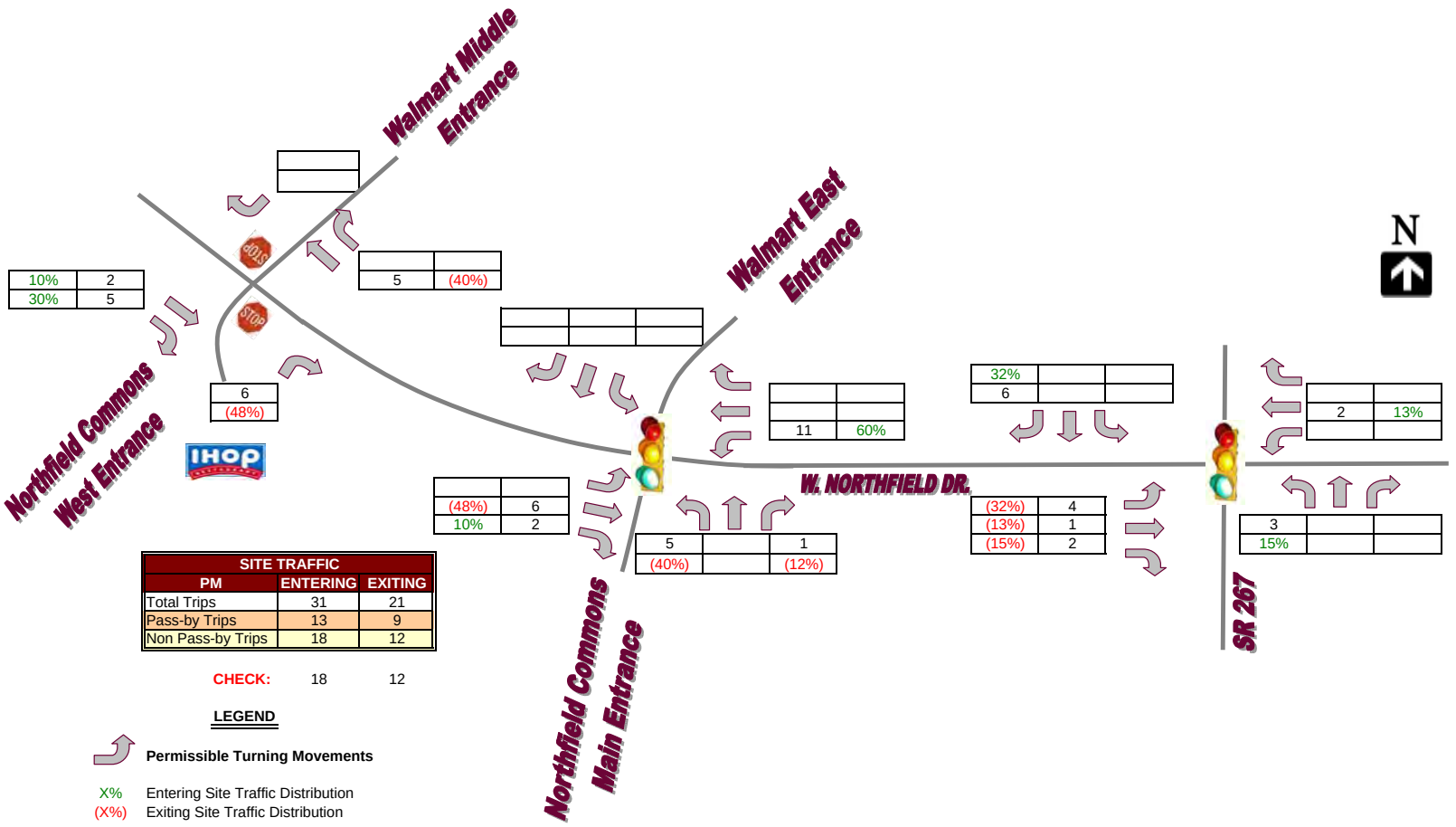
YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE



PM PEAK HOUR - NON PASS-BY SITE TRAFFIC (ALTERNATE 2)

RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE

TRIP DISTRIBUTION & ASSIGNMENT



SITE TRAFFIC		
PM	ENTERING	EXITING
Total Trips	31	21
Pass-by Trips	13	9
Non Pass-by Trips	18	12
CHECK:	18	12

LEGEND

Permissible Turning Movements

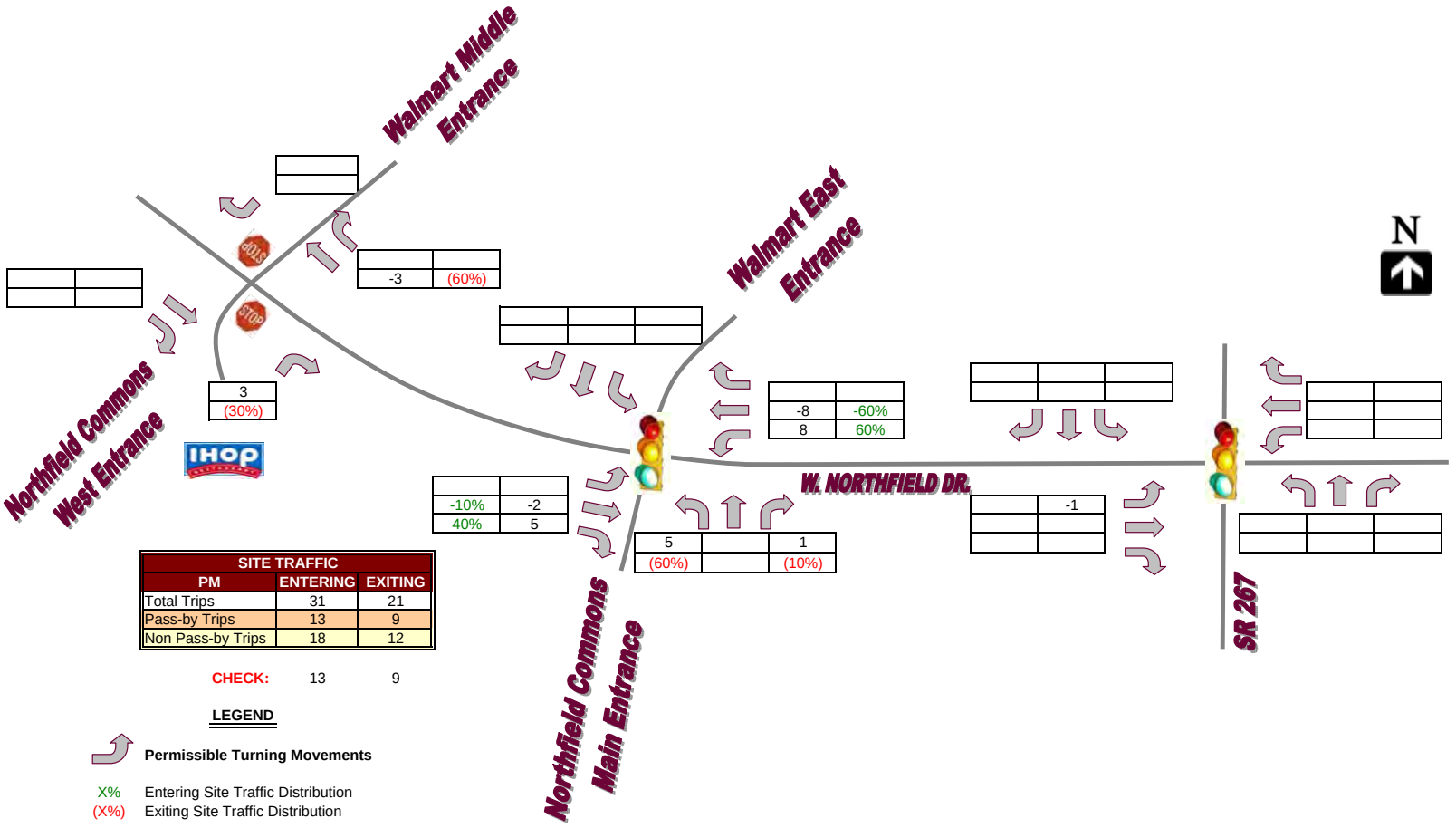
X% Entering Site Traffic Distribution

(X%) Exiting Site Traffic Distribution

PM PEAK HOUR - PASS-BY SITE TRAFFIC (ALTERNATE 2)

RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE

TRIP DISTRIBUTION & ASSIGNMENT



SITE TRAFFIC		
PM	ENTERING	EXITING
Total Trips	31	21
Pass-by Trips	13	9
Non Pass-by Trips	18	12
CHECK:	13	9

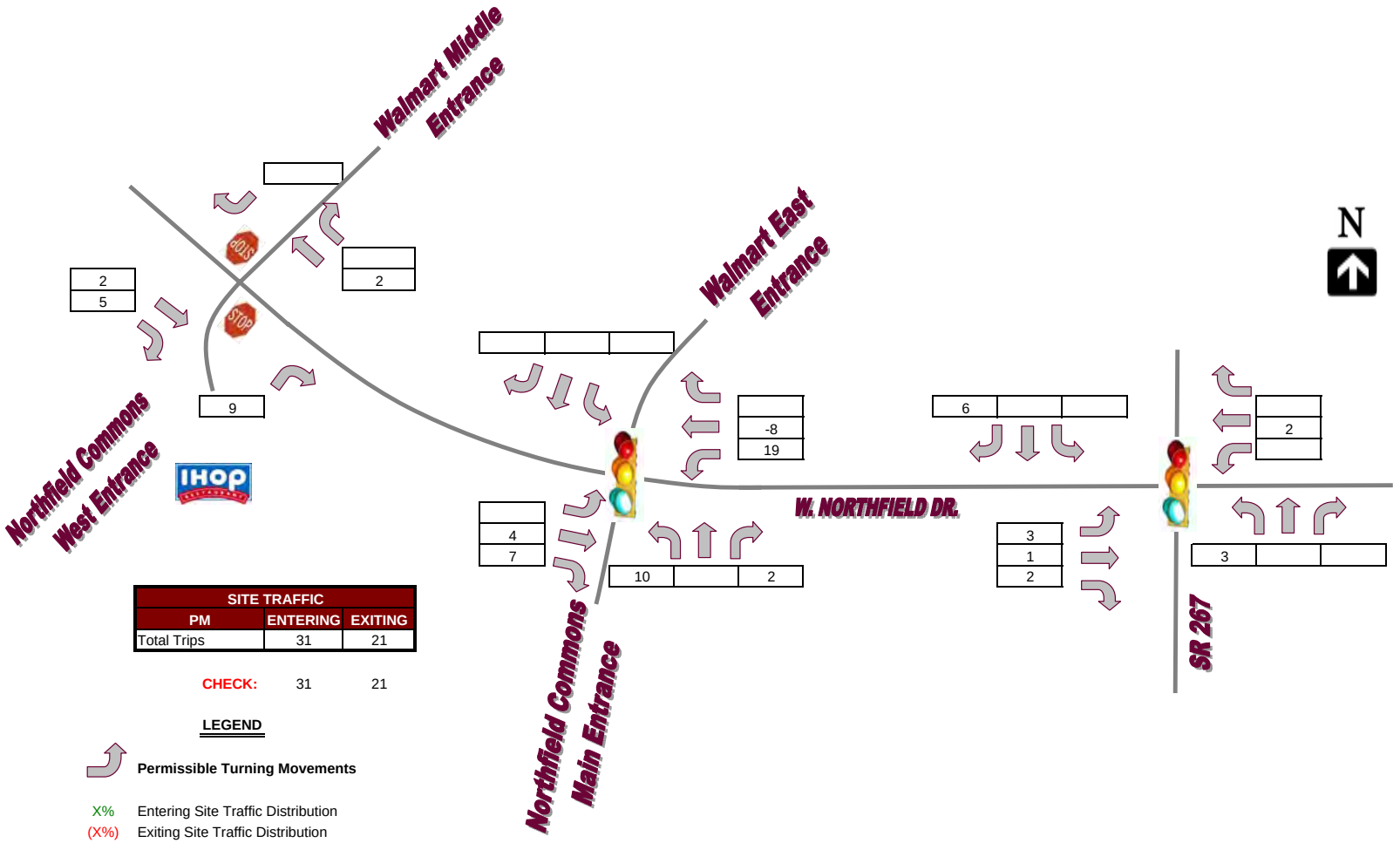
LEGEND

Permissible Turning Movements

X% Entering Site Traffic Distribution

(X%) Exiting Site Traffic Distribution

YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE



SITE TRAFFIC		
PM	ENTERING	EXITING
Total Trips	31	21

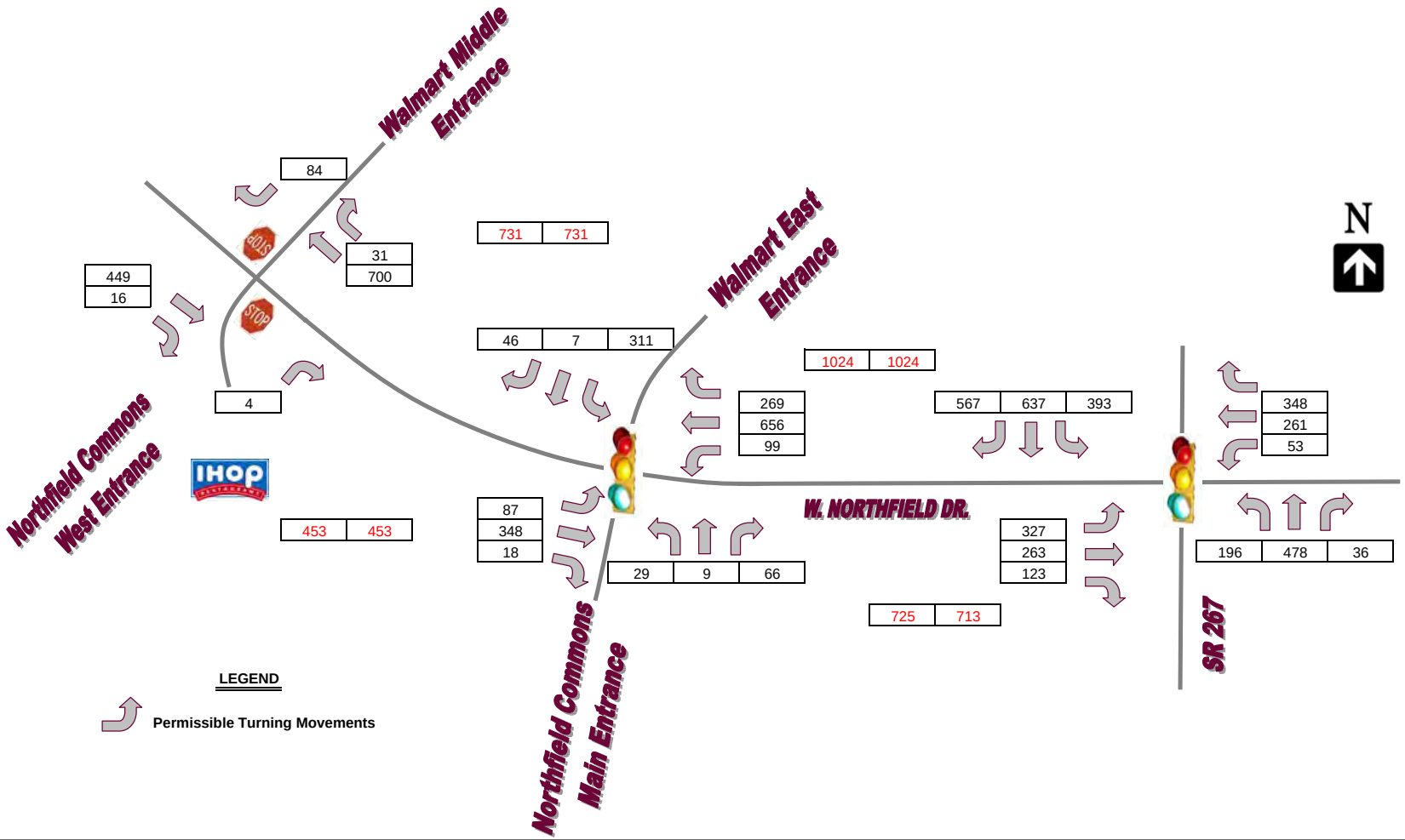
CHECK: 31 21

LEGEND

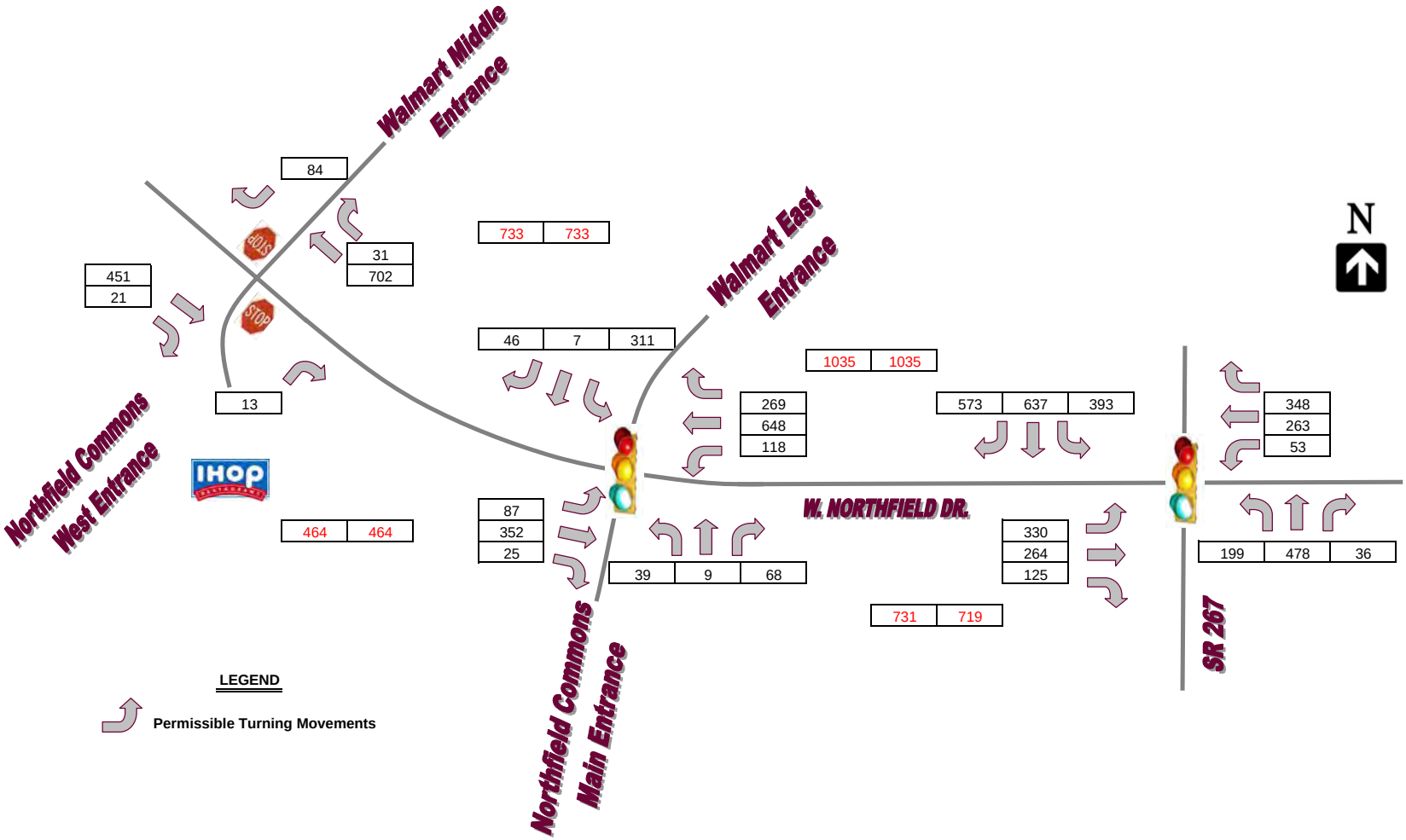
Permissible Turning Movements

X% Entering Site Traffic Distribution
(X%) Exiting Site Traffic Distribution

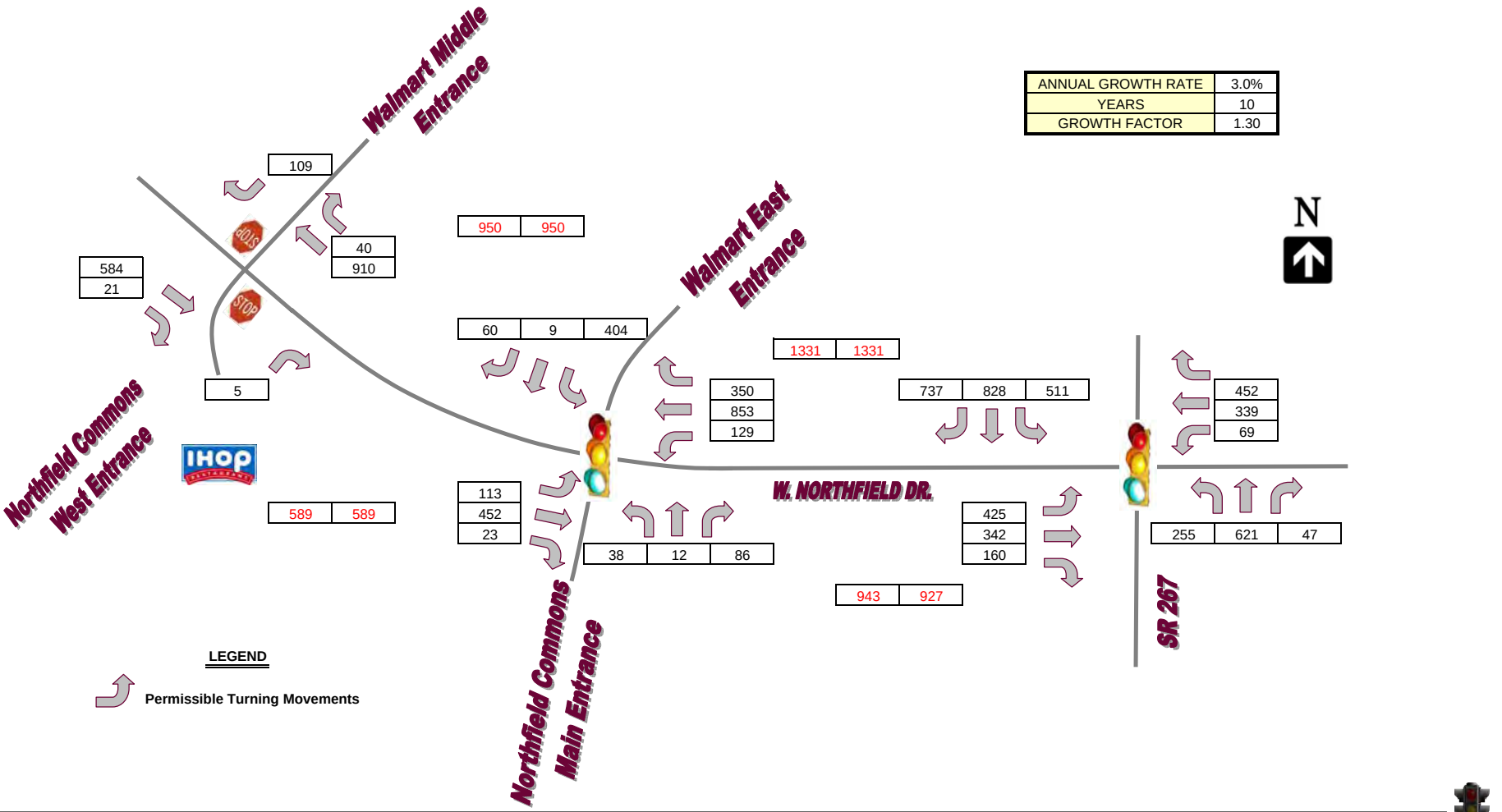
YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE



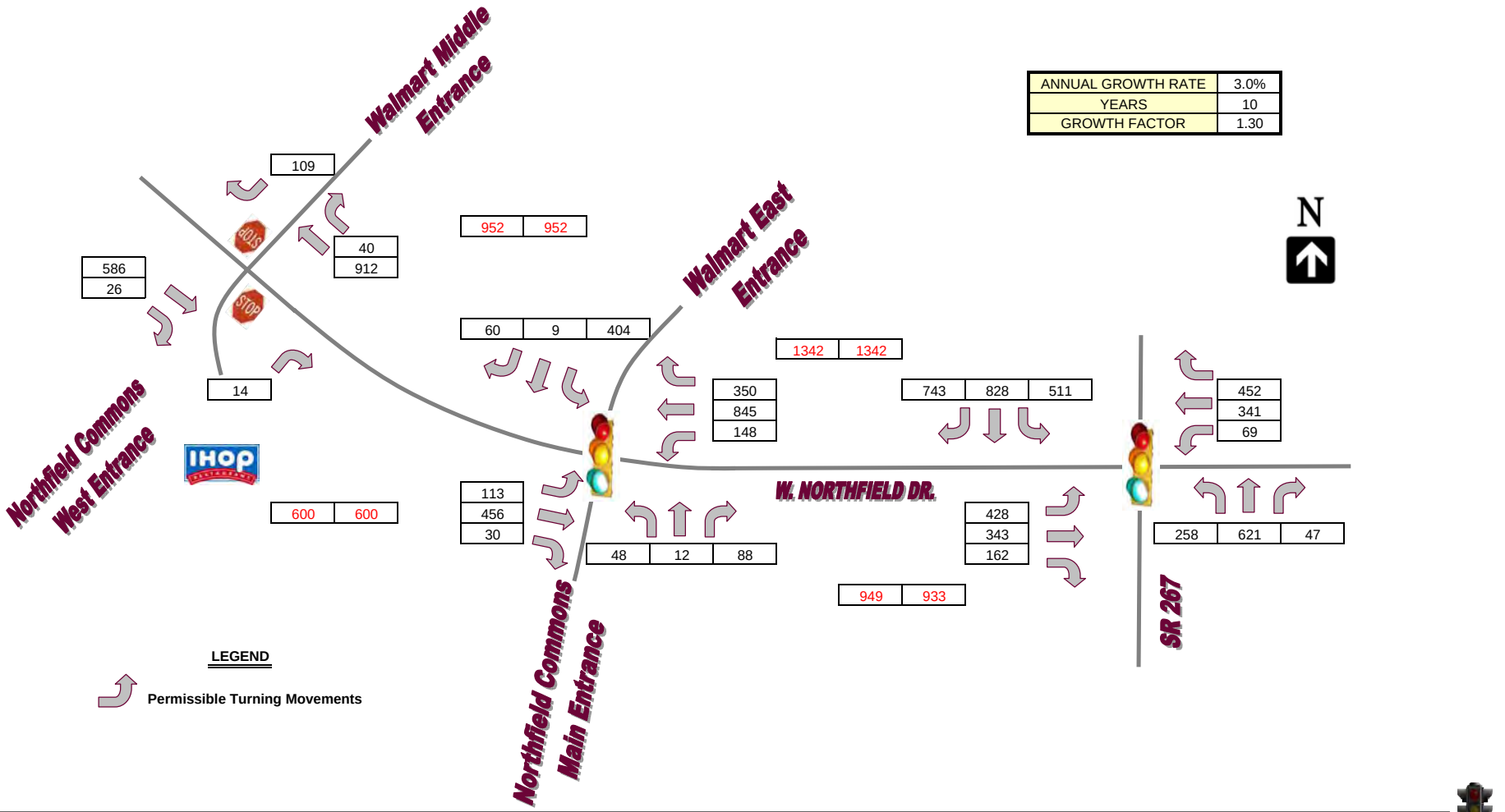
YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE



YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE

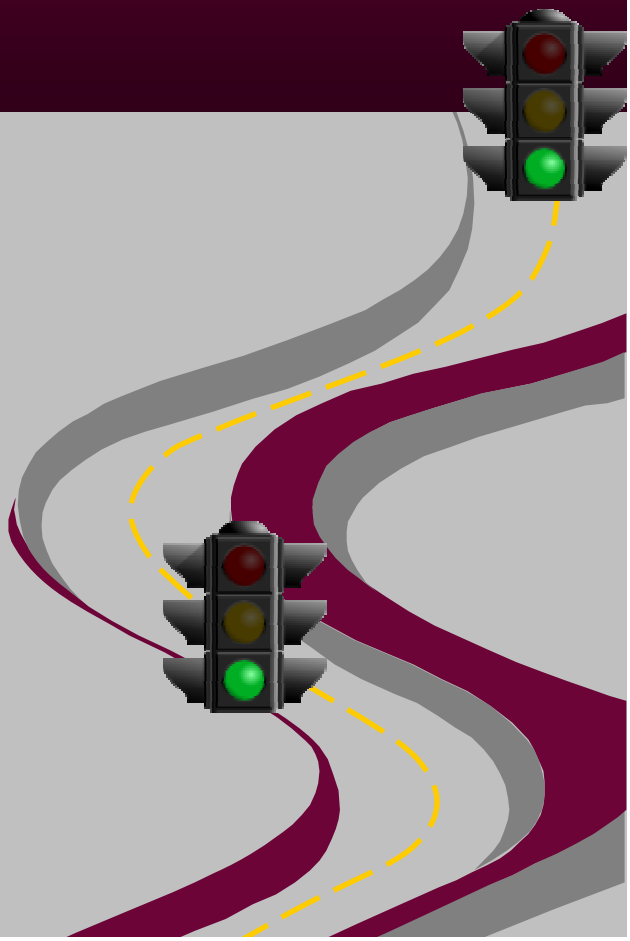


YEAR 2011 AM PEAK HOUR - COMBINED TRAFFIC (ALTERNATE 2)
RIGHT-IN/RIGHT-OUT AT NORTHFIELD COMMONS WEST ENTRANCE



APPENDIX C

FULL ACCESS AT NORTHFIELD COMMONS WEST ENTRANCE



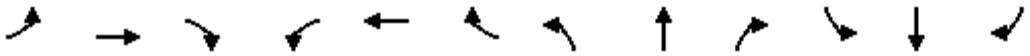
ALTERNATIVE 1
INTERSECTION CAPACITY ANALYSIS

VS ENGINEERING, INC.
Civil • Structural • Transportation • Environmental

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	16	579	4	1	165	3	1	0	1	39	0	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.89	0.90	0.25	0.88	0.38	0.25	0.25	0.25	0.41	0.25	0.57
Hourly flow rate (vph)	20	651	4	4	188	8	4	0	4	95	0	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked												
vC, conflicting volume	195			655			823	896	328	569	894	98
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	195			655			823	896	328	569	894	98
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			98	100	99	76	100	97
cM capacity (veh/h)	1390			928			254	277	674	401	277	939

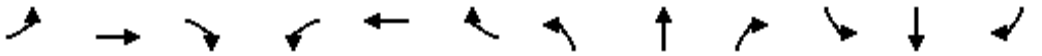
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2	SW 1	SW 2
Volume Total	345	330	98	102	4	4	95	28
Volume Left	20	0	4	0	4	0	95	0
Volume Right	0	4	0	8	0	4	0	28
cSH	1390	1700	928	1700	254	674	401	939
Volume to Capacity	0.01	0.19	0.00	0.06	0.02	0.01	0.24	0.03
Queue Length 95th (ft)	1	0	0	0	1	0	23	2
Control Delay (s)	0.6	0.0	0.4	0.0	19.4	10.4	16.7	9.0
Lane LOS	A		A		C	B	C	A
Approach Delay (s)	0.3		0.2		14.9		15.0	
Approach LOS					B		B	

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	40.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	599	3	5	165	124	0	0	5	63	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.85		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1805	3500		1597	3406	1583		1429		1736	1693	
Flt Permitted	0.63	1.00		0.26	1.00	1.00		1.00		0.75	1.00	
Satd. Flow (perm)	1196	3500		438	3406	1583		1429		1370	1693	
Peak-hour factor, PHF	0.85	0.92	0.38	0.63	0.88	0.89	0.25	0.25	0.42	0.83	0.25	0.50
Adj. Flow (vph)	20	651	8	8	188	139	0	0	12	76	4	8
RTOR Reduction (vph)	0	1	0	0	0	99	0	6	0	0	4	0
Lane Group Flow (vph)	20	658	0	8	188	40	0	6	0	76	8	0
Heavy Vehicles (%)	0%	3%	0%	13%	6%	2%	0%	0%	13%	4%	1%	1%
Parking (#/hr)									0			
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	18.3	17.0		18.1	16.9	16.9		28.8		28.8	28.8	
Effective Green, g (s)	18.3	17.0		18.1	16.9	16.9		28.8		28.8	28.8	
Actuated g/C Ratio	0.31	0.29		0.31	0.29	0.29		0.49		0.49	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	384	1008		158	976	453		698		669	826	
v/s Ratio Prot	c0.00	c0.19		0.00	0.06			0.00			0.00	
v/s Ratio Perm	0.01			0.01		0.03				c0.06		
v/c Ratio	0.05	0.65		0.05	0.19	0.09		0.01		0.11	0.01	
Uniform Delay, d1	14.2	18.4		14.5	15.9	15.4		7.8		8.2	7.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.5		0.1	0.1	0.1		0.0		0.3	0.0	
Delay (s)	14.3	19.9		14.7	16.0	15.5		7.8		8.5	7.8	
Level of Service	B	B		B	B	B		A		A	A	
Approach Delay (s)		19.8			15.8			7.8			8.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	451	152	76	15	75	197	56	401	19	247	289	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Peak-hour factor, PHF	0.94	0.84	0.91	0.75	0.78	0.95	0.58	0.81	0.68	0.72	0.85	0.85
Adj. Flow (vph)	480	181	84	20	96	207	97	495	28	343	340	192
RTOR Reduction (vph)	0	27	0	0	0	45	0	0	16	0	0	86
Lane Group Flow (vph)	480	238	0	20	96	162	97	495	12	343	340	106
Heavy Vehicles (%)	3%	2%	4%	7%	4%	5%	2%	3%	6%	5%	3%	9%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	15.8	14.8		9.9	8.9	18.5	30.6	24.7	34.6	38.0	28.4	44.2
Effective Green, g (s)	15.8	14.8		9.9	8.9	18.5	30.6	24.7	34.6	38.0	28.4	44.2
Actuated g/C Ratio	0.20	0.18		0.12	0.11	0.23	0.38	0.31	0.43	0.48	0.36	0.55
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	672	605		209	203	356	677	1082	754	817	1244	819
v/s Ratio Prot	c0.14	0.07		0.01	c0.05	c0.05	0.01	0.14	0.00	c0.05	0.10	0.03
v/s Ratio Perm						0.05	0.04		0.01	0.15		0.05
v/c Ratio	0.71	0.39		0.10	0.47	0.45	0.14	0.46	0.02	0.42	0.27	0.13
Uniform Delay, d1	30.0	28.7		31.1	33.3	26.4	16.1	22.3	13.0	13.8	18.4	8.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.0	0.2		0.1	0.6	0.3	0.0	1.4	0.0	0.1	0.5	0.0
Delay (s)	33.0	28.8		31.2	34.0	26.7	16.2	23.7	13.0	13.9	19.0	8.7
Level of Service	C	C		C	C	C	B	C	B	B	B	A
Approach Delay (s)		31.5			29.2			22.0			14.7	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

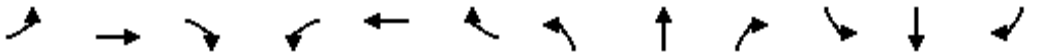
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	16	582	15	11	168	3	11	0	11	39	0	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.89	0.90	0.25	0.88	0.38	0.25	0.25	0.25	0.41	0.25	0.57
Hourly flow rate (vph)	20	654	17	44	191	8	44	0	44	95	0	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked												
vC, conflicting volume	199			671			914	989	335	694	993	99
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	199			671			914	989	335	694	993	99
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			95			79	100	93	68	100	97
cM capacity (veh/h)	1386			916			211	233	666	297	232	937

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2	SW 1	SW 2
Volume Total	347	344	139	103	44	44	95	28
Volume Left	20	0	44	0	44	0	95	0
Volume Right	0	17	0	8	0	44	0	28
cSH	1386	1700	916	1700	211	666	297	937
Volume to Capacity	0.01	0.20	0.05	0.06	0.21	0.07	0.32	0.03
Queue Length 95th (ft)	1	0	4	0	19	5	34	2
Control Delay (s)	0.6	0.0	3.2	0.0	26.5	10.8	22.8	9.0
Lane LOS	A		A		D	B	C	A
Approach Delay (s)	0.3		1.8		18.7		19.6	
Approach LOS					C		C	

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	609	6	9	175	124	3	0	8	63	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.85		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3495		1597	3406	1583	1805	1429		1736	1693	
Flt Permitted	0.63	1.00		0.25	1.00	1.00	0.75	1.00		0.75	1.00	
Satd. Flow (perm)	1191	3495		418	3406	1583	1424	1429		1361	1693	
Peak-hour factor, PHF	0.85	0.92	0.38	0.63	0.88	0.89	0.25	0.25	0.42	0.83	0.25	0.50
Adj. Flow (vph)	20	662	16	14	199	139	12	0	19	76	4	8
RTOR Reduction (vph)	0	4	0	0	0	98	0	10	0	0	4	0
Lane Group Flow (vph)	20	674	0	14	199	41	12	9	0	76	8	0
Heavy Vehicles (%)	0%	3%	0%	13%	6%	2%	0%	0%	13%	4%	1%	1%
Parking (#/hr)									0			
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	18.5	17.2		18.5	17.2	17.2	28.5	28.5		28.5	28.5	
Effective Green, g (s)	18.5	17.2		18.5	17.2	17.2	28.5	28.5		28.5	28.5	
Actuated g/C Ratio	0.31	0.29		0.31	0.29	0.29	0.48	0.48		0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	387	1019		157	993	461	688	690		657	818	
v/s Ratio Prot	0.00	c0.19		c0.00	0.06			0.01			0.00	
v/s Ratio Perm	0.02			0.03		0.03	0.01			c0.06		
v/c Ratio	0.05	0.66		0.09	0.20	0.09	0.02	0.01		0.12	0.01	
Uniform Delay, d1	14.1	18.3		14.4	15.7	15.2	8.0	7.9		8.4	7.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.6		0.2	0.1	0.1	0.0	0.0		0.4	0.0	
Delay (s)	14.1	20.0		14.6	15.8	15.3	8.0	8.0		8.7	7.9	
Level of Service	B	B		B	B	B	A	A		A	A	
Approach Delay (s)		19.8			15.6			8.0			8.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	457	155	80	15	78	197	60	401	19	247	289	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Peak-hour factor, PHF	0.94	0.84	0.91	0.75	0.78	0.95	0.58	0.81	0.68	0.72	0.85	0.85
Adj. Flow (vph)	486	185	88	20	100	207	103	495	28	343	340	200
RTOR Reduction (vph)	0	26	0	0	0	45	0	0	17	0	0	95
Lane Group Flow (vph)	486	247	0	20	100	162	103	495	11	343	340	105
Heavy Vehicles (%)	3%	2%	4%	7%	4%	5%	2%	3%	6%	5%	3%	9%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	17.7	18.0		8.9	8.9	18.6	30.7	22.7	31.3	34.1	24.4	42.1
Effective Green, g (s)	17.7	18.0		8.9	8.9	18.6	30.7	22.7	31.3	34.1	24.4	42.1
Actuated g/C Ratio	0.22	0.22		0.11	0.11	0.23	0.38	0.28	0.39	0.43	0.30	0.53
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	752	736		188	203	358	679	995	692	733	1069	780
v/s Ratio Prot	c0.14	0.08		0.01	c0.05	0.05	0.02	0.14	0.00	c0.06	0.10	0.03
v/s Ratio Perm				0.00		0.05	0.04		0.01	0.14		0.04
v/c Ratio	0.65	0.34		0.11	0.49	0.45	0.15	0.50	0.02	0.47	0.32	0.13
Uniform Delay, d1	28.3	26.0		30.3	33.4	26.3	16.1	23.9	14.9	16.4	21.4	9.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.1		0.1	0.7	0.3	0.0	1.8	0.0	0.2	0.8	0.0
Delay (s)	29.7	26.1		30.4	34.1	26.7	16.2	25.7	14.9	16.6	22.2	9.7
Level of Service	C	C		C	C	C	B	C	B	B	C	A
Approach Delay (s)		28.4			29.2			23.6			17.2	
Approach LOS		C			C			C			B	

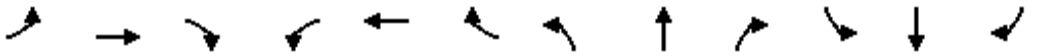
Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	21	756	16	11	218	4	11	0	11	51	0	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.89	0.90	0.25	0.88	0.38	0.25	0.25	0.25	0.41	0.25	0.57
Hourly flow rate (vph)	26	849	18	44	248	11	44	0	44	124	0	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked												
vC, conflicting volume	258			867			1160	1257	434	862	1261	129
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	258			867			1160	1257	434	862	1261	129
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			94			68	100	92	43	100	96
cM capacity (veh/h)	1318			772			136	160	576	219	159	897

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2	SW 1	SW 2
Volume Total	451	442	168	134	44	44	124	37
Volume Left	26	0	44	0	44	0	124	0
Volume Right	0	18	0	11	0	44	0	37
cSH	1318	1700	772	1700	136	576	219	897
Volume to Capacity	0.02	0.26	0.06	0.08	0.32	0.08	0.57	0.04
Queue Length 95th (ft)	2	0	5	0	32	6	78	3
Control Delay (s)	0.6	0.0	3.1	0.0	43.6	11.8	41.0	9.2
Lane LOS	A		A		E	B	E	A
Approach Delay (s)	0.3		1.7		27.7		33.7	
Approach LOS					D		D	

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	789	7	11	225	161	3	0	10	82	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3496		1597	3406	1583	1805	1429		1736	1680	
Flt Permitted	0.56	1.00		0.21	1.00	1.00	0.75	1.00		0.74	1.00	
Satd. Flow (perm)	1057	3496		347	3406	1583	1422	1429		1355	1680	
Peak-hour factor, PHF	0.85	0.92	0.38	0.63	0.88	0.89	0.25	0.25	0.42	0.83	0.25	0.50
Adj. Flow (vph)	26	858	18	17	256	181	12	0	24	99	4	10
RTOR Reduction (vph)	0	3	0	0	0	121	0	14	0	0	6	0
Lane Group Flow (vph)	26	873	0	17	256	60	12	10	0	99	8	0
Heavy Vehicles (%)	0%	3%	0%	13%	6%	2%	0%	0%	13%	4%	1%	1%
Parking (#/hr)									0			
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	23.3	20.7		20.7	19.4	19.4	25.0	25.0		25.0	25.0	
Effective Green, g (s)	23.3	20.7		20.7	19.4	19.4	25.0	25.0		25.0	25.0	
Actuated g/C Ratio	0.39	0.35		0.35	0.33	0.33	0.42	0.42		0.42	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	450	1227		149	1120	521	603	606		574	712	
v/s Ratio Prot	c0.00	c0.25		0.00	0.08			0.01			0.00	
v/s Ratio Perm	0.02			0.04		0.04	0.01			c0.07		
v/c Ratio	0.06	0.71		0.11	0.23	0.11	0.02	0.02		0.17	0.01	
Uniform Delay, d1	11.0	16.6		13.1	14.4	13.8	9.9	9.9		10.6	9.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	2.0		0.3	0.1	0.1	0.1	0.1		0.7	0.0	
Delay (s)	11.0	18.5		13.5	14.5	13.9	9.9	9.9		11.2	9.9	
Level of Service	B	B		B	B	B	A	A		B	A	
Approach Delay (s)		18.3			14.2			9.9			11.1	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	592	201	103	20	101	256	77	521	25	321	376	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Peak-hour factor, PHF	0.94	0.84	0.91	0.75	0.78	0.95	0.58	0.81	0.68	0.72	0.85	0.85
Adj. Flow (vph)	630	239	113	27	129	269	133	643	37	446	442	258
RTOR Reduction (vph)	0	25	0	0	0	46	0	0	23	0	0	123
Lane Group Flow (vph)	630	327	0	27	129	223	133	643	14	446	442	135
Heavy Vehicles (%)	3%	2%	4%	7%	4%	5%	2%	3%	6%	5%	3%	9%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	14.7	16.1		8.5	8.5	15.8	23.5	18.5	25.6	28.1	20.8	35.5
Effective Green, g (s)	14.7	16.1		8.5	8.5	15.8	23.5	18.5	25.6	28.1	20.8	35.5
Actuated g/C Ratio	0.21	0.23		0.12	0.12	0.23	0.34	0.26	0.37	0.40	0.30	0.51
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	714	752		205	222	347	594	926	666	690	1041	752
v/s Ratio Prot	c0.19	0.10		0.01	0.07	c0.07	0.02	0.18	0.00	c0.07	0.13	0.04
v/s Ratio Perm				0.00		0.08	0.06		0.01	0.19		0.05
v/c Ratio	0.88	0.43		0.13	0.58	0.64	0.22	0.69	0.02	0.65	0.42	0.18
Uniform Delay, d1	26.8	23.1		26.0	29.1	24.5	16.7	23.2	14.2	16.9	19.8	9.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.1	0.1		0.1	2.5	3.1	0.1	4.3	0.0	1.6	1.3	0.0
Delay (s)	38.9	23.2		26.1	31.6	27.6	16.8	27.5	14.2	18.5	21.1	9.4
Level of Service	D	C		C	C	C	B	C	B	B	C	A
Approach Delay (s)		33.3			28.7			25.1			17.4	
Approach LOS		C			C			C			B	

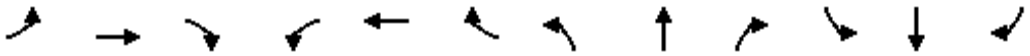
Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	74	375	16	4	690	31	10	0	4	84	1	84
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.90	0.50	0.25	0.93	0.78	0.63	0.25	0.50	0.96	0.25	0.81
Hourly flow rate (vph)	92	417	32	16	742	40	16	0	8	88	4	104
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	782			449			1126	1431	224	1195	1427	391
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	430			449			829	1183	224	909	1178	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			99			91	100	99	52	97	89
cM capacity (veh/h)	984			1122			184	147	785	183	148	942

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2	SW 1	SW 2
Volume Total	301	240	387	411	16	8	88	108
Volume Left	92	0	16	0	16	0	88	0
Volume Right	0	32	0	40	0	8	0	104
cSH	984	1700	1122	1700	184	785	183	786
Volume to Capacity	0.09	0.14	0.01	0.24	0.09	0.01	0.48	0.14
Queue Length 95th (ft)	8	0	1	0	7	1	58	12
Control Delay (s)	3.4	0.0	0.5	0.0	26.4	9.6	41.5	10.3
Lane LOS	A		A		D	A	E	B
Approach Delay (s)	1.9		0.2		20.8		24.3	
Approach LOS					C		C	

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	54.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	432	18	95	660	269	19	9	66	227	6	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.88		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3547		1805	3574	1599	1805	1669		1770	1644	
Flt Permitted	0.36	1.00		0.31	1.00	1.00	0.70	1.00		0.70	1.00	
Satd. Flow (perm)	681	3547		587	3574	1599	1339	1669		1308	1644	
Peak-hour factor, PHF	0.65	0.88	0.64	0.68	0.94	0.90	0.70	0.56	0.97	0.85	0.75	0.64
Adj. Flow (vph)	20	491	28	140	702	299	27	16	68	267	8	72
RTOR Reduction (vph)	0	8	0	0	0	185	0	41	0	0	43	0
Lane Group Flow (vph)	20	511	0	140	702	114	27	43	0	267	37	0
Heavy Vehicles (%)	0%	1%	0%	0%	1%	1%	0%	0%	0%	2%	0%	0%
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.2	18.2		27.4	22.4	22.4	23.6	23.6		23.6	23.6	
Effective Green, g (s)	19.2	18.2		27.4	22.4	22.4	23.6	23.6		23.6	23.6	
Actuated g/C Ratio	0.33	0.31		0.46	0.38	0.38	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	241	1094		380	1357	607	536	668		523	658	
v/s Ratio Prot	0.00	0.14		c0.03	c0.20			0.03			0.02	
v/s Ratio Perm	0.03			0.14		0.07	0.02			c0.20		
v/c Ratio	0.08	0.47		0.37	0.52	0.19	0.05	0.06		0.51	0.06	
Uniform Delay, d1	13.6	16.5		9.7	14.1	12.2	10.8	10.9		13.3	10.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.6	0.3	0.2	0.2	0.2		3.5	0.2	
Delay (s)	13.7	16.8		10.3	14.5	12.4	11.0	11.1		16.9	11.0	
Level of Service	B	B		B	B	B	B	B		B	B	
Approach Delay (s)		16.7			13.4			11.1			15.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	327	263	123	53	261	348	196	478	36	393	637	567
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Peak-hour factor, PHF	0.95	0.90	0.90	0.70	0.97	0.92	0.77	0.90	0.82	0.95	0.88	0.90
Adj. Flow (vph)	344	292	137	76	269	378	255	531	44	414	724	630
RTOR Reduction (vph)	0	26	0	0	0	39	0	0	27	0	0	149
Lane Group Flow (vph)	344	403	0	76	269	339	255	531	17	414	724	481
Heavy Vehicles (%)	1%	1%	0%	0%	0%	4%	1%	3%	0%	3%	1%	1%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	13.1	16.2		14.6	14.6	27.0	30.9	18.9	30.4	31.7	19.3	32.4
Effective Green, g (s)	13.1	16.2		14.6	14.6	27.0	30.9	18.9	30.4	31.7	19.3	32.4
Actuated g/C Ratio	0.16	0.20		0.18	0.18	0.34	0.39	0.24	0.38	0.40	0.24	0.40
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	568	675		329	347	524	690	828	715	694	862	648
v/s Ratio Prot	0.10	0.12		0.03	c0.14	c0.10	0.06	0.15	0.00	0.09	c0.20	c0.12
v/s Ratio Perm				0.01		0.12	0.09		0.01	0.14		0.18
v/c Ratio	0.61	0.60		0.23	0.78	0.65	0.37	0.64	0.02	0.60	0.84	0.74
Uniform Delay, d1	31.1	28.9		27.5	31.1	22.5	17.6	27.5	15.5	19.1	28.9	20.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.9		0.1	9.5	2.1	0.1	3.8	0.0	0.9	9.7	4.0
Delay (s)	32.3	29.9		27.6	40.6	24.5	17.7	31.3	15.5	20.0	38.5	24.3
Level of Service	C	C		C	D	C	B	C	B	C	D	C
Approach Delay (s)		31.0			30.8			26.3			29.1	
Approach LOS		C			C			C			C	

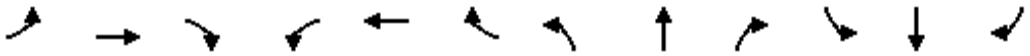
Intersection Summary			
HCM Average Control Delay	29.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	74	373	25	18	684	31	18	0	13	84	1	84
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.90	0.50	0.25	0.93	0.78	0.63	0.25	0.50	0.96	0.25	0.81
Hourly flow rate (vph)	92	414	50	72	735	40	29	0	26	88	4	104
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	775			464			1242	1544	232	1318	1549	388
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	414			464			957	1308	232	1045	1313	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			93			80	100	97	36	97	89
cM capacity (veh/h)	994			1107			142	117	776	136	117	939

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2	SW 1	SW 2
Volume Total	300	257	440	407	29	26	88	108
Volume Left	92	0	72	0	29	0	88	0
Volume Right	0	50	0	40	0	26	0	104
cSH	994	1700	1107	1700	142	776	136	744
Volume to Capacity	0.09	0.15	0.07	0.24	0.20	0.03	0.64	0.14
Queue Length 95th (ft)	8	0	5	0	18	3	86	13
Control Delay (s)	3.4	0.0	2.0	0.0	36.7	9.8	69.5	10.7
Lane LOS	A		A		E	A	F	B
Approach Delay (s)	1.8		1.0		23.9		37.0	
Approach LOS					C		E	

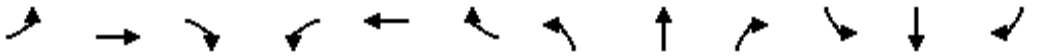
Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	436	21	100	666	269	21	9	68	227	6	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.88		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3543		1805	3574	1599	1805	1668		1770	1644	
Flt Permitted	0.36	1.00		0.30	1.00	1.00	0.70	1.00		0.70	1.00	
Satd. Flow (perm)	676	3543		576	3574	1599	1339	1668		1306	1644	
Peak-hour factor, PHF	0.65	0.88	0.64	0.68	0.94	0.90	0.70	0.56	0.97	0.85	0.75	0.64
Adj. Flow (vph)	20	495	33	147	709	299	30	16	70	267	8	72
RTOR Reduction (vph)	0	10	0	0	0	185	0	42	0	0	43	0
Lane Group Flow (vph)	20	518	0	147	709	114	30	44	0	267	37	0
Heavy Vehicles (%)	0%	1%	0%	0%	1%	1%	0%	0%	0%	2%	0%	0%
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.2	18.2		27.5	22.5	22.5	23.5	23.5		23.5	23.5	
Effective Green, g (s)	19.2	18.2		27.5	22.5	22.5	23.5	23.5		23.5	23.5	
Actuated g/C Ratio	0.33	0.31		0.47	0.38	0.38	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	239	1093		379	1363	610	533	664		520	655	
v/s Ratio Prot	0.00	0.15		c0.03	c0.20			0.03			0.02	
v/s Ratio Perm	0.03			0.15		0.07	0.02			c0.20		
v/c Ratio	0.08	0.47		0.39	0.52	0.19	0.06	0.07		0.51	0.06	
Uniform Delay, d1	13.6	16.5		9.7	14.1	12.2	10.9	11.0		13.4	10.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.3		0.7	0.4	0.1	0.2	0.2		3.6	0.2	
Delay (s)	13.7	16.9		10.4	14.4	12.3	11.1	11.2		17.0	11.1	
Level of Service	B	B		B	B	B	B	B		B	B	
Approach Delay (s)		16.7			13.4			11.2			15.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	264	125	53	263	348	199	478	36	393	637	573
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Peak-hour factor, PHF	0.95	0.90	0.90	0.70	0.97	0.92	0.77	0.90	0.82	0.95	0.88	0.90
Adj. Flow (vph)	347	293	139	76	271	378	258	531	44	414	724	637
RTOR Reduction (vph)	0	26	0	0	0	39	0	0	27	0	0	149
Lane Group Flow (vph)	347	406	0	76	271	339	258	531	17	414	724	488
Heavy Vehicles (%)	1%	1%	0%	0%	0%	4%	1%	3%	0%	3%	1%	1%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	13.2	16.3		14.7	14.7	27.1	30.7	18.7	30.3	31.5	19.1	32.3
Effective Green, g (s)	13.2	16.3		14.7	14.7	27.1	30.7	18.7	30.3	31.5	19.1	32.3
Actuated g/C Ratio	0.16	0.20		0.18	0.18	0.34	0.38	0.23	0.38	0.39	0.24	0.40
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	572	680		332	349	526	686	819	713	690	853	646
v/s Ratio Prot	0.10	0.12		0.03	c0.14	c0.10	0.06	0.15	0.00	0.09	c0.20	c0.12
v/s Ratio Perm				0.01		0.12	0.09		0.01	0.14		0.18
v/c Ratio	0.61	0.60		0.23	0.78	0.64	0.38	0.65	0.02	0.60	0.85	0.76
Uniform Delay, d1	31.0	28.9		27.4	31.1	22.4	17.8	27.7	15.6	19.2	29.1	20.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.9		0.1	9.5	2.0	0.1	4.0	0.0	0.9	10.3	4.5
Delay (s)	32.2	29.8		27.5	40.6	24.4	17.9	31.6	15.6	20.2	39.4	24.9
Level of Service	C	C		C	D	C	B	C	B	C	D	C
Approach Delay (s)		30.9			30.8			26.5			29.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	96	486	30	19	891	40	21	0	14	109	1	109
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.90	0.50	0.25	0.93	0.78	0.63	0.25	0.50	0.96	0.25	0.81
Hourly flow rate (vph)	120	540	60	76	958	51	33	0	28	114	4	135
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked	0.80						0.80	0.80		0.80	0.80	0.80
vC, conflicting volume	1009			600			1578	1971	300	1674	1976	505
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	498			600			1212	1707	300	1333	1713	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	86			92			56	100	96	0	93	84
cM capacity (veh/h)	856			987			75	58	702	73	58	868

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2	SW 1	SW 2
Volume Total	390	330	555	530	33	28	114	139
Volume Left	120	0	76	0	33	0	114	0
Volume Right	0	60	0	51	0	28	0	135
cSH	856	1700	987	1700	75	702	73	618
Volume to Capacity	0.14	0.19	0.08	0.31	0.44	0.04	1.55	0.22
Queue Length 95th (ft)	12	0	6	0	45	3	238	21
Control Delay (s)	4.2	0.0	2.1	0.0	86.5	10.3	399.4	12.5
Lane LOS	A		A		F	B	F	B
Approach Delay (s)	2.3		1.1		51.7		186.7	
Approach LOS					F		F	

Intersection Summary			
Average Delay	25.0		
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	566	26	129	864	350	27	12	88	295	8	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.88		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3544		1805	3574	1599	1805	1668		1770	1645	
Flt Permitted	0.23	1.00		0.25	1.00	1.00	0.69	1.00		0.68	1.00	
Satd. Flow (perm)	433	3544		471	3574	1599	1309	1668		1276	1645	
Peak-hour factor, PHF	0.65	0.88	0.64	0.68	0.94	0.90	0.70	0.56	0.97	0.85	0.75	0.64
Adj. Flow (vph)	26	643	41	190	919	389	39	21	91	347	11	94
RTOR Reduction (vph)	0	8	0	0	0	230	0	59	0	0	61	0
Lane Group Flow (vph)	26	676	0	190	919	159	39	53	0	347	44	0
Heavy Vehicles (%)	0%	1%	0%	0%	1%	1%	0%	0%	0%	2%	0%	0%
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	22.8	20.8		29.4	24.1	24.1	20.9	20.9		20.9	20.9	
Effective Green, g (s)	22.8	20.8		29.4	24.1	24.1	20.9	20.9		20.9	20.9	
Actuated g/C Ratio	0.39	0.35		0.50	0.41	0.41	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	214	1249		355	1460	653	464	591		452	583	
v/s Ratio Prot	0.00	0.19		c0.05	c0.26			0.03			0.03	
v/s Ratio Perm	0.04			0.22		0.10	0.03			c0.27		
v/c Ratio	0.12	0.54		0.54	0.63	0.24	0.08	0.09		0.77	0.08	
Uniform Delay, d1	11.5	15.3		9.2	13.9	11.5	12.7	12.7		16.9	12.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.5		1.6	0.9	0.2	0.4	0.3		11.8	0.3	
Delay (s)	11.8	15.8		10.7	14.8	11.7	13.0	13.0		28.7	12.9	
Level of Service	B	B		B	B	B	B	B		C	B	
Approach Delay (s)		15.6			13.4			13.0			25.0	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

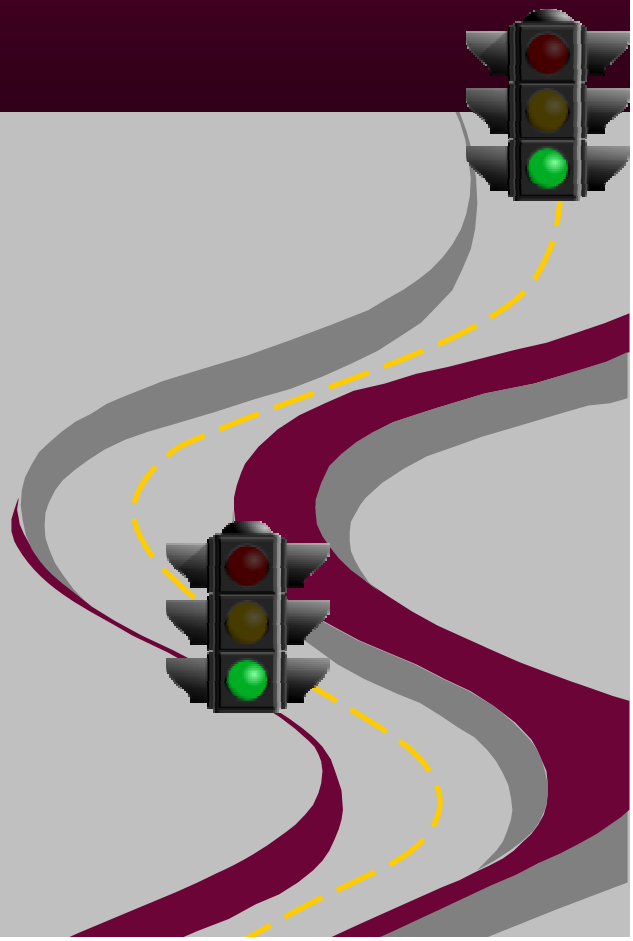
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	428	343	162	69	341	452	258	621	47	511	828	743
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Peak-hour factor, PHF	0.95	0.90	0.90	0.70	0.97	0.92	0.77	0.90	0.82	0.95	0.88	0.90
Adj. Flow (vph)	451	381	180	99	352	491	335	690	57	538	941	826
RTOR Reduction (vph)	0	24	0	0	0	39	0	0	29	0	0	126
Lane Group Flow (vph)	451	537	0	99	352	452	335	690	28	538	941	700
Heavy Vehicles (%)	1%	1%	0%	0%	0%	4%	1%	3%	0%	3%	1%	1%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	16.7	23.2		19.1	19.1	31.1	26.4	21.2	33.8	39.2	28.0	44.7
Effective Green, g (s)	16.7	23.2		19.1	19.1	31.1	26.4	21.2	33.8	39.2	28.0	44.7
Actuated g/C Ratio	0.19	0.26		0.21	0.21	0.35	0.29	0.24	0.38	0.44	0.31	0.50
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	643	860		383	403	537	524	826	696	763	1112	794
v/s Ratio Prot	0.13	0.16		0.04	c0.19	c0.11	0.04	0.20	0.01	c0.09	0.26	c0.16
v/s Ratio Perm				0.02		0.18	0.15		0.01	0.21		0.27
v/c Ratio	0.70	0.62		0.26	0.87	0.84	0.64	0.84	0.04	0.71	0.85	0.88
Uniform Delay, d1	34.3	29.5		29.5	34.3	27.2	27.7	32.7	17.8	20.7	29.0	20.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	1.0		0.1	18.0	11.0	1.9	9.8	0.0	2.4	8.0	11.0
Delay (s)	37.1	30.6		29.7	52.2	38.2	29.5	42.5	17.8	23.1	37.0	31.3
Level of Service	D	C		C	D	D	C	D	B	C	D	C
Approach Delay (s)		33.5			42.6			37.2			31.7	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	35.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX D

RIGHT-IN/RIGHT OUT AT NORTHFIELD COMMONS WEST ENTRANCE



ALTERNATIVE 2
INTERSECTION CAPACITY ANALYSIS

VS ENGINEERING, INC.
Civil • Structural • Transportation • Environmental

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	0	595	4	0	166	3	0	0	1	0	0	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.89	0.90	0.25	0.88	0.38	0.25	0.25	0.25	0.41	0.25	0.57
Hourly flow rate (vph)	0	669	4	0	189	8	0	0	4	0	0	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked												
vC, conflicting volume	197			673			793	867	336	531	866	98
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	197			673			793	867	336	531	866	98
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	99	100	100	97
cM capacity (veh/h)	1388			914			271	293	665	433	294	938

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	SW 1
Volume Total	446	227	126	71	4	28
Volume Left	0	0	0	0	0	0
Volume Right	0	4	0	8	4	28
cSH	1700	1700	1700	1700	665	938
Volume to Capacity	0.26	0.13	0.07	0.04	0.01	0.03
Queue Length 95th (ft)	0	0	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	0.0	10.4	9.0
Lane LOS					B	A
Approach Delay (s)	0.0		0.0		10.4	9.0
Approach LOS					B	A

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	560	3	6	164	124	1	0	5	102	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.85		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3499		1597	3406	1583	1805	1429		1736	1693	
Flt Permitted	0.57	1.00		0.32	1.00	1.00	0.75	1.00		0.75	1.00	
Satd. Flow (perm)	1090	3499		530	3406	1583	1424	1429		1370	1693	
Peak-hour factor, PHF	0.85	0.92	0.38	0.63	0.88	0.89	0.25	0.25	0.42	0.83	0.25	0.50
Adj. Flow (vph)	39	609	8	10	186	139	4	0	12	123	4	8
RTOR Reduction (vph)	0	2	0	0	0	103	0	6	0	0	4	0
Lane Group Flow (vph)	39	615	0	10	186	36	4	6	0	123	8	0
Heavy Vehicles (%)	0%	3%	0%	13%	6%	2%	0%	0%	13%	4%	1%	1%
Parking (#/hr)									0			
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.5	16.7		16.3	15.1	15.1	29.1	29.1		29.1	29.1	
Effective Green, g (s)	19.5	16.7		16.3	15.1	15.1	29.1	29.1		29.1	29.1	
Actuated g/C Ratio	0.33	0.28		0.28	0.26	0.26	0.49	0.49		0.49	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	394	990		168	872	405	702	705		676	835	
v/s Ratio Prot	c0.00	c0.18		0.00	0.05			0.00			0.00	
v/s Ratio Perm	0.03			0.02		0.02	0.00			c0.09		
v/c Ratio	0.10	0.62		0.06	0.21	0.09	0.01	0.01		0.18	0.01	
Uniform Delay, d1	13.5	18.4		15.7	17.3	16.7	7.6	7.6		8.3	7.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.2		0.1	0.1	0.1	0.0	0.0		0.6	0.0	
Delay (s)	13.6	19.6		15.8	17.4	16.8	7.6	7.6		8.9	7.6	
Level of Service	B	B		B	B	B	A	A		A	A	
Approach Delay (s)		19.3			17.1			7.6			8.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	451	152	76	15	75	197	56	401	19	247	289	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Peak-hour factor, PHF	0.94	0.84	0.91	0.75	0.78	0.95	0.58	0.81	0.68	0.72	0.85	0.85
Adj. Flow (vph)	480	181	84	20	96	207	97	495	28	343	340	192
RTOR Reduction (vph)	0	27	0	0	0	45	0	0	16	0	0	86
Lane Group Flow (vph)	480	238	0	20	96	162	97	495	12	343	340	106
Heavy Vehicles (%)	3%	2%	4%	7%	4%	5%	2%	3%	6%	5%	3%	9%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	15.8	14.8		9.9	8.9	18.5	30.6	24.7	34.6	38.0	28.4	44.2
Effective Green, g (s)	15.8	14.8		9.9	8.9	18.5	30.6	24.7	34.6	38.0	28.4	44.2
Actuated g/C Ratio	0.20	0.18		0.12	0.11	0.23	0.38	0.31	0.43	0.48	0.36	0.55
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	672	605		209	203	356	677	1082	754	817	1244	819
v/s Ratio Prot	c0.14	0.07		0.01	c0.05	c0.05	0.01	0.14	0.00	c0.05	0.10	0.03
v/s Ratio Perm						0.05	0.04		0.01	0.15		0.05
v/c Ratio	0.71	0.39		0.10	0.47	0.45	0.14	0.46	0.02	0.42	0.27	0.13
Uniform Delay, d1	30.0	28.7		31.1	33.3	26.4	16.1	22.3	13.0	13.8	18.4	8.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.0	0.2		0.1	0.6	0.3	0.0	1.4	0.0	0.1	0.5	0.0
Delay (s)	33.0	28.8		31.2	34.0	26.7	16.2	23.7	13.0	13.9	19.0	8.7
Level of Service	C	C		C	C	C	B	C	B	B	B	A
Approach Delay (s)		31.5			29.2			22.0			14.7	
Approach LOS		C			C			C			B	

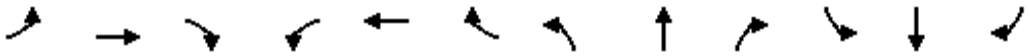
Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	0	598	15	0	179	3	0	0	11	0	0	16
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.89	0.90	0.25	0.88	0.38	0.25	0.25	0.25	0.41	0.25	0.57
Hourly flow rate (vph)	0	672	17	0	203	8	0	0	44	0	0	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked												
vC, conflicting volume	211			689			810	892	344	587	896	106
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	211			689			810	892	344	587	896	106
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	93	100	100	97
cM capacity (veh/h)	1371			902			263	284	658	371	282	928

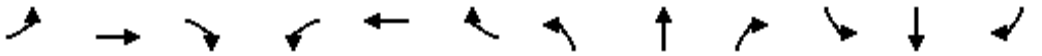
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	SW 1
Volume Total	448	241	136	76	44	28
Volume Left	0	0	0	0	0	0
Volume Right	0	17	0	8	44	28
cSH	1700	1700	1700	1700	658	928
Volume to Capacity	0.26	0.14	0.08	0.04	0.07	0.03
Queue Length 95th (ft)	0	0	0	0	5	2
Control Delay (s)	0.0	0.0	0.0	0.0	10.9	9.0
Lane LOS					B	A
Approach Delay (s)	0.0		0.0		10.9	9.0
Approach LOS					B	A

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	27.0%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	570	6	20	164	124	14	0	8	102	1	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.85		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3494		1597	3406	1583	1805	1429		1736	1693	
Flt Permitted	0.63	1.00		0.27	1.00	1.00	0.75	1.00		0.75	1.00	
Satd. Flow (perm)	1206	3494		454	3406	1583	1424	1429		1361	1693	
Peak-hour factor, PHF	0.85	0.92	0.38	0.63	0.88	0.89	0.25	0.25	0.42	0.83	0.25	0.50
Adj. Flow (vph)	39	620	16	32	186	139	56	0	19	123	4	8
RTOR Reduction (vph)	0	4	0	0	0	100	0	10	0	0	4	0
Lane Group Flow (vph)	39	632	0	32	186	39	56	9	0	123	8	0
Heavy Vehicles (%)	0%	3%	0%	13%	6%	2%	0%	0%	13%	4%	1%	1%
Parking (#/hr)									0			
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	19.3	16.6		19.3	16.6	16.6	27.7	27.7		27.7	27.7	
Effective Green, g (s)	19.3	16.6		19.3	16.6	16.6	27.7	27.7		27.7	27.7	
Actuated g/C Ratio	0.33	0.28		0.33	0.28	0.28	0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	422	983		201	958	445	669	671		639	795	
v/s Ratio Prot	0.00	c0.18		c0.01	0.05			0.01			0.00	
v/s Ratio Perm	0.03			0.04		0.02	0.04			c0.09		
v/c Ratio	0.09	0.64		0.16	0.19	0.09	0.08	0.01		0.19	0.01	
Uniform Delay, d1	13.7	18.6		13.9	16.1	15.6	8.6	8.4		9.1	8.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.5		0.4	0.1	0.1	0.2	0.0		0.7	0.0	
Delay (s)	13.7	20.1		14.3	16.2	15.7	8.9	8.4		9.8	8.4	
Level of Service	B	C		B	B	B	A	A		A	A	
Approach Delay (s)		19.7			15.8			8.8			9.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	457	155	80	15	78	197	60	401	19	247	289	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Peak-hour factor, PHF	0.94	0.84	0.91	0.75	0.78	0.95	0.58	0.81	0.68	0.72	0.85	0.85
Adj. Flow (vph)	486	185	88	20	100	207	103	495	28	343	340	200
RTOR Reduction (vph)	0	26	0	0	0	45	0	0	17	0	0	95
Lane Group Flow (vph)	486	247	0	20	100	162	103	495	11	343	340	105
Heavy Vehicles (%)	3%	2%	4%	7%	4%	5%	2%	3%	6%	5%	3%	9%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	17.7	18.0		8.9	8.9	18.6	30.7	22.7	31.3	34.1	24.4	42.1
Effective Green, g (s)	17.7	18.0		8.9	8.9	18.6	30.7	22.7	31.3	34.1	24.4	42.1
Actuated g/C Ratio	0.22	0.22		0.11	0.11	0.23	0.38	0.28	0.39	0.43	0.30	0.53
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	752	736		188	203	358	679	995	692	733	1069	780
v/s Ratio Prot	c0.14	0.08		0.01	c0.05	0.05	0.02	0.14	0.00	c0.06	0.10	0.03
v/s Ratio Perm				0.00		0.05	0.04		0.01	0.14		0.04
v/c Ratio	0.65	0.34		0.11	0.49	0.45	0.15	0.50	0.02	0.47	0.32	0.13
Uniform Delay, d1	28.3	26.0		30.3	33.4	26.3	16.1	23.9	14.9	16.4	21.4	9.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.1		0.1	0.7	0.3	0.0	1.8	0.0	0.2	0.8	0.0
Delay (s)	29.7	26.1		30.4	34.1	26.7	16.2	25.7	14.9	16.6	22.2	9.7
Level of Service	C	C		C	C	C	B	C	B	B	C	A
Approach Delay (s)		28.4			29.2			23.6			17.2	
Approach LOS		C			C			C			B	

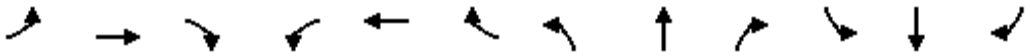
Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	0	777	16	0	229	4	0	0	11	0	0	21
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.89	0.90	0.25	0.88	0.38	0.25	0.25	0.25	0.41	0.25	0.57
Hourly flow rate (vph)	0	873	18	0	260	11	0	0	44	0	0	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked												
vC, conflicting volume	271			891			1049	1153	445	746	1156	135
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	271			891			1049	1153	445	746	1156	135
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	92	100	100	96
cM capacity (veh/h)	1304			757			174	199	566	282	198	888

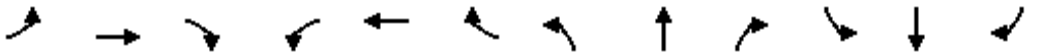
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	SW 1
Volume Total	582	309	173	97	44	37
Volume Left	0	0	0	0	0	0
Volume Right	0	18	0	11	44	37
cSH	1700	1700	1700	1700	566	888
Volume to Capacity	0.34	0.18	0.10	0.06	0.08	0.04
Queue Length 95th (ft)	0	0	0	0	6	3
Control Delay (s)	0.0	0.0	0.0	0.0	11.9	9.2
Lane LOS					B	A
Approach Delay (s)	0.0		0.0		11.9	9.2
Approach LOS					B	A

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	738	7	22	213	161	14	0	10	133	1	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3496		1597	3406	1583	1805	1429		1736	1680	
Flt Permitted	0.56	1.00		0.22	1.00	1.00	0.75	1.00		0.74	1.00	
Satd. Flow (perm)	1061	3496		368	3406	1583	1422	1429		1355	1680	
Peak-hour factor, PHF	0.85	0.92	0.38	0.63	0.88	0.89	0.25	0.25	0.42	0.83	0.25	0.50
Adj. Flow (vph)	51	802	18	35	242	181	56	0	24	160	4	10
RTOR Reduction (vph)	0	3	0	0	0	125	0	14	0	0	6	0
Lane Group Flow (vph)	51	817	0	35	242	56	56	10	0	160	8	0
Heavy Vehicles (%)	0%	3%	0%	13%	6%	2%	0%	0%	13%	4%	1%	1%
Parking (#/hr)									0			
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	23.5	19.7		20.7	18.3	18.3	24.9	24.9		24.9	24.9	
Effective Green, g (s)	23.5	19.7		20.7	18.3	18.3	24.9	24.9		24.9	24.9	
Actuated g/C Ratio	0.40	0.33		0.35	0.31	0.31	0.42	0.42		0.42	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	471	1167		179	1056	491	600	603		572	709	
v/s Ratio Prot	0.01	c0.23		c0.01	0.07			0.01			0.00	
v/s Ratio Perm	0.04			0.06		0.04	0.04			c0.12		
v/c Ratio	0.11	0.70		0.20	0.23	0.11	0.09	0.02		0.28	0.01	
Uniform Delay, d1	11.0	17.1		13.2	15.1	14.6	10.3	9.9		11.2	9.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.9		0.5	0.1	0.1	0.3	0.1		1.2	0.0	
Delay (s)	11.1	19.0		13.7	15.2	14.7	10.6	10.0		12.4	9.9	
Level of Service	B	B		B	B	B	B	A		B	A	
Approach Delay (s)		18.5			14.9			10.4			12.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	592	201	103	20	101	256	77	521	25	321	376	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3400	3271		1687	1827	1538	1770	3505	1524	1719	3505	1482
Peak-hour factor, PHF	0.94	0.84	0.91	0.75	0.78	0.95	0.58	0.81	0.68	0.72	0.85	0.85
Adj. Flow (vph)	630	239	113	27	129	269	133	643	37	446	442	258
RTOR Reduction (vph)	0	25	0	0	0	46	0	0	24	0	0	129
Lane Group Flow (vph)	630	327	0	27	129	223	133	643	13	446	442	129
Heavy Vehicles (%)	3%	2%	4%	7%	4%	5%	2%	3%	6%	5%	3%	9%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	13.0	15.2		8.3	8.3	14.7	20.5	16.3	22.4	24.9	18.5	31.5
Effective Green, g (s)	13.0	15.2		8.3	8.3	14.7	20.5	16.3	22.4	24.9	18.5	31.5
Actuated g/C Ratio	0.20	0.23		0.13	0.13	0.23	0.32	0.25	0.34	0.38	0.28	0.48
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	680	765		215	233	348	558	879	642	659	998	718
v/s Ratio Prot	c0.19	0.10		0.01	0.07	c0.06	0.02	0.18	0.00	c0.07	0.13	0.04
v/s Ratio Perm				0.00		0.08	0.06		0.01	0.19		0.05
v/c Ratio	0.93	0.43		0.13	0.55	0.64	0.24	0.73	0.02	0.68	0.44	0.18
Uniform Delay, d1	25.5	21.2		23.9	26.6	22.8	16.5	22.3	14.1	16.7	19.0	9.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.4	0.1		0.1	1.6	3.0	0.1	5.3	0.0	2.2	1.4	0.0
Delay (s)	43.9	21.3		24.0	28.2	25.8	16.6	27.7	14.1	18.9	20.5	9.5
Level of Service	D	C		C	C	C	B	C	B	B	C	A
Approach Delay (s)		35.8			26.4			25.2			17.4	
Approach LOS		D			C			C			B	

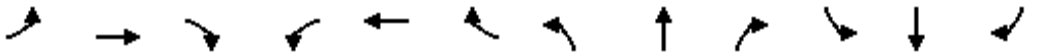
Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	0	449	16	0	700	31	0	0	4	0	0	84
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.90	0.50	0.25	0.93	0.78	0.25	0.25	0.50	0.25	0.25	0.81
Hourly flow rate (vph)	0	499	32	0	753	40	0	0	8	0	0	104
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	792			531			995	1307	265	1030	1303	396
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	399			531			638	1006	265	679	1001	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	99	100	100	89
cM capacity (veh/h)	993			1047			276	206	739	287	208	926

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	SW 1
Volume Total	333	198	502	291	8	104
Volume Left	0	0	0	0	0	0
Volume Right	0	32	0	40	8	104
cSH	1700	1700	1700	1700	739	926
Volume to Capacity	0.20	0.12	0.30	0.17	0.01	0.11
Queue Length 95th (ft)	0	0	0	0	1	9
Control Delay (s)	0.0	0.0	0.0	0.0	9.9	9.4
Lane LOS					A	A
Approach Delay (s)	0.0		0.0		9.9	9.4
Approach LOS					A	A

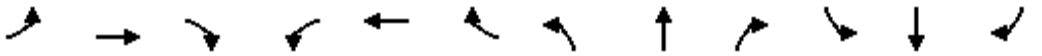
Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	32.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	348	18	99	656	269	29	9	66	311	7	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.88		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3541		1805	3574	1599	1805	1669		1770	1647	
Flt Permitted	0.25	1.00		0.46	1.00	1.00	0.70	1.00		0.70	1.00	
Satd. Flow (perm)	476	3541		868	3574	1599	1338	1669		1308	1647	
Peak-hour factor, PHF	0.65	0.88	0.64	0.68	0.94	0.90	0.70	0.56	0.97	0.85	0.75	0.64
Adj. Flow (vph)	134	395	28	146	698	299	41	16	68	366	9	72
RTOR Reduction (vph)	0	10	0	0	0	206	0	40	0	0	42	0
Lane Group Flow (vph)	134	413	0	146	698	93	41	44	0	366	39	0
Heavy Vehicles (%)	0%	1%	0%	0%	1%	1%	0%	0%	0%	2%	0%	0%
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	22.3	18.3		22.3	18.3	18.3	24.7	24.7		24.7	24.7	
Effective Green, g (s)	22.3	18.3		22.3	18.3	18.3	24.7	24.7		24.7	24.7	
Actuated g/C Ratio	0.38	0.31		0.38	0.31	0.31	0.42	0.42		0.42	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	270	1098		392	1109	496	560	699		548	690	
v/s Ratio Prot	c0.03	0.12		0.03	c0.20			0.03			0.02	
v/s Ratio Perm	0.15			0.12		0.06	0.03			c0.28		
v/c Ratio	0.50	0.38		0.37	0.63	0.19	0.07	0.06		0.67	0.06	
Uniform Delay, d1	12.8	15.9		12.4	17.4	14.9	10.3	10.2		13.8	10.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.2		0.6	1.1	0.2	0.3	0.2		6.3	0.2	
Delay (s)	14.2	16.1		13.0	18.6	15.1	10.5	10.4		20.2	10.4	
Level of Service	B	B		B	B	B	B	B		C	B	
Approach Delay (s)		15.6			17.0			10.5			18.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	327	263	123	53	261	348	196	478	36	393	637	567
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Peak-hour factor, PHF	0.95	0.90	0.90	0.70	0.97	0.92	0.77	0.90	0.82	0.95	0.88	0.90
Adj. Flow (vph)	344	292	137	76	269	378	255	531	44	414	724	630
RTOR Reduction (vph)	0	26	0	0	0	39	0	0	27	0	0	149
Lane Group Flow (vph)	344	403	0	76	269	339	255	531	17	414	724	481
Heavy Vehicles (%)	1%	1%	0%	0%	0%	4%	1%	3%	0%	3%	1%	1%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	13.1	16.2		14.6	14.6	27.0	30.9	18.9	30.4	31.7	19.3	32.4
Effective Green, g (s)	13.1	16.2		14.6	14.6	27.0	30.9	18.9	30.4	31.7	19.3	32.4
Actuated g/C Ratio	0.16	0.20		0.18	0.18	0.34	0.39	0.24	0.38	0.40	0.24	0.40
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	568	675		329	347	524	690	828	715	694	862	648
v/s Ratio Prot	0.10	0.12		0.03	c0.14	c0.10	0.06	0.15	0.00	0.09	c0.20	c0.12
v/s Ratio Perm				0.01		0.12	0.09		0.01	0.14		0.18
v/c Ratio	0.61	0.60		0.23	0.78	0.65	0.37	0.64	0.02	0.60	0.84	0.74
Uniform Delay, d1	31.1	28.9		27.5	31.1	22.5	17.6	27.5	15.5	19.1	28.9	20.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.9		0.1	9.5	2.1	0.1	3.8	0.0	0.9	9.7	4.0
Delay (s)	32.3	29.9		27.6	40.6	24.5	17.7	31.3	15.5	20.0	38.5	24.3
Level of Service	C	C		C	D	C	B	C	B	C	D	C
Approach Delay (s)		31.0			30.8			26.3			29.1	
Approach LOS		C			C			C			C	

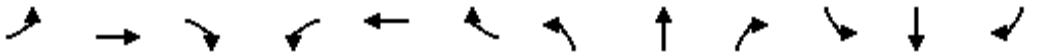
Intersection Summary			
HCM Average Control Delay	29.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	0	451	21	0	702	31	0	0	13	0	0	84
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.90	0.50	0.25	0.93	0.78	0.25	0.25	0.50	0.25	0.25	0.81
Hourly flow rate (vph)	0	501	42	0	755	40	0	0	26	0	0	104
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked	0.85						0.85	0.85		0.85	0.85	0.85
vC, conflicting volume	795			543			1003	1317	272	1051	1318	397
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	413			543			658	1026	272	714	1027	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	96	100	100	89
cM capacity (veh/h)	986			1036			268	202	732	265	201	930

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	SW 1
Volume Total	334	209	503	291	26	104
Volume Left	0	0	0	0	0	0
Volume Right	0	42	0	40	26	104
cSH	1700	1700	1700	1700	732	930
Volume to Capacity	0.20	0.12	0.30	0.17	0.04	0.11
Queue Length 95th (ft)	0	0	0	0	3	9
Control Delay (s)	0.0	0.0	0.0	0.0	10.1	9.4
Lane LOS					B	A
Approach Delay (s)	0.0		0.0		10.1	9.4
Approach LOS					B	A

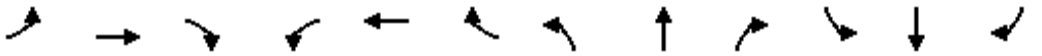
Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	32.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	352	25	118	648	269	39	9	68	311	7	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.88		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3530		1805	3574	1599	1805	1668		1770	1647	
Flt Permitted	0.25	1.00		0.44	1.00	1.00	0.70	1.00		0.70	1.00	
Satd. Flow (perm)	484	3530		841	3574	1599	1338	1668		1306	1647	
Peak-hour factor, PHF	0.65	0.88	0.64	0.68	0.94	0.90	0.70	0.56	0.97	0.85	0.75	0.64
Adj. Flow (vph)	134	400	39	174	689	299	56	16	70	366	9	72
RTOR Reduction (vph)	0	15	0	0	0	207	0	41	0	0	42	0
Lane Group Flow (vph)	134	424	0	174	689	92	56	45	0	366	39	0
Heavy Vehicles (%)	0%	1%	0%	0%	1%	1%	0%	0%	0%	2%	0%	0%
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	22.2	18.2		22.2	18.2	18.2	24.8	24.8		24.8	24.8	
Effective Green, g (s)	22.2	18.2		22.2	18.2	18.2	24.8	24.8		24.8	24.8	
Actuated g/C Ratio	0.38	0.31		0.38	0.31	0.31	0.42	0.42		0.42	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	272	1089		382	1102	493	562	701		549	692	
v/s Ratio Prot	c0.03	0.12		0.03	c0.19			0.03			0.02	
v/s Ratio Perm	0.15			0.14		0.06	0.04			c0.28		
v/c Ratio	0.49	0.39		0.46	0.63	0.19	0.10	0.06		0.67	0.06	
Uniform Delay, d1	12.8	16.0		12.7	17.5	15.0	10.3	10.2		13.8	10.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.2		0.9	1.1	0.2	0.4	0.2		6.3	0.2	
Delay (s)	14.2	16.3		13.6	18.6	15.2	10.7	10.4		20.1	10.3	
Level of Service	B	B		B	B	B	B	B		C	B	
Approach Delay (s)		15.8			17.0			10.5			18.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	330	264	125	53	263	348	199	478	36	393	637	573
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Peak-hour factor, PHF	0.95	0.90	0.90	0.70	0.97	0.92	0.77	0.90	0.82	0.95	0.88	0.90
Adj. Flow (vph)	347	293	139	76	271	378	258	531	44	414	724	637
RTOR Reduction (vph)	0	26	0	0	0	39	0	0	27	0	0	149
Lane Group Flow (vph)	347	406	0	76	271	339	258	531	17	414	724	488
Heavy Vehicles (%)	1%	1%	0%	0%	0%	4%	1%	3%	0%	3%	1%	1%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	13.2	16.3		14.7	14.7	27.1	30.7	18.7	30.3	31.5	19.1	32.3
Effective Green, g (s)	13.2	16.3		14.7	14.7	27.1	30.7	18.7	30.3	31.5	19.1	32.3
Actuated g/C Ratio	0.16	0.20		0.18	0.18	0.34	0.38	0.23	0.38	0.39	0.24	0.40
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	572	680		332	349	526	686	819	713	690	853	646
v/s Ratio Prot	0.10	0.12		0.03	c0.14	c0.10	0.06	0.15	0.00	0.09	c0.20	c0.12
v/s Ratio Perm				0.01		0.12	0.09		0.01	0.14		0.18
v/c Ratio	0.61	0.60		0.23	0.78	0.64	0.38	0.65	0.02	0.60	0.85	0.76
Uniform Delay, d1	31.0	28.9		27.4	31.1	22.4	17.8	27.7	15.6	19.2	29.1	20.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.9		0.1	9.5	2.0	0.1	4.0	0.0	1.0	10.3	4.5
Delay (s)	32.2	29.8		27.5	40.6	24.4	17.9	31.6	15.6	20.3	39.4	24.9
Level of Service	C	C		C	D	C	B	C	B	C	D	C
Approach Delay (s)		30.9			30.8			26.5			29.7	
Approach LOS		C			C			C			C	

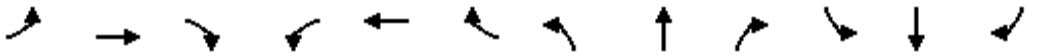
Intersection Summary			
HCM Average Control Delay	29.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (veh/h)	0	586	26	0	912	40	0	0	14	0	0	109
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.90	0.50	0.25	0.93	0.78	0.25	0.25	0.50	0.25	0.25	0.81
Hourly flow rate (vph)	0	651	52	0	981	51	0	0	28	0	0	135
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					666							
pX, platoon unblocked	0.75						0.75	0.75		0.75	0.75	0.75
vC, conflicting volume	1032			703			1302	1709	352	1360	1709	516
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	379			703			739	1281	352	816	1281	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	96	100	100	84
cM capacity (veh/h)	894			904			194	125	651	196	125	819

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	SW 1
Volume Total	434	269	654	378	28	135
Volume Left	0	0	0	0	0	0
Volume Right	0	52	0	51	28	135
cSH	1700	1700	1700	1700	651	819
Volume to Capacity	0.26	0.16	0.38	0.22	0.04	0.16
Queue Length 95th (ft)	0	0	0	0	3	15
Control Delay (s)	0.0	0.0	0.0	0.0	10.8	10.3
Lane LOS					B	B
Approach Delay (s)	0.0		0.0		10.8	10.3
Approach LOS					B	B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	456	30	148	845	350	48	12	88	404	9	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.88		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1624	3179		1624	3217	1439	1624	1502		1593	1483	
Flt Permitted	0.20	1.00		0.25	1.00	1.00	0.69	1.00		0.68	1.00	
Satd. Flow (perm)	340	3179		433	3217	1439	1177	1502		1148	1483	
Peak-hour factor, PHF	0.65	0.88	0.64	0.68	0.94	0.90	0.70	0.56	0.97	0.85	0.75	0.64
Adj. Flow (vph)	174	518	47	218	899	389	69	21	91	475	12	94
RTOR Reduction (vph)	0	9	0	0	0	198	0	50	0	0	52	0
Lane Group Flow (vph)	174	556	0	218	899	191	69	62	0	475	54	0
Heavy Vehicles (%)	0%	1%	0%	0%	1%	1%	0%	0%	0%	2%	0%	0%
Turn Type	pm+pt			pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	26.2	20.1		32.0	23.0	23.0	33.9	33.9		33.9	33.9	
Effective Green, g (s)	26.2	20.1		32.0	23.0	23.0	33.9	33.9		33.9	33.9	
Actuated g/C Ratio	0.35	0.27		0.43	0.31	0.31	0.45	0.45		0.45	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	223	852		328	987	441	532	679		519	670	
v/s Ratio Prot	0.06	0.17		c0.08	c0.28			0.04			0.04	
v/s Ratio Perm	0.21			0.20		0.13	0.06			c0.41		
v/c Ratio	0.78	0.65		0.66	0.91	0.43	0.13	0.09		0.92	0.08	
Uniform Delay, d1	18.9	24.4		15.1	25.0	20.8	12.0	11.7		19.2	11.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.1	1.8		5.0	12.2	0.7	0.5	0.3		23.3	0.2	
Delay (s)	35.0	26.2		20.1	37.2	21.5	12.5	12.0		42.5	11.9	
Level of Service	D	C		C	D	C	B	B		D	B	
Approach Delay (s)		28.2			30.7			12.2			36.9	
Approach LOS		C			C			B			D	

Intersection Summary			
HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

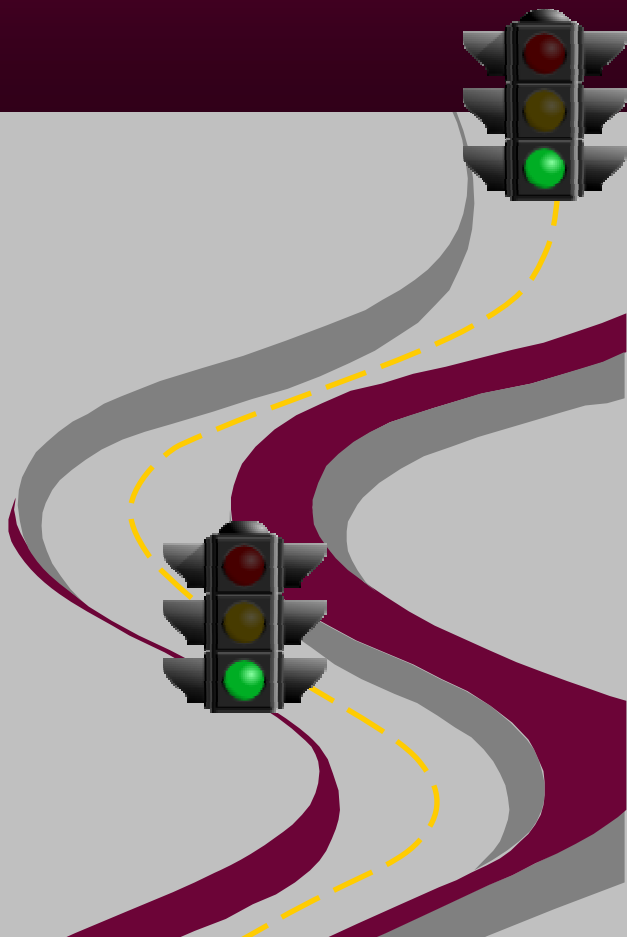
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	428	343	162	69	341	452	258	621	47	511	828	743
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Lane Util. Factor	0.97	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3467	3335		1805	1900	1553	1787	3505	1615	1752	3574	1599
Peak-hour factor, PHF	0.95	0.90	0.90	0.70	0.97	0.92	0.77	0.90	0.82	0.95	0.88	0.90
Adj. Flow (vph)	451	381	180	99	352	491	335	690	57	538	941	826
RTOR Reduction (vph)	0	24	0	0	0	39	0	0	29	0	0	126
Lane Group Flow (vph)	451	537	0	99	352	452	335	690	28	538	941	700
Heavy Vehicles (%)	1%	1%	0%	0%	0%	4%	1%	3%	0%	3%	1%	1%
Turn Type	Prot			pm+pt		pm+ov	pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases				8		8	2		2	6		6
Actuated Green, G (s)	16.7	23.2		19.1	19.1	31.1	26.4	21.2	33.8	39.2	28.0	44.7
Effective Green, g (s)	16.7	23.2		19.1	19.1	31.1	26.4	21.2	33.8	39.2	28.0	44.7
Actuated g/C Ratio	0.19	0.26		0.21	0.21	0.35	0.29	0.24	0.38	0.44	0.31	0.50
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	6.0	2.0	2.0	6.0	2.0
Lane Grp Cap (vph)	643	860		383	403	537	524	826	696	763	1112	794
v/s Ratio Prot	0.13	0.16		0.04	c0.19	c0.11	0.04	0.20	0.01	c0.09	0.26	c0.16
v/s Ratio Perm				0.02		0.18	0.15		0.01	0.21		0.27
v/c Ratio	0.70	0.62		0.26	0.87	0.84	0.64	0.84	0.04	0.71	0.85	0.88
Uniform Delay, d1	34.3	29.5		29.5	34.3	27.2	27.7	32.7	17.8	20.7	29.0	20.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	1.0		0.1	18.0	11.0	1.9	9.8	0.0	2.4	8.0	11.0
Delay (s)	37.1	30.6		29.7	52.2	38.2	29.5	42.5	17.8	23.1	37.0	31.3
Level of Service	D	C		C	D	D	C	D	B	C	D	C
Approach Delay (s)		33.5			42.6			37.2			31.7	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	35.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	93.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX E



LEVEL OF SERVICE SUMMARY

VS ENGINEERING, INC.

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LEVEL OF SERVICE RESULTS TABLE

Intersection		Analysis Scenario	LEVEL OF SERVICE											
			EB			WB			NB			SB		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
NORTHFIELD DR. AT NORTHFIELD COMMONS WEST ENT./WALMART MIDDLE ENT.	AM	2011 Existing *Alternative 1 - Full Access*	A	*Free*	*Free*	A	*Free*	*Free*	C	*	B	C	*	A
		2011 Existing *Alternative 2 - Right-in/Right-out*		*Free*	*Free*		*Free*	*Free*			B			A
		2011 Combined *Alternative 1 - Full Access*	A	*Free*	*Free*	A	*Free*	*Free*	D	*	B	C	*	A
		2011 Combined *Alternative 2 - Right-in/Right-out*		*Free*	*Free*		*Free*	*Free*			B			A
		2021 Combined *Alternative 1 - Full Access*	A	*Free*	*Free*	A	*Free*	*Free*	E	*	B	E	*	A
		2021 Combined *Alternative 2 - Right-in/Right-out*		*Free*	*Free*		*Free*	*Free*			B			A
	PM	2011 Existing *Alternative 1 - Full Access*	A	*Free*	*Free*	A	*Free*	*Free*	D	*	A	E	*	B
		2011 Existing *Alternative 2 - Right-in/Right-out*		*Free*	*Free*		*Free*	*Free*			A			A
		2011 Combined *Alternative 1 - Full Access*	A	*Free*	*Free*	A	*Free*	*Free*	E	*	A	F	*	B
		2011 Combined *Alternative 2 - Right-in/Right-out*		*Free*	*Free*		*Free*	*Free*			B			A
		2021 Combined *Alternative 1 - Full Access*	A	*Free*	*Free*	A	*Free*	*Free*	F	*	B	F	*	B
		2021 Combined *Alternative 2 - Right-in/Right-out*		*Free*	*Free*		*Free*	*Free*			B			A
NORTHFIELD DR. AT NORTHFIELD COMMONS MAIN ENT./WALMART EAST ENT. (MCNEES WAY)	AM	2011 Existing *Alternative 1 - Full Access*	B	B	B	B	B	B	A	A	A	A	A	A
		2011 Existing *Alternative 2 - Right-in/Right-out*	B	B	B	B	B	B	A	A	A	A	A	A
		2011 Combined *Alternative 1 - Full Access*	B	B	B	B	B	B	A	A	A	A	A	A
		2011 Combined *Alternative 2 - Right-in/Right-out*	B	C	C	B	B	B	A	A	A	A	A	A
		2021 Combined *Alternative 1 - Full Access*	B	B	B	B	B	B	A	A	A	B	A	A
		2021 Combined *Alternative 2 - Right-in/Right-out*	B	B	B	B	B	B	B	A	A	B	A	A
	PM	2011 Existing *Alternative 1 - Full Access*	B	B	B	B	B	B	B	B	B	B	B	B
		2011 Existing *Alternative 2 - Right-in/Right-out*	B	B	B	B	B	B	B	B	B	C	B	B
		2011 Combined *Alternative 1 - Full Access*	B	B	B	B	B	B	B	B	B	B	B	B
		2011 Combined *Alternative 2 - Right-in/Right-out*	B	B	B	B	B	B	B	B	B	C	B	B
		2021 Combined *Alternative 1 - Full Access*	B	B	B	B	B	B	B	B	B	C	B	B
		2021 Combined *Alternative 2 - Right-in/Right-out*	D	C	C	C	D	C	B	B	B	D	B	B
NORTHFIELD DR. AT SR 267	AM	2011 Existing	C	C	C	C	C	C	B	C	B	B	B	A
		2011 Combined *Alternative 1 - Full Access*	C	C	C	C	C	C	B	C	B	B	C	A
		2011 Combined *Alternative 2 - Right-in/Right-out*	C	C	C	C	C	C	B	C	B	B	C	A
		2021 Combined *Alternative 1 - Full Access*	D	C	C	C	C	C	B	C	B	B	C	A
		2021 Combined *Alternative 2 - Right-in/Right-out*	D	C	C	C	C	C	B	C	B	B	C	A
	PM	2011 Existing	C	C	C	C	D	C	B	C	B	C	D	C
		2011 Combined *Alternative 1 - Full Access*	C	C	C	C	D	C	B	C	B	C	D	C
		2011 Combined *Alternative 2 - Right-in/Right-out*	C	C	C	C	D	C	B	C	B	C	D	C
		2021 Combined *Alternative 1 - Full Access*	D	C	C	C	D	D	C	D	B	C	D	C
		2021 Combined *Alternative 2 - Right-in/Right-out*	D	C	C	C	D	D	C	D	B	C	D	C

Free - Unrestricted free flow movement

- Movement not Permissible

* - Negligible turning movement volume