

Transportation Impact Analysis

C AND G PROPERTY

Prepared for:
Cam West – A Toll Brothers Company

April 2013

Prepared by:



11730 118th Avenue NE, Suite 600
Kirkland, WA 98034-7120
Phone: 425-821-3665
Fax: 425-825-8434
www.transpogroup.com

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**CITY OF KIRKLAND
Hearing Examiner Exhibit**

Applicant
Department
Public

C

FILE # SUB12-00560

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Frequently Asked Questions

This section provides an overview of the following report through responses to frequently asked questions (FAQs).

Where is the project located?

The proposed development is located north of NE 75th Street and east of 126th Avenue NE in the South Rose Hill Neighborhood. Access to the development is provided via NE 75th Street and NE 80th Street.

What is the project land use and trip generation?

The proposed development is located north of NE 75th Street and east of 126th Avenue NE in the South Rose Hill Neighborhood and would include the construction of up to 35 single family homes. The development is anticipated to generate 400 daily trips with 34 weekday AM peak hour trips and 41 weekday PM peak hour trips.

What are the existing and future without-project conditions in the study area?

All study intersections currently operate at LOS C or better during the weekday AM, afternoon school peak, and PM peak hour. In 2015 without the proposed project, all study intersections will continue to operate at the same LOS as defined in existing conditions.

Would the project have any transportation impacts?

All study intersections and the site driveway is anticipated to operate at LOS C or better during the weekday peak hours after the project is completed and occupied.

What mitigation measures are recommended?

Based on the results of this analysis all intersections are expected to operate at LOS C or better with the proposed project. As such all intersections comply with City of Kirkland operational standards and no off-site road improvements would be required of the project.

Introduction

The purpose of this transportation impact analysis (TIA) is to identify potential traffic-related impacts associated with the proposed residential development in Kirkland, WA. As necessary, mitigation measures are identified that would offset or reduce significant impacts.

Project Description

The proposed development is located north of NE 75th Street and east of 126th Avenue NE in the South Rose Hill Neighborhood and would include the construction of up to 35 single family homes. Access to the development is provided via NE 75th Street and NE 80th Street. The property is currently vacant. The proposed project is anticipated to be built and occupied by 2015. The site vicinity and the proposed site plan are illustrated in Figure 1 and Figure 2, respectively.

Study Approach

The scope and approach of this analysis was identified through coordination with City of Kirkland staff and complies with City of Kirkland requirements. Six off-site intersections during the weekday PM peak hour were identified for analysis. It should be noted that two intersections, 128th Avenue NE / NE 80th Street (site access) and 116th Avenue NE / NE 70th Street were identified as significant based on the City's proportional share impact worksheets shown in Appendix A, although five additional study intersections have been included to review potential impacts associated with the current access proposal. In total, the study intersections include:

1. 128th Avenue NE / NE 80th Street
2. 116th Avenue NE / NE 70th Street
3. 128th Avenue NE / NE 75th Street
4. 126th Avenue NE / NE 73rd Street
5. 130th Avenue NE / NE 80th Street
6. 130th Avenue NE / NE 75th Street
7. 126th Avenue NE / NE 80th Street

In addition to the analysis of the weekday PM peak hour, an additional analyses was conducted for the weekday AM and afternoon peak hour periods at the site access intersection of 128th Avenue NE / NE 80th Street to assess the impacts of the proposed projects during those critical time periods.



NOT TO SCALE

Site Vicinity

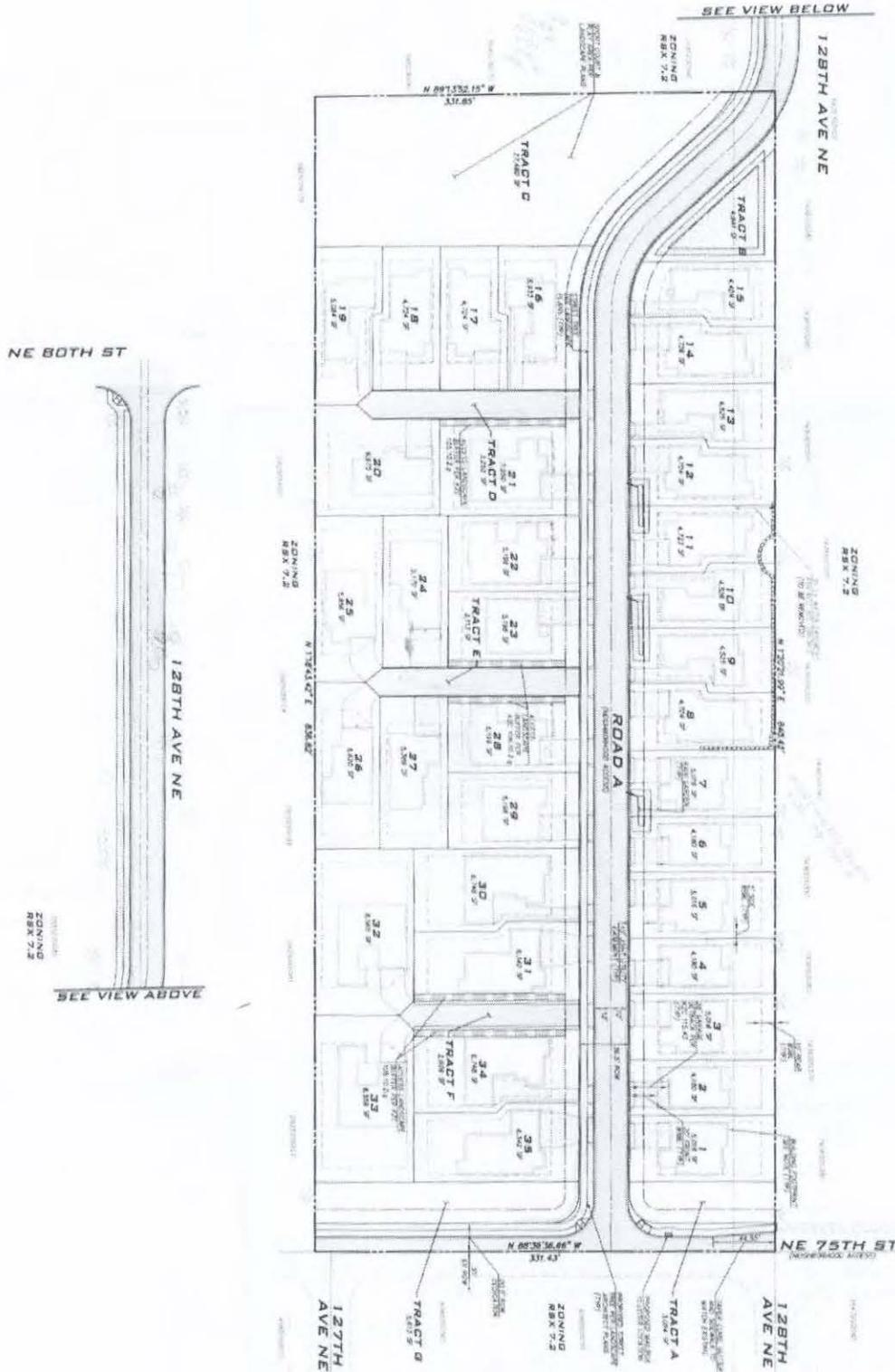
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FIGURE

1



Site Plan

C and G Property

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FIGURE
2

Existing and Without-Project Conditions

This section describes both existing and 2015 without-project conditions within the identified study area. Study area characteristics are provided for the roadway network, planned improvements, existing and forecasted without-project volumes, traffic operations, and transit and non-motorized facilities.

Roadway Network

The existing roadway network is discussed along with planned improvements that would likely be complete before the proposed project horizon year, if any. In general, the roadway descriptions given apply to the portions of the roadways within the study area of the proposed project.

The street system providing access to the site includes two-way streets, with on-street parking on the local streets and sidewalks typically provided on arterial streets. The primary roadways within the vicinity of the site are described in Table 1.

Table 1. Roadway Network Existing Conditions Summary

Roadway	Street Classification	# Lanes	Pedestrian Facilities
128th Avenue NE	Collector	2	Sidewalks on both sides of street north of NE 80th Street
126th Avenue NE	Local	2	Sidewalks intermittent on the east and west side
130th Avenue NE	Local	2	Sidewalk located on west side
NE 73rd Street	Local	2	N/A
NE 75th Street	Local	2	Sidewalks on north side of street, except adjacent to site frontage
NE 80th Street	Collector	2	Sidewalks on north and south side. Eastbound and westbound bicycle lanes.
NE 70th Street	Minor Arterial	2-3	Sidewalks and bicycle lanes on both sides of roadway
116th Ave NE	Collector	2-3	Sidewalks south of NE 70th St; Bike lanes north of NE 70th St

Planned Improvements

The City of Kirkland 2011–2016 *Capital Improvement Program* (CIP) was reviewed to identify transportation improvement projects planned for the study area. The CIP lists improvement projects that have been approved by the City and have identified funding sources within the next six years.

Based on this review, there are no street or intersection improvements in the project study area that are programmed to occur within the planning horizon for this analysis that would modify the channelization or increase the capacity at any of the study intersections.

Transit and Non-Motorized Facilities

In general, the project site is served by transit with one transit route (Route 238) operating within a short walking distance of the project site on NE 80th Street. Route 238 services Totem Lake, Kirkland, and Bothell with service provided approximately every 30 minutes on weekdays and every 60 minutes on weekends.

The project is located southwest of the Rose Hill Elementary School and pedestrian facilities between the project and the elementary school are provided. Pedestrian facilities exist on 128th Avenue NE north of the site and on NE 80th Street adjacent to the site and the school. In addition a marked crosswalk exists at the intersection of NE 80th Street / 128th Avenue NE, providing a pedestrian crossing between the proposed development and the school.

Limited pedestrian facilities exist within the neighborhood to the south, although pedestrian facilities are located on NE 75th Street east of the site. Sidewalks are also provided on 130th Avenue NE and 126th Avenue NE to the east and west of the site.

Traffic Volumes

Existing weekday PM peak hour traffic counts at study intersections were collected in February 2012 and 2013. Weekday AM and mid-day school peak hour counts were collected at the intersection of 128th Avenue NE / NE 80th Street in December 2012 while school was in session. The existing traffic volumes are shown in Figure 3. Count sheets are provided in Appendix B.

Consistent with City standards, 2015 without-project volumes were estimated by applying a general annual growth rate of 1.0-percent to existing volumes. This growth rate is consistent with the growth assumed in the concurrency model. In addition to the background growth rate, the City has requested that two pipeline projects be included, Potala Village and McCleod. Figure 4 illustrates 2015 without-project weekday peak hour traffic volumes at the study intersections.

Traffic Operations

The operational characteristics of an intersection are determined by calculating the intersection level of service (LOS). Level of service for intersection operations is described alphabetically (A through F). LOS is based on the calculated average control delay per vehicle and is typically reported for the whole intersection for signalized and all-way stop-controlled intersections, and by movement for two-way, stop-controlled intersections. Control delay is defined as the combination of initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Appendix C provides a more detailed explanation of LOS.

As described in the City of Kirkland's *Traffic Impact Analysis Guidelines*, the City requires project developers to mitigate intersections operating at LOS E when the project's proportionate share exceeds 15 percent of the intersection's total entering volume. For intersections operating at LOS F, projects are required to mitigate impacts when the project's proportionate share is greater than 5 percent of the total entering volume. Intersections operating at LOS A through D require no mitigation.

Existing and 2015 without-project peak hour level of service was calculated at study intersections based on methodologies contained in the *Highway Capacity Manual* (Transportation Research Board, 2000). *Synchro 8.0* was used for the calculations. Signal timing at the intersection of 116th Avenue NE / NE 70th Street was obtained from WSDOT. Results for the weekday AM, afternoon school, and PM peak hour are summarized in Table 2. Detailed LOS worksheets are included in Appendix D.

Table 2. Existing and 2015 Without-Project LOS Summary

Intersection	Existing (2012)			2015 Without-Project		
	LOS ¹	Delay ²	WM ³	LOS	Delay	WM
Weekday AM Peak Hour						
128th Avenue NE / NE 80th Street	C	16.5	NB	C	16.9	NB
Weekday Afternoon School Peak Hour						
128th Avenue NE / NE 80th Street	C	20.8	NB	C	22.9	NB
Weekday PM Peak Hour						
128th Avenue NE / NE 75th Street	A	8.9	EB	A	8.9	EB
126th Avenue NE / NE 73rd Street	A	9.4	WB	A	9.4	WB
126th Avenue NE / NE 80th Street	B	13.9	SB	B	14.0	SB
128th Avenue NE / NE 80th Street	B	13.6	NB	B	13.7	NB
130th Avenue NE / NE 80th Street	B	11.6	NB	B	11.7	NB
130th Avenue NE / NE 75th Street	A	8.5	EB	A	8.5	EB
116th Ave NE / NE 70th Street	C	31.0	0.83	C	31.0	0.88

1. Level of Service as defined in the *Highway Capacity Manual* (TRB, 2000)
2. Average delay per vehicle in seconds.
3. Worst movement or approach reported for unsignalized intersections.

As shown in Table 2, during the existing and 2015 without project weekday AM, afternoon, and PM peak hour, all study intersections currently operate at LOS C or better.

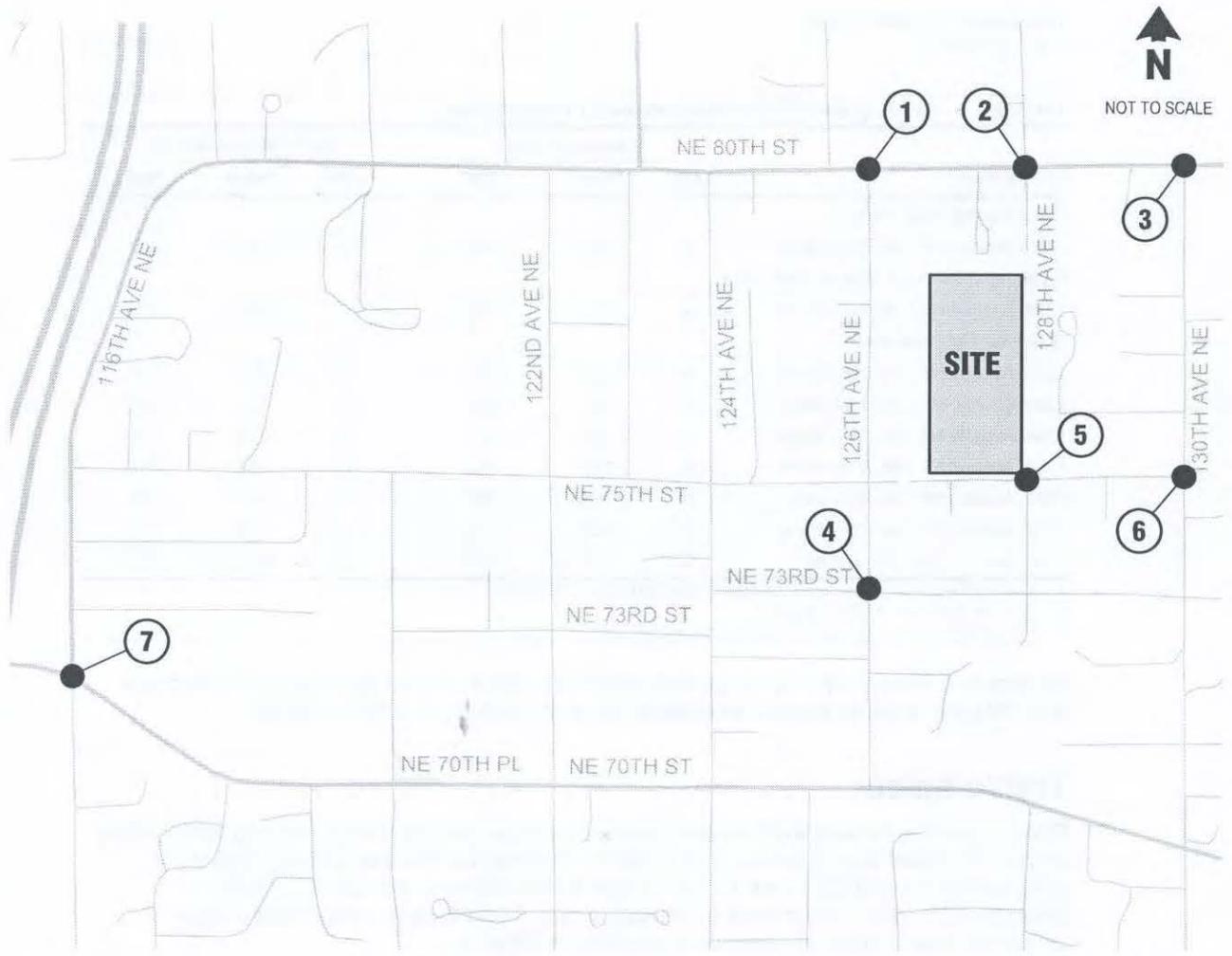
Traffic Safety

Recent collision records were reviewed within the study area to identify existing traffic safety issues. The most recent summary of collision data from the Washington Department of Transportation (WSDOT) is for the three-year period between January 1, 2009 and December 31, 2011. A summary of the total and average annual number of reported collisions at each study intersection is provided in Table 3.

Table 3. Intersection Collision Summary

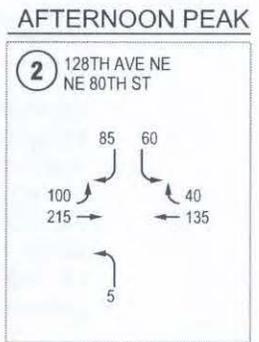
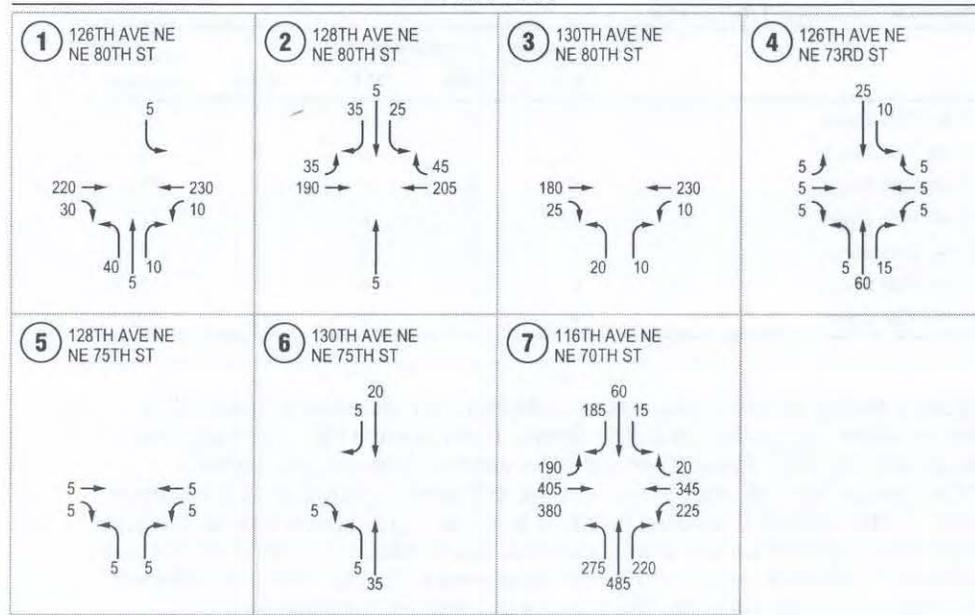
Intersection	Number of Collisions			Total	Annual Average
	2009	2010	2011		
128th Avenue NE / NE 75th Street	0	0	0	0	0
126th Avenue NE / NE 73rd Street	0	0	0	0	0
126th Avenue NE / NE 80th Street	1	0	0	1	0.33
128th Avenue NE / NE 80th Street	2	0	0	2	0.67
130th Avenue NE / NE 80th Street	0	0	0	0	0
130th Avenue NE / NE 75th Street	0	0	0	0	0
116th Avenue NE / NE 70th Street	9	6	12	27	9.0

As shown in Table 3, during the study time period collisions were reported at three of the study intersections, 126th Avenue NE / NE 80th Street, 128th Avenue NE / NE 80th Street, and 116th Avenue NE / NE 70th Street. Over the three year study period one collision occurred at 126th Avenue NE / NE 80th Street and two collisions occurred at 128th Avenue NE / NE 80th Street. The collisions included rear end and entering at an angle from the side street. No injuries were reported for any of the collisions. At the intersection of 116th Avenue NE / NE 70th Street 27 collisions occurred over the three year period with the predominant collision type involving rear end collisions. No fatalities occurred at this intersection.



PM PEAK

AM PEAK



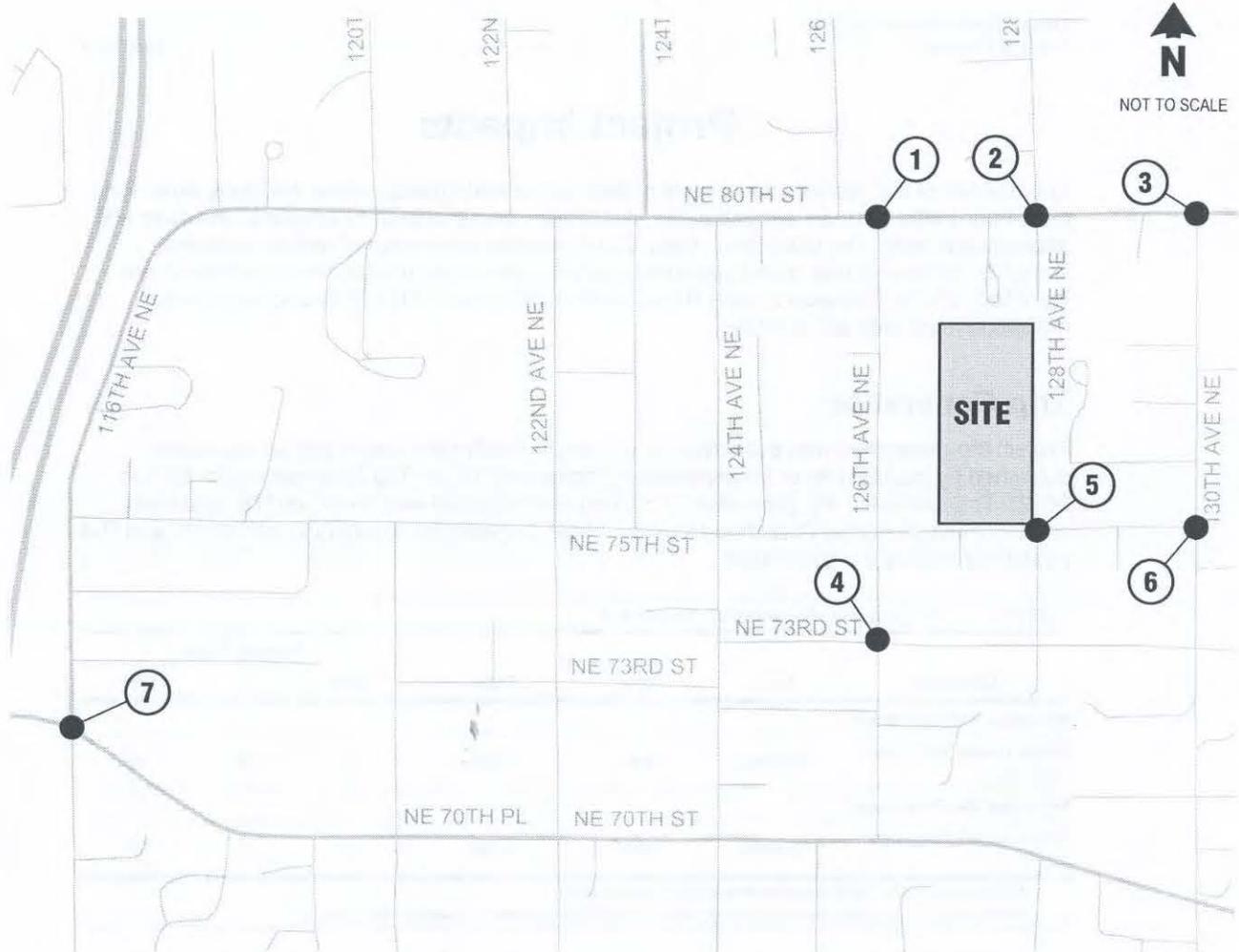
Existing Weekday Peak Hour Traffic Volumes

FIGURE

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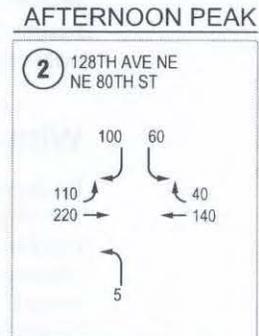
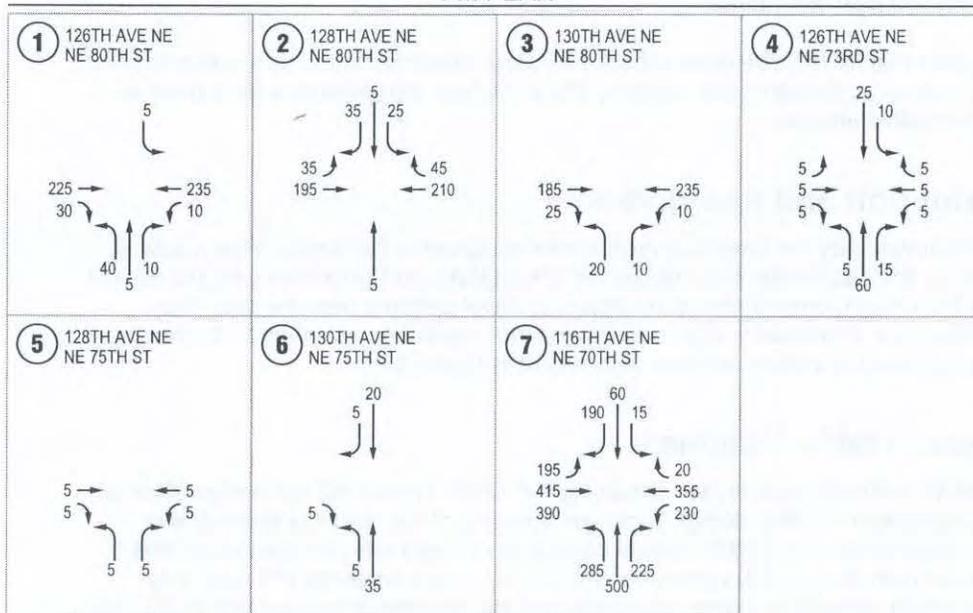
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PM PEAK

AM PEAK



2015 Without-Project Weekday Peak Hour Traffic Volumes

FIGURE

C and G Property



Project Impacts

This section of the analysis documents project-generated impacts within the study area. First, peak hour traffic volumes are estimated, distributed, and assigned to adjacent roadways and intersections within the study area. Next, 2015 volumes are projected and the potential impact to traffic volumes, traffic operations, safety, non-motorized facilities, and transit are identified. Where intersections are shown to not comply with City of Kirkland standards, mitigation measures are identified.

Trip Generation

Project trip generation was estimated for the single family land use based on equations published by the Institute of Transportation Engineers (ITE) in *Trip Generation* (9th Edition, 2012). The estimated trip generation for the current proposal was based on ITE land-use code 210 Single Family Detached Housing. Table 4 shows the resulting weekday AM and PM peak hour vehicle trip generation.

Table 4. Project Trip Generation Summary

Land Use	Size	Daily	Rate ¹	Primary Trips		
				Total	In	Out
Weekday PM Peak Hour²						
Single Family Detached (LU 210)	35 units	400	EQN	41	26	15
Weekday AM Peak Hour						
Single Family Detached (LU 210)	35 units	400	EQN	34	9	25

1. Rates based on ITE Trip Generation Manual, 9th Edition (2012).
2. Afternoon peak hour was conservatively assumed to be consistent with the weekday PM peak hour.

The development is anticipated generate 400 daily trips with 34 weekday AM peak hour trips and 41 weekday PM peak hour trips.

It should be noted that for the afternoon school peak hour analysis, no trip rate is provided in the ITE *Trip Generation*; therefore the weekday PM peak hour trip generation was used to provide a conservative analysis.

Trip Distribution and Assignment

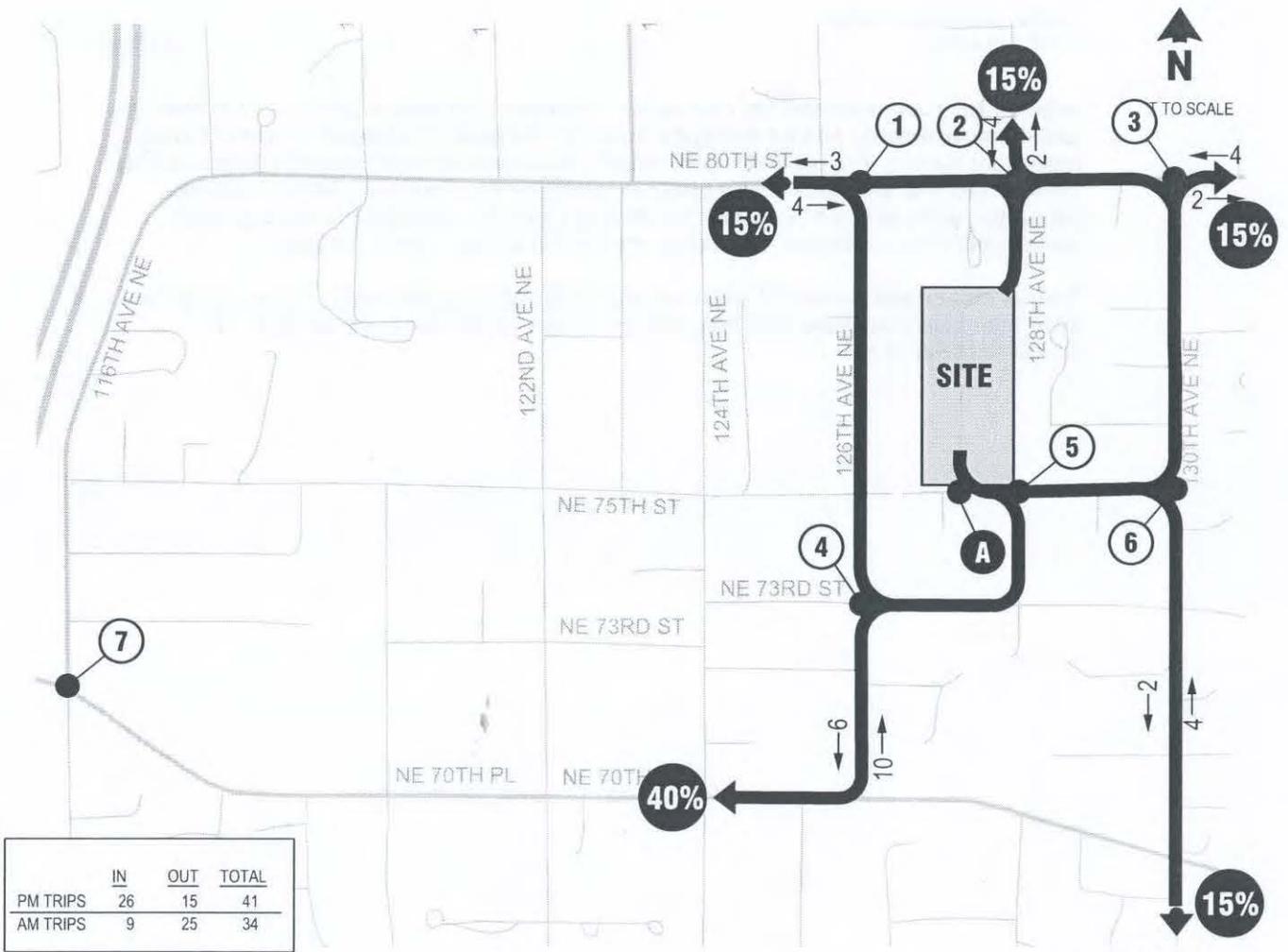
Project traffic generated by the proposed project was assigned to the surrounding roadway network based on the distribution provided by the City of Kirkland Concurrency Model as well as comments from neighborhood residents regarding travel patterns near the site. The resulting distribution is illustrated in Figure 5. Project trips were then assigned to the roadway network based on the distribution, and are also shown in Figure 5.

With-Project Traffic Volumes

Background traffic volumes were shifted assuming the 128th Avenue NE connection through the site, connecting with NE 80th Street. Based on a review of the roadway network and number of residences near the 128th Avenue connection an estimate of background trips utilizing the new 128th Avenue NE connection was made for the weekday PM peak hour period. The potential users of this new connection include the residences located on NE 75th Street between 128th Avenue NE and the roadway closure west of 127th Avenue NE, residences on 127th Avenue NE, and potentially a couple of residences on 128th Avenue NE

between NE 75th Street and NE 73rd Street. This results in approximately 9 - 12 residences totaling approximately 16 trips during the weekday PM peak hour (based on recent turning movement counts). The resulting traffic volume assignment and with-project volumes during the weekday AM, afternoon school peak, and PM peak hour with the 128th Avenue NE connection were adjusted to account for shifts in traffic. No reductions to existing traffic patterns from the residences were taken, resulting in a conservative analysis.

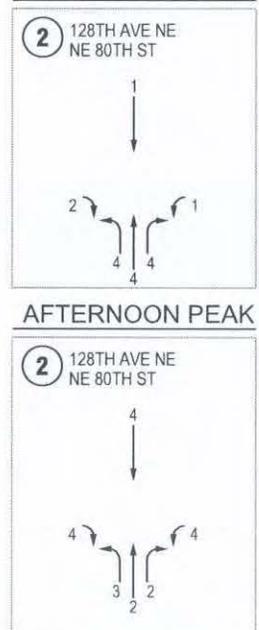
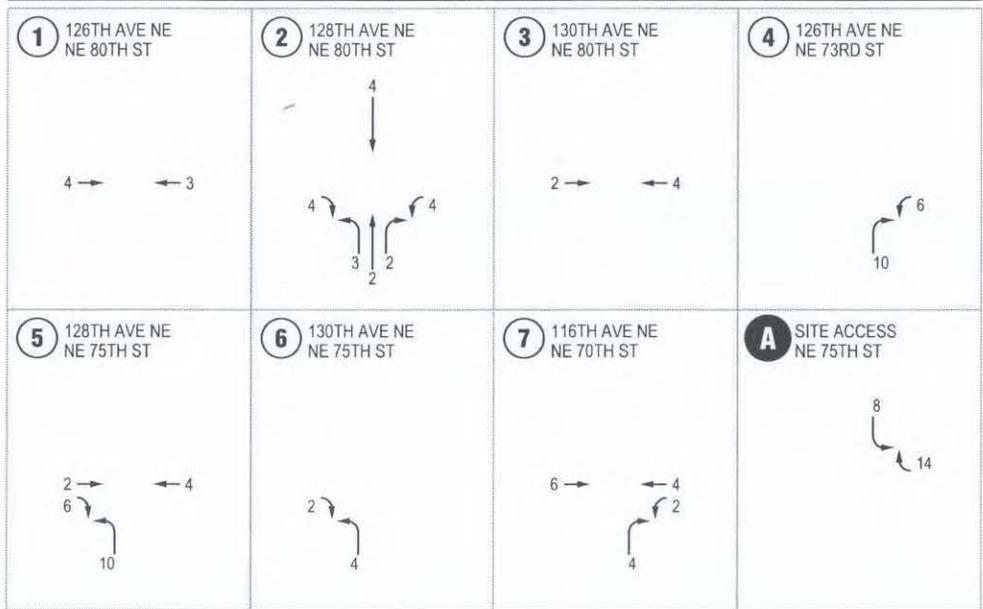
The net new project-generated traffic was added to without project traffic volumes to obtain 2015 with-project weekday peak hour traffic volumes for the study intersections and is illustrated in Figure 6.



	IN	OUT	TOTAL
PM TRIPS	26	15	41
AM TRIPS	9	25	34

PM PEAK

AM PEAK



Trip Distribution and Assignment

FIGURE

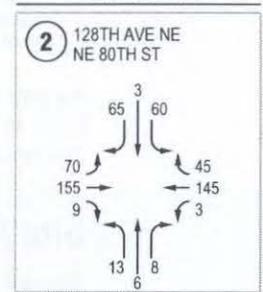
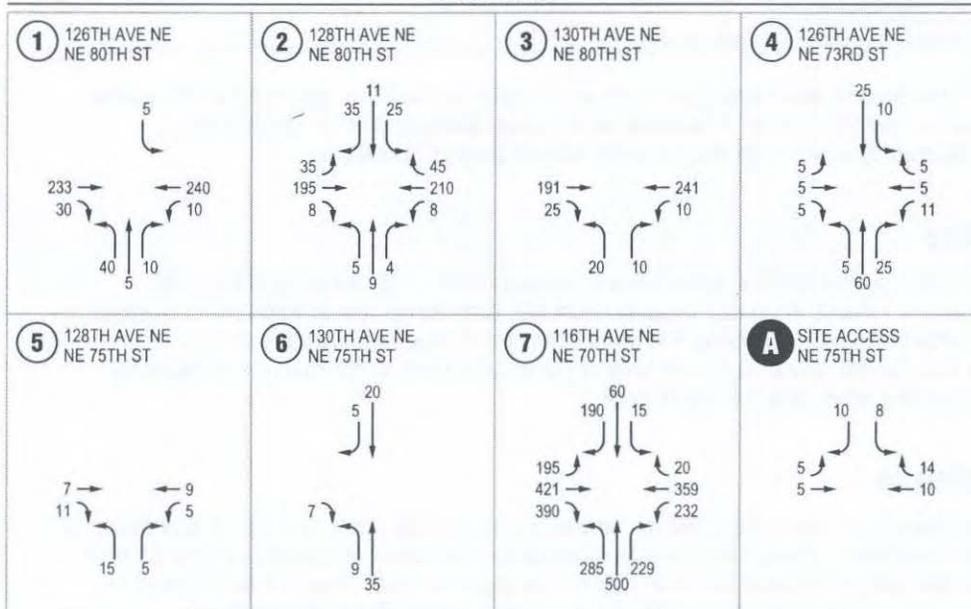
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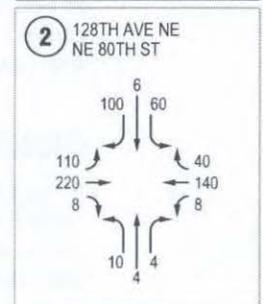


PM PEAK

AM PEAK



AFTERNOON PEAK



Future With-Project Weekday Peak Hour Traffic Volumes

FIGURE

C and G Property

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Traffic Operations Impact

Future with-project level of service analysis was conducted for the weekday AM, afternoon school peak, and PM peak hour to analyze traffic impacts of the proposed project. The same methodologies were applied and all intersection parameters such as channelization and intersection control were held consistent with those used in the evaluation of existing and without project conditions. Signal timing at the intersection of 116th Avenue NE / NE 70th Street were not optimized between without and with-project conditions. Table 5 compares the 2015 without- and with-project traffic operations during the weekday AM, afternoon school peak, and PM peak hour. The detailed LOS worksheets are included in Appendix D.

Table 5. Future Without- and With-Project LOS Summary

Intersection	2015 Without-Project			2015 With-Project		
	LOS ¹	Delay ²	WM ³	LOS	Delay	WM
Weekday AM Peak Hour						
128th Avenue NE / NE 80th Street	C	16.9	NB	C	16.5	SB
Weekday Afternoon Peak Hour						
128th Avenue NE / NE 80th Street	C	22.9	NB	C	20.7	NB
Weekday PM Peak Hour						
128th Avenue NE / NE 75th Street	A	8.9	EB	A	9.0	EB
126th Avenue NE / NE 73rd Street	A	9.4	WB	A	9.5	WB
126th Avenue NE / NE 80th Street	B	14.0	SB	B	14.2	SB
128th Avenue NE / NE 80th Street (Site Access)	B	13.7	NB	B	13.5	NB
130th Avenue NE / NE 80th Street	B	11.7	NB	B	11.8	NB
130th Avenue NE / NE 75th Street	A	8.5	EB	A	8.5	EB
116th Avenue NE / NE 70th Street	C	31.0	0.88	C	33.0	0.88
Site Access / NE 75th Street	-	-	-	A	8.6	SB

1. Level of Service as defined by the *Highway Capacity Manual* (TRB, 2010)
2. Average delay per vehicle in seconds.
3. Worst Movement reported for unsignalized intersections.

As shown in Table 5 all study intersections are anticipated to continue operating at the same LOS as without project conditions. The delay at the study intersections is expected to increase by less than two seconds from without to with-project conditions.

Site Access

Access to the site is provided via a full access driveway on NE 75th Street and NE 80th Street. As shown in Table 5 driveway operations at NE 75th Street are anticipated to operate at LOS B or better during the weekday PM peak hour. Intersection operations at NE 80th Street / 128th Avenue NE are anticipated to operate at LOS C or better during the weekday AM, afternoon school peak, and PM peak hour.

Sight Distance

A sight distance analysis was conducted at the site access points using the City of Kirkland *Sight Distance Guidelines*. Based on the side-street stop-controlled approach and the 25 mph speed limit on NE 80th Street and NE 75th Street, the required sight distance for a driver 14 feet back of the edge of traveled way is 280 feet east and west of the site access.

The edge of traveled way on NE 80th Street was assumed to be the bike lane, which is conservative as motorists often consider the edge of traveled way to be located at the edge of the vehicle travel lane. Results of the sight distance analysis are shown in Table 6. The sight distance triangles are shown in Figure 7.

Table 6. Driveway Sight Distance Analysis

Direction	Minimum (Required) ¹	Recommended (Desirable) ¹	Measured Distance	Met?
NE 80th Street / 128th Avenue NE				
East	150 feet	280 feet	270 feet	Yes
West	150 feet	280 feet	>300 feet	Yes
NE 75th Street / Site Access				
East	150 feet	280 feet	>280 feet	Yes
West	150 feet	280 feet	280 feet	Yes

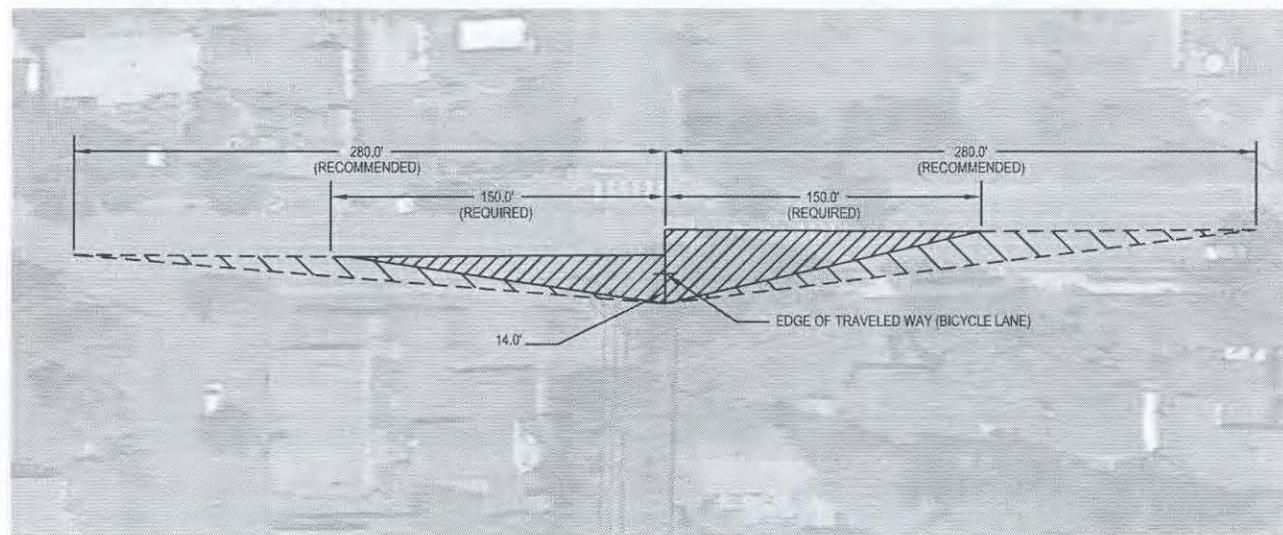
1. From City of Kirkland's *Sight Distance Guidelines* for intersection Type B (stop-controlled) with a roadway speed of 25 mph.

No vertical or horizontal obstructions from the roadway alignment within the defined sight triangle are present at the proposed site access locations. A tree east of the NE 80th Street access inhibits the view of drivers looking east when assuming the 14 foot setback from the edge of bike lane. With this obstruction, sight distance is reduced to 270 feet. Assuming the edge of traveled way is the vehicle travel lane increases sight distance to over 280 feet. With the development of the roadway frontage on NE 75th Street, landscaping and vegetation will need to be maintained to prevent any sight obstructions between 3 feet and 8 feet, per the City of Kirkland *Sight Distance Guidelines*.



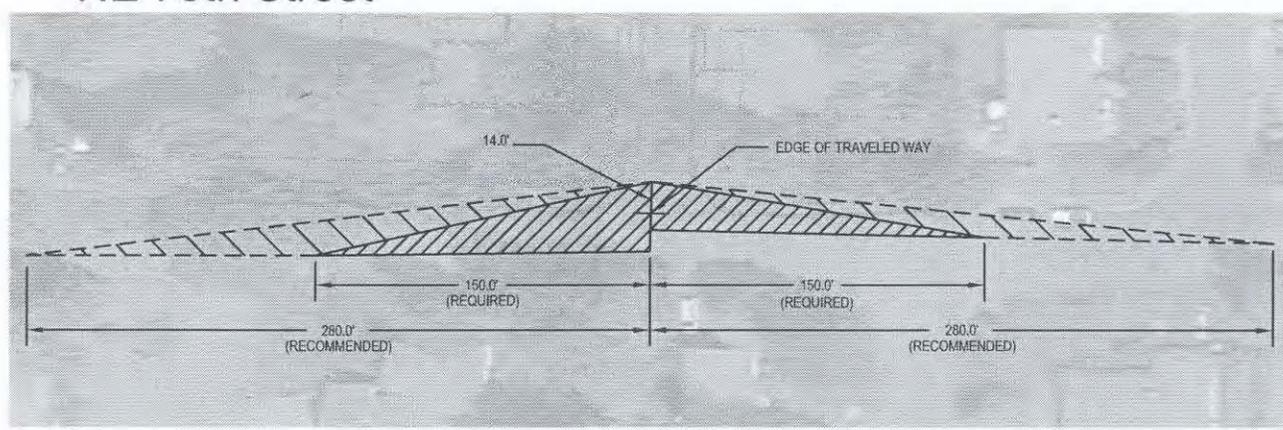
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NE 80th Street



- RECOMMENDED VERTICAL SIGHT DISTANCE CURRENTLY MET IN BOTH DIRECTIONS.
- RECOMMENDED HORIZONTAL SIGHT DISTANCE CURRENTLY MET TOWARDS THE WEST.
- REQUIRED HORIZONTAL SIGHT DISTANCE CURRENTLY MET TOWARDS THE EAST. RECOMMENDED SIGHT DISTANCE IS BLOCKED AT APPROXIMATELY 270 FEET BY TREE.

NE 75th Street



- RECOMMENDED HORIZONTAL AND VERTICAL SIGHT DISTANCE CURRENTLY MET IN BOTH DIRECTIONS.
- VEGETATION ALONG ROADWAY MUST BE MAINTAINED WITHIN SIGHT TRIANGLES BETWEEN 3 FEET AND 8 FEET.

Sight Distance

C and G Property

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FIGURE

7

Findings and Recommendations

This transportation impact analysis summarizes the potential project traffic related impacts of the proposed residential development in Kirkland, WA. The following outlines the general findings of the study.

- The proposed development is located north of NE 75th Street and east of 126th Avenue NE in the South Rose Hill Neighborhood and would include the construction of up to 35 single family homes. Access to the development is provided via NE 75th Street and NE 80th Street.
- The development is anticipated generate 400 daily trips with 34 weekday AM peak hour trips and 41 weekday PM peak hour trips.
- All study intersections would continue to operate at LOS C or better during with or without-project conditions.
- No off-site mitigation measures are required based on the analysis.
- Sight distance is met at both access driveways.

Findings and Recommendations

The Board of Directors, upon review of the findings and recommendations of the audit, has approved the following findings and recommendations:

- 1. The Board of Directors should review the findings and recommendations of the audit and determine the appropriate actions to be taken.
- 2. The Board of Directors should review the findings and recommendations of the audit and determine the appropriate actions to be taken.
- 3. The Board of Directors should review the findings and recommendations of the audit and determine the appropriate actions to be taken.
- 4. The Board of Directors should review the findings and recommendations of the audit and determine the appropriate actions to be taken.

Appendix A: City of Kirkland Concurrency Results

The following table provides a summary of the concurrency results for the City of Kirkland:

Category	Findings	Recommendations
Category 1	Findings 1.1, 1.2, 1.3	Recommendations 1.1, 1.2, 1.3
Category 2	Findings 2.1, 2.2, 2.3	Recommendations 2.1, 2.2, 2.3
Category 3	Findings 3.1, 3.2, 3.3	Recommendations 3.1, 3.2, 3.3
Category 4	Findings 4.1, 4.2, 4.3	Recommendations 4.1, 4.2, 4.3
Category 5	Findings 5.1, 5.2, 5.3	Recommendations 5.1, 5.2, 5.3
Category 6	Findings 6.1, 6.2, 6.3	Recommendations 6.1, 6.2, 6.3
Category 7	Findings 7.1, 7.2, 7.3	Recommendations 7.1, 7.2, 7.3
Category 8	Findings 8.1, 8.2, 8.3	Recommendations 8.1, 8.2, 8.3
Category 9	Findings 9.1, 9.2, 9.3	Recommendations 9.1, 9.2, 9.3
Category 10	Findings 10.1, 10.2, 10.3	Recommendations 10.1, 10.2, 10.3

Proportional Share Impact Worksheet

Input appropriate information in green cells

¹ See "Intersection Description" worksheet for descriptions

Project Name:	C and G Property		Through Lanes ¹
Major Street ¹	116th Street	# of Lanes* =	1
Minor Street ¹	I-405 NB	# of Lanes* =	1

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

DATE:

2/11/2013

Daily Project Traffic Entering the Intersection

(Total of both approaches divided by two)

	Daily Volumes	Entering Leg Volumes*	
Major Street Volume $V_1 =$	15	30	0
Minor Street Volume $V_2 =$	15	30	0

Major

(Total of both approaches divided by two)

Minor

*Do not leave cell empty for zero volume

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
0.833	1	0.833	1

Calculate Base Percentages

$P_1 = V_1 / (10,000 \times f_1) =$	0.18%
$P_2 = V_2 / (5,000 \times f_2) =$	0.30%
$P_3 = V_1 / (15,000 \times f_3) =$	0.12%
$P_4 = V_2 / (2,500 \times f_4) =$	0.60%

Calculate Proportional Share

$S_1 = (P_1 + P_2) / 2 =$	0.24%
$S_2 = (P_3 + P_4) / 2 =$	0.36%

Intersection Proportional Share = Maximum of S1 and S2 = 0.36%

Significant Intersection? no

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By: Scott Lee
Company: Transpo Group

Proportional Share Impact Worksheet

Input appropriate information in green cells

Project Name:	C and G Property		Through Lanes¹
Major Street¹	116th Avenue NE	# of Lanes* =	1
Minor Street¹	70th St	# of Lanes* =	1

¹ See "Intersection Description" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

DATE: 3/20/1900

Daily Project Traffic Entering the Intersection

(Total of both approaches divided by two)	Major Street Volume $V_1 =$	25	50	0	<i>Major</i>
(Total of both approaches divided by two)	Minor Street Volume $V_2 =$	65	50	80	<i>Minor</i>

Daily Volumes **Entering Leg Volumes ***

*Do not leave cell empty for zero volume

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
0.833	1	0.833	1

Calculate Base Percentages

$P_1 = V_1 / (10,000 \times f_1) =$ 0.30%

$P_2 = V_2 / (5,000 \times f_2) =$ 1.30%

$P_3 = V_1 / (15,000 \times f_3) =$ 0.20%

$P_4 = V_2 / (2,500 \times f_4) =$ 2.60%

Calculate Proportional Share

$S_1 = (P_1 + P_2) / 2 =$ 0.80%

$S_2 = (P_3 + P_4) / 2 =$ 1.40%

Intersection Proportional Share = Maximum of S1 and S2 = 1.40%
Significant Intersection? yes

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By: Scott Lee
Company: Transpo Group

Proportional Share Impact Worksheet

Input appropriate information in green cells

Project Name:	C and G Property		Through Lanes ¹
Major Street ¹	NE 70th Street	# of Lanes*= <u> </u>	1
Minor Street ¹	132nd Avenue NE	# of Lanes*= <u> </u>	1

¹ See "Intersection Description" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

DATE:

 2/11/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	Entering Leg Volumes *		
(Total of both approaches divided by two)	Major Street Volume $V_1 =$	15	30	0	Major
(Total of both approaches divided by two)	Minor Street Volume $V_2 =$	15	30	0	Minor

*Do not leave cell empty for zero volume

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
<u>0.833</u>	<u>1</u>	<u>0.833</u>	<u>1</u>

Calculate Base Percentages

$P_1 = V_1 / (10,000 \times f_1) =$	<u> </u> 0.18%
$P_2 = V_2 / (5,000 \times f_2) =$	<u> </u> 0.30%
$P_3 = V_1 / (15,000 \times f_3) =$	<u> </u> 0.12%
$P_4 = V_2 / (2,500 \times f_4) =$	<u> </u> 0.60%

Calculate Proportional Share

$S_1 = (P_1 + P_2) / 2 =$	<u> </u> 0.24%
$S_2 = (P_3 + P_4) / 2 =$	<u> </u> 0.36%

Intersection Proportional Share = Maximum of S1 and S2 = 0.36%

Significant Intersection? no

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By: Scott Lee
 Company: Transpo Group

Proportional Share Impact Worksheet

Input appropriate information in green cells

Project Name:	C and G Property		Through Lanes¹
Major Street¹	NE 85th Street	# of Lanes*=¹	2
Minor Street¹	120th Avenue NE	# of Lanes*=¹	1

¹ See "Intersection Description" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

DATE: 2/11/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	Entering Leg Volumes *		
(Total of both approaches divided by two)	Major Street Volume $V_1 =$	42.5	54	31	<i>Major</i>
(Total of both approaches divided by two)	Minor Street Volume $V_2 =$	7.5	15	0	<i>Minor</i>

*Do not leave cell empty for zero volume

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
1	1	1	1

Calculate Base Percentages

$P_1 = V_1 / (10,000 \times f_1) =$	0.43%
$P_2 = V_2 / (5,000 \times f_2) =$	0.15%
$P_3 = V_1 / (15,000 \times f_3) =$	0.28%
$P_4 = V_2 / (2,500 \times f_4) =$	0.30%

Calculate Proportional Share

$S_1 = (P_1 + P_2) / 2 =$	0.29%
$S_2 = (P_3 + P_4) / 2 =$	0.29%

Intersection Proportional Share = Maximum of S1 and S2 = 0.29%
Significant Intersection? no

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By: Scott Lee
Company: Transpo Group

Proportional Share Impact Worksheet

Input appropriate information in green cells

Project Name:	C and G Property		Through Lanes¹	2
Major Street¹	NE 85th Street	# of Lanes*=¹		2
Minor Street¹	124th Avenue NE	# of Lanes*=¹		1

¹ See "Intersection Description" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

DATE:

2/11/2013

Daily Project Traffic Entering the Intersection

		Daily Volumes	Entering Leg Volumes *		
(Total of both approaches divided by two)	Major Street Volume $V_1 =$	31.5	39	24	<i>Major</i>
(Total of both approaches divided by two)	Minor Street Volume $V_2 =$	11.5	8	15	<i>Minor</i>

*Do not leave cell empty for zero volume

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
1	1	1	1

Calculate Base Percentages

$P_1 = V_1 / (10,000 \times f_1) =$	0.32%
$P_2 = V_2 / (5,000 \times f_2) =$	0.23%
$P_3 = V_1 / (15,000 \times f_3) =$	0.21%
$P_4 = V_2 / (2,500 \times f_4) =$	0.46%

Calculate Proportional Share

$S_1 = (P_1 + P_2) / 2 =$	0.27%
$S_2 = (P_3 + P_4) / 2 =$	0.34%

Intersection Proportional Share = Maximum of S1 and S2 = 0.34%
Significant Intersection? no

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By: Scott Lee
Company: Transpo Group

Proportional Share Impact Worksheet

Input appropriate information in green cells

Project Name:	C and G Property		Through Lanes ¹
Major Street ¹	NE 90th Street	# of Lanes* =	1
Minor Street ¹	124th Avenue NE	# of Lanes* =	1

¹ See "Intersection Description" worksheet for descriptions

1. May Change without notice, call Thang Nguyen 425-587-3869 with questions

DATE:

2/11/2013

Daily Project Traffic Entering the Intersection

(Total of both approaches divided by two)

	Daily Volumes	Entering Leg Volumes *		
Major Street Volume $V_1 =$	0	0	0	Major
Minor Street Volume $V_2 =$	8	8	8	Minor

(Total of both approaches divided by two)

*Do not leave cell empty for zero volume

Determine Geometric Factors

Number of Lanes		Geometric Factors			
Major Street	Minor Street	f_1	f_2	f_3	f_4
2	2	1.000	1.330	1.000	1.330
2	1	1.000	1.000	1.000	1.000
1	2	0.833	1.330	0.833	1.330
1	1	0.833	1.000	0.833	1.000

f_1	f_2	f_3	f_4
0.833	1	0.833	1

Calculate Base Percentages

$P_1 = V_1 / (10,000 \times f_1) =$	0.00%
$P_2 = V_2 / (5,000 \times f_2) =$	0.16%
$P_3 = V_1 / (15,000 \times f_3) =$	0.00%
$P_4 = V_2 / (2,500 \times f_4) =$	0.32%

Calculate Proportional Share

$S_1 = (P_1 + P_2) / 2 =$	0.08%
$S_2 = (P_3 + P_4) / 2 =$	0.16%

Intersection Proportional Share = Maximum of S1 and S2 = 0.16%
Significant Intersection? no

1. Number of through lanes. Do not count exclusive turn lanes. Use the smaller number of lanes if the number of lanes is unequal on two legs. For Example, if one minor leg has two lanes and one minor leg has one lane, the number of lanes on the minor leg is one.

Computed By: Scott Lee
 Company: Transpo Group

Appendix B: Traffic Volumes

Year	2010	2011	2012	2013	2014	2015
Northbound	1200	1300	1400	1500	1600	1700
Southbound	1100	1200	1300	1400	1500	1600

Year	2010	2011	2012	2013	2014	2015
Eastbound	1300	1400	1500	1600	1700	1800
Westbound	1200	1300	1400	1500	1600	1700

Appendix B: Traffic Volumes

Year	2010	2011	2012	2013	2014	2015
Northbound	1200	1300	1400	1500	1600	1700
Southbound	1100	1200	1300	1400	1500	1600
Eastbound	1300	1400	1500	1600	1700	1800
Westbound	1200	1300	1400	1500	1600	1700

Year	2010	2011	2012	2013	2014	2015
Northbound	1200	1300	1400	1500	1600	1700
Southbound	1100	1200	1300	1400	1500	1600
Eastbound	1300	1400	1500	1600	1700	1800
Westbound	1200	1300	1400	1500	1600	1700

Year	2010	2011	2012	2013	2014	2015
Northbound	1200	1300	1400	1500	1600	1700
Southbound	1100	1200	1300	1400	1500	1600
Eastbound	1300	1400	1500	1600	1700	1800
Westbound	1200	1300	1400	1500	1600	1700

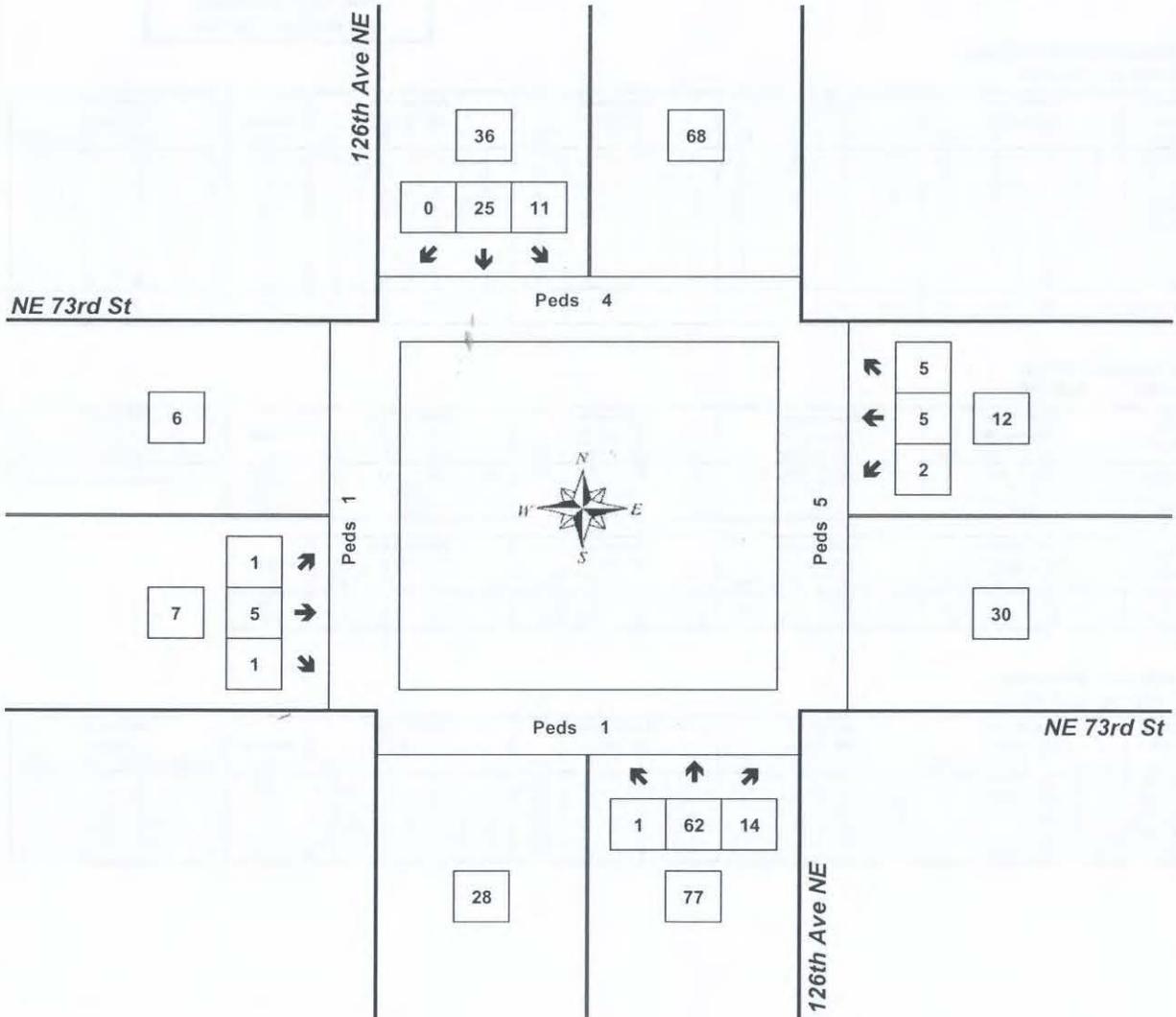
Peak Hour Summary



Mark Skaggs
(206) 251-0300

126th Ave NE & NE 73rd St

5:00 PM to 6:00 PM
Wednesday, February 22, 2012



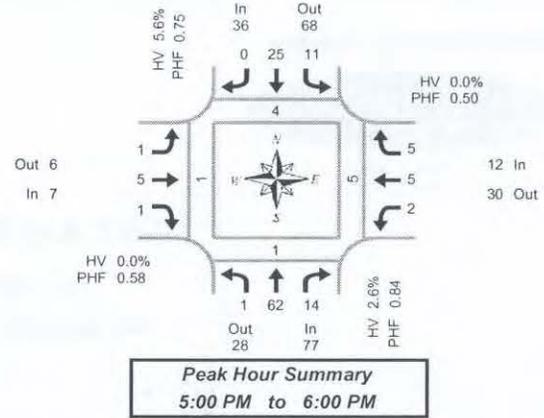
Approach	PHF	HV%	Volume
EB	0.58	0.0%	7
WB	0.50	0.0%	12
NB	0.84	2.6%	77
SB	0.75	5.6%	36
Intersection	0.92	3.0%	132

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

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



126th Ave NE & NE 73rd St

Wednesday, February 22, 2012
4:00 PM to 6:00 PM

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

Interval Start Time	Northbound 126th Ave NE				Southbound 126th Ave NE				Eastbound NE 73rd St				Westbound NE 73rd St				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	11	3	0	2	3	0	0	0	0	0	0	1	0	0	0	20	0	0	0	0
4:15 PM	0	4	2	0	0	4	0	0	0	0	0	0	0	1	2	0	13	0	1	1	0
4:30 PM	0	5	3	1	0	5	0	0	0	0	1	0	2	0	1	0	17	0	0	0	0
4:45 PM	0	13	3	0	2	4	1	0	0	1	0	0	0	4	0	0	28	0	0	0	0
5:00 PM	0	16	3	0	7	5	0	1	0	1	1	0	1	2	0	0	36	2	0	0	0
5:15 PM	1	14	3	0	1	8	0	0	0	3	0	0	1	1	4	0	36	1	0	4	0
5:30 PM	0	13	4	1	3	6	0	1	1	1	0	0	0	2	1	0	31	0	1	1	1
5:45 PM	0	19	4	1	0	6	0	0	0	0	0	0	0	0	0	0	29	1	0	0	0
Total Survey	1	95	25	3	15	41	1	2	1	6	2	0	5	10	8	0	210	4	2	6	1

Peak Hour Summary 5:00 PM to 6:00 PM

By Approach	Northbound 126th Ave NE				Southbound 126th Ave NE				Eastbound NE 73rd St				Westbound NE 73rd St				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	77	28	105	2	36	68	104	2	7	6	13	0	12	30	42	0	132	4	1	5	1
%HV	2.6%				5.6%				0.0%				0.0%				3.0%				
PHF	0.84				0.75				0.58				0.50				0.92				

By Movement	Northbound 126th Ave NE				Southbound 126th Ave NE				Eastbound NE 73rd St				Westbound NE 73rd St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	1	62	14	77	11	25	0	36	1	5	1	7	2	5	5	12	132
PHF	0.25	0.82	0.88	0.84	0.39	0.78	0.00	0.75	0.25	0.42	0.25	0.58	0.50	0.63	0.31	0.50	0.92

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

Interval Start Time	Northbound 126th Ave NE				Southbound 126th Ave NE				Eastbound NE 73rd St				Westbound NE 73rd St				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	33	11	1	4	16	1	0	0	1	1	0	3	5	3	0	78	0	1	1	0
4:15 PM	0	38	11	1	9	18	1	1	0	2	2	0	3	7	3	0	94	2	1	1	0
4:30 PM	1	48	12	1	10	22	1	1	0	5	2	0	4	7	5	0	117	3	0	4	0
4:45 PM	1	56	13	1	13	23	1	2	1	6	1	0	2	9	5	0	131	3	1	5	1
5:00 PM	1	62	14	2	11	25	0	2	1	5	1	0	2	5	5	0	132	4	1	5	1

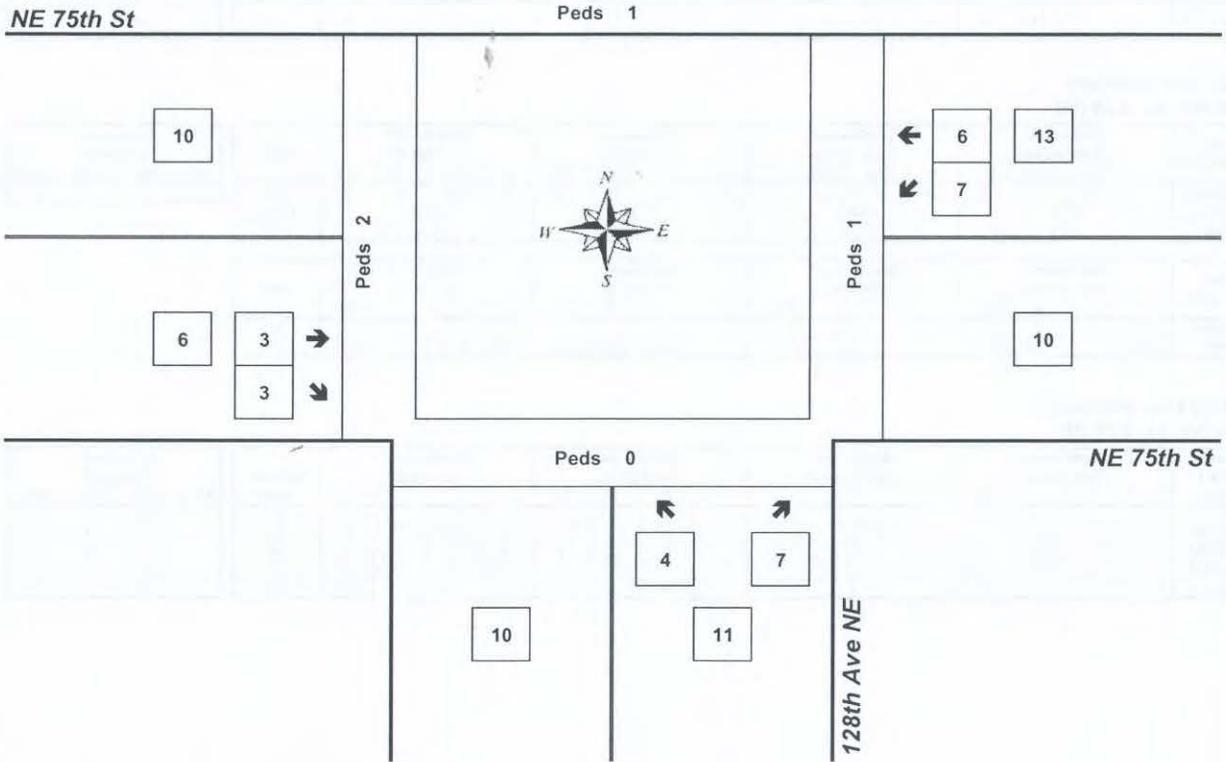
Peak Hour Summary



Mark Skaggs
(206) 251-0300

128th Ave NE & NE 75th St

4:30 PM to 5:30 PM
Wednesday, February 22, 2012



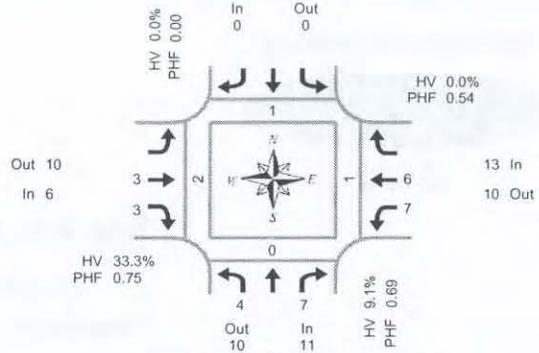
Approach	PHF	HV%	Volume
EB	0.75	33.3%	6
WB	0.54	0.0%	13
NB	0.69	9.1%	11
SB	0.00	0.0%	0
Intersection	0.75	10.0%	30

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

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



128th Ave NE & NE 75th St

Wednesday, February 22, 2012

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound 128th Ave NE				Southbound 128th Ave NE			Eastbound NE 75th St			Westbound NE 75th St			Interval Total	Pedestrians Crosswalk				
	L	R	HV		In	Out	Total	T	R	HV	L	T	HV		North	South	East	West	
4:00 PM	2	1	0					2	0	0	0	0	0	0	5	0	0	0	0
4:15 PM	0	0	0					0	0	0	0	0	1	0	1	0	0	0	0
4:30 PM	2	1	1					0	2	2	1	1	0	7	0	0	0	0	
4:45 PM	1	3	0					2	0	0	2	0	0	8	0	0	0	0	
5:00 PM	0	2	0					0	0	0	3	0	0	5	1	0	1	2	
5:15 PM	1	1	0					1	1	0	1	5	0	10	0	0	0	0	
5:30 PM	1	2	0					0	0	0	0	0	0	3	0	0	0	0	
5:45 PM	1	2	1					0	0	0	0	0	0	3	0	0	0	0	
Total Survey	8	12	2					5	3	2	7	7	0	42	1	0	1	2	

Peak Hour Summary

4:30 PM to 5:30 PM

By Approach	Northbound 128th Ave NE				Southbound 128th Ave NE			Eastbound NE 75th St				Westbound NE 75th St				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	11	10	21	1	0	0	0	6	10	16	2	13	10	23	0	30	1	0	1	2
%HV	9.1%				0.0%			33.3%				0.0%				10.0%				
PHF	0.69				0.00			0.75				0.54				0.75				

By Movement	Northbound 128th Ave NE				Southbound 128th Ave NE			Eastbound NE 75th St				Westbound NE 75th St				Total
	L	R	Total	HV	In	Out	Total	T	R	Total	L	T	Total	HV		
Volume	4	7	11	1			0	3	3	6	7	6	13	30		
PHF	0.50	0.58	0.69				0.00	0.38	0.38	0.75	0.58	0.30	0.54	0.75		

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound 128th Ave NE				Southbound 128th Ave NE			Eastbound NE 75th St			Westbound NE 75th St			Interval Total	Pedestrians Crosswalk			
	L	R	HV		In	Out	Total	T	R	HV	L	T	HV		North	South	East	West
4:00 PM	5	5	1					4	2	2	3	2	0	21	0	0	0	0
4:15 PM	3	6	1					2	2	2	6	2	0	21	1	0	1	2
4:30 PM	4	7	1					3	3	2	7	6	0	30	1	0	1	2
4:45 PM	3	8	0					3	1	0	6	5	0	26	1	0	1	2
5:00 PM	3	7	1					1	1	0	4	5	0	21	1	0	1	2

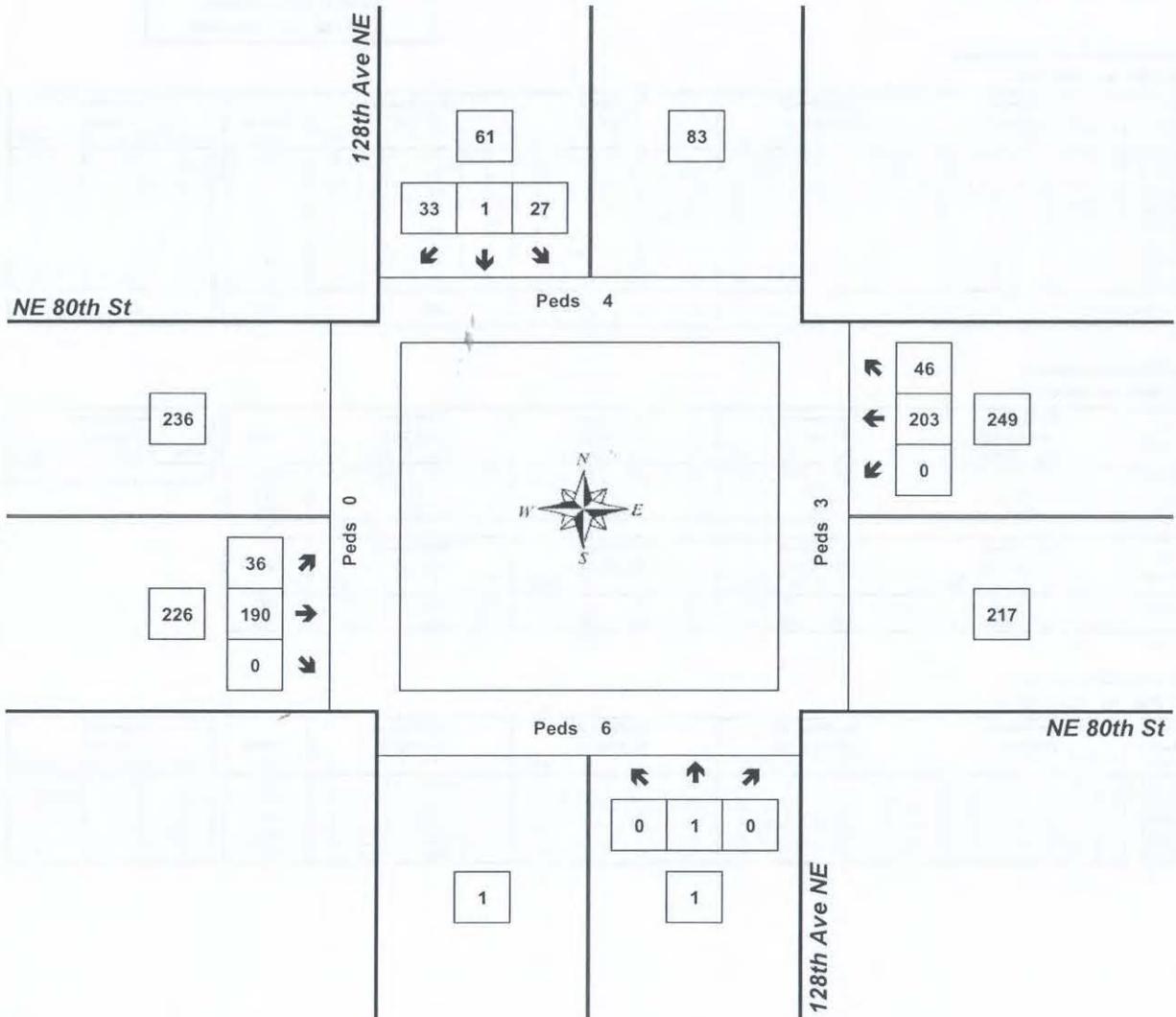
Peak Hour Summary



Mark Skaggs
(206) 251-0300

128th Ave NE & NE 80th St

5:00 PM to 6:00 PM
Wednesday, February 22, 2012



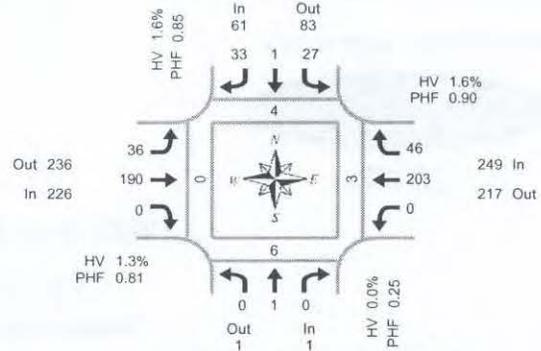
Approach	PHF	HV%	Volume
EB	0.81	1.3%	226
WB	0.90	1.6%	249
NB	0.25	0.0%	1
SB	0.85	1.6%	61
Intersection	0.93	1.5%	537

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

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Peak Hour Summary
5:00 PM to 6:00 PM

128th Ave NE & NE 80th St

Wednesday, February 22, 2012
4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound 128th Ave NE				Southbound 128th Ave NE				Eastbound NE 80th St				Westbound NE 80th St				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	6	0	4	19	0	1	0	27	9	0	69	3	4	4	0
4:15 PM	0	0	0	0	2	0	9	1	8	30	0	1	0	35	5	1	89	1	0	0	0
4:30 PM	0	0	0	0	3	0	3	0	5	28	0	1	0	30	2	0	71	4	5	0	0
4:45 PM	0	0	0	0	7	1	6	0	10	34	1	0	0	40	6	1	105	0	5	0	0
5:00 PM	0	0	0	0	3	1	8	0	5	47	0	1	0	54	10	0	128	0	1	2	0
5:15 PM	0	1	0	0	6	0	8	0	15	55	0	0	0	51	8	1	144	1	3	1	0
5:30 PM	0	0	0	0	9	0	9	1	7	49	0	1	0	55	14	1	143	2	2	0	0
5:45 PM	0	0	0	0	9	0	8	0	9	39	0	1	0	43	14	2	122	1	0	0	0
Total Survey	0	1	0	0	43	2	57	2	63	301	1	6	0	335	68	6	871	12	20	7	0

Peak Hour Summary

5:00 PM to 6:00 PM

By Approach	Northbound 128th Ave NE				Southbound 128th Ave NE				Eastbound NE 80th St				Westbound NE 80th St				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	1	1	2	0	61	83	144	1	226	236	462	3	249	217	466	4	537	4	6	3	0
%HV			0.0%				1.6%				1.3%				1.6%		1.5%				
PHF			0.25				0.85				0.81				0.90		0.93				

By Movement	Northbound 128th Ave NE				Southbound 128th Ave NE				Eastbound NE 80th St				Westbound NE 80th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	1	0	1	27	1	33	61	36	190	0	226	0	203	46	249	537
PHF	0.00	0.25	0.00	0.25	0.75	0.25	0.92	0.85	0.60	0.86	0.00	0.81	0.00	0.92	0.82	0.90	0.93

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound 128th Ave NE				Southbound 128th Ave NE				Eastbound NE 80th St				Westbound NE 80th St				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	16	1	24	1	27	111	1	3	0	132	22	2	334	8	14	4	0
4:15 PM	0	0	0	0	15	2	26	1	28	139	1	3	0	159	23	2	393	5	11	2	0
4:30 PM	0	1	0	0	19	2	25	0	35	164	1	2	0	175	26	2	448	5	14	3	0
4:45 PM	0	1	0	0	25	2	31	1	37	185	1	2	0	200	38	3	520	3	11	3	0
5:00 PM	0	1	0	0	27	1	33	1	36	190	0	3	0	203	46	4	537	4	6	3	0

Peak Hour Summary



Mark Skaggs
(206) 251-0300

130th Ave NE & NE 80th St

5:00 PM to 6:00 PM
Wednesday, February 22, 2012

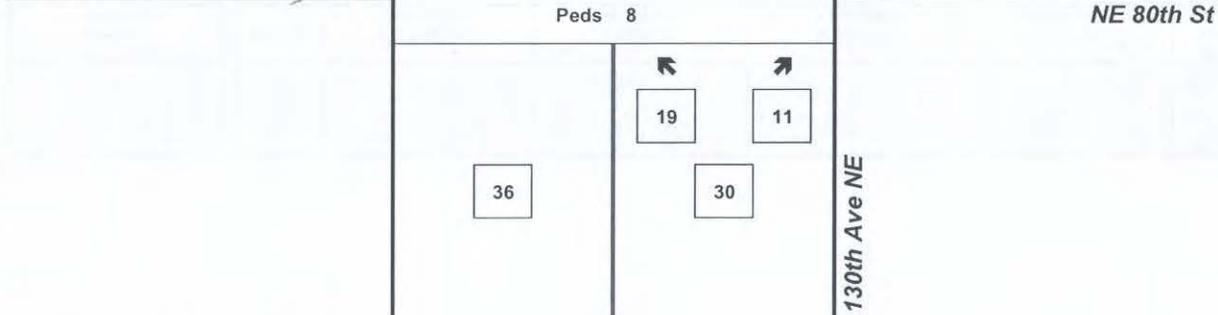
NE 80th St

Peds 5



Peds 8

NE 80th St



Approach	PHF	HV%	Volume
EB	0.89	1.4%	207
WB	0.88	1.3%	238
NB	0.83	0.0%	30
SB	0.00	0.0%	0
Intersection	0.88	1.3%	475

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