

TECHNICAL MEMORANDUM

Project: Emerald Heights
Subject: Study Area Traffic Confirmation Analysis
Date: July 13, 2017
Author: Michelle M. Brown, ^{MMB} Senior Transportation Engineer
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The original *Traffic Impact Analysis* report for the entire Emerald Heights Master Plan was completed in 2010.¹ As planned, Emerald Heights continues to complete its expansion. However, there has been some concern by the neighbors that traffic conditions have drastically changed in the area, and that the assumptions used for the original *Traffic Impact Analysis* are no longer valid. Therefore, an evaluation was completed to determine if the assumptions used in the original analysis are still valid. For the original analysis, traffic counts were performed at the site access driveways and along 176th Avenue NE (Abbey Road) in December 2009 and in March 2010. This memorandum compares the original traffic counts to new counts conducted in June 2017. In addition, operations analysis results and trip generation assumptions are also compared.

1. Traffic Counts

Multi-day traffic counts conducted in 2009 determined that the site generated an average of 104 PM peak hour trips (44 in, 60 out through the Main Entrance Driveway on 176th Avenue NE as this was the only entrance used at that time). The traffic count at this same location in March 2010 showed that the site generated 108 PM peak hour trips (52 in, 56 out), which confirmed the consistency in the traffic generated by the Emerald Heights community and the accuracy of the trip generation estimate.

New driveway counts were performed in June 2017, and determined that the site now generates 130 PM peak hour trips (60 in, 70 out using both the Main Driveway and the exit-only staff driveway). These counts are a bit higher than expected, likely due to construction trips and other master planning project related traffic, not traffic specifically related to the Emerald Heights land use.

Traffic volumes along 176th Avenue NE were also counted during the PM peak hour. In 2010 there were 82 vehicles (excluding the Emerald Heights site trips) passing the Main Entrance Driveway. The 2017 traffic count showed 92 vehicles (excluding the Emerald Heights site trips) passing the Main Entrance Driveway during the same time. The original report assumed a 2% annual increase in background traffic growth. In over seven years, the background traffic volumes during the peak of the intersection along 176th Avenue NE traffic have increased less than assumed in the original study. Therefore, the overall traffic forecast assumptions in the original report remain conservative and valid. The 2010 and 2017 traffic count sheets are attached.

¹ Emerald Heights – Redmond, WA – Traffic Impact Analysis, June 4, 2010, Heffron Transportation, Inc.

2. Trip Generation Rates

The trip generation rate used for the 2010 *Traffic Impact Analysis* was 0.26 trips per unit. This rate was derived from the 2009 traffic counts at the Emerald Heights site. This rate is higher than the average rates of similar land uses (Land Uses: 251, 252, 253, 254, and 255) in both the 8th and 9th Editions of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*.

To provide a conservative estimate, a trip generation rate that was based on the June 2017 traffic counts was applied to the remaining planned projects on the site (new Assisted Living Building, new Courtyard Independent Living Building, and the Corwin Center renovation). Using a rate of 0.29 trips per unit, these projects are estimated to generate 26 additional PM peak hour trips. This would bring the total site trip generation to 153 PM peak hour trips. As a comparison, the original *Traffic Impact Analysis* included an assumption that the full site buildout would generate about 170 PM peak hour trips. Therefore, the assumptions in the original report are still considered conservative and valid.

3. Traffic Operations

The original *Traffic Impact Analysis* concluded that the Emerald Heights development would not significantly change the operating levels at any of the study area intersections, including the site access driveways, which would continue to operate at very good levels at full buildout (LOS A or B, on a grading scale from A to F, with LOS A as excellent and LOS F as failing). Based on the new traffic counts and estimated trip generation at full buildout, the original assumptions and forecasts are still valid, and the driveway is still expected to operate at LOS B or better. Therefore no additional traffic analysis is needed for the master planning efforts at the Emerald Heights site.

4. Parking

When the original *Traffic Impact Analysis* was prepared, the Emerald Heights community had 503 parking spaces for 401 total residents units, employees, and visitors. The original expansion plan would have provided another 189 spaces, with a total 850 spaces (482 required). This was to accommodate a total of 608 total units. The current expansion plan is smaller than originally proposes with 532 units, and 592 parking spaces. The proposed parking supply would still exceed the City's requirement of 540 spaces, and would include van accessible spaces and areas for electric vehicle parking. There continue to be unused parking spaces on the current campus, and no parking overflow is expected for day to day operations.

5. Traffic Impact Fees

The City of Redmond imposes traffic impact fees for new developments that would add peak hour trips to the transportation network. As stated in the *Traffic Impact Analysis* and Redmond Municipal Code 3.10; the impact fees should be based on the number of additional residential units constructed. As the new additions to the site occur, traffic impact fees are being paid based on the fees at the time, which remains valid and consistent with the City's requirements.

6. Conclusion

The original *Traffic Impact Analysis* conducted for the Emerald Heights Master Plan in June 2010 concluded that the Emerald Heights development would not significantly change the operating levels at any of the study area intersections, including the site access driveways with the proposed additions and changes to the site. With each phase of the master plan development, separate transportation evaluations have been conducted to ensure the current proposal is within the parameters evaluated within the original traffic study. Each of the phases so far are well within those parameters and have not triggered any additional transportation analysis.

This additional evaluation confirms that the background traffic growth and the estimated traffic forecasts for Emerald Heights were conservative in the original study and remain valid. The approach to paying traffic impact fees also remains consistent with the City's current standards. No additional traffic analysis should be required to accommodate the remaining Emerald Heights master planning expansion efforts beyond what has already been completed.

Attachment – 2010 and 2017 Traffic Counts at Emerald Heights Site Access Driveways.

MMB/mch

Emerald Heights - Study Area Traffic Confirmation Memo.Docx

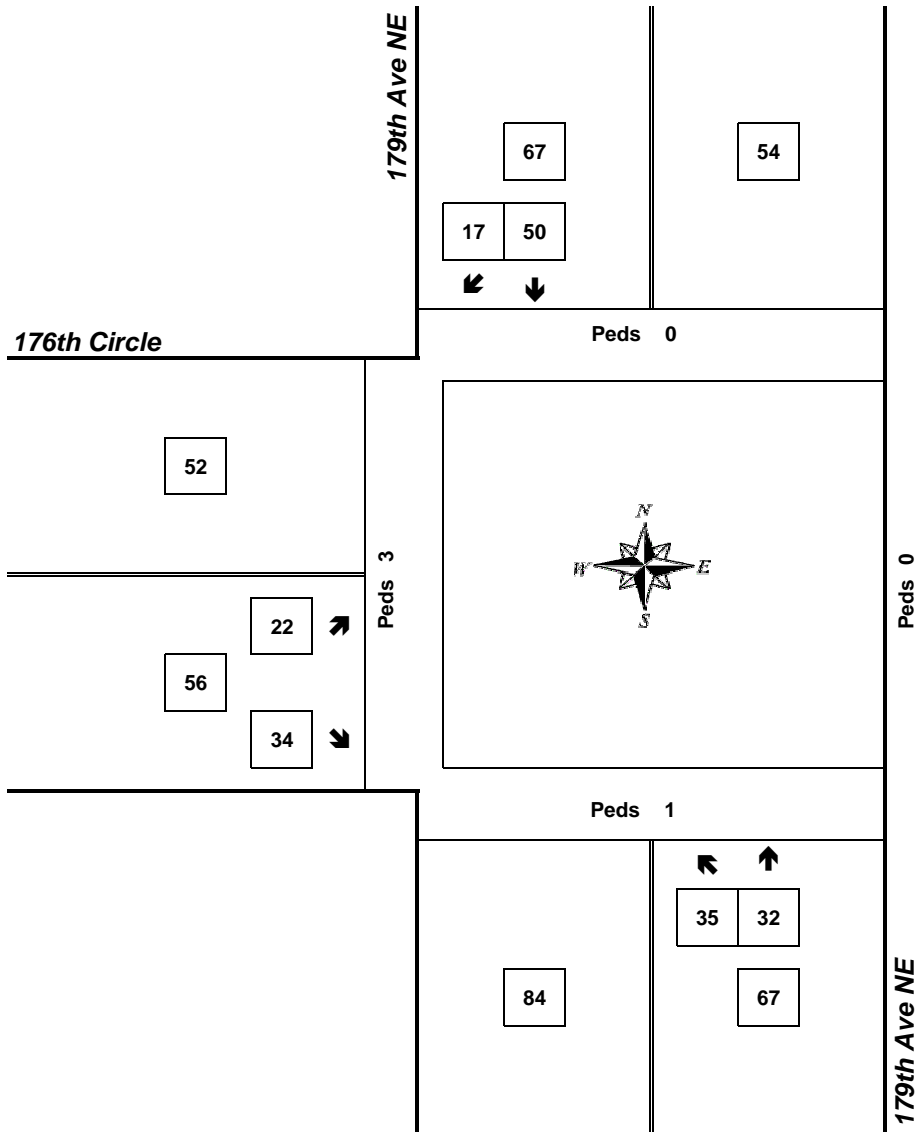
Peak Hour Summary



Mark Skaggs
(206) 251-0300

179th Ave NE & 176th Circle

4:00 PM to 5:00 PM
Wednesday, March 24, 2010



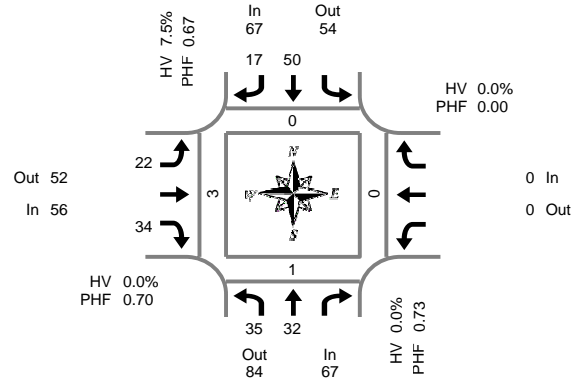
Approach	PHF	HV%	Volume
EB	0.70	0.0%	56
WB	0.00	0.0%	0
NB	0.73	0.0%	67
SB	0.67	7.5%	67
Intersection	0.78	2.6%	190

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

Total Vehicle Summary



Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:00 PM to 5:00 PM

179th Ave NE & 176th Circle

Wednesday, March 24, 2010

4:00 PM to 6:00 PM

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound 179th Ave NE			Southbound 179th Ave NE			Eastbound 176th Circle			Westbound 176th Circle			Interval Total	Pedestrians Crosswalk			
	L	T	HV	T	R	HV	L	R	HV	In	Out	Total		North	South	East	West
4:00 PM	12	8	0	17	8	2	7	9	0				61	0	0	0	1
4:15 PM	16	7	0	10	4	0	6	8	0				51	0	0	0	1
4:30 PM	2	9	0	6	3	1	7	13	0				40	0	0	0	0
4:45 PM	5	8	0	17	2	2	2	4	0				38	0	1	0	1
5:00 PM	5	10	0	8	1	1	1	2	0				27	0	0	0	1
5:15 PM	2	8	1	11	1	1	1	3	0				26	1	1	0	0
5:30 PM	2	9	1	17	0	1	0	6	0				34	0	0	0	1
5:45 PM	4	10	0	4	2	2	5	4	0				29	0	0	0	3
Total Survey	48	69	2	90	21	10	29	49	0				306	1	2	0	8

Peak Hour Summary

4:00 PM to 5:00 PM

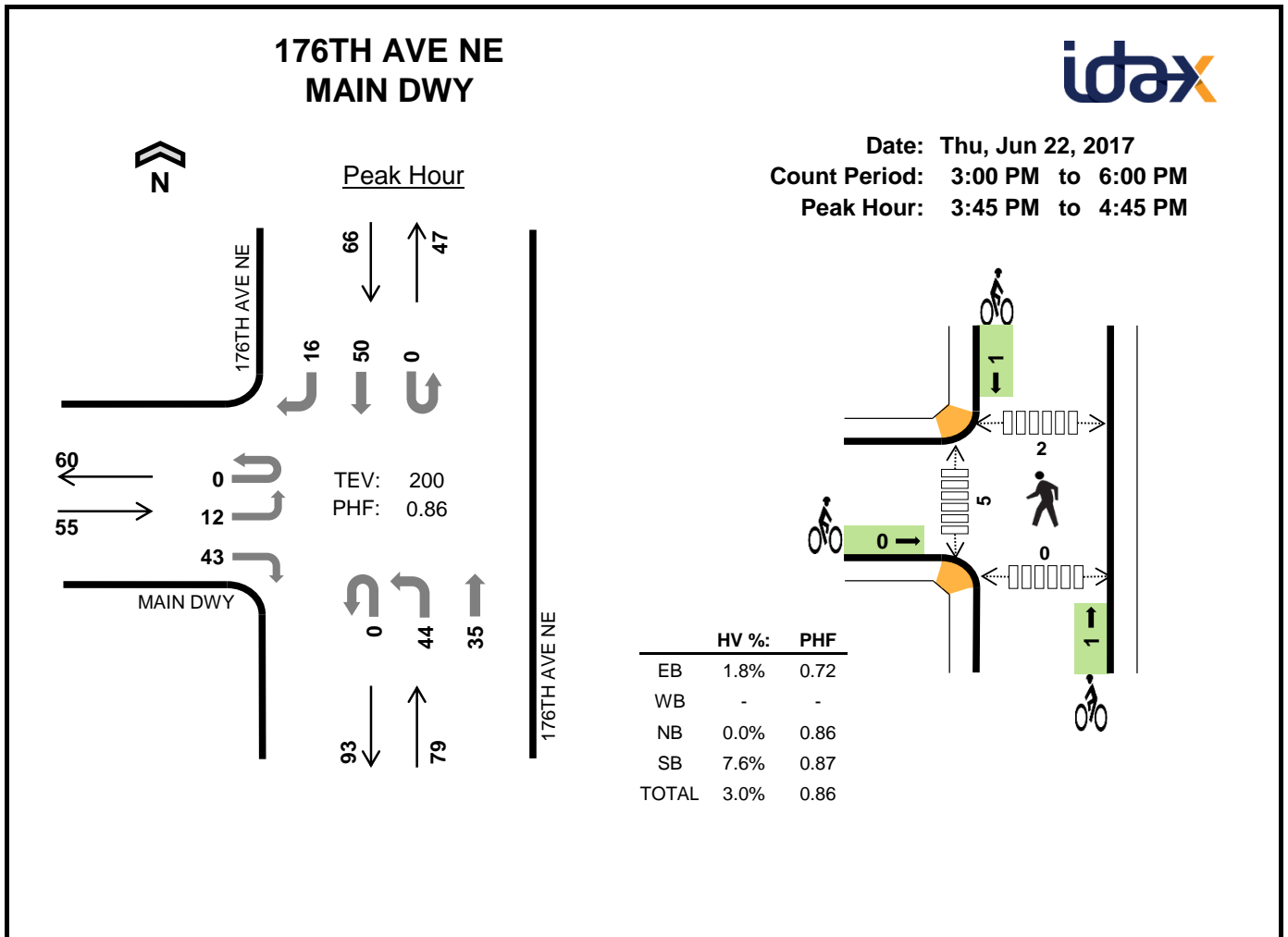
By Approach	Northbound 179th Ave NE				Southbound 179th Ave NE				Eastbound 176th Circle				Westbound 176th Circle			Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total		North	South	East	West
Volume	67	84	151	0	67	54	121	5	56	52	108	0	0	0	0	190	0	1	0	3
%HV	0.0%				7.5%				0.0%				0.0%			2.6%				
PHF	0.73				0.67				0.70				0.00			0.78				

By Movement	Northbound 179th Ave NE			Southbound 179th Ave NE			Eastbound 176th Circle			Westbound 176th Circle			Total
	L	T	Total	T	R	Total	L	R	Total	In	Out	Total	
Volume	35	32	67	50	17	67	22	34	56			0	190
PHF	0.55	0.89	0.73	0.74	0.53	0.67	0.79	0.65	0.70			0.00	0.78

Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound 179th Ave NE			Southbound 179th Ave NE			Eastbound 176th Circle			Westbound 176th Circle			Interval Total	Pedestrians Crosswalk			
	L	T	HV	T	R	HV	L	R	HV	In	Out	Total		North	South	East	West
4:00 PM	35	32	0	50	17	5	22	34	0				190	0	1	0	3
4:15 PM	28	34	0	41	10	4	16	27	0				156	0	1	0	3
4:30 PM	14	35	1	42	7	5	11	22	0				131	1	2	0	2
4:45 PM	14	35	2	53	4	5	4	15	0				125	1	2	0	3
5:00 PM	13	37	2	40	4	5	7	15	0				116	1	1	0	5



Three-Hour Count Summaries

Interval Start	MAIN DWY				0				176TH AVE NE				176TH AVE NE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:45 PM	0	2	0	7	0	0	0	0	0	9	6	0	0	0	11	4	39	0
4:00 PM	0	4	0	9	0	0	0	0	0	11	10	0	0	0	10	3	47	0
4:15 PM	0	1	0	13	0	0	0	0	0	13	10	0	0	0	14	5	56	0
4:30 PM	0	5	0	14	0	0	0	0	0	11	9	0	0	0	15	4	58	200
Peak Hour	0	12	0	43	0	0	0	0	0	44	35	0	0	0	50	16	200	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:45 PM	0	0	0	2	2	0	0	0	0	0	0	1	0	0	1
4:00 PM	0	0	0	0	0	0	0	1	0	1	0	2	1	0	3
4:15 PM	0	0	0	2	2	0	0	0	0	0	0	1	1	0	2
4:30 PM	1	0	0	1	2	0	0	0	1	1	0	1	0	0	1
Peak Hour	1	0	0	5	6	0	0	1	1	2	0	5	2	0	7

Three-Hour Count Summaries																		
Interval Start	MAIN DWY				0				176TH AVE NE				176TH AVE NE				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	0	8	0	0	0	0	0	10	8	0	0	0	14	4	44	0
3:15 PM	0	0	0	12	0	0	0	0	0	6	12	0	0	0	15	3	48	0
3:30 PM	0	4	0	17	0	0	0	0	0	6	13	0	0	0	8	7	55	0
3:45 PM	0	2	0	7	0	0	0	0	0	9	6	0	0	0	11	4	39	186
4:00 PM	0	4	0	9	0	0	0	0	0	11	10	0	0	0	10	3	47	189
4:15 PM	0	1	0	13	0	0	0	0	0	13	10	0	0	0	14	5	56	197
4:30 PM	0	5	0	14	0	0	0	0	0	11	9	0	0	0	15	4	58	200
4:45 PM	0	1	0	4	0	0	0	0	0	2	12	0	0	0	12	3	34	195
5:00 PM	0	1	0	11	0	0	0	0	2	1	14	0	0	0	15	1	45	193
5:15 PM	0	2	0	5	0	0	0	0	0	4	13	0	0	0	18	2	44	181
5:30 PM	0	2	0	3	0	0	0	0	0	2	19	0	0	0	19	1	46	169
5:45 PM	0	0	0	4	0	0	0	0	0	1	17	0	0	0	14	2	38	173
Count Total	0	22	0	107	0	0	0	0	2	76	143	0	0	0	165	39	554	0
Peak Hour	0	12	0	43	0	0	0	0	0	44	35	0	0	0	50	16	200	0

Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

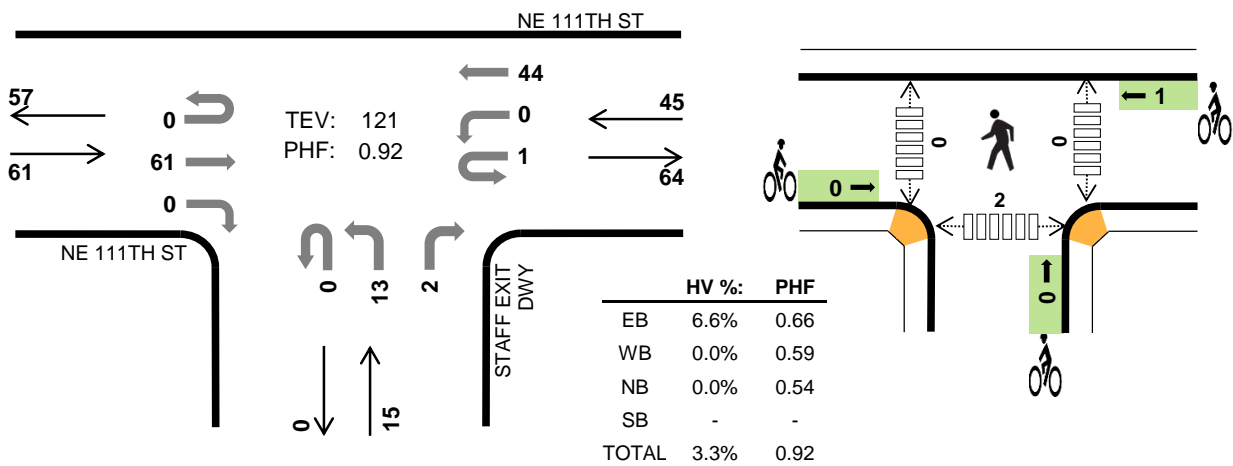
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)					
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total	
3:00 PM	0	0	0	3	3	0	0	0	0	0	0	1	0	0	0	1
3:15 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	1	0	1	0	0	2	0	2	
3:45 PM	0	0	0	2	2	0	0	0	0	0	0	1	0	0	0	1
4:00 PM	0	0	0	0	0	0	0	1	0	1	0	2	1	0	0	3
4:15 PM	0	0	0	2	2	0	0	0	0	0	0	1	1	0	0	2
4:30 PM	1	0	0	1	2	0	0	0	1	1	0	1	0	0	0	1
4:45 PM	1	0	0	1	2	0	0	0	0	0	0	1	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7
5:30 PM	0	0	1	1	2	0	0	0	0	0	0	2	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Total	2	0	1	11	14	0	0	3	1	4	0	17	4	0	21	
Peak Hr	1	0	0	5	6	0	0	1	1	2	0	5	2	0	0	7

STAFF EXIT DWY NE 111TH ST



Peak Hour

Date: Thu, Jun 22, 2017
 Count Period: 3:00 PM to 6:00 PM
 Peak Hour: 3:30 PM to 4:30 PM



Three-Hour Count Summaries

Interval Start	NE 111TH ST Eastbound				NE 111TH ST Westbound				STAFF EXIT DWY Northbound				0 Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:30 PM	0	0	10	0	1	0	18	0	0	3	0	0	0	0	0	0	32	0
3:45 PM	0	0	17	0	0	0	6	0	0	3	0	0	0	0	0	0	26	0
4:00 PM	0	0	11	0	0	0	17	0	0	2	0	0	0	0	0	0	30	0
4:15 PM	0	0	23	0	0	0	3	0	0	5	0	2	0	0	0	0	33	121
Peak Hour	0	0	61	0	1	0	44	0	0	13	0	2	0	0	0	0	121	0

Note: For all three-hour count summary, see next page.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
3:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
3:45 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	2	2
Peak Hour	4	0	0	0	4	0	1	0	0	1	0	0	0	2	2

Three-Hour Count Summaries																		
Interval Start	NE 111TH ST				NE 111TH ST				STAFF EXIT DWY				0				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
3:00 PM	0	0	14	0	0	0	7	0	0	3	0	0	0	0	0	0	24	0
3:15 PM	0	0	24	0	0	0	6	0	0	2	0	0	0	0	0	0	32	0
3:30 PM	0	0	10	0	1	0	18	0	0	3	0	0	0	0	0	0	32	0
3:45 PM	0	0	17	0	0	0	6	0	0	3	0	0	0	0	0	0	26	114
4:00 PM	0	0	11	0	0	0	17	0	0	2	0	0	0	0	0	0	30	120
4:15 PM	0	0	23	0	0	0	3	0	0	5	0	2	0	0	0	0	33	121
4:30 PM	0	0	15	0	0	0	12	0	0	2	0	2	0	0	0	0	31	120
4:45 PM	0	0	13	0	0	0	7	0	0	3	0	0	0	0	0	0	23	117
5:00 PM	0	0	13	0	0	0	8	0	0	2	0	1	0	0	0	0	24	111
5:15 PM	0	0	19	0	0	0	12	0	0	2	0	0	0	0	0	0	33	111
5:30 PM	0	0	21	0	0	0	16	0	0	2	0	1	0	0	0	0	40	120
5:45 PM	0	0	16	0	0	0	7	0	0	1	0	0	0	0	0	0	24	121
Count Total	0	0	196	0	1	0	119	0	0	30	0	6	0	0	0	0	352	0
Peak Hour	0	0	61	0	1	0	44	0	0	13	0	2	0	0	0	0	121	0
<i>Note: Three-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.</i>																		
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)							
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total			
3:00 PM	2	0	0	0	2	1	0	0	0	1	0	0	0	2	2			
3:15 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0			
3:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0			
3:45 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0			
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4:15 PM	2	0	0	0	2	0	0	0	0	0	0	0	0	2	2			
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
4:45 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0			
5:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1			
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5			
5:30 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0			
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Count Total	9	0	0	0	9	1	1	0	0	2	1	0	0	9	10			
Peak Hr	4	0	0	0	4	0	1	0	0	1	0	0	0	2	2			