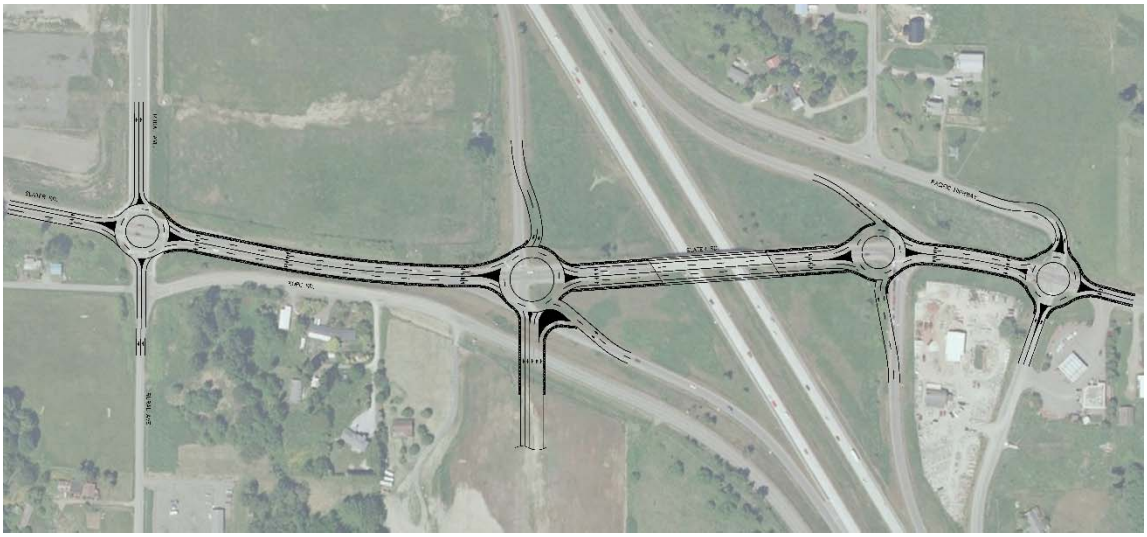
Interstate-5, Exit 260 Slater Road

Corridor Report and
Preliminary Interchange Justification Evaluation



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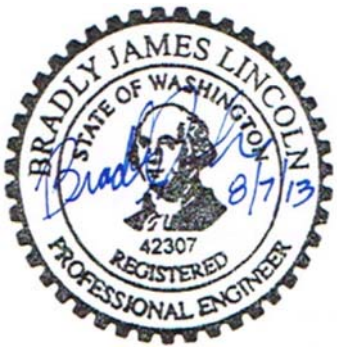

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1. INTRODUCTION

This congestion relief and safety project is located at the southern limits of the City of Ferndale in Whatcom County. The Interstate-5 at Slater Road Interchange is exit 260. The interchange is not currently funded for improvements, but has previously been identified as needing improvements as part of the City of Ferndale *Main Street Master Plan Planned Action EIS (June 2011)* and as part of the WSDOT *Fairhaven to Slater Interstate-5 Mater Plan (November 2008)*. The ultimate planned improvements can be phased to improve the ramp terminals with adjacent intersections and to ultimately replace the Interstate crossing.

The preferred alternative improvements show that existing operations will be significantly improved, even with the future build-out growth of the area, and maintain acceptable LOS D for the Interstate-5 merge operations without changing the existing I-5 mainline gore line. The improvements should not require a full Interchange Justification Report. However, WSDOT recommended the traffic analysis be presented in a format similar to an Interchange Justification Report for ease of review and due to the preferred alternative including the Kope Road realignment to the southbound ramp.

2. PROJECT DESCRIPTION

The Interstate-5 at Slater Road Interchange is from MP 259.71 to MP 260.56. The ultimate preferred improvement consists of roundabouts at the ramp terminals with Slater Road and the immediately adjacent intersections on Slater Road west of the southbound ramp, Rural Avenue, and east of the northbound ramp, Pacific Avenue. The ultimate improvements will also require widening of the Slater Road Bridge over Interstate-5.

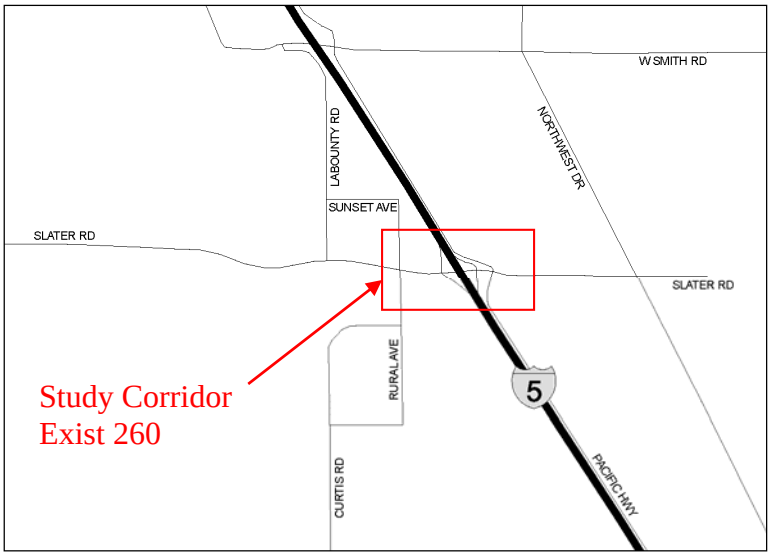


Figure 1: Site Vicinity

3. PROJECT PURPOSE AND NEED

The purpose and need of the Slater Road Interchange improvements include:

- Increases safety and relieve congestion at the ramp terminals and closely spaced intersections.
- Accommodate the increase in traffic volume expected at the Slater Road Interchange ramp terminals and closely spaced intersections.
- Consistent safety and congestion/design standard improvements with the WSDOT *Fairhaven to Slater Interstate-5 Mater Plan (November 2008)* and the City of Ferndale *Main Street Master Plan Planned Action EIS (June 2011).*

4. STUDY AREA ANALYSIS AND FINDINGS

The purpose of the study area analysis is as follows:

- What are the existing and future access needs in the corridor?
- Are the proposed improvements at the Interstate-5 at Slater Road Interchange necessary?
- Can the needs addressed by the proposed improvements be accomplished more efficiently with local infrastructure improvements?
- How do the proposed improvements impact the operation and safety of adjacent interchanges, the I-5 mainline and local intersections?

To establish the area of influence for the proposed improvements at the Slater Road Interchange, the existing and future operating conditions and safety in the study area were evaluated. The study corridor includes the closely spaced intersection of Rural Avenue, west of the interchange, and Pacific Avenue, east of the interchange. The future build-out accounts for known developments and anticipated developments that will impact the Slater Road corridor.

The 3 interchanges in the vicinity are listed below:

I-5 Interchange at Bakerview Road, MP 258.02 – MP 258.30 (Exit258)
I-5 Interchange at Slater Road, MP 259.71 – MP 260.56 (Exit 260)
I-5 Interchange at Main Street, MP 262.09 – MP 263.02 (Exit 262)

The Bakerview Road and Main Street interchanges were analyzed as part of the WSDOT *Fairhaven to Slater Interstate-5 Mater Plan (November 2008)* and the City of Ferndale *Main Street Master Plan Planned Action EIS (June 2011)*, respectively. However, there is potential additional growth in the area that was not included as part of either study that would impact the Slater Road interchange. Therefore, several additional improvement alternatives have been evaluated for the Slater Road corridor to determine the most appropriate interim and ultimate improvement alternatives that will provide adequate safety improvements and capacity for the potential growth in the region.

5. STUDY AREA METHODOLOGY

The Slater Road corridor currently consists of one signalized intersection and three unsignalized intersections, which already have inadequate capacity to handle the existing traffic volumes in the area. The *Main Street Master Plan Planned Action EIS (June 2011)* performed for the City of Ferndale identified that some of the intersections along the Slater Road corridor currently operate at deficient levels. Additionally, the WSDOT *Fairhaven to Slater Interstate-5 Mater Plan (November 2008)* identified the existing Slater Road ramp deficiencies. Both of these other recent jurisdictional studies conducted detailed evaluations and alternatives analysis of the adjacent interchanges. The analysis performed for the adjacent interchanges is referenced in this study.

5.1 Intersection Level of Service Analysis

The intersection level of service analysis has been performed for the 2013 existing conditions and the future build-out conditions. The future build-out conditions have also been analyzed with a Kope Road extension south of Slater Road to the north end of Bellingham International Airport. The following intersections have been analyzed:

1. Slater Road at Rural Avenue
2. Slater Road at I-5 Southbound Ramps
3. Slater Road at I-5 Northbound Ramps
4. Slater Road at Pacific Avenue

Traffic congestion is measured in terms of level of service. Peak-hour level of service at intersections is determined based on the methodology described in the *2010 Highway Capacity Manual* (HCM). Peak-hour level of service has been analyzed using the *Synchro 8.0 Build 803* software for stop-controlled and signalized intersections. The *Sidra Intersection 6.0.11.3995* software has been utilized for roundabout controlled intersections. WSDOT recognizes *Synchro 8.0* and *Sidra Intersection 6.0* as the industry standard for analyzing stop-controlled, signalized and roundabout controlled intersections. The results of the analysis are based on the *Synchro 8.0* percentile level of service for signalized intersections.

In accordance with the HCM, road facilities and intersections are rated between LOS A and LOS F, with LOS A being free flow and LOS F being forced flow or over-capacity conditions. A summary of the level of service criteria is included in Table 1. Geometric characteristics and conflicting traffic movements are taken into consideration when determining level of service values. The level of service at intersections is measured in terms of average control delay per vehicle in seconds. The typically acceptable level of service standard for WSDOT is LOS D, which has been utilized as the threshold for the intersections analyzed in this report.

Table 1: Level of Service Criteria

Level of Service [1]	Expected Delay	Intersection Control Delay (Seconds per Vehicle)	
		Unsignalized Intersections	**Signalized** Intersections
A	Little/No Delay	≤10	≤10
B	Short Delays	>10 and ≤15	>10 and ≤20
C	Average Delays	>15 and ≤25	>20 and ≤35
D	Long Delays	>25 and ≤35	>35 and ≤55
E	Very Long Delays	>35 and ≤50	>55 and ≤80
F	Extreme Delays[2]	>50	>80

WSDOT utilizes a volume to capacity (v/c) ratio of 0.92 for any approach at roundabouts as the threshold to determine if it has acceptable conditions.

The level of service analysis has been performed for the weekday PM peak-hour. Data for the weekday AM peak-hour and the Saturday peak-hour showed that AM peak-hour and Saturday peak-hour volumes were lower than the weekday PM peak-hour.

5.2 Turning Movement Volumes

Existing traffic volumes were obtained from the Whatcom Council of Governments (WCOG), which were performed by the independent count firm of All Traffic Data (ATD). The future build-out volumes have been calculated using a combination of growth rate and specific development trips. The future build-out volumes have also been calculated with a Kope Road connection.

[1] **Source:** *Highway Capacity Manual* 2010.

LOS A: Free-flow traffic conditions, with minimal delay to stopped vehicles (no vehicle is delayed longer than one cycle at signalized intersection).
LOS B: Generally stable traffic flow conditions.
LOS C: Occasional back-ups may develop, but delay to vehicles is short term and still tolerable.
LOS D: During short periods of the peak hour, delays to approaching vehicles may be substantial but are tolerable during times of less demand (i.e. vehicles delayed one cycle or less at signal).
LOS E: Intersections operate at or near capacity, with long queues developing on all approaches and long delays.
LOS F: Jammed conditions on all approaches with excessively long delays and vehicles unable to move at times.

[2] When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection.

5.2.1. Kope Road Extension

The future build-out turning movement volumes have been calculated with the existing road network and with a potential new Kope Road extension to the south. The extension would occur between the existing south terminus of Kope Road, south of Slater Road, and the north terminus at the Bellingham International Airport. The change in turning movements with the Kope Road extension to the south is based on data from the WCOG model. The Kope Road extension to the south will result in the shift of an estimated 110 northbound and 65 southbound existing trips. The Kope Road extension to the south will result in a reduction in trips at the study intersections. Detailed volumes from the WCOG model with the Kope Road connection are included in the attachments.

5.2.2. Growth Rate

Volume data was obtained from the WCOG model to determine a growth rate for the Slater Road corridor. WCOG volume data for the year 2008 and 2032 shows straight-line growth rates that range from 0% to 6% in the study area. Growth rates were also calculated for the 2013 to 2032 timeframe based on the existing 2013 PM peak-hour counts. The 2013 to 2032 straight-line growth rates ranged from 0% to 1%. Additionally, the WCOG 2032 to 2042 growth projections were less than 1% per year for this area. From the WCOG data it was determined that the majority of the WCOG projected growth for the Slater Road corridor occurred between 2008 and 2013. However, to account for the future growth from the WCOG model data, a 19% growth rate has been applied in the future build-out turning movement calculations before additional anticipated pipeline was included. WCOG model data showing the growth rate calculations is included in the attachments.

5.2.3. Pipeline Development

The pipeline developments that are included in the future build-out volumes are additional to the growth from the WCOG model. The pipeline developments are:

- Costco Development (City of Bellingham)
- Corrections Facility (Whatcom County)
- Consolidated Mixed-Use Commercial Development (Lummi Nation)

Traffic impact analysis reports for the Costco Development and Correction Facility have been submitted to the respective jurisdictions for review. Figures showing the PM peak-hour trip distributions for these developments are included in the attachments.

The Lummi Nation has development planned that will impact the Slater Road corridor and interchange. This mixed-use development could occur in several areas west of Interstate-5. However, the highest impact on the study intersections would occur if this development is located on the south side of Slater Road, west of Interstate-5. The trips generated by future development have been calculated using standard Institute of Transportation Engineers (ITE) average trip generation rates and estimated build-out for the area. This additional potential build-out could

consist of approximately 700,000 SF of mixed use (retail/restaurant/office) and 300 hotel rooms. These uses are anticipated to generate approximately 2,000 more PM peak-hour trips to the study area. These trips have been distributed based on WCOG model data, input from WSDOT staff and distributions from other developments in the City of Ferndale and City of Bellingham areas. The distribution for this potential build-out will change, depending on whether the Kope Road extension occurs. Distributions for each scenario, the existing road system and with the Kope Road extension, are included in the attachments.

5.2.4. Kope Road Realignment

The Kope Road realignment to the southbound ramp intersection included in the preferred alternative is only anticipated to change the assignment of trips. Unlike the Kope Road extension, the Kope Road realignment will not add or remove trips from the Slater Road corridor. The Kope Road realignment can occur without or with the Kope Road extension to the south, but is only an option with the preferred alternatives of roundabouts. The Kope Road realignment has not been analyzed with any of the other improvement alternatives.

5.2.5. Total Turning Movement Volumes

The future build-out peak-hour trips at the study intersections range from a 57% to 222% increase from the 2013 existing turning movements, depending on the Kope Road extension and realignment scenarios.

5.2.6. Ramp and Mainline Volumes

Future build-out volumes were also calculated for the I-5 mainline and northbound and southbound on-ramps from Slater Road. These volumes have been calculated to analyze the merge conditions for the northbound and southbound on-ramps. The future build-out mainline volumes for the PM peak-hour are based on 2013 mainline volumes from WSDOT with a 1.5% straight-line growth rate for 19 years. The growth rate is based on historical volumes increases along I-5 and similar to the growth rate utilized in the *Main Street Master Plan Planned Action EIS (June 2011)*. The future build-out ramp volumes for the PM peak-hour are based on the turning movements used for the intersection level of service analysis and are approximately 19% greater than the existing peak-hour volumes. The volumes on the northbound on-ramp are the highest under the future build-out conditions with the Kope Road extension to the south. However, the volumes on the southbound on-ramp are the highest without the Kope Road extension to the south.

5.3 Intersection Level of Service Results

The 2013 existing level of service analysis shows that the intersection of Slater Road at Rural Avenue operates at LOS B, but the remaining study intersections operate at LOS F. The intersection of Slater Road at Rural Avenue operates at LOS B since it is a signalized intersection with channelization for most movements. It is important to note that the existing queue length on the northbound off-ramp identified in the analysis is approximately 650 feet (the ramp has approximately 1,200 feet of storage available). The 2013 existing volumes and level of service results at the study intersections are shown in Figure 2.

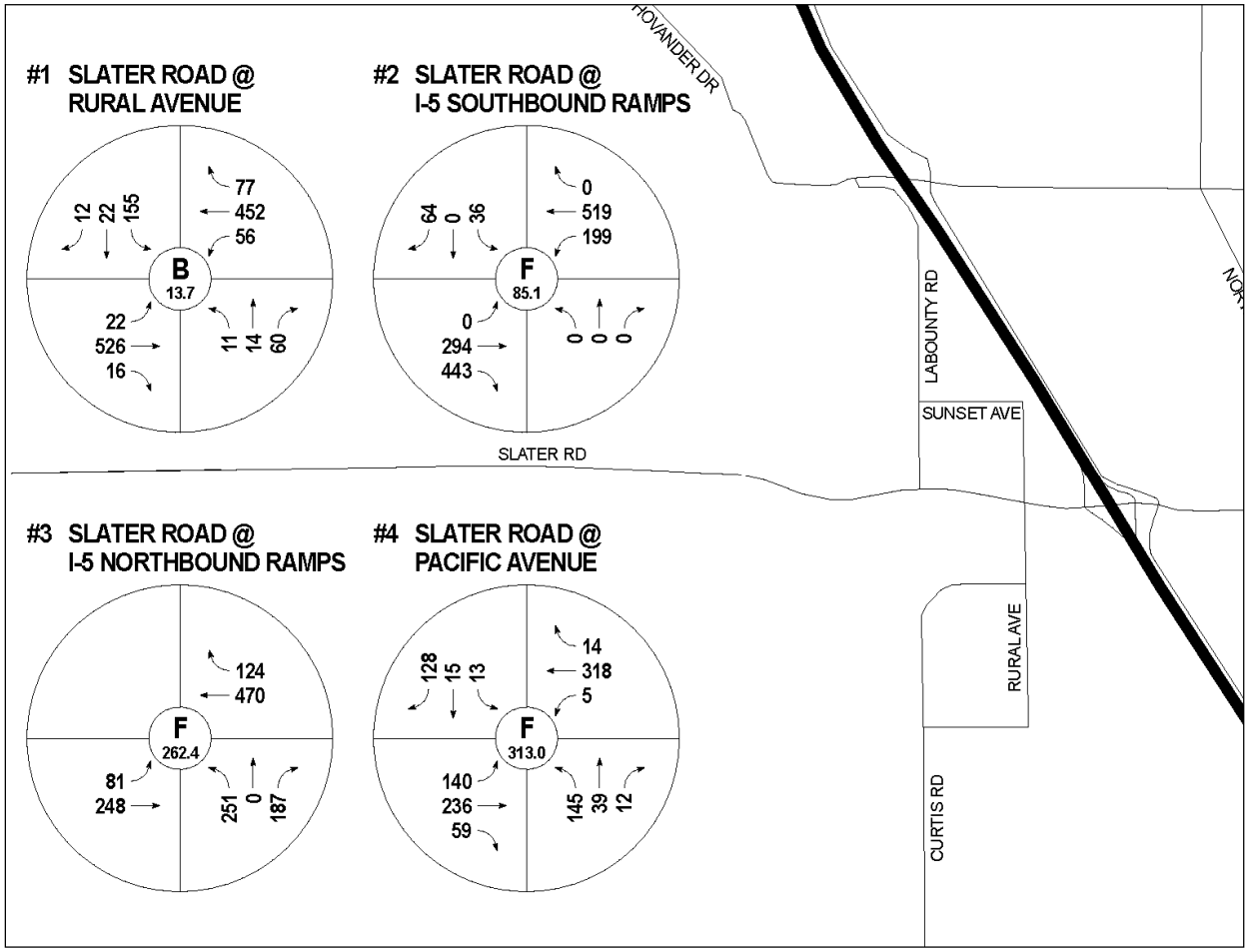


Figure 2: 2013 Existing Turning Movements and Level of Service

All of the study intersections are anticipated to operate at LOS F with severe delays under the future build-out conditions. The minor reduction in trips at the study intersections with the Kope Road extension to the south is not anticipated to significantly change the levels of service at the study intersections. Additionally, it is assumed that the queue length on the northbound off-ramp will extend beyond the 1,200 foot ramp based on the increase in delay, especially since the queue length was not able to be calculated by the software due to the volumes and delay. The future build-out turning movements and level of service results are shown in Figure 3. The preferred alternative to provide adequate capacity for the future build-out conditions is 2-lane roundabouts.

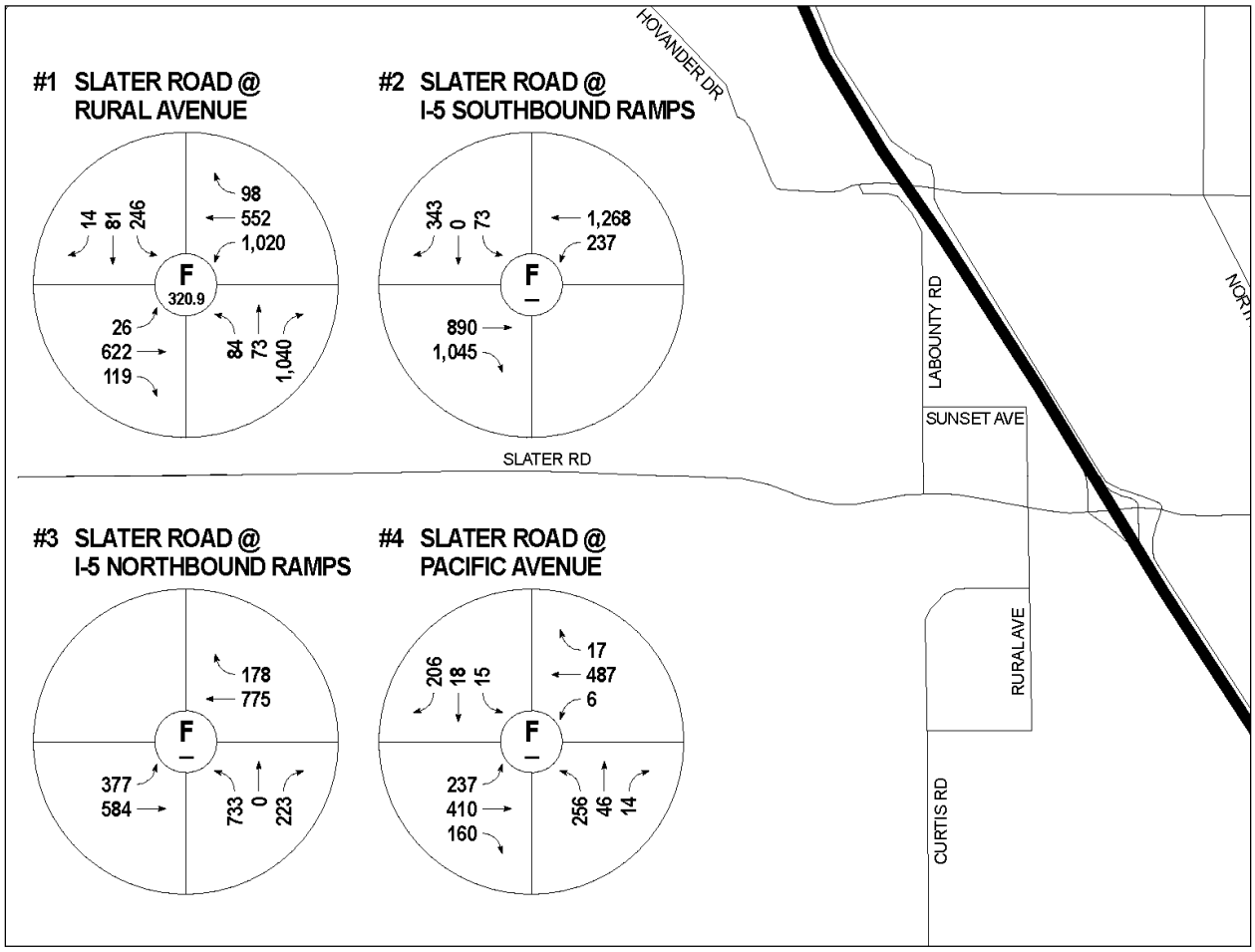


Figure 3: Future Build-Out Turning Movements and Level of Service

5.4 Ramp Merge Level of Service Results

The ramp merge level of service results were calculated using the HCM 2010 methodology, similar to the study intersection analysis. The ramp merge analysis was performed using factors provided by WSDOT and included in their previous analysis of the ramp merge areas. The ramp merge analysis based on the highest volumes and the results are summarized in Table 2.

Table 2: Future Build-Out Ramp Merge Analysis Summary

Direction	Volume Analysis (Future Build-Out Volumes[3])					Ramp Density		Merge Area Speed
	Mainline	Ramp	Volume Total	Capacity	Acceptable Capacity	Density (pc/mi/ln)	LOS	Speed (mph)
Northbound Merge	3,110	790	3,900	4,800	Yes	30.5	D	60.1
Southbound Merge	2,615	1,520	4,135	4,800	Yes	32.0	D	61.1

The ramp merge analysis shows that the northbound and southbound on-ramp merge areas are anticipated to operate at acceptable capacity, with an acceptable density and with an acceptable speed. It is important to note that the change in volumes without or with the Kope Road extension is minor and the analysis has been performed with the highest volumes of the different scenarios. The ramp merge analysis therefore represents a conservatively high analysis of the ram merge. The ramp merge calculations are included in the attachments.

6. STUDY AREA COLLISION ANALYSIS

The *Main Street Master Plan Planned Action EIS (June 2011)* documented the collision history in the City of Ferndale area, including the Slater Road corridor. The *Main Street Master Plan Planned Action EIS* analyzed data from October 2007 to October 2010 provided by WSDOT. The analysis showed that none of the study intersections had more than 4 collisions per year or a collision rate of more than 1.0 per million entering vehicles. Slater Road at the southbound ramp was included as one of the intersections with the highest collision history in the *Main Street Master Plan Planned Action EIS (June 2011).*

7. STUDY AREA ANALYSIS CONCLUSIONS

To determine the area of influence for the proposed improvements along the Slater Road corridor at the Interstate-5 interchange, the study area analysis was focused on providing answers to the questions posed in Section 4. Reponses to those questions are listed below.

[3] These volumes include factors for heavy vehicles, driver population and peak-hour factors.

What are the existing and future access needs in the corridor?

The Interstate-5 interchange at Slater Road and the adjacent closely spaced intersections do not have programmed improvements. However, the WSDOT *Fairhaven to Slater Interstate-5 Master Plan (November 2008)* and the City of Ferndale *Main Street Master Plan Planned Action EIS (June 2011)* documented that there are existing deficient levels of service along the Slater Road corridor at the Interstate-5 interchange. In addition, the future build-out analysis shows that additional improvements to the intersections are required to accommodate the regional growth. The proposed improvements of 2-lane roundabouts, realigned Kope Road to the southbound ramp intersection and Slater Road Bridge widening will accommodate the future full build-out projections at the Slater Road interchange. Improvements to the Interstate-5 mainline or ramps, outside of the terminals at Slater Road, were documented in the WSDOT *Fairhaven to Slater Interstate-5 Mater Plan (November 2008)* and the City of Ferndale *Main Street Master Plan Planned Action EIS (June 2011)* reports and are unchanged in this report based on the future build-out ramp merge analysis showing acceptable operations.

The analysis also demonstrated that an interim improvements to the southbound and northbound ramp intersections would accommodate approximately 75% of the future anticipated mixed-use area growth. The interim improvements include the Kope Road realignment to the southbound ramp intersection, partial 2-lane roundabouts at the southbound and northbound intersections, restriping of the Interstate-5 undercrossing bridge and a 1-lane roundabout at the Pacific Avenue intersection. The Rural Avenue signal can be retained under the interim conditions with minor modifications.

Is the proposed access revision at the Interstate-5 at Slater Road necessary?

Yes. There is an existing and worsening safety and operational problem. The analysis shows that the northbound and southbound Interstate-5 ramp terminals at Slater Road and the Slater Road at Pacific Avenue intersection currently operate at LOS F. In addition, the 95th Percentile queue on the northbound off-ramp is anticipated to impact the I-5 northbound mainline volumes. The improvements are necessary to improve the existing and future operation of the intersections and reduce the existing and future queue impacts of the northbound off-ramp on the Interstate-5 northbound mainline.

Can the needs addressed by the proposed improvements be accomplished more efficiently with local infrastructure improvements?

No. The Slater Road corridor is an important east-west corridor that provides access to areas between the City of Bellingham and the City of Ferndale and is the primary access for the Lummi Nation. These improvements are necessary to maintain acceptable operations to access these areas since no other efficiently accessible connections to Interstate-5 exist. The options for local infrastructure improvements were assessed in both the WSDOT *Fairhaven to Slater Interstate-5 Mater Plan (November 2008)* and the City of Ferndale *Main Street Master Plan Planned Action EIS (June 2011)* reports and both concluded that the Slater Road interchange improvements were

needed even with any local improvements. Additionally, the WCOG modeling showed that a Kope Road extension to the south only removed 175 trips from the interchange; which is insufficient to improve the operations of the intersections.

How do the proposed improvements impact the operation and safety of adjacent interchanges, the I-5 mainline and local intersections?

There is no change to the number of interchange ramp access connections to the mainline and the existing gore line for the Slater Road interchange ramp connections are not proposed to change. The northbound and southbound ramp terminals and the Pacific Avenue intersection currently operate at LOS F. The proposed improvements will improve the safety of the Interstate-5 mainline (reduction of impacts of northbound off-ramp queues) and the operation of the local intersections (operation of LOS D or better).

The study area analysis indicates there is significant benefit to the safety and operation of the ramp terminal intersections and adjacent local intersections at the Slater Road corridor with the proposed improvements, with no negative impacts to operations and safety on the mainline and adjacent interchanges. Given these findings, it is anticipated that a full Interchange Justification Report is not warranted for the proposed improvements. However, the traffic analysis needed to support that decision is organized below similar to an IJR to help make the review easier.

WSDOT and the City of Ferndale have completed two major corridor studies recently that included the Slater Road intersections with the southbound and northbound ramps and adjacent Main Street and Bakerview Road interchanges. No new interchanges or significant arterial connections were recommended in either of these adopted studies. WCOG and WSDOT have planned a major regional study, but the study is not anticipated to be completed for a couple of years. This WCOG and WSDOT study will use the same existing WCOG traffic data included in this study. Based on a preliminary review, it is not anticipated that any of the future options being reviewed in the WCOG and WSDOT study would have any significant change to the recommendations in this study.

8. POLICY POINT #1 – NEED FOR THE ACCESS POINT REVISION

8.1 Project Description

The proposed full improvements will provide 2-lane roundabouts with slip-lanes, if required, along Slater Road at the intersections with Rural Avenue, the Interstate-5 southbound ramps, the Interstate-5 northbound ramps and Pacific Avenue. The Interstate-5 mainline and ramps are not proposed to be changed. The Slater Road Bridge over Interstate-5 will also need to be widened as part of the future build-out conditions; although interim improvements to the bridge would accommodate approximately 75% of the future projected growth before the full improvements are required.

The need for the intersection improvements include:

- Deficient operation of the study intersections under the existing and future build-out conditions.
- Future queue lengths on the northbound off-ramp are anticipated to impact the Interstate-5 mainline traffic under the future build-out conditions.

8.2 Analysis and Data

Improvements to the Slater Road corridor was identified as part of the *Main Street Master Plan Planned Action EIS* performed for the City of Ferndale. The existing data is based on data from WCOG and an independent count firm. The *Synchro 8.0 Build 803* and *Sidra Intersection 6.0.11.3995* software were used to analyze the existing and proposed improvements. Traffic volumes were calculated for future build-out conditions with the existing street system and with a Kope Road extension to the south. Additionally, the preferred alternative with the roundabouts was analyzed with a Kope Road realignment at the southbound ramp terminal to create a 5-leg roundabout.

The growth for the future build-out conditions is based on WCOG growth projections for the area and additional planned development west of I-5. The future build-out is the equivalent of an additional 57% to 222% increase in peak-hour trips at the study intersections from the 2013 existing turning movements, depending on the scenario. Depending on the rate of development, the improvements are anticipated to accommodate regional and local growth for a 20 to 30-year horizon.

9. POLICY POINT #2 - REASONABLE ALTERNATIVES

There were several alternatives that were analyzed as part of this analysis. These alternatives included:

- Signalization with channelization
- Single-Point Urban Interchange (SPUI)
- Diverging Diamond
- Roundabouts

The alternatives were all evaluated for the future build-out conditions with the existing street system. The potential Kope Road extension to the south results in a reduction in trips at the study intersections. Therefore the alternatives have been evaluated with the highest anticipated volumes at the study intersections. The reasonable alternatives were evaluated based on the operation (level of service), queuing, cost and ability for phasing.

9.1 Signal Improvements

The signal improvements alternative required extensive widening and channelization to allow the study intersections to operate at LOS D or better under the future build-out conditions. The level of service results with extensive improvement, bridge widening and signalization is summarized in Table 3.

Table 3: Level of Service Summary with Signal Alternative

Intersection	2013 Existing Conditions		Future Build-Out Conditions					
			No Imp		w Roundabouts		w Signals	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. Slater Rd at Rural Ave	B	13.7 sec	F	320.9 sec	B	0.737 v/c	D	45.1 sec
2. Slater Rd at I-5 SB Ramps	F	85.1 sec	F	>1000 sec	B	0.861 v/c	C	20.0 sec
3. Slater Rd at I-5 NB Ramps	F	262.4 sec	F	>1000 sec	B	0.825 v/c	C	25.7 sec
4. Slater Rd at Pacific Ave	F	313.0 sec	F	>1000 sec	B	0.678v/c	C	23.6 sec

The level of service calculations is included in the attachments.

There are two main reasons why signalization was not the preferred alternative, improvements to the I-5 undercrossing bridge and queuing. The signal alternative will require the I-5 undercrossing bridge to be a 6-lane structure to allow two lanes in each direction and two eastbound left-turn lanes at the I-5 Northbound Ramps. In comparison, the preferred alternative of roundabouts only requires a 4-lane I-5 undercrossing bridge. The cost comparison of the signal alternative and the preferred roundabout alternative is summarized in Table 4.

Table 4: Cost Estimate Summary for Signal Alternative

Alternative	Rural Road Intersection	Rural to Ramps Link	I-5 Ramp Intersections	Pacific Avenue Intersection	Total
Roundabouts	$1,700,000	$1,000,000	$14,600,000	$1,700,000	$19,000,000
Signalization	$2,000,000	$2,500,000	$15,000,000	$1,500,000	$21,000,000

It is important to note that these are planning level costs and assume some economies of scale since the corridor improvements would be constructed at the same time, as opposed to being phased.

The lane configuration for the signal alternative that is documented in Table 3 was necessary to prevent queue backups between intersections and onto the I-5 mainline. Even with the signal alternative lane configuration, there are queue backups that could occur between the closely spaced I-5 Northbound Ramps and the Pacific Avenue intersections that could significantly impact the operation of both intersections.

The signal alternative is not the preferred alternative due to the costs and the potential queue backups.

9.2 Single-Point Urban Interchange

A Single-Point Urban Interchange (SPUI) was evaluated for the interchange with signals at the Rural Avenue and Pacific Avenue intersections. The SPUI alternative results show all of the study intersections operating at an acceptable level of service with the future build-out conditions. The level of service is summarized in Table 5.

Table 5: Level of Service Summary with SPUI Alternative

Intersection	2013 Existing Conditions		Future Build-Out Conditions					
			No Imp		w Roundabouts		w SPUI	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. Slater Rd at Rural Ave	B	13.7 sec	F	320.9 sec	B	0.737 v/c	D	45.1 sec
2. Slater Rd at I-5 SB Ramps	F	85.1 sec	F	>1000 sec	B	0.861 v/c	C	30.2 sec
3. Slater Rd at I-5 NB Ramps	F	262.4 sec	F	>1000 sec	B	0.825 v/c		
4. Slater Rd at Pacific Ave	F	313.0 sec	F	>1000 sec	B	0.678v/c	C	23.6 sec

It is important to note that it has been assumed that the Rural Avenue and Pacific Avenue intersections will operate at the same level of service as the signal alternative with the SPUI alternative. The level of service calculations is included in the attachments.

The SPUI improvement is difficult to phase, as compared to the preferred roundabout improvements and signal alternative, and therefore intermediate improvements necessitated by growth must be timed accurately. The SPUI is also the most expensive of the alternatives that were analyzed. The cost summary is included in Table 6.

Table 6: Cost Estimate Summary for SPUI Alternative

Alternative	Rural Road Intersection	Rural to Ramps Link	I-5 Ramp Intersections	Pacific Avenue Intersection	Total
Roundabouts	$1,700,000	$1,000,000	$14,600,000	$1,700,000	$19,000,000
SPUI	$2,000,000	$2,000,000	$37,000,000	$2,000,000	$43,000,000

The SPUI alternative was not chosen as the preferred alternative due to the cost of the improvements and the inability to phase the improvements.

9.3 Diverging Diamond Alternative

The diverging diamond alternative is an interchange configuration that eliminates the left-turns onto the on-ramps, which typically have the longest delays and queue lengths at an interchange. The Rural Avenue and Pacific Avenue intersections have been analyzed as signalized intersections with this alternative. The level of service analysis, which is summarized in Table 7, shows that all of the study intersections operate at acceptable levels with this alternative.

Table 7: Level of Service Summary with Diverging Diamond Alternative

Intersection	2013 Existing Conditions		Future Build-Out Conditions					
			No Imp		w Roundabouts		w Div.Dia.	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. Slater Rd at Rural Ave	B	13.7 sec	F	320.9 sec	B	0.737 v/c	D	45.1 sec
2. Slater Rd at I-5 SB Ramps	F	85.1 sec	F	>1000 sec	B	0.861 v/c	C	23.7 sec
3. Slater Rd at I-5 NB Ramps	F	262.4 sec	F	>1000 sec	B	0.825 v/c	C	22.9 sec
4. Slater Rd at Pacific Ave	F	313.0 sec	F	>1000 sec	B	0.678v/c	C	20.9 sec

It is important to note that it has been assumed that the Rural Avenue intersection will operate at the same level of service as the signal alternative with the Diverging Diamond alternative. The level of service calculations is included in the attachments.

The diverging diamond improvement will provide adequate queuing, but is also difficult to phase like the SPUI alternative. In addition, the diverging diamond will likely lead to driver confusion since it is not a typical interchange configuration. The cost summary is included in Table 8.

Table 8: Cost Estimate Summary for Diverging Diamond Alternative

Alternative	Rural Road Intersection	Rural to Ramps Link	I-5 Ramp Intersections	Pacific Avenue Intersection	Total
Roundabouts	$1,700,000	$1,000,000	$14,600,000	$1,700,000	$19,000,000
Diverging Diamond	$2,000,000	$2,500,000	$16,400,000	$2,000,000	$22,400,000

The diverging diamond alternative was not chosen as the preferred alternative due to the cost of the improvements, the inability to phase the improvements and the potential for driver confusion.

9.4 2-Lane Roundabouts – Preferred Alternative

The preferredd alternative for the improvements is 2-lane roundabouts. The Slater Road intersection improvements will include a 2-lane roundabout with a fifth leg for a Kope Road realignment at the southbound ramp.

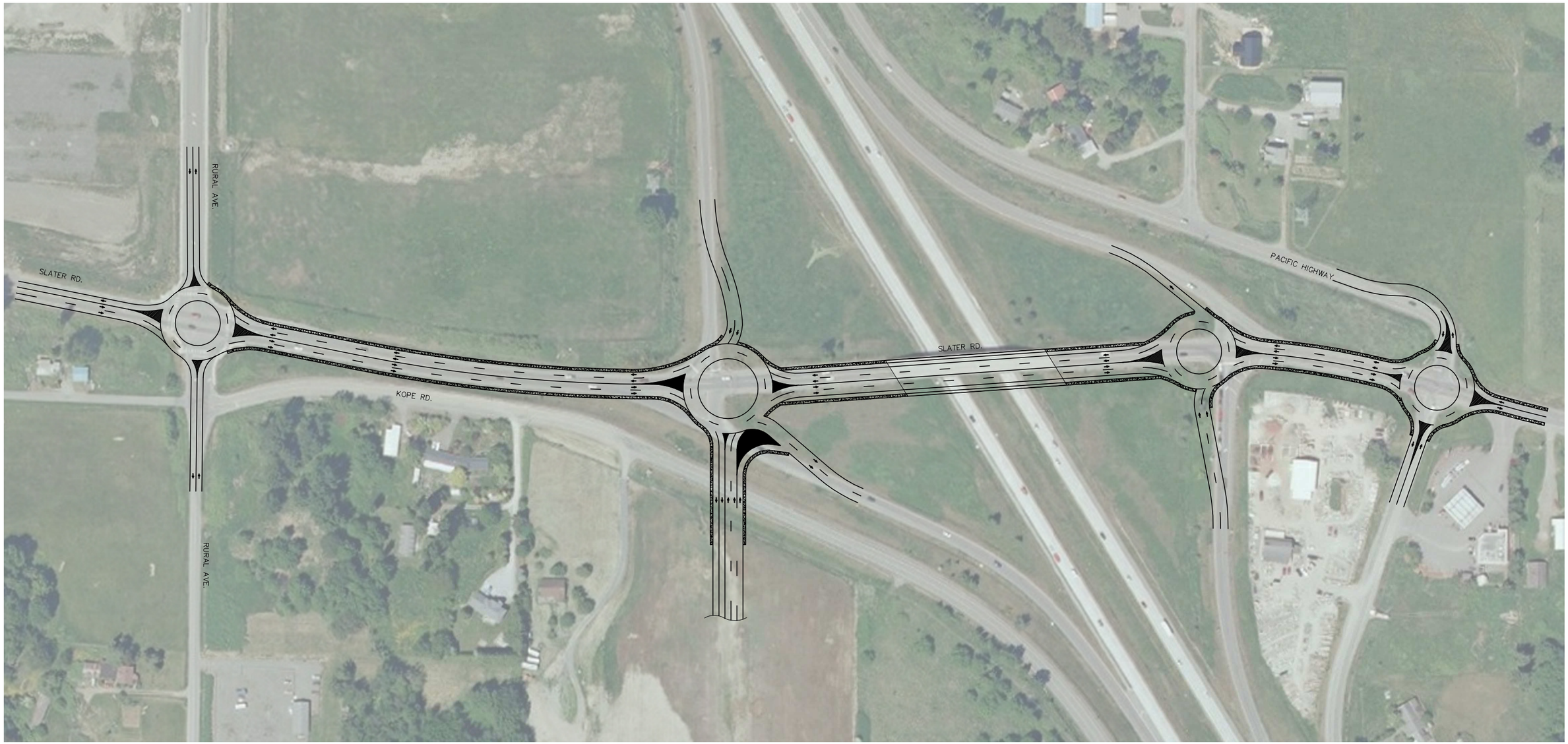
The Rural Avenue roundabout will have two-lane approaches for the eastbound and westbound approaches and the eastbound departure will have two-lanes. The remaining approaches and departures will only require one-lane.

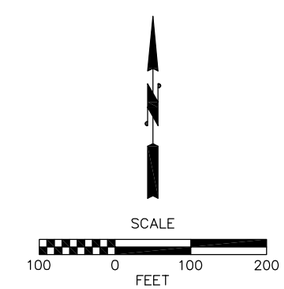
The I-5 Southbound Ramps will include a fifth leg in the southwest quadrant for a Kope Road realignment. The southbound ramp will require 2-lane approaches and departures on all legs, except the approach in the southwest quadrant. The approach in the southwest quadrant will require the addition of a slip lane for the movement onto the southbound on-ramp.

The I-5 Northbound Ramps will also require 2-lanes on all approaches and departures, except for the northbound departure, which will only require one lane. This lane configuration will require the I-5 undercrossing bridge to be widened to allow two lanes in each direction.

The Pacific Avenue intersection will require 2-lanes on the approaches and departures on the west side. The remaining approaches and departures will only require one lane.

A figure showing the preferred alternative for the future build-out conditions is shown in Figure 4.





Aug 07, 2013 - 3:56pm kevin: X:\Gibson Traffic Consultants\Projects\20120076 - Lummi Tribe's Slater Road & I-5 Interchange Improvements\CADD\Base\FiveLeg Layout.dwg Layout Name: FUTURE BUILD OUT

No.	Date	Revision	By	Appr.

Perteet Inc.
425-252-7700 I 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

GTC Gibson Traffic Consultants, Inc.
Transportation Planners and Traffic Engineers
2802 Wetmore Avenue, Suite 220, Everett, WA 98201
425.339.8266 - www.gibsontraffic.com - info@gibsontraffic.com

Drawn By TMR	Date X	SCALE	
Designed By TMR	X	Horiz X	
Checked By X	X	Vert X	
Approved By		Project Number X	

CLIENT

SLATER ROAD/I-5 ACCESS
FIVE LEG RAB OPTION
FUTURE BUILD OUT

Drawing No. FULL

Sheet No. X / X of Total

10. POLICY POINT #3 – OPERATION AND COLLISION ANALYSIS

This section summarizes the operation analysis of the preferred alternative. The analysis was performed for the following conditions:

- 2013 existing conditions
- future interim conditions
- future build-out conditions

10.1 Existing Configuration

The 2013 existing conditions level of service analysis has been performed with the existing volumes shown in Figure 2, existing lane configuration, existing peak-hour factors and existing heavy-vehicle factors. The future build-out analysis has been analyzed utilizing the volumes shown in Figure 3 and the existing channelization and control.

The 2013 existing level of service analysis shows that the intersection of Slater Road at Rural Avenue operates at LOS B, but the remaining study intersections operate at LOS F. The intersection of Slater Road at Rural Avenue operates at an acceptable level of service since it has channelization and is signalized. All of the study intersections are anticipated to operate at LOS F with severe delays under the future build-out conditions without any improvements. The level of service of the study intersections is summarized in Table 9.

Table 9: Level of Service Summary

Intersection	2013 Existing Conditions		Future Build-Out Conditions	
	LOS	Delay	LOS	Delay
1. Slater Rd at Rural Ave	B	13.7 sec	F	320.9 sec
2. Slater Rd at I-5 SB Ramps	F	85.1 sec	F	>1000 sec
3. Slater Rd at I-5 NB Ramps	F	262.4 sec	F	>1000 sec
4. Slater Rd at Pacific Ave	F	313.0 sec	F	>1000 sec

10.2 Future Interim Conditions

Future interim conditions were analyzed to determine the amount of development that can occur with only minor improvements to the Interstate-5 undercrossing bridge. The interim improvements assume three lanes across the bridge (2 westbound and 1 eastbound) with sidewalk and or reduced shoulder width on one side.

The future build-out volumes include a growth rate and three pipeline developments. Two of the pipeline developments, the Costco development and the Corrections Facility development, have already been submitted to their respective jurisdictions. Additional mixed use developments west of Interstate-5 have been projected to account for approximately 2,000 PM peak-hour trips in the area.

The future interim improvements were analyzed with a 3-lane bridge (2 westbound lanes and 1 eastbound lane) and partial 2-lane roundabouts at the ramp terminals. It was determined that 75% of the mixed-use development west of Interstate-5 could be accommodated (in addition to the growth rate and other pipeline developments) by these improvements. Additionally, the Rural Avenue signal would only require minor changes, assuming the Kope Road realignment to a 5-leg roundabout at the southbound ramp intersection. The Pacific Avenue roundabout would also be able to be phased to a 1-lane roundabout under the interim conditions. The future interim volumes and level of service are shown in Figure 5.

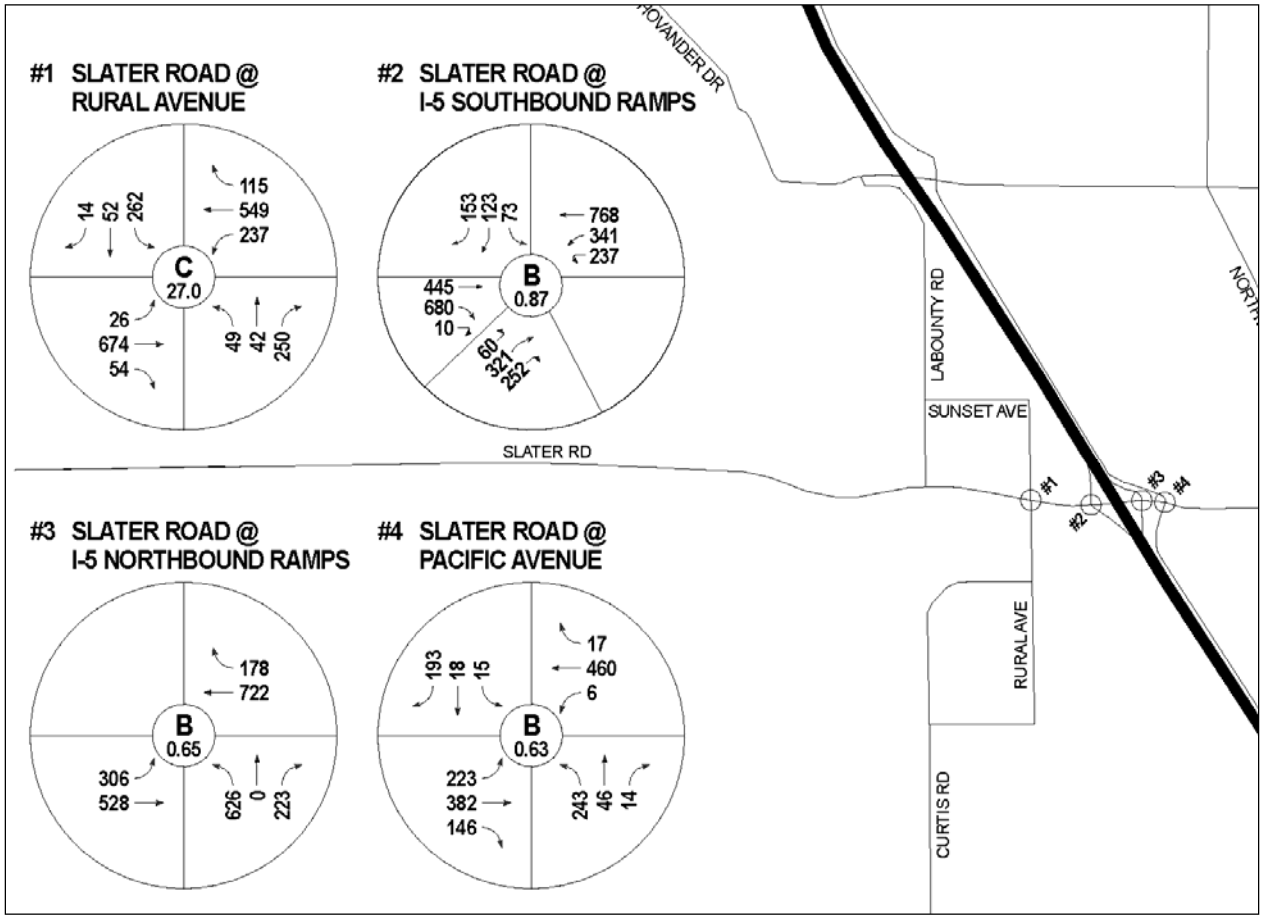


Figure 5: Future Interim Volumes and Level of Service with Preferred Alternative

The future interim conditions level of service results are summarized in Table 10.

Table 10: Level of Service Summary with Future Interim Improvements

Intersection	2013 Existing Conditions		Future Interim Conditions			
			No Imp		w Roundabouts	
	LOS	Delay	LOS	Delay	LOS	Delay
1. Slater Rd at Rural Ave	B	13.7 sec	F	320.9 sec	C	27.0 sec
2. Slater Rd at I-5 SB Ramps	F	85.1 sec	F	>1000 sec	B	0.868 v/c
3. Slater Rd at I-5 NB Ramps	F	262.4 sec	F	>1000 sec	B	0.652 v/c
4. Slater Rd at Pacific Ave	F	313.0 sec	F	>1000 sec	B	0.633 v/c

The Rural Avenue at Slater Road intersection is able to remain as a signalized intersection under the future interim conditions with the Kope Road realignment to southbound ramp intersection since the level of service is acceptable and the queue lengths for the westbound approach, the queue lengths between the Rural Avenue and southbound ramps intersection, will be less than 350 feet. This queue length is not anticipated to disrupt the operation of the southbound ramp intersection. The phased improvements to the Slater Road corridor are anticipated to save approximately $6,000,000 from the cost of the ultimate improvements. The interim improvements along the Slater Road corridor are shown in Figure 6.

10.3 Future Build-Out Growth Conditions

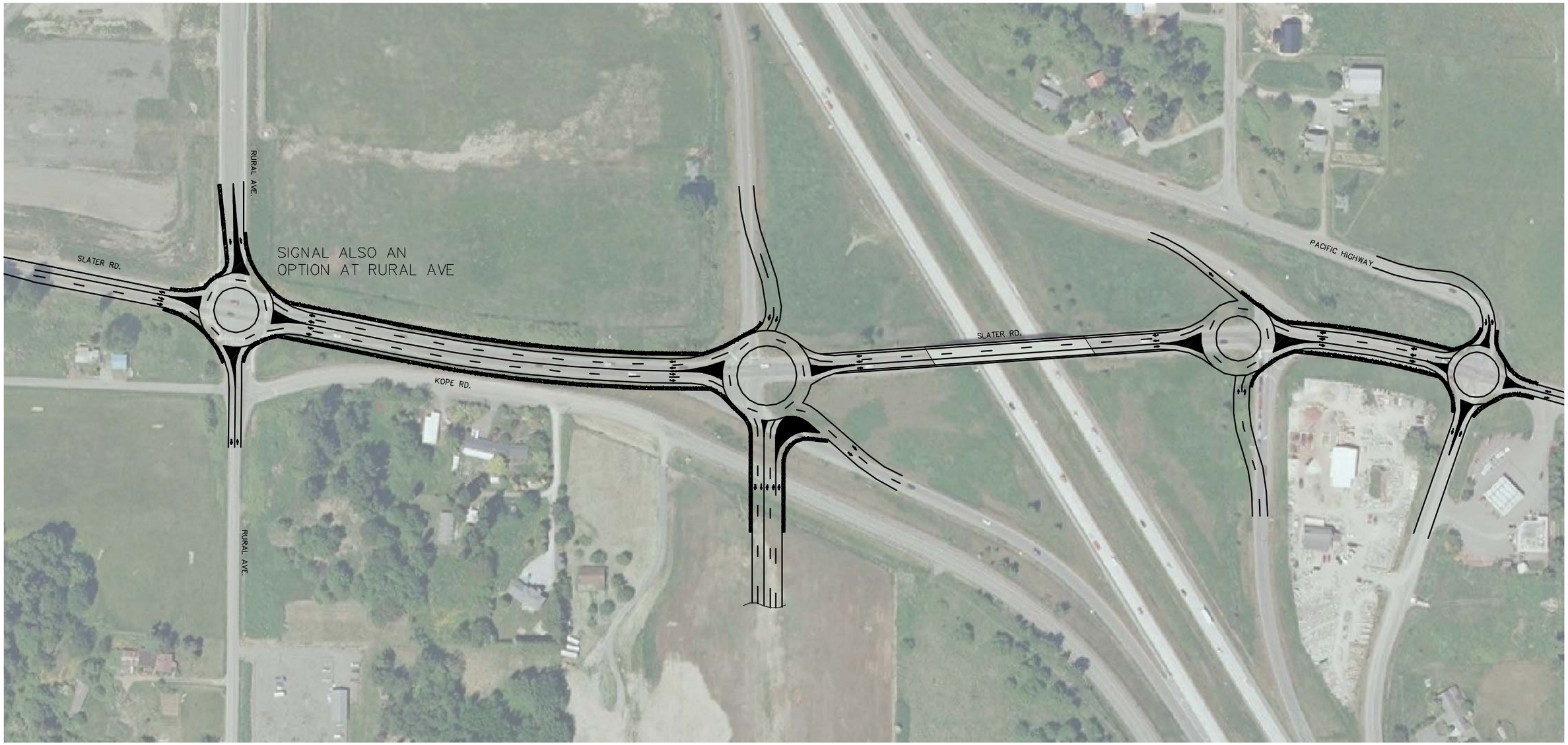
The future build-out conditions have been analyzed without and with a Kope Road extension to the south between the south terminus of Kope and northern end of Bellingham International Airport. Additionally, an analysis of the improvements required without and with a Kope Road realignment at the southbound ramp has been performed.

10.3.1. Kope Road Extension and Realignment

The effects of the Kope Road extension to the south is based on data from the WCOG model. The model data shows that there are anticipated to be 110 northbound and 65 southbound trips along Kope Road with the connection and these trips are anticipated to come from the northbound and southbound ramps, respectively. The Kope Road extension to the south is anticipated to result in 10% of the traffic from the mixed-use development west of Interstate-5 utilizing Kope Road, which is approximately 200 peak-hour trips. The Kope Road connection to the south is therefore anticipated to reduce the volume along the Slater Road corridor.

Additionally, a realignment of Kope Road to create a fifth leg at the southbound ramp in the southwest quadrant has been analyzed. This fifth leg would also serve as an access to development south of Slater Road. The realignment of Kope Road to the southbound ramp intersection has a significant benefit on the improvements required along the corridor, especially for the Rural Avenue intersection.

The analysis of the Kope Road extension to the south, but without the Kope Road realignment to the southbound ramp intersection, and the future build-out volumes shows that the Rural Avenue intersection will require at least two lanes on all approaches and departures with slip lanes for the eastbound and northbound right-turn lanes. This is compared to fewer approach and departure lanes and no slip lanes with the Kope Road realignment to the southbound ramp intersection. As for the southbound ramp intersection, there is very little difference without and with the Kope Road realignment. The Kope Road realignment will not require any additional lanes on any of the existing approaches or departures of the southbound ramp. Additionally, the eastbound approach at the southbound ramp, which has the critical v/c ratio, is actually anticipated to decrease (improved operations) with the Kope Road realignment. A comparison of the required lane configuration and results for the Rural Avenue and southbound ramp intersections without and with the Kope Road realignment is included in the attachments.



N

SCALE

100 0 100 200

FEET

No.	Date	Revision	By	Appr.

Perteet Inc.
425-252-7700 I 1-800-615-9900
2707 Colby Avenue, Suite 900
Everett, Washington 98201

GTC Gibson Traffic Consultants, Inc.

Drawn By TMR	Date X	SCALE	
Designed By TMR	X	Horiz X	
Checked By X	X	Vert X	
Approved By		Project Number X	

CLIENT

SLATER ROAD/I-5 ACCESS
FIVE LEG RAB OPTION
INTERIM

Drawing No.

Sheet No. X / X of Total

Aug 08, 2012 - 8:37 am mikes X:\Gibson Traffic Consultants\Projects\2012\01-Lynnwood Hwy 99 & Slater Road & I-5 Interchange Improvements\CADD\Base Hwy\Leg -5\Layout.dwg Layout: Layout1

In addition to decreasing the volumes along the Slater Road corridor, decreasing the required improvements at the Rural Avenue intersection and not significantly impacting the southbound ramp; the Kope Road extension and realignment will reduce the travel length for vehicles destined to and from the south without sacrificing any other movements. For these reasons, the Kope Road realignment to the southbound ramp intersection has been included as part of the preferred alternative. However, the future build-out volumes with the Kope Road extension to the south have not been utilized in the future build-out analysis for two reasons:

1. The Kope Road extension to the south results in lower volumes along the Slater Road corridor,
    a. Therefore, not utilizing the Kope Road extension to the south represents a conservatively high analysis of the Slater Road corridor.
2. There is not currently right-of-way for the Kope Road extension to the south, which could prevent the extension from occurring without extensive tunneling or wetland mitigation.
3. Although the Kope Road extension to the south removes trips from the Slater Road corridor, the reduction in trips is not enough to change the required improvements to maintain LOS D conditions.

The volumes shown in Figure 7 for the future build-out conditions therefore include the Kope Road realignment, but not the Kope Road extension to the south.

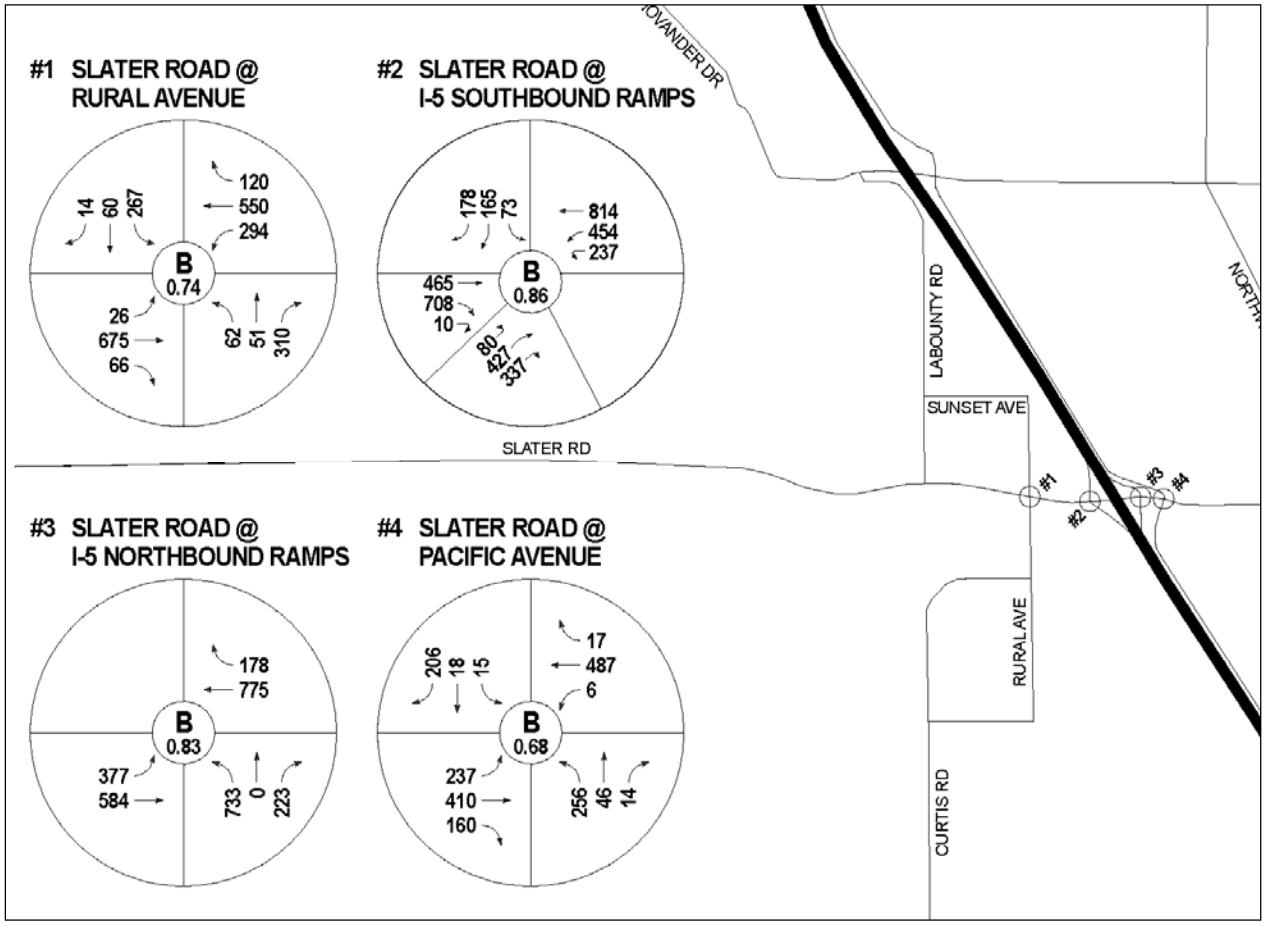


Figure 7: Future Build-Out Volumes and Level of Service with Preferred Alternative

The preferred alternative for the future build-out conditions is 2-lane roundabouts for all study intersections, with slip lanes for critical movements. The level of service results with future build-out improvements are shown in Table 11.

Table 11: Level of Service Summary with Future Build-Out Improvements

Intersection	2013 Existing Conditions		Future Interim Conditions				Future Build-Out Conditions			
			No Imp		w Roundabouts		No Imp		w Roundabouts	
	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. Slater Rd at Rural Ave	B	13.7 sec	F	320.9 sec	C	27.0 sec	F	265.3 sec	B	0.737 v/c
2. Slater Rd at I-5 SB Ramps	F	85.1 sec	F	>1000 sec	B	0.868 v/c	F	>1000 sec	B	0.861 v/c
3. Slater Rd at I-5 NB Ramps	F	262.4 sec	F	>1000 sec	B	0.652 v/c	F	>1000 sec	B	0.825 v/c
4. Slater Rd at Pacific Ave	F	313.0 sec	F	>1000 sec	B	0.633 v/c	F	>1000 sec	B	0.678v/c

The channelization at the study intersections with the preferred alternative is shown in Figure 4 and the level of service calculations are included in the attachments.

11. POLICY POINT #4 – ACCESS CONNECTIONS AND DESIGN

The preferred alternative of 2-lane roundabouts will maintain the fully directional function of the existing interchange. Changes to the Interstate-5 mainline and the ramps, outside of the terminals at Slater Road, are not proposed as part of the preferred alternatives. The preferred alternative will not change the existing spacing between interchanges along Interstate-5 or the intersections along Slater Road.

The future interim alternative includes a 3-lane Slater Road bridge over Interstate-5. This 3-lane bridge can be constructed within the existing 2-lane bridge, although deviations to WSDOT would need to be required. The future build-out alternative will require the Interstate-5 undercrossing bridge to be reconstructed.

12. POLICY POINT #5 – LAND USE AND TRANSPORTATION PLANS

The preferred alternatives are consistent with what is included in the adopted WSDOT *Fairhaven to Slater Interstate-5 Mater Plan (November 2008)* and the City of Ferndale *Main Street Master Plan Planned Action EIS (June 2011)*. Neither study identified any new interchanges or significant arterial connections in this influence area. The preferred alternative is also consistent with Lummi Nation plans and the traffic counts are consistent with what is being used by WCOG for the latest regional access plan. Additionally, preliminary review indicates the proposed improvements would not be altered or alter any preliminary scenarios being reviewed in the WCOG regional plan.

13. POLICY POINT #6 – FUTURE INTERCHANGES

There are no future interchanges to Interstate-5 that are currently proposed in the vicinity of the Slater Road interchange.

14. POLICY POINT #7 – COORDINATION

The preferred alternative is similar to what was analyzed for the WSDOT *Fairhaven to Slater Interstate-5 Mater Plan (November 2008)* and the City of Ferndale *Main Street Master Plan Planned Action EIS (June 2011)*. Improvements to the study intersections will be coordinated with the City of Ferndale, Whatcom County and Lummi Nation.

15. POLICY POINT #8 – ENVIRONMENTAL PROCESS

The preferred alternatives will need to be evaluated for the State Environmental Policy Act (SEPA) and the National Environmental Policy Act (NEPA) processes.

16. ACCESS AND DESIGN CONCLUSIONS

In conclusion, the preferred alternative will improve the operations the study intersections and the safety of the northbound off-ramp queue impacts on the northbound Interstate-5 mainline.

Counts, Growth and Pipeline Data

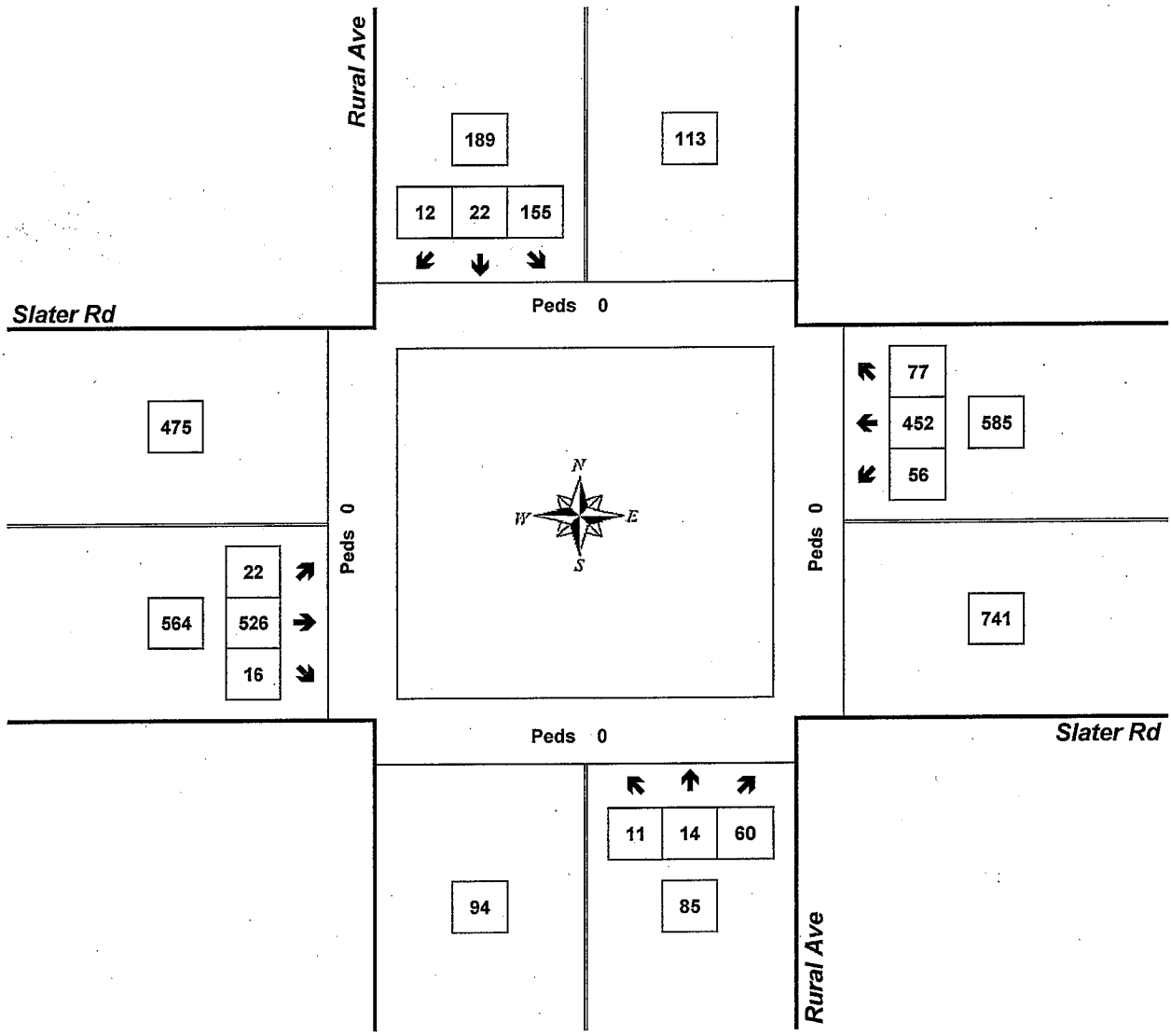
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

Rural Ave & Slater Rd

4:15 PM to 5:15 PM
Tuesday, April 09, 2013



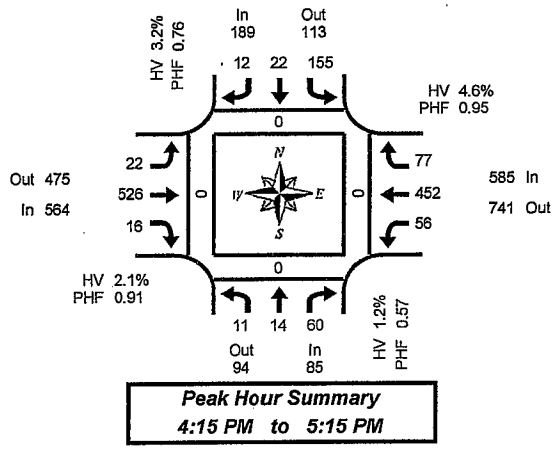
Approach	PHF	HV%	Volume
EB	0.91	2.1%	564
WB	0.95	4.6%	585
NB	0.57	1.2%	85
SB	0.76	3.2%	189
Intersection	0.95	3.2%	1,423

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:15 PM to 5:15 PM

Rural Ave & Slater Rd

Tuesday, April 09, 2013
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Rural Ave				Southbound Rural Ave				Eastbound Slater Rd				Westbound Slater Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	3	3	10	0	50	1	3	0	2	113	2	7	17	87	17	5	308	0	0	0	0
4:15 PM	0	1	8	1	31	2	1	1	6	146	3	1	19	118	16	5	351	0	0	0	0
4:30 PM	4	6	27	0	38	4	2	2	2	142	6	2	11	95	21	8	358	0	0	0	0
4:45 PM	3	3	11	0	38	6	5	1	6	116	2	5	12	120	19	5	341	0	0	0	0
5:00 PM	4	4	14	0	48	10	4	2	8	122	5	4	14	119	21	9	373	0	0	0	0
5:15 PM	2	0	11	1	31	3	2	0	2	121	3	6	17	105	21	5	318	0	0	0	0
5:30 PM	0	2	12	0	32	2	4	2	5	117	3	7	11	113	18	1	319	0	0	0	1
5:45 PM	1	2	7	0	23	5	4	0	4	108	1	3	9	102	14	3	280	0	0	0	0
Total Survey	17	21	100	2	291	33	25	8	35	985	25	35	110	859	147	41	2,648	0	0	0	1

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound Rural Ave				Southbound Rural Ave				Eastbound Slater Rd				Westbound Slater Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	85	94	179	1	189	113	302	6	564	475	1,039	12	585	741	1,326	27	1,423	0	0	0	0
%HV	1.2%				3.2%				2.1%				4.6%				3.2%				
PHF	0.57				0.76				0.91				0.95				0.95				

By Movement	Northbound Rural Ave				Southbound Rural Ave				Eastbound Slater Rd				Westbound Slater Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	11	14	60	85	155	22	12	189	22	526	16	564	56	452	77	585	1,423
PHF	0.69	0.58	0.56	0.57	0.81	0.55	0.60	0.76	0.69	0.90	0.67	0.91	0.74	0.94	0.92	0.95	0.95

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Rural Ave				Southbound Rural Ave				Eastbound Slater Rd				Westbound Slater Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	10	13	56	1	157	13	11	4	16	517	13	15	59	420	73	23	1,358	0	0	0	0
4:15 PM	11	14	60	1	155	22	12	6	22	526	16	12	56	452	77	27	1,423	0	0	0	0
4:30 PM	13	13	63	1	155	23	13	5	18	501	16	17	54	439	82	27	1,390	0	0	0	0
4:45 PM	9	9	48	1	149	21	15	5	21	476	13	22	54	457	79	20	1,351	0	0	0	1
5:00 PM	7	8	44	1	134	20	14	4	19	468	12	20	51	439	74	18	1,290	0	0	0	1

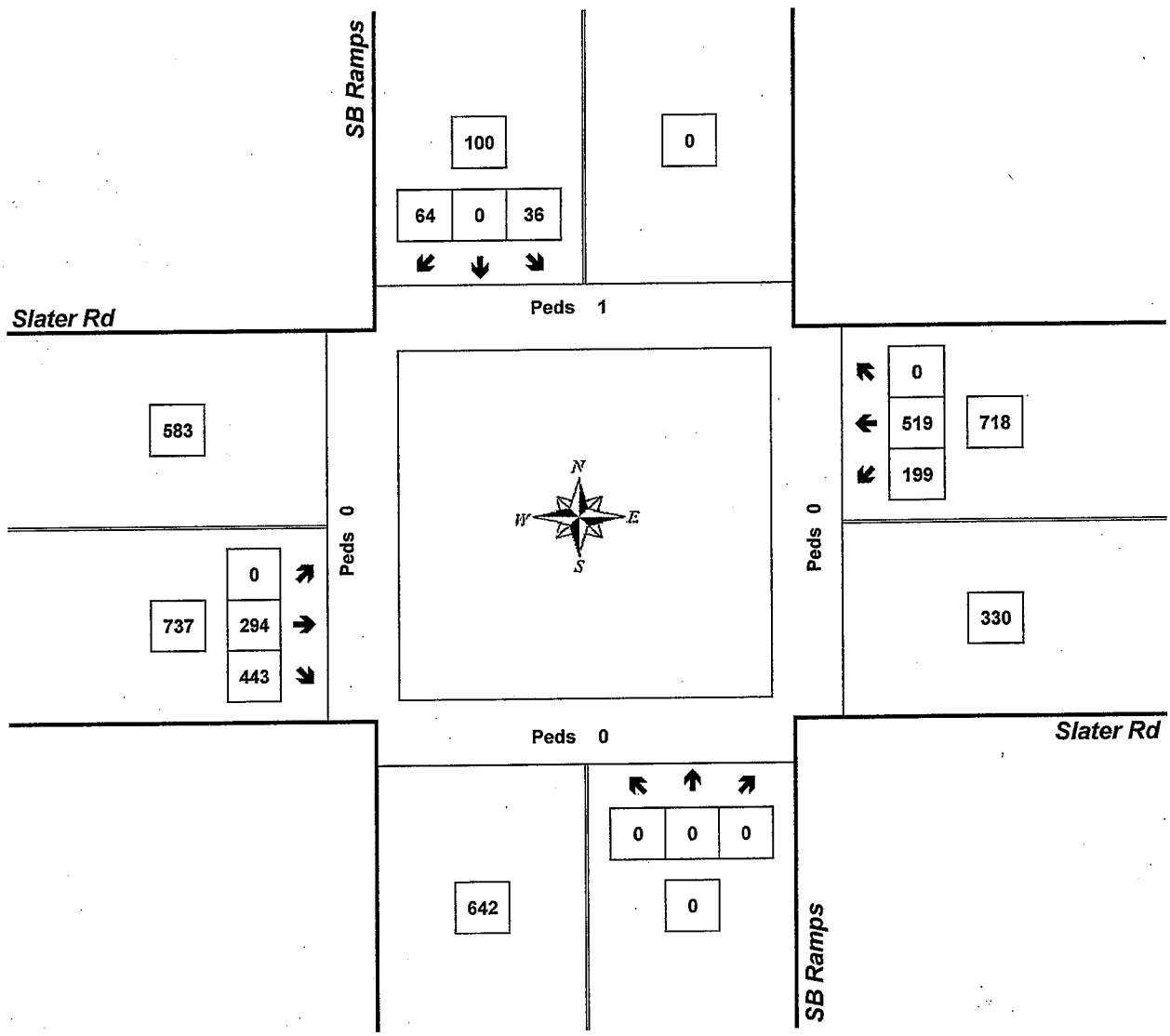
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

SB Ramps & Slater Rd

4:15 PM to 5:15 PM
Tuesday, April 09, 2013

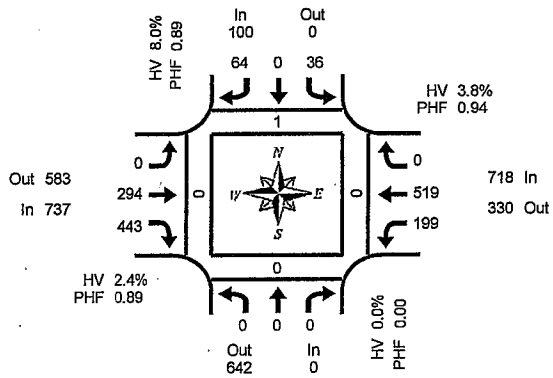


Approach	PHF	HV%	Volume
EB	0.89	2.4%	737
WB	0.94	3.8%	718
NB	0.00	0.0%	0
SB	0.89	8.0%	100
Intersection	0.96	3.4%	1,555

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:15 PM to 5:15 PM

SB Ramps & Slater Rd

Tuesday, April 09, 2013
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SB Ramps				Southbound SB Ramps				Eastbound Slater Rd				Westbound Slater Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	0	0	0	0	4	0	18	3	0	69	109	7	53	102	0	5	355	0	0	0	0
4:15 PM	0	0	0	0	8	0	19	2	0	63	117	2	45	124	0	5	376	0	0	0	0
4:30 PM	0	0	0	0	13	0	14	0	0	84	123	6	53	116	0	10	403	0	0	0	0
4:45 PM	0	0	0	0	7	0	11	1	0	82	85	5	46	145	0	7	376	0	0	0	0
5:00 PM	0	0	0	0	8	0	20	5	0	65	118	5	55	134	0	5	400	1	0	0	0
5:15 PM	0	0	0	0	7	0	18	1	0	59	98	9	39	117	0	6	338	0	0	0	0
5:30 PM	0	0	0	0	10	0	20	1	0	65	98	7	43	124	0	0	360	0	0	0	0
5:45 PM	0	0	0	0	13	0	13	1	0	45	85	3	25	114	0	3	295	0	0	0	0
Total Survey	0	0	0	0	70	0	133	14	0	532	833	44	359	976	0	41	2,903	1	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound SB Ramps				Southbound SB Ramps				Eastbound Slater Rd				Westbound Slater Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	0	642	642	0	100	0	100	8	737	583	1,320	18	718	330	1,048	27	1,555	1	0	0	0
%HV	0.0%				8.0%				2.4%				3.8%				3.4%				
PHF	0.00				0.89				0.89				0.94				0.96				

By Movement	Northbound SB Ramps				Southbound SB Ramps				Eastbound Slater Rd				Westbound Slater Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	0	0	36	0	64	100	0	294	443	737	199	519	0	718	1,555
PHF	0.00	0.00	0.00	0.00	0.69	0.00	0.80	0.89	0.00	0.88	0.90	0.89	0.90	0.89	0.00	0.94	0.96

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound SB Ramps				Southbound SB Ramps				Eastbound Slater Rd				Westbound Slater Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	0	0	0	0	32	0	62	6	0	298	434	20	197	487	0	27	1,510	0	0	0	0
4:15 PM	0	0	0	0	36	0	64	8	0	294	443	18	199	519	0	27	1,555	1	0	0	0
4:30 PM	0	0	0	0	35	0	63	7	0	290	424	25	193	512	0	28	1,517	1	0	0	0
4:45 PM	0	0	0	0	32	0	69	8	0	271	399	26	183	520	0	18	1,474	1	0	0	0
5:00 PM	0	0	0	0	38	0	71	8	0	234	399	24	162	489	0	14	1,393	1	0	0	0

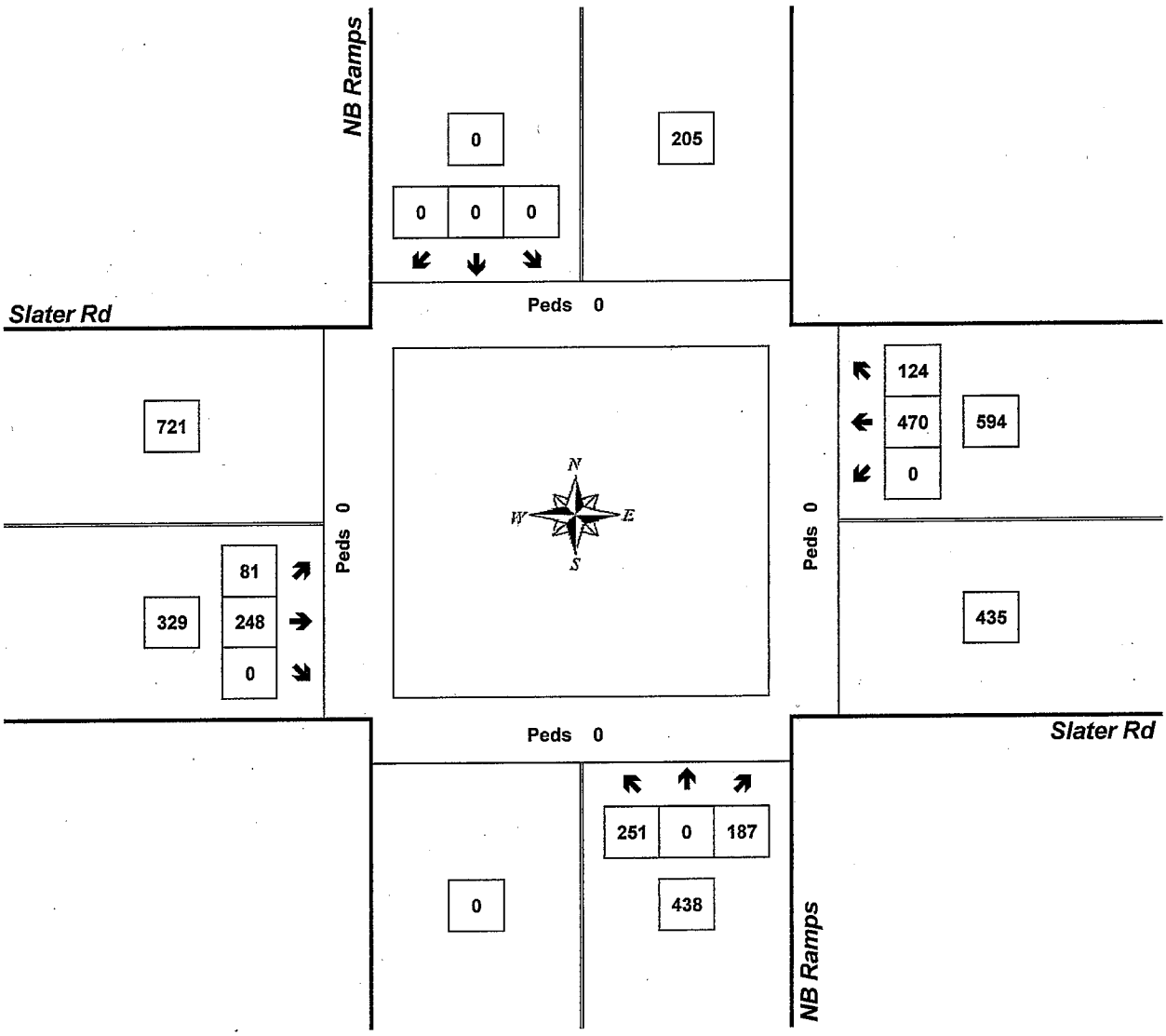
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

NB Ramps & Slater Rd

4:15 PM to 5:15 PM
Tuesday, April 09, 2013



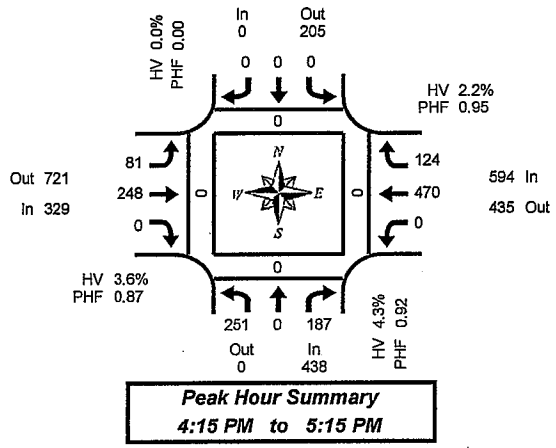
Approach	PHF	HV%	Volume
EB	0.87	3.6%	329
WB	0.95	2.2%	594
NB	0.92	4.3%	438
SB	0.00	0.0%	0
Intersection	0.93	3.2%	1,361

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:15 PM to 5:15 PM

NB Ramps & Slater Rd

Tuesday, April 09, 2013
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound NB Ramps				Southbound NB Ramps				Eastbound Slater Rd				Westbound Slater Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	60	1	51	5	0	0	0	0	20	56	0	4	0	95	26	5	309	0	0	0	0
4:15 PM	66	0	47	3	0	0	0	0	20	52	0	3	0	108	29	2	322	0	0	0	0
4:30 PM	53	0	48	9	0	0	0	0	18	77	0	2	0	119	28	2	343	0	0	0	0
4:45 PM	65	0	54	4	0	0	0	0	25	65	0	4	0	122	35	5	366	0	0	0	0
5:00 PM	67	0	38	3	0	0	0	0	18	54	0	3	0	121	32	4	330	0	0	0	0
5:15 PM	69	0	50	4	0	0	0	0	21	47	0	4	0	89	43	2	319	0	0	0	0
5:30 PM	74	0	39	1	0	0	0	0	16	62	0	3	0	91	34	0	316	0	0	0	0
5:45 PM	73	0	31	2	0	0	0	0	9	51	0	3	0	63	13	3	240	0	0	0	0
Total Survey	527	1	358	31	0	0	0	0	147	464	0	26	0	808	240	23	2,545	0	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound NB Ramps				Southbound NB Ramps				Eastbound Slater Rd				Westbound Slater Rd				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	438	0	438	19	0	205	205	0	329	721	1,050	12	594	435	1,029	13	1,361
%HV	4.3%				0.0%				3.6%				2.2%				3.2%
PHF	0.92				0.00				0.87				0.95				0.93

Pedestrians Crosswalk			
North	South	East	West
0	0	0	0

By Movement	Northbound NB Ramps				Southbound NB Ramps				Eastbound Slater Rd				Westbound Slater Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	251	0	187	438	0	0	0	0	81	248	0	329	0	470	124	594	1,361
PHF	0.94	0.00	0.87	0.92	0.00	0.00	0.00	0.00	0.81	0.81	0.00	0.87	0.00	0.96	0.89	0.95	0.93

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound NB Ramps				Southbound NB Ramps				Eastbound Slater Rd				Westbound Slater Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	244	1	200	21	0	0	0	0	83	250	0	13	0	444	118	14	1,340	0	0	0	0
4:15 PM	251	0	187	19	0	0	0	0	81	248	0	12	0	470	124	13	1,361	0	0	0	0
4:30 PM	254	0	190	20	0	0	0	0	82	243	0	13	0	451	138	13	1,358	0	0	0	0
4:45 PM	275	0	181	12	0	0	0	0	80	228	0	14	0	423	144	11	1,331	0	0	0	0
5:00 PM	283	0	158	10	0	0	0	0	64	214	0	13	0	364	122	9	1,205	0	0	0	0

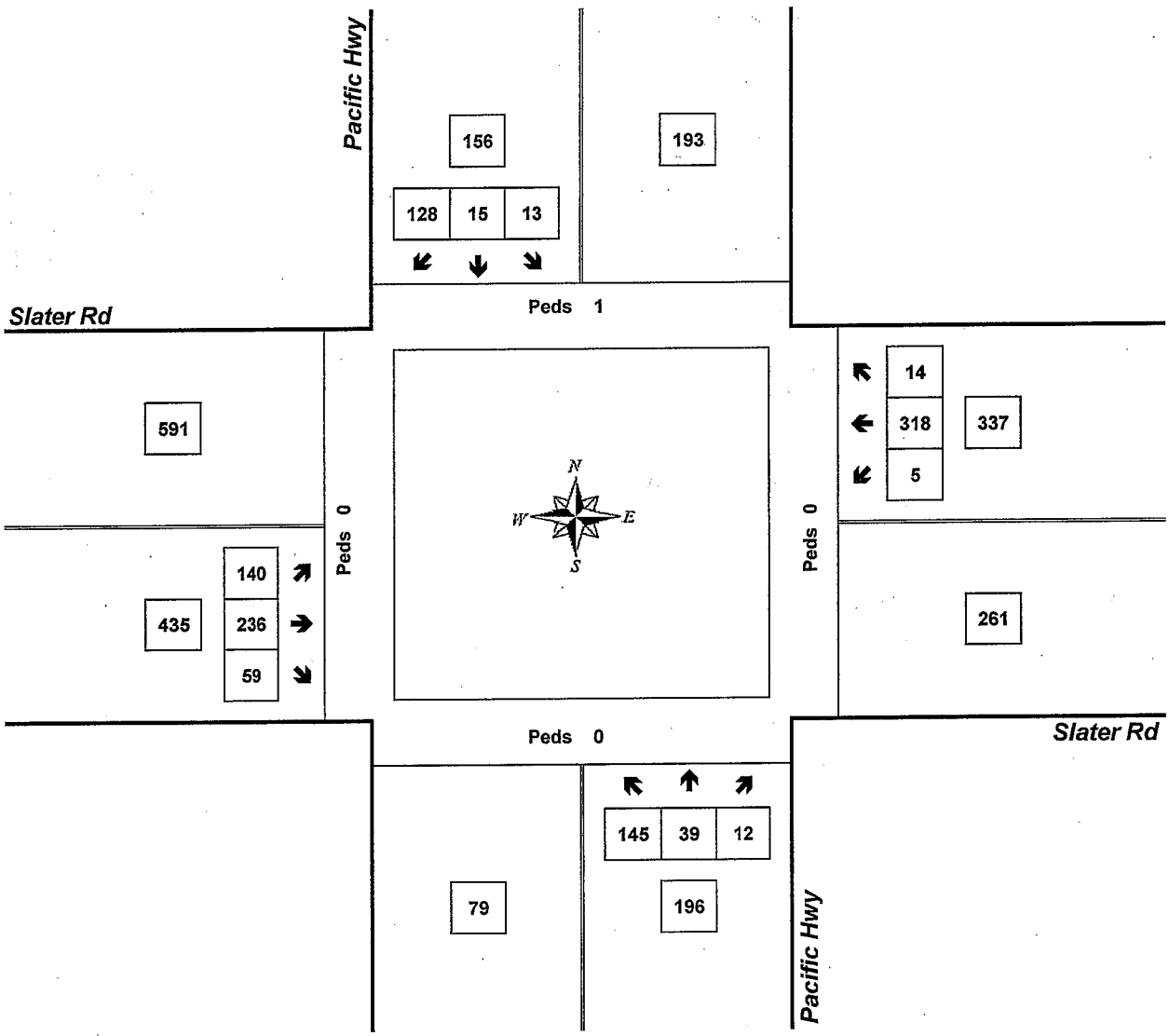
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

Pacific Hwy & Slater Rd

4:15 PM to 5:15 PM
Tuesday, April 09, 2013



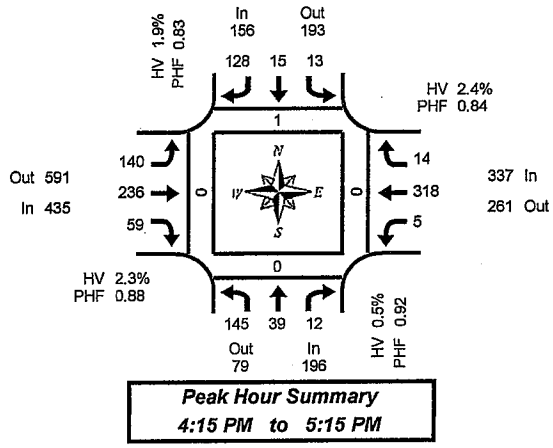
Approach	PHF	HV%	Volume
EB	0.88	2.3%	435
WB	0.84	2.4%	337
NB	0.92	0.5%	196
SB	0.83	1.9%	156
Intersection	0.91	2.0%	1,124

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:15 PM to 5:15 PM

Pacific Hwy & Slater Rd

Tuesday, April 09, 2013
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Pacific Hwy				Southbound Pacific Hwy				Eastbound Slater Rd				Westbound Slater Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	27	1	3	3	3	9	34	3	43	51	14	6	1	54	4	5	244	0	0	0	0
4:15 PM	41	9	3	0	2	6	29	0	36	48	14	2	0	66	3	2	257	0	0	0	0
4:30 PM	34	7	1	0	6	3	38	1	32	76	16	1	1	73	5	1	292	0	0	0	0
4:45 PM	32	14	4	1	3	5	30	1	43	56	21	3	4	93	3	3	308	0	0	0	0
5:00 PM	38	9	4	0	2	1	31	1	29	56	8	4	0	86	3	2	267	1	0	0	0
5:15 PM	36	11	2	1	5	3	22	0	42	47	11	0	0	71	5	1	255	0	0	0	0
5:30 PM	38	5	2	1	3	5	33	0	27	50	21	4	0	57	3	1	244	0	0	0	0
5:45 PM	13	9	2	2	4	4	15	1	29	48	8	3	0	48	6	1	186	0	0	0	0
Total Survey	259	65	21	8	28	36	232	7	281	432	113	23	6	548	32	16	2,053	1	0	0	0

Peak Hour Summary
4:15 PM to 5:15 PM

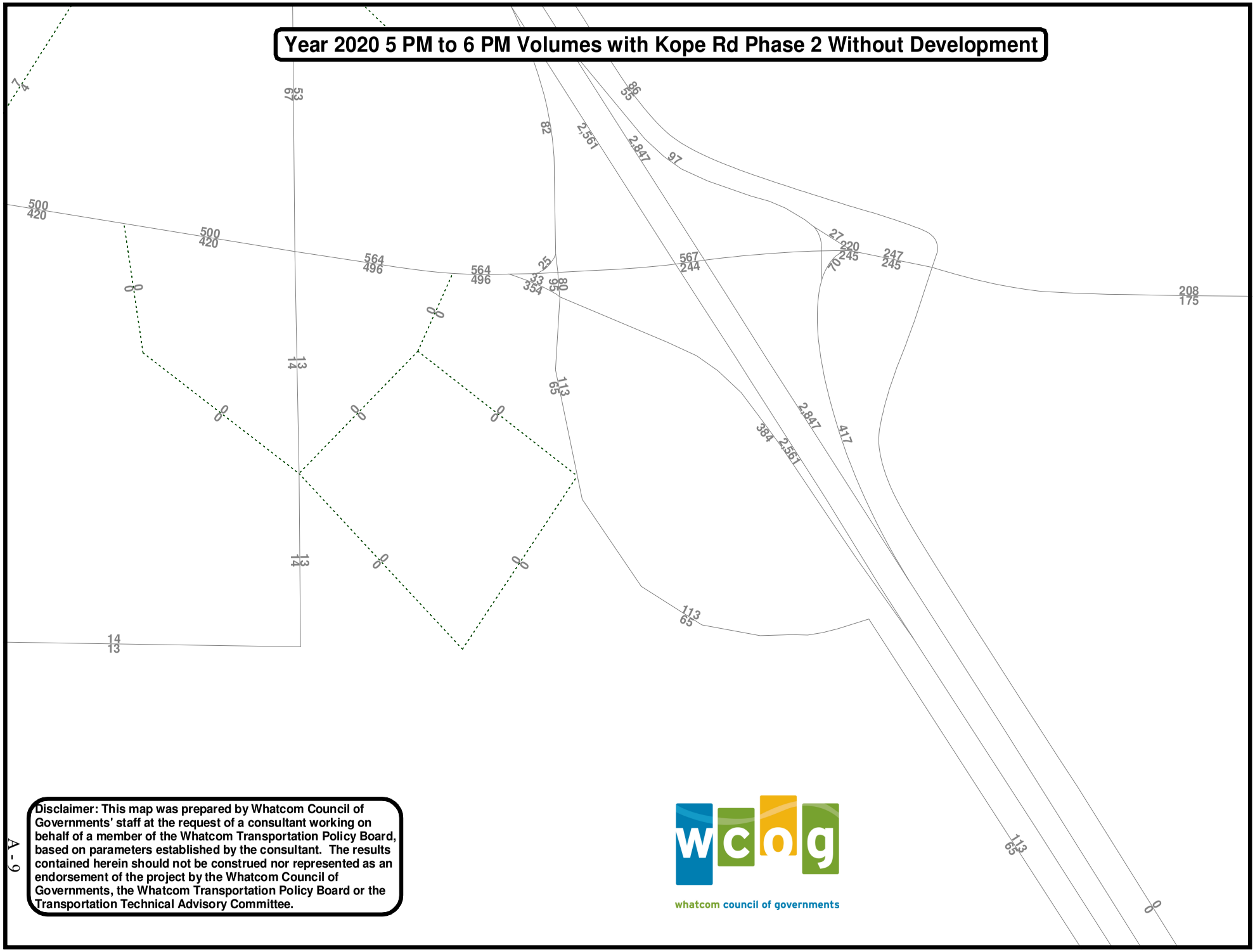
By Approach	Northbound Pacific Hwy				Southbound Pacific Hwy				Eastbound Slater Rd				Westbound Slater Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	196	79	275	1	156	193	349	3	435	591	1,026	10	337	261	598	8	1,124	1	0	0	0
%HV	0.5%				1.9%				2.3%				2.4%				2.0%				
PHF	0.92				0.83				0.88				0.84				0.91				

By Movement	Northbound Pacific Hwy				Southbound Pacific Hwy				Eastbound Slater Rd				Westbound Slater Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	145	39	12	196	13	15	128	156	140	236	59	435	5	318	14	337	1,124
PHF	0.88	0.70	0.75	0.92	0.54	0.63	0.84	0.83	0.81	0.78	0.70	0.88	0.31	0.85	0.70	0.84	0.91

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound Pacific Hwy				Southbound Pacific Hwy				Eastbound Slater Rd				Westbound Slater Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	134	31	11	4	14	23	131	5	154	231	65	12	6	286	15	11	1,101	0	0	0	0
4:15 PM	145	39	12	1	13	15	128	3	140	236	59	10	5	318	14	8	1,124	1	0	0	0
4:30 PM	140	41	11	2	16	12	121	3	146	235	56	8	5	323	16	7	1,122	1	0	0	0
4:45 PM	144	39	12	3	13	14	116	2	141	209	61	11	4	307	14	7	1,074	1	0	0	0
5:00 PM	125	34	10	4	14	13	101	2	127	201	48	11	0	262	17	5	952	1	0	0	0

Year 2020 5 PM to 6 PM Volumes with Kope Rd Phase 2 Without Development

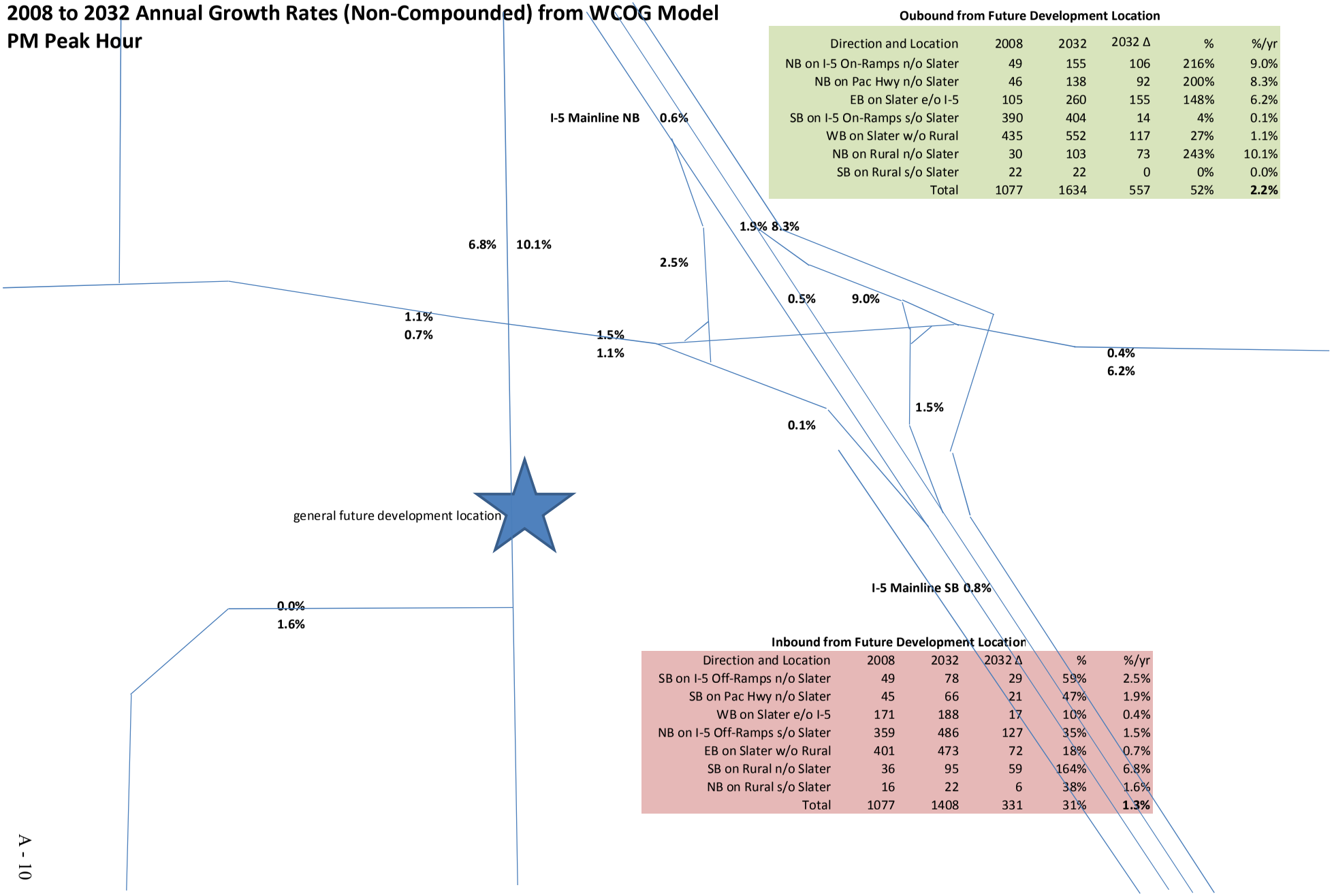


Disclaimer: This map was prepared by Whatcom Council of Governments' staff at the request of a consultant working on behalf of a member of the Whatcom Transportation Policy Board, based on parameters established by the consultant. The results contained herein should not be construed nor represented as an endorsement of the project by the Whatcom Council of Governments, the Whatcom Transportation Policy Board or the Transportation Technical Advisory Committee.

wcog

whatcom council of governments

2008 to 2032 Annual Growth Rates (Non-Compounded) from WCOG Model
PM Peak Hour



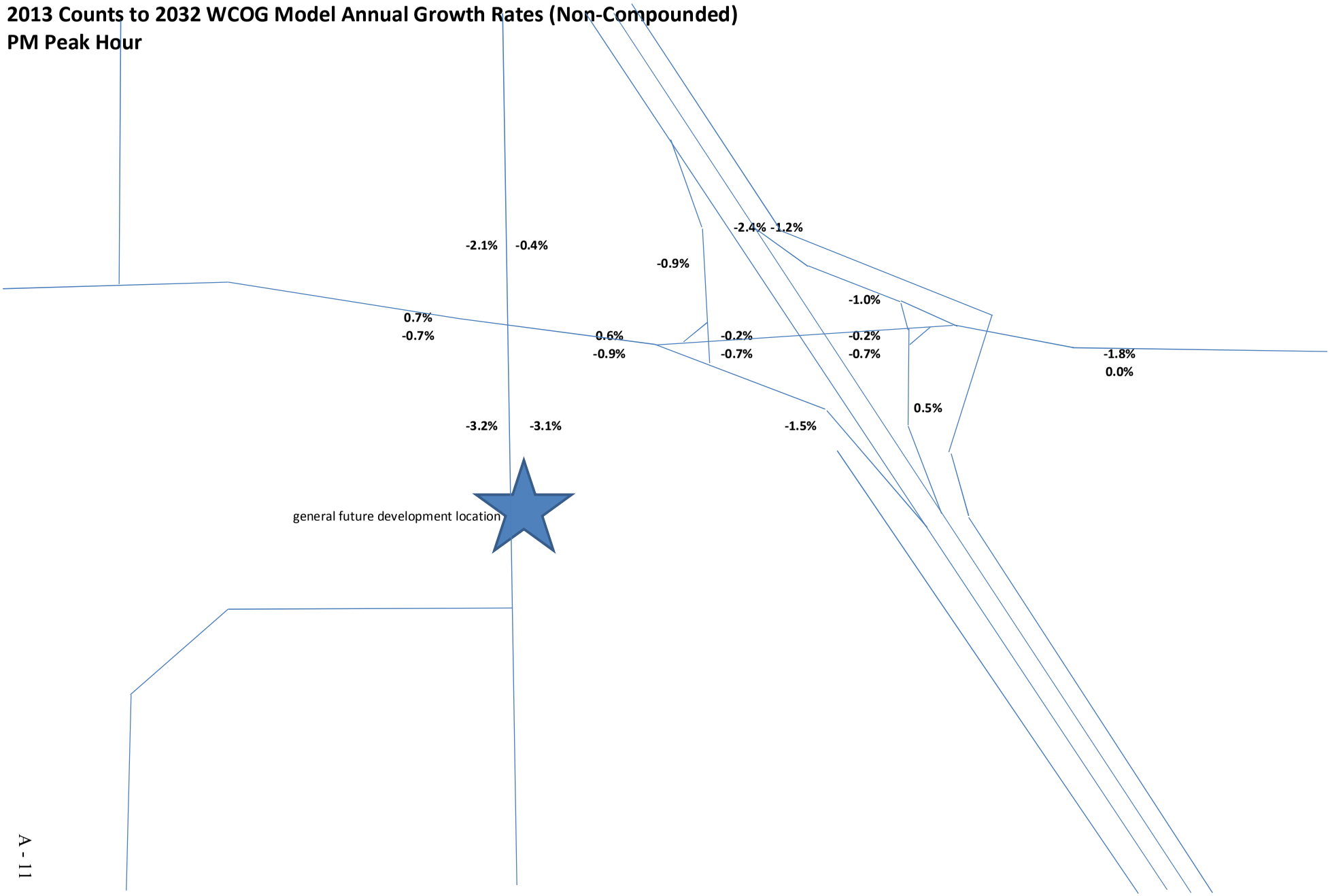
Oubound from Future Development Location

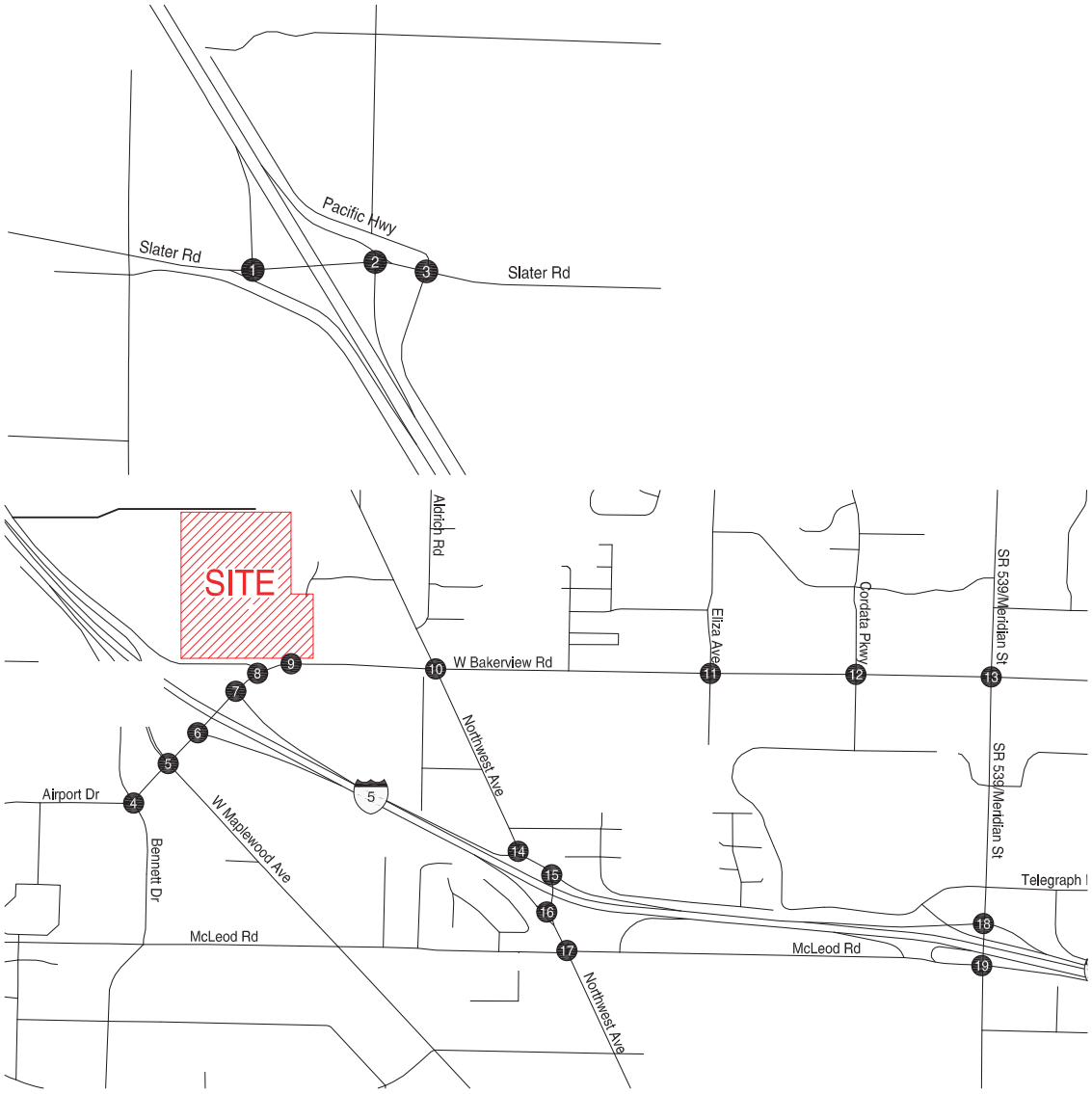
Direction and Location	2008	2032	2032 Δ	%	%/yr
NB on I-5 On-Ramps n/o Slater	49	155	106	216%	9.0%
NB on Pac Hwy n/o Slater	46	138	92	200%	8.3%
EB on Slater e/o I-5	105	260	155	148%	6.2%
SB on I-5 On-Ramps s/o Slater	390	404	14	4%	0.1%
WB on Slater w/o Rural	435	552	117	27%	1.1%
NB on Rural n/o Slater	30	103	73	243%	10.1%
SB on Rural s/o Slater	22	22	0	0%	0.0%
Total	1077	1634	557	52%	**2.2%**

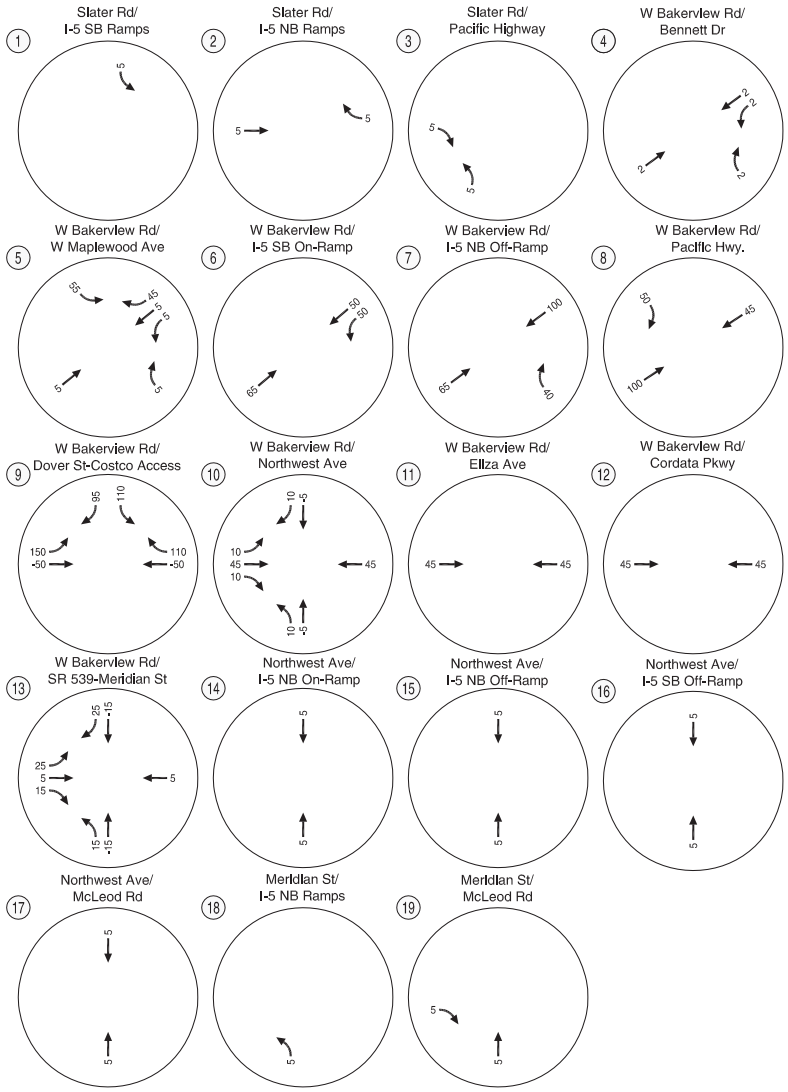
Inbound from Future Development Location

Direction and Location	2008	2032	2032 Δ	%	%/yr
SB on I-5 Off-Ramps n/o Slater	49	78	29	59%	2.5%
SB on Pac Hwy n/o Slater	45	66	21	47%	1.9%
WB on Slater e/o I-5	171	188	17	10%	0.4%
NB on I-5 Off-Ramps s/o Slater	359	486	127	35%	1.5%
EB on Slater w/o Rural	401	473	72	18%	0.7%
SB on Rural n/o Slater	36	95	59	164%	6.8%
NB on Rural s/o Slater	16	22	6	38%	1.6%
Total	1077	1408	331	31%	**1.3%**

2013 Counts to 2032 WCOG Model Annual Growth Rates (Non-Compounded)
PM Peak Hour



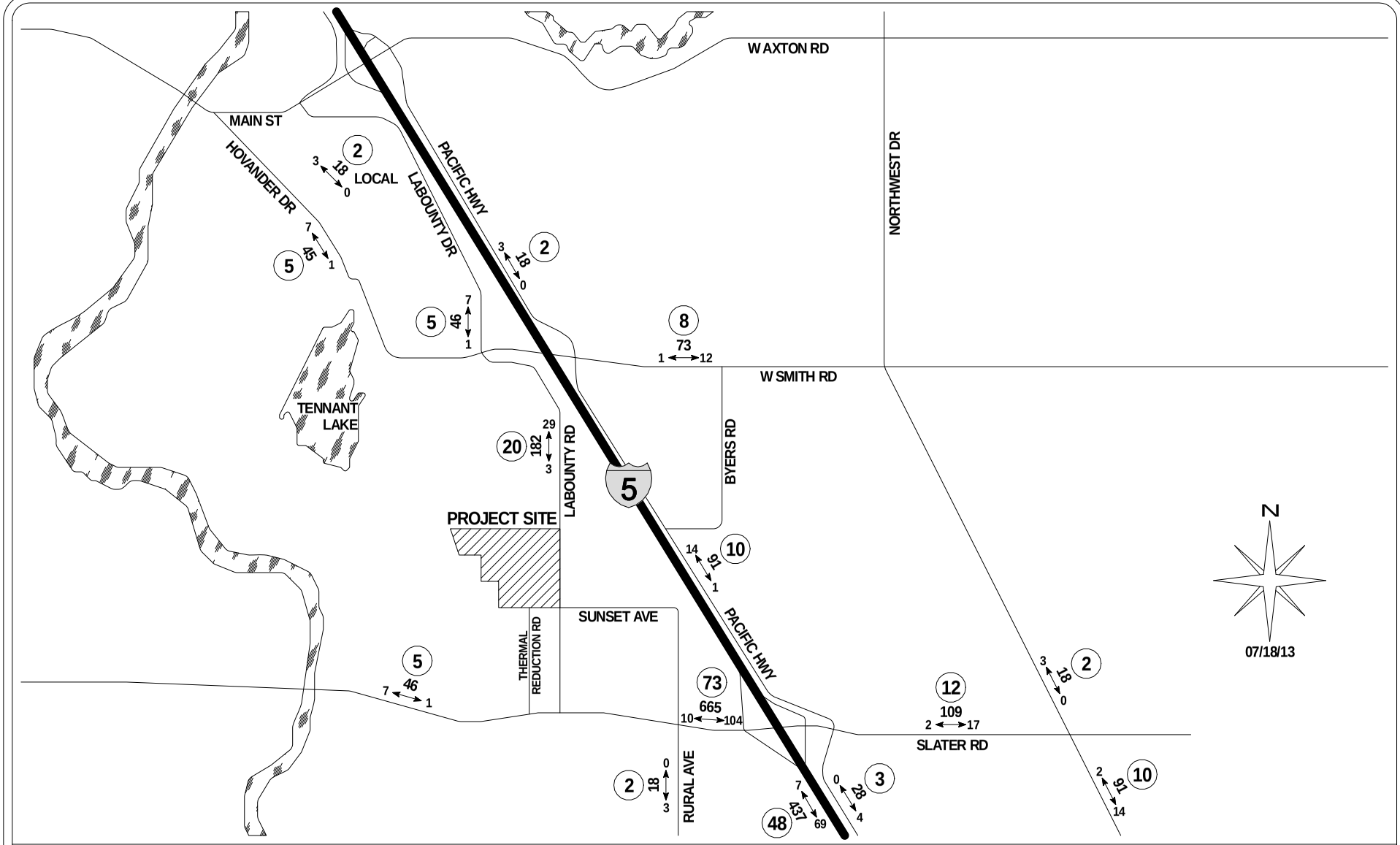




SITE GENERATED TRIP ASSIGNMENT WEEKDAY AM PEAK HOUR
BELLINGHAM, WA

FIGURE 13

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #13-079

CORRECTIONS FACILITY AND SHERIFFS DEPARTMENT HEADQUARTERS

WHATCOM COUNTY

LEGEND

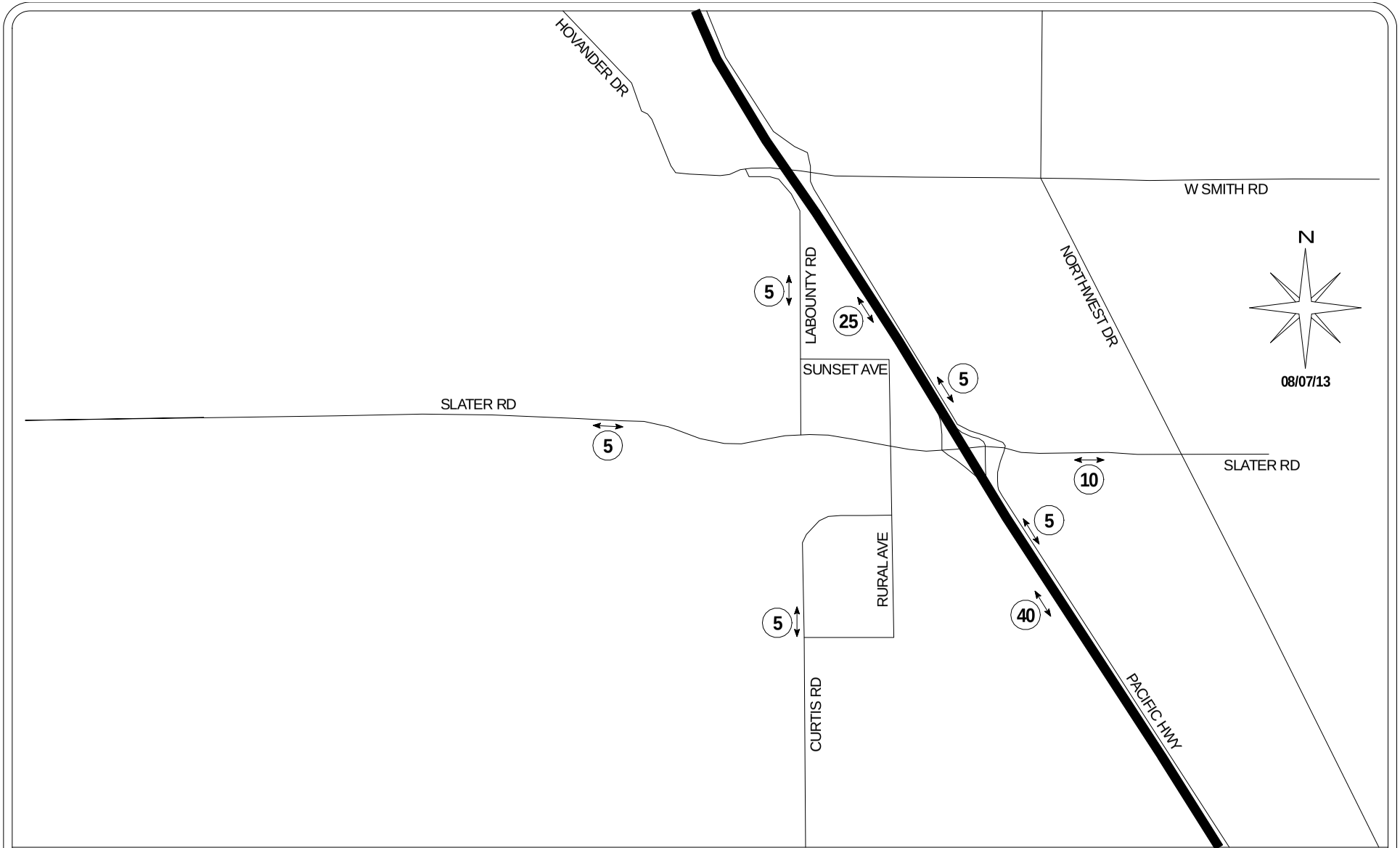
AWDT — NEW DAILY TRIPS

PM ↔ PEAK — NEW PM PEAK-HOUR TRIPS

XX — TRIP DISTRIBUTION %

FIGURE 2

PM PEAK-HOUR DEVELOPMENT TRIP DISTRIBUTION



GIBSON TRAFFIC CONSULTANTS

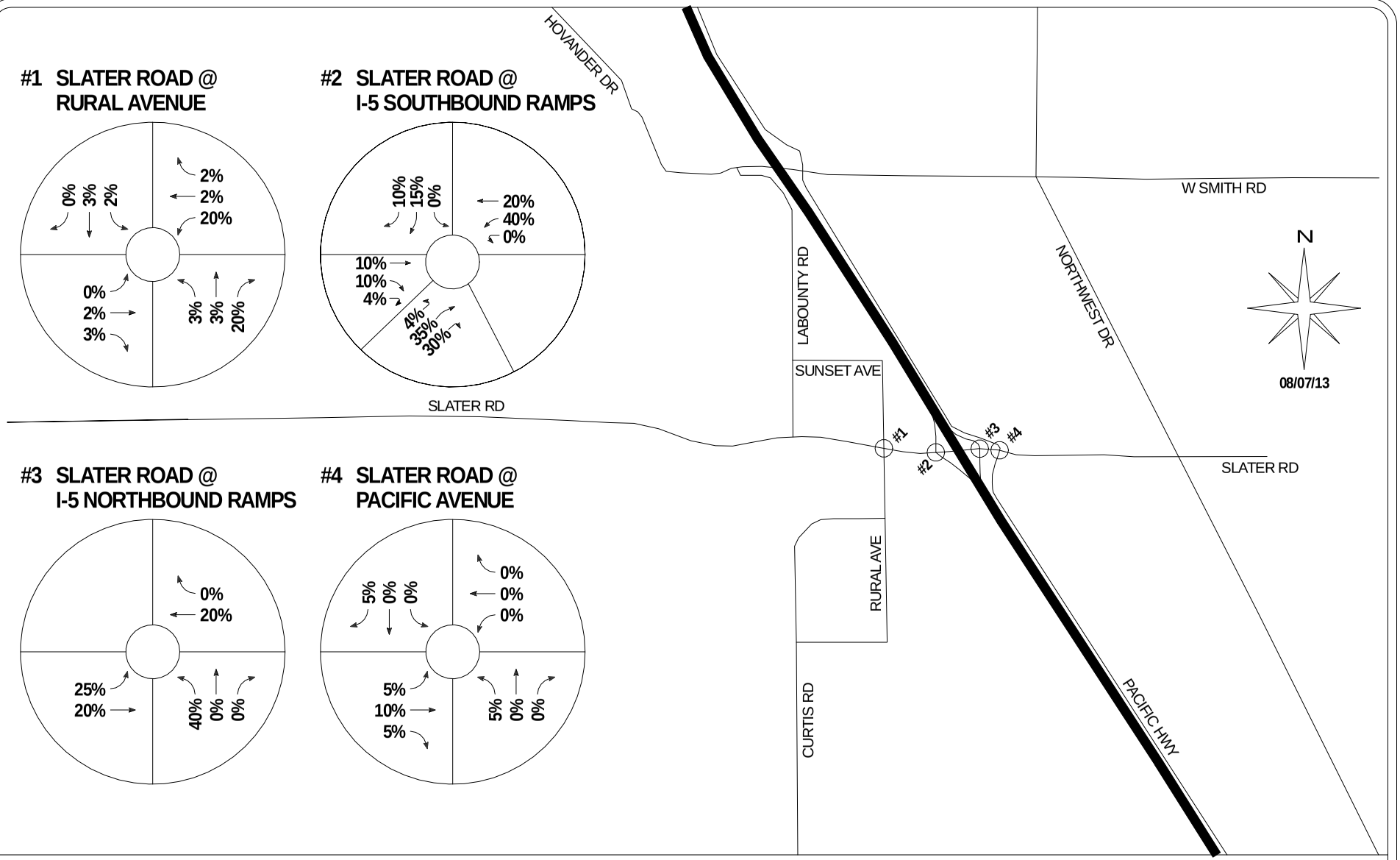
TRAFFIC IMPACT STUDY
GTC #11-130

CORRIDOR REPORT AND PRELIMINARY INTERCHANGE JUSTIFICATION EVALUATION

LEGEND

(X) ↔ DISTRIBUTION PERCENTAGE

MIXED-USE
TRIP DISTRIBUTION
WITHOUT KOPE ROAD EXTENSION



GIBSON TRAFFIC CONSULTANTS

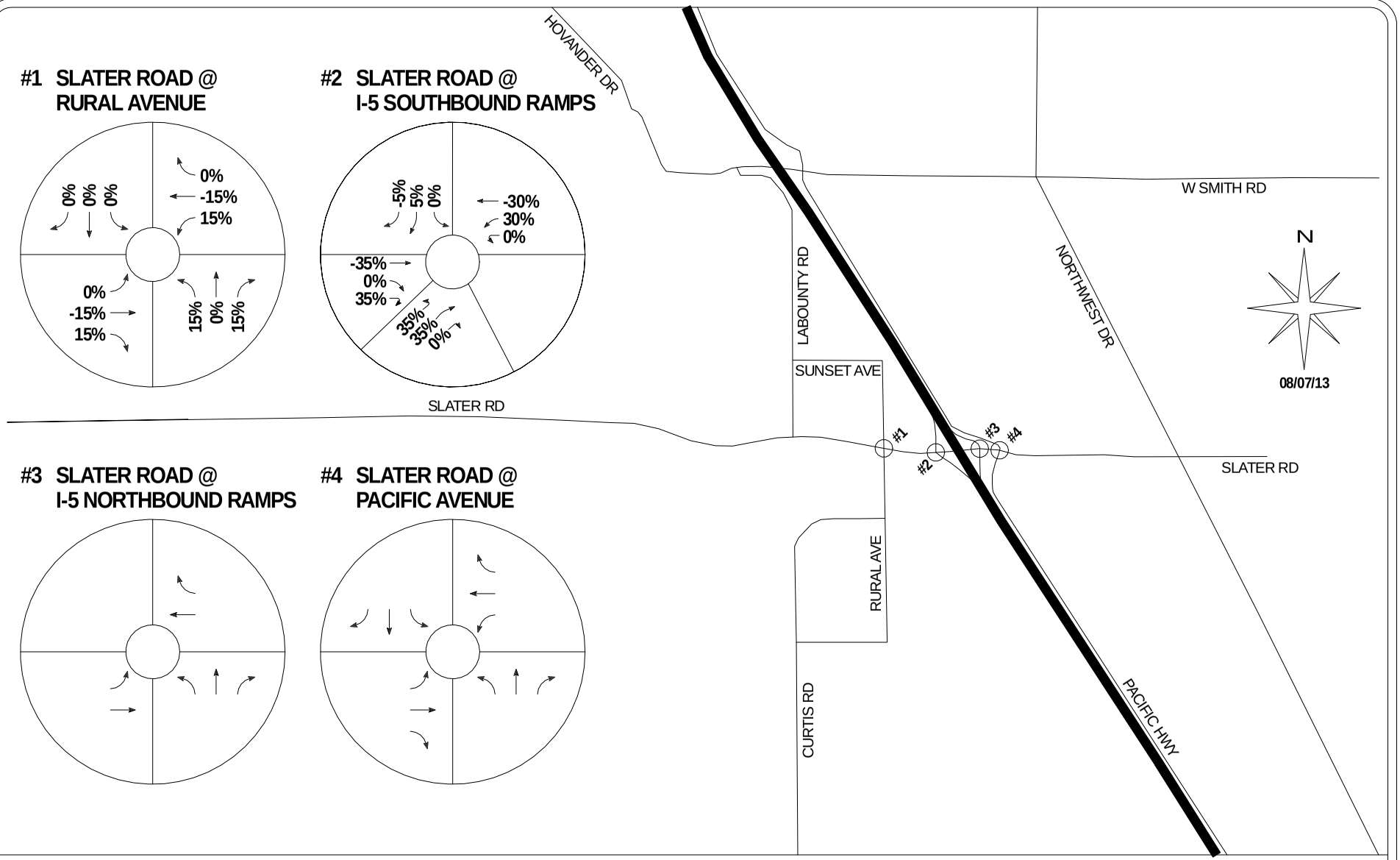
TRAFFIC IMPACT STUDY
GTC #11-130

CORRIDOR REPORT AND PRELIMINARY INTERCHANGE JUSTIFICATION EVALUATION

LEGEND

XXX → DISTRIBUTION PERCENTAGE

MIXED-USE
TRIP DISTRIBUTION
WITHOUT KOPE ROAD EXTENSION



GIBSON TRAFFIC CONSULTANTS

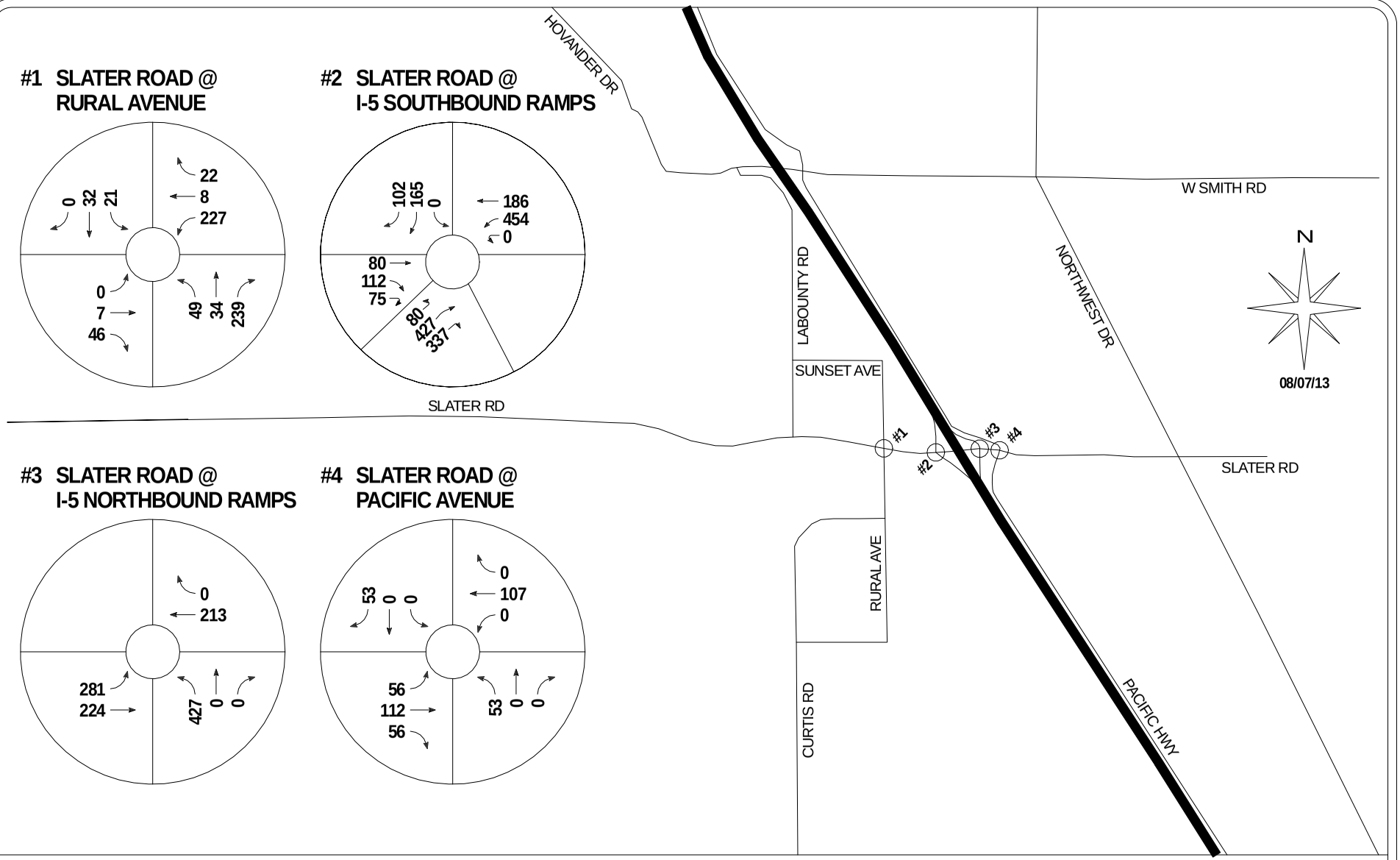
TRAFFIC IMPACT STUDY
GTC #11-130

CORRIDOR REPORT AND PRELIMINARY INTERCHANGE JUSTIFICATION EVALUATION

LEGEND

XXX → DISTRIBUTION PERCENTAGE

MIXED-USE
PASS-BY TRIP DISTRIBUTION



GIBSON TRAFFIC CONSULTANTS

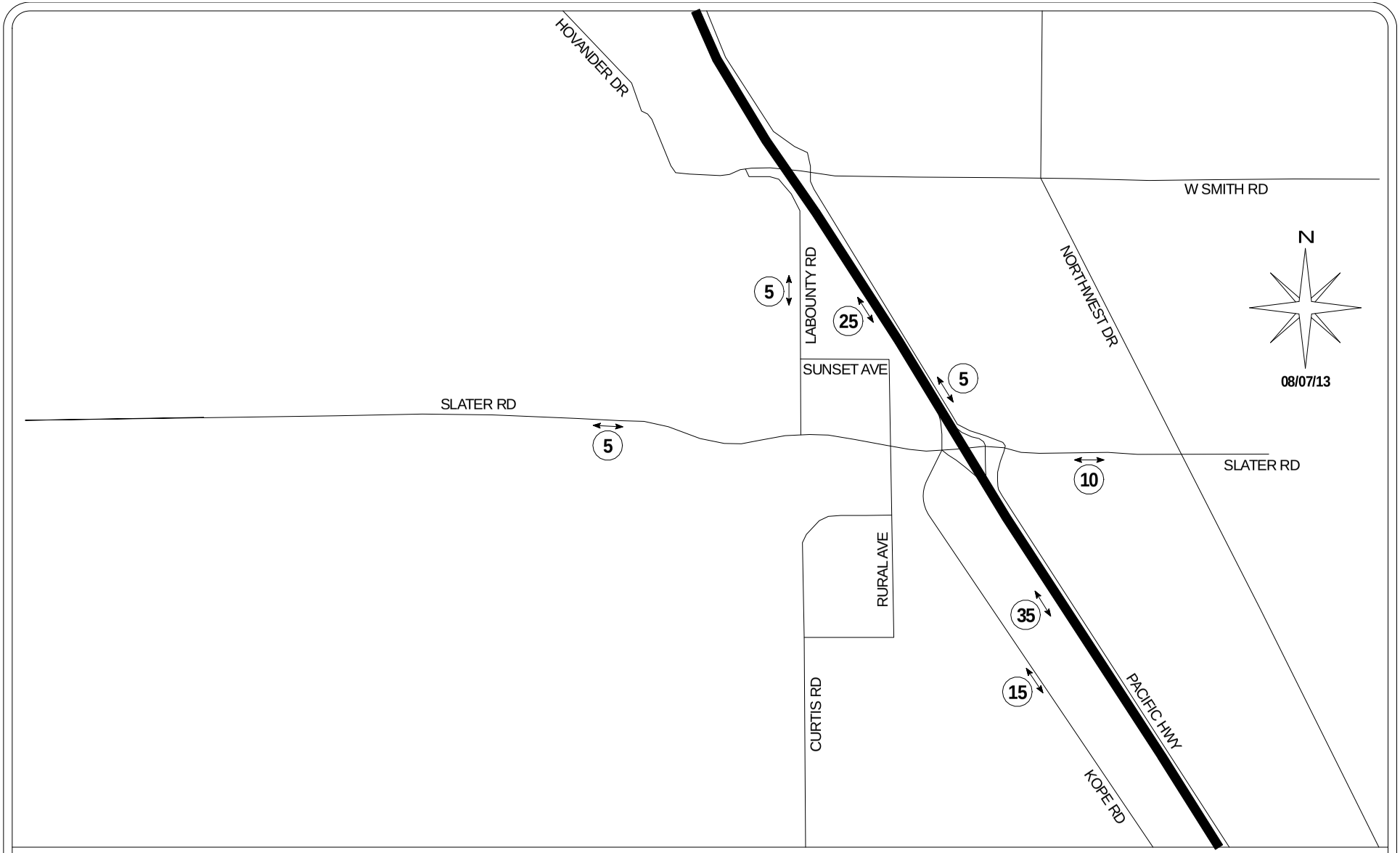
TRAFFIC IMPACT STUDY
GTC #11-130

CORRIDOR REPORT AND PRELIMINARY INTERCHANGE JUSTIFICATION EVALUATION

LEGEND

XXX → WEEKDAY PM PEAK-HOUR TRIPS

MIXED-USE
TURNING MOVEMENTS
WITHOUT KOPE ROAD EXTENSION



GIBSON TRAFFIC CONSULTANTS

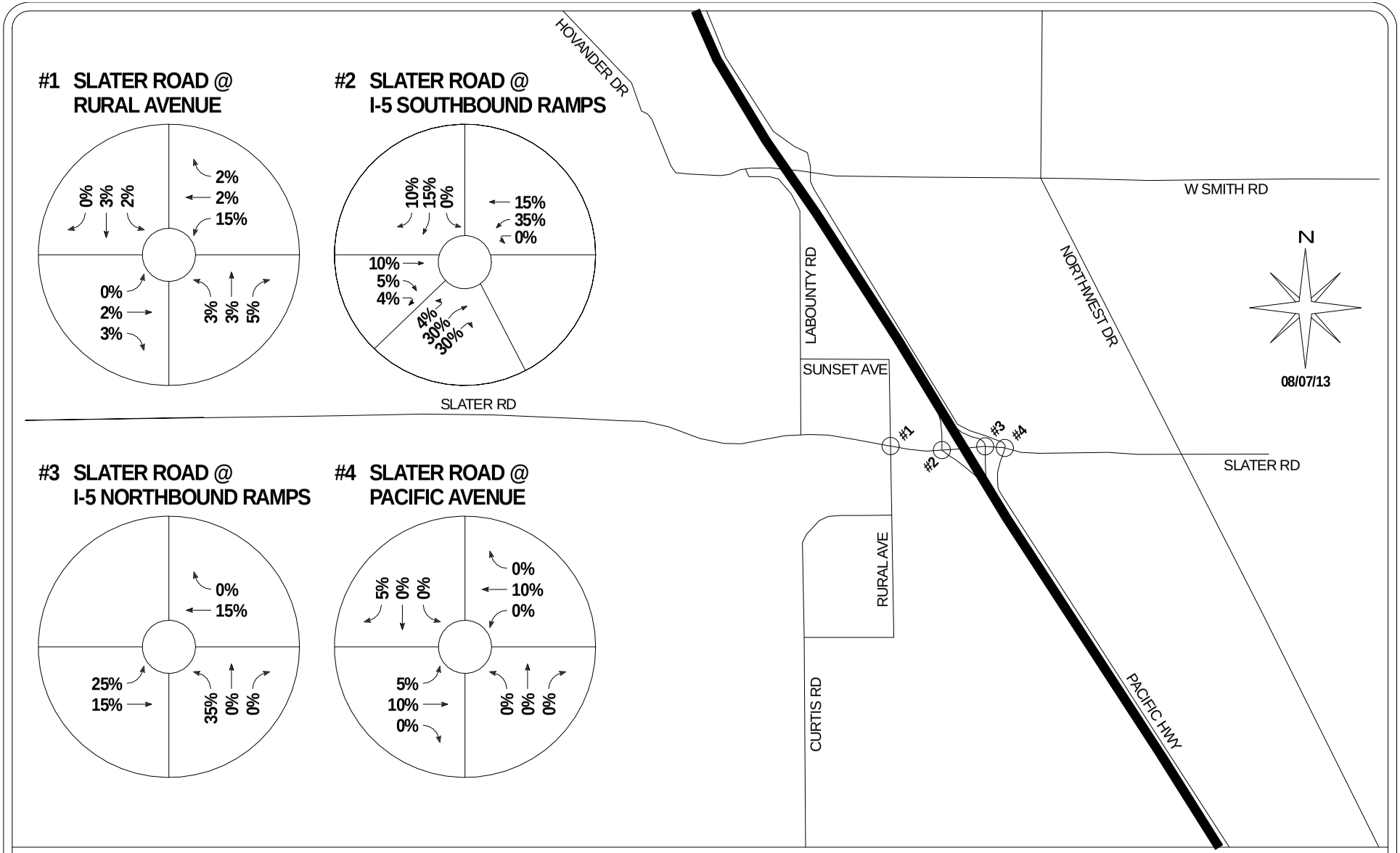
TRAFFIC IMPACT STUDY
GTC #11-130

CORRIDOR REPORT AND PRELIMINARY INTERCHANGE JUSTIFICATION EVALUATION

LEGEND

(X) DISTRIBUTION PERCENTAGE

MIXED-USE
TRIP DISTRIBUTION
WITH KOPE ROAD EXTENSION



GIBSON TRAFFIC CONSULTANTS

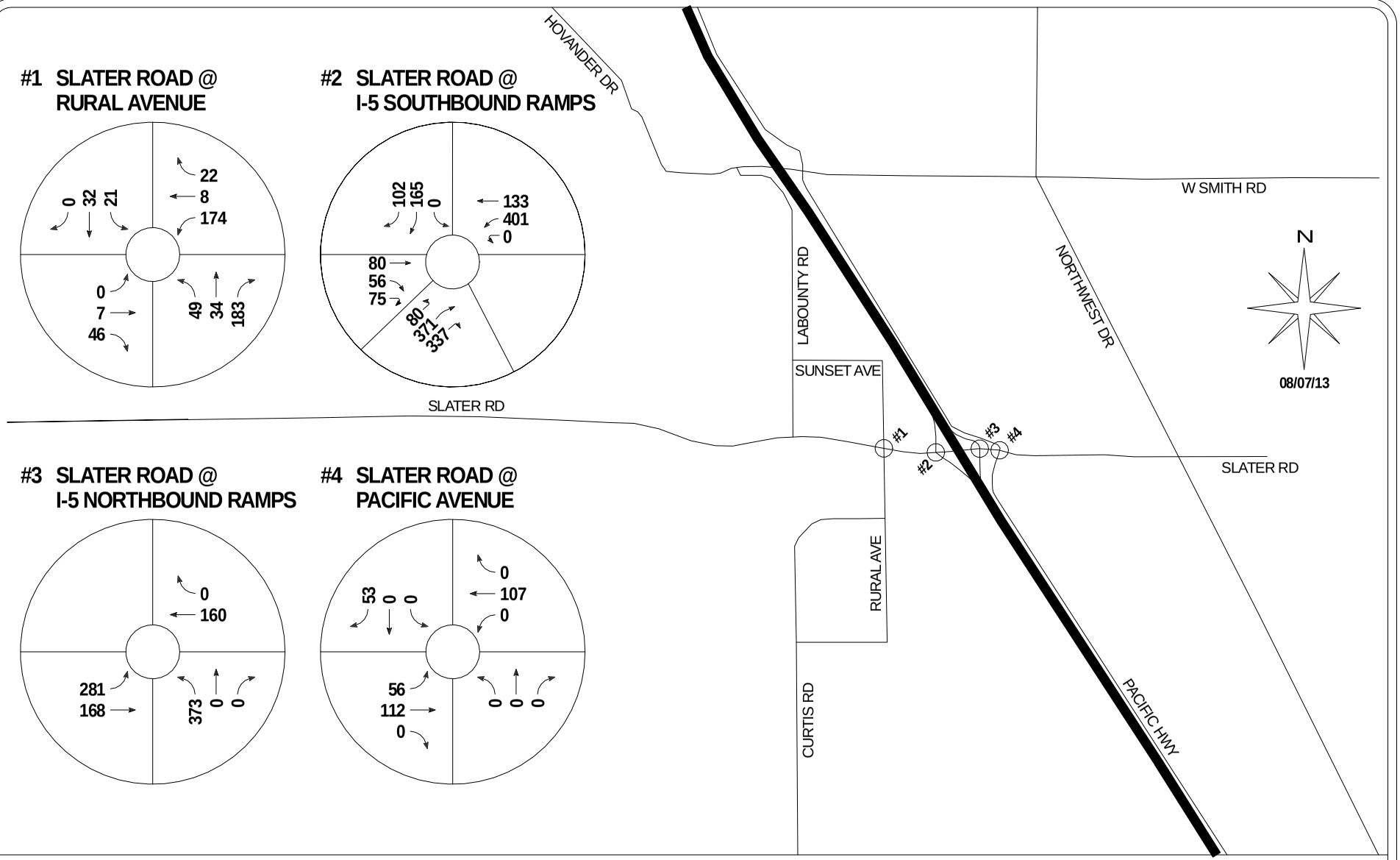
TRAFFIC IMPACT STUDY
GTC #11-130

CORRIDOR REPORT AND PRELIMINARY INTERCHANGE JUSTIFICATION EVALUATION

LEGEND

XXX → DISTRIBUTION PERCENTAGE

MIXED-USE TRIP DISTRIBUTION WITH KOPE ROAD EXTENSION



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #11-130

CORRIDOR REPORT AND PRELIMINARY INTERCHANGE JUSTIFICATION EVALUATION

LEGEND

XXX → WEEKDAY PM PEAK-HOUR TRIPS

MIXED-USE TURNING MOVEMENTS WITH KOPE ROAD EXTENSION

Turning Movement Calculations without Kope Road Realign

Future Build-Out Volumes
without Kope Road Ext. or Realign

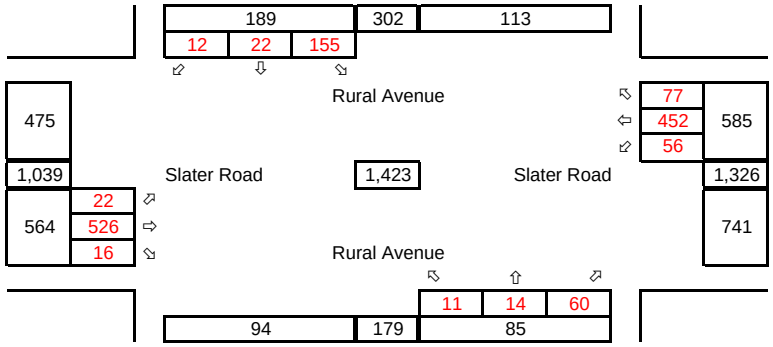
1 Slater Rd @ Rural Ave

Synchro ID: 1

Existing
Average Weekday
PM Peak-Hour

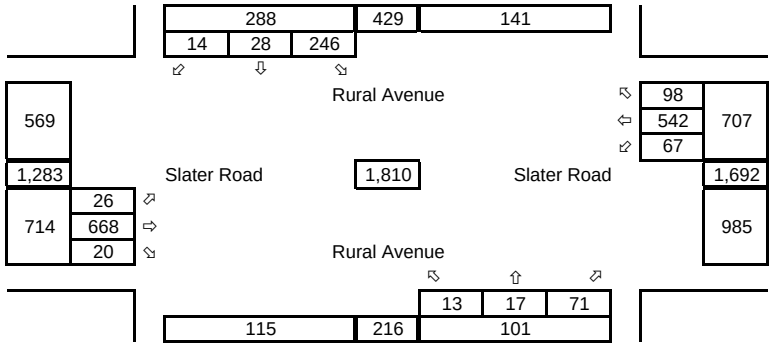
Year: **4/9/2013**

Data Source: **ATD**

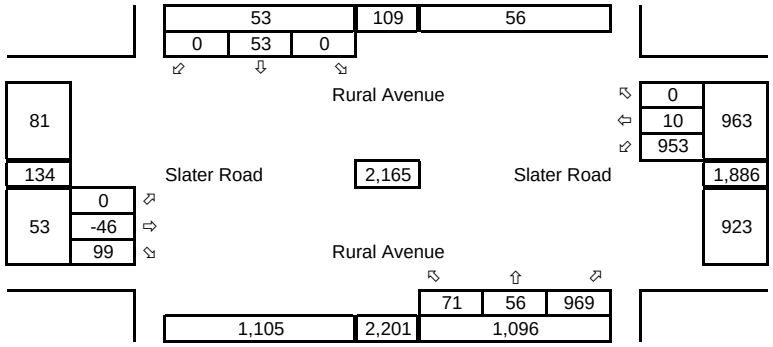


Future without Development
Average Weekday
PM Peak-Hour

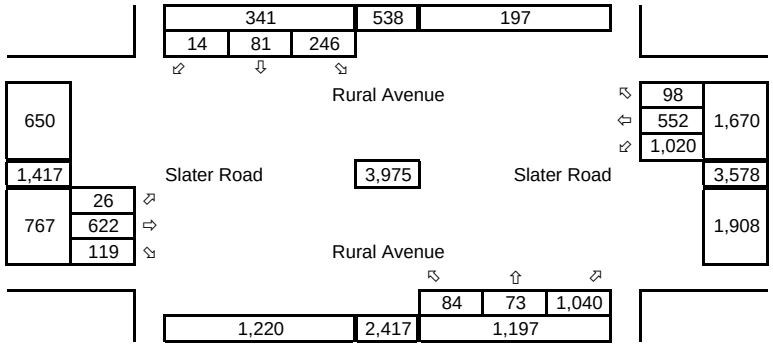
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour



Future with Development
Average Weekday
PM Peak-Hour

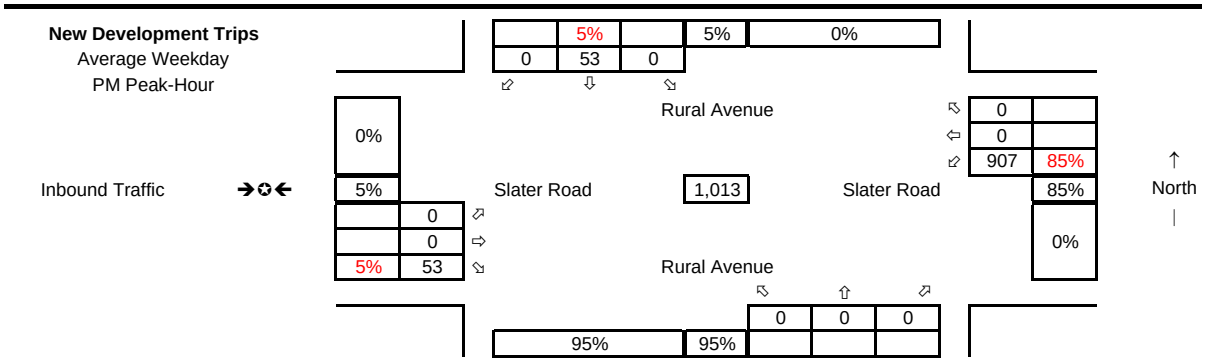


Future Build-Out Volumes
without Kope Road Ext. or Realign

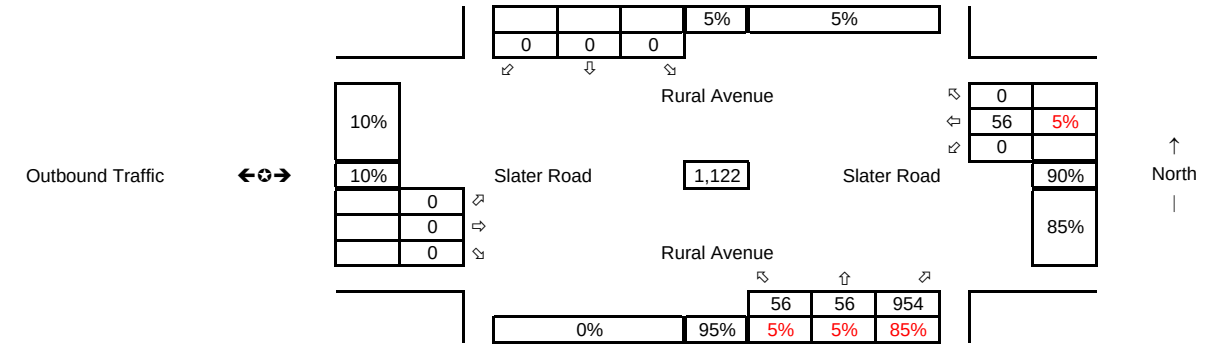
1 Slater Rd @ Rural Ave

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

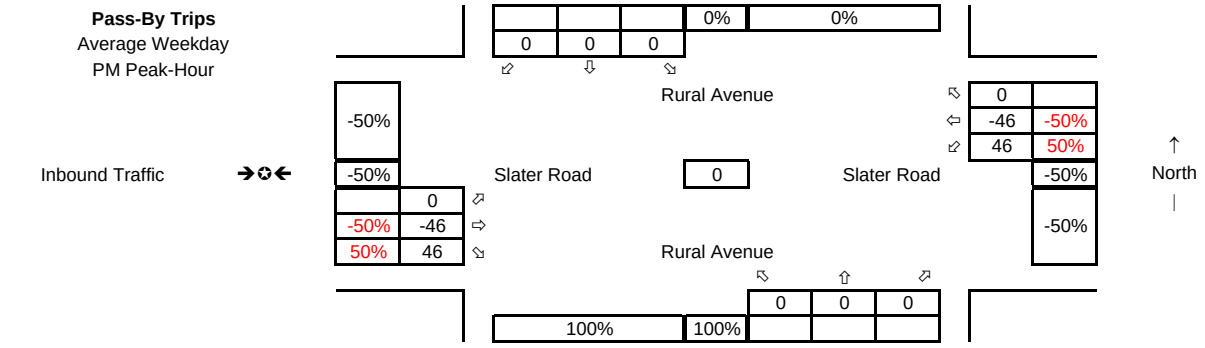


Outbound Traffic

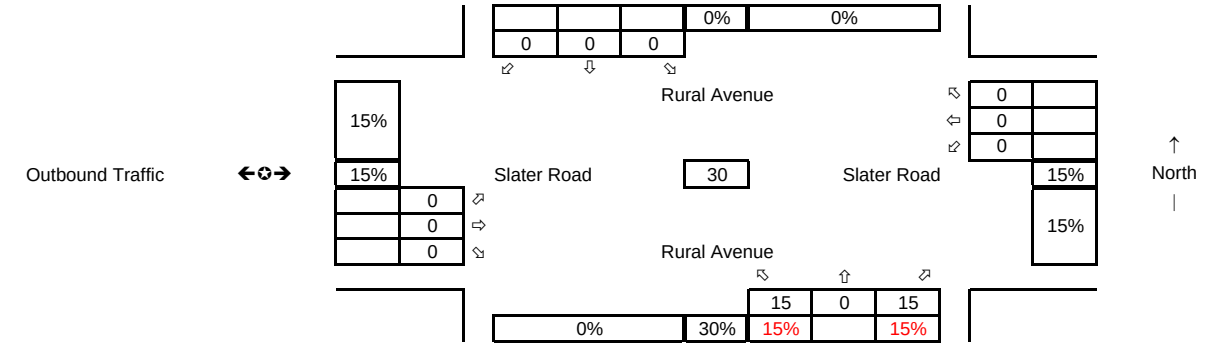


Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic



Outbound Traffic

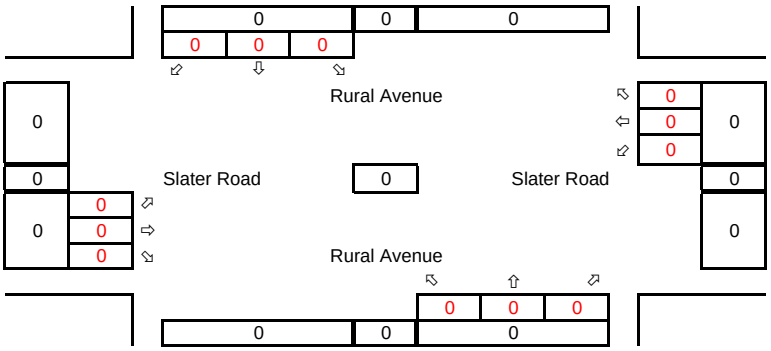


Future Build-Out Volumes
without Kope Road Ext. or Realign

1 Slater Rd @ Rural Ave

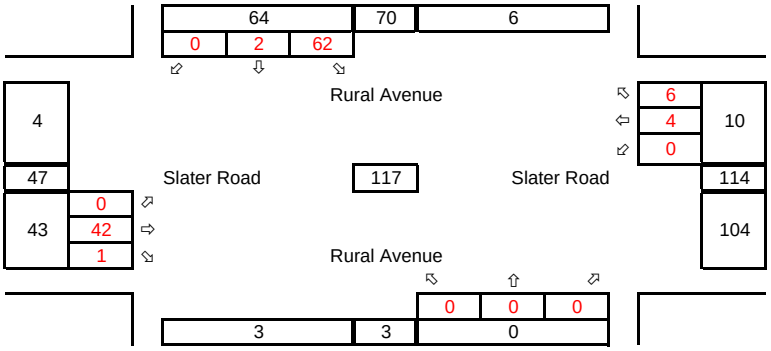
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
without Kope Road Ext. or Realign

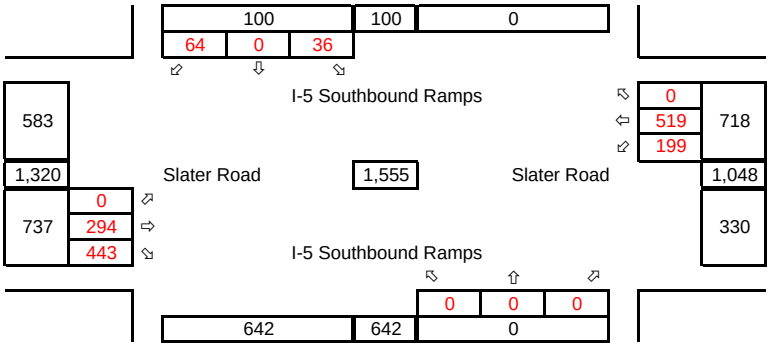
2 Slater Rd @ I-5 SB Ramps

Synchro ID: 2

Existing
Average Weekday
PM Peak-Hour

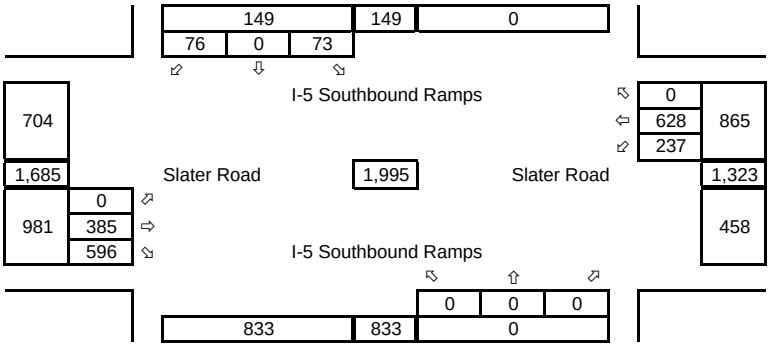
Year: **4/9/2013**

Data Source: **ATD**

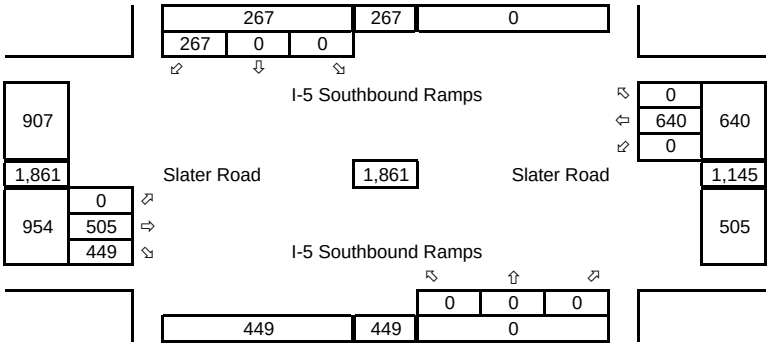


Future without Development
Average Weekday
PM Peak-Hour

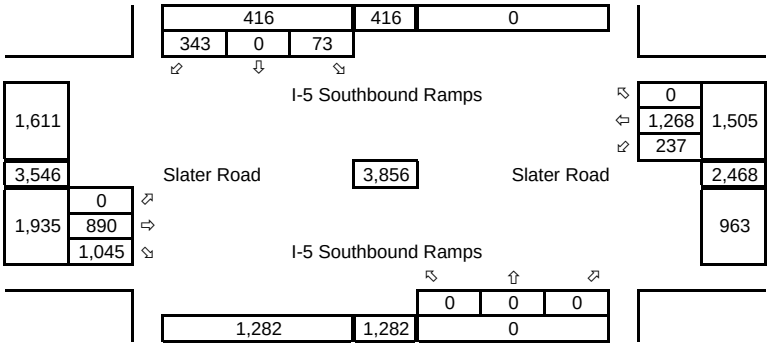
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour



Future with Development
Average Weekday
PM Peak-Hour



Future Build-Out Volumes
without Kope Road Ext. or Realign

2 Slater Rd @ I-5 SB Ramps

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

			25%			25%	0%				
			267	0	0						
					I-5 Southbound Ramps				0		
	85%								640	60%	
									0		
	85%			Slater Road		907		Slater Road		60%	North
		0								0%	
		0									
		0			I-5 Southbound Ramps						
							0	0	0		
			0%			0%					

Outbound Traffic

						0%	0%				
			0	0	0						
					I-5 Southbound Ramps				0		
	0%								0		
									0		
	85%			Slater Road		954		Slater Road		45%	North
		0								45%	
	45%	505									
	40%	449			I-5 Southbound Ramps						
							0	0	0		
			40%			40%					

Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

						0%	0%				
			0	0	0						
					I-5 Southbound Ramps				0		
	0%								0		
									0		
	0%			Slater Road		0		Slater Road		0%	North
		0								0%	
		0									
		0			I-5 Southbound Ramps						
							0	0	0		
			0%			0%					

Outbound Traffic

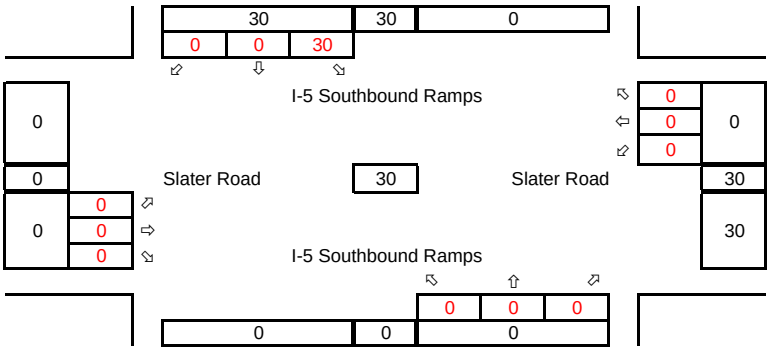
						0%	0%				
			0	0	0						
					I-5 Southbound Ramps				0		
	0%								0		
									0		
	0%			Slater Road		0		Slater Road		0%	North
		0								0%	
		0									
		0			I-5 Southbound Ramps						
							0	0	0		
			0%			0%					

Future Build-Out Volumes
without Kope Road Ext. or Realign

2 Slater Rd @ I-5 SB Ramps

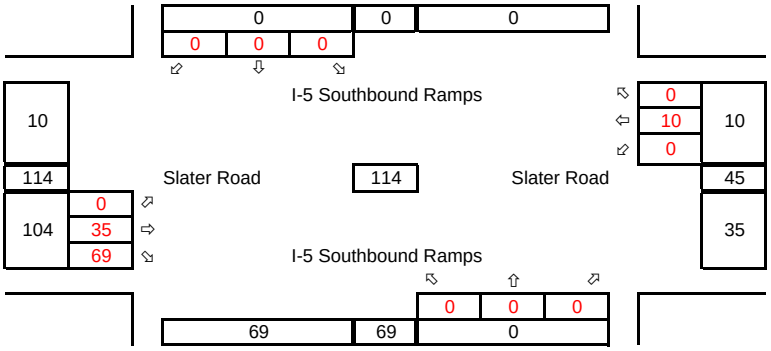
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
without Kope Road Ext. or Realign

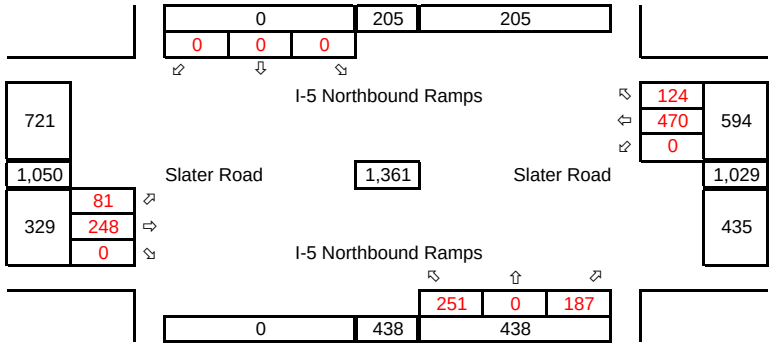
3 Slater Rd @ I-5 NB Ramps

Synchro ID: 3

Existing
Average Weekday
PM Peak-Hour

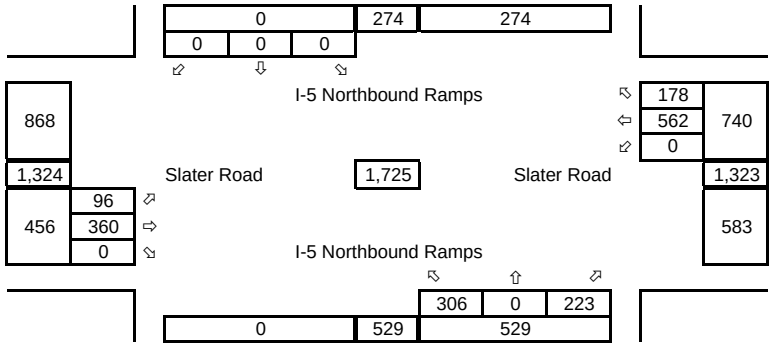
Year: **4/9/2013**

Data Source: **ATD**

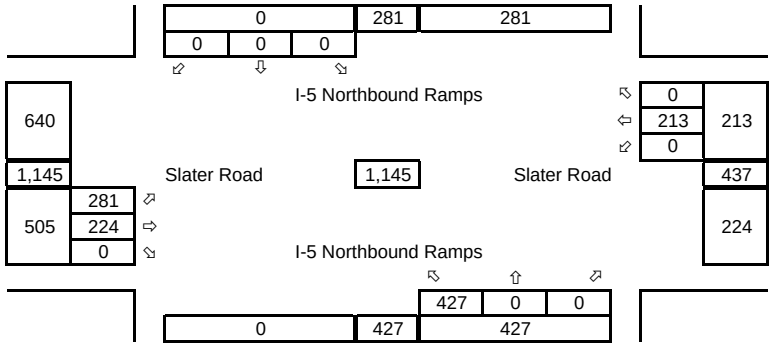


Future without Development
Average Weekday
PM Peak-Hour

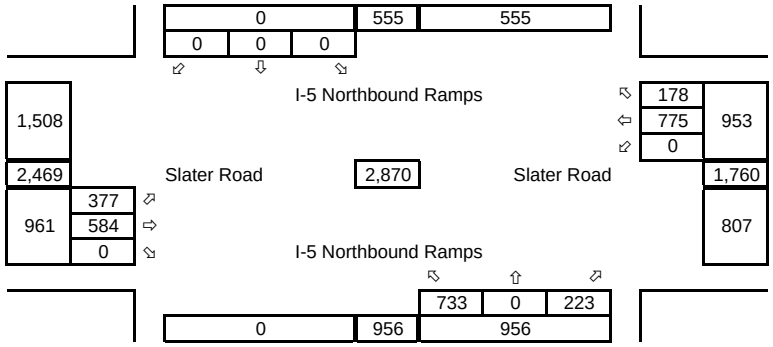
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour



Future with Development
Average Weekday
PM Peak-Hour

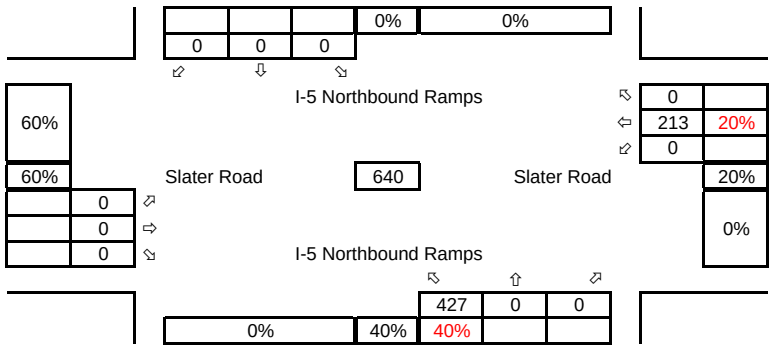


Future Build-Out Volumes
without Kope Road Ext. or Realign

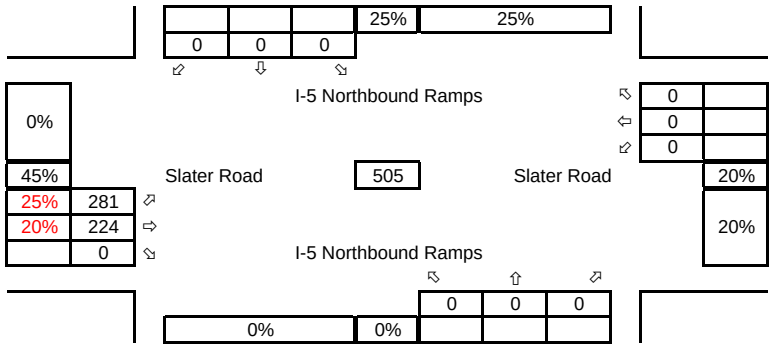
3 Slater Rd @ I-5 NB Ramps

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

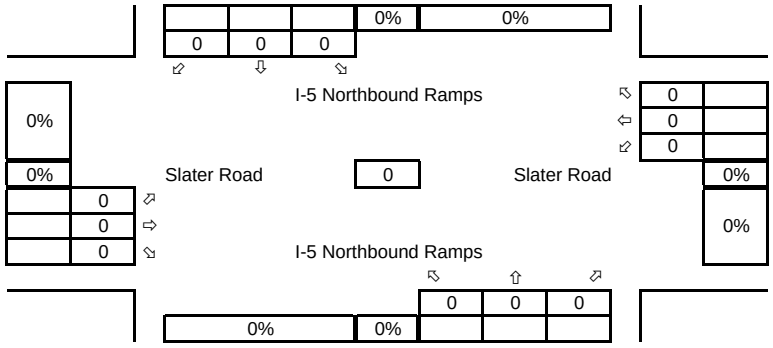


Outbound Traffic

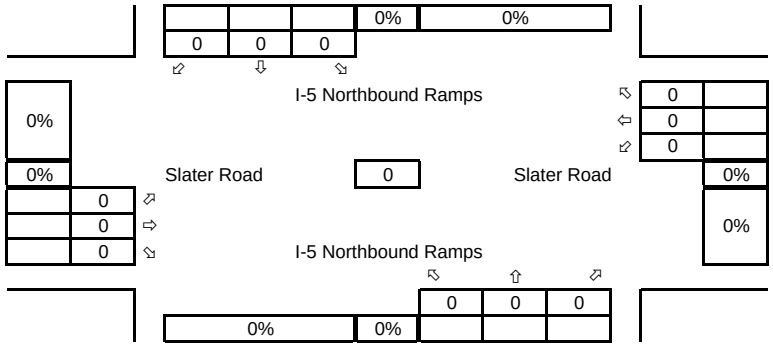


Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic



Outbound Traffic

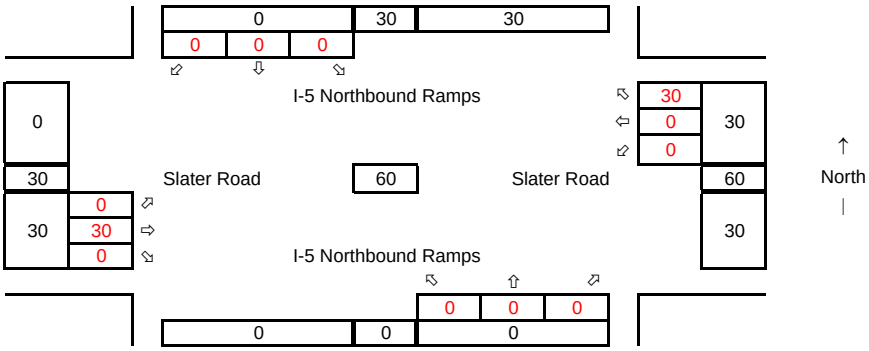


Future Build-Out Volumes
without Kope Road Ext. or Realign

3 Slater Rd @ I-5 NB Ramps

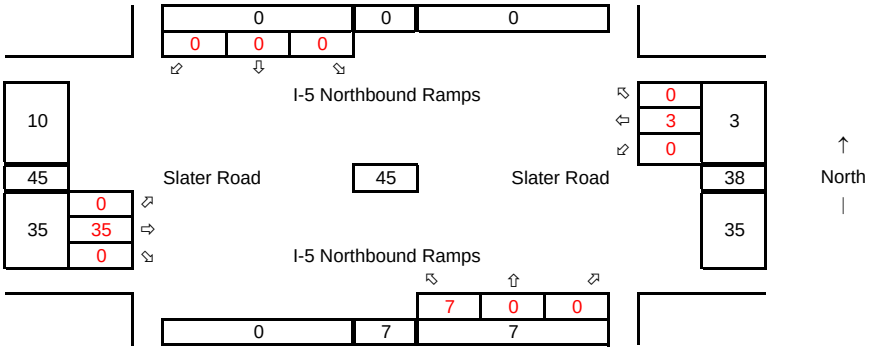
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
without Kope Road Ext. or Realign

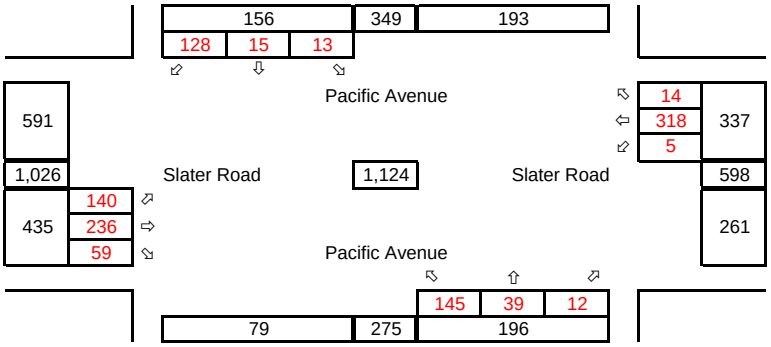
4 Slater Rd @ Pacific Ave

Synchro ID: 4

Existing
Average Weekday
PM Peak-Hour

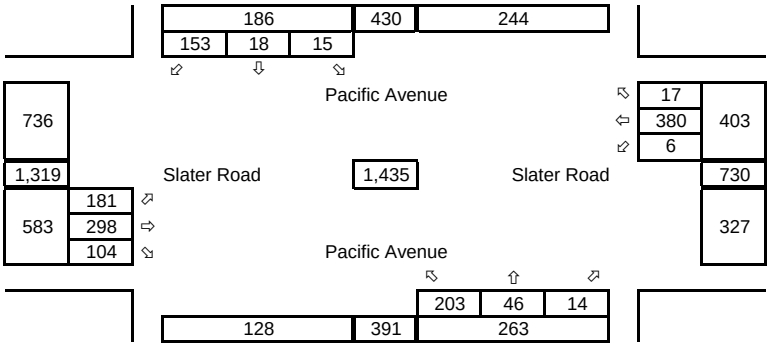
Year: **4/9/2013**

Data Source: **ATD**

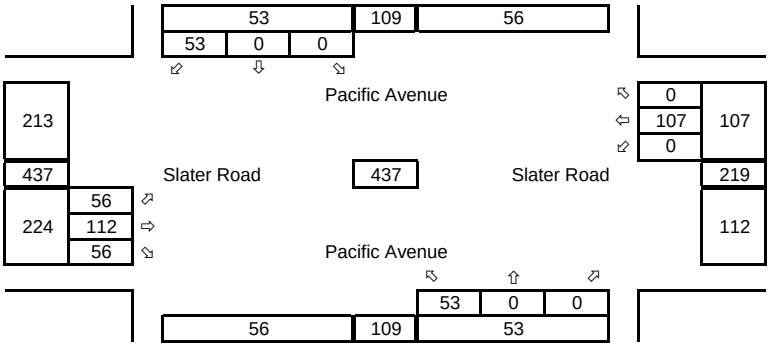


Future without Development
Average Weekday
PM Peak-Hour

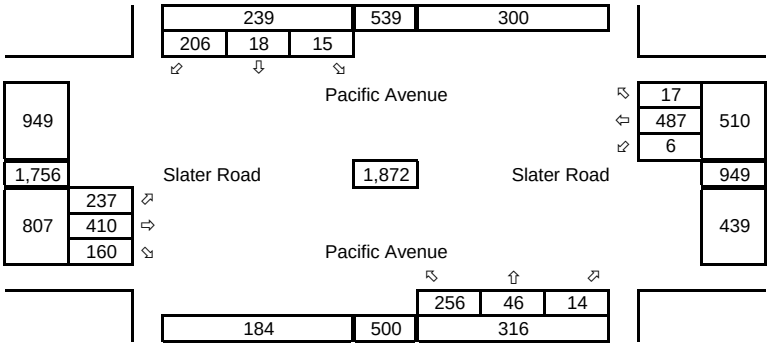
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour



Future with Development
Average Weekday
PM Peak-Hour

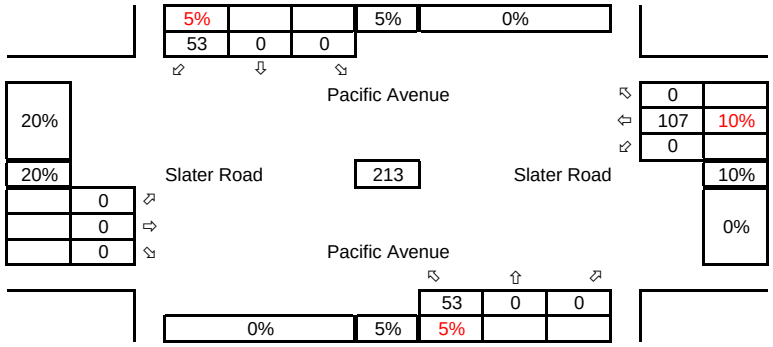


Future Build-Out Volumes
without Kope Road Ext. or Realign

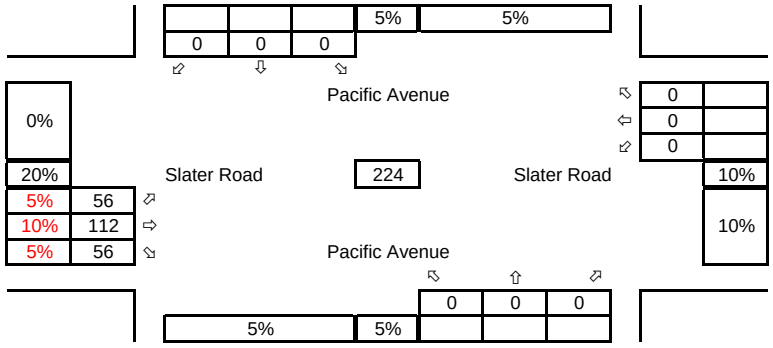
4 Slater Rd @ Pacific Ave

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

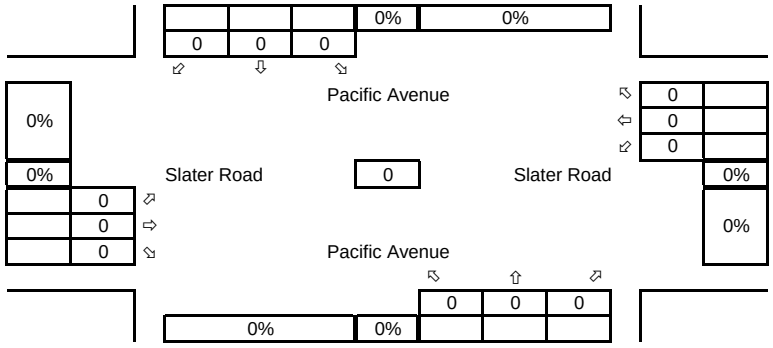


Outbound Traffic

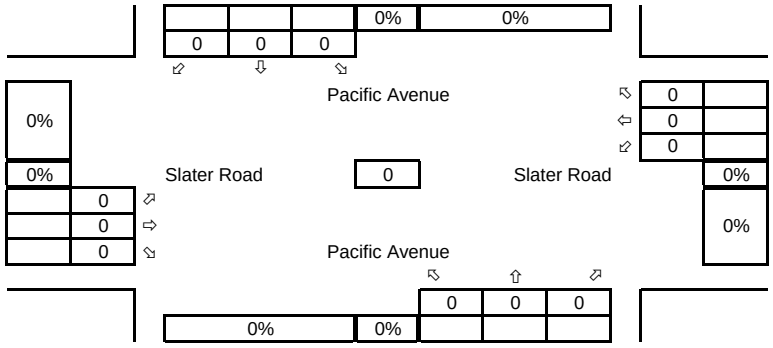


Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic



Outbound Traffic

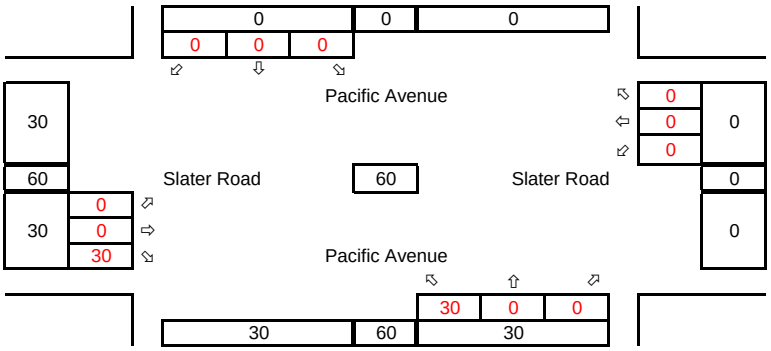


Future Build-Out Volumes
without Kope Road Ext. or Realign

4 Slater Rd @ Pacific Ave

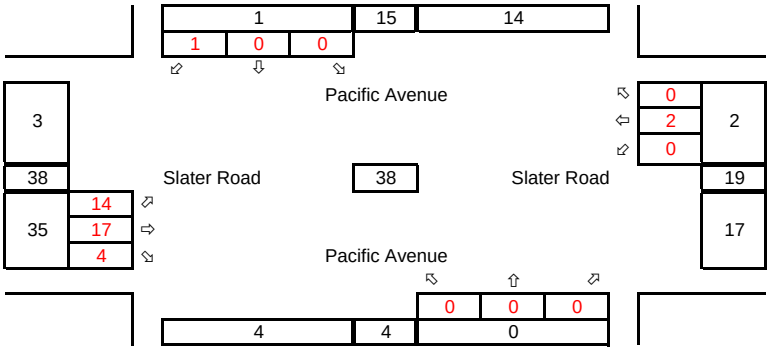
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

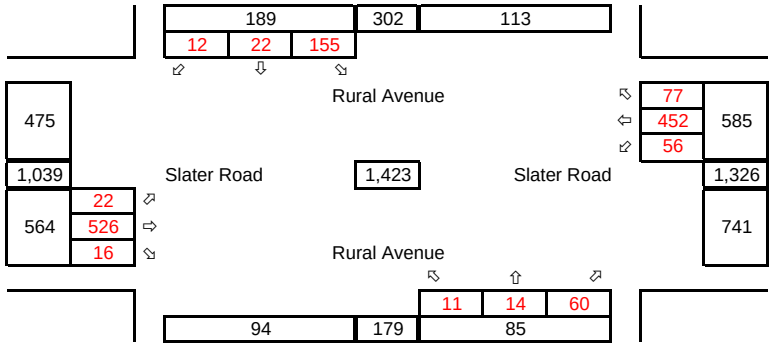
1 Slater Rd @ Rural Ave

Synchro ID: 1

Existing
Average Weekday
PM Peak-Hour

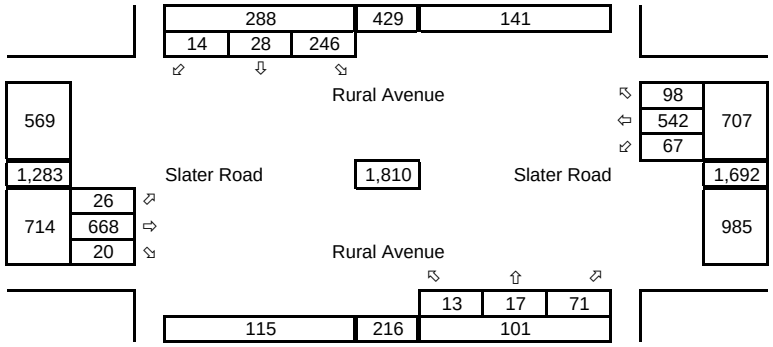
Year: **4/9/2013**

Data Source: **ATD**

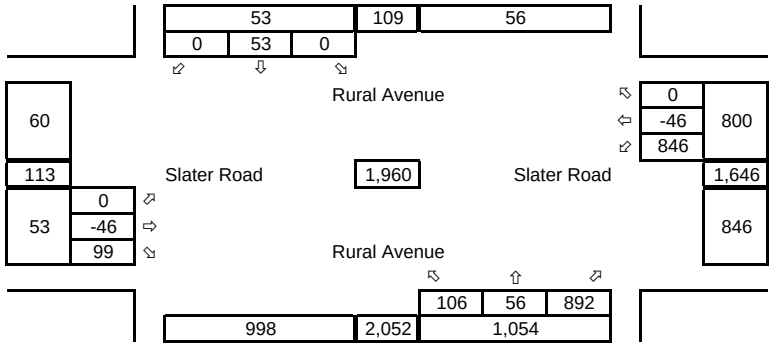


Future without Development
Average Weekday
PM Peak-Hour

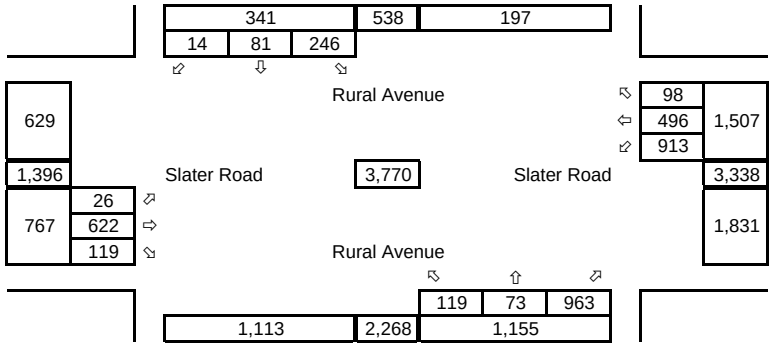
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour



Future with Development
Average Weekday
PM Peak-Hour



Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

1 Slater Rd @ Rural Ave

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

				5%		5%	0%			
			0	53	0					
						Rural Avenue			0	
	0%								0	
									800	75%
5%						Slater Road	906	Slater Road		75%
	0									
	0									0%
5%	53					Rural Avenue				
							0	0	0	
			85%			85%				

North

Outbound Traffic

				5%		5%				
			0	0	0					
						Rural Avenue			0	
	5%								0	
									0	
5%						Slater Road	954	Slater Road		75%
	0									
	0									75%
	0					Rural Avenue				
							56	56	842	
			0%			85%	5%	5%	75%	

North

Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

				0%		0%				
			0	0	0					
						Rural Avenue			0	
	-50%								-46	-50%
									46	50%
-50%						Slater Road	0	Slater Road		-50%
	0									
	-46									-50%
50%	46					Rural Avenue				
							0	0	0	
			100%			100%				

North

Outbound Traffic

				0%		0%				
			0	0	0					
						Rural Avenue			0	
	50%								0	
									0	
50%						Slater Road	100	Slater Road		50%
	0									
	0									50%
	0					Rural Avenue				
							50	0	50	
			0%			100%	50%		50%	

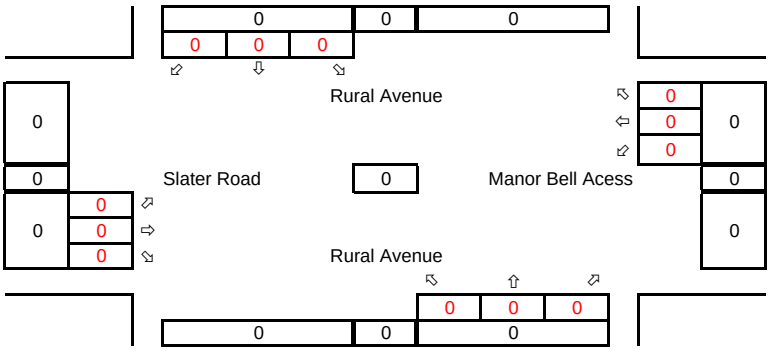
North

Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

1 Slater Rd @ Rural Ave

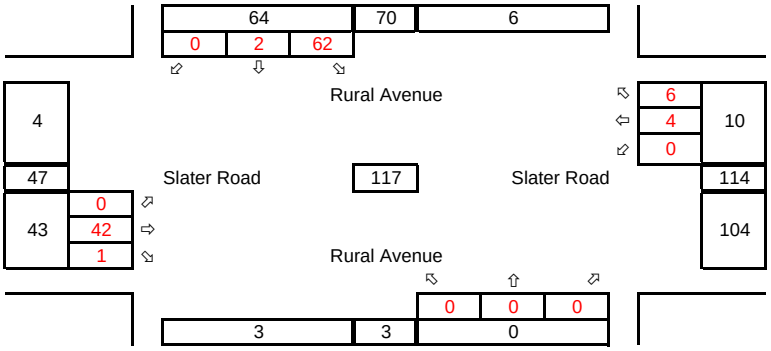
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

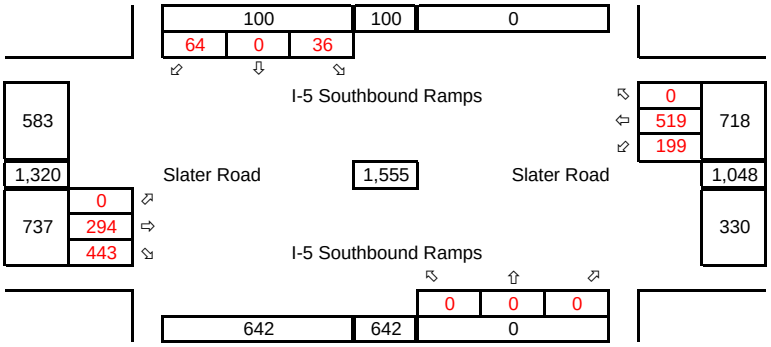
2 Slater Rd @ I-5 SB Ramps

Synchro ID: 2

Existing
Average Weekday
PM Peak-Hour

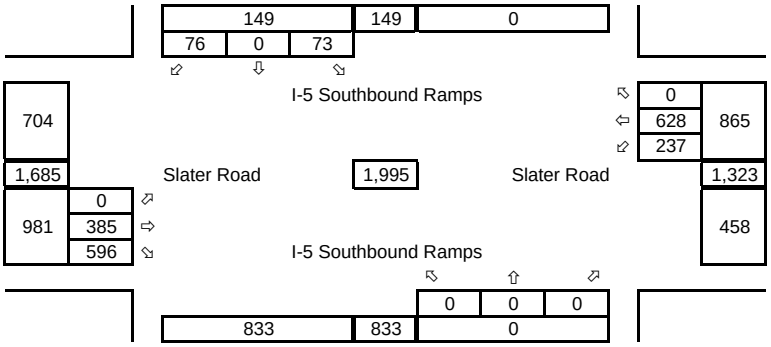
Year: **4/9/2013**

Data Source: **ATD**

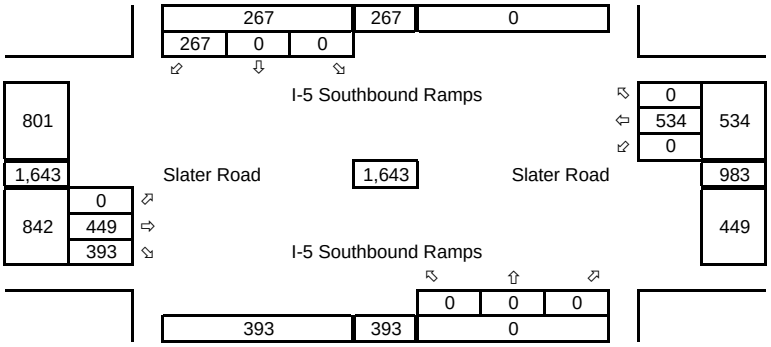


Future without Development
Average Weekday
PM Peak-Hour

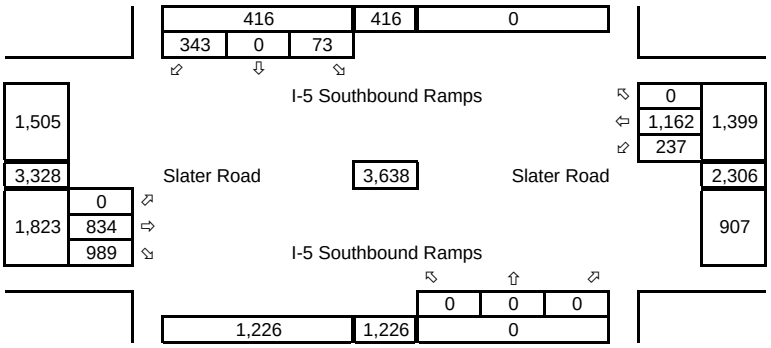
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour

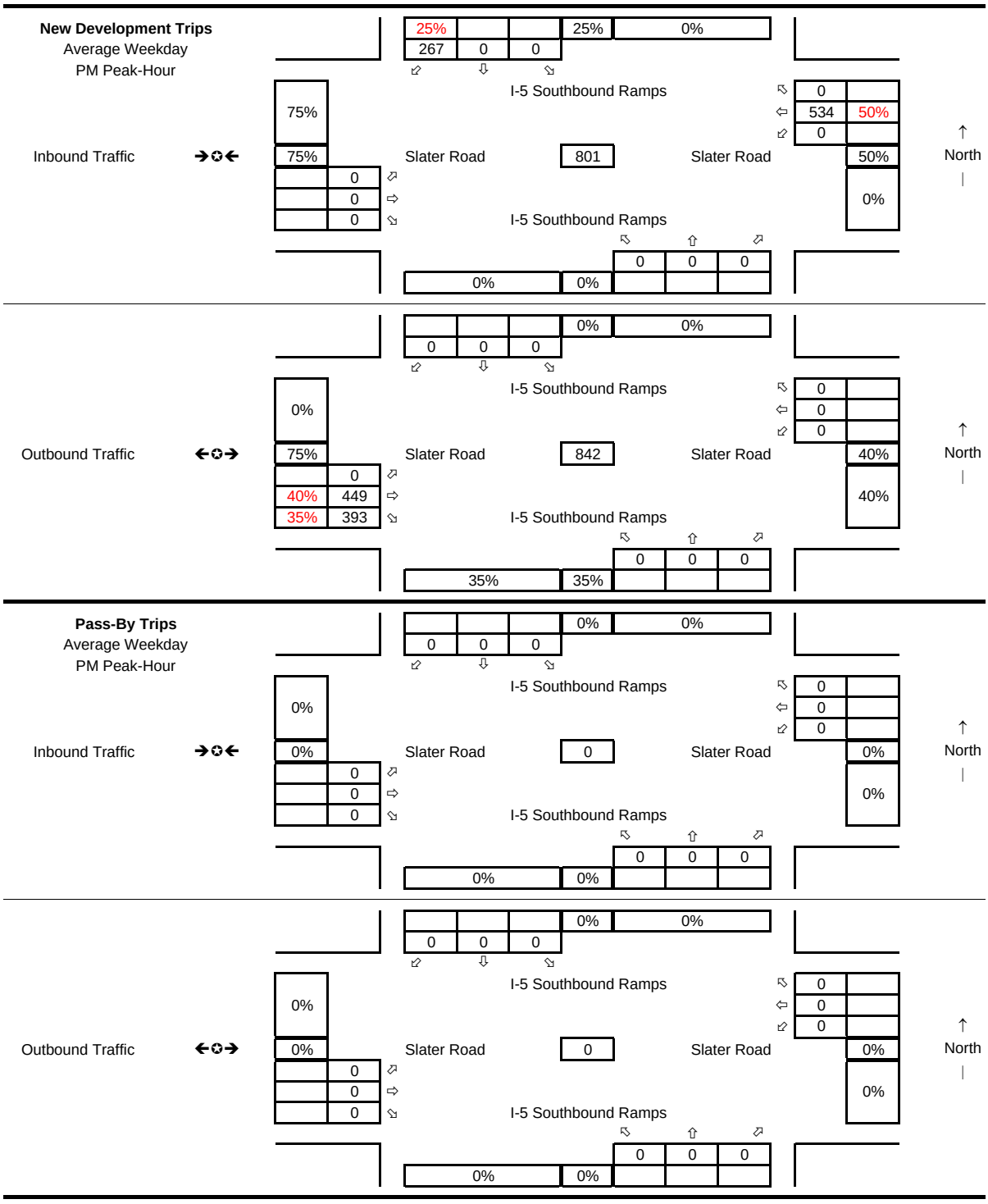


Future with Development
Average Weekday
PM Peak-Hour



Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

2 Slater Rd @ I-5 SB Ramps

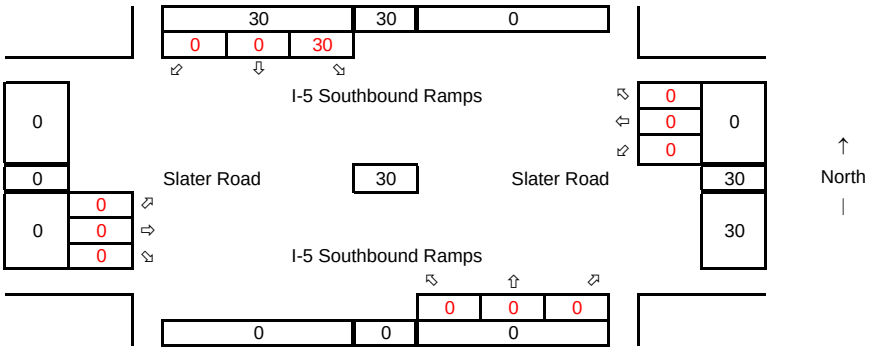


Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

2 Slater Rd @ I-5 SB Ramps

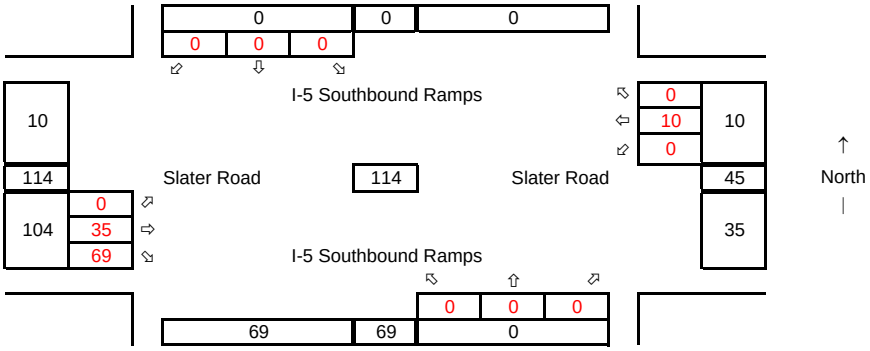
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

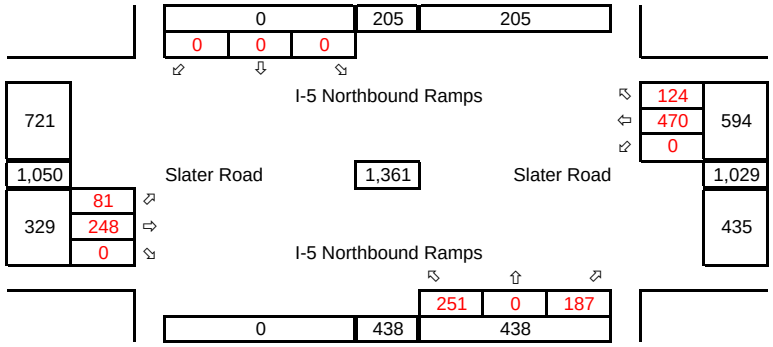
3 Slater Rd @ I-5 NB Ramps

Synchro ID: 3

Existing
Average Weekday
PM Peak-Hour

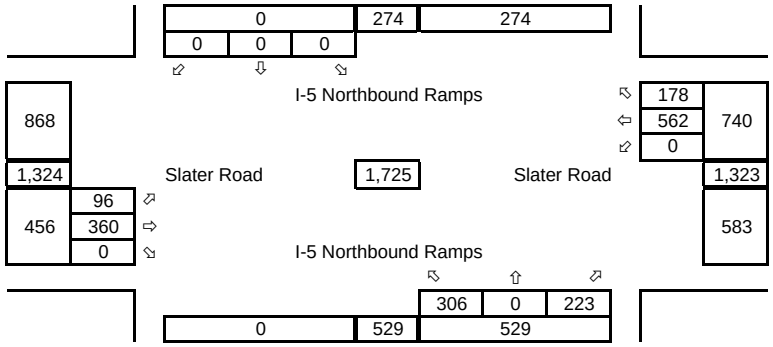
Year: **4/9/2013**

Data Source: **ATD**

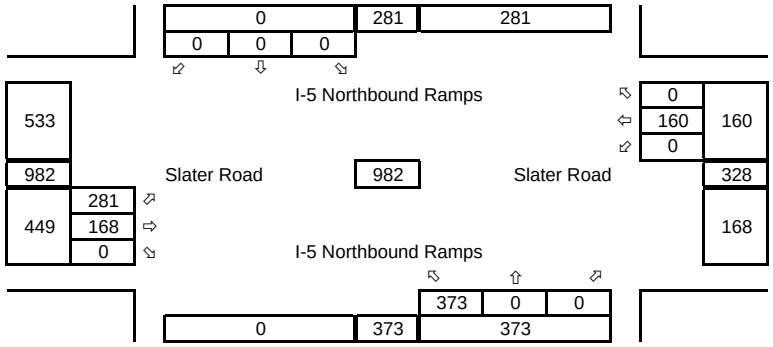


Future without Development
Average Weekday
PM Peak-Hour

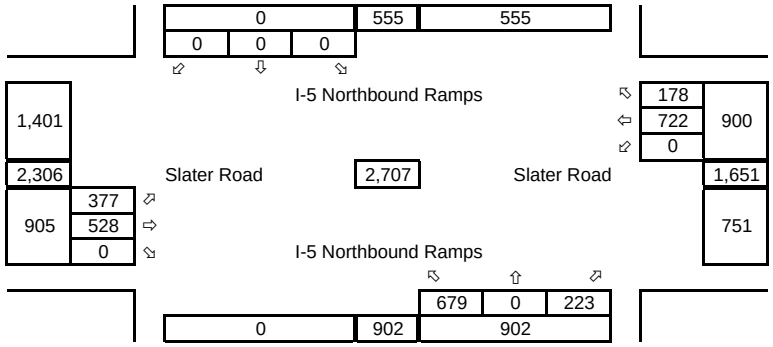
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour



Future with Development
Average Weekday
PM Peak-Hour



Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

3 Slater Rd @ I-5 NB Ramps

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

								0%	0%			
						0	0	0				
								I-5 Northbound Ramps			0	
	50%										160	15%
											0	
	50%					Slater Road		533		Slater Road		15%
		0										0%
		0										
		0						I-5 Northbound Ramps				
									373	0	0	
						0%		35%	35%			

North

Outbound Traffic

								25%	25%			
						0	0	0				
								I-5 Northbound Ramps			0	
	0%										0	
											0	
	40%					Slater Road		449		Slater Road		15%
	25%	281										15%
	15%	168										
		0						I-5 Northbound Ramps				
									0	0	0	
						0%		0%				

North

Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

								0%	0%			
						0	0	0				
								I-5 Northbound Ramps			0	
	0%										0	
											0	
	0%					Slater Road		0		Slater Road		0%
		0										0%
		0										
		0						I-5 Northbound Ramps				
									0	0	0	
						0%		0%				

North

Outbound Traffic

								0%	0%			
						0	0	0				
								I-5 Northbound Ramps			0	
	0%										0	
											0	
	0%					Slater Road		0		Slater Road		0%
		0										0%
		0										
		0						I-5 Northbound Ramps				
									0	0	0	
						0%		0%				

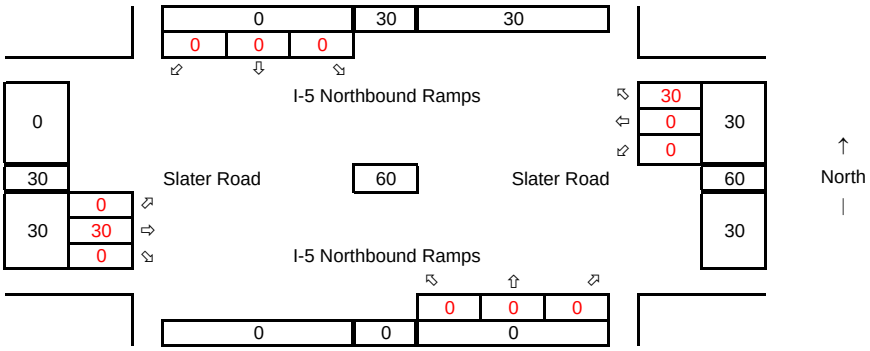
North

Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

3 Slater Rd @ I-5 NB Ramps

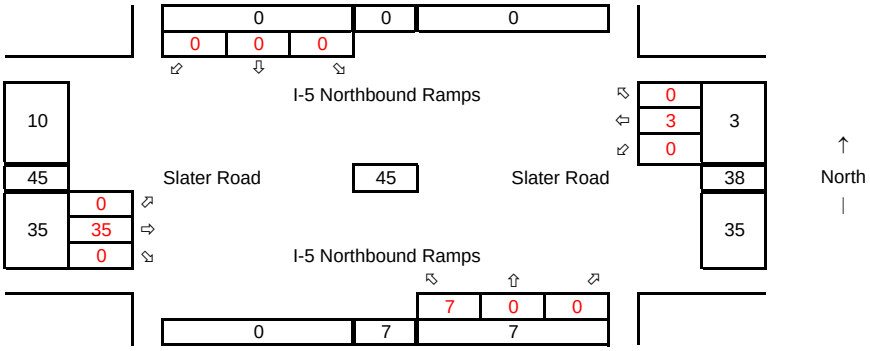
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

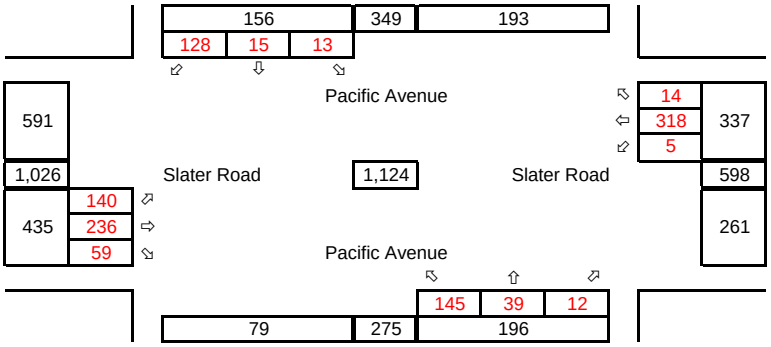
4 Slater Rd @ Pacific Ave

Synchro ID: 4

Existing
Average Weekday
PM Peak-Hour

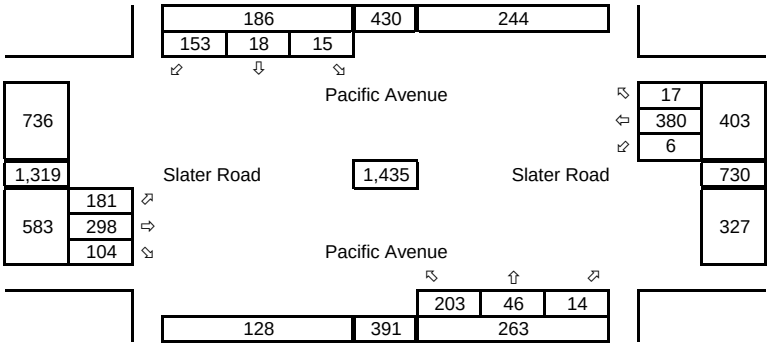
Year: **4/9/2013**

Data Source: **ATD**

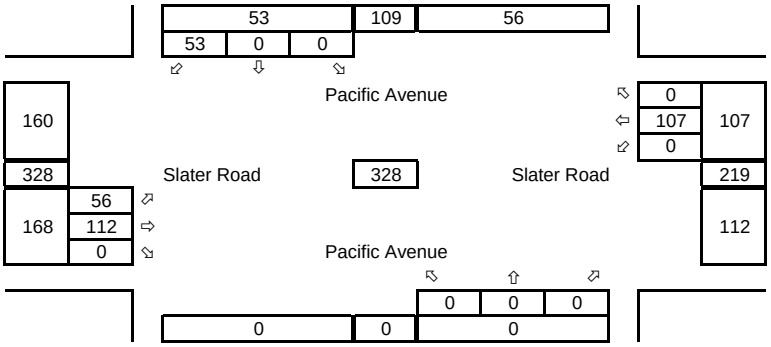


Future without Development
Average Weekday
PM Peak-Hour

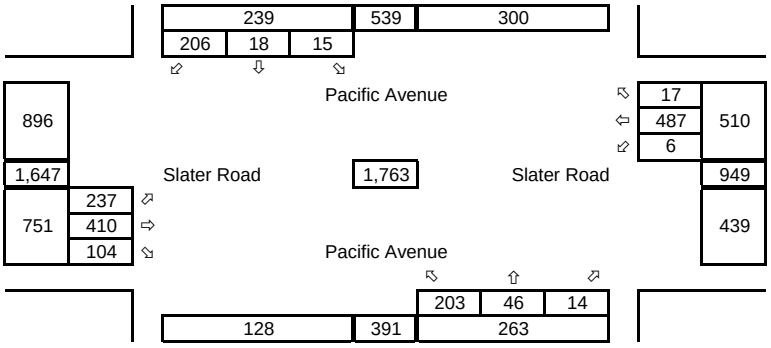
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour



Future with Development
Average Weekday
PM Peak-Hour



Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

4 Slater Rd @ Pacific Ave

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

			5%			5%	0%					
			53	0	0							
						Pacific Avenue				0		
	15%									107	10%	
										0		
	15%		Slater Road			160			Slater Road		10%	
		0									0%	
		0										
		0				Pacific Avenue						
							0	0	0			
			0%			0%						

Outbound Traffic

						5%	5%					
			0	0	0							
						Pacific Avenue				0		
	0%									0		
										0		
	15%		Slater Road			168			Slater Road		10%	
	5%	56									10%	
	10%	112										
		0				Pacific Avenue						
							0	0	0			
			0%			0%						

Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

						0%	0%					
			0	0	0							
						Pacific Avenue				0		
	0%									0		
										0		
	0%		Slater Road			0			Slater Road		0%	
		0									0%	
		0										
		0				Pacific Avenue						
							0	0	0			
			0%			0%						

Outbound Traffic

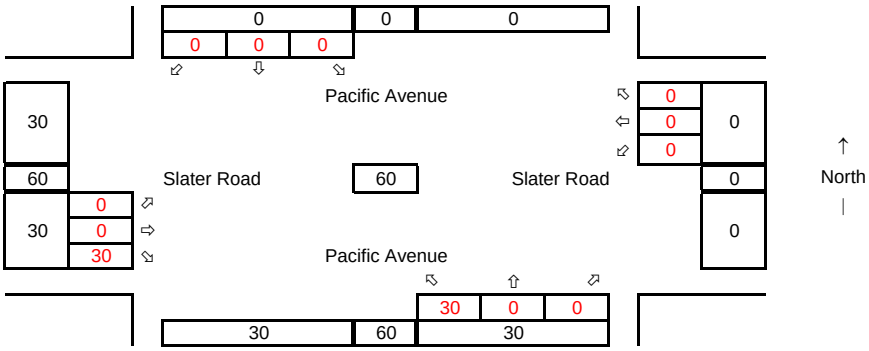
						0%	0%					
			0	0	0							
						Pacific Avenue				0		
	0%									0		
										0		
	0%		Slater Road			0			Slater Road		0%	
		0									0%	
		0										
		0				Pacific Avenue						
							0	0	0			
			0%			0%						

Future Build-Out Volumes
with Kope Road Ext.
without Kope Road Realign

4 Slater Rd @ Pacific Ave

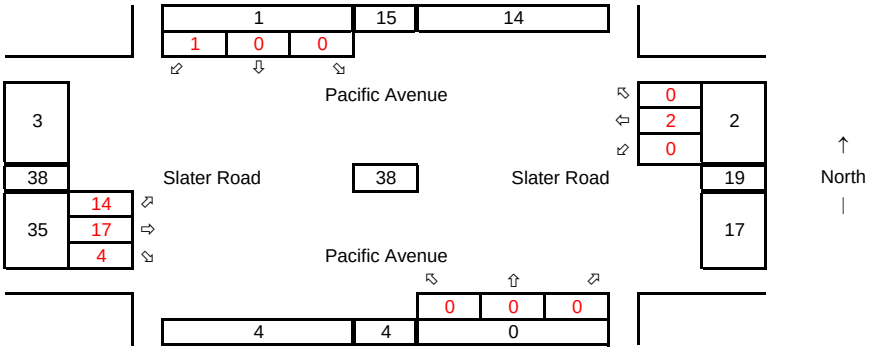
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Turning Movement Calculations with Kope Road Realign

Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

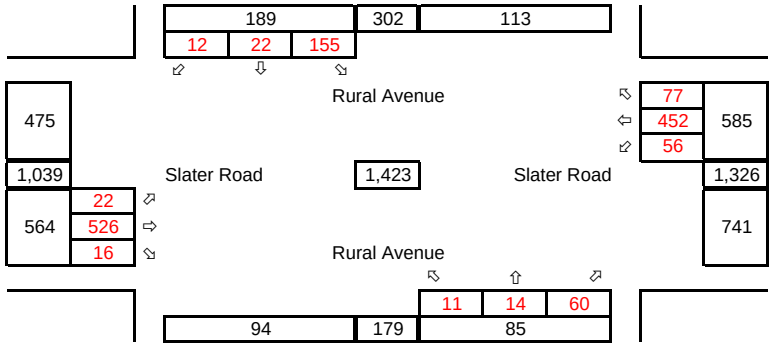
1 Slater Rd @ Rural Ave

Synchro ID: 1

Existing
Average Weekday
PM Peak-Hour

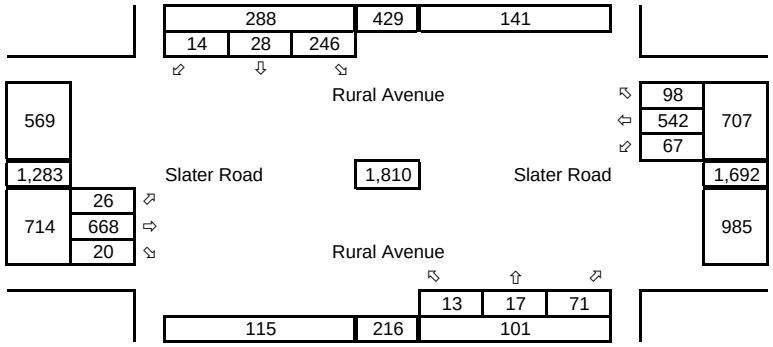
Year: **4/9/2013**

Data Source: **ATD**

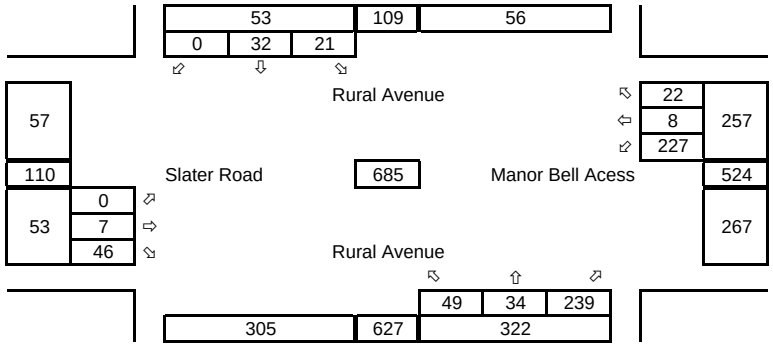


Future without Development
Average Weekday
PM Peak-Hour

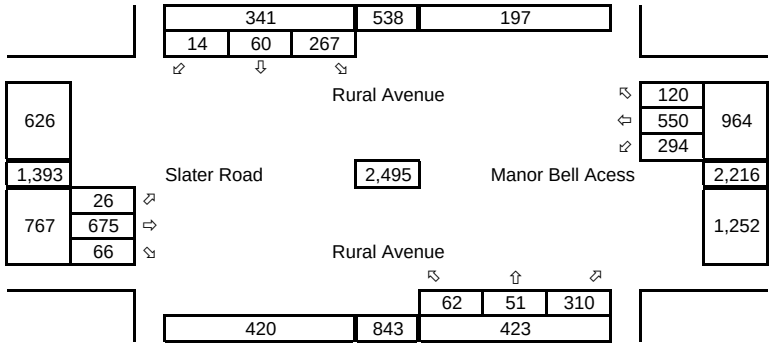
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour

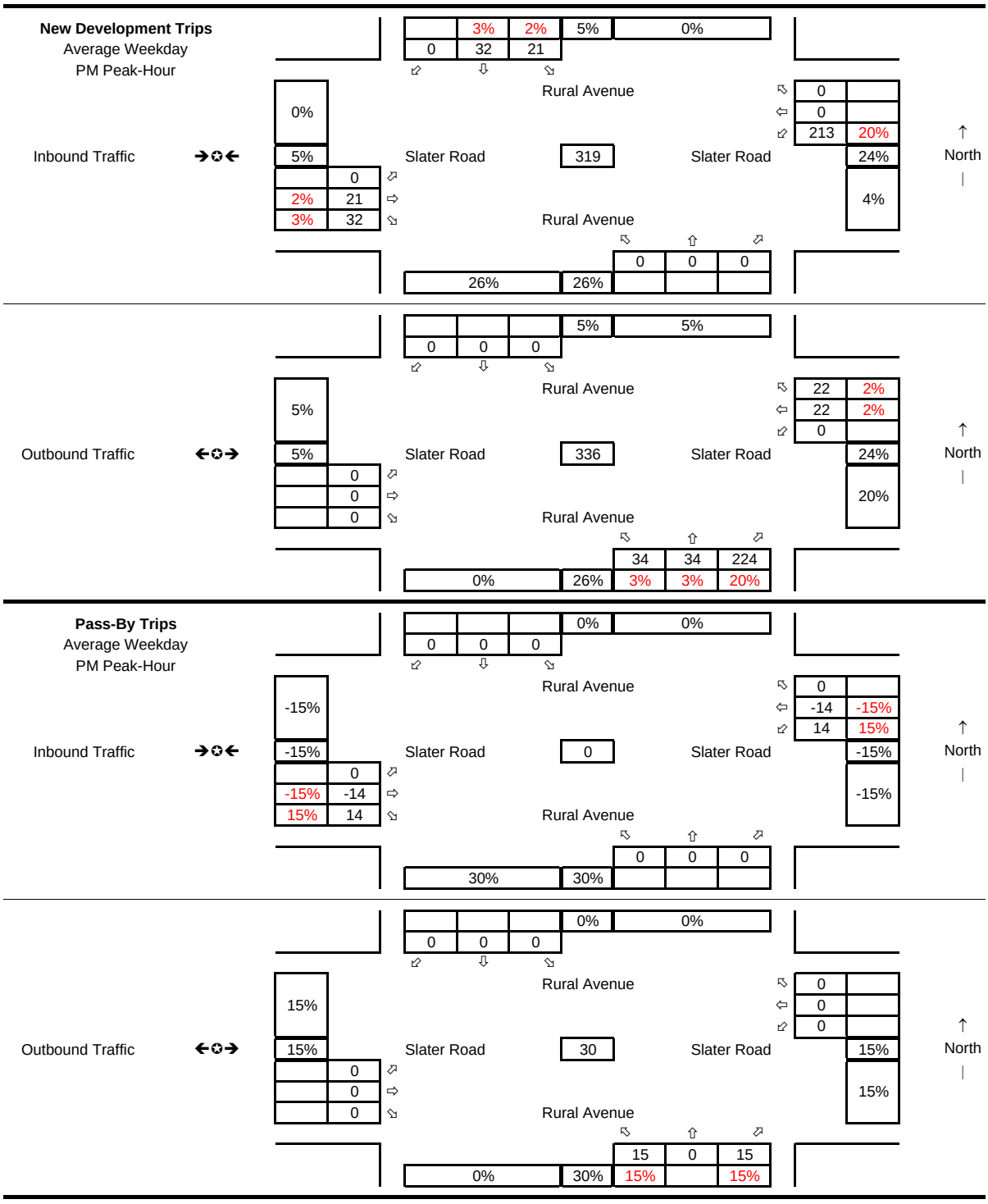


Future with Development
Average Weekday
PM Peak-Hour



Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

1 Slater Rd @ Rural Ave

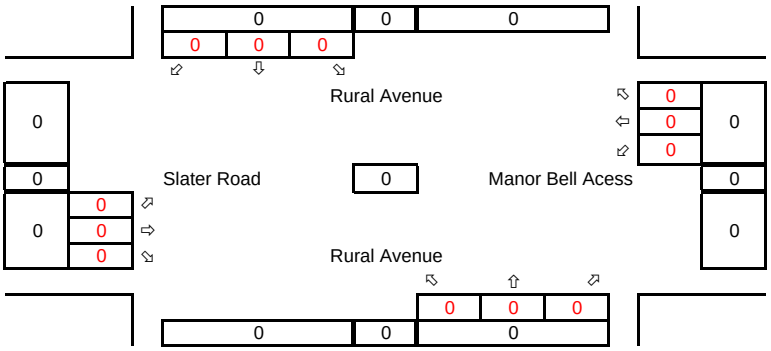


Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

1 Slater Rd @ Rural Ave

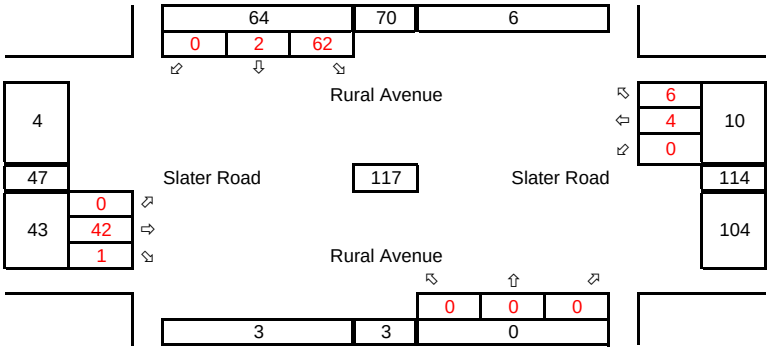
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

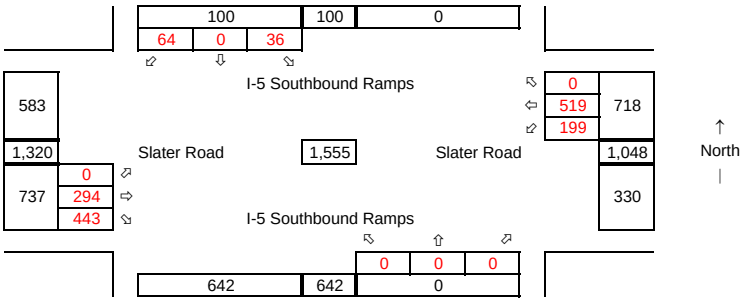
2 Slater Rd @ I-5 SB Ramps

Synchro ID: 2

Existing
Average Weekday
PM Peak-Hour

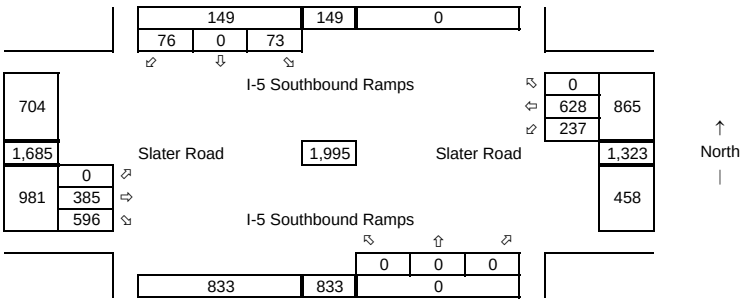
Year: **4/9/2013**

Data Source: **ATD**

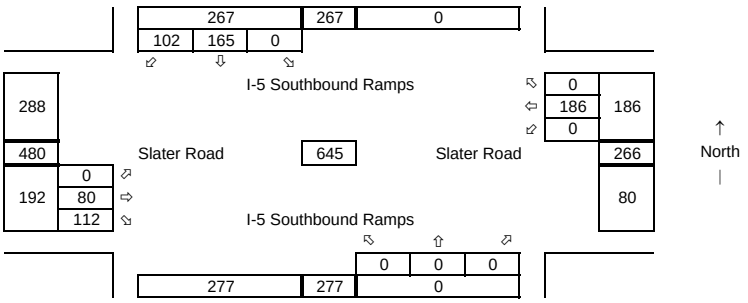


Future without Development
Average Weekday
PM Peak-Hour

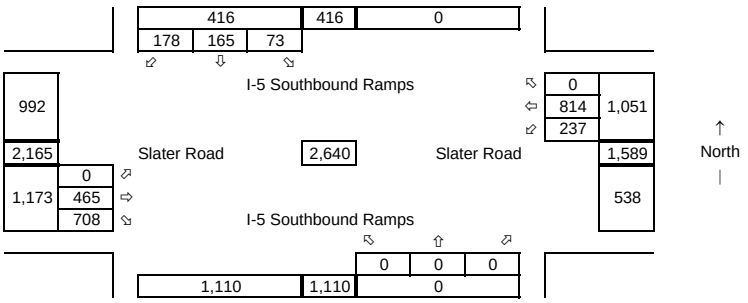
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour



Future with Development
Average Weekday
PM Peak-Hour



	%	Vol
EBR-SWT		75
WBL-SWT		454
NWL-WBT		80
NWR-EBT		427
NWR-SET		337

Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

2 Slater Rd @ I-5 SB Ramps

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

			10%	15%		25%	0%					
			107	160	0							
					I-5 Southbound Ramps				0			
	30%								213	20%		
									0			
Inbound Traffic	30%			Slater Road		480		Slater Road		20%		
		0										
		0								0%		
		0			I-5 Southbound Ramps							
							0	0	0			
			15%			15%						

	%	Vol
EBR-SWT	4%	43
WBL-SWT	40%	427
NWL-WBT	0%	0
NWR-EBT	0%	0
NWR-SET	0%	0

Outbound Traffic

						0%	0%					
			0	0	0							
					I-5 Southbound Ramps				0			
	0%								0			
									0			
Outbound Traffic	20%			Slater Road		224		Slater Road		10%		
		0										
	10%	112								10%		
	10%	112			I-5 Southbound Ramps							
							0	0	0			
			10%			10%						

	%	Vol
EBR-SWT	0%	0
WBL-SWT	0%	0
NWL-WBT	4%	45
NWR-EBT	35%	393
NWR-SET	30%	337

Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

			-5%	5%		0%	0%					
			-5	5	0							
					I-5 Southbound Ramps				0			
	-35%								-27	-30%		
									0			
Inbound Traffic	-70%			Slater Road		-59		Slater Road		-65%		
		0										
	-35%	-32								-35%		
		0			I-5 Southbound Ramps							
							0	0	0			
			5%			5%						

	%	Vol
EBR-SWT	35%	32
WBL-SWT	30%	27
NWL-WBT	0%	0
NWR-EBT	0%	0
NWR-SET	0%	0

Outbound Traffic

						0%	0%					
			0	0	0							
					I-5 Southbound Ramps				0			
	0%								0			
									0			
Outbound Traffic	0%			Slater Road		0		Slater Road		0%		
		0										
		0								0%		
		0			I-5 Southbound Ramps							
							0	0	0			
			0%			0%						

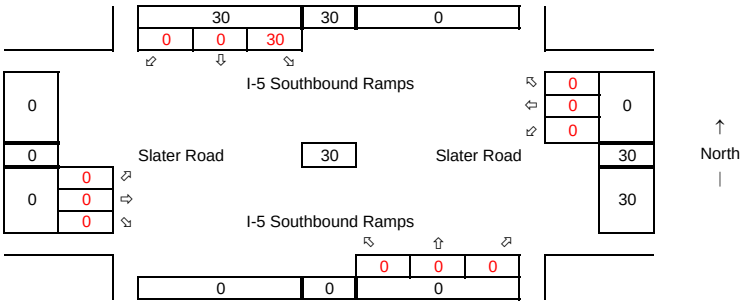
	%	Vol
EBR-SWT	0%	0
WBL-SWT	0%	0
NWL-WBT	35%	35
NWR-EBT	35%	35
NWR-SET	0%	0

Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

2 Slater Rd @ I-5 SB Ramps

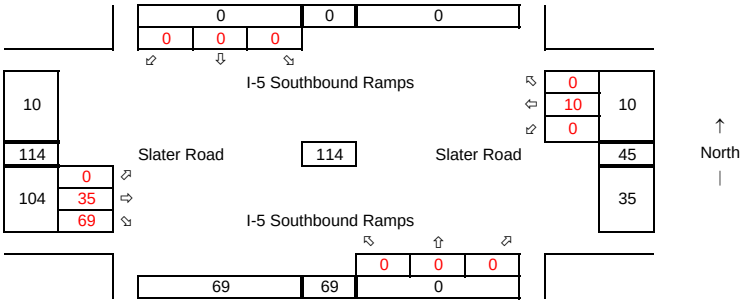
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

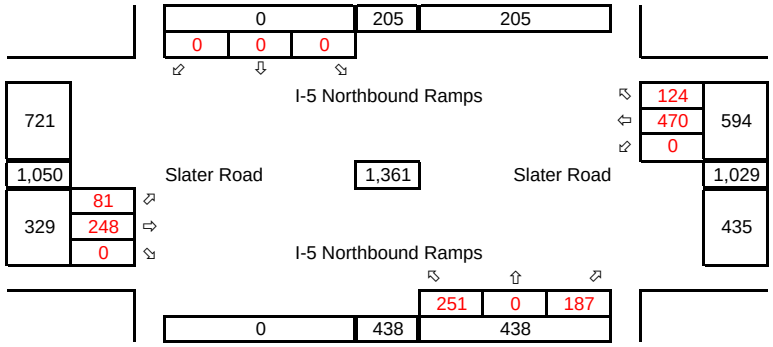
3 Slater Rd @ I-5 NB Ramps

Synchro ID: 3

Existing
Average Weekday
PM Peak-Hour

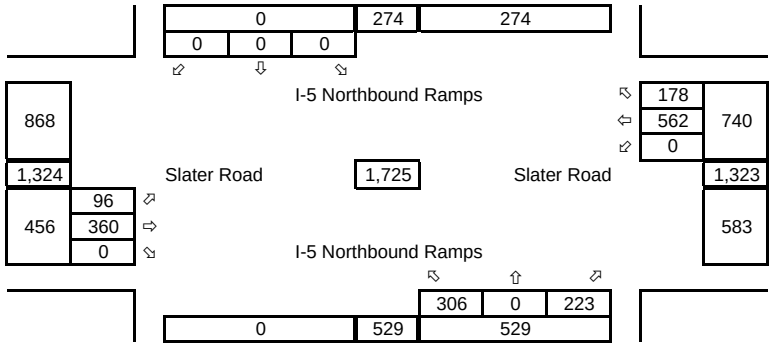
Year: **4/9/2013**

Data Source: **ATD**

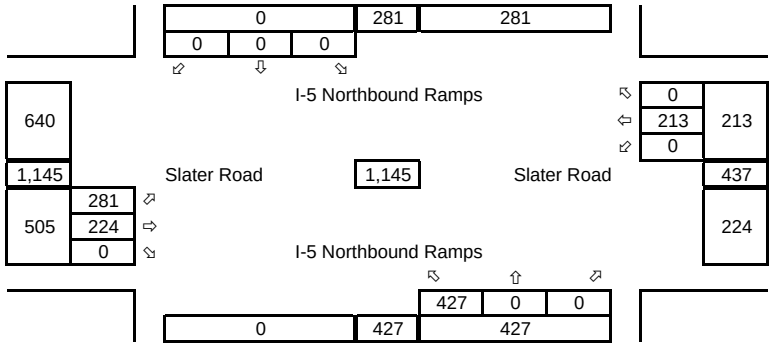


Future without Development
Average Weekday
PM Peak-Hour

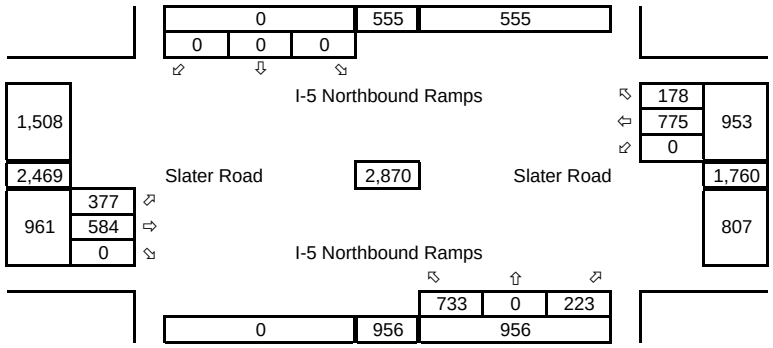
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour



Future with Development
Average Weekday
PM Peak-Hour

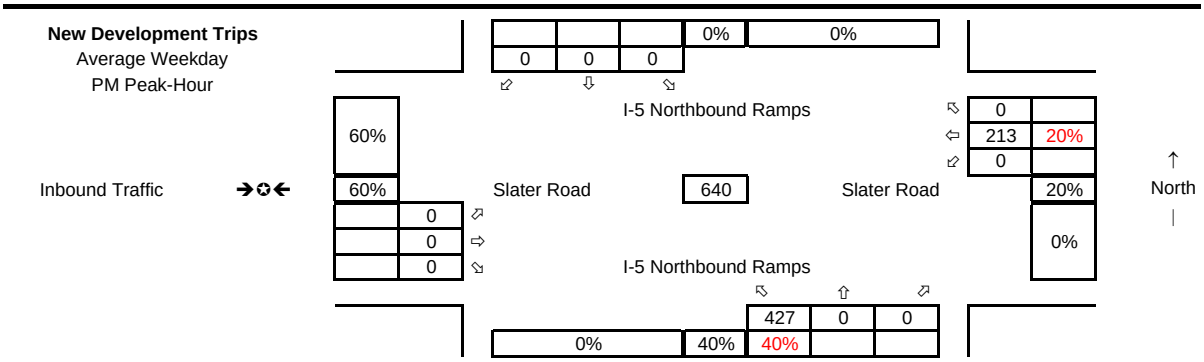


Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

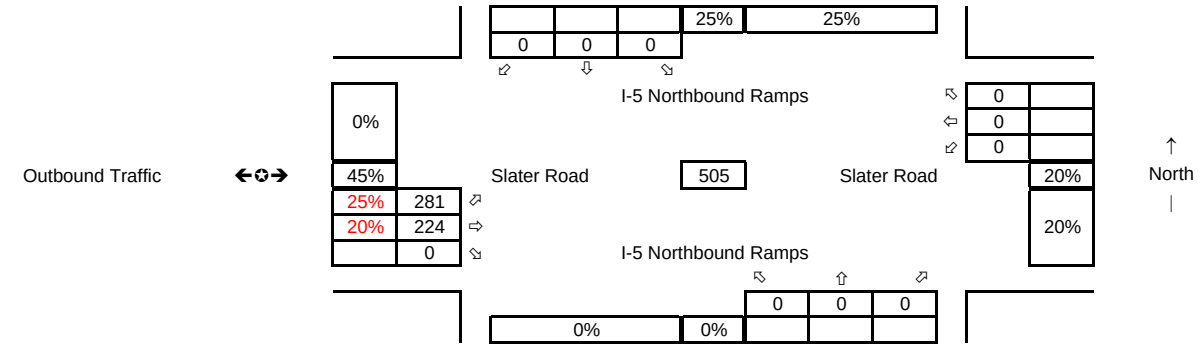
3 Slater Rd @ I-5 NB Ramps

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

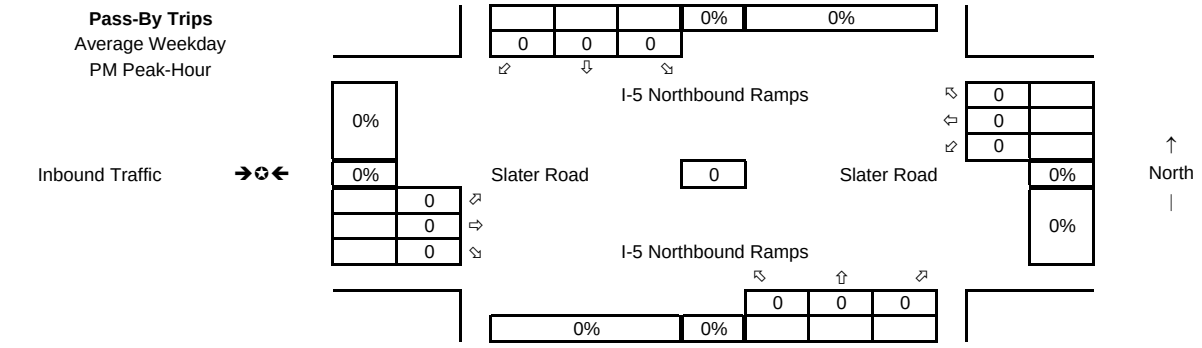


Outbound Traffic

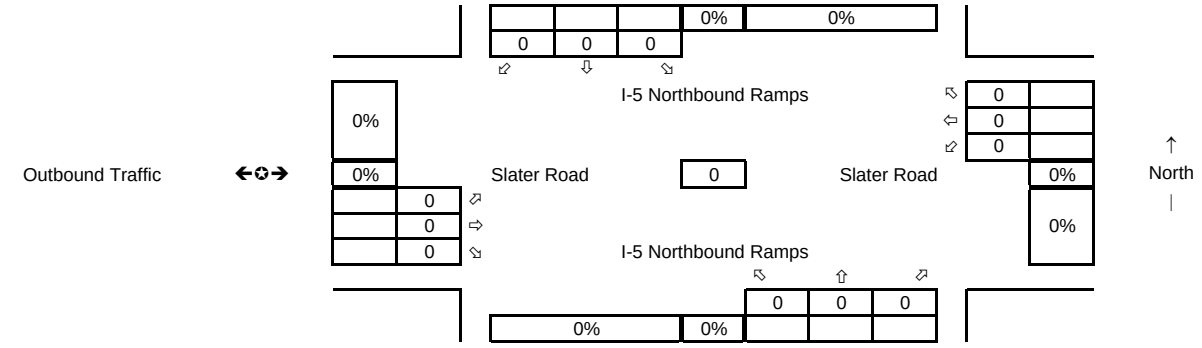


Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic



Outbound Traffic

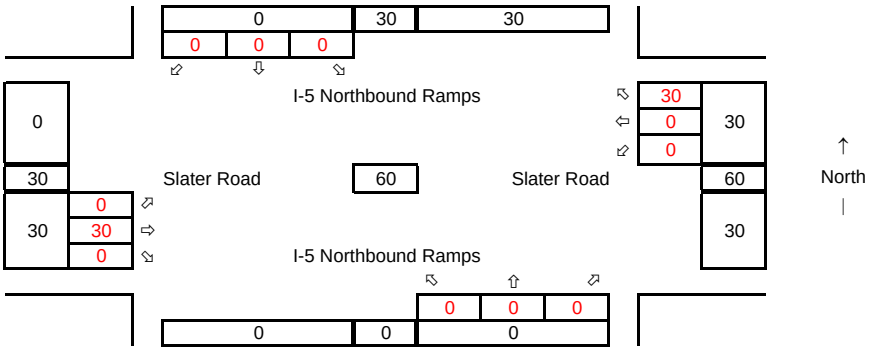


Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

3 Slater Rd @ I-5 NB Ramps

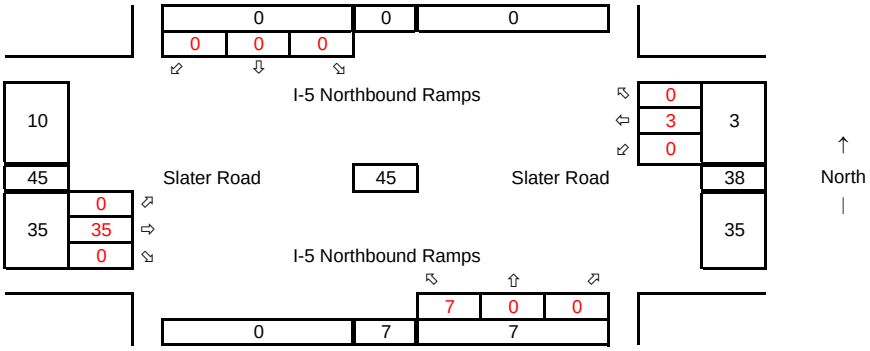
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

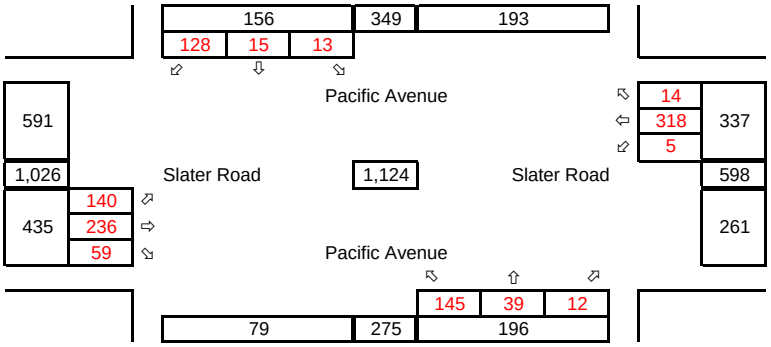
4 Slater Rd @ Pacific Ave

Synchro ID: 4

Existing
Average Weekday
PM Peak-Hour

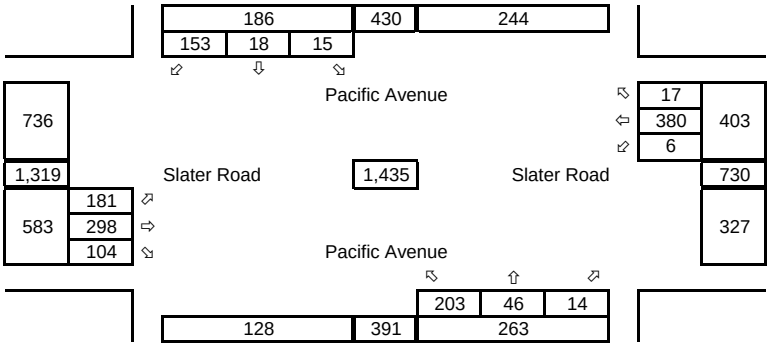
Year: **4/9/2013**

Data Source: **ATD**

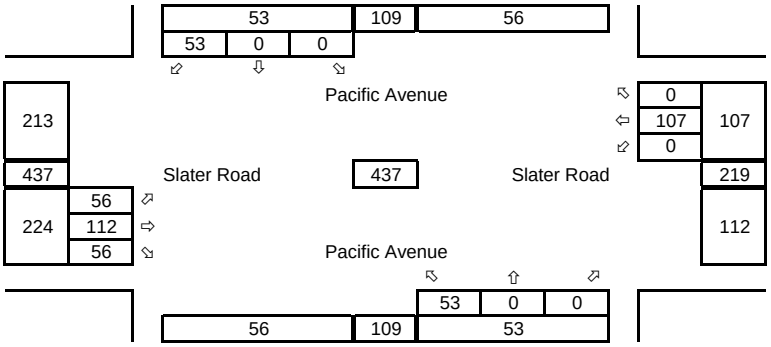


Future without Development
Average Weekday
PM Peak-Hour

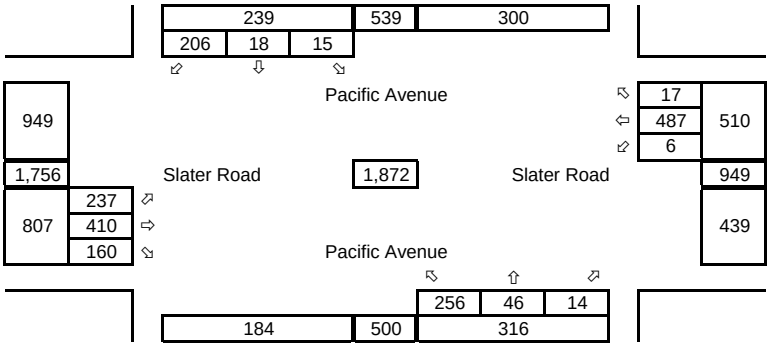
Total Growth = 1.1900



Total Development Trips
Average Weekday
PM Peak-Hour



Future with Development
Average Weekday
PM Peak-Hour



Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

4 Slater Rd @ Pacific Ave

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

			5%			5%	0%				
			53	0	0						
						Pacific Avenue			0		
	20%								107	10%	
									0		
	20%			Slater Road		213		Slater Road		10%	
		0								0%	
		0									
		0				Pacific Avenue					
							53	0	0		
			0%			5%	5%				

North

Outbound Traffic

						5%	5%				
			0	0	0						
						Pacific Avenue			0		
	0%								0		
									0		
	20%			Slater Road		224		Slater Road		10%	
	5%	56								10%	
	10%	112									
	5%	56				Pacific Avenue					
							0	0	0		
			5%			5%					

North

Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

						0%	0%				
			0	0	0						
						Pacific Avenue			0		
	0%								0		
									0		
	0%			Slater Road		0		Slater Road		0%	
		0								0%	
		0									
		0				Pacific Avenue					
							0	0	0		
			0%			0%					

North

Outbound Traffic

						0%	0%				
			0	0	0						
						Pacific Avenue			0		
	0%								0		
									0		
	0%			Slater Road		0		Slater Road		0%	
		0								0%	
		0									
		0				Pacific Avenue					
							0	0	0		
			0%			0%					

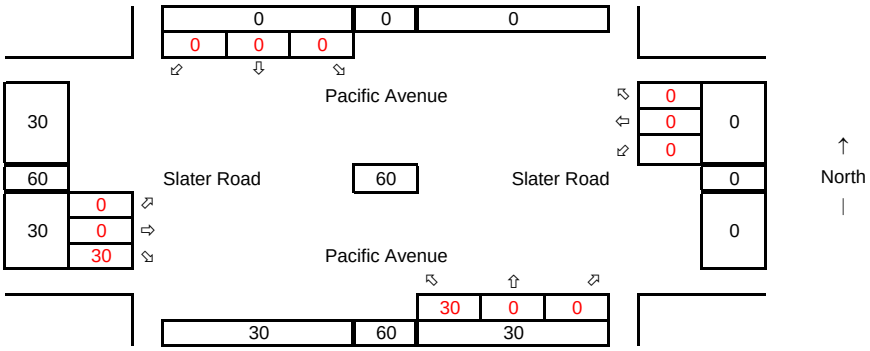
North

Future Build-Out Volumes
without Kope Road Ext.
with Kope Rad Realign

4 Slater Rd @ Pacific Ave

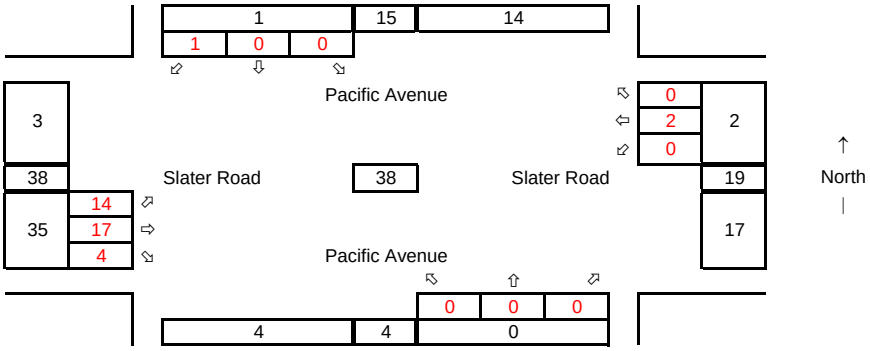
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
with Kope Road Ext. and Realign

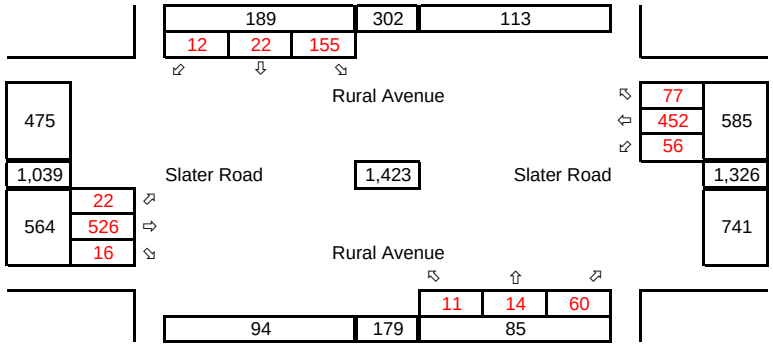
1 Slater Rd @ Rural Ave

Synchro ID: 1

Existing
Average Weekday
PM Peak-Hour

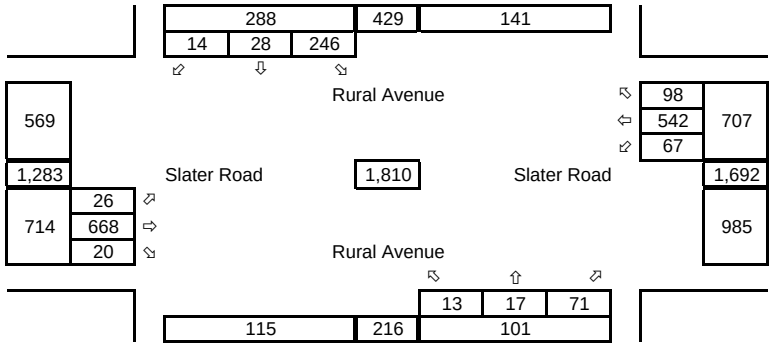
Year: **4/9/2013**

Data Source: **ATD**

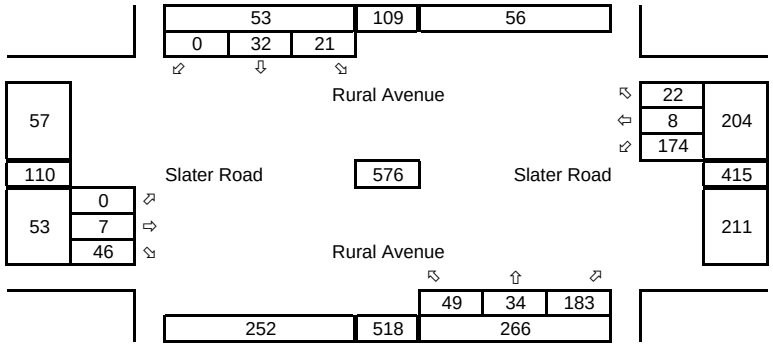


Future without Development
Average Weekday
PM Peak-Hour

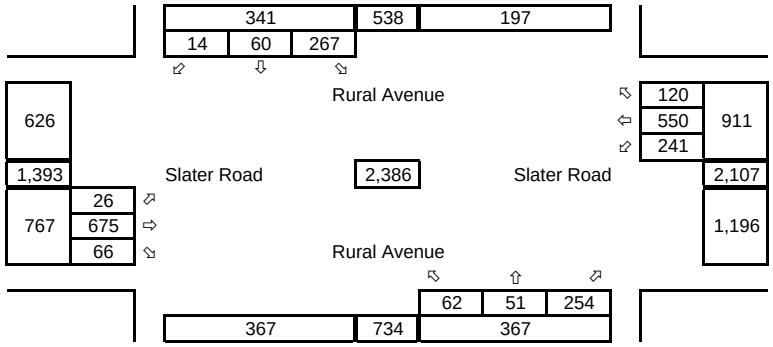
Total Growth = 1.1900



Total Project Trips
Average Weekday
PM Peak-Hour

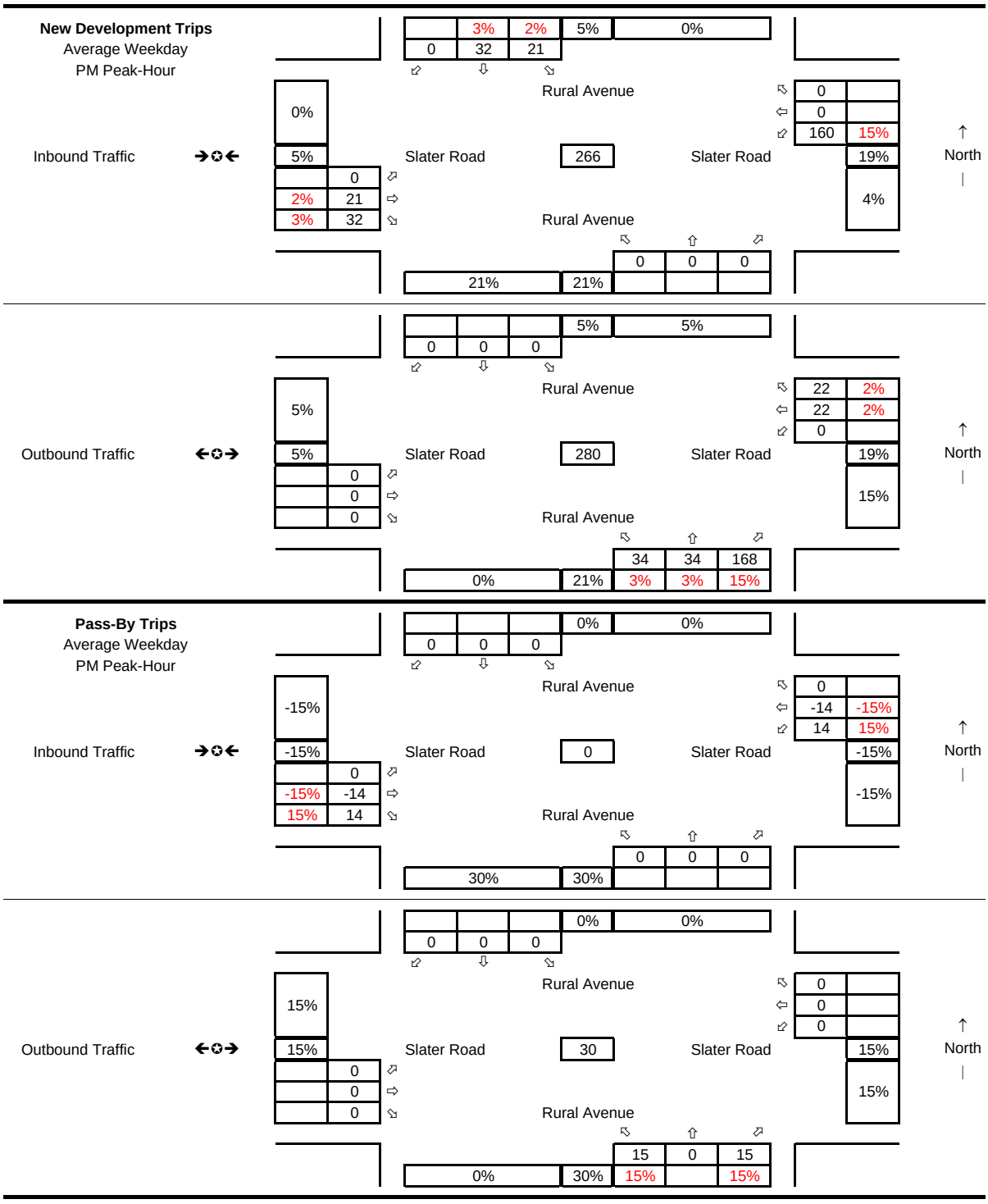


Future with Project
Average Weekday
PM Peak-Hour



Future Build-Out Volumes
with Kope Road Ext. and Realign

1 Slater Rd @ Rural Ave

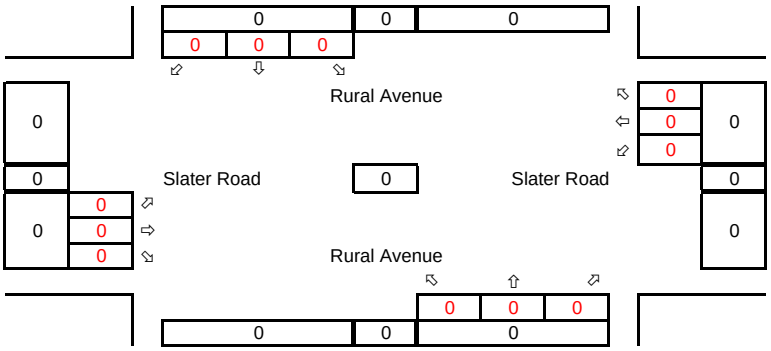


Future Build-Out Volumes
with Kope Road Ext. and Realign

1 Slater Rd @ Rural Ave

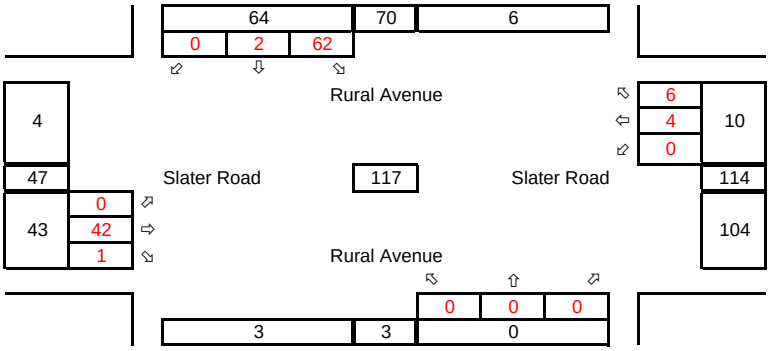
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
with Kope Road Ext. and Realign

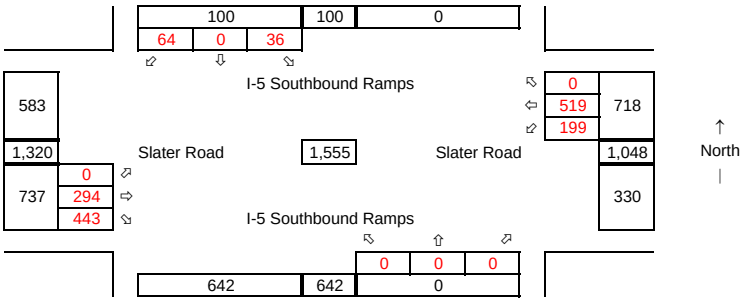
2 Slater Rd @ I-5 SB Ramps

Synchro ID: 2

Existing
Average Weekday
PM Peak-Hour

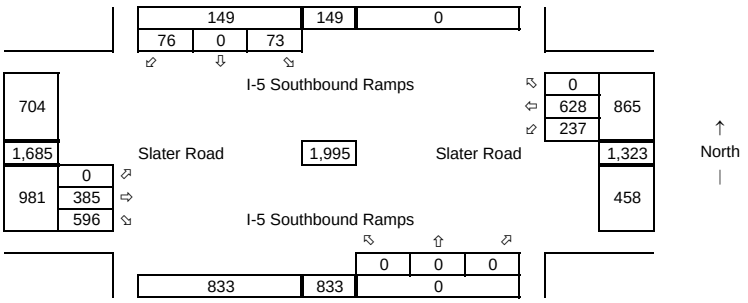
Year: **4/9/2013**

Data Source: **ATD**

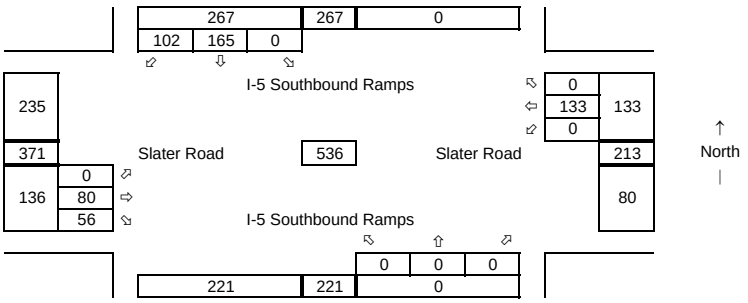


Future without Development
Average Weekday
PM Peak-Hour

Total Growth = 1.1900

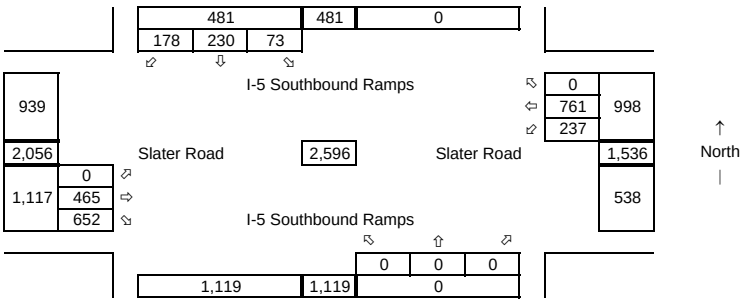


Total Project Trips
Average Weekday
PM Peak-Hour



Future with Project
Average Weekday
PM Peak-Hour

Includes Kope Road Trips



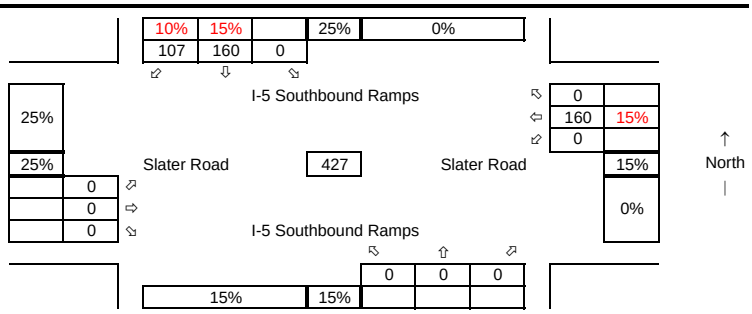
	%	Vol
EBR-SWT		75
WBL-SWT		401
NWL-WBT		80
NWR-EBT		481
NWR-SET		337

Future Build-Out Volumes
with Kope Road Ext. and Realign

2 Slater Rd @ I-5 SB Ramps

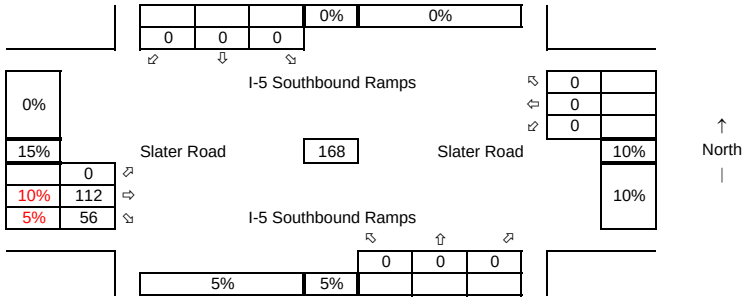
New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic



	%	Vol
EBR-SWT	4%	43
WBL-SWT	35%	373
NWL-WBT	0%	0
NWR-EBT	0%	0
NWR-SET	0%	0

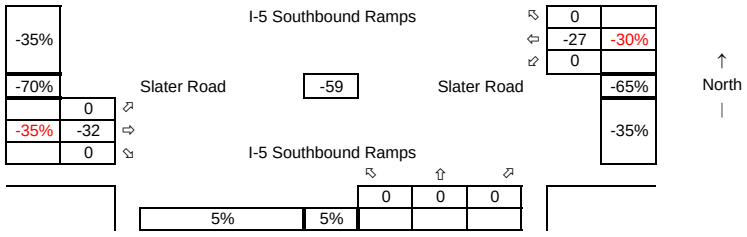
Outbound Traffic



	%	Vol
EBR-SWT	0%	0
WBL-SWT	0%	0
NWL-WBT	4%	45
NWR-EBT	30%	337
NWR-SET	30%	337

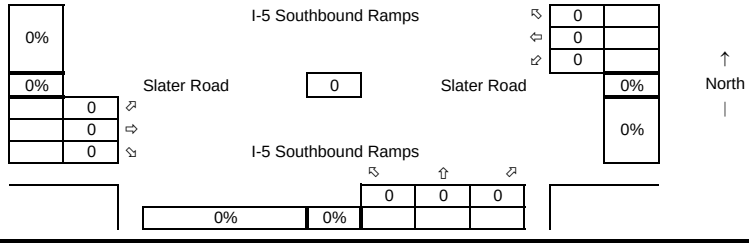
Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic



	%	Vol
EBR-SWT	35%	32
WBL-SWT	30%	27
NWL-WBT	0%	0
NWR-EBT	0%	0
NWR-SET	0%	0

Outbound Traffic



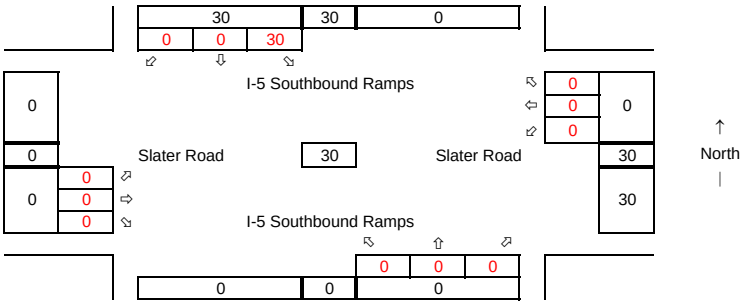
	%	Vol
EBR-SWT	0%	0
WBL-SWT	0%	0
NWL-WBT	35%	35
NWR-EBT	35%	35
NWR-SET	0%	0

Future Build-Out Volumes
with Kope Road Ext. and Realign

2 Slater Rd @ I-5 SB Ramps

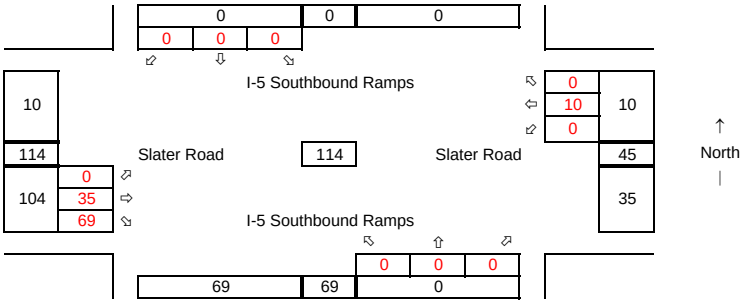
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
with Kope Road Ext. and Realign

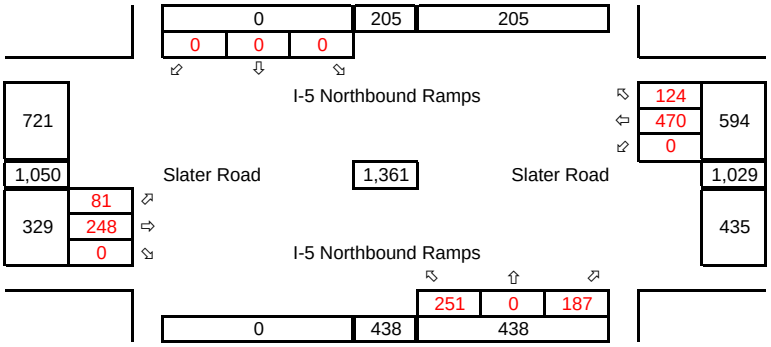
3 Slater Rd @ I-5 NB Ramps

Synchro ID: 3

Existing
Average Weekday
PM Peak-Hour

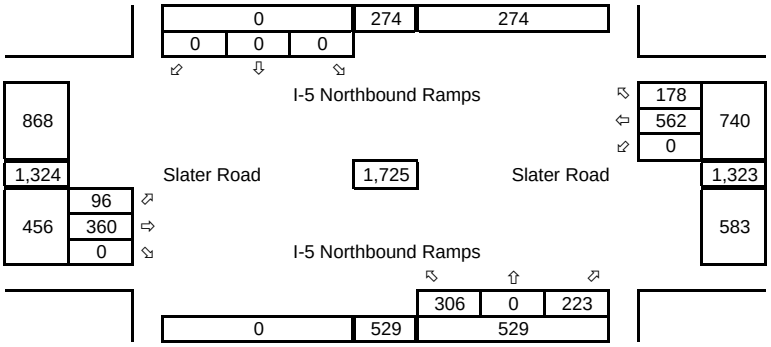
Year: **4/9/2013**

Data Source: **ATD**

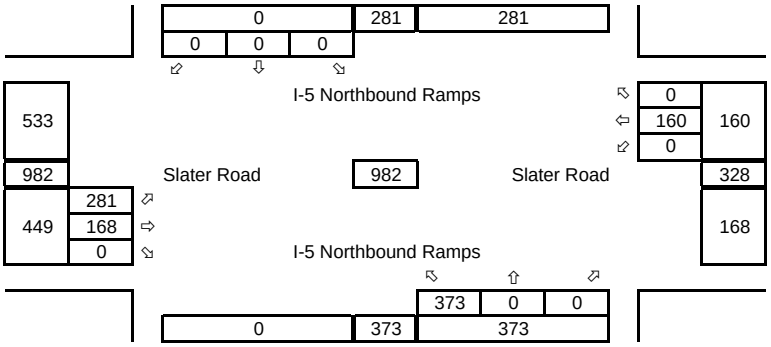


Future without Development
Average Weekday
PM Peak-Hour

Total Growth = 1.1900

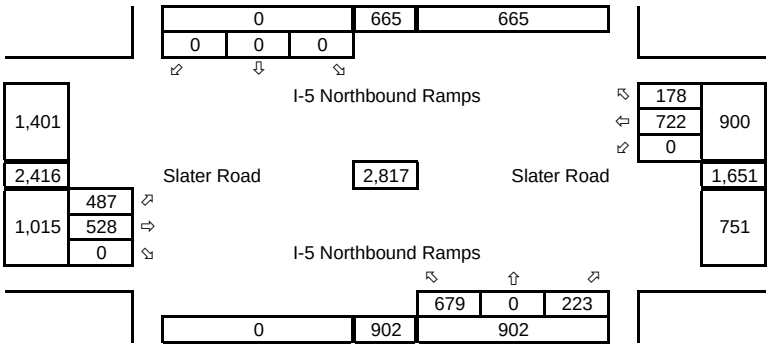


Total Project Trips
Average Weekday
PM Peak-Hour



Future with Project
Average Weekday
PM Peak-Hour

Includes Kope Road Trips

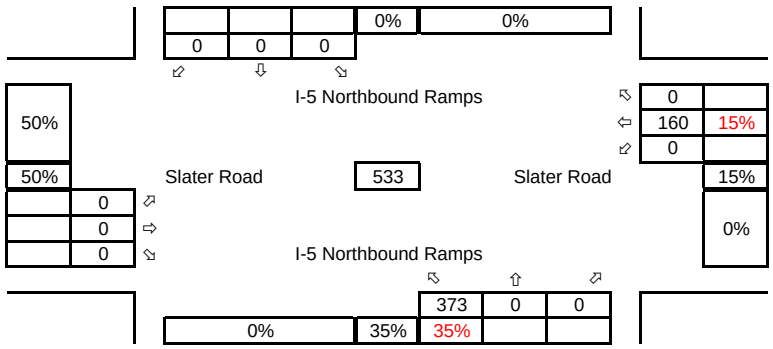


Future Build-Out Volumes
with Kope Road Ext. and Realign

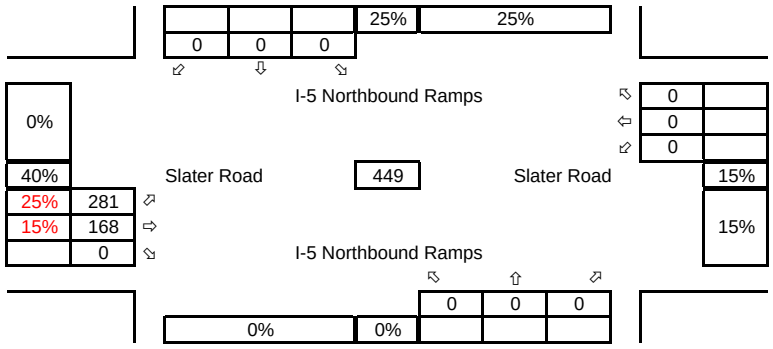
3 Slater Rd @ I-5 NB Ramps

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

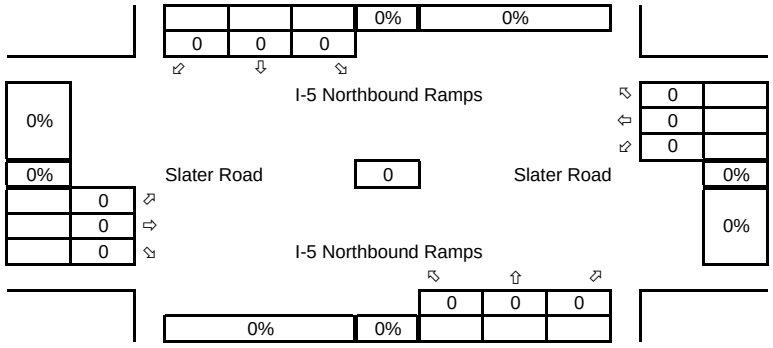


Outbound Traffic

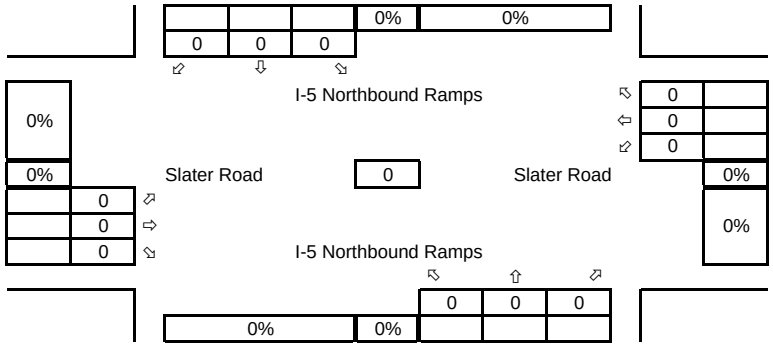


Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic



Outbound Traffic

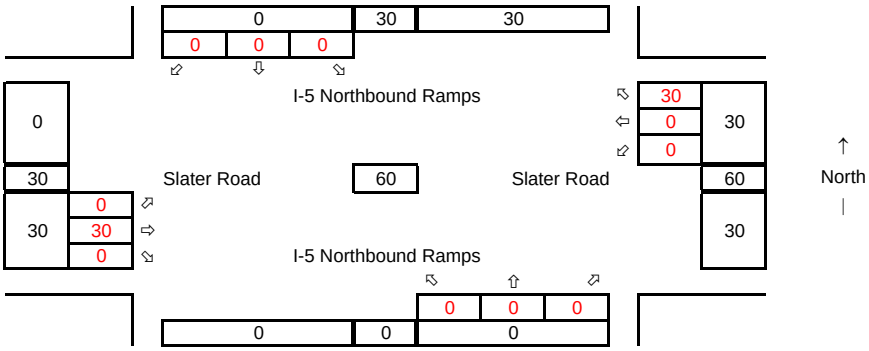


Future Build-Out Volumes
with Kope Road Ext. and Realign

3 Slater Rd @ I-5 NB Ramps

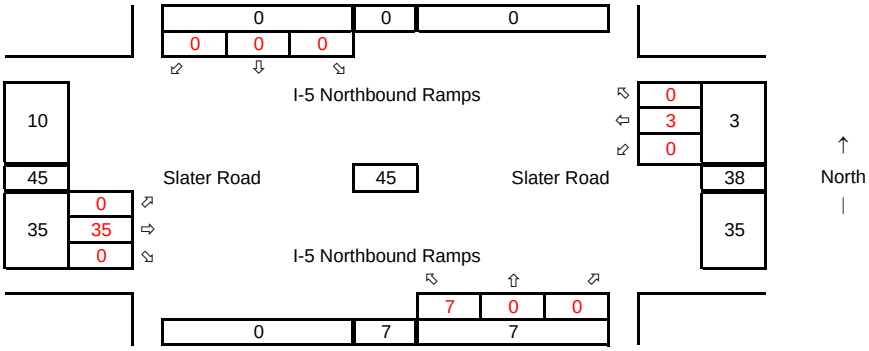
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Build-Out Volumes
with Kope Road Ext. and Realign

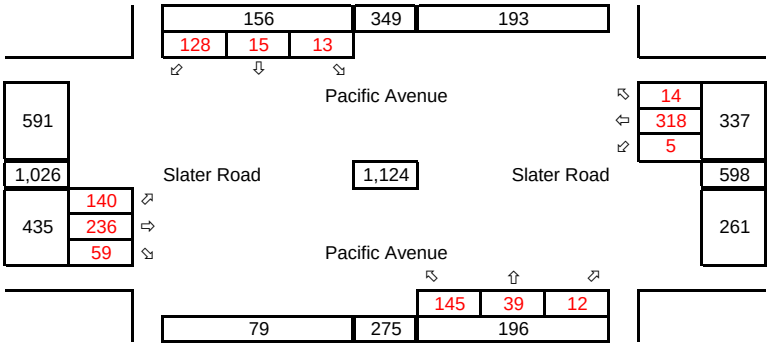
4 Slater Rd @ Pacific Ave

Synchro ID: 4

Existing
Average Weekday
PM Peak-Hour

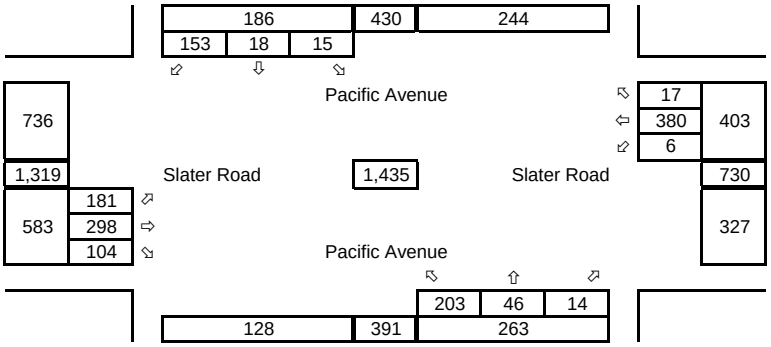
Year: **4/9/2013**

Data Source: **ATD**

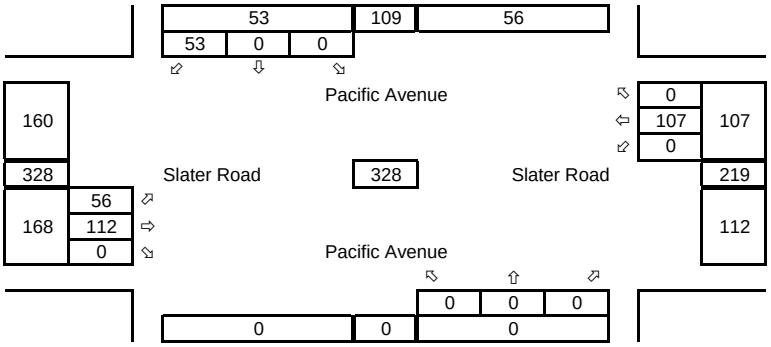


Future without Development
Average Weekday
PM Peak-Hour

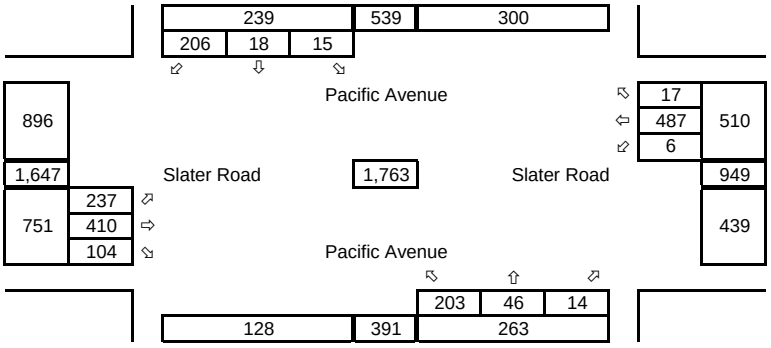
Total Growth = 1.1900



Total Project Trips
Average Weekday
PM Peak-Hour



Future with Project
Average Weekday
PM Peak-Hour

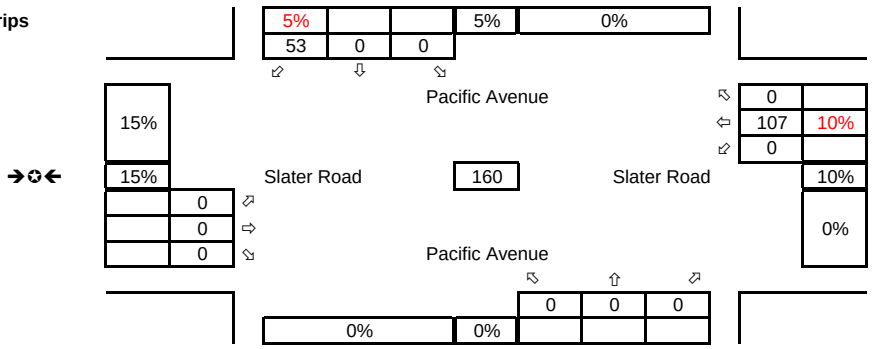


Future Build-Out Volumes
with Kope Road Ext. and Realign

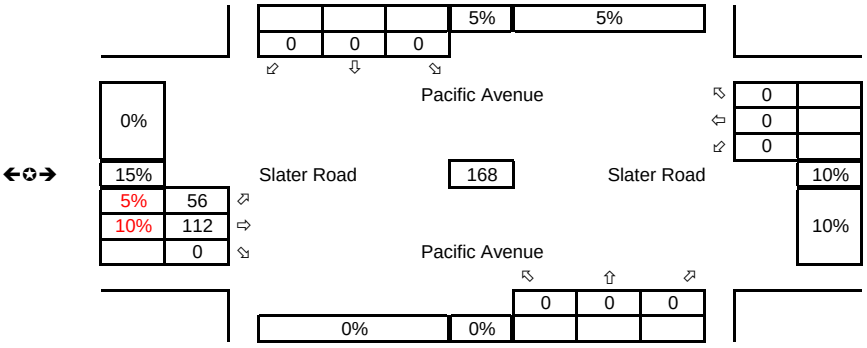
4 Slater Rd @ Pacific Ave

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

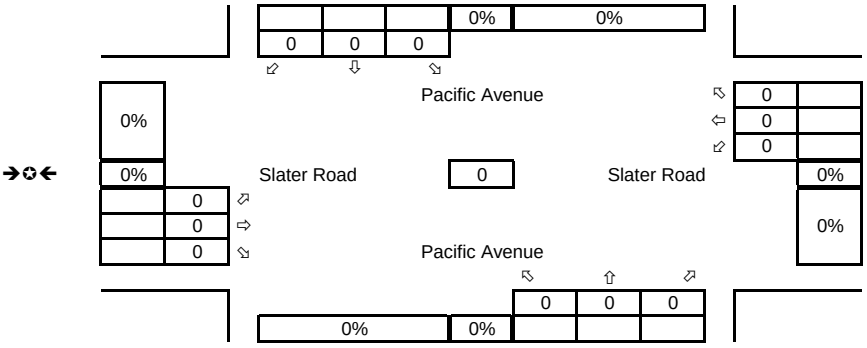


Outbound Traffic

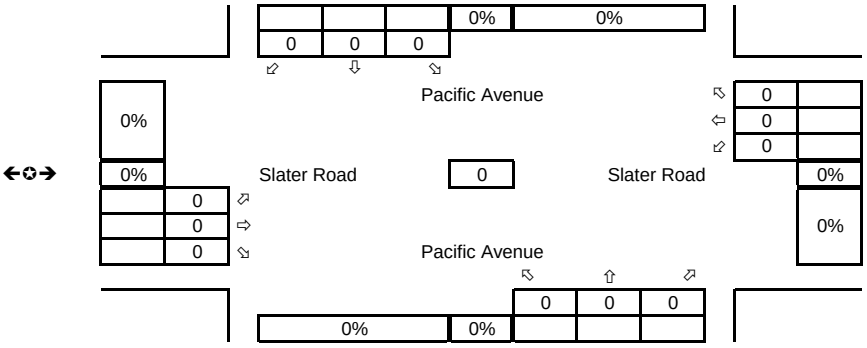


Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic



Outbound Traffic

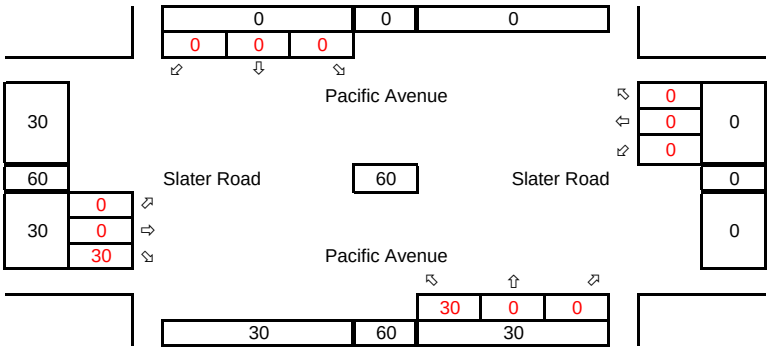


Future Build-Out Volumes
with Kope Road Ext. and Realign

4 Slater Rd @ Pacific Ave

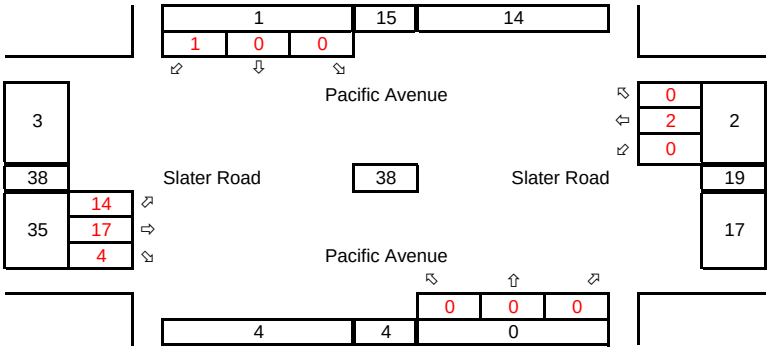
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



2013 Existing Level of Service Calculations

Lanes, Volumes, Timings
1: Rural Avenue & Slater Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	526	16	56	452	77	11	14	60	155	22	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		85	0		0	100		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996				0.850			0.850		0.946	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1837	0	1752	1845	1568	1752	1845	1568	1752	1745	0
Flt Permitted	0.418			0.269			0.734			0.748		
Satd. Flow (perm)	771	1837	0	496	1845	1568	1354	1845	1568	1380	1745	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				57			63		13	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		2005			1023			161			1887	
Travel Time (s)		39.1			19.9			3.1			36.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	23	554	17	59	476	81	12	15	63	163	23	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	571	0	59	476	81	12	15	63	163	36	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	5	2		1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.0	20.0		8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
Total Split (s)	8.0	75.0		10.0	77.0	77.0	35.0	35.0	35.0	35.0	35.0	
Total Split (%)	6.7%	62.5%		8.3%	64.2%	64.2%	29.2%	29.2%	29.2%	29.2%	29.2%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	None		None	None	None	Min	Min	Min	Min	Min	
Act Effct Green (s)	25.9	23.9		28.2	26.4	26.4	12.9	12.9	12.9	12.9	12.9	
Actuated g/C Ratio	0.51	0.47		0.55	0.52	0.52	0.25	0.25	0.25	0.25	0.25	
v/c Ratio	0.05	0.66		0.13	0.50	0.10	0.04	0.03	0.14	0.47	0.08	
Control Delay	5.1	15.8		5.4	10.8	4.0	19.9	19.7	7.5	25.3	15.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.1	15.8		5.4	10.8	4.0	19.9	19.7	7.5	25.3	15.6	
LOS	A	B		A	B	A	B	B	A	C	B	
Approach Delay		15.4			9.3			11.2			23.5	
Approach LOS		B			A			B			C	
Queue Length 50th (ft)	2	139		6	63	2	3	4	0	46	6	
Queue Length 95th (ft)	11	281		21	206	24	17	19	28	121	30	

Lanes, Volumes, Timings
1: Rural Avenue & Slater Road

Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1925			943			81			1807	
Turn Bay Length (ft)	100			100		85				100		
Base Capacity (vph)	481	1812		445	1829	1555	903	1231	1067	920	1168	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.05	0.32		0.13	0.26	0.05	0.01	0.01	0.06	0.18	0.03	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 50.9
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.66
Intersection Signal Delay: 13.7 — Intersection LOS: B
Intersection Capacity Utilization 57.2% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: Rural Avenue & Slater Road

2013 Existing Conditions
Gibson Traffic Consultants, Inc. [BJL 11-130]
PM Peak-Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	394	443	199	519	0	0	0	0	36	0	64
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	428	482	216	564	0	0	0	0	39	0	70
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												4
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1023										
pX, platoon unblocked				0.78			0.78	0.78	0.78	0.78	0.78	
vC, conflicting volume	564			428			1666	1666	669	1666	1425	564
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	564			126			1712	1712	435	1712	1404	564
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			81			100	100	100	18	100	87
cM capacity (veh/h)	1007			1139			41	57	485	47	88	525

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	910	780	109
Volume Left	0	216	39
Volume Right	482	0	70
cSH	1700	1139	132
Volume to Capacity	0.54	0.19	0.82
Queue Length 95th (ft)	0	17	127
Control Delay (s)	0.0	4.3	85.1
Lane LOS		A	F
Approach Delay (s)	0.0	4.3	85.1
Approach LOS			F

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	81	248	0	0	470	124	251	0	187	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	87	267	0	0	505	133	270	0	201	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									7			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	505			267			1013	946	267	1113	1013	572
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	505			267			1013	946	267	1113	1013	572
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	92			100			0	100	74	100	100	100
cM capacity (veh/h)	1054			1291			203	239	770	128	218	518

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	354	639	471
Volume Left	87	0	270
Volume Right	0	133	201
cSH	1054	1700	318
Volume to Capacity	0.08	0.38	1.48
Queue Length 95th (ft)	7	0	647
Control Delay (s)	2.8	0.0	262.4
Lane LOS	A		F
Approach Delay (s)	2.8	0.0	262.4
Approach LOS			F

Intersection Summary			
Average Delay	85.1		
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	140	236	59	5	318	14	145	39	12	13	15	128
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	154	259	65	5	349	15	159	43	13	14	16	141
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	365			324			1116	975	292	1002	1000	357
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	365			324			1116	975	292	1002	1000	357
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	87			100			0	80	98	91	92	80
cM capacity (veh/h)	1194			1236			124	218	747	166	211	687

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	478	370	215	171
Volume Left	154	5	159	14
Volume Right	65	15	13	141
cSH	1194	1236	144	465
Volume to Capacity	0.13	0.00	1.50	0.37
Queue Length 95th (ft)	11	0	363	42
Control Delay (s)	3.6	0.2	313.0	17.2
Lane LOS	A	A	F	C
Approach Delay (s)	3.6	0.2	313.0	17.2
Approach LOS			F	C

Intersection Summary			
Average Delay	58.4		
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

Future Build-Out Level of Service Calculations without Improvements

Lanes, Volumes, Timings
1: Rural Avenue & Slater Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	622	119	1020	552	98	84	73	1040	246	81	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		85	0		0	100		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976				0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1800	0	1752	1845	1568	1752	1845	1568	1752	1802	0
Flt Permitted	0.446			0.069			0.667			0.707		
Satd. Flow (perm)	823	1800	0	127	1845	1568	1230	1845	1568	1304	1802	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				61			381		7	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		2005			1023			161			1887	
Travel Time (s)		39.1			19.9			3.1			36.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	27	655	125	1074	581	103	88	77	1095	259	85	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	780	0	1074	581	103	88	77	1095	259	100	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	5	2		1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.0	20.0		8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
Total Split (s)	8.0	62.0		24.0	78.0	78.0	34.0	34.0	34.0	34.0	34.0	
Total Split (%)	6.7%	51.7%		20.0%	65.0%	65.0%	28.3%	28.3%	28.3%	28.3%	28.3%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	None		None	None	None	Min	Min	Min	Min	Min	
Act Effct Green (s)	56.7	52.7		76.8	72.2	72.2	30.1	30.1	30.1	30.1	30.1	
Actuated g/C Ratio	0.49	0.46		0.67	0.63	0.63	0.26	0.26	0.26	0.26	0.26	
v/c Ratio	0.06	0.94		2.92	0.50	0.10	0.27	0.16	1.58	0.76	0.21	
Control Delay	8.2	49.0		887.5	13.9	4.5	38.5	35.7	290.8	56.1	33.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	8.2	49.0		887.5	13.9	4.5	38.5	35.7	290.8	56.1	33.8	
LOS	A	D		F	B	A	D	D	F	E	C	
Approach Delay		47.7			547.0			257.6			49.9	
Approach LOS		D			F			F			D	
Queue Length 50th (ft)	6	527		~1408	236	12	55	47	~992	189	57	
Queue Length 95th (ft)	16	#788		#1667	327	34	104	88	#1253	#324	105	

Lanes, Volumes, Timings
1: Rural Avenue & Slater Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1925			943			81			1807	
Turn Bay Length (ft)	100			100		85				100		
Base Capacity (vph)	438	917		368	1195	1038	322	483	692	342	477	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.06	0.85		2.92	0.49	0.10	0.27	0.16	1.58	0.76	0.21	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 114.9
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 2.92
Intersection Signal Delay: 320.9 — Intersection LOS: F
Intersection Capacity Utilization 128.0% — ICU Level of Service H
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rural Avenue & Slater Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	890	1045	237	1268	0	0	0	0	73	0	343
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	967	1136	258	1378	0	0	0	0	79	0	373
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												4
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		1023										
pX, platoon unblocked				0.50			0.50	0.50	0.50	0.50	0.50	
vC, conflicting volume	1378			967			3429	3429	1535	3429	2861	1378
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1378			437			5351	5351	1571	5351	4217	1378
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			54			0	100	100	0	100	0
cM capacity (veh/h)	497			563			0	0	68	0	1	177

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	2103	1636	452
Volume Left	0	258	79
Volume Right	1136	0	373
cSH	1700	563	0
Volume to Capacity	1.24	0.46	1816.13
Queue Length 95th (ft)	0	60	Err
Control Delay (s)	0.0	16.7	Err
Lane LOS		C	F
Approach Delay (s)	0.0	16.7	Err
Approach LOS			F

Intersection Summary			
Average Delay	1085.2		
Intersection Capacity Utilization	204.7%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	377	584	0	0	775	178	733	0	223	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	405	628	0	0	833	191	788	0	240	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									7			
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	833			628			2368	2272	628	2488	2368	929
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	833			628			2368	2272	628	2488	2368	929
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	49			100			0	100	50	100	100	100
cM capacity (veh/h)	795			949			14	20	481	6	17	323

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1033	1025	1028
Volume Left	405	0	788
Volume Right	0	191	240
cSH	795	1700	19
Volume to Capacity	0.51	0.60	55.07
Queue Length 95th (ft)	74	0	Err
Control Delay (s)	12.5	0.0	Err
Lane LOS	B		F
Approach Delay (s)	12.5	0.0	Err
Approach LOS			F

Intersection Summary			
Average Delay	3334.9		
Intersection Capacity Utilization	153.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	237	410	160	6	487	17	256	46	14	15	18	206
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	260	451	176	7	535	19	281	51	15	16	20	226
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	554			626			1853	1626	538	1658	1705	545
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	554			626			1853	1626	538	1658	1705	545
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	74			99			0	33	97	43	71	58
cM capacity (veh/h)	1016			955			21	75	543	29	67	539

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	887	560	347	263
Volume Left	260	7	281	16
Volume Right	176	19	15	226
cSH	1016	955	24	204
Volume to Capacity	0.26	0.01	14.40	1.29
Queue Length 95th (ft)	26	1	Err	356
Control Delay (s)	5.7	0.2	Err	207.3
Lane LOS	A	A	F	F
Approach Delay (s)	5.7	0.2	Err	207.3
Approach LOS			F	F

Intersection Summary			
Average Delay	1716.8		
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		

Merge Analysis

Filename	default.txt
Created	########
Format	SPREADSHEET
Daily Average	Single-day (none)
Date(s) Selected	April 21-27, 2013
Period	1:00
Period Summation	Sum/Avg All, Sub Closest Good/Suspect for Bad

Element 005es26001:_MN_O_1 (Northbound On-Ramp)

Time	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00			
	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Sum	7-Day Average	1939.714
Sunday, April 21, 2013	51	48	32	24	18	7	20	23	39	48	79	76	116	114	149	107	120	101	91	64	91	55	49	38	1560	Weekday Average	2033.6
Monday, April 22, 2013	29	13	17	7	10	28	47	70	62	97	79	103	131	141	152	222	242	204	106	85	71	51	38	23	2028	4-5 PM Peak-Hour Average	235.4
Tuesday, April 23, 2013	23	16	8	8	9	26	40	62	95	66	84	107	120	134	151	238	229	190	110	60	77	53	38	31	1975	5-6 PM Peak-Hour Average	179.4
Wednesday, April 24, 2013	31	13	12	20	12	29	42	64	83	91	91	114	127	176	164	188	227	187	102	97	61	59	35	39	2064		
Thursday, April 25, 2013	29	11	13	7	15	22	34	67	71	64	73	107	148	138	168	202	244	159	115	87	73	78	42	43	2010		
Friday, April 26, 2013	21	22	16	8	19	18	40	56	81	88	100	117	117	144	159	226	235	157	110	80	80	68	74	55	2091		
Saturday, April 27, 2013	52	40	29	27	21	14	23	33	41	72	79	106	117	114	138	180	149	141	89	71	91	91	69	63	1850		

Element 005es26001:_MN_Stn (Mainline Northbound Between Ramps)

Time	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00			
	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Sum	7-Day Average	22270.86
Sunday, April 21, 2013	364	249	135	75	68	80	121	224	338	505	749	1015	1288	1472	1660	1803	1845	1909	1794	1457	1189	934	581	404	20259	Weekday Average	22516.6
Monday, April 22, 2013	216	126	67	81	123	429	715	907	881	721	891	1133	1220	1279	1503	1796	2127	2177	1499	1245	1122	900	524	293	21975	4-5 PM Peak-Hour Average	2041
Tuesday, April 23, 2013	204	105	61	72	140	399	716	928	843	795	818	983	1136	1285	1533	1747	1964	2104	1578	1187	1069	919	471	294	21351	5-6 PM Peak-Hour Average	2086.6
Wednesday, April 24, 2013	180	87	69	79	145	416	719	872	903	810	965	1065	1248	1387	1531	1754	2007	2104	1575	1286	1174	1022	482	285	22165		
Thursday, April 25, 2013	188	124	70	85	132	421	714	904	840	870	922	1179	1268	1459	1483	1836	2001	2029	1544	1240	1359	1040	604	367	22679		
Friday, April 26, 2013	219	124	90	81	117	264	569	876	845	860	967	1273	1377	1536	1789	1959	2106	2019	1673	1550	1408	1346	827	538	24413		
Saturday, April 27, 2013	342	185	111	93	70	135	262	556	961	787	1003	1242	1402	1538	1632	1820	1885	1778	1670	1497	1302	1242	957	584	23054		

Element 005es26001:_MN_X_1 (Northbound Off Ramp)

Time	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00			
	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Sum	7-Day Average	5456.286
Sunday, April 21, 2013	67	51	36	24	24	38	54	70	78	108	161	203	292	274	332	300	300	234	225	213	159	139	85	57	3524	Weekday Average	5960.2
Monday, April 22, 2013	51	31	19	21	54	152	369	352	337	293	292	385	363	345	380	446	440	524	305	214	201	138	90	48	5850	4-5 PM Peak-Hour Average	459.8
Tuesday, April 23, 2013	41	23	19	21	41	151	367	348	342	259	251	293	370	396	402	451	459	526	360	234	206	148	91	57	5856	5-6 PM Peak-Hour Average	513
Wednesday, April 24, 2013	41	19	16	21	56	145	382	343	322	278	274	311	310	362	394	433	462	500	333	261	194	167	84	65	5773		
Thursday, April 25, 2013	41	20	23	26	54	154	369	358	316	286	298	322	313	325	405	454	460	486	363	240	250	173	117	56	5909		
Friday, April 26, 2013	52	23	20	23	64	152	320	330	339	283	331	350	374	401	453	507	478	529	390	266	256	205	149	118	6413		
Saturday, April 27, 2013	48	49	26	28	35	79	94	126	161	243	283	310	359	344	374	383	409	317	269	269	221	193	154	95	4869		

Element 005es26001:_MS_O_1 (Southbound On-Ramp)

Time	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00			
	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Sum	7-Day Average	5907.286
Sunday, April 21, 2013	68	53	44	33	29	36	73	98	135	206	270	268	342	317	299	284	305	234	168	162	146	115	93	41	3819	Weekday Average	6491.4
Monday, April 22, 2013	42	24	20	29	41	117	257	456	419	388	381	318	381	362	411	536	693	561	304	209	174	95	89	58	6365	4-5 PM Peak-Hour Average	661.4
Tuesday, April 23, 2013	55	34	15	26	40	98	252	442	468	361	342	355	386	379	423	535	673	568	331	200	156	107	89	58	6393	5-6 PM Peak-Hour Average	542
Wednesday, April 24, 2013	39	28	29	27	32	124	254	439	476	380	323	368	346	363	429	513	678	541	285	202	166	106	81	73	6302		
Thursday, April 25, 2013	49	31	27	38	36	117	234	480	404	364	381	344	356	392	453	555	667	552	323	225	190	139	83	89	6529		
Friday, April 26, 2013	56	30	24	31	31	107	224	444	428	380	463	432	441	415	501	557	596	488	379	263	228	113	126	111	6868		
Saturday, April 27, 2013	90	44	45	40	39	55	101	179	215	308	422	369	403	405	376	345	375	306	252	176	158	141	123	108	5075		

Element 005es26001:_MS_Stn (Mainline Southbound Between Ramps)

Time	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00			
	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Sum	7-Day Average	23516.43
Sunday, April 21, 2013	170	85	62	82	98	206	302	535	950	1418	1689	1897	1887	1751	1645	1423	1327	1142	1050	854	655	472	330	180	20210	Weekday Average	23988
Monday, April 22, 2013	102	77	57	103	195	577	1034	1925	1708	1723	1604	1501	1416	1399	1298	1401	1642	1761	1191	755	531	336	220	164	22720	4-5 PM Peak-Hour Average	1697.8
Tuesday, April 23, 2013	117	71	70	102	205	516	1048	1939	1721	1710	1591	1613	1503	1392	1374	1378	1622	1684	1180	782	605	337	227	151	22938	5-6 PM Peak-Hour Average	1754.4
Wednesday, April 24, 2013	107	64	52	118	201	583	1078	1959	1764	1833	1655	1570	1530	1539	1459	1400	1688	1705	1177	862	630	372	258	175	23779		
Thursday, April 25, 2013	119	60	55	102	219	538	1079	1855	1820	1729	1575	1533	1561	1476	1597	1509	1724	1815	1227	859	577	410	294	188	23921		
Friday, April 26, 2013	142	70	64	115	205	514	1030	1758	1862	1938	1906	1885	1784	1750	1736	1700	1813	1807	1550	1091	728	539	358	237	26582		
Saturday, April 27, 2013	138	70	90	78	141	276	588	1081	1496	2033	2009	2051	2185	2135	1945	2030	1413	1269	1058	755	563	448	378	235	24465		

Element 005es26001:_MS_X_1 (Southbound Off-Ramp)

Time	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00			
	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Volume	Sum	7-Day Average	1704.429
Sunday, April 21, 2013	17	9	8	6	7	7	11	36	68	73	130	130	103	121	100	81	88	97	64	56	43	25	24	15	1319	Weekday Average	1793.8
Monday, April 22, 2013	4	6	5	2	4	48	79	131	113	127	135	149	158	132	153	147	118	121	61	65	42	38	16	15	1869	4-5 PM Peak-Hour Average	130.4
Tuesday, April 23, 2013	10	6	5	4	4	53	78	124	117	99	106	125	135	102	108	127	131	102	66	61	49	29	31	14	1686	5-6 PM Peak-Hour Average	116.6
Wednesday, April 24, 2013	6	5	9	7	7	49	73	125	110	115	116	102	127	128	104	112	140	119	91	51	28	38	22	12	1696		
Thursday, April 25, 2013	9	3	7	6	6	50	73	121	110	110	106	118	135	121	134	112	133	115	83	71	63	46	25	15	1772		
Friday, April 26, 2013	11	6	5	4	6	46	75	114	93	122	142	149	140	126	131	146	130	126	88	99	70	52	43	22	1946		
Saturday, April 27, 2013	16	8	3	9	5	24	36	53	57	97	127	139	129	129	134	144	123	113	75	60	63	39	45	15	1643		

STATE OF WASHINGTON - DEPARTMENT OF TRANSPORTATION
T R I P S S Y S T E M
PERMANENT TRAFFIC RECORDERS
ANNUAL AVERAGE DAILY TRAFFIC VOLUMES
URBAN STATIONS

RECORDER NUMBER		2003 AADT	2004 AADT	2005 AADT	2006 AADT	2007 AADT	2008 AADT	2009 AADT	2010 AADT	2011 AADT	2012 AADT
D1	BOTHWAYS	137751	139430	141573	141550	140836	135421	140520	142393	144000	145277
	NORTHBOUND	68912	69560	70665	70345	70241	67807	70848	72179	73048	73746
	SOUTHBOUND	68821	69903	70803	71030	70624	67822	69706	70126	71029	71776
D10	BOTHWAYS	101840	101588	101514	99397	99019	96635	97372	97870	93073	60221
	EASTBOUND	50536	50407	50412	49236	48965	47716	48080	48121	45805	29180
	WESTBOUND	51317	51181	51102	50162	50054	48919	49351	49795	47285	30999
D11	BOTHWAYS	97384	96575	*	*	*	*	*	*	*	*
	EASTBOUND	50127	50404	*	*	*	*	*	*	*	*
	WESTBOUND	47257	46171	*	*	45990	46810	*	*	*	*
D12	BOTHWAYS	25638	26371	26939	28456	30704	29968	31288	31955	31351	31084
	EASTBOUND	12790	13189	13482	14194	15284	14883	15590	15893	15590	15431
	WESTBOUND	12847	13182	13457	14262	15420	15086	15698	16013	15745	15654
D13	BOTHWAYS	57995	58179	59824	58113	57313	53764	54561	55738	52855	53849
	EASTBOUND	27971	27842	28529	27987	27492	25679	26370	27067	26496	26460
	WESTBOUND	30024	30337	31294	30126	29845	28084	28191	28671	26366	27402
D14	BOTHWAYS	56391	56703	57416	57721	59252	57185	57371	56053	54191	53963
	NORTHBOUND	28322	28615	29164	29268	30004	29181	28841	28369	27097	27126
	SOUTHBOUND	28069	28071	28252	28453	29248	28260	28434	27642	27094	26837
D3	BOTHWAYS	92539	91387	90949	90393	90339	87710	88733	88566	87978	86687
	EASTBOUND	46225	45912	45514	45514	45611	44041	44497	44232	44026	43520
	WESTBOUND	46372	45491	45435	44887	44729	43681	44258	44346	43987	43144
P04	BOTHWAYS	41023	42455	43690	45330	45635	44540	45544	47157	49041	50304
	NORTHBOUND	20182	20901	21512	22350	22539	21975	22432	23265	24163	24775
	SOUTHBOUND	20841	21554	22178	22980	23096	22566	23095	23900	24878	25535
P06	BOTHWAYS	*	35296	36897	38381	38341	36986	37838	38422	38064	37116
	EASTBOUND	*	17289	18060	18756	18724	18042	18444	18712	18452	17988
	WESTBOUND	*	18007	18837	19625	19618	18944	19394	19710	19578	19122
P07	BOTHWAYS	6158	6150	6033	6171	6138	*	5734	5984	5858	5506
	EASTBOUND	2920	2926	2831	2858	2915	*	2655	2755	2721	2521
	WESTBOUND	3239	3222	3203	3303	3249	*	3068	3225	3137	2990
P1	BOTHWAYS	175881	177439	179752	178615	179553	175610	181503	181677	181094	180159
	NORTHBOUND	86840	87749	89180	89111	89248	87703	90469	90270	89936	89579
	SOUTHBOUND	89198	89888	90641	89560	90305	87870	90963	91340	91145	90783
P19	BOTHWAYS	39842	40556	41957	43820	45402	45010	45644	46276	46566	46503
	EASTBOUND	19096	19470	20237	21417	22202	22059	22326	22652	22751	22661
	WESTBOUND	20746	21086	21720	22403	23199	22951	23359	23628	23856	23836

* NOT AVAILABLE

Location:	I-5 at Slater Road	
Type:	NB Merge	SB Merge
Mainline		
Lanes:	2	2
FFS (mph):	70	70
F_{hv}:	0.976	0.976
PHF:	0.93	0.93
F_p:	0.95	0.95
2013 Volume:	2,087	1,754
Growth Rate:	1.50%	1.50%
Years of Growth:	19	19
2032 Volume:	2,682	2,254
V_f:	3,110	2,615
Ramp		
Lanes:	1	1
FFS (mph):	35	35
F_{hv}:	0.985	0.985
PHF:	0.9	0.9
F_p:	0.95	0.95
Volume:	665	1,282
V_f:	790	1,520
V_{fo}:	3,900	4,135
Capacity		
Capacity:	4,800	4,800
Demand<Capacity:	Yes	Yes
Density & LOS		
Accel Length (ft):	800	800
D_R:	30.5	32.0
LOS:	D	D
Merge Area Speed		
S_R (mph):	60.1	61.1

Alternatives Level of Service Analysis

Lanes, Volumes, Timings
1: Rural Avenue & Slater Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	622	119	1020	496	98	119	73	1075	246	81	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	500		0	600		0	250		250	375		0
Storage Lanes	1		0	2		0	1		2	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.97	0.95	0.95	1.00	1.00	0.88	1.00	1.00	1.00
Frt		0.976			0.975				0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	3421	0	3400	3417	0	1752	1845	2760	1752	1802	0
Flt Permitted	0.950			0.950			0.692			0.950		
Satd. Flow (perm)	1752	3421	0	3400	3417	0	1277	1845	2760	1752	1802	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			27				933		7	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		2005			1023			1228			1887	
Travel Time (s)		39.1			19.9			23.9			36.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	27	655	125	1074	522	103	125	77	1132	259	85	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	780	0	1074	625	0	125	77	1132	259	100	0
Turn Type	Prot	NA		Prot	NA		pm+pt	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases							8		8			
Detector Phase	5	2		1	6		3	8	8	7	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.0	20.0		8.0	20.0		8.0	20.0	20.0	8.0	20.0	
Total Split (s)	10.0	31.0		43.0	64.0		10.0	24.0	24.0	22.0	36.0	
Total Split (%)	8.3%	25.8%		35.8%	53.3%		8.3%	20.0%	20.0%	18.3%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max		None	C-Max		None	Min	Min	None	Min	
Act Effct Green (s)	6.0	28.7		39.2	65.9		24.1	18.1	18.1	18.0	30.1	
Actuated g/C Ratio	0.05	0.24		0.33	0.55		0.20	0.15	0.15	0.15	0.25	
v/c Ratio	0.31	0.94		0.97	0.33		0.45	0.28	0.94	0.99	0.22	
Control Delay	64.8	64.0		55.4	20.2		37.0	46.9	23.8	104.1	33.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	64.8	64.0		55.4	20.2		37.0	46.9	23.8	104.1	33.6	
LOS	E	E		E	C		D	D	C	F	C	
Approach Delay		64.1			42.4			26.3			84.4	
Approach LOS		E			D			C			F	
Queue Length 50th (ft)	21	313		448	198		67	52	88	203	56	
Queue Length 95th (ft)	52	#452		#563	m203		115	99	#249	#375	103	

Lanes, Volumes, Timings
1: Rural Avenue & Slater Road

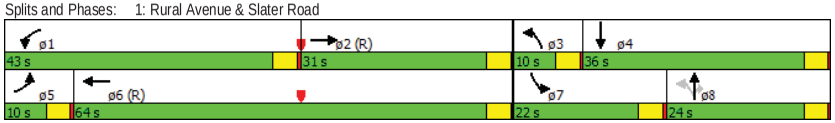
Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1925			943			1148			1807	
Turn Bay Length (ft)	500			600			250		250	375		
Base Capacity (vph)	88	831		1110	1888		280	307	1237	262	485	
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	
Reduced v/c Ratio	0.31	0.94		0.97	0.33		0.45	0.25	0.92	0.99	0.21	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 79 (66%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 45.1 — Intersection LOS: D
Intersection Capacity Utilization 82.2% — ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Rural Avenue & Slater Road



Future Build-Out Conditions - Signal Alternative
Gibson Traffic Consultants, Inc. [BJL 11-130]
PM Peak-Hour

Lanes, Volumes, Timings
2: I-5 Southbound Ramps & Slater Road

Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	890	1045	237	1268	0	0	0	0	73	0	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		600	350		0	0		0	0		400
Storage Lanes	0		1	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.950	0.850									0.850
Flt Protected				0.950							0.950	
Satd. Flow (prot)	0	3221	1441	1770	3539	0	0	0	0	0	1770	1583
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	0	3221	1441	1770	3539	0	0	0	0	0	1770	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		91	648									79
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1023			1059			1195			766	
Travel Time (s)		19.9			20.6			27.2			17.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	967	1136	258	1378	0	0	0	0	79	0	373
Shared Lane Traffic (%)			43%									
Lane Group Flow (vph)	0	1455	648	258	1378	0	0	0	0	0	79	373
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		2		1	6						4	
Permitted Phases			2							4		4
Detector Phase		2	2	1	6					4	4	4
Switch Phase												
Minimum Initial (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Minimum Split (s)		20.0	20.0	8.0	20.0					20.0	20.0	20.0
Total Split (s)		62.0	62.0	26.0	88.0					32.0	32.0	32.0
Total Split (%)		51.7%	51.7%	21.7%	73.3%					26.7%	26.7%	26.7%
Yellow Time (s)		3.5	3.5	3.5	3.5					3.5	3.5	3.5
All-Red Time (s)		0.5	0.5	0.5	0.5					0.5	0.5	0.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0						0.0	0.0
Total Lost Time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?		Yes	Yes	Yes								
Recall Mode		C-Max	C-Max	None	C-Max					Max	Max	Max
Act Effct Green (s)		59.6	59.6	20.4	84.0						28.0	28.0
Actuated g/C Ratio		0.50	0.50	0.17	0.70						0.23	0.23
v/c Ratio		0.89	0.62	0.86	0.56						0.19	0.87
Control Delay		23.8	4.3	73.9	2.5						38.5	56.1
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		23.8	4.3	73.9	2.5						38.5	56.1
LOS		C	A	E	A						D	E
Approach Delay		17.8			13.7						53.0	
Approach LOS		B			B						D	
Queue Length 50th (ft)		549	123	156	32						49	226
Queue Length 95th (ft)		m597	m170	m#314	35						93	#398
Internal Link Dist (ft)		943			979			1115			686	

Lanes, Volumes, Timings
2: I-5 Southbound Ramps & Slater Road

Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)			600	350								400
Base Capacity (vph)		1644	1041	324	2477						413	429
Starvation Cap Reductn		0	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.89	0.62	0.80	0.56						0.19	0.87

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 117 (98%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 20.0 — Intersection LOS: C
Intersection Capacity Utilization 70.3% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: I-5 Southbound Ramps & Slater Road

Future Build-Out Conditions - Signal Alternative
Gibson Traffic Consultants, Inc. [BJL 11-130]
PM Peak-Hour

Lanes, Volumes, Timings
3: I-5 Northbound Ramps & Slater Road

Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	377	584	0	0	775	178	733	0	223	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	0		0	400		400	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt						0.850			0.850			
Flt Protected	0.950						0.950	0.950				
Satd. Flow (prot)	3400	3505	0	0	3505	1568	1665	1665	1568	0	0	0
Flt Permitted	0.950						0.950	0.950				
Satd. Flow (perm)	3400	3505	0	0	3505	1568	1665	1665	1568	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						191			240			
Link Speed (mph)		35			35			30			30	
Link Distance (ft)		1059			402			990			987	
Travel Time (s)		20.6			7.8			22.5			22.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	405	628	0	0	833	191	788	0	240	0	0	0
Shared Lane Traffic (%)							50%					
Lane Group Flow (vph)	405	628	0	0	833	191	394	394	240	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			8				
Permitted Phases						6	8		8			
Detector Phase	5	2			6	6	8	8	8			
Switch Phase												
Minimum Initial (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Minimum Split (s)	8.0	20.0			20.0	20.0	20.0	20.0	20.0			
Total Split (s)	25.0	69.0			44.0	44.0	51.0	51.0	51.0			
Total Split (%)	20.8%	57.5%			36.7%	36.7%	42.5%	42.5%	42.5%			
Yellow Time (s)	3.5	3.5			3.5	3.5	3.5	3.5	3.5			
All-Red Time (s)	0.5	0.5			0.5	0.5	0.5	0.5	0.5			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	None			None	None	C-Max	C-Max	C-Max			
Act Effct Green (s)	18.7	58.4			35.7	35.7	53.6	53.6	53.6			
Actuated g/C Ratio	0.16	0.49			0.30	0.30	0.45	0.45	0.45			
v/c Ratio	0.77	0.37			0.80	0.32	0.53	0.53	0.29			
Control Delay	33.2	17.4			35.7	5.3	29.0	29.0	3.9			
Queue Delay	0.0	0.0			0.4	0.0	0.0	0.0	0.0			
Total Delay	33.2	17.4			36.1	5.3	29.0	29.0	3.9			
LOS	C	B			D	A	C	C	A			
Approach Delay		23.6			30.4			23.1				
Approach LOS		C			C			C				
Queue Length 50th (ft)	136	208			179	17	234	234	0			
Queue Length 95th (ft)	m155	m219			209	31	366	366	51			

Lanes, Volumes, Timings
3: I-5 Northbound Ramps & Slater Road

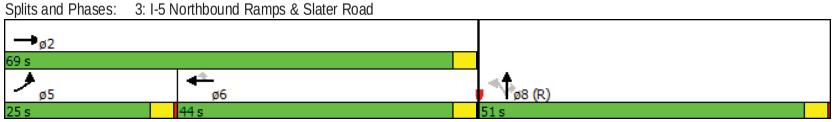
Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		979			322			910			907	
Turn Bay Length (ft)	200						400		400			
Base Capacity (vph)	595	1898			1168	650	743	743	833			
Starvation Cap Reductn	0	0			74	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.68	0.33			0.76	0.29	0.53	0.53	0.29			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 8:NBTL, Start of Green, Master Intersection
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 25.7 — Intersection LOS: C
Intersection Capacity Utilization 70.3% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: I-5 Northbound Ramps & Slater Road



Lanes, Volumes, Timings
4: Pacific Avenue & Slater Road

Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	237	410	160	6	487	17	256	46	14	15	18	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		0	300		0	250		0	100		0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.958			0.995			0.966				0.850
Flt Protected	0.950			0.950			0.950				0.978	
Satd. Flow (prot)	1770	3391	0	1770	3522	0	1770	1799	0	0	1822	1583
Flt Permitted	0.275			0.414			0.950				0.896	
Satd. Flow (perm)	512	3391	0	771	3522	0	1770	1799	0	0	1669	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66			3			15				226
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		402			3859			677			640	
Travel Time (s)		7.8			75.2			13.2			12.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	260	451	176	7	535	19	281	51	15	16	20	226
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	627	0	7	554	0	281	66	0	0	36	226
Turn Type	pm+pt	NA		Perm	NA		Prot	NA		Perm	NA	Perm
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6						4		4
Detector Phase	5	2		6	6		3	8		4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.0	20.0		20.0	20.0		8.0	20.0		20.0	20.0	20.0
Total Split (s)	27.0	62.0		35.0	35.0		35.0	58.0		23.0	23.0	23.0
Total Split (%)	22.5%	51.7%		29.2%	29.2%		29.2%	48.3%		19.2%	19.2%	19.2%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	C-Max		C-Max	C-Max		None	Max		Max	Max	Max
Act Effct Green (s)	58.0	58.0		37.7	37.7		24.0	54.0			26.0	26.0
Actuated g/C Ratio	0.48	0.48		0.31	0.31		0.20	0.45			0.22	0.22
v/c Ratio	0.62	0.37		0.03	0.50		0.79	0.08			0.10	0.44
Control Delay	13.1	4.9		31.8	36.0		61.5	15.2			41.8	8.5
Queue Delay	0.0	0.2		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	13.1	5.2		31.8	36.0		61.5	15.2			41.8	8.5
LOS	B	A		C	D		E	B			D	A
Approach Delay		7.5			36.0			52.7			13.1	
Approach LOS		A			D			D			B	
Queue Length 50th (ft)	31	25		4	182		208	22			23	0
Queue Length 95th (ft)	59	49		17	255		287	49			56	70
Internal Link Dist (ft)		322			3779			597			560	

Lanes, Volumes, Timings
4: Pacific Avenue & Slater Road

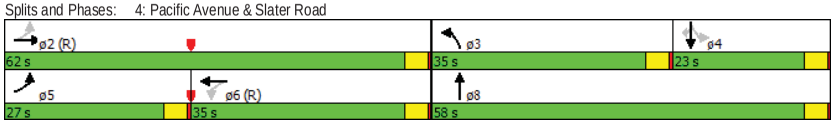
Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	200			300			250					
Base Capacity (vph)	488	1673		242	1108		457	817			361	519
Starvation Cap Reductn	0	420		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	6		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.53	0.50		0.03	0.50		0.61	0.08			0.10	0.44

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 85 (71%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.79
Intersection Signal Delay: 23.6 — Intersection LOS: C
Intersection Capacity Utilization 58.0% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 4: Pacific Avenue & Slater Road



Future Build-Out Conditions - Signal Alternative
Gibson Traffic Consultants, Inc. [BJL 11-130]
PM Peak-Hour

Lanes, Volumes, Timings
3: Slater Road & NB On-Ramp & NB Off-Ramp/SB Off-Ramp

Lane Group	EBL	EBR2	WBL	WBR2	NBL	NBT	NBR2	SBL	SBT	SBR2
Lane Configurations										
Volume (vph)	733	233	73	343	237	535	178	377	511	1045
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0		300			300		
Storage Lanes	2		1		1			2		
Taper Length (ft)	25		25		50			50		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt		0.850		0.850			0.850			0.850
Flt Protected	0.950		0.950		0.950			0.950		
Satd. Flow (prot)	3433	1583	1770	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.950		0.950		0.950			0.950		
Satd. Flow (perm)	3433	1583	1770	1583	1770	3539	1583	3433	3539	1583
Right Turn on Red		Yes		Yes			Yes			Yes
Satd. Flow (RTOR)		214		118			191			854
Link Speed (mph)						40			40	
Link Distance (ft)						3100			650	
Travel Time (s)						52.8			11.1	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	772	245	77	361	249	563	187	397	538	1100
Shared Lane Traffic (%)										
Lane Group Flow (vph)	772	245	77	361	249	563	187	397	538	1100
Turn Type	Prot	custom	Prot	custom	Prot	NA	Free	Prot	NA	Free
Protected Phases	4	5	8	1	5	2		1	6	
Permitted Phases							Free			Free
Detector Phase	4	5	8	1	5	2		1	6	
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	12.0	22.0	12.0	12.0	24.0		12.0	24.0	
Total Split (s)	43.0	35.0	43.0	41.0	35.0	36.0		41.0	42.0	
Total Split (%)	35.8%	29.2%	35.8%	34.2%	29.2%	30.0%		34.2%	35.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	8.0	8.0	8.0	8.0	8.0	8.0		8.0	8.0	
Lead/Lag		Lag		Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?		Yes		Yes	Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)	31.7	27.0	31.7	25.2	27.0	39.1	120.0	25.2	37.3	120.0
Actuated g/C Ratio	0.26	0.22	0.26	0.21	0.22	0.33	1.00	0.21	0.31	1.00
v/c Ratio	0.85	0.47	0.16	0.85	0.63	0.49	0.12	0.55	0.49	0.69
Control Delay	51.6	10.9	33.8	48.2	49.9	36.6	0.2	44.3	36.2	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.6	10.9	33.8	48.2	49.9	36.6	0.2	44.3	36.2	2.5
LOS	D	B	C	D	D	D	A	D	D	A
Approach Delay						33.1			19.6	
Approach LOS						C			B	
Queue Length 50th (ft)	289	19	45	186	175	187	0	141	180	0
Queue Length 95th (ft)	355	92	83	284	265	273	0	177	242	0
Internal Link Dist (ft)						3020			570	

Lanes, Volumes, Timings
3: Slater Road & NB On-Ramp & NB Off-Ramp/SB Off-Ramp

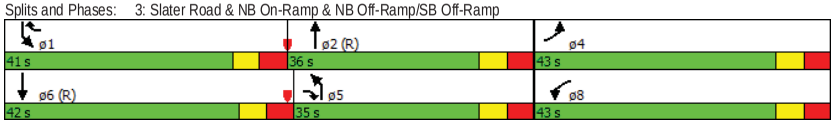
Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBR2	WBL	WBR2	NBL	NBT	NBR2	SBL	SBT	SBR2
Turn Bay Length (ft)		200		200	300		200	300		200
Base Capacity (vph)	1001	522	516	520	398	1153	1583	944	1099	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.47	0.15	0.69	0.63	0.49	0.12	0.42	0.49	0.69

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 30.2 Intersection LOS: C
Intersection Capacity Utilization 73.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Slater Road & NB On-Ramp & NB Off-Ramp/SB Off-Ramp



Future Build-Out Conditions - SPUI Alternative (rotated 90-deg cw) PM Peak-Hour
Gibson Traffic Consultants, Inc. [BJL 11-130]

Lane Group	EBT	EBR2	NWT	ø3	ø4
Lane Configurations					
Volume (vph)	890	1045	1268		
Ideal Flow (vphpl)	1900	1900	1900		
Lane Util. Factor	0.95	1.00	0.95		
Frt		0.850			
Flt Protected					
Satd. Flow (prot)	3539	1583	3539		
Flt Permitted					
Satd. Flow (perm)	3539	1583	3539		
Right Turn on Red		Yes			
Satd. Flow (RTOR)		1091			
Link Speed (mph)	30		30		
Link Distance (ft)	279		275		
Travel Time (s)	6.3		6.3		
Peak Hour Factor	0.92	0.92	0.92		
Adj. Flow (vph)	967	1136	1378		
Shared Lane Traffic (%)					
Lane Group Flow (vph)	967	1136	1378		
Turn Type	NA	Perm	NA		
Protected Phases	2		4 3	3	4
Permitted Phases		2			
Detector Phase	2	2	4 3		
Switch Phase					
Minimum Initial (s)	4.0	4.0		2.0	4.0
Minimum Split (s)	25.5	25.5		6.0	20.0
Total Split (s)	67.0	67.0		6.0	47.0
Total Split (%)	55.8%	55.8%		5%	39%
Yellow Time (s)	3.5	3.5		3.5	3.5
All-Red Time (s)	0.5	0.5		0.5	0.5
Lost Time Adjust (s)	0.0	0.0			
Total Lost Time (s)	4.0	4.0			
Lead/Lag				Lead	Lag
Lead-Lag Optimize?					
Recall Mode	C-Min	C-Min		None	None
Act Effct Green (s)	62.1	62.1	49.9		
Actuated g/C Ratio	0.52	0.52	0.42		
v/c Ratio	0.53	0.84	0.94		
Control Delay	20.7	8.8	38.0		
Queue Delay	0.0	0.0	0.0		
Total Delay	20.7	8.8	38.0		
LOS	C	A	D		
Approach Delay	14.3		38.0		
Approach LOS	B		D		
Queue Length 50th (ft)	257	17	238		
Queue Length 95th (ft)	306	153	#705		
Internal Link Dist (ft)	199		195		
Turn Bay Length (ft)					
Base Capacity (vph)	1890	1354	1626		
Starvation Cap Reductn	0	0	0		

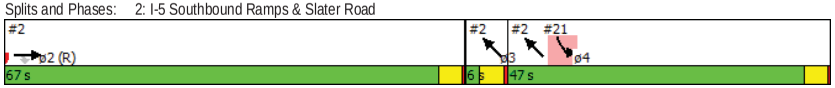
Lanes, Volumes, Timings
2: I-5 Southbound Ramps & Slater Road
Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBT	EBR2	NWT	ø3	ø4
Spillback Cap Reductn	0	0	0		
Storage Cap Reductn	0	0	0		
Reduced v/c Ratio	0.51	0.84	0.85		

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 111 (93%), Referenced to phase 2:EBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 23.7 — Intersection LOS: C
Intersection Capacity Utilization 68.0% — ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: I-5 Southbound Ramps & Slater Road



Future Build-Out Conditions - Div. Diamond Alternative
Gibson Traffic Consultants, Inc. [BJL 11-130]
PM Peak-Hour

Lanes, Volumes, Timings
3: Slater Road

Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	0	0	0	0	584	0	0	775	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	0	0	0	3539	0	0	3539	0	0	0	0
Flt Permitted												
Satd. Flow (perm)	0	0	0	0	3539	0	0	3539	0	0	0	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		141			148			126			147	
Travel Time (s)		3.2			3.4			2.9			3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	635	0	0	842	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	635	0	0	842	0	0	0	0
Turn Type					NA			NA				
Protected Phases					2			4 3				
Permitted Phases												
Detector Phase					2			4 3				
Switch Phase												
Minimum Initial (s)					4.0							
Minimum Split (s)					20.0							
Total Split (s)					52.0							
Total Split (%)					43.3%							
Yellow Time (s)					3.5							
All-Red Time (s)					0.5							
Lost Time Adjust (s)					0.0							
Total Lost Time (s)					4.0							
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode					C-Min							
Act Effct Green (s)					45.4			66.6				
Actuated g/C Ratio					0.38			0.56				
v/c Ratio					0.47			0.43				
Control Delay					29.7			17.7				
Queue Delay					0.0			0.0				
Total Delay					29.7			17.7				
LOS					C			B				
Approach Delay					29.7			17.7				
Approach LOS					C			B				
Queue Length 50th (ft)					212			243				
Queue Length 95th (ft)					260			326				
Internal Link Dist (ft)		61			68			46			67	
Turn Bay Length (ft)												
Base Capacity (vph)					1451			2528				
Starvation Cap Reductn					0			0				

Lanes, Volumes, Timings
3: Slater Road

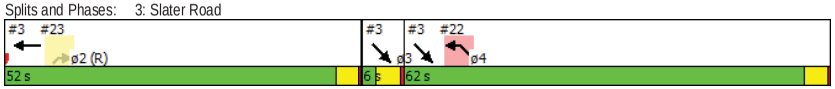
Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Spillback Cap Reductn					0			0				
Storage Cap Reductn					0			0				
Reduced v/c Ratio					0.44			0.33				

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:WBT, Start of Green, Master Intersection
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 22.9 — Intersection LOS: C
Intersection Capacity Utilization 44.2% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Slater Road



Future Build-Out Conditions - Div. Diamond Alternative
Gibson Traffic Consultants, Inc. [BJL 11-130]
PM Peak-Hour

Lanes, Volumes, Timings
4: Pacific Avenue & Slater Road

Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Volume (vph)	237	410	160	6	487	17	256	46	14	15	18	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	220		0	250	500		0		0	0		
Storage Lanes	1		0	1	1		1		0	1		
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.76	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.958				0.850		0.965			0.862	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3391	0	1770	4247	1583	1770	1798	0	1770	1606	0
Flt Permitted	0.950			0.950			0.478			0.715		
Satd. Flow (perm)	1770	3391	0	1770	4247	1583	890	1798	0	1332	1606	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53				82		15			224	
Link Speed (mph)		30						30			30	
Link Distance (ft)		339						801			792	
Travel Time (s)		7.7						18.2			18.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	258	446	174	7	529	18	278	50	15	16	20	224
Shared Lane Traffic (%)												
Lane Group Flow (vph)	258	620	0	7	529	18	278	65	0	16	244	0
Turn Type	pm+pt	NA		Prot	custom	custom	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2					6	8			4		
Detector Phase	5	2		1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Minimum Split (s)	8.0	20.0		8.0	20.0	20.0	20.0	20.0		20.0	20.0	
Total Split (s)	20.0	46.0		8.0	34.0	34.0	66.0	66.0		66.0	66.0	
Total Split (%)	16.7%	38.3%		6.7%	28.3%	28.3%	55.0%	55.0%		55.0%	55.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5		0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max		None	C-Max	C-Max	Min	Min		Min	Min	
Act Effct Green (s)	72.0	69.7		6.1	53.5	53.5	40.0	40.0		40.0	40.0	
Actuated g/C Ratio	0.60	0.58		0.05	0.45	0.45	0.33	0.33		0.33	0.33	
v/c Ratio	0.24	0.31		0.08	0.28	0.02	0.94	0.11		0.04	0.36	
Control Delay	4.7	5.6		55.7	24.9	0.1	75.7	18.6		21.9	5.2	
Queue Delay	0.7	0.4		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	5.4	6.0		55.7	24.9	0.1	75.7	18.6		21.9	5.2	
LOS	A	A		E	C	A	E	B		C	A	
Approach Delay		5.8						64.9			6.3	
Approach LOS		A						E			A	
Queue Length 50th (ft)	22	18		5	110	0	207	26		8	10	
Queue Length 95th (ft)	71	260		21	198	0	279	48		20	55	
Internal Link Dist (ft)		259						721			712	

Lanes, Volumes, Timings
4: Pacific Avenue & Slater Road

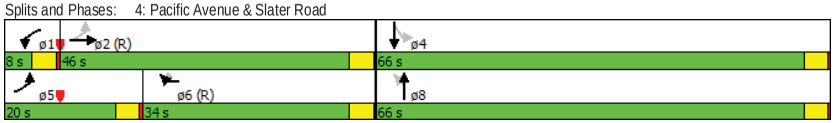
Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2
Turn Bay Length (ft)	220			250	500	500						
Base Capacity (vph)	1061	1992		90	1894	751	459	936		688	938	
Starvation Cap Reductn	506	806		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.46	0.52		0.08	0.28	0.02	0.61	0.07		0.02	0.26	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 67 (56%), Referenced to phase 2:EBTL and 6:WBR, Start of 1st Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 20.9 — Intersection LOS: C
Intersection Capacity Utilization 65.7% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 4: Pacific Avenue & Slater Road



Future Build-Out Conditions - Div. Diamond Alternative
Gibson Traffic Consultants, Inc. [BJL 11-130]
PM Peak-Hour

Lanes, Volumes, Timings
21: Slater Road & I-5 Southbound Ramps

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø2	ø3
Lane Configurations								
Volume (vph)	0	890	0	0	73	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.97	1.00		
Frt								
Flt Protected					0.950			
Satd. Flow (prot)	0	3539	0	0	3433	0		
Flt Permitted					0.950			
Satd. Flow (perm)	0	3539	0	0	3433	0		
Right Turn on Red				Yes	No	Yes		
Satd. Flow (RTOR)								
Link Speed (mph)		30	30		30			
Link Distance (ft)		187	306		175			
Travel Time (s)		4.3	7.0		4.0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	0	967	0	0	79	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	967	0	0	79	0		
Turn Type		NA			NA			
Protected Phases		Free!			4!		2	3
Permitted Phases								
Detector Phase					4			
Switch Phase								
Minimum Initial (s)					4.0		4.0	2.0
Minimum Split (s)					20.0		25.5	6.0
Total Split (s)					47.0		67.0	6.0
Total Split (%)					39.2%		56%	5%
Yellow Time (s)					3.5		3.5	3.5
All-Red Time (s)					0.5		0.5	0.5
Lost Time Adjust (s)					0.0			
Total Lost Time (s)					4.0			
Lead/Lag					Lag			Lead
Lead-Lag Optimize?								
Recall Mode					None		C-Min	None
Act Effct Green (s)		120.0			37.8			
Actuated g/C Ratio		1.00			0.32			
v/c Ratio		0.27			0.07			
Control Delay		0.2			26.5			
Queue Delay		0.0			0.0			
Total Delay		0.2			26.5			
LOS		A			C			
Approach Delay		0.2			26.5			
Approach LOS		A			C			
Queue Length 50th (ft)		0			20			
Queue Length 95th (ft)		0			38			
Internal Link Dist (ft)		107	226		95			
Turn Bay Length (ft)								
Base Capacity (vph)		3539			1230			
Starvation Cap Reductn		0			0			

Lanes, Volumes, Timings
21: Slater Road & I-5 Southbound Ramps

Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	ø2	ø3
Spillback Cap Reductn		0			0			
Storage Cap Reductn		0			0			
Reduced v/c Ratio		0.27			0.06			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 111 (93%), Referenced to phase 2:EBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 2.2 — Intersection LOS: A
Intersection Capacity Utilization 34.6% — ICU Level of Service A
Analysis Period (min) 15
! Phase conflict between lane groups.

Splits and Phases: 21: Slater Road & I-5 Southbound Ramps

Future Build-Out Conditions - Div. Diamond Alternative
Gibson Traffic Consultants, Inc. [BJL 11-130]
PM Peak-Hour

Lanes, Volumes, Timings
22: I-5 Northbound Ramps & Slater Road

Lane Group	EBT	EBR	WBL	WBT	NWL	NWR	ø2	ø3
Lane Configurations								
Volume (vph)	0	0	0	775	733	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	1.00		
Frt								
Flt Protected					0.950			
Satd. Flow (prot)	0	0	0	3539	3433	0		
Flt Permitted					0.950			
Satd. Flow (perm)	0	0	0	3539	3433	0		
Right Turn on Red		Yes			No	Yes		
Satd. Flow (RTOR)								
Link Speed (mph)	30			30	30			
Link Distance (ft)	200			141	187			
Travel Time (s)	4.5			3.2	4.3			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	0	0	0	842	797	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	0	0	0	842	797	0		
Turn Type				NA	NA			
Protected Phases				Free!	4!		2	3
Permitted Phases								
Detector Phase					4			
Switch Phase								
Minimum Initial (s)					4.0		4.0	2.0
Minimum Split (s)					20.0		20.0	6.0
Total Split (s)					62.0		52.0	6.0
Total Split (%)					51.7%		43%	5%
Yellow Time (s)					3.5		3.5	3.5
All-Red Time (s)					0.5		0.5	0.5
Lost Time Adjust (s)					0.0			
Total Lost Time (s)					4.0			
Lead/Lag					Lag			Lead
Lead-Lag Optimize?								
Recall Mode					None		C-Min	Min
Act Effct Green (s)				120.0	38.9			
Actuated g/C Ratio				1.00	0.32			
v/c Ratio				0.24	0.72			
Control Delay				0.5	39.0			
Queue Delay				0.0	0.2			
Total Delay				0.5	39.2			
LOS				A	D			
Approach Delay				0.5	39.2			
Approach LOS				A	D			
Queue Length 50th (ft)				6	278			
Queue Length 95th (ft)				0	306			
Internal Link Dist (ft)	120			61	107			
Turn Bay Length (ft)								
Base Capacity (vph)				3539	1659			
Starvation Cap Reductn				0	0			

Lanes, Volumes, Timings
22: I-5 Northbound Ramps & Slater Road

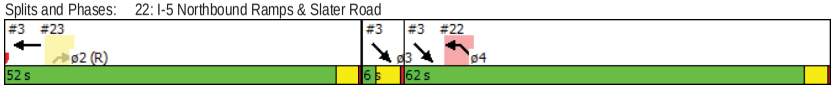
Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBT	EBR	WBL	WBT	NWL	NWR	ø2	ø3
Spillback Cap Reductn				246	238			
Storage Cap Reductn				0	0			
Reduced v/c Ratio				0.26	0.56			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:WBT, Start of Green, Master Intersection
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 19.3 — Intersection LOS: B
Intersection Capacity Utilization 75.0% — ICU Level of Service D
Analysis Period (min) 15
! Phase conflict between lane groups.

Splits and Phases: 22: I-5 Northbound Ramps & Slater Road



Future Build-Out Conditions - Div. Diamond Alternative
Gibson Traffic Consultants, Inc. [BJL 11-130]
PM Peak-Hour

Lanes, Volumes, Timings
23: I-5 Northbound Ramps & Slater Road

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	ø3	ø4
Lane Configurations								
Volume (vph)	584	0	0	0	0	223		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	0.88		
Frt						0.850		
Flt Protected								
Satd. Flow (prot)	3539	0	0	0	0	2787		
Flt Permitted								
Satd. Flow (perm)	3539	0	0	0	0	2787		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)						848		
Link Speed (mph)	30			30	30			
Link Distance (ft)	147			339	207			
Travel Time (s)	3.3			7.7	4.7			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	635	0	0	0	0	242		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	635	0	0	0	0	242		
Turn Type	NA					custom		
Protected Phases	Free						3	4
Permitted Phases						2		
Detector Phase	3					2		
Switch Phase								
Minimum Initial (s)						4.0	2.0	4.0
Minimum Split (s)						20.0	6.0	20.0
Total Split (s)						52.0	6.0	62.0
Total Split (%)						43.3%	5%	52%
Yellow Time (s)						3.5	3.5	3.5
All-Red Time (s)						0.5	0.5	0.5
Lost Time Adjust (s)						0.0		
Total Lost Time (s)						4.0		
Lead/Lag							Lead	Lag
Lead-Lag Optimize?								
Recall Mode						C-Min	Min	None
Act Effct Green (s)	120.0					45.4		
Actuated g/C Ratio	1.00					0.38		
v/c Ratio	0.18					0.15		
Control Delay	0.1					0.2		
Queue Delay	0.0					0.0		
Total Delay	0.1					0.2		
LOS	A					A		
Approach Delay	0.1							
Approach LOS	A							
Queue Length 50th (ft)	0					0		
Queue Length 95th (ft)	0					0		
Internal Link Dist (ft)	67			259	127			
Turn Bay Length (ft)								
Base Capacity (vph)	3539					1643		
Starvation Cap Reductn	0					0		

Lanes, Volumes, Timings
23: I-5 Northbound Ramps & Slater Road

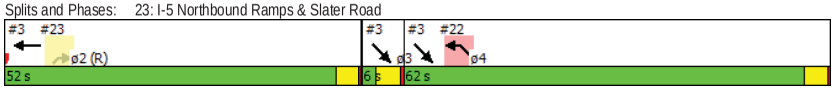
Slater Road Corridor Report & Pre. Int. Jus. Eval.

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	ø3	ø4
Spillback Cap Reductn	0					0		
Storage Cap Reductn	0					0		
Reduced v/c Ratio	0.18					0.15		

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:WBT, Start of Green, Master Intersection
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 0.1 — Intersection LOS: A
Intersection Capacity Utilization 44.2% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 23: I-5 Northbound Ramps & Slater Road



Future Build-Out Conditions - Div. Diamond Alternative
Gibson Traffic Consultants, Inc. [BJL 11-130]
PM Peak-Hour

Future Interim Level of Service Analysis

Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

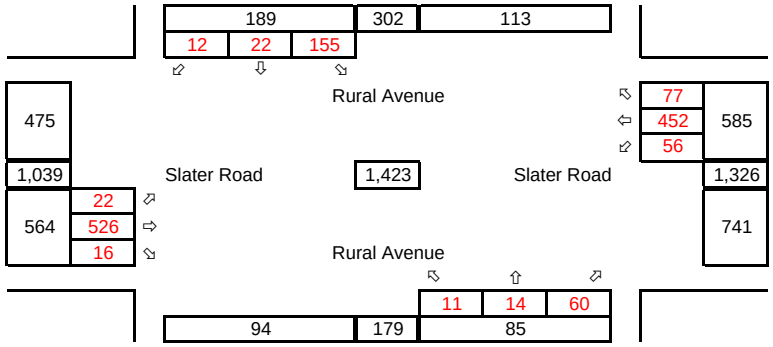
1 Slater Rd @ Rural Ave

Synchro ID: 1

Existing
Average Weekday
PM Peak-Hour

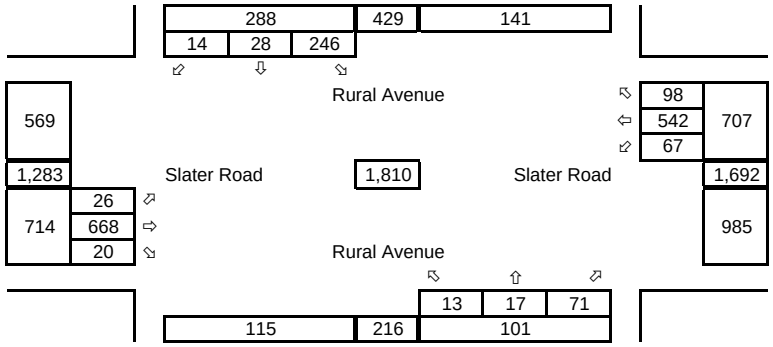
Year: **4/9/2013**

Data Source: **ATD**

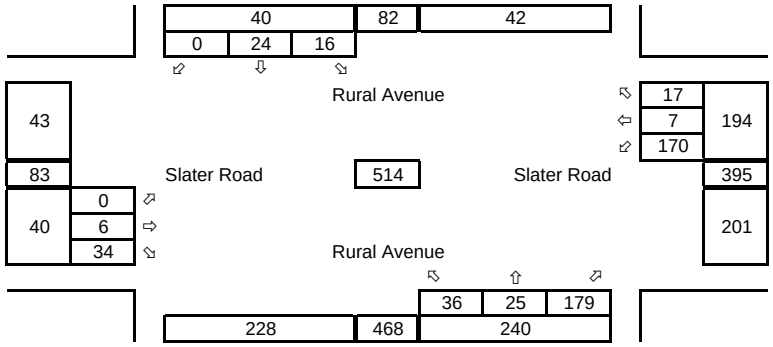


Future without Development
Average Weekday
PM Peak-Hour

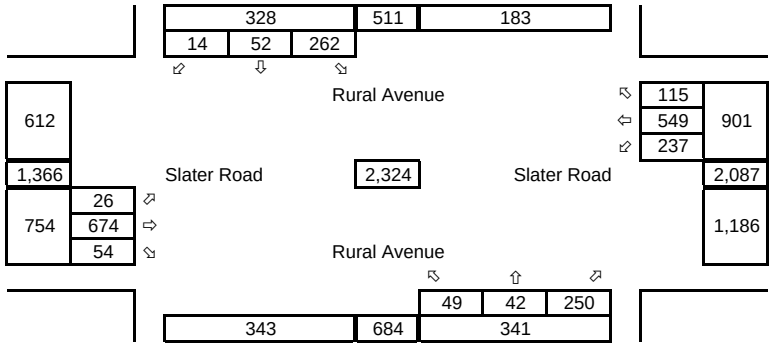
Year: 2032
Growth Rate = 1.0%
Years of Growth = 19
Total Growth = 1.1900



Total Project Trips
Average Weekday
PM Peak-Hour

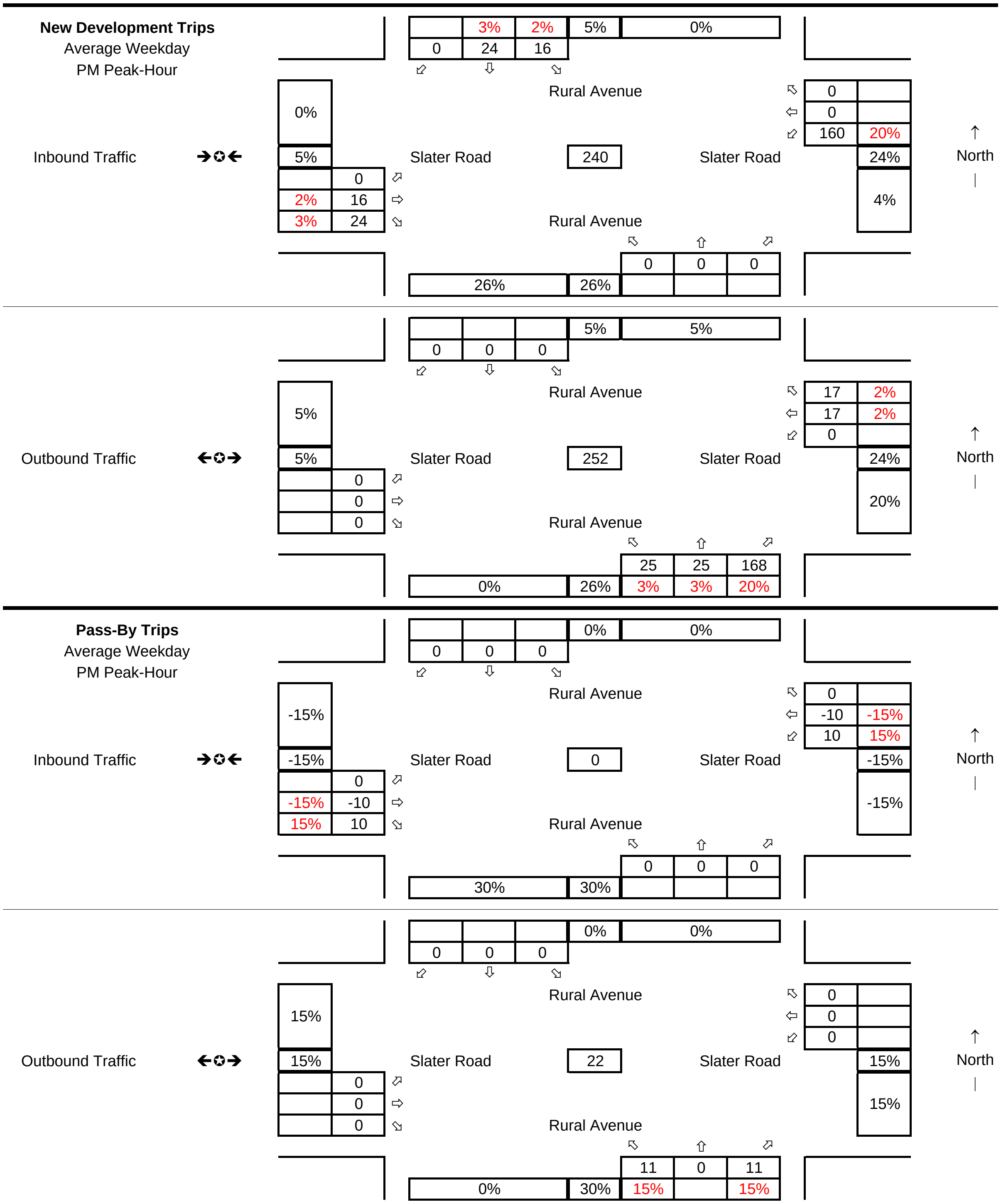


Future with Project
Average Weekday
PM Peak-Hour



Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

1 Slater Rd @ Rural Ave

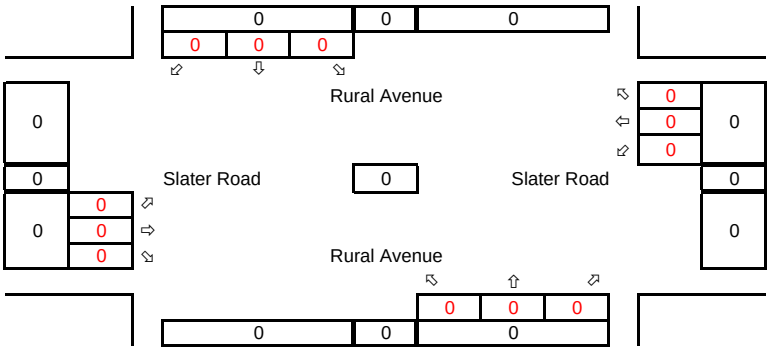


Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

1 Slater Rd @ Rural Ave

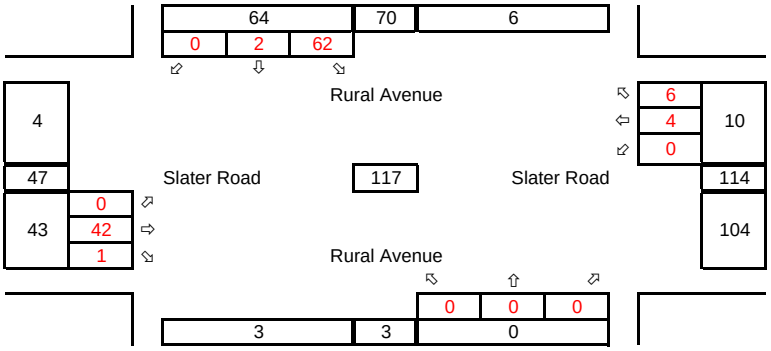
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

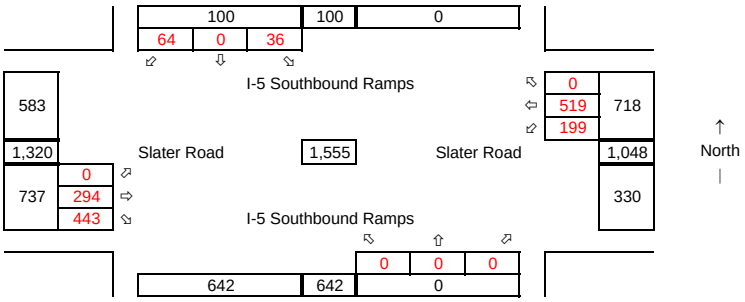
2 Slater Rd @ I-5 SB Ramps

Synchro ID: 2

Existing
Average Weekday
PM Peak-Hour

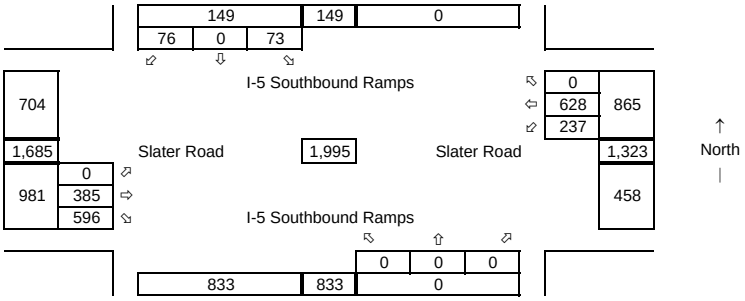
Year: **4/9/2013**

Data Source: **ATD**

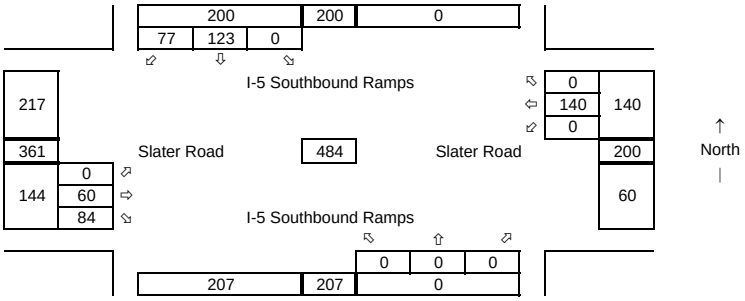


Future without Development
Average Weekday
PM Peak-Hour

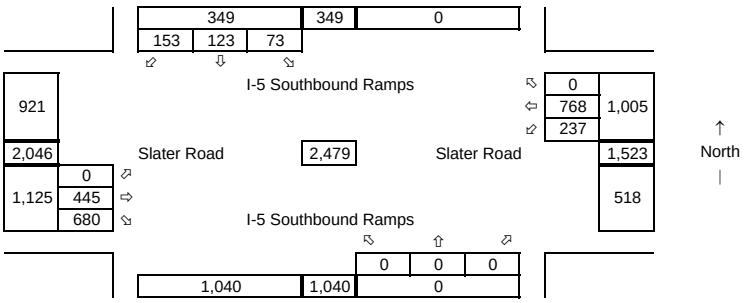
Year: 2032
Growth Rate = 1.0%
Years of Growth = 19
Total Growth = 1.1900



Total Project Trips
Average Weekday
PM Peak-Hour



Future with Project
Average Weekday
PM Peak-Hour



	%	Vol
EBR-SWT		56
WBL-SWT		341
NWL-WBT		60
NWR-EBT		321
NWR-SET		252

Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

2 Slater Rd @ I-5 SB Ramps

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

			10%	15%		25%	0%					
			80	120	0							
					I-5 Southbound Ramps				0			
	30%								160	20%		
									0			
30%			Slater Road			360		Slater Road		20%		
		0										
		0								0%		
		0			I-5 Southbound Ramps							
							0	0	0			
			15%			15%						

	%	Vol
EBR-SWT	4%	32
WBL-SWT	40%	320
NWL-WBT	0%	0
NWR-EBT	0%	0
NWR-SET	0%	0

Outbound Traffic

						0%	0%					
			0	0	0							
					I-5 Southbound Ramps				0			
	0%								0			
									0			
20%			Slater Road			168		Slater Road		10%		
		0										
10%		84								10%		
10%		84			I-5 Southbound Ramps							
							0	0	0			
			10%			10%						

	%	Vol
EBR-SWT	0%	0
WBL-SWT	0%	0
NWL-WBT	4%	34
NWR-EBT	35%	295
NWR-SET	30%	252

Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

			-5%	5%		0%	0%					
			-3	3	0							
					I-5 Southbound Ramps				0			
	-35%								-20	-30%		
									0			
-70%			Slater Road			-44		Slater Road		-65%		
		0										
-35%		-24								-35%		
		0			I-5 Southbound Ramps							
							0	0	0			
			5%			5%						

	%	Vol
EBR-SWT	35%	24
WBL-SWT	30%	20
NWL-WBT	0%	0
NWR-EBT	0%	0
NWR-SET	0%	0

Outbound Traffic

						0%	0%					
			0	0	0							
					I-5 Southbound Ramps				0			
	0%								0			
									0			
0%			Slater Road			0		Slater Road		0%		
		0										
		0								0%		
		0			I-5 Southbound Ramps							
							0	0	0			
			0%			0%						

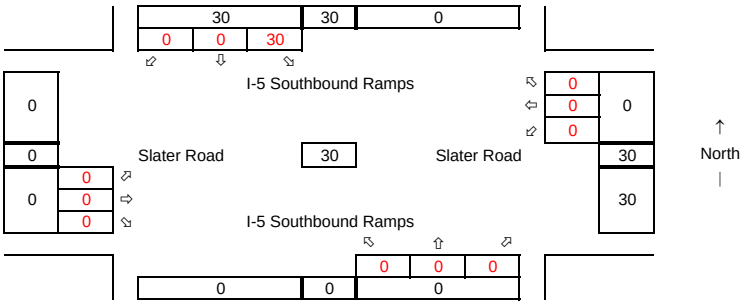
	%	Vol
EBR-SWT	0%	0
WBL-SWT	0%	0
NWL-WBT	35%	26
NWR-EBT	35%	26
NWR-SET	0%	0

Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

2 Slater Rd @ I-5 SB Ramps

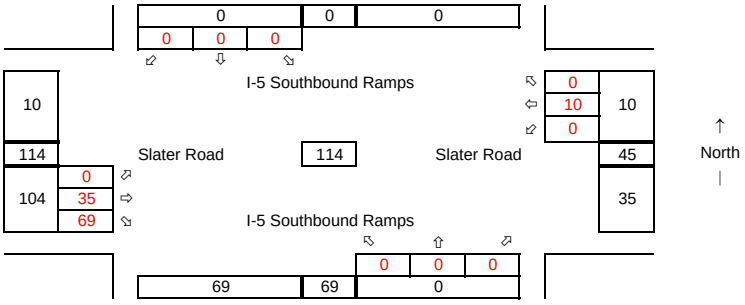
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



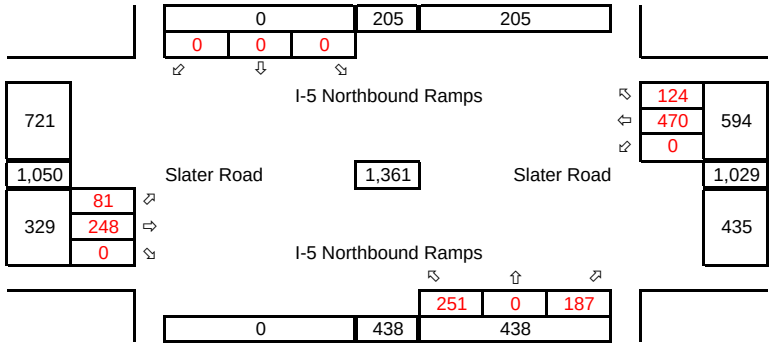
Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

3 Slater Rd @ I-5 NB Ramps

Synchro ID: 3
Existing
Average Weekday
PM Peak-Hour

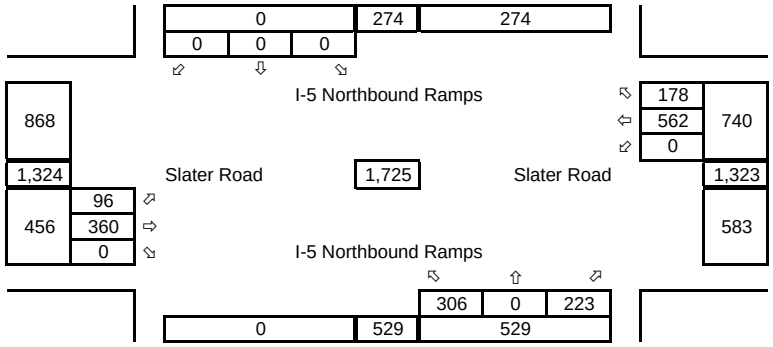
Year: **4/9/2013**

Data Source: **ATD**

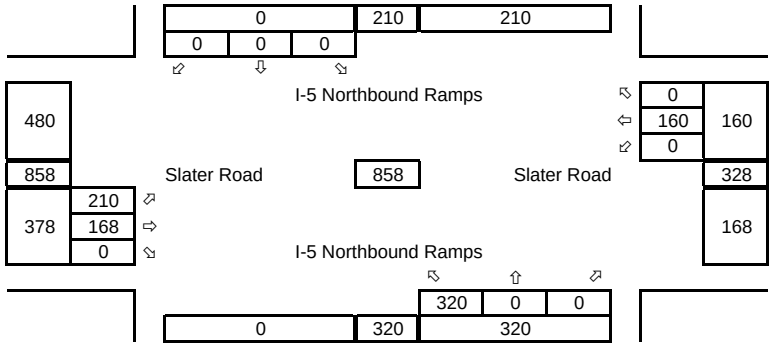


Future without Development
Average Weekday
PM Peak-Hour

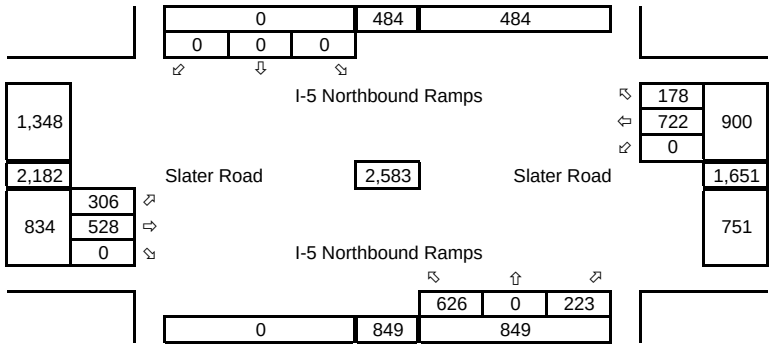
Year: 2032
Growth Rate = 1.0%
Years of Growth = 19
Total Growth = 1.1900



Total Project Trips
Average Weekday
PM Peak-Hour



Future with Project
Average Weekday
PM Peak-Hour



Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

3 Slater Rd @ I-5 NB Ramps

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

						0%	0%				
			0	0	0						
					I-5 Northbound Ramps				0		
	60%								160	20%	
									0		
	60%			Slater Road		480		Slater Road		20%	
		0								0%	
		0									
		0			I-5 Northbound Ramps						
							320	0	0		
			0%			40%	40%				

Outbound Traffic

						25%	25%				
			0	0	0						
					I-5 Northbound Ramps				0		
	0%								0		
									0		
	45%			Slater Road		378		Slater Road		20%	
	25%	210								20%	
	20%	168									
		0			I-5 Northbound Ramps						
							0	0	0		
			0%			0%					

Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

						0%	0%				
			0	0	0						
					I-5 Northbound Ramps				0		
	0%								0		
									0		
	0%			Slater Road		0		Slater Road		0%	
		0								0%	
		0									
		0			I-5 Northbound Ramps						
							0	0	0		
			0%			0%					

Outbound Traffic

						0%	0%				
			0	0	0						
					I-5 Northbound Ramps				0		
	0%								0		
									0		
	0%			Slater Road		0		Slater Road		0%	
		0								0%	
		0									
		0			I-5 Northbound Ramps						
							0	0	0		
			0%			0%					

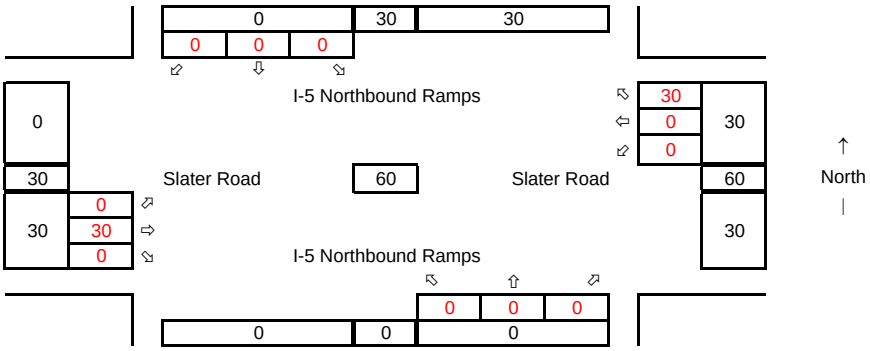
↑ North

Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

3 Slater Rd @ I-5 NB Ramps

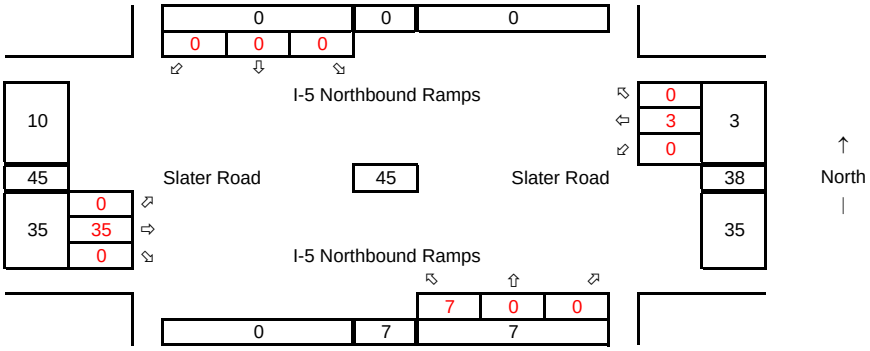
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

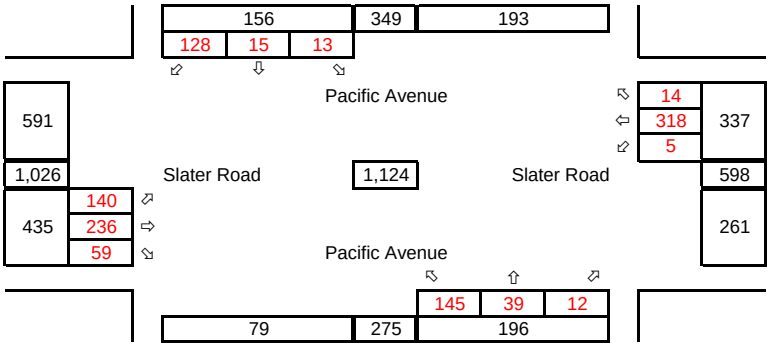
4 Slater Rd @ Pacific Ave

Synchro ID: 4

Existing
Average Weekday
PM Peak-Hour

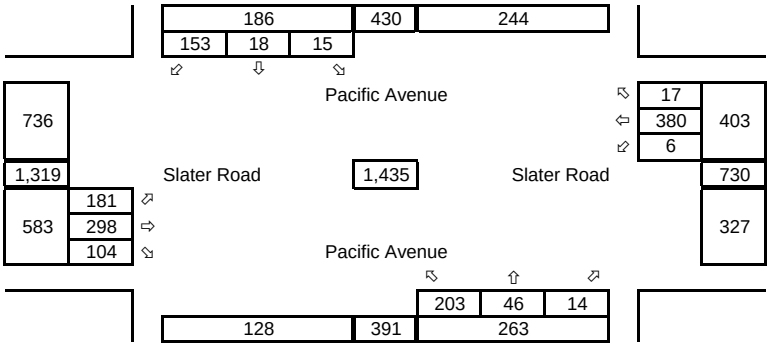
Year: **4/9/2013**

Data Source: **ATD**

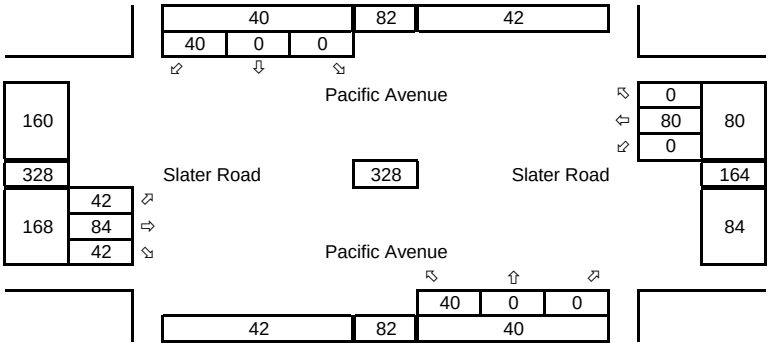


Future without Development
Average Weekday
PM Peak-Hour

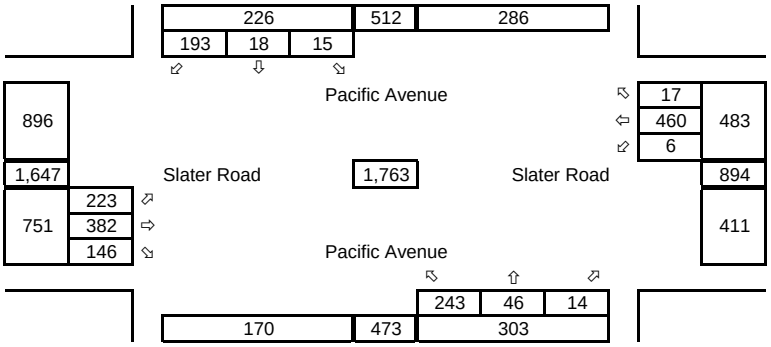
Year: 2032
Growth Rate = 1.0%
Years of Growth = 19
Total Growth = 1.1900



Total Project Trips
Average Weekday
PM Peak-Hour



Future with Project
Average Weekday
PM Peak-Hour



Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

4 Slater Rd @ Pacific Ave

New Development Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

			5%			5%	0%					
			40	0	0							
						Pacific Avenue				0		
	20%									80	10%	
										0		
	20%			Slater Road		160			Slater Road		10%	
		0									0%	
		0										
		0				Pacific Avenue						
							40	0	0			
			0%			5%	5%					

↑ North

Outbound Traffic

						5%	5%					
			0	0	0							
						Pacific Avenue				0		
	0%									0		
										0		
	20%			Slater Road		168			Slater Road		10%	
	5%	42									10%	
	10%	84										
	5%	42				Pacific Avenue						
							0	0	0			
			5%			5%						

↑ North

Pass-By Trips
Average Weekday
PM Peak-Hour

Inbound Traffic

						0%	0%					
			0	0	0							
						Pacific Avenue				0		
	0%									0		
										0		
	0%			Slater Road		0			Slater Road		0%	
		0									0%	
		0										
		0				Pacific Avenue						
							0	0	0			
			0%			0%						

↑ North

Outbound Traffic

						0%	0%					
			0	0	0							
						Pacific Avenue				0		
	0%									0		
										0		
	0%			Slater Road		0			Slater Road		0%	
		0									0%	
		0										
		0				Pacific Avenue						
							0	0	0			
			0%			0%						

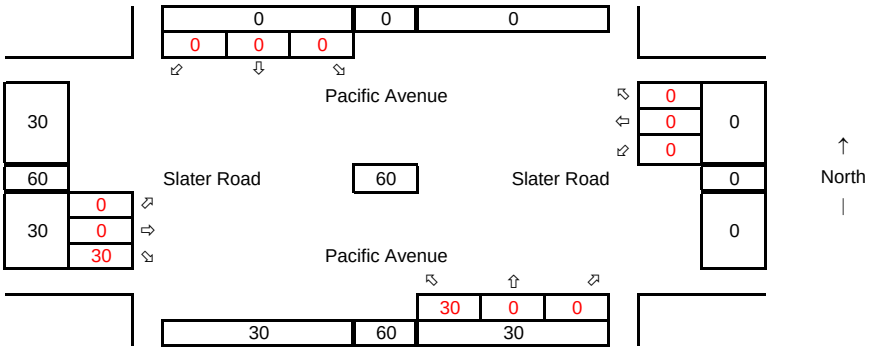
↑ North

Future Interim Volumes (75%)
without Kope Road Ext.
with Kope Road Realign

4 Slater Rd @ Pacific Ave

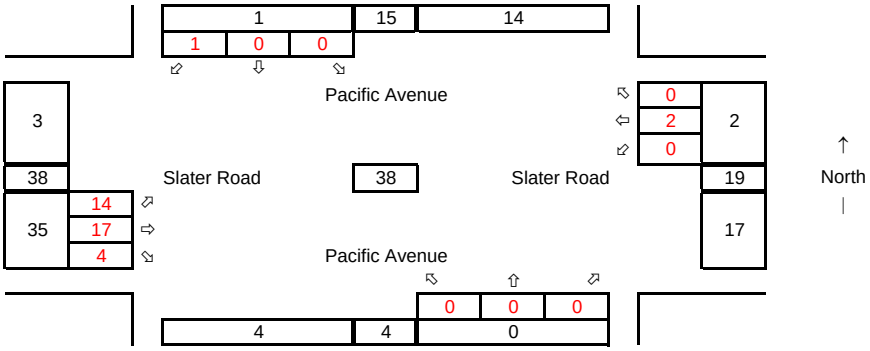
Pipeline Trips
Average Weekday
PM Peak-Hour

Costco Development TIA
Kittleson & Associates, Inc.
May 2013



Pipeline Trips
Average Weekday
PM Peak-Hour

Corrections Facility
GTC July 2013



Lanes, Volumes, Timings
1: Rural Avenue & Slater Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	674	54	237	549	115	47	42	250	262	52	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		85	0		0	100		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989				0.850			0.850		0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1824	0	1752	1845	1568	1752	1845	1568	1752	1786	0
Flt Permitted	0.412			0.113			0.711			0.728		
Satd. Flow (perm)	760	1824	0	208	1845	1568	1312	1845	1568	1343	1786	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				69			263		11	
Link Speed (mph)		35			35			35			35	
Link Distance (ft)		2005			1023			1312			1887	
Travel Time (s)		39.1			19.9			25.6			36.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	27	709	57	249	578	121	49	44	263	276	55	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	766	0	249	578	121	49	44	263	276	70	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		
Detector Phase	5	2		1	6	6	8	8	8	4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	8.0	20.0		8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
Total Split (s)	8.0	64.0		20.0	76.0	76.0	36.0	36.0	36.0	36.0	36.0	
Total Split (%)	6.7%	53.3%		16.7%	63.3%	63.3%	30.0%	30.0%	30.0%	30.0%	30.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Recall Mode	None	None		None	None	None	Min	Min	Min	Min	Min	
Act Effct Green (s)	50.8	46.5		63.4	59.4	59.4	25.1	25.1	25.1	25.1	25.1	
Actuated g/C Ratio	0.52	0.48		0.65	0.61	0.61	0.26	0.26	0.26	0.26	0.26	
v/c Ratio	0.06	0.88		0.74	0.51	0.12	0.14	0.09	0.44	0.80	0.15	
Control Delay	8.0	35.9		31.1	14.0	5.1	33.1	32.0	6.8	54.3	28.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	8.0	35.9		31.1	14.0	5.1	33.1	32.0	6.8	54.3	28.4	
LOS	A	D		C	B	A	C	C	A	D	C	
Approach Delay		34.9			17.3			13.5			49.0	
Approach LOS		C			B			B			D	
Queue Length 50th (ft)	6	430		78	221	14	25	22	0	170	30	
Queue Length 95th (ft)	16	684		#197	341	41	62	56	64	#329	73	

Lanes, Volumes, Timings
1: Rural Avenue & Slater Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1925			943			1232			1807	
Turn Bay Length (ft)	100			100		85				100		
Base Capacity (vph)	441	1207		408	1397	1203	462	650	723	473	636	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.06	0.63		0.61	0.41	0.10	0.11	0.07	0.36	0.58	0.11	

Intersection Summary

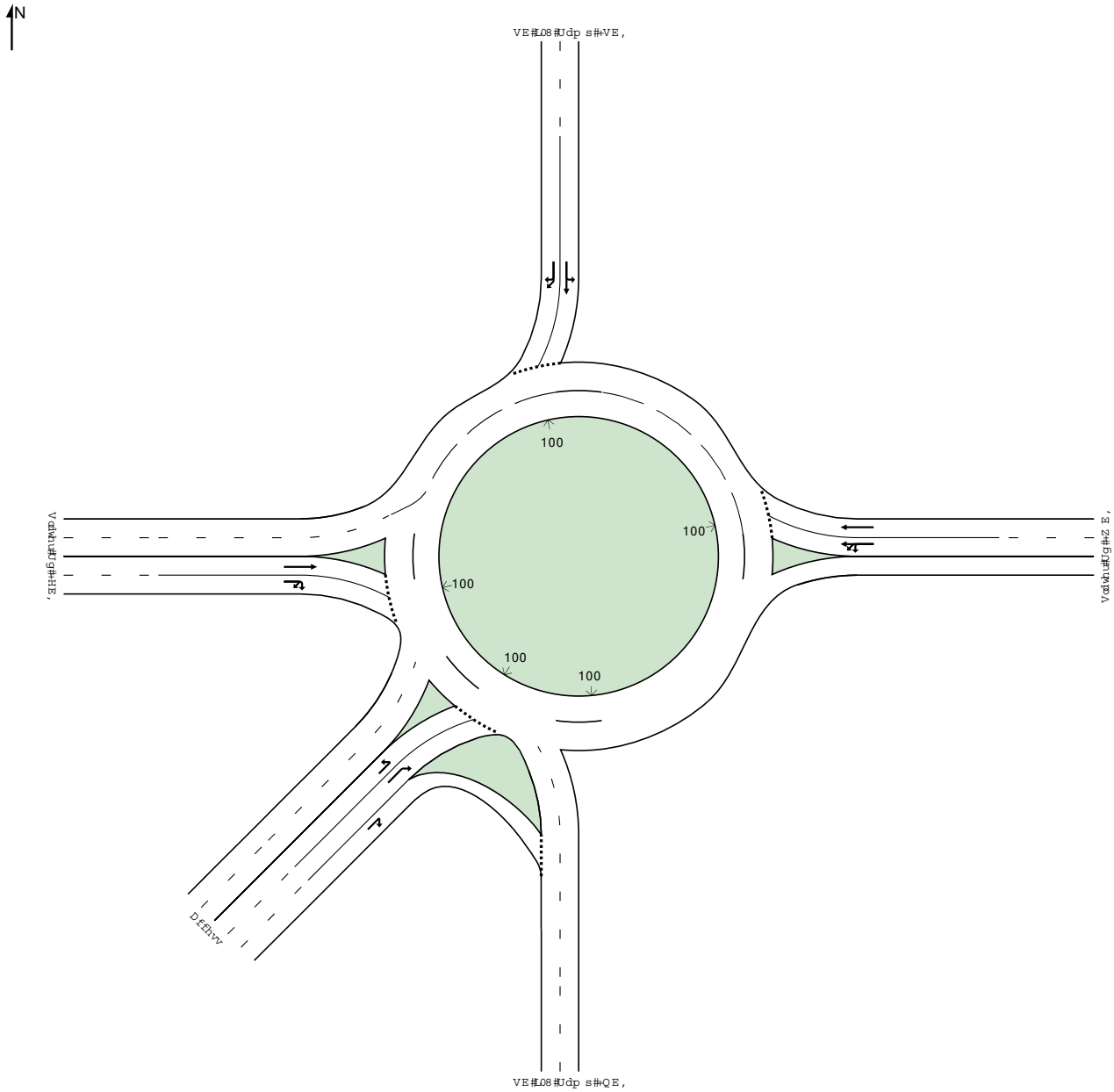
Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 97.1
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 27.0 — Intersection LOS: C
Intersection Capacity Utilization 83.1% — ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Rural Avenue & Slater Road

SITE LAYOUT

Site: Slater Rd at SB I-5 Ramps 75%

Slater I-5 Interchange Corridor Analysis (11-130)
Future Interim



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MOVEMENT SUMMARY

Site: Slater Rd at SB I-5 Ramps 75%

Slater I-5 Interchange Corridor Analysis (11-130)
Future Interim
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Slater Rd (WB)											
1	L2	249	2.0	0.509	13.7	LOS B	4.2	107.2	0.32	1.22	29.7
1a	L1	359	2.0	0.509	12.5	LOS B	4.2	107.2	0.32	1.22	29.7
6	T1	808	2.0	0.509	6.0	LOS A	4.3	108.9	0.31	0.90	32.7
Approach		1417	2.0	0.509	9.0	LOS A	4.3	108.9	0.31	0.52	31.3
North: SB I-5 Ramp (SB)											
7	L2	77	2.0	0.193	19.8	LOS B	0.7	18.7	0.72	1.83	26.8
4	T1	5	2.0	0.193	12.1	LOS B	0.7	18.7	0.72	1.83	26.8
14a	R1	129	2.0	0.416	10.7	LOS B	2.1	54.3	0.75	1.81	30.3
14	R2	161	2.0	0.416	12.3	LOS B	2.1	54.3	0.75	1.81	30.3
Approach		373	2.0	0.416	13.3	LOS B	2.1	54.3	0.74	0.91	29.4
West: Slater Rd (EB)											
2	T1	468	2.0	0.680	14.4	LOS B	5.6	141.5	0.83	2.03	28.7
12	R2	716	2.0	0.868	21.0	LOS C	12.2	310.5	0.96	2.48	25.4
12b	R3	11	2.0	0.868	21.9	LOS C	12.2	310.5	0.96	2.48	25.4
Approach		1195	2.0	0.868	18.4	LOS B	12.2	310.5	0.91	1.15	26.6
SouthWest: Access											
5bx	L3	63	2.0	0.114	18.4	LOS B	0.6	14.2	0.78	1.86	27.5
12ax	R1	338	2.0	0.457	9.9	LOS A	3.0	76.4	0.88	1.67	30.5
12bx	R3	265	2.0	0.317	10.6	LOS B	2.1	52.1	0.81	1.58	29.9
Approach		666	2.0	0.457	11.0	LOS B	3.0	76.4	0.84	0.83	29.9
All Vehicles		3651	2.0	0.868	12.9	LOS B	12.2	310.5	0.65	0.82	29.2

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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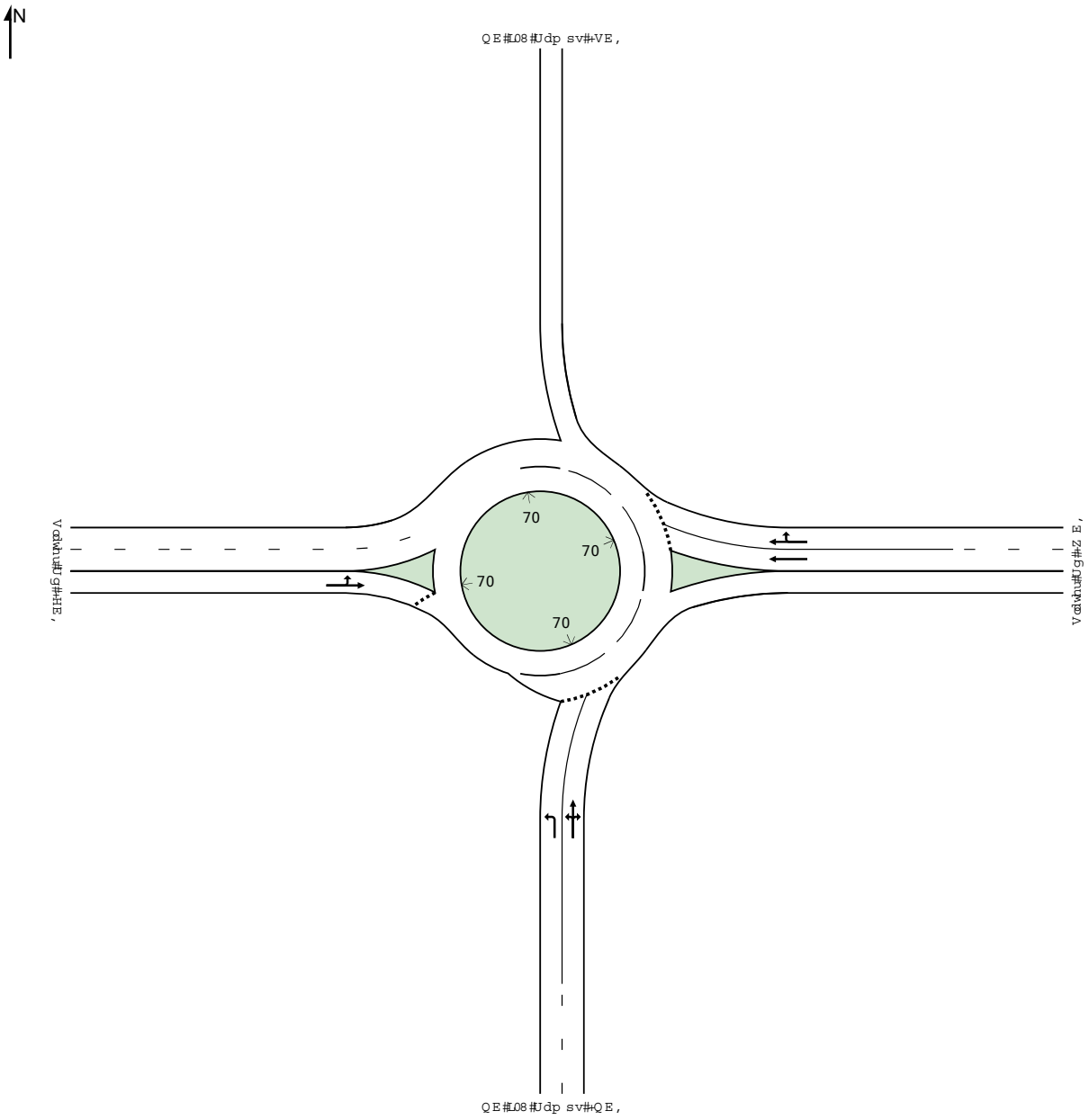
SIDRA INTERSECTION 6

SITE LAYOUT

Site: Slater Rd at NB I-5 Ramps 75%

Slater I-5 Interchange Corridor Analysis (11-130)
Future Interim



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SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: Slater Rd at NB I-5 Ramps 75%

Slater I-5 Interchange Corridor Analysis (11-130)
Future Interim
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB I-5 Ramps (NB)											
3	L2	659	2.0	0.593	14.7	LOS B	5.7	144.4	0.86	1.94	23.4
8	T1	5	2.0	0.593	13.5	LOS B	5.7	144.4	0.86	1.93	24.3
18	R2	235	2.0	0.593	13.5	LOS B	5.7	144.4	0.86	1.93	24.3
Approach		899	2.0	0.593	14.4	LOS B	5.7	144.4	0.86	0.97	23.7
East: Slater Rd (WB)											
6	T1	760	2.0	0.652	17.3	LOS B	5.0	125.9	0.84	1.84	24.0
16	R2	187	2.0	0.652	15.8	LOS B	5.0	125.9	0.84	1.84	24.5
Approach		947	2.0	0.652	17.0	LOS B	5.0	125.9	0.84	0.92	24.1
West: Slater Rd (EB)											
5	L2	322	2.0	0.514	6.9	LOS A	0.0	0.0	0.00	0.00	32.1
2	T1	556	2.0	0.514	6.9	LOS A	0.0	0.0	0.00	0.00	32.1
Approach		878	2.0	0.514	6.9	LOS A	0.0	0.0	0.00	0.00	32.1
All Vehicles		2724	2.0	0.652	12.9	LOS B	5.7	144.4	0.58	0.64	26.0

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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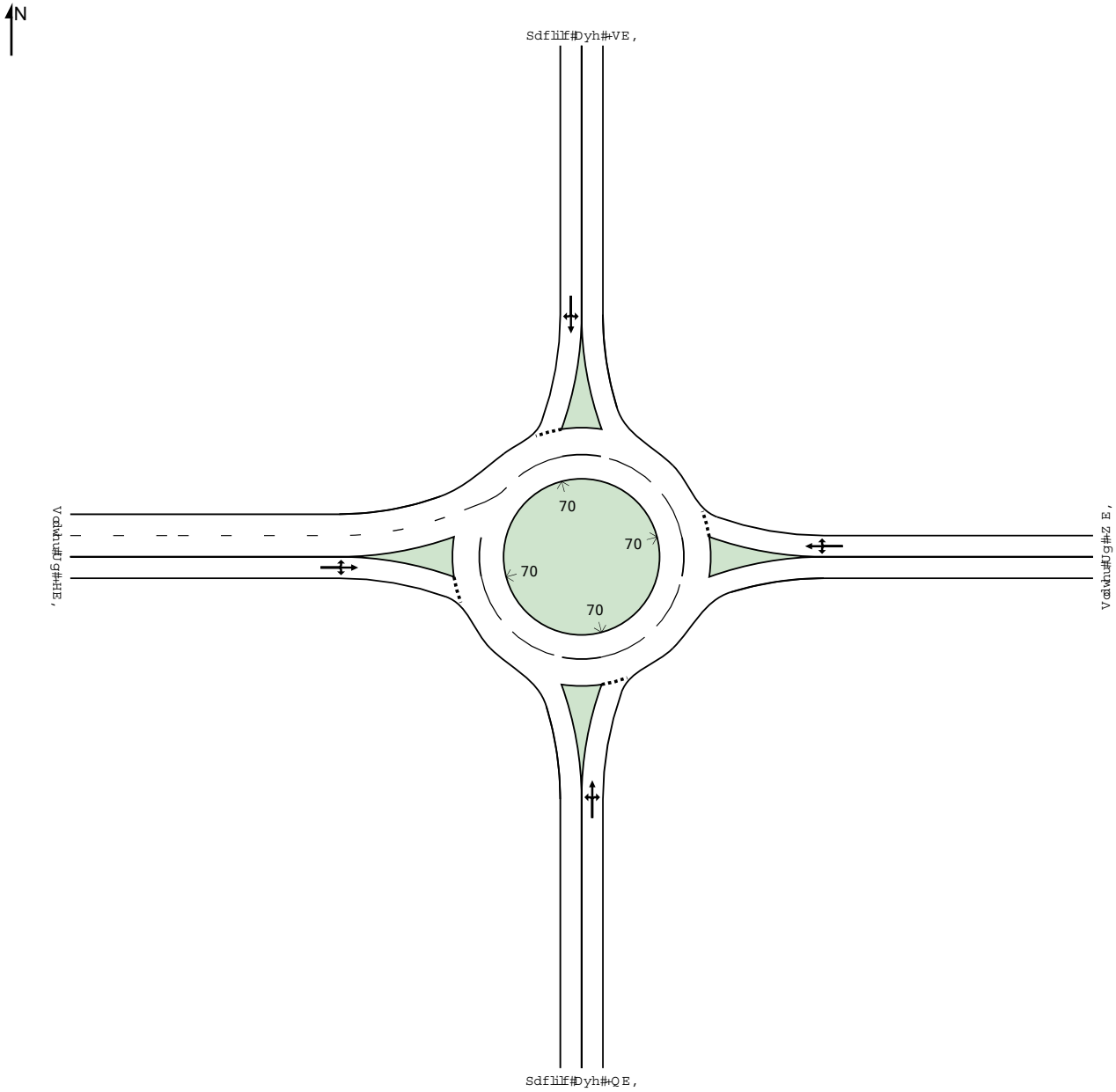
SIDRA INTERSECTION 6

SITE LAYOUT

Site: Slater Rd at Pacific Ave 75%

Slater I-5 Interchange Corridor Analysis (11-130)
Future Interim



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SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: Slater Rd at Pacific Ave 75%

Slater I-5 Interchange Corridor Analysis (11-130)
Future Interim
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Pacific Ave (NB)											
3	L2	256	2.0	0.424	10.4	LOS B	2.7	67.5	0.73	1.43	25.2
8	T1	48	2.0	0.424	10.4	LOS B	2.7	67.5	0.73	1.43	25.2
18	R2	15	2.0	0.424	10.4	LOS B	2.7	67.5	0.73	1.43	25.2
Approach		319	2.0	0.424	10.4	LOS B	2.7	67.5	0.73	0.72	25.2
East: Slater Rd (WB)											
1	L2	6	2.0	0.633	15.0	LOS B	5.7	145.2	0.81	1.70	25.0
6	T1	484	2.0	0.633	15.0	LOS B	5.7	145.2	0.81	1.70	25.0
16	R2	18	2.0	0.633	15.0	LOS B	5.7	145.2	0.81	1.70	25.0
Approach		508	2.0	0.633	15.0	LOS B	5.7	145.2	0.81	0.85	25.0
North: Pacific Ave (SB)											
7	L2	16	2.0	0.373	10.8	LOS B	2.3	59.4	0.80	1.55	26.4
4	T1	19	2.0	0.373	10.8	LOS B	2.3	59.4	0.80	1.55	26.4
14	R2	203	2.0	0.373	10.8	LOS B	2.3	59.4	0.80	1.55	26.4
Approach		238	2.0	0.373	10.8	LOS B	2.3	59.4	0.80	0.78	26.4
West: Slater Rd (EB)											
5	L2	235	2.0	0.550	8.3	LOS A	4.9	124.3	0.26	0.20	27.4
2	T1	402	2.0	0.550	8.3	LOS A	4.9	124.3	0.26	0.20	27.4
12	R2	154	2.0	0.550	8.3	LOS A	4.9	124.3	0.26	0.20	27.4
Approach		791	2.0	0.550	8.3	LOS A	4.9	124.3	0.26	0.10	27.4
All Vehicles		1856	2.0	0.633	10.8	LOS B	5.7	145.2	0.56	0.50	26.2

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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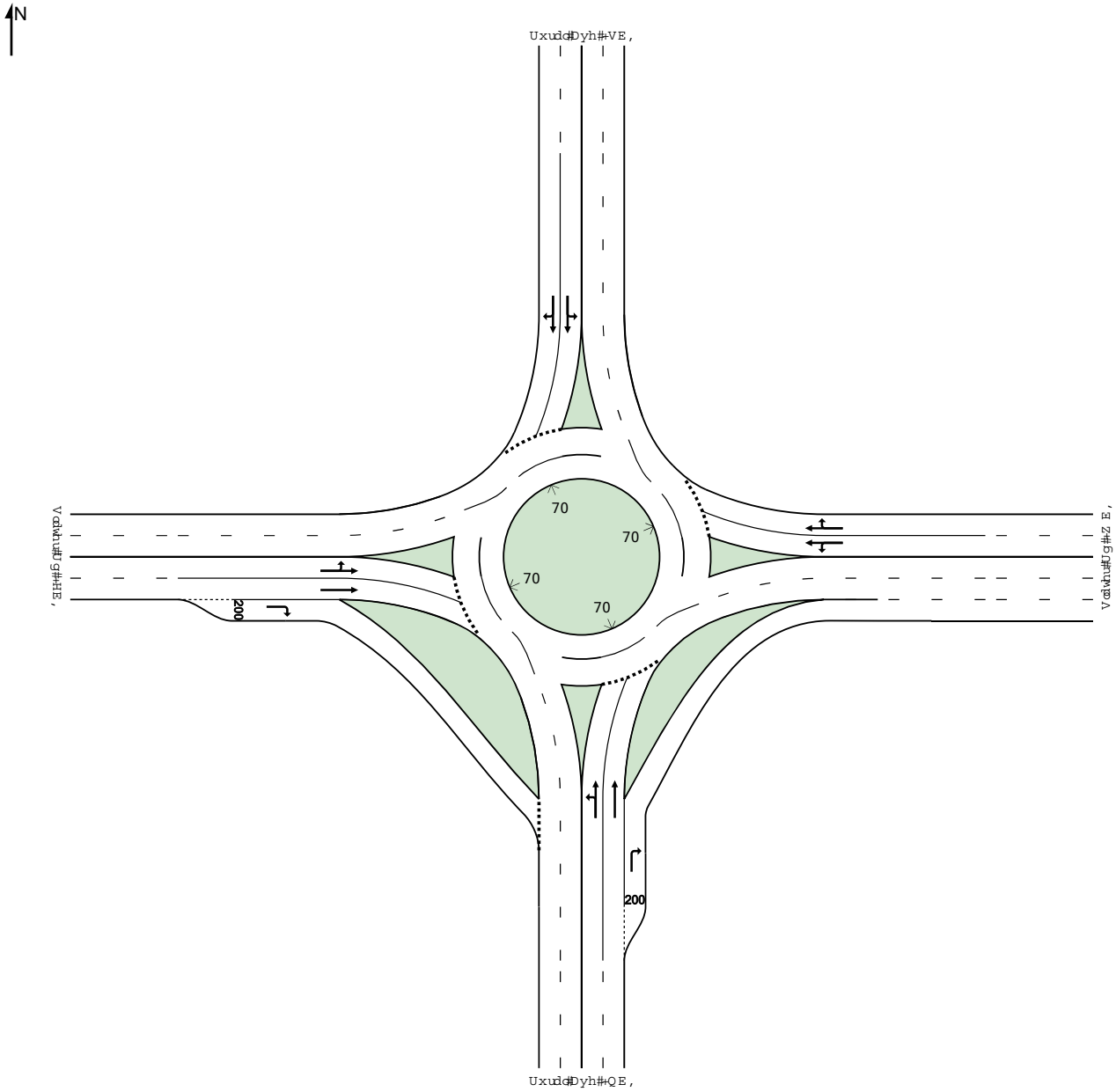
SIDRA INTERSECTION 6

Kope Road Realignment Comparison

SITE LAYOUT

Site: Slater Rd at Rural Ave

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Realign



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SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: Slater Rd at Rural Ave

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Realign
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Rural Ave (NB)											
3	L2	88	2.0	0.094	4.4	LOS A	0.5	12.4	0.66	1.10	27.7
8	T1	77	2.0	0.094	5.7	LOS A	0.5	12.4	0.66	1.18	29.6
18	R2	1095	2.0	0.667	0.2	LOS A	0.0	0.0	0.00	0.00	33.0
Approach		1260	2.0	0.667	0.9	LOS A	0.5	12.4	0.09	0.07	32.3
East: Slater Rd (WB)											
1	L2	1074	2.0	0.806	16.8	LOS B	10.5	266.7	0.74	1.07	22.5
6	T1	581	2.0	0.613	11.3	LOS B	4.7	119.1	0.57	0.81	26.7
16	R2	103	2.0	0.613	11.3	LOS B	4.7	119.1	0.57	0.81	26.7
Approach		1758	2.0	0.806	14.7	LOS B	10.5	266.7	0.68	0.49	23.9
North: Rural Ave (SB)											
7	L2	259	2.0	0.549	19.3	LOS B	4.0	100.7	0.95	2.06	21.7
4	T1	85	2.0	0.306	17.3	LOS B	1.6	39.9	0.86	1.75	24.0
14	R2	15	2.0	0.306	17.3	LOS B	1.6	39.9	0.86	1.75	24.0
Approach		359	2.0	0.549	18.7	LOS B	4.0	100.7	0.92	0.99	22.3
West: Slater Rd (EB)											
5	L2	27	2.0	0.700	31.1	LOS C	7.0	176.8	1.00	2.38	19.5
2	T1	655	2.0	0.700	26.1	LOS C	8.9	225.7	1.00	2.41	21.0
12	R2	125	2.0	0.181	7.2	LOS A	1.3	33.8	0.91	1.60	28.2
Approach		807	2.0	0.700	23.3	LOS C	8.9	225.7	0.99	1.14	21.8
All Vehicles		4184	2.0	0.806	12.5	LOS B	10.5	266.7	0.58	0.53	25.2

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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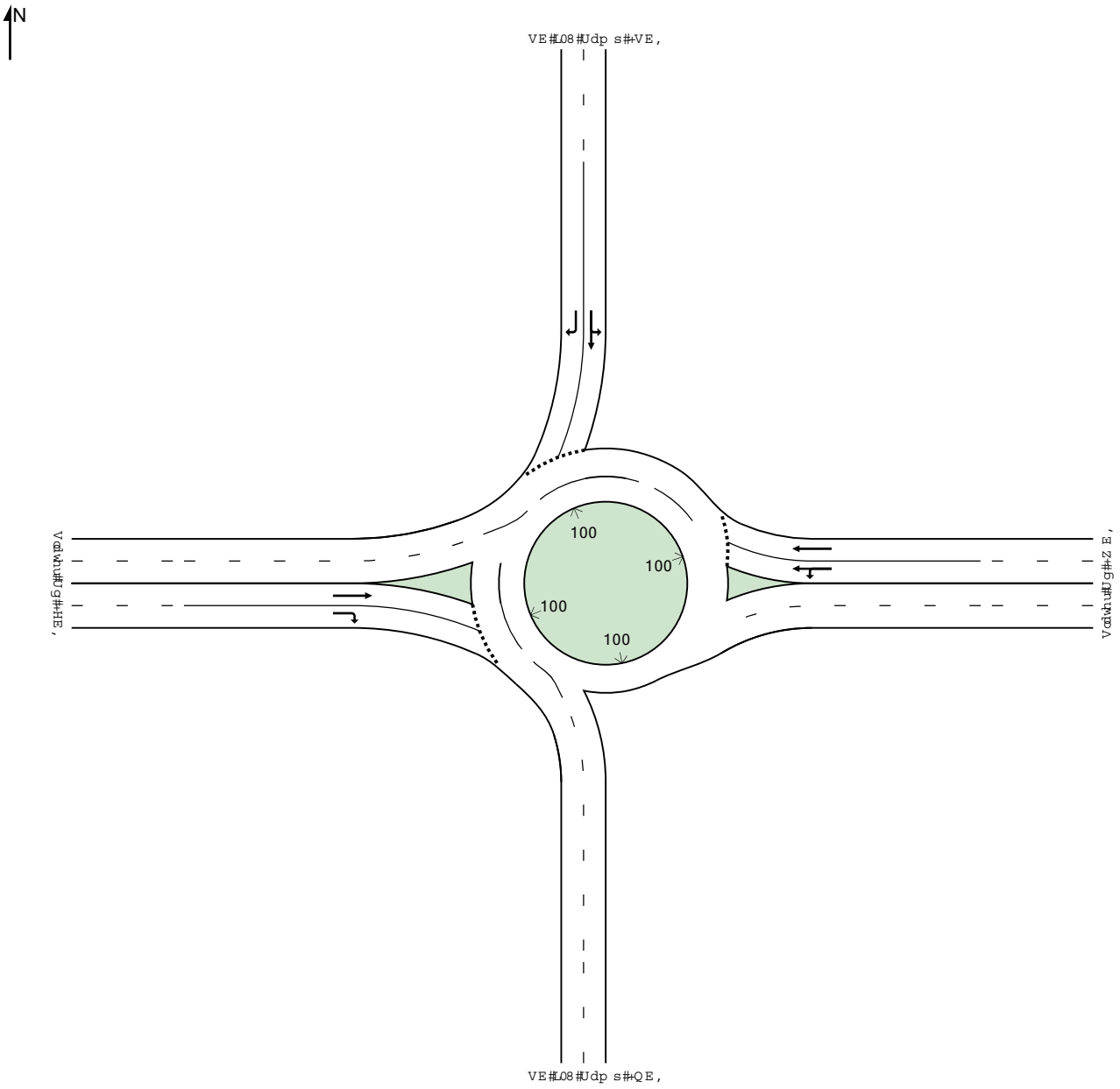
SITE LAYOUT

Site: Slater Rd at SB I-5 Ramps

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Realign



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MOVEMENT SUMMARY

Site: Slater Rd at SB I-5 Ramps

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Realign
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Slater Rd (WB)											
1	L2	249	2.0	0.465	13.3	LOS B	0.0	0.0	0.00	1.14	32.8
6	T1	1335	2.0	0.465	5.6	LOS A	0.0	0.0	0.00	0.96	34.0
Approach		1584	2.0	0.465	6.8	LOS A	0.0	0.0	0.00	0.49	33.8
North: SB I-5 Ramp (SB)											
7	L2	77	2.0	0.132	18.8	LOS B	0.5	13.0	0.66	1.80	27.3
4	T1	5	2.0	0.132	11.1	LOS B	0.5	13.0	0.66	1.80	27.3
14	R2	361	2.0	0.396	12.2	LOS B	2.1	52.9	0.72	1.80	30.0
Approach		443	2.0	0.396	13.3	LOS B	2.1	52.9	0.71	0.90	29.4
West: Slater Rd (EB)											
2	T1	937	2.0	0.850	13.3	LOS B	13.9	352.5	0.91	1.86	29.3
12	R2	1100	2.0	0.865	14.2	LOS B	15.2	385.1	0.90	1.80	28.8
Approach		2037	2.0	0.865	13.8	LOS B	15.2	385.1	0.90	0.92	29.0
All Vehicles		4064	2.0	0.865	11.0	LOS B	15.2	385.1	0.53	0.75	30.8

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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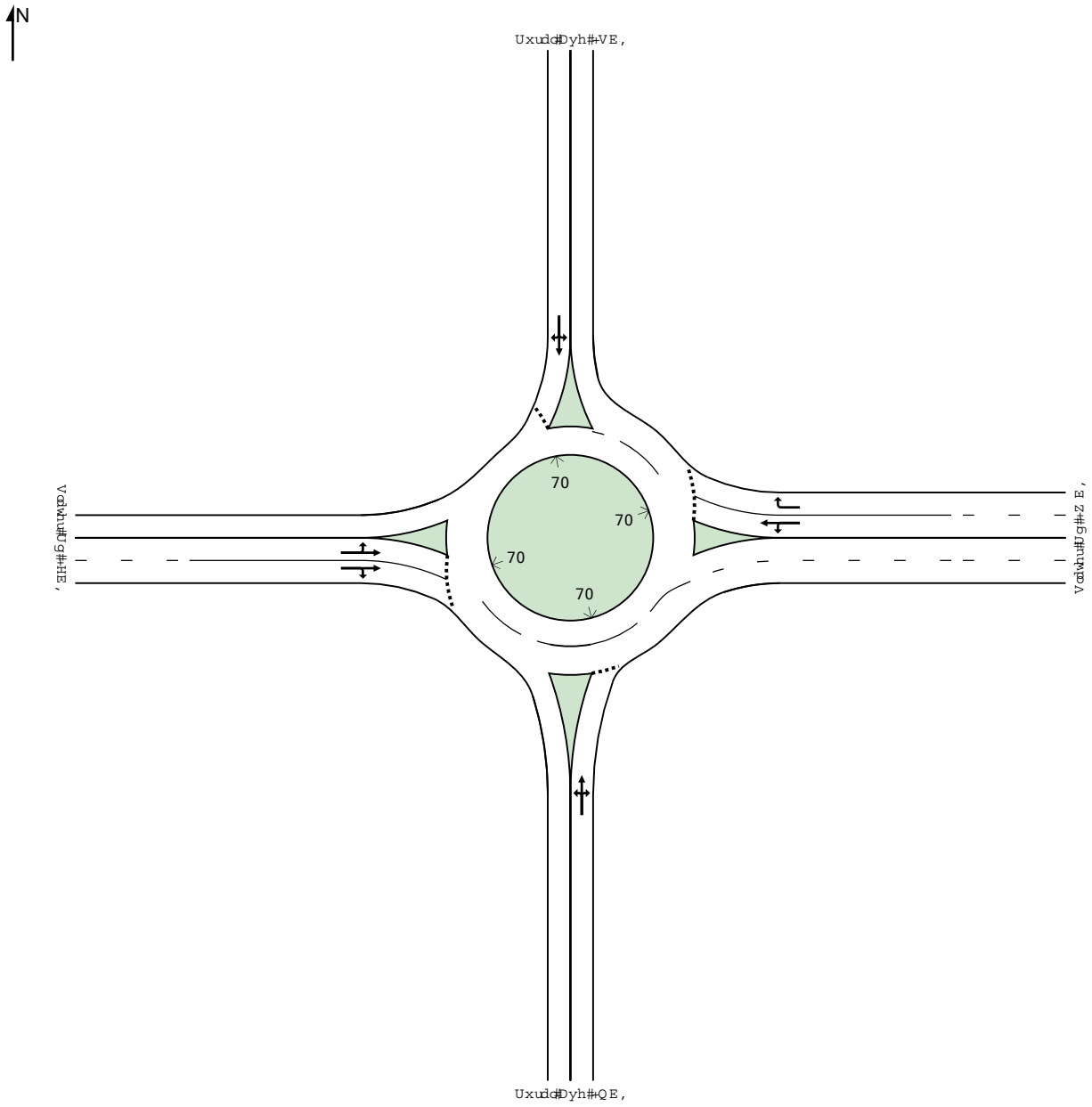
SITE LAYOUT

Site: Slater Rd at Rural Ave - 1-lane

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out w Kope Rd Realign



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SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: Slater Rd at Rural Ave - 1-lane

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out w Kope Rd Realign
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Rural Ave (NB)											
3	L2	65	2.0	0.737	24.5	LOS C	5.9	150.8	0.89	2.02	21.1
8	T1	54	2.0	0.737	24.5	LOS C	5.9	150.8	0.89	2.02	21.1
18	R2	326	2.0	0.737	24.5	LOS C	5.9	150.8	0.89	2.02	21.1
Approach		445	2.0	0.737	24.5	LOS C	5.9	150.8	0.89	1.01	21.1
East: Slater Rd (WB)											
1	L2	309	2.0	0.614	9.4	LOS A	6.4	163.0	0.57	0.67	26.7
6	T1	579	2.0	0.614	9.4	LOS A	6.4	163.0	0.57	0.67	26.7
16	R2	126	2.0	0.139	5.3	LOS A	0.8	19.9	0.40	0.47	29.0
Approach		1015	2.0	0.614	8.9	LOS A	6.4	163.0	0.55	0.32	27.0
North: Rural Ave (SB)											
7	L2	281	2.0	0.705	25.8	LOS C	8.2	209.5	1.00	2.37	20.1
4	T1	63	2.0	0.705	25.8	LOS C	8.2	209.5	1.00	2.37	20.1
14	R2	15	2.0	0.705	25.8	LOS C	8.2	209.5	1.00	2.37	20.1
Approach		359	2.0	0.705	25.8	LOS C	8.2	209.5	1.00	1.19	20.1
West: Slater Rd (EB)											
5	L2	27	2.0	0.488	11.9	LOS B	4.0	100.6	0.86	1.68	26.3
2	T1	711	2.0	0.488	10.9	LOS B	4.2	106.5	0.86	1.62	26.8
12	R2	69	2.0	0.488	10.1	LOS B	4.2	106.5	0.86	1.57	27.2
Approach		807	2.0	0.488	10.9	LOS B	4.2	106.5	0.86	0.81	26.8
All Vehicles		2626	2.0	0.737	14.5	LOS B	8.2	209.5	0.76	0.71	24.6

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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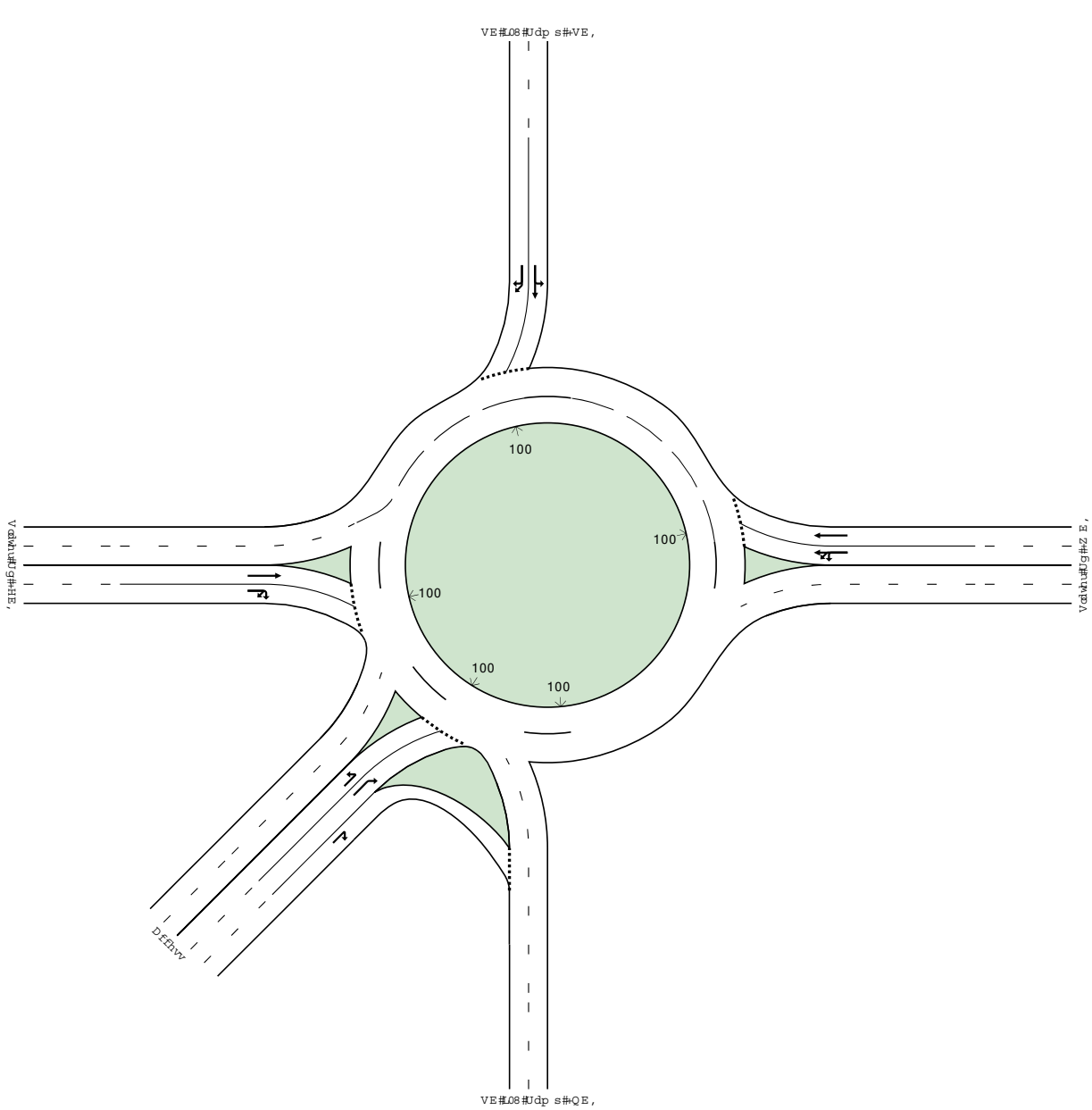
SIDRA INTERSECTION 6

SITE LAYOUT

Site: Slater Rd at SB I-5 Ramps

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out w Kope Rd Realign



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MOVEMENT SUMMARY

Site: Slater Rd at SB I-5 Ramps

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out w Kope Rd Realign
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Slater Rd (WB)											
1	L2	249	2.0	0.554	13.9	LOS B	4.9	124.5	0.39	1.23	29.3
1a	L1	478	2.0	0.554	12.6	LOS B	4.9	124.5	0.39	1.23	29.3
6	T1	857	2.0	0.554	6.1	LOS A	5.0	127.4	0.37	0.91	32.7
Approach		1584	2.0	0.554	9.3	LOS A	5.0	127.4	0.38	0.53	31.0
North: SB I-5 Ramp (SB)											
7	L2	77	2.0	0.155	18.6	LOS B	0.7	16.7	0.73	1.84	27.4
4	T1	5	2.0	0.155	10.9	LOS B	0.7	16.7	0.73	1.84	27.4
14a	R1	174	2.0	0.472	11.1	LOS B	2.8	71.8	0.81	1.90	30.1
14	R2	187	2.0	0.472	12.7	LOS B	2.8	71.8	0.81	1.90	30.1
Approach		443	2.0	0.472	13.1	LOS B	2.8	71.8	0.80	0.95	29.6
West: Slater Rd (EB)											
2	T1	489	2.0	0.720	16.2	LOS B	6.5	164.9	0.89	2.15	27.7
12	R2	745	2.0	0.861	21.2	LOS C	12.4	315.3	0.97	2.52	25.3
12b	R3	11	2.0	0.861	22.1	LOS C	12.4	315.3	0.97	2.52	25.3
Approach		1245	2.0	0.861	19.3	LOS B	12.4	315.3	0.94	1.19	26.2
SouthWest: Access											
5bx	L3	84	2.0	0.109	17.7	LOS B	0.6	16.1	0.82	1.76	27.4
12ax	R1	449	2.0	0.540	10.6	LOS B	4.2	107.5	0.93	1.84	30.2
12bx	R3	355	2.0	0.376	10.6	LOS B	2.7	69.0	0.86	1.58	29.8
Approach		888	2.0	0.540	11.3	LOS B	4.2	107.5	0.89	0.86	29.7
All Vehicles		4161	2.0	0.861	13.1	LOS B	12.4	315.3	0.70	0.84	29.0

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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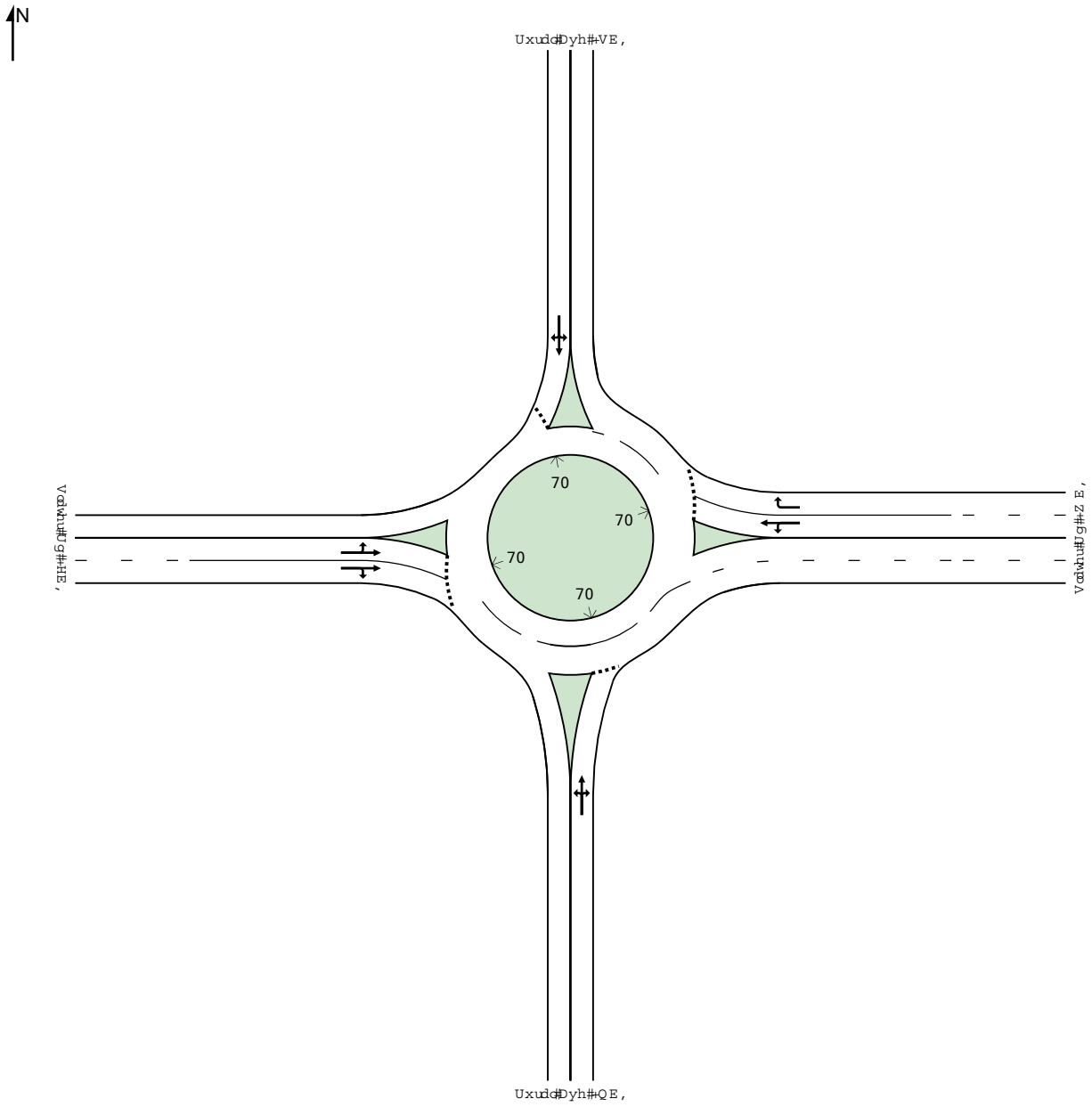
Future Build-Out Level of Service Analysis with Preferred Alternative

SITE LAYOUT

Site: Slater Rd at Rural Ave - 1-lane

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Connection



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SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: Slater Rd at Rural Ave - 1-lane

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Connection
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Rural Ave (NB)											
3	L2	65	2.0	0.737	24.5	LOS C	5.9	150.8	0.89	2.02	21.1
8	T1	54	2.0	0.737	24.5	LOS C	5.9	150.8	0.89	2.02	21.1
18	R2	326	2.0	0.737	24.5	LOS C	5.9	150.8	0.89	2.02	21.1
Approach		445	2.0	0.737	24.5	LOS C	5.9	150.8	0.89	1.01	21.1
East: Slater Rd (WB)											
1	L2	309	2.0	0.614	9.4	LOS A	6.4	163.0	0.57	0.67	26.7
6	T1	579	2.0	0.614	9.4	LOS A	6.4	163.0	0.57	0.67	26.7
16	R2	126	2.0	0.139	5.3	LOS A	0.8	19.9	0.40	0.47	29.0
Approach		1015	2.0	0.614	8.9	LOS A	6.4	163.0	0.55	0.32	27.0
North: Rural Ave (SB)											
7	L2	281	2.0	0.705	25.8	LOS C	8.2	209.5	1.00	2.37	20.1
4	T1	63	2.0	0.705	25.8	LOS C	8.2	209.5	1.00	2.37	20.1
14	R2	15	2.0	0.705	25.8	LOS C	8.2	209.5	1.00	2.37	20.1
Approach		359	2.0	0.705	25.8	LOS C	8.2	209.5	1.00	1.19	20.1
West: Slater Rd (EB)											
5	L2	27	2.0	0.488	11.9	LOS B	4.0	100.6	0.86	1.68	26.3
2	T1	711	2.0	0.488	10.9	LOS B	4.2	106.5	0.86	1.62	26.8
12	R2	69	2.0	0.488	10.1	LOS B	4.2	106.5	0.86	1.57	27.2
Approach		807	2.0	0.488	10.9	LOS B	4.2	106.5	0.86	0.81	26.8
All Vehicles		2626	2.0	0.737	14.5	LOS B	8.2	209.5	0.76	0.71	24.6

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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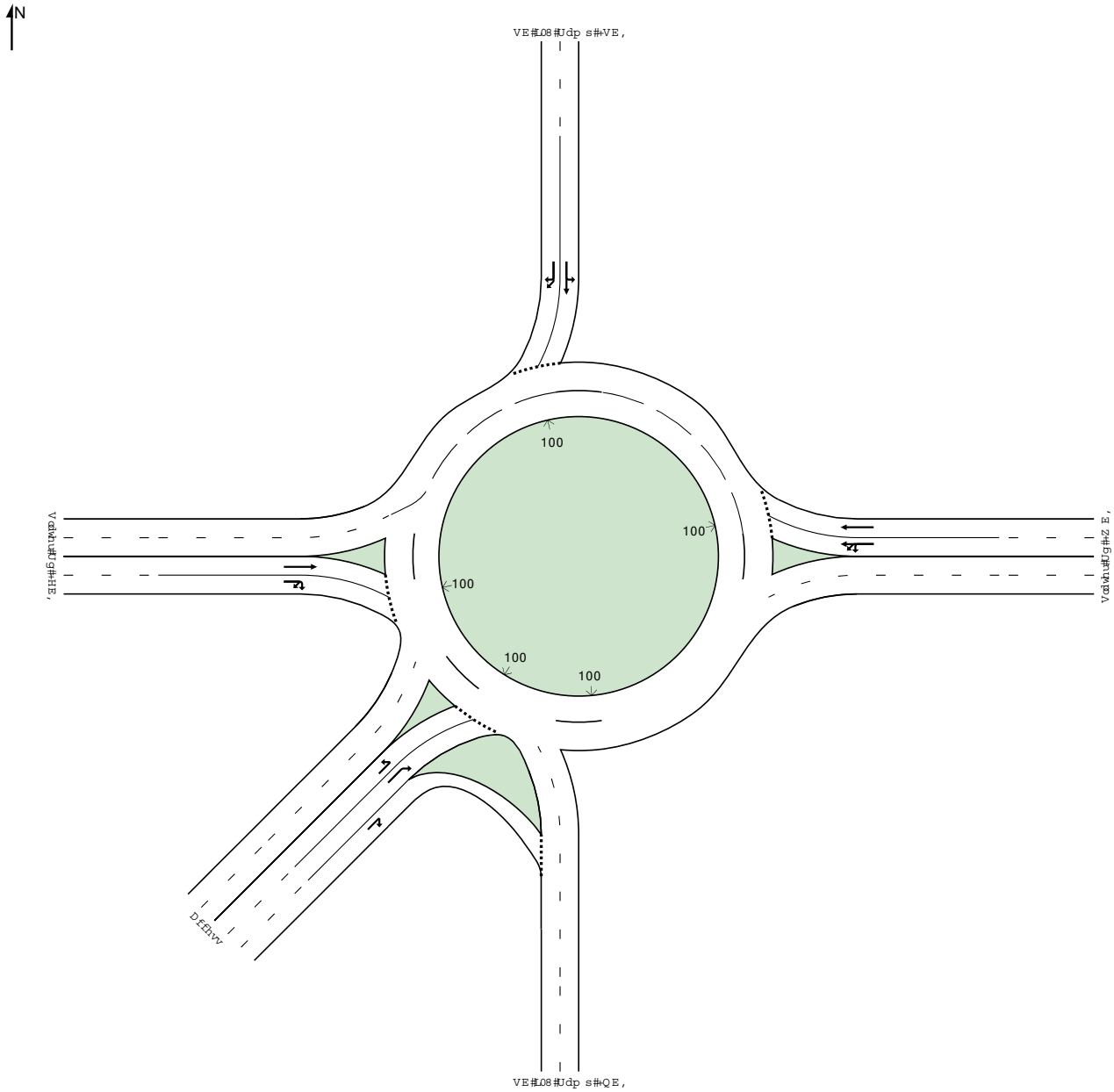
SITE LAYOUT

Site: Slater Rd at SB I-5 Ramps

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Connection



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MOVEMENT SUMMARY

Site: Slater Rd at SB I-5 Ramps

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Connection
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Slater Rd (WB)											
1	L2	249	2.0	0.554	13.9	LOS B	4.9	124.5	0.39	1.23	29.3
1a	L1	478	2.0	0.554	12.6	LOS B	4.9	124.5	0.39	1.23	29.3
6	T1	857	2.0	0.554	6.1	LOS A	5.0	127.4	0.37	0.91	32.7
Approach		1584	2.0	0.554	9.3	LOS A	5.0	127.4	0.38	0.53	31.0
North: SB I-5 Ramp (SB)											
7	L2	77	2.0	0.155	18.6	LOS B	0.7	16.7	0.73	1.84	27.4
4	T1	5	2.0	0.155	10.9	LOS B	0.7	16.7	0.73	1.84	27.4
14a	R1	174	2.0	0.472	11.1	LOS B	2.8	71.8	0.81	1.90	30.1
14	R2	187	2.0	0.472	12.7	LOS B	2.8	71.8	0.81	1.90	30.1
Approach		443	2.0	0.472	13.1	LOS B	2.8	71.8	0.80	0.95	29.6
West: Slater Rd (EB)											
2	T1	489	2.0	0.720	16.2	LOS B	6.5	164.9	0.89	2.15	27.7
12	R2	745	2.0	0.861	21.2	LOS C	12.4	315.3	0.97	2.52	25.3
12b	R3	11	2.0	0.861	22.1	LOS C	12.4	315.3	0.97	2.52	25.3
Approach		1245	2.0	0.861	19.3	LOS B	12.4	315.3	0.94	1.19	26.2
SouthWest: Access											
5bx	L3	84	2.0	0.109	17.7	LOS B	0.6	16.1	0.82	1.76	27.4
12ax	R1	449	2.0	0.540	10.6	LOS B	4.2	107.5	0.93	1.84	30.2
12bx	R3	355	2.0	0.376	10.6	LOS B	2.7	69.0	0.86	1.58	29.8
Approach		888	2.0	0.540	11.3	LOS B	4.2	107.5	0.89	0.86	29.7
All Vehicles		4161	2.0	0.861	13.1	LOS B	12.4	315.3	0.70	0.84	29.0

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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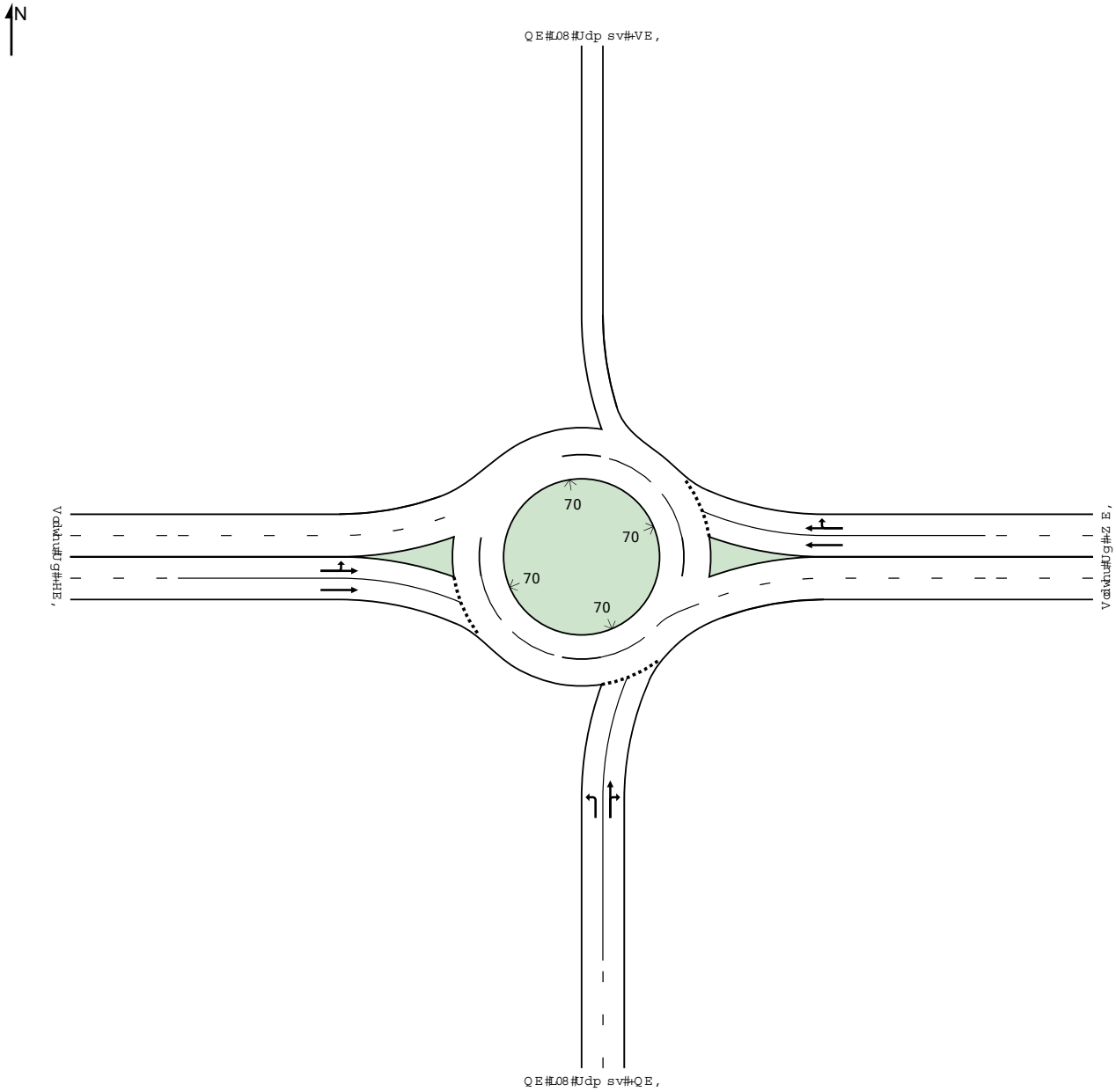
SITE LAYOUT

Site: Slater Rd at NB I-5 Ramps

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Connection



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MOVEMENT SUMMARY

Site: Slater Rd at NB I-5 Ramps

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Connection
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: NB I-5 Ramps (NB)											
3	L2	772	2.0	0.795	20.3	LOS C	7.7	194.5	0.82	1.97	21.4
8	T1	5	2.0	0.382	11.2	LOS B	1.7	42.2	0.65	1.35	26.2
18	R2	235	2.0	0.382	11.2	LOS B	1.7	42.2	0.65	1.35	26.2
Approach		1012	2.0	0.795	18.1	LOS B	7.7	194.5	0.78	0.91	22.3
East: Slater Rd (WB)											
6	T1	816	2.0	0.825	32.4	LOS C	8.7	221.0	0.96	2.30	19.3
16	R2	187	2.0	0.825	29.4	LOS C	8.7	221.0	0.97	2.32	20.0
Approach		1003	2.0	0.825	31.9	LOS C	8.7	221.0	0.96	1.15	19.4
West: Slater Rd (EB)											
5	L2	397	2.0	0.311	5.0	LOS A	0.0	0.0	0.00	0.00	30.3
2	T1	615	2.0	0.311	4.6	LOS A	0.0	0.0	0.00	0.00	33.3
Approach		1012	2.0	0.311	4.8	LOS A	0.0	0.0	0.00	0.00	32.0
All Vehicles		3026	2.0	0.825	18.2	LOS B	8.7	221.0	0.58	0.69	23.6

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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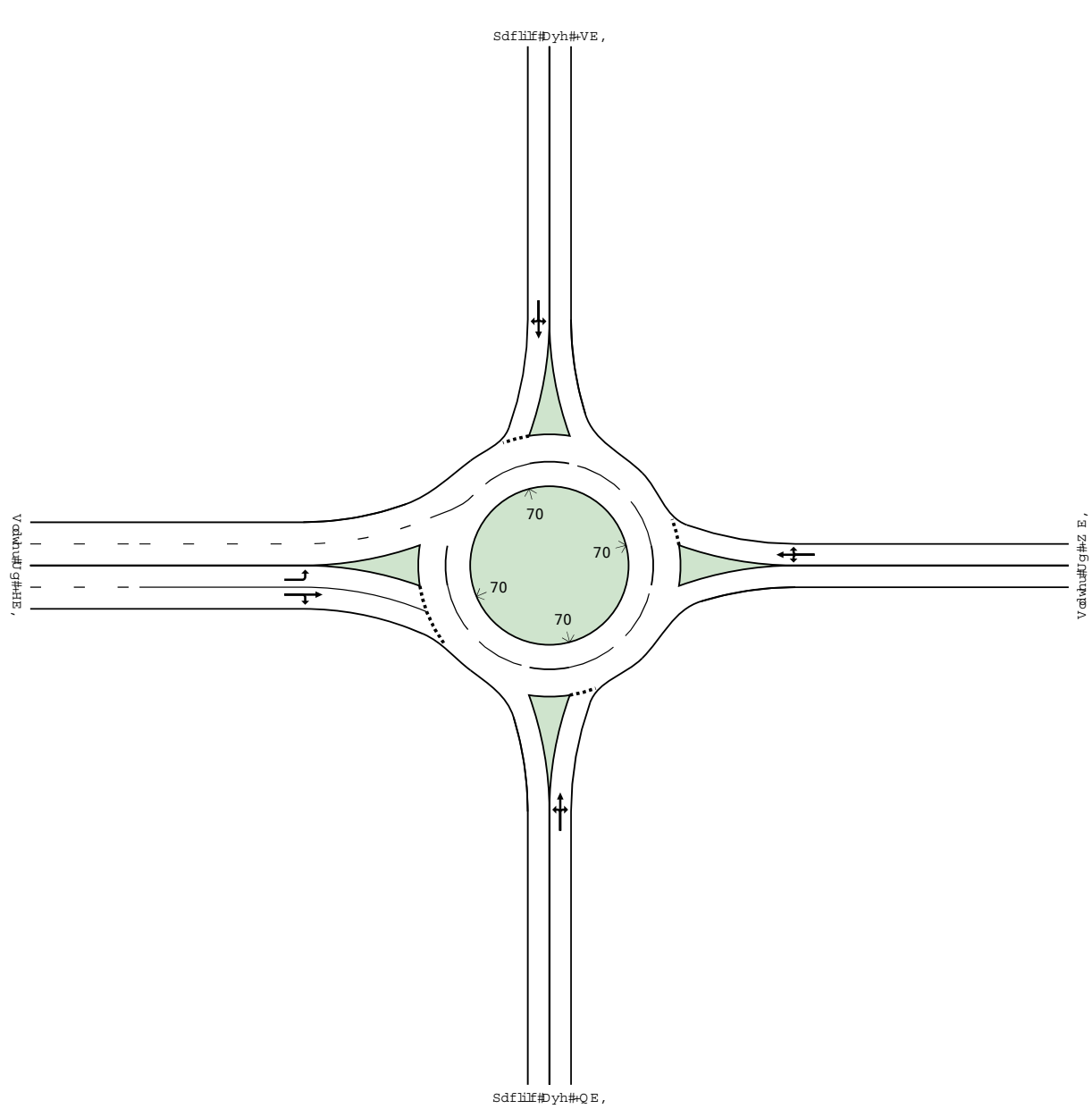
SITE LAYOUT

Site: Slater Rd at Pacific Ave

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Connection



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SIDRA INTERSECTION 6

MOVEMENT SUMMARY

Site: Slater Rd at Pacific Ave

Slater I-5 Interchange Corridor Analysis (11-130)
Future Build-Out wo Kope Rd Connection
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Pacific Ave (NB)											
3	L2	269	2.0	0.407	9.4	LOS A	2.0	51.2	0.63	1.28	25.6
8	T1	48	2.0	0.407	9.4	LOS A	2.0	51.2	0.63	1.28	25.6
18	R2	15	2.0	0.407	9.4	LOS A	2.0	51.2	0.63	1.28	25.6
Approach		333	2.0	0.407	9.4	LOS A	2.0	51.2	0.63	0.64	25.6
East: Slater Rd (WB)											
1	L2	6	2.0	0.678	16.9	LOS B	6.7	169.7	0.85	1.84	24.2
6	T1	513	2.0	0.678	16.9	LOS B	6.7	169.7	0.85	1.84	24.2
16	R2	18	2.0	0.678	16.9	LOS B	6.7	169.7	0.85	1.84	24.2
Approach		537	2.0	0.678	16.9	LOS B	6.7	169.7	0.85	0.92	24.2
North: Pacific Ave (SB)											
7	L2	16	2.0	0.420	12.3	LOS B	2.9	73.0	0.84	1.71	25.7
4	T1	19	2.0	0.420	12.3	LOS B	2.9	73.0	0.84	1.71	25.7
14	R2	219	2.0	0.420	12.3	LOS B	2.9	73.0	0.84	1.71	25.7
Approach		254	2.0	0.420	12.3	LOS B	2.9	73.0	0.84	0.85	25.7
West: Slater Rd (EB)											
5	L2	249	2.0	0.212	4.9	LOS A	1.2	29.5	0.18	0.14	27.2
2	T1	432	2.0	0.386	5.7	LOS A	2.7	69.8	0.20	0.14	29.6
12	R2	168	2.0	0.386	5.7	LOS A	2.7	69.8	0.20	0.14	29.6
Approach		849	2.0	0.386	5.5	LOS A	2.7	69.8	0.19	0.07	28.8
All Vehicles		1973	2.0	0.678	10.1	LOS B	6.7	169.7	0.53	0.50	26.5

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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