

OFFICER REPORTED CRASHES THAT OCCURRED *at* OR *in the vicinity of* MULTIPLE INTERSECTIONS & ROAD SEGMENTS IN THE CITY OF KIRKLAND

01/01/2019 - 12/31/2021

Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a

JURISDICTION	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	REPORT NUMBER	DATE	MOST SEVERE INJURY TYPE	# I N J U R Y	# F A T A L I T Y	# V E H I C L E S	# P E R S O N S	JUNCTION RELATIONSHIP	FIRST COLLISION TYPE / OBJECT STRUCK
City Street	Kirkland	84TH AVE NE	13195	NE 132ND ST	EA77786	11/03/2020	Possible Injury	1	0	2	0	At Intersection and Related	Entering at angle
City Street	Kirkland	84TH AVE NE	0	NE 132ND ST	EA47207	06/29/2020	No Apparent Injury	0	0	2	0	At Intersection and Related	Entering at angle
City Street	Kirkland	JUANITA DR NE	0	NE 132ND ST	E910989	04/12/2019	Possible Injury	2	0	2	0	At Intersection and Related	From opposite direction - one left turn - one straight
City Street	Kirkland	JUANITA DR NE	12807	NE 132ND ST	EA95481	12/21/2020	No Apparent Injury	0	0	1	0	At Intersection and Not Related	Fire Hydrant
City Street	Kirkland	JUANITA DR NE	12807	NE 132ND ST	EB83899	10/28/2021	No Apparent Injury	0	0	2	0	At Intersection and Related	From same direction - both going straight - one stopped - rear-end
City Street	Kirkland	NE 132ND ST	8400	84TH AVE NE	EB69100	09/18/2021	No Apparent Injury	0	0	3	0	At Intersection and Related	Entering at angle
City Street	Kirkland	NE 132ND ST	7700	JUANITA DR NE	EB86485	10/31/2021	Possible Injury	1	0	2	0	At Intersection and Related	Entering at angle

From City

**City of Kirkland
Transportation Group**

ATTACHMENT 9

From 1/1/2019 to 12/31/2021

Total Collisions: 4

Injury Collisions: 2

Fatal Collisions: 0

Collision Summary Report

1/26/23

JUANITA DR NE & NE 132ND ST

Page 1 of 2

19-12327	4/12/2019	09:08	JUANITA DR NE & NE 132ND ST	0'	Direction: Not Stated	Daylight	Adv. Weather: Clear / Partly Cloudy		
E910989	Approach Turn		Curve & Grade		Road: Wet		Possible Injury	# Inj: 2	# Killed: 0
Unit 1	Motor Vehicle (UT)	North	Making Left Turn		Male	Age: 44	No Traffic Control		
No Injury		Contrib Circ: Inattention			Had Not Been Drinking		Lap & Shoulder Belt Used		
Unit 2	Motor Vehicle (4D)	South	Going Straight Ahead		Male	Age: 26	No Traffic Control		
Possible Injury		Contrib Circ: None			Had Not Been Drinking		Lap & Shoulder Belt Used		
20-40979	12/21/2020	22:56	JUANITA DR NE & NE 132ND ST	10'	Direction: South	Dark - Street Lights On	Adv. Weather: Raining		
EA95481	Parked Vehicle / Fixed Object		Curve in Sag		Road: Snowy / Slush		No injury	# Inj: 0	# Killed: 0
Unit 1	Motor Vehicle (SD)	North	Going Straight Ahead		Female	Age: 17	No Traffic Control		
No Injury		Contrib Circ: Exceeding Reas. Safe Speed					Lap & Shoulder Belt Used		
Unit 2	Property Owner				Not Stated	Age:			
		Contrib Circ:							
21-38859	10/28/2021	15:38	JUANITA DR NE & NE 132ND ST	0'	Direction: Not Stated	Daylight	Adv. Weather: Raining		
EB83899	Rear-End		Straight & Grade		Road: Wet		No injury	# Inj: 0	# Killed: 0
Unit 1	Motor Vehicle (UT)	North	Going Straight Ahead		Male	Age: 55	No Traffic Control		
No Injury		Contrib Circ: Exceeding Stated Speed Limit					Lap & Shoulder Belt Used		
Unit 2	Motor Vehicle (UT)	North	Making Left Turn		Male	Age: 52	No Traffic Control		
No Injury		Contrib Circ: None					Lap & Shoulder Belt Used		
21-39169	10/31/2021	12:01	JUANITA DR NE & NE 132ND ST	0'	Direction: Not Stated	Daylight	Adv. Weather: Clear / Partly Cloudy		
EB86485	Right Angle / Broadside		Curve & Level		Road: Dry		Possible injury	# Inj: 1	# Killed: 0
Unit 1	Motor Vehicle (2D)	East	Merging; entering traffic		Male	Age: 62	Stop Sign		
No Injury		Contrib Circ: Did Not Grant R/W to Vehicle					Lap & Shoulder Belt Used		
Unit 2	Motor Vehicle (UT)	South	Going Straight Ahead		Female	Age: 55	No Traffic Control		
Possible Injury		Contrib Circ: None					Lap & Shoulder Belt Used		

Settings for Query:

Start Date: 1/1/2019
End Date: 12/31/2021
Street: JUANITA DR NE
Cross Street: NE 132ND ST
Within Distance of: 50
Sorted By: Date and Time

**City of Kirkland
Transportation Group**

ATTACHMENT 9

From 1/1/2017 to 12/31/2022

Total Collisions: 7

Injury Collisions: 3

Fatal Collisions: 0

Collision Summary Report

1/31/23

NE 132ND ST & 84TH AVE NE

Page 1 of 2

17-8813	3/15/2017	07:05	84TH AVE NE & NE 132ND ST	0'	Direction: Not Stated	Dawn	Adv. Weather: Raining		
E656103	Pedestrian / Bicycle Involved			Straight & Level		Road: Wet	Possible injury	# Inj: 1	# Killed: 0
Unit 1	Motor Vehicle (SD)	West	Making Left Turn			Male	Age: 76	Stop Sign	
No Injury		Contrib Circ: Did Not Grant R/W to Pedestrian / Pedalcyclist				Had Not Been Drinking		Lap & Shoulder Belt Used	
Unit 2	Pedestrian	East				Male	Age: 16	Stop Sign	
Possible Injury		Contrib Circ: None				Had Not Been Drinking			
17-20541	6/17/2017	17:53	84TH AVE NE & NE 132ND ST	0'	Direction: Not Stated	Daylight	Adv. Weather: Raining		
E682299	Right Angle / Broadside			Straight & Level		Road: Wet	Possible injury	# Inj: 6	# Killed: 0
Unit 1	Motor Vehicle (4D)	South	Going Straight Ahead			Female	Age: 49	Stop Sign	
Possible Injury		Contrib Circ: Disregard Stop Sign / Flashing Red				Had Not Been Drinking		Lap & Shoulder Belt Used	
Unit 2	Motor Vehicle (UT)	East	Making Left Turn			Male	Age: 39	Stop Sign	
Possible Injury		Contrib Circ: None				Had Not Been Drinking		Lap & Shoulder Belt Used	
17-37319	10/25/2017	20:48	NE 132ND ST & 84TH AVE NE	0'	Direction: Not Stated	Dark - Street Lights On	Adv. Weather: Clear / Partly Cloudy		
E728197	Right Angle / Broadside			Straight & Level		Road: Wet	No injury	# Inj: 0	# Killed: 0
Unit 1	Motor Vehicle (4D)	North	Going Straight Ahead			Male	Age: 41	Stop Sign	
No Injury		Contrib Circ: Disregard Stop Sign / Flashing Red				Had Not Been Drinking		Lap & Shoulder Belt Used	
Unit 2	Motor Vehicle (UT)	West	Going Straight Ahead			Male	Age: 42	Stop Sign	
No Injury		Contrib Circ: None				Had Not Been Drinking		Lap & Shoulder Belt Used	
20-19732	6/29/2020	16:58	84TH AVE NE & NE 132ND ST	0'	Direction: Not Stated	Daylight	Adv. Weather: Clear / Partly Cloudy		
EA47207	Right Angle / Broadside			Straight & Level		Road:	No injury	# Inj: 0	# Killed: 0
Unit 1	Motor Vehicle (SEDAN)	South	Going Straight Ahead			Male	Age: 25	Stop Sign	
No Injury		Contrib Circ: Driver Distractions Outside Vehicle				Had Not Been Drinking		Lap & Shoulder Belt Used	
Unit 2	Motor Vehicle	West	Going Straight Ahead			Female	Age: 55	Stop Sign	
No Injury		Contrib Circ: None				Had Not Been Drinking		Lap & Shoulder Belt Used	
20-35736	11/3/2020	17:57	84TH AVE NE & NE 132ND ST	0'	Direction: Not Stated	Dark - Street Lights On	Adv. Weather: Clear / Partly Cloudy		
EA77786	Right Angle / Broadside			Straight & Level		Road: Wet	Possible injury	# Inj: 1	# Killed: 0
Unit 1	Motor Vehicle (4D)	South	Going Straight Ahead			Male	Age: 43	Stop Sign	
No Injury		Contrib Circ: Exceeding Reas. Safe Speed						Lap & Shoulder Belt Used	
Unit 2	Motor Vehicle (UT)	West	Going Straight Ahead			Female	Age: 34	Stop Sign	
Possible Injury		Contrib Circ: None						Lap & Shoulder Belt Used	

NE 132ND ST & 84TH AVE NE

21-34212	9/18/2021	16:22	NE 132ND ST & 84TH AVE NE	0'	Direction: Not Stated	Daylight	Adv. Weather: Raining		
EB69100	Right Angle / Broadside		Straight & Grade		Road: Wet	No injury	# Inj: 0	# Killed: 0	
Unit 1	Motor Vehicle (PK)	South	Going Straight Ahead		Male	Age: 21	Stop Sign		
No Injury		Contrib Circ: Disregard Traffic Sign and Signals					Lap & Shoulder Belt Used		
Unit 2	Motor Vehicle (UT)	West	Going Straight Ahead		Female	Age: 48	Stop Sign		
No Injury		Contrib Circ: None					Lap & Shoulder Belt Used		
Unit 3	Motor Vehicle (HB)				Female	Age: 34			
No Injury		Contrib Circ:					Lap & Shoulder Belt Used		
22-1495	1/12/2022	19:00	84TH AVE NE & NE 132ND ST	0'	Direction: Not Stated	Dark - Street Lights On	Adv. Weather: Clear / Partly Cloudy		
EC12521	Right Angle / Broadside				Road: Dry	No injury	# Inj: 0	# Killed: 0	
Unit 1	Motor Vehicle (SD)	North	Going Straight Ahead		Female	Age: 39	Stop Sign		
No Injury		Contrib Circ: None					Lap & Shoulder Belt Used		
Unit 2	Motor Vehicle (SD)	West	Going Straight Ahead		Male	Age: 51	Stop Sign		
No Injury		Contrib Circ: None					Lap & Shoulder Belt Used		

Settings for Query:

Start Date: 1/1/2017

End Date: 12/31/2022

Street: NE 132ND ST

Cross Street: 84TH AVE NE

Within Distance of: 50

Sorted By: Date and Time

**City of Kirkland
Transportation Group**

ATTACHMENT 9

From 1/1/2019 to 12/31/2021

Total Collisions: 0

Injury Collisions: 0

Fatal Collisions: 0

Collision Summary Report

1/26/23

82ND AVE NE & NE 132ND ST

Page 1 of 1

Settings for Query:

Start Date: 1/1/2019

End Date: 12/31/2021

Street: 82ND AVE NE

Cross Street: NE 132ND ST

Within Distance of: 50

Sorted By: Date and Time

**City of Kirkland
Transportation Group**

ATTACHMENT 9

From 1/1/2019 to 12/31/2021

Total Collisions: 3

Injury Collisions: 1

Fatal Collisions: 0

Collision Summary Report

1/27/23

84TH AVE NE from NE 132ND ST to NE 136TH ST

Page 1 of 1

20-19732	6/29/2020	16:58	84TH AVE NE & NE 132ND ST	0'	Direction: Not Stated	Daylight	Adv. Weather: Clear / Partly Cloudy		
EA47207	Right Angle / Broadside			Straight & Level		Road:	No injury	# Inj: 0	# Killed: 0
Unit 1	Motor Vehicle (SEDAN)	South	Going Straight Ahead			Male	Age: 25	Stop Sign	
No Injury		Contrib Circ: Driver Distractions Outside Vehicle				Had Not Been Drinking		Lap & Shoulder Belt Used	
Unit 2	Motor Vehicle	West	Going Straight Ahead			Female	Age: 55	Stop Sign	
No Injury		Contrib Circ: None				Had Not Been Drinking		Lap & Shoulder Belt Used	
20-35736	11/3/2020	17:57	84TH AVE NE & NE 132ND ST	0'	Direction: Not Stated	Dark - Street Lights On	Adv. Weather: Clear / Partly Cloudy		
EA77786	Right Angle / Broadside			Straight & Level		Road: Wet	Possible injury	# Inj: 1	# Killed: 0
Unit 1	Motor Vehicle (4D)	South	Going Straight Ahead			Male	Age: 43	Stop Sign	
No Injury		Contrib Circ: Exceeding Reas. Safe Speed				Lap & Shoulder Belt Used			
Unit 2	Motor Vehicle (UT)	West	Going Straight Ahead			Female	Age: 34	Stop Sign	
Possible Injury		Contrib Circ: None				Lap & Shoulder Belt Used			
21-34212	9/18/2021	16:22	NE 132ND ST & 84TH AVE NE	0'	Direction: Not Stated	Daylight	Adv. Weather: Raining		
EB69100	Right Angle / Broadside			Straight & Grade		Road: Wet	No injury	# Inj: 0	# Killed: 0
Unit 1	Motor Vehicle (PK)	South	Going Straight Ahead			Male	Age: 21	Stop Sign	
No Injury		Contrib Circ: Disregard Traffic Sign and Signals				Lap & Shoulder Belt Used			
Unit 2	Motor Vehicle (UT)	West	Going Straight Ahead			Female	Age: 48	Stop Sign	
No Injury		Contrib Circ: None				Lap & Shoulder Belt Used			
Unit 3	Motor Vehicle (HB)					Female	Age: 34		
No Injury		Contrib Circ:				Lap & Shoulder Belt Used			

Segment Length: 0.22 miles (1,174')

Settings for Query:

Start Date: 1/1/2019

End Date: 12/31/2021

Street: 84TH AVE NE between NE 132ND ST and NE 136TH ST

Include Intersection Related: True

Sorted By: Date and Time

**City of Kirkland
Transportation Group**

ATTACHMENT 9

From 1/1/2019 to 12/31/2021

Total Collisions: 3

Injury Collisions: 1

Fatal Collisions: 0

Collision Summary Report

1/27/23

NE 132ND ST from 80TH AVE NE to 84TH AVE NE

Page 1 of 1

20-19732	6/29/2020	16:58	84TH AVE NE & NE 132ND ST	0'	Direction: Not Stated	Daylight	Adv. Weather: Clear / Partly Cloudy		
EA47207	Right Angle / Broadside			Straight & Level		Road:	No injury	# Inj: 0	# Killed: 0
Unit 1	Motor Vehicle (SEDAN)	South	Going Straight Ahead			Male	Age: 25	Stop Sign	
No Injury		Contrib Circ: Driver	Distractions Outside Vehicle			Had Not Been Drinking		Lap & Shoulder Belt Used	
Unit 2	Motor Vehicle	West	Going Straight Ahead			Female	Age: 55	Stop Sign	
No Injury		Contrib Circ: None				Had Not Been Drinking		Lap & Shoulder Belt Used	
20-35736	11/3/2020	17:57	84TH AVE NE & NE 132ND ST	0'	Direction: Not Stated	Dark - Street Lights On	Adv. Weather: Clear / Partly Cloudy		
EA77786	Right Angle / Broadside			Straight & Level		Road: Wet	Possible injury	# Inj: 1	# Killed: 0
Unit 1	Motor Vehicle (4D)	South	Going Straight Ahead			Male	Age: 43	Stop Sign	
No Injury		Contrib Circ: Exceeding Reas. Safe Speed						Lap & Shoulder Belt Used	
Unit 2	Motor Vehicle (UT)	West	Going Straight Ahead			Female	Age: 34	Stop Sign	
Possible Injury		Contrib Circ: None						Lap & Shoulder Belt Used	
21-34212	9/18/2021	16:22	NE 132ND ST & 84TH AVE NE	0'	Direction: Not Stated	Daylight	Adv. Weather: Raining		
EB69100	Right Angle / Broadside			Straight & Grade		Road: Wet	No injury	# Inj: 0	# Killed: 0
Unit 1	Motor Vehicle (PK)	South	Going Straight Ahead			Male	Age: 21	Stop Sign	
No Injury		Contrib Circ: Disregard Traffic Sign and Signals						Lap & Shoulder Belt Used	
Unit 2	Motor Vehicle (UT)	West	Going Straight Ahead			Female	Age: 48	Stop Sign	
No Injury		Contrib Circ: None						Lap & Shoulder Belt Used	
Unit 3	Motor Vehicle (HB)					Female	Age: 34		
No Injury		Contrib Circ:						Lap & Shoulder Belt Used	

Segment Length: 0.25 miles (1,323')

Settings for Query:

Start Date: 1/1/2019

End Date: 12/31/2021

Street: NE 132ND ST between 80TH AVE NE and 84TH AVE NE

Include Intersection Related: True

Sorted By: Date and Time











Appendix D

Level of Service and Queue Calculation Worksheets

2022 Existing AM Peak Hour

Lanes, Volumes, Timings
1: Juanita Dr NE & NE 132nd St





04/12/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	57	139	71	81	454
Future Volume (vph)	54	57	139	71	81	454
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-5%		0%			-5%
Storage Length (ft)	0	100		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Link Speed (mph)	25		35			35
Link Distance (ft)	578		509			466
Travel Time (s)	15.8		9.9			9.1
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	6%	0%	1%	3%	3%	1%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

















1: Juanita Dr NE & NE 132nd St

04/12/2023

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	54	57	139	71	81	454
Future Vol, veh/h	54	57	139	71	81	454
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-5	-	0	-	-	-5
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	6	0	1	3	3	1
Mvmt Flow	62	66	160	82	93	522
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	910	202	0	0	243	0
Stage 1	202	-	-	-	-	-
Stage 2	708	-	-	-	-	-
Critical Hdwy	5.46	5.7	-	-	4.13	-
Critical Hdwy Stg 1	4.46	-	-	-	-	-
Critical Hdwy Stg 2	4.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.3	-	-	2.227	-
Pot Cap-1 Maneuver	386	868	-	-	1317	-
Stage 1	870	-	-	-	-	-
Stage 2	586	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	347	867	-	-	1316	-
Mov Cap-2 Maneuver	347	-	-	-	-	-
Stage 1	869	-	-	-	-	-
Stage 2	527	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13.4	0		1.2		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	347	867	1316	-
HCM Lane V/C Ratio	-	-	0.179	0.076	0.071	-
HCM Control Delay (s)	-	-	17.6	9.5	7.9	0
HCM Lane LOS	-	-	C	A	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.2	0.2	-





Lanes, Volumes, Timings
2: 84th Ave NE & NE 132nd St

04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	129	17	45	127	25	46	42	70	48	36	71
Future Volume (vph)	33	129	17	45	127	25	46	42	70	48	36	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-5%			4%	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		240			502			615			765	
Travel Time (s)		6.5			13.7			12.0			14.9	
Confl. Peds. (#/hr)	20		4	4		20	22		2	2		22
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles (%)	3%	5%	12%	7%	6%	12%	2%	2%	1%	6%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

















HCM 6th AWSC
2: 84th Ave NE & NE 132nd St

04/12/2023

Intersection												
Intersection Delay, s/veh	14.4											
Intersection LOS	B											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	33	129	17	45	127	25	46	42	70	48	36	71
Future Vol, veh/h	33	129	17	45	127	25	46	42	70	48	36	71
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles, %	3	5	12	7	6	12	2	2	1	6	3	3
Mvmt Flow	52	202	27	70	198	39	72	66	109	75	56	111
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	14.6			15.7			13.4			13.5		
HCM LOS	B			C			B			B		
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %	29%	18%	23%	31%								
Vol Thru, %	27%	72%	64%	23%								
Vol Right, %	44%	9%	13%	46%								
Sign Control	Stop	Stop	Stop	Stop								
Traffic Vol by Lane	158	179	197	155								
LT Vol	46	33	45	48								
Through Vol	42	129	127	36								
RT Vol	70	17	25	71								
Lane Flow Rate	247	280	308	242								
Geometry Grp	1	1	1	1								
Degree of Util (X)	0.417	0.474	0.522	0.414								
Departure Headway (Hd)	6.079	6.104	6.101	6.147								
Convergence, Y/N	Yes	Yes	Yes	Yes								
Cap	593	590	591	584								
Service Time	4.127	4.151	4.145	4.195								
HCM Lane V/C Ratio	0.417	0.475	0.521	0.414								
HCM Control Delay	13.4	14.6	15.7	13.5								
HCM Lane LOS	B	B	C	B								
HCM 95th-tile Q	2	2.5	3	2								

Lanes, Volumes, Timings
3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	83	10	53	72	111	3	3	53	29	5	145
Future Volume (vph)	71	83	10	53	72	111	3	3	53	29	5	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-3%			0%			3%	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		507			410			266			250	
Travel Time (s)		13.8			11.2			7.3			6.8	
Confl. Peds. (#/hr)	59		7	7		59	23					23
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Heavy Vehicles (%)	0%	4%	0%	2%	0%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)					68	68		12	12			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th TWSC

3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

Intersection												
Int Delay, s/veh	11											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	71	83	10	53	72	111	3	3	53	29	5	145
Future Vol, veh/h	71	83	10	53	72	111	3	3	53	29	5	145
Conflicting Peds, #/hr	59	0	7	7	0	59	23	0	0	0	0	23
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	-3	-	-	0	-	-	3	-
Peak Hour Factor	60	60	60	60	60	60	60	60	60	60	60	60
Heavy Vehicles, %	0	4	0	2	0	1	0	0	0	0	0	0
Mvmt Flow	118	138	17	88	120	185	5	5	88	48	8	242
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	364	0	0	162	0	0	927	930	154	877	846	295
Stage 1	-	-	-	-	-	-	390	390	-	448	448	-
Stage 2	-	-	-	-	-	-	537	540	-	429	398	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.5	6.2	7.7	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1206	-	-	1417	-	-	251	269	897	234	262	731
Stage 1	-	-	-	-	-	-	638	611	-	551	535	-
Stage 2	-	-	-	-	-	-	532	524	-	566	567	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1138	-	-	1408	-	-	131	206	891	168	201	675
Mov Cap-2 Maneuver	-	-	-	-	-	-	131	206	-	168	201	-
Stage 1	-	-	-	-	-	-	561	538	-	461	466	-
Stage 2	-	-	-	-	-	-	303	456	-	448	499	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	3.7			1.7			12			29.6		
HCM LOS							B			D		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	609	1138	-	-	1408	-	-	434				
HCM Lane V/C Ratio	0.161	0.104	-	-	0.063	-	-	0.687				
HCM Control Delay (s)	12	8.5	0	-	7.7	0	-	29.6				
HCM Lane LOS	B	A	A	-	A	A	-	D				
HCM 95th %tile Q(veh)	0.6	0.3	-	-	0.2	-	-	5.1				

Lanes, Volumes, Timings
4: NE 132nd St & Bus Dwy




04/12/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	167	235	6	6	0
Future Volume (vph)	2	167	235	6	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		3%	0%		10%	
Link Speed (mph)		25	25		25	
Link Distance (ft)		410	240		341	
Travel Time (s)		11.2	6.5		9.3	
Confl. Peds. (#/hr)	15			15		
Peak Hour Factor	0.62	0.62	0.62	0.62	0.62	0.62
Heavy Vehicles (%)	100%	2%	1%	100%	100%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					










HCM 6th TWSC
4: NE 132nd St & Bus Dwy

04/12/2023

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	167	235	6	6	0
Future Vol, veh/h	2	167	235	6	6	0
Conflicting Peds, #/hr	15	0	0	15	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	3	0	-	10	-
Peak Hour Factor	62	62	62	62	62	62
Heavy Vehicles, %	100	2	1	100	100	0
Mvmt Flow	3	269	379	10	10	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	404	0	-	0	674	399
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	275	-
Critical Hdwy	5.1	-	-	-	9.4	7.2
Critical Hdwy Stg 1	-	-	-	-	8.4	-
Critical Hdwy Stg 2	-	-	-	-	8.4	-
Follow-up Hdwy	3.1	-	-	-	4.4	3.3
Pot Cap-1 Maneuver	776	-	-	-	207	586
Stage 1	-	-	-	-	407	-
Stage 2	-	-	-	-	507	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	765	-	-	-	200	578
Mov Cap-2 Maneuver	-	-	-	-	200	-
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	500	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		23.9		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	765	-	-	-	200	
HCM Lane V/C Ratio	0.004	-	-	-	0.048	
HCM Control Delay (s)	9.7	0	-	-	23.9	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	




Lanes, Volumes, Timings
5: 84th Ave NE & Dwy

04/12/2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	13	46	46	53	124	29
Future Volume (vph)	13	46	46	53	124	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-6%			-8%	10%	
Link Speed (mph)	25			35	35	
Link Distance (ft)	385			765	420	
Travel Time (s)	10.5			14.9	8.2	
Confl. Peds. (#/hr)			13			13
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Heavy Vehicles (%)	0%	2%	4%	4%	3%	0%
Parking (#/hr)					0	0
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC
5: 84th Ave NE & Dwy

















04/12/2023

Intersection						
Int Delay, s/veh	3.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	46	46	53	124	29
Future Vol, veh/h	13	46	46	53	124	29
Conflicting Peds, #/hr	0	0	13	0	0	13
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-6	-	-	-8	10	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	0	2	4	4	3	0
Mvmt Flow	21	75	75	87	203	48
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	477	240	264	0	-	0
Stage 1	240	-	-	-	-	-
Stage 2	237	-	-	-	-	-
Critical Hdwy	5.2	5.62	4.14	-	-	-
Critical Hdwy Stg 1	4.2	-	-	-	-	-
Critical Hdwy Stg 2	4.2	-	-	-	-	-
Follow-up Hdwy	3.5	3.318	2.236	-	-	-
Pot Cap-1 Maneuver	645	831	1289	-	-	-
Stage 1	872	-	-	-	-	-
Stage 2	873	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	591	821	1273	-	-	-
Mov Cap-2 Maneuver	591	-	-	-	-	-
Stage 1	808	-	-	-	-	-
Stage 2	863	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.5	3.7		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1273	-	756	-	-	
HCM Lane V/C Ratio	0.059	-	0.128	-	-	
HCM Control Delay (s)	8	0	10.5	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.2	-	0.4	-	-	

2022 Existing Afternoon Peak Hour





Lanes, Volumes, Timings
2: 84th Ave NE & NE 132nd St

04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	81	7	80	106	32	9	50	70	37	52	21
Future Volume (vph)	26	81	7	80	106	32	9	50	70	37	52	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-5%			4%	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		240			502			615			765	
Travel Time (s)		6.5			13.7			12.0			14.9	
Confl. Peds. (#/hr)	54		9	9		54	53		7	7		53
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	15%	10%	29%	1%	6%	3%	11%	6%	1%	5%	6%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

















HCM 6th AWSC
2: 84th Ave NE & NE 132nd St

04/12/2023

Intersection												
Intersection Delay, s/veh	9.9											
Intersection LOS	A											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	81	7	80	106	32	9	50	70	37	52	21
Future Vol, veh/h	26	81	7	80	106	32	9	50	70	37	52	21
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	15	10	29	1	6	3	11	6	1	5	6	0
Mvmt Flow	31	98	8	96	128	39	11	60	84	45	63	25
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	9.6			10.5			9.4			9.4		
HCM LOS	A			B			A			A		
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %	7%	23%	37%	34%								
Vol Thru, %	39%	71%	49%	47%								
Vol Right, %	54%	6%	15%	19%								
Sign Control	Stop	Stop	Stop	Stop								
Traffic Vol by Lane	129	114	218	110								
LT Vol	9	26	80	37								
Through Vol	50	81	106	52								
RT Vol	70	7	32	21								
Lane Flow Rate	155	137	263	133								
Geometry Grp	1	1	1	1								
Degree of Util (X)	0.213	0.199	0.35	0.189								
Departure Headway (Hd)	4.936	5.21	4.799	5.125								
Convergence, Y/N	Yes	Yes	Yes	Yes								
Cap	720	683	743	693								
Service Time	3.017	3.293	2.871	3.209								
HCM Lane V/C Ratio	0.215	0.201	0.354	0.192								
HCM Control Delay	9.4	9.6	10.5	9.4								
HCM Lane LOS	A	A	B	A								
HCM 95th-tile Q	0.8	0.7	1.6	0.7								

Lanes, Volumes, Timings
3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	88	15	27	99	29	7	0	33	20	11	39
Future Volume (vph)	28	88	15	27	99	29	7	0	33	20	11	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-3%			0%			3%	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		507			410			266			250	
Travel Time (s)		13.8			11.2			7.3			6.8	
Confl. Peds. (#/hr)	99		6	6		99	52					52
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	5%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)					18	18		15	15			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th TWSC

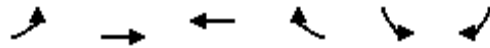
3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	28	88	15	27	99	29	7	0	33	20	11	39
Future Vol, veh/h	28	88	15	27	99	29	7	0	33	20	11	39
Conflicting Peds, #/hr	99	0	6	6	0	99	52	0	0	0	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	-3	-	-	0	-	-	3	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	0	5	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	35	110	19	34	124	36	9	0	41	25	14	49
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	259	0	0	135	0	0	490	523	126	519	514	293
Stage 1	-	-	-	-	-	-	196	196	-	309	309	-
Stage 2	-	-	-	-	-	-	294	327	-	210	205	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.7	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1317	-	-	1462	-	-	492	462	930	432	429	733
Stage 1	-	-	-	-	-	-	810	742	-	670	630	-
Stage 2	-	-	-	-	-	-	719	651	-	769	711	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1193	-	-	1454	-	-	399	392	925	358	364	631
Mov Cap-2 Maneuver	-	-	-	-	-	-	399	392	-	358	364	-
Stage 1	-	-	-	-	-	-	779	714	-	588	556	-
Stage 2	-	-	-	-	-	-	599	574	-	711	684	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.7			1.3			10.1			14.3		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	752	1193	-	-	1454	-	-	473				
HCM Lane V/C Ratio	0.066	0.029	-	-	0.023	-	-	0.185				
HCM Control Delay (s)	10.1	8.1	0	-	7.5	0	-	14.3				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-	-	0.7				

Lanes, Volumes, Timings
4: NE 132nd St & Bus Dwy




04/12/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	140	154	6	6	1
Future Volume (vph)	1	140	154	6	6	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		3%	0%		10%	
Link Speed (mph)		25	25		25	
Link Distance (ft)		410	240		341	
Travel Time (s)		11.2	6.5		9.3	
Confl. Peds. (#/hr)	22			22		
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	100%	2%	1%	100%	100%	100%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					










HCM 6th TWSC
4: NE 132nd St & Bus Dwy

04/12/2023

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	140	154	6	6	1
Future Vol, veh/h	1	140	154	6	6	1
Conflicting Peds, #/hr	22	0	0	22	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	3	0	-	10	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	100	2	1	100	100	100
Mvmt Flow	1	165	181	7	7	1
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	210	0	-	0	374	207
Stage 1	-	-	-	-	207	-
Stage 2	-	-	-	-	167	-
Critical Hdwy	5.1	-	-	-	9.4	8.2
Critical Hdwy Stg 1	-	-	-	-	8.4	-
Critical Hdwy Stg 2	-	-	-	-	8.4	-
Follow-up Hdwy	3.1	-	-	-	4.4	4.2
Pot Cap-1 Maneuver	943	-	-	-	384	602
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	613	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	923	-	-	-	367	589
Mov Cap-2 Maneuver	-	-	-	-	367	-
Stage 1	-	-	-	-	558	-
Stage 2	-	-	-	-	600	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		14.5		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	923	-	-	-	388	
HCM Lane V/C Ratio	0.001	-	-	-	0.021	
HCM Control Delay (s)	8.9	0	-	-	14.5	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	




Lanes, Volumes, Timings
5: 84th Ave NE & Dwy

04/12/2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	19	18	103	88	13
Future Volume (vph)	15	19	18	103	88	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-6%			-8%	10%	
Link Speed (mph)	25			35	35	
Link Distance (ft)	385			765	420	
Travel Time (s)	10.5			14.9	8.2	
Confl. Peds. (#/hr)			25			25
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Heavy Vehicles (%)	7%	0%	6%	3%	5%	0%
Parking (#/hr)					0	0
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC
5: 84th Ave NE & Dwy











04/12/2023

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	19	18	103	88	13
Future Vol, veh/h	15	19	18	103	88	13
Conflicting Peds, #/hr	0	0	25	0	0	25
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-6	-	-	-8	10	-
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	7	0	6	3	5	0
Mvmt Flow	20	26	24	139	119	18
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	340	153	162	0	-	0
Stage 1	153	-	-	-	-	-
Stage 2	187	-	-	-	-	-
Critical Hdwy	5.27	5.6	4.16	-	-	-
Critical Hdwy Stg 1	4.27	-	-	-	-	-
Critical Hdwy Stg 2	4.27	-	-	-	-	-
Follow-up Hdwy	3.563	3.3	2.254	-	-	-
Pot Cap-1 Maneuver	723	922	1393	-	-	-
Stage 1	908	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	675	900	1360	-	-	-
Mov Cap-2 Maneuver	675	-	-	-	-	-
Stage 1	869	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.9	1.1		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1360	-	785	-	-	
HCM Lane V/C Ratio	0.018	-	0.059	-	-	
HCM Control Delay (s)	7.7	0	9.9	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-	

2022 Existing PM Peak Hour

Lanes, Volumes, Timings
1: Juanita Dr NE & NE 132nd St





04/12/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	66	136	412	59	67	300
Future Volume (vph)	66	136	412	59	67	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-5%		0%			-5%
Storage Length (ft)	0	100		0	0	
Storage Lanes	1	1		0	0	
Taper Length (ft)	25				25	
Link Speed (mph)	25		35			35
Link Distance (ft)	578		509			466
Travel Time (s)	15.8		9.9			9.1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	1%	1%	2%	2%	1%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

















1: Juanita Dr NE & NE 132nd St

04/12/2023

Intersection						
Int Delay, s/veh	3.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	66	136	412	59	67	300
Future Vol, veh/h	66	136	412	59	67	300
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	-5	-	0	-	-	-5
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	1	1	2	2	1
Mvmt Flow	73	149	453	65	74	330
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	964	486	0	0	518	0
Stage 1	486	-	-	-	-	-
Stage 2	478	-	-	-	-	-
Critical Hdwy	5.4	5.71	-	-	4.12	-
Critical Hdwy Stg 1	4.4	-	-	-	-	-
Critical Hdwy Stg 2	4.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	-	-	2.218	-
Pot Cap-1 Maneuver	373	624	-	-	1048	-
Stage 1	713	-	-	-	-	-
Stage 2	717	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	341	624	-	-	1048	-
Mov Cap-2 Maneuver	341	-	-	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	655	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14.5	0	1.6			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	341	624	1048	-
HCM Lane V/C Ratio	-	-	0.213	0.24	0.07	-
HCM Control Delay (s)	-	-	18.4	12.6	8.7	0
HCM Lane LOS	-	-	C	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0.9	0.2	-

Lanes, Volumes, Timings
2: 84th Ave NE & NE 132nd St





04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	123	16	66	131	40	11	57	71	28	32	22
Future Volume (vph)	41	123	16	66	131	40	11	57	71	28	32	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-5%			4%	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		240			502			615			765	
Travel Time (s)		6.5			13.7			12.0			14.9	
Confl. Peds. (#/hr)	36		4	4		36	16		1	1		16
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	18%	0%	1%	11%	3%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th AWSC
2: 84th Ave NE & NE 132nd St

04/12/2023

















Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	123	16	66	131	40	11	57	71	28	32	22
Future Vol, veh/h	41	123	16	66	131	40	11	57	71	28	32	22
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	1	0	0	1	0	18	0	1	11	3	0
Mvmt Flow	47	140	18	75	149	45	13	65	81	32	36	25
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB	WB		NB		SB						
Opposing Approach	WB	EB		SB		NB						
Opposing Lanes	1	1		1		1						
Conflicting Approach Left	SB	NB		EB		WB						
Conflicting Lanes Left	1	1		1		1						
Conflicting Approach Right	NB	SB		WB		EB						
Conflicting Lanes Right	1	1		1		1						
HCM Control Delay	9.8	10.5		9.8		9.3						
HCM LOS	A	B		A		A						

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	23%	28%	34%
Vol Thru, %	41%	68%	55%	39%
Vol Right, %	51%	9%	17%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	139	180	237	82
LT Vol	11	41	66	28
Through Vol	57	123	131	32
RT Vol	71	16	40	22
Lane Flow Rate	158	205	269	93
Geometry Grp	1	1	1	1
Degree of Util (X)	0.227	0.277	0.356	0.138
Departure Headway (Hd)	5.165	4.873	4.759	5.342
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	687	730	749	663
Service Time	3.254	2.95	2.831	3.441
HCM Lane V/C Ratio	0.23	0.281	0.359	0.14
HCM Control Delay	9.8	9.8	10.5	9.3
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0.9	1.1	1.6	0.5

Lanes, Volumes, Timings
3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	101	3	16	108	49	10	3	8	41	15	23
Future Volume (vph)	23	101	3	16	108	49	10	3	8	41	15	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-3%			0%			3%	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		507			410			266			250	
Travel Time (s)		13.8			11.2			7.3			6.8	
Confl. Peds. (#/hr)	39		13	13		39	3		10	10		3
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)					8	8		0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th TWSC

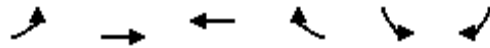
3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	101	3	16	108	49	10	3	8	41	15	23
Future Vol, veh/h	23	101	3	16	108	49	10	3	8	41	15	23
Conflicting Peds, #/hr	39	0	13	13	0	39	3	0	10	10	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	-3	-	-	0	-	-	3	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	3	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	32	140	4	22	150	68	14	4	11	57	21	32
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	257	0	0	157	0	0	477	520	165	491	488	226
Stage 1	-	-	-	-	-	-	219	219	-	267	267	-
Stage 2	-	-	-	-	-	-	258	301	-	224	221	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.7	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1320	-	-	1435	-	-	502	463	885	453	445	803
Stage 1	-	-	-	-	-	-	788	726	-	711	662	-
Stage 2	-	-	-	-	-	-	751	669	-	754	698	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1271	-	-	1417	-	-	440	421	866	409	405	771
Mov Cap-2 Maneuver	-	-	-	-	-	-	440	421	-	409	405	-
Stage 1	-	-	-	-	-	-	757	698	-	666	626	-
Stage 2	-	-	-	-	-	-	681	633	-	713	671	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			0.7			12.1			14.9		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	537	1271	-	-	1417	-	-	473				
HCM Lane V/C Ratio	0.054	0.025	-	-	0.016	-	-	0.232				
HCM Control Delay (s)	12.1	7.9	0	-	7.6	0	-	14.9				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.9				

Lanes, Volumes, Timings
4: NE 132nd St & Bus Dwy





04/12/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	9	138	161	11	13	7
Future Volume (vph)	9	138	161	11	13	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		3%	0%		10%	
Link Speed (mph)		25	25		25	
Link Distance (ft)		410	240		341	
Travel Time (s)		11.2	6.5		9.3	
Confl. Peds. (#/hr)	29			29		
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Heavy Vehicles (%)	11%	2%	1%	0%	8%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					










HCM 6th TWSC
4: NE 132nd St & Bus Dwy

04/12/2023

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	138	161	11	13	7
Future Vol, veh/h	9	138	161	11	13	7
Conflicting Peds, #/hr	29	0	0	29	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	3	0	-	10	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	11	2	1	0	8	0
Mvmt Flow	13	194	227	15	18	10
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	271	0	-	0	484	264
Stage 1	-	-	-	-	264	-
Stage 2	-	-	-	-	220	-
Critical Hdwy	4.21	-	-	-	8.48	7.2
Critical Hdwy Stg 1	-	-	-	-	7.48	-
Critical Hdwy Stg 2	-	-	-	-	7.48	-
Follow-up Hdwy	2.299	-	-	-	3.572	3.3
Pot Cap-1 Maneuver	1242	-	-	-	406	724
Stage 1	-	-	-	-	662	-
Stage 2	-	-	-	-	710	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1208	-	-	-	379	704
Mov Cap-2 Maneuver	-	-	-	-	379	-
Stage 1	-	-	-	-	636	-
Stage 2	-	-	-	-	690	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.5	0		13.5		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1208	-	-	-	452	
HCM Lane V/C Ratio	0.01	-	-	-	0.062	
HCM Control Delay (s)	8	0	-	-	13.5	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	




Lanes, Volumes, Timings
5: 84th Ave NE & Dwy

04/12/2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	4	6	119	83	0
Future Volume (vph)	1	4	6	119	83	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-6%			-8%	10%	
Link Speed (mph)	25			35	35	
Link Distance (ft)	385			765	420	
Travel Time (s)	10.5			14.9	8.2	
Confl. Peds. (#/hr)			14			14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	3%	4%	0%
Parking (#/hr)					0	0
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC
5: 84th Ave NE & Dwy












04/12/2023

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	4	6	119	83	0
Future Vol, veh/h	1	4	6	119	83	0
Conflicting Peds, #/hr	0	0	14	0	0	14
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-6	-	-	-8	10	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	3	4	0
Mvmt Flow	1	5	7	145	101	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	274	115	115	0	-	0
Stage 1	115	-	-	-	-	-
Stage 2	159	-	-	-	-	-
Critical Hdwy	5.2	5.6	4.1	-	-	-
Critical Hdwy Stg 1	4.2	-	-	-	-	-
Critical Hdwy Stg 2	4.2	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	789	961	1487	-	-	-
Stage 1	951	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	765	948	1467	-	-	-
Mov Cap-2 Maneuver	765	-	-	-	-	-
Stage 1	934	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9	0.4		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1467	-	905	-	-	
HCM Lane V/C Ratio	0.005	-	0.007	-	-	
HCM Control Delay (s)	7.5	0	9	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

2024 No Action AM Peak Hour

Lanes, Volumes, Timings
1: Juanita Dr NE & NE 132nd St






04/12/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	56	59	145	74	84	472
Future Volume (vph)	56	59	145	74	84	472
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-5%		0%			-5%
Storage Length (ft)	0	100		0	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	25		35			35
Link Distance (ft)	578		509			466
Travel Time (s)	15.8		9.9			9.1
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	6%	0%	1%	3%	3%	1%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

















1: Juanita Dr NE & NE 132nd St

04/12/2023

Intersection						
Int Delay, s/veh	2.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	56	59	145	74	84	472
Future Vol, veh/h	56	59	145	74	84	472
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	-	150	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	-5	-	0	-	-	-5
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	6	0	1	3	3	1
Mvmt Flow	64	68	167	85	97	543
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	948	211	0	0	253	0
Stage 1	211	-	-	-	-	-
Stage 2	737	-	-	-	-	-
Critical Hdwy	5.46	5.7	-	-	4.13	-
Critical Hdwy Stg 1	4.46	-	-	-	-	-
Critical Hdwy Stg 2	4.46	-	-	-	-	-
Follow-up Hdwy	3.554	3.3	-	-	2.227	-
Pot Cap-1 Maneuver	370	859	-	-	1306	-
Stage 1	864	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	342	858	-	-	1305	-
Mov Cap-2 Maneuver	438	-	-	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	530	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12	0	1.2			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	438	858	1305	-
HCM Lane V/C Ratio	-	-	0.147	0.079	0.074	-
HCM Control Delay (s)	-	-	14.6	9.6	8	-
HCM Lane LOS	-	-	B	A	A	-
HCM 95th %tile Q(veh)	-	-	0.5	0.3	0.2	-





Lanes, Volumes, Timings
2: 84th Ave NE & NE 132nd St

04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	113	15	47	132	26	48	44	73	71	45	165
Future Volume (vph)	29	113	15	47	132	26	48	44	73	71	45	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-5%			4%	
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		240			502			615			765	
Travel Time (s)		6.5			13.7			14.0			17.4	
Confl. Peds. (#/hr)	20		4	4		20	22		2	2		22
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles (%)	3%	5%	12%	7%	6%	12%	2%	2%	1%	6%	3%	3%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

















HCM 6th AWSC
2: 84th Ave NE & NE 132nd St

04/12/2023

Intersection												
Intersection Delay, s/veh	22.4											
Intersection LOS	C											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	113	15	47	132	26	48	44	73	71	45	165
Future Vol, veh/h	29	113	15	47	132	26	48	44	73	71	45	165
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles, %	3	5	12	7	6	12	2	2	1	6	3	3
Mvmt Flow	45	177	23	73	206	41	75	69	114	111	70	258
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	17.1			21.3			16.6			29.5		
HCM LOS	C			C			C			D		
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %	29%	18%	23%	25%								
Vol Thru, %	27%	72%	64%	16%								
Vol Right, %	44%	10%	13%	59%								
Sign Control	Stop	Stop	Stop	Stop								
Traffic Vol by Lane	165	157	205	281								
LT Vol	48	29	47	71								
Through Vol	44	113	132	45								
RT Vol	73	15	26	165								
Lane Flow Rate	258	245	320	439								
Geometry Grp	1	1	1	1								
Degree of Util (X)	0.494	0.491	0.626	0.789								
Departure Headway (Hd)	6.902	7.208	7.037	6.47								
Convergence, Y/N	Yes	Yes	Yes	Yes								
Cap	521	498	513	562								
Service Time	4.973	5.283	5.104	4.47								
HCM Lane V/C Ratio	0.495	0.492	0.624	0.781								
HCM Control Delay	16.6	17.1	21.3	29.5								
HCM Lane LOS	C	C	C	D								
HCM 95th-tile Q	2.7	2.7	4.3	7.4								

Lanes, Volumes, Timings
3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	86	10	55	166	111	3	3	55	0	0	0
Future Volume (vph)	71	86	10	55	166	111	3	3	55	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-3%			0%			3%	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		507			410			266			250	
Travel Time (s)		13.8			11.2			7.3			6.8	
Confl. Peds. (#/hr)	59		7	7		59	23					23
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Heavy Vehicles (%)	0%	4%	0%	2%	0%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)					68	68		12	12			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th TWSC

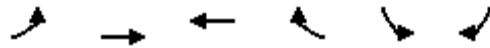
3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	71	86	10	55	166	111	3	3	55	0	0	0
Future Vol, veh/h	71	86	10	55	166	111	3	3	55	0	0	0
Conflicting Peds, #/hr	59	0	7	7	0	59	23	0	0	0	0	23
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	-3	-	-	0	-	-	3	-
Peak Hour Factor	60	60	60	60	60	60	60	60	60	60	60	60
Heavy Vehicles, %	0	4	0	2	0	1	0	0	0	0	0	0
Mvmt Flow	118	143	17	92	277	185	5	5	92	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	521	0	0	167	0	0	972	1100	159	1049	1016	452
Stage 1	-	-	-	-	-	-	395	395	-	613	613	-
Stage 2	-	-	-	-	-	-	577	705	-	436	403	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.5	6.2	7.7	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1056	-	-	1411	-	-	234	214	892	174	202	589
Stage 1	-	-	-	-	-	-	634	608	-	436	439	-
Stage 2	-	-	-	-	-	-	506	442	-	561	564	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	997	-	-	1402	-	-	191	159	886	121	150	544
Mov Cap-2 Maneuver	-	-	-	-	-	-	191	159	-	121	150	-
Stage 1	-	-	-	-	-	-	548	525	-	358	377	-
Stage 2	-	-	-	-	-	-	450	379	-	433	487	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	3.9			1.3			11.8			0		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	631	997	-	-	1402	-	-	-				
HCM Lane V/C Ratio	0.161	0.119	-	-	0.065	-	-	-				
HCM Control Delay (s)	11.8	9.1	0	-	7.7	0	-	0				
HCM Lane LOS	B	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0.6	0.4	-	-	0.2	-	-	-				

Lanes, Volumes, Timings
4: NE 132nd St & Bus Dwy




04/12/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	145	335	6	6	0
Future Volume (vph)	2	145	335	6	6	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		3%	0%		10%	
Link Speed (mph)		25	25		25	
Link Distance (ft)		410	240		341	
Travel Time (s)		11.2	6.5		9.3	
Confl. Peds. (#/hr)	15			15		
Peak Hour Factor	0.62	0.62	0.62	0.62	0.62	0.62
Heavy Vehicles (%)	100%	2%	1%	100%	100%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					










HCM 6th TWSC
4: NE 132nd St & Bus Dwy

04/12/2023

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	145	335	6	6	0
Future Vol, veh/h	2	145	335	6	6	0
Conflicting Peds, #/hr	15	0	0	15	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	3	0	-	10	-
Peak Hour Factor	62	62	62	62	62	62
Heavy Vehicles, %	100	2	1	100	100	0
Mvmt Flow	3	234	540	10	10	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	565	0	-	0	800	560
Stage 1	-	-	-	-	560	-
Stage 2	-	-	-	-	240	-
Critical Hdwy	5.1	-	-	-	9.4	7.2
Critical Hdwy Stg 1	-	-	-	-	8.4	-
Critical Hdwy Stg 2	-	-	-	-	8.4	-
Follow-up Hdwy	3.1	-	-	-	4.4	3.3
Pot Cap-1 Maneuver	659	-	-	-	159	455
Stage 1	-	-	-	-	306	-
Stage 2	-	-	-	-	539	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	650	-	-	-	154	449
Mov Cap-2 Maneuver	-	-	-	-	154	-
Stage 1	-	-	-	-	300	-
Stage 2	-	-	-	-	531	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		29.9		
HCM LOS				D		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	650	-	-	-	154	
HCM Lane V/C Ratio	0.005	-	-	-	0.063	
HCM Control Delay (s)	10.6	0	-	-	29.9	
HCM Lane LOS	B	A	-	-	D	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	




Lanes, Volumes, Timings
5: 84th Ave NE & Dwy

04/12/2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	72	166	46	50	129	29
Future Volume (vph)	72	166	46	50	129	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-6%			-8%	10%	
Link Speed (mph)	25			30	30	
Link Distance (ft)	385			765	420	
Travel Time (s)	10.5			17.4	9.5	
Confl. Peds. (#/hr)			13			13
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Heavy Vehicles (%)	0%	2%	4%	4%	3%	0%
Parking (#/hr)					0	0
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC
5: 84th Ave NE & Dwy

















04/12/2023

Intersection						
Int Delay, s/veh	8.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	72	166	46	50	129	29
Future Vol, veh/h	72	166	46	50	129	29
Conflicting Peds, #/hr	0	0	13	0	0	13
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-6	-	-	-8	10	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	0	2	4	4	3	0
Mvmt Flow	118	272	75	82	211	48
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	480	248	272	0	-	0
Stage 1	248	-	-	-	-	-
Stage 2	232	-	-	-	-	-
Critical Hdwy	5.2	5.62	4.14	-	-	-
Critical Hdwy Stg 1	4.2	-	-	-	-	-
Critical Hdwy Stg 2	4.2	-	-	-	-	-
Follow-up Hdwy	3.5	3.318	2.236	-	-	-
Pot Cap-1 Maneuver	643	824	1280	-	-	-
Stage 1	867	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	589	814	1264	-	-	-
Mov Cap-2 Maneuver	589	-	-	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	865	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	15.4	3.8		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1264	-	730	-	-	
HCM Lane V/C Ratio	0.06	-	0.534	-	-	
HCM Control Delay (s)	8	0	15.4	-	-	
HCM Lane LOS	A	A	C	-	-	
HCM 95th %tile Q(veh)	0.2	-	3.2	-	-	

2024 No Action Afternoon Peak Hour

Lanes, Volumes, Timings
2: 84th Ave NE & NE 132nd St





04/24/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	70	6	83	110	33	9	52	73	52	66	47
Future Volume (vph)	22	70	6	83	110	33	9	52	73	52	66	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-5%			4%	
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		240			502			615			765	
Travel Time (s)		6.5			13.7			14.0			17.4	
Confl. Peds. (#/hr)	54		9	9		54	53		7	7		53
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	15%	10%	29%	1%	6%	3%	11%	6%	1%	5%	6%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th AWSC
2: 84th Ave NE & NE 132nd St

04/24/2023

















Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	70	6	83	110	33	9	52	73	52	66	47
Future Vol, veh/h	22	70	6	83	110	33	9	52	73	52	66	47
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	15	10	29	1	6	3	11	6	1	5	6	0
Mvmt Flow	27	84	7	100	133	40	11	63	88	63	80	57
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB	WB		NB		SB						
Opposing Approach	WB	EB		SB		NB						
Opposing Lanes	1	1		1		1						
Conflicting Approach Left	SB	NB		EB		WB						
Conflicting Lanes Left	1	1		1		1						
Conflicting Approach Right	NB	SB		WB		EB						
Conflicting Lanes Right	1	1		1		1						
HCM Control Delay	9.8	11.2		9.7		10.3						
HCM LOS	A	B		A		B						

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	22%	37%	32%
Vol Thru, %	39%	71%	49%	40%
Vol Right, %	54%	6%	15%	28%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	134	98	226	165
LT Vol	9	22	83	52
Through Vol	52	70	110	66
RT Vol	73	6	33	47
Lane Flow Rate	161	118	272	199
Geometry Grp	1	1	1	1
Degree of Util (X)	0.23	0.181	0.383	0.286
Departure Headway (Hd)	5.128	5.53	5.06	5.182
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	701	649	713	696
Service Time	3.157	3.562	3.072	3.198
HCM Lane V/C Ratio	0.23	0.182	0.381	0.286
HCM Control Delay	9.7	9.8	11.2	10.3
HCM Lane LOS	A	A	B	B
HCM 95th-tile Q	0.9	0.7	1.8	1.2

Lanes, Volumes, Timings
3: 82nd Ave NE/Dwy & NE 132nd St

04/24/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	92	16	28	128	29	7	0	34	0	0	0
Future Volume (vph)	28	92	16	28	128	29	7	0	34	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-3%			0%			3%	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		507			410			266			250	
Travel Time (s)		13.8			11.2			7.3			6.8	
Confl. Peds. (#/hr)	99		6	6		99	52					52
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	5%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)				18	18	18	15	15	15			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th TWSC

3: 82nd Ave NE/Dwy & NE 132nd St

04/24/2023

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	28	92	16	28	128	29	7	0	34	0	0	0
Future Vol, veh/h	28	92	16	28	128	29	7	0	34	0	0	0
Conflicting Peds, #/hr	99	0	6	6	0	99	52	0	0	0	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	-3	-	-	0	-	-	3	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	0	5	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	35	115	20	35	160	36	9	0	43	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	295	0	0	141	0	0	501	566	131	564	558	329
Stage 1	-	-	-	-	-	-	201	201	-	347	347	-
Stage 2	-	-	-	-	-	-	300	365	-	217	211	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.7	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1278	-	-	1455	-	-	484	436	924	400	402	698
Stage 1	-	-	-	-	-	-	805	739	-	635	602	-
Stage 2	-	-	-	-	-	-	713	627	-	762	706	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1158	-	-	1447	-	-	437	369	919	330	340	601
Mov Cap-2 Maneuver	-	-	-	-	-	-	437	369	-	330	340	-
Stage 1	-	-	-	-	-	-	774	710	-	556	531	-
Stage 2	-	-	-	-	-	-	659	553	-	703	678	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.7			1.1			10			0		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	773	1158	-	-	1447	-	-	-				
HCM Lane V/C Ratio	0.066	0.03	-	-	0.024	-	-	-				
HCM Control Delay (s)	10	8.2	0	-	7.5	0	-	0				
HCM Lane LOS	B	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-	-	-				

Lanes, Volumes, Timings
4: NE 132nd St & Bus Dwy




04/24/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	126	185	6	6	1
Future Volume (vph)	1	126	185	6	6	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		3%	0%		10%	
Link Speed (mph)		25	25		25	
Link Distance (ft)		410	240		341	
Travel Time (s)		11.2	6.5		9.3	
Confl. Peds. (#/hr)	22			22		
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	100%	2%	1%	100%	100%	100%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					










HCM 6th TWSC
4: NE 132nd St & Bus Dwy

04/24/2023

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	126	185	6	6	1
Future Vol, veh/h	1	126	185	6	6	1
Conflicting Peds, #/hr	22	0	0	22	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	3	0	-	10	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	100	2	1	100	100	100
Mvmt Flow	1	148	218	7	7	1
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	247	0	-	0	394	244
Stage 1	-	-	-	-	244	-
Stage 2	-	-	-	-	150	-
Critical Hdwy	5.1	-	-	-	9.4	8.2
Critical Hdwy Stg 1	-	-	-	-	8.4	-
Critical Hdwy Stg 2	-	-	-	-	8.4	-
Follow-up Hdwy	3.1	-	-	-	4.4	4.2
Pot Cap-1 Maneuver	909	-	-	-	369	565
Stage 1	-	-	-	-	535	-
Stage 2	-	-	-	-	631	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	890	-	-	-	353	553
Mov Cap-2 Maneuver	-	-	-	-	353	-
Stage 1	-	-	-	-	523	-
Stage 2	-	-	-	-	618	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		14.9		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	890	-	-	-	372	
HCM Lane V/C Ratio	0.001	-	-	-	0.022	
HCM Control Delay (s)	9.1	0	-	-	14.9	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	




Lanes, Volumes, Timings
5: 84th Ave NE & Dwy

04/24/2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	33	71	18	103	92	13
Future Volume (vph)	33	71	18	103	92	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-6%			-8%	10%	
Link Speed (mph)	25			30	30	
Link Distance (ft)	385			765	420	
Travel Time (s)	10.5			17.4	9.5	
Confl. Peds. (#/hr)			25			25
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Heavy Vehicles (%)	7%	0%	6%	3%	5%	0%
Parking (#/hr)					0	0
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC
5: 84th Ave NE & Dwy












04/24/2023

Intersection						
Int Delay, s/veh	3.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	71	18	103	92	13
Future Vol, veh/h	33	71	18	103	92	13
Conflicting Peds, #/hr	0	0	25	0	0	25
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-6	-	-	-8	10	-
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	7	0	6	3	5	0
Mvmt Flow	45	96	24	139	124	18
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	345	158	167	0	-	0
Stage 1	158	-	-	-	-	-
Stage 2	187	-	-	-	-	-
Critical Hdwy	5.27	5.6	4.16	-	-	-
Critical Hdwy Stg 1	4.27	-	-	-	-	-
Critical Hdwy Stg 2	4.27	-	-	-	-	-
Follow-up Hdwy	3.563	3.3	2.254	-	-	-
Pot Cap-1 Maneuver	720	916	1387	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	672	894	1354	-	-	-
Mov Cap-2 Maneuver	672	-	-	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	866	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.4	1.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1354	-	809	-	-	
HCM Lane V/C Ratio	0.018	-	0.174	-	-	
HCM Control Delay (s)	7.7	0	10.4	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-	

2024 No Action PM Peak Hour

Lanes, Volumes, Timings
1: Juanita Dr NE & NE 132nd St






04/12/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	69	141	429	61	70	312
Future Volume (vph)	69	141	429	61	70	312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-5%		0%			-5%
Storage Length (ft)	0	100		0	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	25		35			35
Link Distance (ft)	578		509			466
Travel Time (s)	15.8		9.9			9.1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	1%	1%	2%	2%	1%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

















1: Juanita Dr NE & NE 132nd St

04/12/2023

Intersection						
Int Delay, s/veh	3.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	69	141	429	61	70	312
Future Vol, veh/h	69	141	429	61	70	312
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	-	150	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	-5	-	0	-	-	-5
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	1	1	2	2	1
Mvmt Flow	76	155	471	67	77	343
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1002	505	0	0	538	0
Stage 1	505	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Critical Hdwy	5.4	5.71	-	-	4.12	-
Critical Hdwy Stg 1	4.4	-	-	-	-	-
Critical Hdwy Stg 2	4.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	-	-	2.218	-
Pot Cap-1 Maneuver	358	610	-	-	1030	-
Stage 1	702	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	331	610	-	-	1030	-
Mov Cap-2 Maneuver	460	-	-	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	654	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13.4	0		1.6		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	460	610	1030	-
HCM Lane V/C Ratio	-	-	0.165	0.254	0.075	-
HCM Control Delay (s)	-	-	14.4	12.9	8.8	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.6	1	0.2	-

Lanes, Volumes, Timings
2: 84th Ave NE & NE 132nd St





04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	128	17	69	136	42	11	59	74	29	33	23
Future Volume (vph)	43	128	17	69	136	42	11	59	74	29	33	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-5%			4%	
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		240			502			615			765	
Travel Time (s)		6.5			13.7			14.0			17.4	
Confl. Peds. (#/hr)	36		4	4		36	16		1	1		16
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	18%	0%	1%	11%	3%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th AWSC
2: 84th Ave NE & NE 132nd St

04/12/2023

















Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	43	128	17	69	136	42	11	59	74	29	33	23
Future Vol, veh/h	43	128	17	69	136	42	11	59	74	29	33	23
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	1	0	0	1	0	18	0	1	11	3	0
Mvmt Flow	49	145	19	78	155	48	13	67	84	33	38	26
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB	WB		NB		SB						
Opposing Approach	WB	EB		SB		NB						
Opposing Lanes	1	1		1		1						
Conflicting Approach Left	SB	NB		EB		WB						
Conflicting Lanes Left	1	1		1		1						
Conflicting Approach Right	NB	SB		WB		EB						
Conflicting Lanes Right	1	1		1		1						
HCM Control Delay	10.1	10.8		10		9.5						
HCM LOS	B	B		A		A						

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	23%	28%	34%
Vol Thru, %	41%	68%	55%	39%
Vol Right, %	51%	9%	17%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	144	188	247	85
LT Vol	11	43	69	29
Through Vol	59	128	136	33
RT Vol	74	17	42	23
Lane Flow Rate	164	214	281	97
Geometry Grp	1	1	1	1
Degree of Util (X)	0.242	0.292	0.374	0.148
Departure Headway (Hd)	5.325	5.019	4.802	5.515
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	679	720	738	654
Service Time	3.325	3.019	2.896	3.521
HCM Lane V/C Ratio	0.242	0.297	0.381	0.148
HCM Control Delay	10	10.1	10.8	9.5
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.9	1.2	1.7	0.5

Lanes, Volumes, Timings
3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	105	3	17	112	49	10	3	8	41	15	23
Future Volume (vph)	23	105	3	17	112	49	10	3	8	41	15	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-3%			0%			3%	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		507			410			266			250	
Travel Time (s)		13.8			11.2			7.3			6.8	
Confl. Peds. (#/hr)	39		13	13		39	3		10	10		3
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)					8	8		0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th TWSC

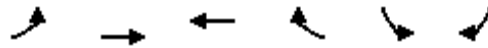
3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	105	3	17	112	49	10	3	8	41	15	23
Future Vol, veh/h	23	105	3	17	112	49	10	3	8	41	15	23
Conflicting Peds, #/hr	39	0	13	13	0	39	3	0	10	10	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	-3	-	-	0	-	-	3	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	3	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	32	146	4	24	156	68	14	4	11	57	21	32
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	263	0	0	163	0	0	493	536	171	507	504	232
Stage 1	-	-	-	-	-	-	225	225	-	277	277	-
Stage 2	-	-	-	-	-	-	268	311	-	230	227	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.7	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1313	-	-	1428	-	-	490	454	878	440	435	797
Stage 1	-	-	-	-	-	-	782	721	-	701	654	-
Stage 2	-	-	-	-	-	-	742	662	-	748	693	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1264	-	-	1410	-	-	428	411	859	396	394	765
Mov Cap-2 Maneuver	-	-	-	-	-	-	428	411	-	396	394	-
Stage 1	-	-	-	-	-	-	751	692	-	656	617	-
Stage 2	-	-	-	-	-	-	671	625	-	707	665	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.4			0.7			12.3			15.3		
HCM LOS							B			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	525	1264	-	-	1410	-	-	460				
HCM Lane V/C Ratio	0.056	0.025	-	-	0.017	-	-	0.239				
HCM Control Delay (s)	12.3	7.9	0	-	7.6	0	-	15.3				
HCM Lane LOS	B	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-	-	0.9				

Lanes, Volumes, Timings
4: NE 132nd St & Bus Dwy





04/12/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	9	144	168	11	13	7
Future Volume (vph)	9	144	168	11	13	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		3%	0%		10%	
Link Speed (mph)		25	25		25	
Link Distance (ft)		410	240		341	
Travel Time (s)		11.2	6.5		9.3	
Confl. Peds. (#/hr)	29			29		
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Heavy Vehicles (%)	11%	2%	1%	0%	8%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC
4: NE 132nd St & Bus Dwy










04/12/2023

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	144	168	11	13	7
Future Vol, veh/h	9	144	168	11	13	7
Conflicting Peds, #/hr	29	0	0	29	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	3	0	-	10	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	11	2	1	0	8	0
Mvmt Flow	13	203	237	15	18	10
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	281	0	-	0	503	274
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	229	-
Critical Hdwy	4.21	-	-	-	8.48	7.2
Critical Hdwy Stg 1	-	-	-	-	7.48	-
Critical Hdwy Stg 2	-	-	-	-	7.48	-
Follow-up Hdwy	2.299	-	-	-	3.572	3.3
Pot Cap-1 Maneuver	1231	-	-	-	391	713
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	700	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1197	-	-	-	365	693
Mov Cap-2 Maneuver	-	-	-	-	365	-
Stage 1	-	-	-	-	625	-
Stage 2	-	-	-	-	680	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.5	0		13.8		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1197	-	-	-	437	
HCM Lane V/C Ratio	0.011	-	-	-	0.064	
HCM Control Delay (s)	8	0	-	-	13.8	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

Lanes, Volumes, Timings




5: 84th Ave NE & Dwy

04/12/2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	4	6	124	86	0
Future Volume (vph)	1	4	6	124	86	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-6%			-8%	10%	
Link Speed (mph)	25			30	30	
Link Distance (ft)	385			765	420	
Travel Time (s)	10.5			17.4	9.5	
Confl. Peds. (#/hr)			14			14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	3%	4%	0%
Parking (#/hr)					0	0
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC
5: 84th Ave NE & Dwy












04/12/2023

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	4	6	124	86	0
Future Vol, veh/h	1	4	6	124	86	0
Conflicting Peds, #/hr	0	0	14	0	0	14
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-6	-	-	-8	10	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	3	4	0
Mvmt Flow	1	5	7	151	105	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	284	119	119	0	-	0
Stage 1	119	-	-	-	-	-
Stage 2	165	-	-	-	-	-
Critical Hdwy	5.2	5.6	4.1	-	-	-
Critical Hdwy Stg 1	4.2	-	-	-	-	-
Critical Hdwy Stg 2	4.2	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	781	957	1482	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	918	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	757	944	1462	-	-	-
Mov Cap-2 Maneuver	757	-	-	-	-	-
Stage 1	931	-	-	-	-	-
Stage 2	906	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9	0.3		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1462	-	900	-	-	
HCM Lane V/C Ratio	0.005	-	0.007	-	-	
HCM Control Delay (s)	7.5	0	9	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

2024 With Project AM Peak Hour

Lanes, Volumes, Timings
1: Juanita Dr NE & NE 132nd St






04/12/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	88	67	145	87	101	472
Future Volume (vph)	88	67	145	87	101	472
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-5%		0%			-5%
Storage Length (ft)	0	100		0	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	25		35			35
Link Distance (ft)	578		509			466
Travel Time (s)	15.8		9.9			9.1
Confl. Peds. (#/hr)				1	1	
Confl. Bikes (#/hr)				1		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	3%	0%	1%	2%	2%	1%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

















1: Juanita Dr NE & NE 132nd St

04/12/2023

Intersection						
Int Delay, s/veh	3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	88	67	145	87	101	472
Future Vol, veh/h	88	67	145	87	101	472
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	-	150	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	-5	-	0	-	-	-5
Peak Hour Factor	87	87	87	87	87	87
Heavy Vehicles, %	3	0	1	2	2	1
Mvmt Flow	101	77	167	100	116	543
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	993	218	0	0	268	0
Stage 1	218	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Critical Hdwy	5.43	5.7	-	-	4.12	-
Critical Hdwy Stg 1	4.43	-	-	-	-	-
Critical Hdwy Stg 2	4.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.3	-	-	2.218	-
Pot Cap-1 Maneuver	357	852	-	-	1296	-
Stage 1	867	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	325	851	-	-	1295	-
Mov Cap-2 Maneuver	423	-	-	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	511	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13.4	0		1.4		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	423	851	1295	-
HCM Lane V/C Ratio	-	-	0.239	0.09	0.09	-
HCM Control Delay (s)	-	-	16.2	9.7	8.1	-
HCM Lane LOS	-	-	C	A	A	-
HCM 95th %tile Q(veh)	-	-	0.9	0.3	0.3	-





Lanes, Volumes, Timings
2: 84th Ave NE & NE 132nd St

04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	115	15	47	163	26	56	44	73	79	49	218
Future Volume (vph)	29	115	15	47	163	26	56	44	73	79	49	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-5%			4%	
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		240			502			615			765	
Travel Time (s)		6.5			13.7			14.0			17.4	
Confl. Peds. (#/hr)	20		4	4		20	22		2	2		22
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles (%)	3%	7%	13%	6%	6%	12%	2%	2%	1%	5%	2%	2%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

















HCM 6th AWSC
2: 84th Ave NE & NE 132nd St

04/12/2023

Intersection												
Intersection Delay, s/veh	47.4											
Intersection LOS	E											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	115	15	47	163	26	56	44	73	79	49	218
Future Vol, veh/h	29	115	15	47	163	26	56	44	73	79	49	218
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles, %	3	7	13	6	6	12	2	2	1	5	2	2
Mvmt Flow	45	180	23	73	255	41	88	69	114	123	77	341
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	21.3			34.1			21.3			81.5		
HCM LOS	C			D			C			F		
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %	32%	18%	20%	23%								
Vol Thru, %	25%	72%	69%	14%								
Vol Right, %	42%	9%	11%	63%								
Sign Control	Stop	Stop	Stop	Stop								
Traffic Vol by Lane	173	159	236	346								
LT Vol	56	29	47	79								
Through Vol	44	115	163	49								
RT Vol	73	15	26	218								
Lane Flow Rate	270	248	369	541								
Geometry Grp	1	1	1	1								
Degree of Util (X)	0.577	0.555	0.783	1.055								
Departure Headway (Hd)	7.996	8.376	7.938	7.025								
Convergence, Y/N	Yes	Yes	Yes	Yes								
Cap	454	435	457	519								
Service Time	5.996	6.376	5.938	5.025								
HCM Lane V/C Ratio	0.595	0.57	0.807	1.042								
HCM Control Delay	21.3	21.3	34.1	81.5								
HCM Lane LOS	C	C	D	F								
HCM 95th-tile Q	3.6	3.3	6.9	16.1								

Lanes, Volumes, Timings
3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	86	10	55	206	161	3	7	55	0	0	0
Future Volume (vph)	101	86	10	55	206	161	3	7	55	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-3%			0%			3%	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		507			410			266			250	
Travel Time (s)		13.8			11.2			7.3			6.8	
Confl. Peds. (#/hr)	59		7	7		59	23					23
Peak Hour Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Heavy Vehicles (%)	0%	4%	0%	2%	0%	1%	0%	0%	0%	0%	0%	0%
Parking (#/hr)					68	68		12	12			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th TWSC

3: 82nd Ave NE/Dwy & NE 132nd St

04/12/2023

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	101	86	10	55	206	161	3	7	55	0	0	0
Future Vol, veh/h	101	86	10	55	206	161	3	7	55	0	0	0
Conflicting Peds, #/hr	59	0	7	7	0	59	23	0	0	0	0	23
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	-3	-	-	0	-	-	3	-
Peak Hour Factor	60	60	60	60	60	60	60	60	60	60	60	60
Heavy Vehicles, %	0	4	0	2	0	1	0	0	0	0	0	0
Mvmt Flow	168	143	17	92	343	268	5	12	92	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	670	0	0	167	0	0	1179	1349	159	1260	1223	559
Stage 1	-	-	-	-	-	-	495	495	-	720	720	-
Stage 2	-	-	-	-	-	-	684	854	-	540	503	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.5	6.2	7.7	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	930	-	-	1411	-	-	169	152	892	121	148	508
Stage 1	-	-	-	-	-	-	560	549	-	375	386	-
Stage 2	-	-	-	-	-	-	442	378	-	484	501	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	878	-	-	1402	-	-	127	101	886	73	98	469
Mov Cap-2 Maneuver	-	-	-	-	-	-	127	101	-	73	98	-
Stage 1	-	-	-	-	-	-	440	430	-	280	327	-
Stage 2	-	-	-	-	-	-	387	320	-	333	393	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	5.2			1			16.6			0		
HCM LOS							C			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	419	878	-	-	1402	-	-	-				
HCM Lane V/C Ratio	0.259	0.192	-	-	0.065	-	-	-				
HCM Control Delay (s)	16.6	10.1	0	-	7.7	0	-	0				
HCM Lane LOS	C	B	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	1	0.7	-	-	0.2	-	-	-				

Lanes, Volumes, Timings

4: NE 132nd St & Bus Dwy





04/12/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	145	425	8	8	0
Future Volume (vph)	2	145	425	8	8	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		3%	0%		10%	
Link Speed (mph)		25	25		25	
Link Distance (ft)		410	240		341	
Travel Time (s)		11.2	6.5		9.3	
Confl. Peds. (#/hr)	15			15		
Peak Hour Factor	0.62	0.62	0.62	0.62	0.62	0.62
Heavy Vehicles (%)	100%	2%	1%	100%	100%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					










HCM 6th TWSC
4: NE 132nd St & Bus Dwy

04/12/2023

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	145	425	8	8	0
Future Vol, veh/h	2	145	425	8	8	0
Conflicting Peds, #/hr	15	0	0	15	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	3	0	-	10	-
Peak Hour Factor	62	62	62	62	62	62
Heavy Vehicles, %	100	2	1	100	100	0
Mvmt Flow	3	234	685	13	13	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	713	0	-	0	947	707
Stage 1	-	-	-	-	707	-
Stage 2	-	-	-	-	240	-
Critical Hdwy	5.1	-	-	-	9.4	7.2
Critical Hdwy Stg 1	-	-	-	-	8.4	-
Critical Hdwy Stg 2	-	-	-	-	8.4	-
Follow-up Hdwy	3.1	-	-	-	4.4	3.3
Pot Cap-1 Maneuver	566	-	-	-	116	360
Stage 1	-	-	-	-	235	-
Stage 2	-	-	-	-	539	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	558	-	-	-	112	355
Mov Cap-2 Maneuver	-	-	-	-	112	-
Stage 1	-	-	-	-	230	-
Stage 2	-	-	-	-	531	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.2	0		41.3		
HCM LOS				E		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	558	-	-	-	112	
HCM Lane V/C Ratio	0.006	-	-	-	0.115	
HCM Control Delay (s)	11.5	0	-	-	41.3	
HCM Lane LOS	B	A	-	-	E	
HCM 95th %tile Q(veh)	0	-	-	-	0.4	




Lanes, Volumes, Timings
5: 84th Ave NE & Dwy

04/12/2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	100	218	46	50	142	29
Future Volume (vph)	100	218	46	50	142	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-6%			-8%	10%	
Link Speed (mph)	25			30	30	
Link Distance (ft)	385			765	420	
Travel Time (s)	10.5			17.4	9.5	
Confl. Peds. (#/hr)			13			13
Peak Hour Factor	0.61	0.61	0.61	0.61	0.61	0.61
Heavy Vehicles (%)	0%	2%	4%	4%	3%	0%
Parking (#/hr)					0	0
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC
5: 84th Ave NE & Dwy

















04/12/2023

Intersection						
Int Delay, s/veh	13					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	100	218	46	50	142	29
Future Vol, veh/h	100	218	46	50	142	29
Conflicting Peds, #/hr	0	0	13	0	0	13
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-6	-	-	-8	10	-
Peak Hour Factor	61	61	61	61	61	61
Heavy Vehicles, %	0	2	4	4	3	0
Mvmt Flow	164	357	75	82	233	48
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	502	270	294	0	-	0
Stage 1	270	-	-	-	-	-
Stage 2	232	-	-	-	-	-
Critical Hdwy	5.2	5.62	4.14	-	-	-
Critical Hdwy Stg 1	4.2	-	-	-	-	-
Critical Hdwy Stg 2	4.2	-	-	-	-	-
Follow-up Hdwy	3.5	3.318	2.236	-	-	-
Pot Cap-1 Maneuver	630	804	1256	-	-	-
Stage 1	853	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	576	794	1240	-	-	-
Mov Cap-2 Maneuver	576	-	-	-	-	-
Stage 1	790	-	-	-	-	-
Stage 2	865	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	22.7	3.9		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1240	-	710	-	-	
HCM Lane V/C Ratio	0.061	-	0.734	-	-	
HCM Control Delay (s)	8.1	0	22.7	-	-	
HCM Lane LOS	A	A	C	-	-	
HCM 95th %tile Q(veh)	0.2	-	6.5	-	-	

2024 With Project Afternoon Peak Hour





Lanes, Volumes, Timings
2: 84th Ave NE & NE 132nd St

04/24/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	72	6	83	125	33	11	52	73	60	69	68
Future Volume (vph)	22	72	6	83	125	33	11	52	73	60	69	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-5%			4%	
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		240			502			615			765	
Travel Time (s)		6.5			13.7			14.0			17.4	
Confl. Peds. (#/hr)	54		9	9		54	53		7	7		53
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	14%	13%	33%	1%	6%	3%	9%	6%	1%	5%	6%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

















HCM 6th AWSC
2: 84th Ave NE & NE 132nd St

04/24/2023

Intersection												
Intersection Delay, s/veh	11											
Intersection LOS	B											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	72	6	83	125	33	11	52	73	60	69	68
Future Vol, veh/h	22	72	6	83	125	33	11	52	73	60	69	68
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles, %	14	13	33	1	6	3	9	6	1	5	6	0
Mvmt Flow	27	87	7	100	151	40	13	63	88	72	83	82
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB	WB			NB			SB				
Opposing Approach	WB	EB			SB			NB				
Opposing Lanes	1	1			1			1				
Conflicting Approach Left	SB	NB			EB			WB				
Conflicting Lanes Left	1	1			1			1				
Conflicting Approach Right	NB	SB			WB			EB				
Conflicting Lanes Right	1	1			1			1				
HCM Control Delay	10.1	11.9			9.9			11				
HCM LOS	B	B			A			B				
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %	8%	22%	34%	30%								
Vol Thru, %	38%	72%	52%	35%								
Vol Right, %	54%	6%	14%	35%								
Sign Control	Stop	Stop	Stop	Stop								
Traffic Vol by Lane	136	100	241	197								
LT Vol	11	22	83	60								
Through Vol	52	72	125	69								
RT Vol	73	6	33	68								
Lane Flow Rate	164	120	290	237								
Geometry Grp	1	1	1	1								
Degree of Util (X)	0.239	0.19	0.418	0.344								
Departure Headway (Hd)	5.251	5.686	5.182	5.223								
Convergence, Y/N	Yes	Yes	Yes	Yes								
Cap	683	631	694	688								
Service Time	3.286	3.723	3.211	3.255								
HCM Lane V/C Ratio	0.24	0.19	0.418	0.344								
HCM Control Delay	9.9	10.1	11.9	11								
HCM Lane LOS	A	B	B	B								
HCM 95th-tile Q	0.9	0.7	2.1	1.5								

Lanes, Volumes, Timings
3: 82nd Ave NE/Dwy & NE 132nd St

04/24/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	92	16	30	144	47	7	2	34	0	0	0
Future Volume (vph)	39	92	16	30	144	47	7	2	34	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-3%			0%			3%	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		507			410			266			250	
Travel Time (s)		13.8			11.2			7.3			6.8	
Confl. Peds. (#/hr)	99		6	6		99	52					52
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles (%)	0%	4%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)				18	18	18	15	15	15			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th TWSC

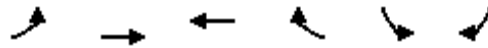
3: 82nd Ave NE/Dwy & NE 132nd St

04/24/2023

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	39	92	16	30	144	47	7	2	34	0	0	0
Future Vol, veh/h	39	92	16	30	144	47	7	2	34	0	0	0
Conflicting Peds, #/hr	99	0	6	6	0	99	52	0	0	0	0	52
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	-3	-	-	0	-	-	3	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	0	4	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	49	115	20	38	180	59	9	3	43	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	338	0	0	141	0	0	567	643	131	631	624	361
Stage 1	-	-	-	-	-	-	229	229	-	385	385	-
Stage 2	-	-	-	-	-	-	338	414	-	246	239	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.7	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1232	-	-	1455	-	-	437	394	924	357	364	668
Stage 1	-	-	-	-	-	-	778	718	-	602	576	-
Stage 2	-	-	-	-	-	-	681	597	-	732	684	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1116	-	-	1447	-	-	388	327	919	288	302	575
Mov Cap-2 Maneuver	-	-	-	-	-	-	388	327	-	288	302	-
Stage 1	-	-	-	-	-	-	737	679	-	519	506	-
Stage 2	-	-	-	-	-	-	627	524	-	662	647	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.2			1			10.5			0		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	703	1116	-	-	1447	-	-	-				
HCM Lane V/C Ratio	0.076	0.044	-	-	0.026	-	-	-				
HCM Control Delay (s)	10.5	8.4	0	-	7.6	0	-	0				
HCM Lane LOS	B	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-	-	-				

Lanes, Volumes, Timings
4: NE 132nd St & Bus Dwy




04/24/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	126	221	8	8	1
Future Volume (vph)	1	126	221	8	8	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		3%	0%		10%	
Link Speed (mph)		25	25		25	
Link Distance (ft)		410	240		341	
Travel Time (s)		11.2	6.5		9.3	
Confl. Peds. (#/hr)	22			22		
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	100%	2%	1%	100%	100%	100%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					










HCM 6th TWSC
4: NE 132nd St & Bus Dwy

04/24/2023

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	126	221	8	8	1
Future Vol, veh/h	1	126	221	8	8	1
Conflicting Peds, #/hr	22	0	0	22	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	3	0	-	10	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	100	2	1	100	100	100
Mvmt Flow	1	148	260	9	9	1
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	291	0	-	0	437	287
Stage 1	-	-	-	-	287	-
Stage 2	-	-	-	-	150	-
Critical Hdwy	5.1	-	-	-	9.4	8.2
Critical Hdwy Stg 1	-	-	-	-	8.4	-
Critical Hdwy Stg 2	-	-	-	-	8.4	-
Follow-up Hdwy	3.1	-	-	-	4.4	4.2
Pot Cap-1 Maneuver	869	-	-	-	337	525
Stage 1	-	-	-	-	497	-
Stage 2	-	-	-	-	631	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	851	-	-	-	323	514
Mov Cap-2 Maneuver	-	-	-	-	323	-
Stage 1	-	-	-	-	486	-
Stage 2	-	-	-	-	618	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		16		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	851	-	-	-	337	
HCM Lane V/C Ratio	0.001	-	-	-	0.031	
HCM Control Delay (s)	9.2	0	-	-	16	
HCM Lane LOS	A	A	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	




Lanes, Volumes, Timings
5: 84th Ave NE & Dwy

04/24/2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	43	100	18	103	95	13
Future Volume (vph)	43	100	18	103	95	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-6%			-8%	10%	
Link Speed (mph)	25			30	30	
Link Distance (ft)	385			765	420	
Travel Time (s)	10.5			17.4	9.5	
Confl. Peds. (#/hr)			25			25
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Heavy Vehicles (%)	5%	0%	6%	3%	4%	0%
Parking (#/hr)					0	0
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC
5: 84th Ave NE & Dwy












04/24/2023

Intersection						
Int Delay, s/veh	4.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	100	18	103	95	13
Future Vol, veh/h	43	100	18	103	95	13
Conflicting Peds, #/hr	0	0	25	0	0	25
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-6	-	-	-8	10	-
Peak Hour Factor	74	74	74	74	74	74
Heavy Vehicles, %	5	0	6	3	4	0
Mvmt Flow	58	135	24	139	128	18
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	349	162	171	0	-	0
Stage 1	162	-	-	-	-	-
Stage 2	187	-	-	-	-	-
Critical Hdwy	5.25	5.6	4.16	-	-	-
Critical Hdwy Stg 1	4.25	-	-	-	-	-
Critical Hdwy Stg 2	4.25	-	-	-	-	-
Follow-up Hdwy	3.545	3.3	2.254	-	-	-
Pot Cap-1 Maneuver	721	912	1382	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	673	890	1349	-	-	-
Mov Cap-2 Maneuver	673	-	-	-	-	-
Stage 1	868	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.8	1.1		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1349	-	811	-	-	
HCM Lane V/C Ratio	0.018	-	0.238	-	-	
HCM Control Delay (s)	7.7	0	10.8	-	-	
HCM Lane LOS	A	A	B	-	-	
HCM 95th %tile Q(veh)	0.1	-	0.9	-	-	

2024 With Project PM Peak Hour

Lanes, Volumes, Timings
1: Juanita Dr NE & NE 132nd St






04/24/2023

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	72	149	429	66	74	312
Future Volume (vph)	72	149	429	66	74	312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-5%		0%			-5%
Storage Length (ft)	0	100		0	150	
Storage Lanes	1	1		0	1	
Taper Length (ft)	25				25	
Link Speed (mph)	25		35			35
Link Distance (ft)	578		509			466
Travel Time (s)	15.8		9.9			9.1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	1%	1%	2%	1%	1%
Shared Lane Traffic (%)						
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC

















1: Juanita Dr NE & NE 132nd St

04/24/2023

Intersection						
Int Delay, s/veh	3.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	72	149	429	66	74	312
Future Vol, veh/h	72	149	429	66	74	312
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	100	-	-	150	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	-5	-	0	-	-	-5
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	1	1	2	1	1
Mvmt Flow	79	164	471	73	81	343
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1013	508	0	0	544	0
Stage 1	508	-	-	-	-	-
Stage 2	505	-	-	-	-	-
Critical Hdwy	5.4	5.71	-	-	4.11	-
Critical Hdwy Stg 1	4.4	-	-	-	-	-
Critical Hdwy Stg 2	4.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.309	-	-	2.209	-
Pot Cap-1 Maneuver	354	608	-	-	1030	-
Stage 1	701	-	-	-	-	-
Stage 2	702	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	326	608	-	-	1030	-
Mov Cap-2 Maneuver	455	-	-	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	13.6	0		1.7		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	455	608	1030	-
HCM Lane V/C Ratio	-	-	0.174	0.269	0.079	-
HCM Control Delay (s)	-	-	14.6	13.1	8.8	-
HCM Lane LOS	-	-	B	B	A	-
HCM 95th %tile Q(veh)	-	-	0.6	1.1	0.3	-

Lanes, Volumes, Timings
2: 84th Ave NE & NE 132nd St





04/24/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	140	19	69	151	42	12	59	74	29	33	26
Future Volume (vph)	46	140	19	69	151	42	12	59	74	29	33	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			-5%			4%	
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		240			502			615			765	
Travel Time (s)		6.5			13.7			14.0			17.4	
Confl. Peds. (#/hr)	36		4	4		36	16		1	1		16
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	17%	0%	1%	10%	3%	0%
Shared Lane Traffic (%)												
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th AWSC
2: 84th Ave NE & NE 132nd St

04/24/2023

















Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	46	140	19	69	151	42	12	59	74	29	33	26
Future Vol, veh/h	46	140	19	69	151	42	12	59	74	29	33	26
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	1	0	0	1	0	17	0	1	10	3	0
Mvmt Flow	52	159	22	78	172	48	14	67	84	33	38	30
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB	WB		NB		SB						
Opposing Approach	WB	EB		SB		NB						
Opposing Lanes	1	1		1		1						
Conflicting Approach Left	SB	NB		EB		WB						
Conflicting Lanes Left	1	1		1		1						
Conflicting Approach Right	NB	SB		WB		EB						
Conflicting Lanes Right	1	1		1		1						
HCM Control Delay	10.5	11.4		10.2		9.7						
HCM LOS	B	B		B		A						

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	22%	26%	33%
Vol Thru, %	41%	68%	58%	38%
Vol Right, %	51%	9%	16%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	205	262	88
LT Vol	12	46	69	29
Through Vol	59	140	151	33
RT Vol	74	19	42	26
Lane Flow Rate	165	233	298	100
Geometry Grp	1	1	1	1
Degree of Util (X)	0.248	0.328	0.41	0.155
Departure Headway (Hd)	5.419	5.072	4.955	5.595
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	662	713	729	641
Service Time	3.452	3.081	2.962	3.632
HCM Lane V/C Ratio	0.249	0.327	0.409	0.156
HCM Control Delay	10.2	10.5	11.4	9.7
HCM Lane LOS	B	B	B	A
HCM 95th-tile Q	1	1.4	2	0.5

Lanes, Volumes, Timings
3: 82nd Ave NE/Dwy & NE 132nd St

04/24/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	105	3	17	112	68	10	4	8	58	18	34
Future Volume (vph)	32	105	3	17	112	68	10	4	8	58	18	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			-3%			0%			3%	
Link Speed (mph)		25			25			25			25	
Link Distance (ft)		507			410			266			250	
Travel Time (s)		13.8			11.2			7.3			6.8	
Confl. Peds. (#/hr)	39		13	13		39	3		10	10		3
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles (%)	0%	3%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Parking (#/hr)					8	8	0	0	0			
Shared Lane Traffic (%)												
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											

HCM 6th TWSC

3: 82nd Ave NE/Dwy & NE 132nd St

04/24/2023

Intersection												
Int Delay, s/veh	5.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	32	105	3	17	112	68	10	4	8	58	18	34
Future Vol, veh/h	32	105	3	17	112	68	10	4	8	58	18	34
Conflicting Peds, #/hr	39	0	13	13	0	39	3	0	10	10	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	-3	-	-	0	-	-	3	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	3	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	44	146	4	24	156	94	14	6	11	81	25	47
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	289	0	0	163	0	0	539	586	171	545	541	245
Stage 1	-	-	-	-	-	-	249	249	-	290	290	-
Stage 2	-	-	-	-	-	-	290	337	-	255	251	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.7	7.1	6.5
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.7	6.1	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1284	-	-	1428	-	-	456	425	878	413	412	783
Stage 1	-	-	-	-	-	-	759	704	-	688	644	-
Stage 2	-	-	-	-	-	-	722	645	-	723	674	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1236	-	-	1410	-	-	382	381	859	368	369	752
Mov Cap-2 Maneuver	-	-	-	-	-	-	382	381	-	368	369	-
Stage 1	-	-	-	-	-	-	720	668	-	636	608	-
Stage 2	-	-	-	-	-	-	634	609	-	674	640	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.8			0.7			13			17.6		
HCM LOS							B			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	478	1236	-	-	1410	-	-	437				
HCM Lane V/C Ratio	0.064	0.036	-	-	0.017	-	-	0.35				
HCM Control Delay (s)	13	8	0	-	7.6	0	-	17.6				
HCM Lane LOS	B	A	A	-	A	A	-	C				
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0.1	-	-	1.5				

Lanes, Volumes, Timings
4: NE 132nd St & Bus Dwy





04/24/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	9	161	187	11	13	7
Future Volume (vph)	9	161	187	11	13	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		3%	0%		10%	
Link Speed (mph)		25	25		25	
Link Distance (ft)		410	240		341	
Travel Time (s)		11.2	6.5		9.3	
Confl. Peds. (#/hr)	29			29		
Peak Hour Factor	0.71	0.71	0.71	0.71	0.71	0.71
Heavy Vehicles (%)	11%	2%	1%	0%	8%	0%
Shared Lane Traffic (%)						
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					










HCM 6th TWSC
4: NE 132nd St & Bus Dwy

04/24/2023

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	161	187	11	13	7
Future Vol, veh/h	9	161	187	11	13	7
Conflicting Peds, #/hr	29	0	0	29	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	3	0	-	10	-
Peak Hour Factor	71	71	71	71	71	71
Heavy Vehicles, %	11	2	1	0	8	0
Mvmt Flow	13	227	263	15	18	10
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	307	0	-	0	553	300
Stage 1	-	-	-	-	300	-
Stage 2	-	-	-	-	253	-
Critical Hdwy	4.21	-	-	-	8.48	7.2
Critical Hdwy Stg 1	-	-	-	-	7.48	-
Critical Hdwy Stg 2	-	-	-	-	7.48	-
Follow-up Hdwy	2.299	-	-	-	3.572	3.3
Pot Cap-1 Maneuver	1204	-	-	-	356	685
Stage 1	-	-	-	-	625	-
Stage 2	-	-	-	-	674	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1171	-	-	-	332	666
Mov Cap-2 Maneuver	-	-	-	-	332	-
Stage 1	-	-	-	-	599	-
Stage 2	-	-	-	-	655	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		14.6		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1171	-	-	-	403	
HCM Lane V/C Ratio	0.011	-	-	-	0.07	
HCM Control Delay (s)	8.1	0	-	-	14.6	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	




Lanes, Volumes, Timings
5: 84th Ave NE & Dwy

04/24/2023

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	4	6	127	89	0
Future Volume (vph)	1	4	6	127	89	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	-6%			-8%	10%	
Link Speed (mph)	25			30	30	
Link Distance (ft)	385			765	420	
Travel Time (s)	10.5			17.4	9.5	
Confl. Peds. (#/hr)			14			14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	0%	0%	2%	3%	0%
Parking (#/hr)					0	0
Shared Lane Traffic (%)						
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM 6th TWSC
5: 84th Ave NE & Dwy

04/24/2023

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	4	6	127	89	0
Future Vol, veh/h	1	4	6	127	89	0
Conflicting Peds, #/hr	0	0	14	0	0	14
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	-6	-	-	-8	10	-
Peak Hour Factor	82	82	82	82	82	82
Heavy Vehicles, %	0	0	0	2	3	0
Mvmt Flow	1	5	7	155	109	0
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	292	123	123	0	-	0
Stage 1	123	-	-	-	-	-
Stage 2	169	-	-	-	-	-
Critical Hdwy	5.2	5.6	4.1	-	-	-
Critical Hdwy Stg 1	4.2	-	-	-	-	-
Critical Hdwy Stg 2	4.2	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	775	953	1477	-	-	-
Stage 1	945	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	751	940	1457	-	-	-
Mov Cap-2 Maneuver	751	-	-	-	-	-
Stage 1	928	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.1	0.3		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1457	-	895	-	-	
HCM Lane V/C Ratio	0.005	-	0.007	-	-	
HCM Control Delay (s)	7.5	0	9.1	-	-	
HCM Lane LOS	A	A	A	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Appendix E

Existing Trip Generation Study and Trip Rate Calculations

Finn Hill Middle School
Count Locations for Existing Trip Generation Study



Finn Hill Middle School Trip Generation Study Summary
 TENW Project No. 2022-174

FINN HILL MIDDLE SCHOOL TRIP GENERATION RATES¹

Peak Period	Total Trips	% In	% Out	Number of Students ²	Trip Gen Rate (trips/student)
AM Peak	567	51%	49%	672	0.84
Afternoon Peak	247	45%	55%	672	0.37
PM Peak	203	48%	52%	672	0.30

Notes:

1. Based on two-day average of counts conducted on Tuesday, May 10, 2022 and Thursday, May 12, 2022 and historical LWSD middle school trip generation studies.
2. Number of students provided by LWSD on 5/13/22 and includes 672 students at FHMS.

Finn Hill Middle School Trip Generation Study

TENW Project No. 2022-174

2-Day Average Trip Generation**AM PEAK HOUR**

Peak Hour	Total Trips - AM Peak Hour								
	Tuesday, May 10, 2022			Thursday, May 12, 2022			2-Day Average		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
7:45-8:45 am	283	271	554	295	284	579	289	278	567

*School starts at 8:30 AM

51%

49%

AFTERNOON PEAK HOUR

Peak Hour	Total Trips - Afternoon Peak Hour								
	Tuesday, May 10, 2022			Thursday, May 12, 2022			2-Day Average		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
2:45-3:45 pm	102	124	226	121	146	267	112	135	247

*School ends at 3:05 PM

45%

55%

PM PEAK HOUR

Peak Hour	Total Trips - PM Peak Hour								
	Tuesday, May 10, 2022			Thursday, May 12, 2022			2-Day Average		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
4:00-5:00 pm				79	89	168	97	106	203
4:15-5:15 pm	114	124	238						

48%

52%

Finn Hill Middle School Trip Generation Study

AM Peak Hour

Day: Tuesday, May 10, 2022

							Off-Site Drop-Off Locations													
Interval	#1 West Dwy / NE 132nd St		#2 Bus Dwy / NE 132nd St		#3 Dwy / 84th Ave NE EAS TRIPS ONLY		A NE 132nd St (west of 82nd Ave NE)		B NE 132nd St (east of 82nd Ave NE)		C 82nd Ave NE (south of 132nd)		D 84th Ave NE (north half) EAS TRIPS ONLY		E 84th Ave NE (south half)		Total Trips			
	Begin	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	Total
7:45 AM		19	20	0	0			0	0	5	5	0	0			3	3	27	28	55
8:00 AM		27	23	5	2			0	0	10	7	3	2			6	5	51	39	90
8:15 AM		97	69	5	4			3	3	32	26	6	7			9	9	152	118	270
8:30 AM		32	64	1	3			1	0	13	13	5	5			1	1	53	86	139
8:45 AM		4	3	0	2			0	0	0	0	0	0			0	0	4	5	9
Peak Hour		175	176	11	9	0	0	4	3	60	51	14	14	0	0	19	18	283	271	554
		351		20		0		7		111		28		0		37		554		

Finn Hill Middle School Trip Generation Study

AM Peak Hour

Day: Thursday, May 12, 2022

							Off-Site Drop-Off Locations												
Interval	#1 West Dwy / NE 132nd St		#2 Bus Dwy / NE 132nd St		#3 Dwy / 84th Ave NE EAS TRIPS ONLY		A NE 132nd St (west of 82nd Ave NE)		B NE 132nd St (east of 82nd Ave NE)		C 82nd Ave NE (south of 132nd)		D 84th Ave NE (north half) EAS TRIPS ONLY		E 84th Ave NE (south half)		Total Trips		
	Begin	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
7:45 AM	38	19	0	0			0	0	7	7	0	0			0	0	45	26	71
8:00 AM	29	31	2	0			2	1	13	8	1	1			2	2	49	43	92
8:15 AM	98	69	5	3			3	3	34	32	11	9			7	7	158	123	281
8:30 AM	20	60	1	3			5	5	14	19	0	2			3	3	43	92	135
8:45 AM	9	10	1	2			0	1	0	0	0	0			0	0	10	13	23
Peak Hour	185	179	8	6	0	0	10	9	68	66	12	12	0	0	12	12	295	284	579
	364		14		0		19		134		24		0		24		579		

Finn Hill Middle School Trip Generation Study

Afternoon Peak Hour

Day: Tuesday, May 10, 2022

							Off-Site Pick-Up Locations												
Interval	#1 West Dwy / NE 132nd St		#2 Bus Dwy / NE 132nd St		#3 Dwy / 84th Ave NE EAS TRIPS ONLY		A NE 132nd St (west of 82nd Ave NE)		B NE 132nd St (east of 82nd Ave NE)		C 82nd Ave NE (south of 132nd)		D 84th Ave NE (north half) EAS TRIPS ONLY		E 84th Ave NE (south half)		Total Trips		
	Begin	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
2:30 PM	16	1	1	0			3	0	1	0	1	0			2	0	24	1	25
2:45 PM	12	5	2	1			9	0	2	0	3	0			5	0	33	6	39
3:00 PM	12	24	8	8			8	16	2	3	3	6			5	11	38	68	106
3:15 PM	10	25	0	2			1	4	1	2	0	1			0	3	12	37	49
3:30 PM	19	13	0	0			0	0	0	0	0	0			0	0	19	13	32
Peak Hour	53	67	10	11	0	0	18	20	5	5	6	7	0	0	10	14	102	124	226
	120		21		0		38		10		13		0		24		226		

Finn Hill Middle School Trip Generation Study

Afternoon Peak Hour

Day: Thursday, May 12, 2022

							Off-Site Pick-Up Locations												
Interval	#1 West Dwy / NE 132nd St		#2 Bus Dwy / NE 132nd St		#3 Dwy / 84th Ave NE EAS TRIPS ONLY		A NE 132nd St (west of 82nd Ave NE)		B NE 132nd St (east of 82nd Ave NE)		C 82nd Ave NE (south of 132nd)		D 84th Ave NE (north half) EAS TRIPS ONLY		E 84th Ave NE (south half)		Total Trips		
	Begin	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
2:30 PM	12	3	0	0			3	0	0	0	1	0			3	0	19	3	22
2:45 PM	12	1	1	0			10	0	8	1	11	0			3	0	45	2	47
3:00 PM	20	11	6	2			6	19	4	10	2	13			8	11	46	66	112
3:15 PM	13	40	0	5			1	1	3	7	1	2			0	5	18	60	78
3:30 PM	12	18	0	0			0	0	0	0	0	0			0	0	12	18	30
Peak Hour	57	70	7	7	0	0	17	20	15	18	14	15	0	0	11	16	121	146	267
	127		14		0		37		33		29		0		27		267		

Finn Hill Middle School Trip Generation Study

PM Peak Hour

Day: Tuesday, May 10, 2022

					Off-Site Locations														
Interval	#1 West Dwy / NE 132nd St		#2 Bus Dwy / NE 132nd St		A NE 132nd St (west of 82nd Ave NE)		B NE 132nd St (east of 82nd Ave NE)		C 82nd Ave NE (south of 132nd)		D 84th Ave NE (north half) EAS TRIPS ONLY		E 84th Ave NE (south half)		Total Trips			Hourly Totals	
	Begin	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	Total			
	4:00 PM	13	13	2	2	4	0	0	0	0	0	0	0	0	19	15	34		
	4:15 PM	22	16	5	2	4	0	2	1	0	0			0	0	33	19	52	
4:30 PM	16	9	6	2	8	2	3	1	0	0			0	0	33	14	47		
4:45 PM	24	39	9	15	2	10	1	2	0	0			0	0	36	66	102	235	4:00 pm - 5:00 pm
5:00 PM	12	15	0	1	0	5	0	4	0	0			0	0	12	25	37	238	4:15 pm - 5:15 pm
5:15 PM	4	14	1	2	0	0	0	2	0	0			0	0	5	18	23	209	4:30 pm - 5:30 pm
5:30 PM	6	9	0	0	0	3	0	1	0	0			0	0	6	13	19	181	4:45 pm - 5:45 pm
5:45 PM	1	1	1	1	0	0	0	0	0	0			0	0	2	2	4	83	5:00 pm - 6:00 pm
Peak Hour	74	79	20	20	14	17	6	8	0	0	0	0	0	0	114	124	238	Peak Hour is 4:15 pm - 5:15 pm	
	153		40		31		14		0		0		0		238				

Finn Hill Middle School Trip Generation Study

PM Peak Hour

Day: Thursday, May 12, 2022

					Off-Site Locations														
Interval	#1 West Dwy / NE 132nd St		#2 Bus Dwy / NE 132nd St		A NE 132nd St (west of 82nd Ave NE)		B NE 132nd St (east of 82nd Ave NE)		C 82nd Ave NE (south of 132nd)		D 84th Ave NE (north half) EAS TRIPS ONLY		E 84th Ave NE (south half)		Total Trips			Hourly Totals	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	Total		
	Begin	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out		
4:00 PM	4	9	1	0	1	1	0	0	0	0			0	0	6	10	16		
4:15 PM	6	4	2	1	0	0	1	1	0	0			0	0	9	6	15		
4:30 PM	37	30	5	4	1	1	1	1	0	0			0	0	44	36	80		
4:45 PM	9	34	9	1	0	0	2	2	0	0			0	0	20	37	57	168	4:00 pm - 5:00 pm
5:00 PM	3	8	1	1	0	0	0	0	0	0			0	0	4	9	13	165	4:15 pm - 5:15 pm
5:15 PM	2	3	0	0	0	0	0	0	0	0			0	0	2	3	5	155	4:30 pm - 5:30 pm
5:30 PM	0	1	0	0	0	0	0	0	0	0			0	0	0	1	1	76	4:45 pm - 5:45 pm
5:45 PM	8	2	0	0	0	0	0	0	0	0			0	0	8	2	10	29	5:00 pm - 6:00 pm
Peak Hour	56	77	17	6	2	2	4	4	0	0	0	0	0	0	79	89	168	Peak Hour is 4:00 pm - 5:00 pm	
	133		23		4		8		0		0		0		168				

Appendix F

Historical LWSD Middle School Trip Generation Calculations

LWSD Middle School Trip Generation SUMMARY OF HISTORICAL DATA

AM PEAK

AM Peak Hour Volumes

Peak Hour	RMS (2013) 2-day average	RMS (2015) 2-day average	RHJH (2010) 2-day average	EMS (2016) 2-day average	FHMS (2022) 2-day average
	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
7:00 - 8:00	823	827	595	773	
7:15 - 8:15	769	784	558	777	
7:30 - 8:30	557	571	403	672	
7:45 - 8:45					567
8:00 - 9:00					520

adjusted

RMS started at 7:50 AM
peak = 7:00-8:00

RMS started at 7:50 AM
peak = 7:00-8:00

RHJH started at 7:45 AM
peak = 7:00-8:00

EMS started at 8:00 AM
peak = 7:15-8:15

FHMS started at 8:30 AM
peak should be 7:45-8:45

Peak Hour %
higher than
adjacent hour

7.0%

5.5%

6.6%

15.6%

9.0%

average of 4 data points to
apply

AFTERNOON PEAK

Afternoon Peak Hour Volumes

Peak Hour	RMS (2013) 2-day average	RMS (2015) 2-day average	RHJH (2010) 2-day average	EMS (2016) 2-day average	FHMS (2022) 2-day average
	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
1:45 - 2:45	294	316	236		
2:00 - 3:00	296	327	247	332	
2:15 - 3:15	275	305	214	342	
2:30 - 3:30				295	240
2:45 - 3:45					247
3:00 - 4:00					

adjusted

RMS ended at 2:20 PM
peak = 2:00-3:00

RMS ended at 2:20 PM
peak = 2:00-3:00

RHJH ended at 2:15 PM
peak = 2:00-3:00

EMS ended at 2:30 PM
peak = 2:15-3:15

FHMS ended at 3:05 PM
peak should be 2:45-3:45

Peak Hour %
higher than
adjacent hour

0.7%

3.4%

4.5%

2.9%

3.0%

average of 4 data points to
apply

LWSD Middle School Trip Generation
SUMMARY OF HISTORICAL DATA

AM PEAK

AM Peak Hour Volumes

Peak Hour	RMS (2013) 2-day average		RMS (2015) 2-day average		RHJH (2010) 2-day average		EMS (2016) 2-day average		FHMS (2022) 2-day average	
	in %	out %	in %	out %	in %	out %	in %	out %	in %	out %
7:00 - 8:00	52%	48%	52%	48%	53%	47%				
7:15 - 8:15	51%	49%	51%	49%	52%	48%	52%	48%		
7:30 - 8:30							51%	49%		
7:45 - 8:45									51%	49%
8:00 - 9:00									50%	50%

RMS started at 7:50 AM
peak = 7:00-8:00

RMS started at 7:50 AM
peak = 7:00-8:00

RHJH started at 7:45 AM
peak = 7:00-8:00

EMS started at 8:00 AM
peak = 7:15-8:15

FHMS started at 8:30 AM
peak should be 7:45-8:45

X = adjusted

Peak Hour %
vs. adjacent
hour %

1%

1%

1%

1%

1%

average of 4
data points to
apply

AFTERNOON PEAK

Afternoon Peak Hour Volumes

Peak Hour	RMS (2013) 2-day average		RMS (2015) 2-day average		RHJH (2010) 2-day average		EMS (2016) 2-day average		FHMS (2022) 2-day average	
	in %	out %	in %	out %	in %	out %	in %	out %	in %	out %
1:45 - 2:45	48%	52%	47%	53%	49%	51%				
2:00 - 3:00	46%	54%	43%	57%	45%	55%	45%	55%		
2:15 - 3:15							42%	58%		
2:30 - 3:30									49%	51%
2:45 - 3:45									45%	55%
3:00 - 4:00										

RMS ended at 2:20 PM
peak = 2:00-3:00

RMS ended at 2:20 PM
peak = 2:00-3:00

RHJH ended at 2:15 PM
peak = 2:00-3:00

EMS ended at 2:30 PM
peak = 2:15-3:15

FHMS ended at 3:05 PM
peak should be 2:45-3:45

X = adjusted

Peak Hour %
vs. adjacent
hour %

-2%

-4%

-4%

-4%

-4%

average of 4
data points to
apply

Finn Hill Middle School (FHMS) Trip Generation Study - 2022

ADJUSTED FOR PEAK HOUR

AM PEAK

15-Minute Volumes

Time Starting	Tuesday 5/10/22			Thursday 5/12/22			2-Day Average		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
7:45	27	28	55	45	26	71			
8:00	51	39	90	49	43	92			
8:15	152	118	270	158	123	281			
8:30	53	86	139	43	92	135			
8:45	4	5	9	10	13	23			

*School starts at 8:30 AM

AM Peak Hour Volumes

Peak Hour	Tuesday 5/10/22			Thursday 5/12/22			2-Day Average		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
7:45 - 8:45	283	271	554	295	284	579	289	278	567
8:00 - 9:00	260	248	508	260	271	531	260	260	520

51%

49%

50%

50%

*School starts at 8:30 AM, peak hour is 7:45-8:45

Peak Hour % higher than adjacent hour 9.0%

AFTERNOON PEAK

15-Minute Volumes

Time Starting	Tuesday 5/10/22			Thursday 5/12/22			2-Day Average		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
2:30	24	1	25	19	3	22			
2:45	33	6	39	45	2	47			
3:00	38	68	106	46	66	112			
3:15	12	37	49	18	60	78			
3:30	19	13	32	12	18	30			

*School ends at 3:05 PM

Afternoon Peak Hour Volumes

Peak Hour	Tuesday 5/10/22			Thursday 5/12/22			2-Day Average		
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL
2:30 - 3:30	107	112	219	128	131	259	118	122	240
2:45 - 3:45	102	124	226	121	146	267	112	135	247

49%

51%

45%

55%

*School ends at 3:05 PM, peak hour is 2:45-3:45

Peak Hour % higher than adjacent hour 3.0%

Appendix G

Detailed Trip Generation Estimate

Finn Hill Middle School Addition
TENW Project No. 2022-174

Finn Hill Middle School Addition Trip Generation Estimate

Time Period	Additional Enrollment ¹	Trip Rate ^{2,3}	Directional Distribution ²		Vehicular Trip Generation		
			Entering	Exiting	In	Out	Total
Daily	200	2.63	50%	50%	263	263	526
AM Peak Hour	200	0.84	51%	49%	86	82	168
Afternoon Peak Hour	200	0.37	45%	55%	33	41	74
PM Peak Hour	200	0.30	48%	52%	29	31	60

Notes:

1. Additional student capacity as a result of the Addition (200 students) provided by LWSD on 5/4/22.
2. Trip rates and directional splits based on trip generation study at KIMS conducted on May 10 and May 12, 2022 and historical LWSD middle school trip generation studies.
3. Daily trip rate based on ITE Trip Generation Manual, 11th Edition based on the ratio of daily trip rate to AM peak hour trip rate for LUC 522 (2.10 / 0.67).

Appendix H

Concurrency Test Notice



CITY OF KIRKLAND

Department of Public Works

123 Fifth Avenue, Kirkland, WA 98033 425.587.3800

www.kirklandwa.gov

MEMORANDUM

To: Amy Wasserman, TENW

From: Rochelle Starrett, Transportation Engineer

Date: November 9, 2022

Subject: Finn Hill Middle School Expansion Transportation Concurrency Test Notice,
Tran22-00557

The purpose of this memo is to inform you that the proposed Finn Hill Middle School Expansion has passed transportation concurrency. This memorandum will serve as the transportation concurrency test notice and allows the applicant to proceed with other development permits and the SEPA review. This test notice will expire on February 7, 2023 unless a transportation impact analysis report is submitted, or an extension of this notice is granted by February 7, 2023.

Project Description

Finn Hill Middle School is located at 8040 NE 132nd Street on parcel 2426049128, northwest of the intersection of NE 132nd Street/84th Avenue NE. This project will construct an eight classroom addition with capacity for up to 200 students. The site access is expected to remain as it is today with two primary accesses off NE 132nd Street and access to the shared Environmental and Adventure School campus off 84th Avenue NE. The new site circulation changes implemented in September 2022 by the Lake Washington School District are also expected to remain in place. During peak pick up and drop off times, parents at Finn Hill Middle School enter the pick up/drop off area from NE 132nd Street and exit using the 84th Avenue NE entrance. Figure 1 shows the project site location. The project is currently expected to open by the start of the 2024-2025 school year.

Based on the trip generation report from TENW, the proposed project will generate a net new 526 daily vehicle trips, 168 AM peak hour vehicle trips, 74 school PM peak hour vehicle trips, 60 PM peak hour vehicle trips, and 72 PM peak hour person trips.

H:\Pw\Transportation Group\04_Projects\Development\Development Reviews\2022\Finn Hill MS Expansion\Concurrency Test\Finn Hill MS Concurrency Test.docx

Memorandum to Amy Wasserman
November 9, 2022
Page 3 of 3

certificate of concurrency are issued, or an extension is granted if a transportation impact analysis report is submitted within 90 days of this notice.

EXPIRATION

The concurrency test notice shall expire and a new concurrency test application is required unless:

1. **A complete SEPA checklist, traffic impact analysis (TIA) and all required documentation are submitted to the City within 90 calendar days of the concurrency test notice (February 7, 2023).**
2. A Certificate of Concurrency is issued or an extension is requested and granted by the Public Works Department within one year of issuance of the concurrency test notice. (A Certificate of Concurrency is issued at the same time a development permit or building permit is issued if the applicant holds a valid concurrency test notice.)
3. A Certificate of Concurrency shall expire six years from the date of issuance of the concurrency test notice unless all building permits are issued for buildings approved under the concurrency test notice.

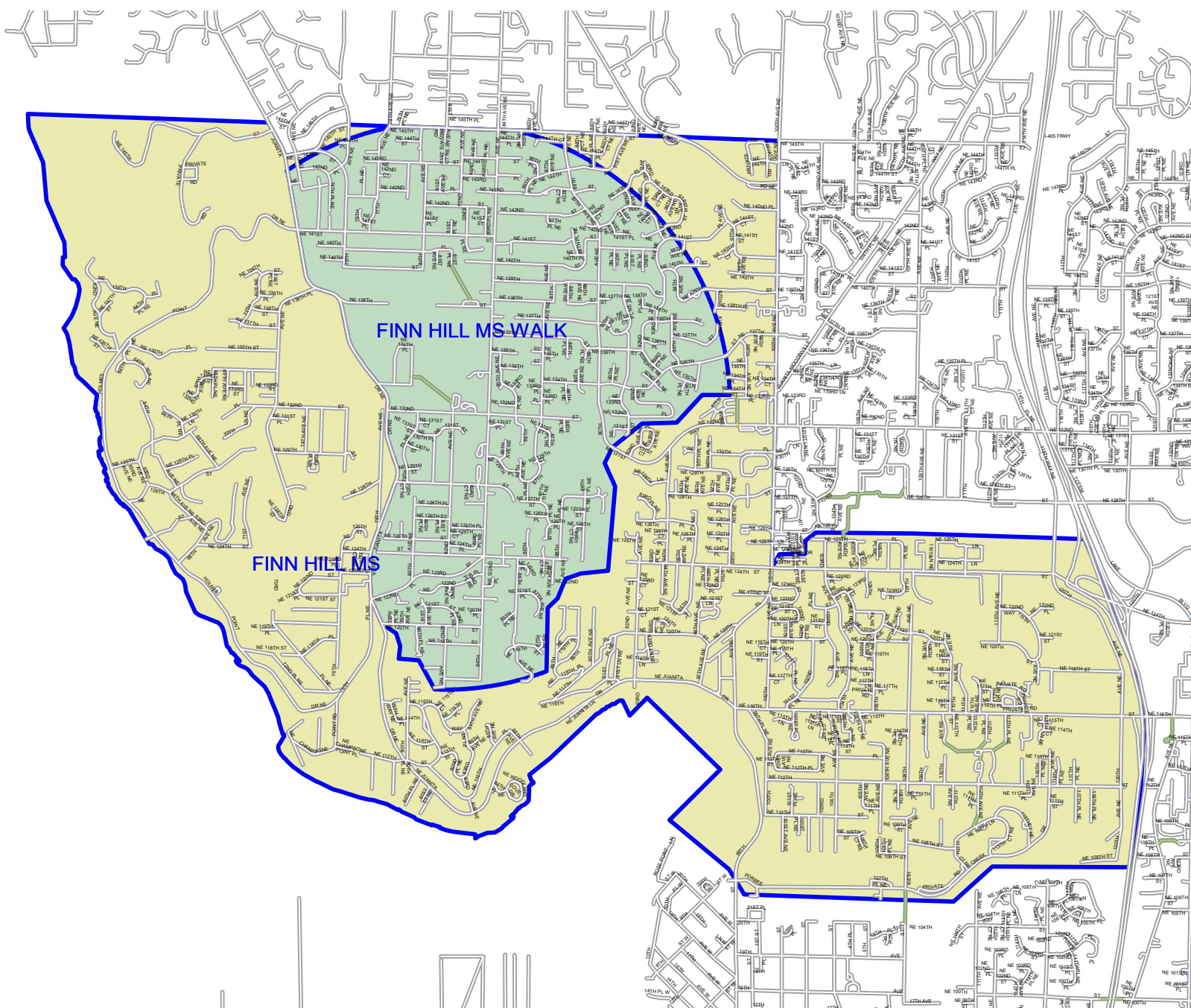
APPEALS

The concurrency test notice may be appealed by the public or agency with jurisdiction. The concurrency test notice is subject to an appeal until the SEPA review process is complete and the appeal deadline has passed. Concurrency appeals are heard before the Hearing Examiner along with any applicable SEPA appeal. For more information, refer to the Kirkland Municipal Code, Title 25. If you have any questions, please call me at x3870.

cc: Energov Tran22-00557
Tony Leavitt, Senior Planner

Appendix I

Detailed Trip Distribution Calculations and Existing School Boundary Map



Finn Hill Middle School Trip Generation Study
Trip Distribution Calculations

AM PEAK HOUR

MAIN DRIVEWAY TRIP DISTRIBUTION (excludes bus driveway)

	Tuesday May 10, 2022										Thursday, May 12, 2022										2-day Average													
	to/from west				to/from east				to/from south				TOTAL		to/from west				to/from east				to/from south				TOTAL		to/from west		to/from east		to/from south	
	in	in %	out	out %	in	in %	out	out %	in	in %	out	out %	in	out	in	in %	out	out %	in	in %	out	out %	in	out	in	in %	out	out %	in	in %	out	out %		
82nd									3	2%	7	4%	3	7					3	2%	5	3%	3	5							2%	4%		
132nd	62	35%	138	78%	110	63%	31	18%					172	169	71	38%	145	81%	111	60%	29	16%			182	174	37%	80%	62%	17%				
Total	62	35%	138	78%	110	63%	31	18%	3	2%	7	4%	175	176	71	38%	145	81%	111	60%	29	16%	3	2%	5	3%	185	179	37%	80%	62%	17%	2%	4%
Rounded to use for distribution of new trips																								35%	80%	60%	15%	5%	5%					

AFTERNOON PEAK HOUR

MAIN DRIVEWAY TRIP DISTRIBUTION (excludes bus driveway)

	Tuesday May 10, 2022										Thursday, May 12, 2022										2-day Average													
	to/from west				to/from east				to/from south				TOTAL		to/from west				to/from east				to/from south				TOTAL		to/from west		to/from east		to/from south	
	in	in %	out	out %	in	in %	out	out %	in	in %	out	out %	in	out	in	in %	out	out %	in	in %	out	out %	in	out	in	in %	out	out %	in	in %	out	out %		
82nd									3	6%	6	9%	3	6					0	0%	11	16%	0	11							3%	13%		
132nd	16	30%	40	60%	34	64%	21	31%					50	61	28	49%	39	56%	29	51%	20	29%			57	59	40%	58%	58%	30%				
Total	16	30%	40	60%	34	64%	21	31%	3	6%	6	9%	53	67	28	49%	39	56%	29	51%	20	29%	0	0%	11	16%	57	70	40%	58%	58%	30%	3%	13%
Rounded to use for distribution of new trips																								35%	60%	60%	30%	5%	10%					

PM PEAK HOUR

MAIN DRIVEWAY TRIP DISTRIBUTION (includes bus driveway)

	Tuesday May 10, 2022										Thursday, May 12, 2022										2-day Average													
	to/from west				to/from east				to/from south				TOTAL		to/from west				to/from east				to/from south				TOTAL		to/from west		to/from east		to/from south	
	in	in %	out	out %	in	in %	out	out %	in	in %	out	out %	in	out	in	in %	out	out %	in	in %	out	out %	in	in %	out	out %	in	in %	out	out %	in	in %	out	out %
82nd									3	3%	15	15%	3	15									2	3%	3	4%	2	3					3%	10%
132nd	31	33%	30	30%	60	64%	54	55%					91	84	26	36%	38	46%	45	62%	42	51%					71	80	35%	38%	63%	53%		
Total	31	33%	30	30%	60	64%	54	55%	3	3%	15	15%	94	99	26	36%	38	46%	45	62%	42	51%	2	3%	3	4%	73	83	35%	38%	63%	53%	3%	10%
Rounded to use for distribution of new trips																								30%	35%	65%	55%	5%	10%					

WEEKDAY DAILY

Average of AM, Afternoon, and PM	37%	59%	61%	33%	3%	9%
Rounded to Nearest 5	35%	55%	60%	35%	5%	10%

AM PEAK HOUR DISTRIBUTION



AFTERNOON PEAK HOUR DISTRIBUTION



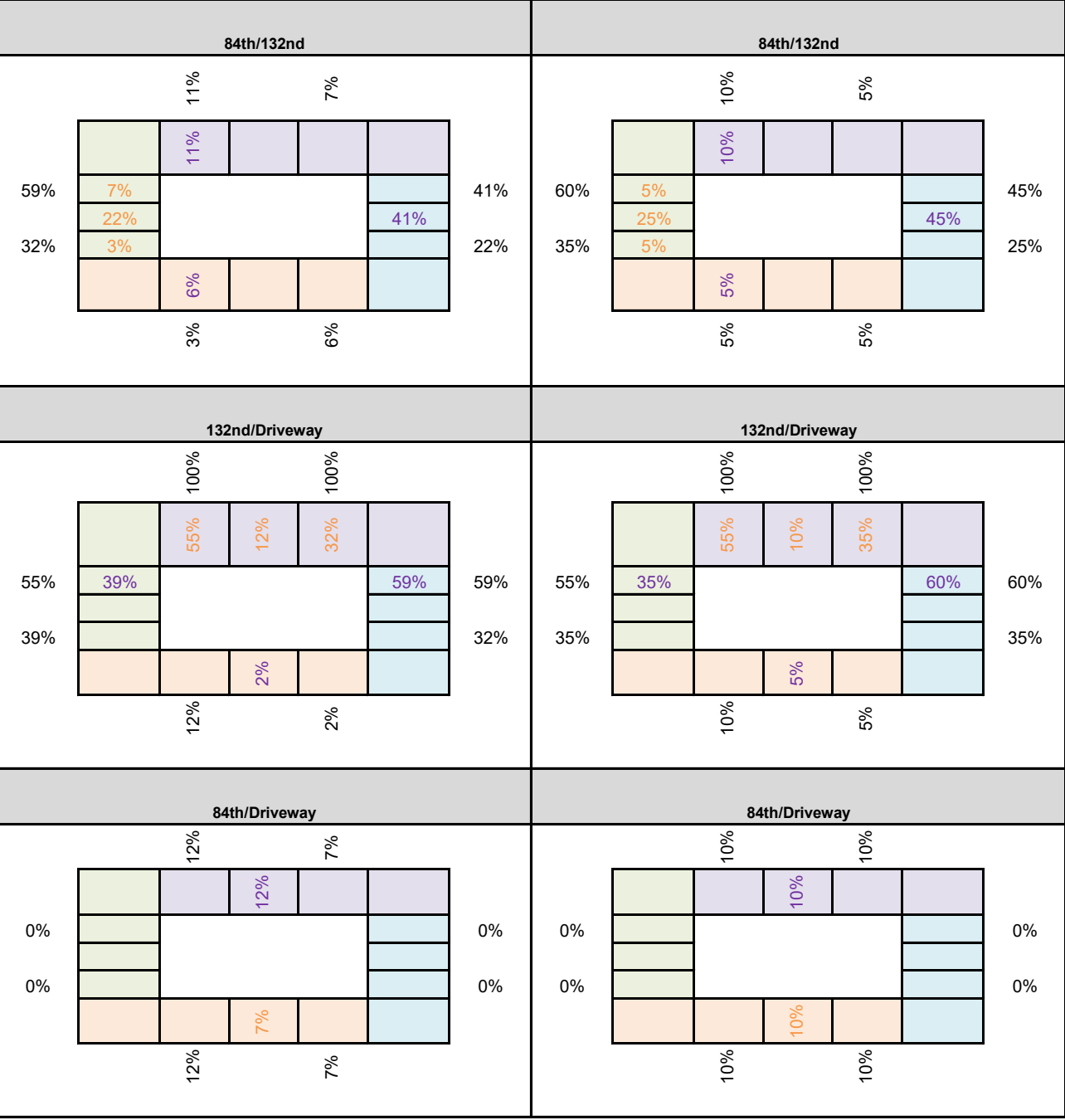
PM PEAK HOUR DISTRIBUTION

Turning Movement Count		School Trips		Distribution Estimated based on TMC		2-day Average Distribution - ROUNDED TO NEAREST 5%	
Tue 5/10/22		74 in 79 out		100% in 100% out		100% in 100% out	
84th/132nd		84th/132nd		84th/132nd		84th/132nd	
<div><div><div>164</div><div>180</div></div><div><div>82</div><div>22</div><div>41</div><div>123</div><div>16</div><div>11</div><div>57</div><div>71</div><div>114</div><div>138</div><div>28</div><div>638</div><div>131</div><div>66</div><div>237</div><div>222</div></div></div>		<div><div><div>49</div><div>41</div></div><div><div>7</div><div>9</div><div>7</div><div>9</div><div>28</div><div>4</div><div>3</div><div>4</div><div>3</div><div>39</div><div>28</div></div></div> <div>Estimated based on TMC</div>		<div><div><div>66%</div><div>52%</div></div><div><div>9%</div><div>12%</div><div>9%</div><div>12%</div><div>35%</div><div>5%</div><div>4%</div><div>5%</div><div>4%</div><div>53%</div><div>35%</div></div></div>		<div><div><div>65%</div><div>55%</div></div><div><div>10%</div><div>10%</div><div>10%</div><div>10%</div><div>40%</div><div>5%</div><div>5%</div><div>5%</div><div>5%</div><div>50%</div><div>40%</div></div></div> <div>estimated</div>	
132nd/Driveway		132nd/Driveway		132nd/Driveway		132nd/Driveway	
<div><div><div>141</div><div>126</div></div><div><div>79</div><div>23</div><div>22</div><div>101</div><div>3</div><div>10</div><div>3</div><div>8</div><div>33</div><div>74</div><div>41</div><div>398</div><div>108</div><div>15</div><div>172</div><div>150</div></div></div>		<div><div><div>23</div><div>22</div><div>22</div></div><div><div>79</div><div>74</div><div>23</div><div>15</div><div>41</div><div>153</div><div>3</div><div>3</div><div>15</div><div>49</div><div>41</div></div></div>		<div><div><div>29%</div><div>30%</div><div>30%</div></div><div><div>100%</div><div>100%</div><div>29%</div><div>19%</div><div>52%</div><div>4%</div><div>4%</div><div>19%</div><div>66%</div><div>52%</div></div></div>		<div><div><div>35%</div><div>30%</div><div>30%</div></div><div><div>100%</div><div>100%</div><div>35%</div><div>10%</div><div>55%</div><div>5%</div><div>5%</div><div>10%</div><div>65%</div><div>55%</div></div></div> <div>set from 2-day average distribution at this driveway</div>	
84th/Driveway		84th/Driveway		84th/Driveway		84th/Driveway	
<div><div><div>4</div><div>5</div></div><div><div>83</div><div>0</div><div>1</div><div>4</div><div>4</div><div>87</div><div>120</div><div>83</div><div>211</div><div>119</div><div>123</div><div>0</div><div>0</div></div></div>		<div><div><div>0</div><div>0</div></div><div><div>7</div><div>9</div><div>7</div><div>9</div><div>16</div><div>9</div><div>9</div><div>7</div><div>9</div><div>0</div><div>0</div></div></div> <div>based on 84th/132nd</div>		<div><div><div>0%</div><div>0%</div></div><div><div>9%</div><div>12%</div><div>9%</div><div>12%</div><div>0%</div><div>9%</div><div>12%</div><div>9%</div><div>12%</div><div>0%</div><div>0%</div></div></div>		<div><div><div>0%</div><div>0%</div></div><div><div>10%</div><div>10%</div><div>10%</div><div>10%</div><div>0%</div><div>10%</div><div>10%</div><div>10%</div><div>0%</div><div>0%</div><div>0%</div></div></div> <div>estimated</div>	
132nd/Juanita Drive		132nd/Juanita Drive		132nd/Juanita Drive		132nd/Juanita Drive	
<div><div><div>0</div><div>0</div></div><div><div>381</div><div>316</div><div>1,023</div><div>433</div><div>52</div><div>367</div><div>539</div><div>65</div><div>1,023</div><div>485</div><div>106</div><div>51</div><div>157</div><div>117</div></div></div>		<div><div><div>0</div><div>0</div></div><div><div>12</div><div>16</div><div>12</div><div>10</div><div>45</div><div>7</div><div>10</div><div>12</div><div>10</div><div>16</div><div>7</div></div></div> <div>XX = Estimated</div>		<div><div><div>0%</div><div>0%</div></div><div><div>17%</div><div>20%</div><div>17%</div><div>13%</div><div>20%</div><div>9%</div><div>13%</div><div>17%</div><div>13%</div><div>20%</div><div>20%</div><div>9%</div><div>29%</div><div>30%</div></div></div>		<div><div><div>0%</div><div>0%</div></div><div><div>15%</div><div>25%</div><div>15%</div><div>15%</div><div>25%</div><div>10%</div><div>15%</div><div>15%</div><div>15%</div><div>25%</div><div>25%</div><div>10%</div><div>35%</div><div>30%</div></div></div>	

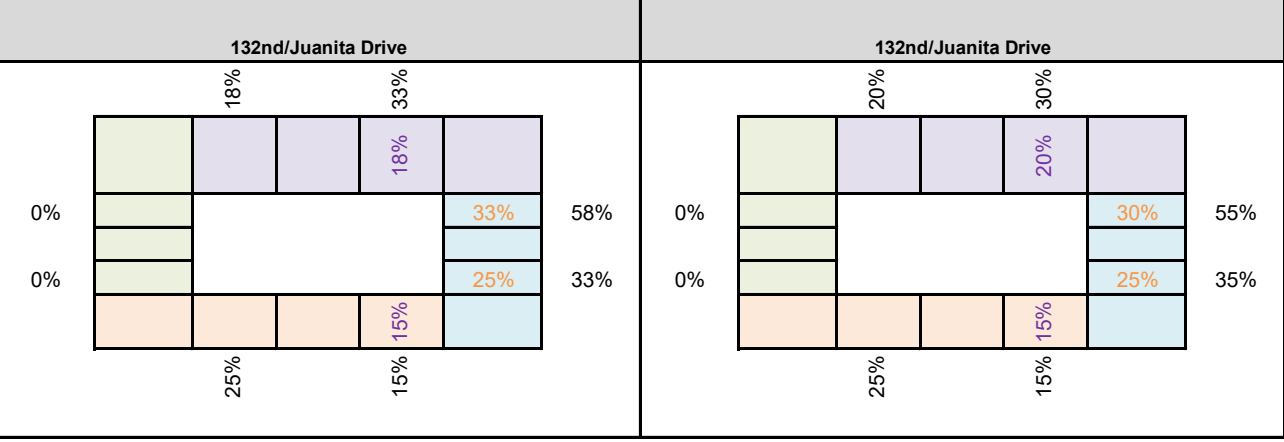
DAILY DISTRIBUTION

2-day Average Distribution - Average of AM, AFT, PM
100% in 100% out

Distribution - ROUNDED TO NEAREST 5%
100% in 100% out



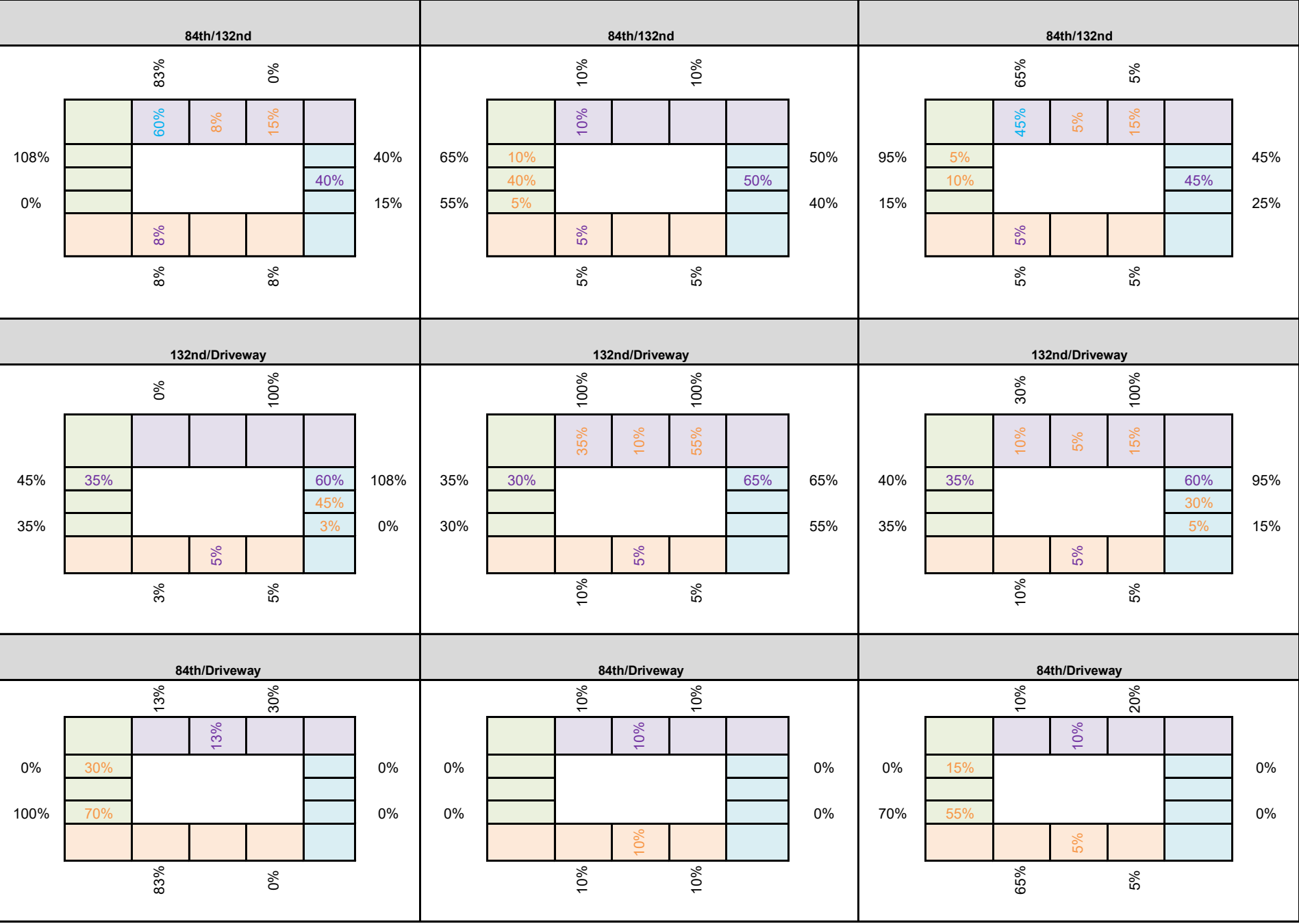
100% in 100% out 100% in 100% out external driveways



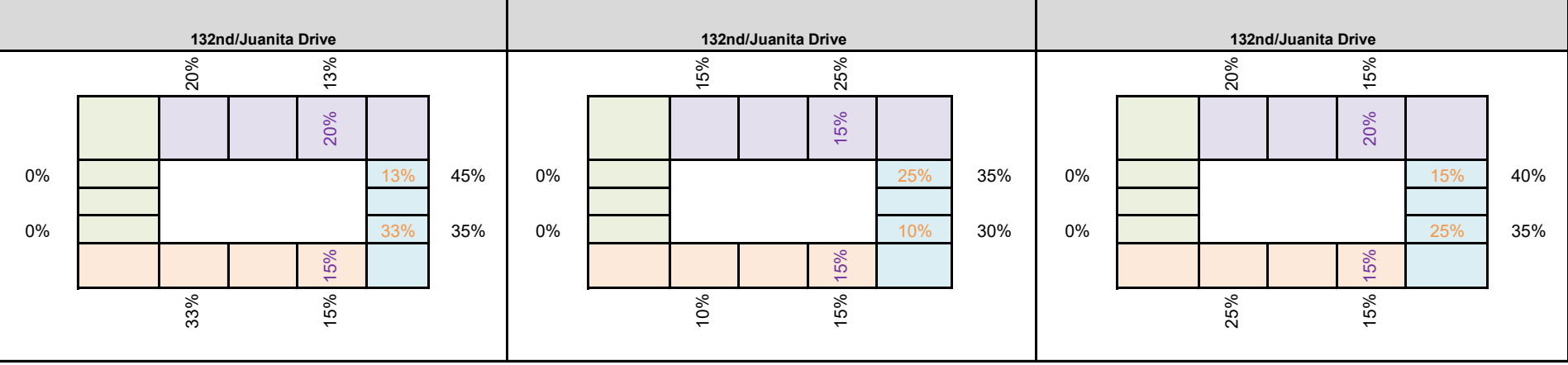
AM & Afternoon Average Distribution - with new circulation & additional shifts
100% in 0% out

PM Distribution - with new circulation & additional shifts
100% in 100% out

Daily Distribution - with new circulation
ROUNDED TO NEAREST 5%
100% in 100% out

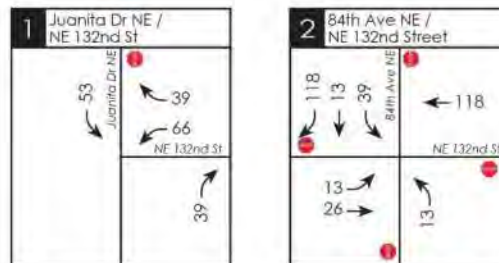


100% in 100% out external driveways 100% in 100% out external driveways 100% in 100% out external driveways



Appendix J

Daily Trip Distribution and Assignment



Appendix I: Daily Project Trip Distribution and Assignment at Study Intersections

Finn Hill Middle School Addition
Distribution based on existing volumes

Code	Intersection	Daily Trip Distribution											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
502	Juanita Dr NE/South Holmes Pt Dr NE	minor						major					
		1%							14%			24%	1%
503	Juanita Dr NE/NE 141st Street	minor						major					
			1%	1%		1%	14%	1%	14%			19%	
1000	84th Ave NE/NE 132nd Street	minor						major					
		5%	10%			45%		5%			15%	5%	45%
2000	Juanita Dr NE/NE 132nd Street	minor						major					
					25%		15%			15%	20%		

Finn Hill Middle School Addition
PM and Daily Trip Assignment

	Daily Trip Generation
New Trips	263 IN 263 OUT

Code	Study Int	Intersection	Turning Volumes											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
502		Juanita Dr NE/South Holmes Pt Dr NE	minor						major					
		Estimated Daily Trips =	3							37		63	3	
503		Juanita Dr NE/NE 141st Street	minor						major					
		Estimated Daily Trips =		3	3		3	37	3	37			50	
1000		84th Ave NE/NE 132nd Street	minor						major					
		Estimated Daily Trips =	13	26			118		13			39	13	118
2000		Juanita Dr NE/NE 132nd Street	minor						major					
		Estimated Daily Trips =				66		39			39	53		

Appendix K

Proportional Share Calculations

Finn Hill Middle School Addition
Proportional Share Summary

Proportional Share Results

Code	Intersection	Intersection Proportional Share	Significant Intersection?
502	<i>Juanita Dr NE/South Holmes Pt Dr NE</i>	0.34%	NO
503	<i>Juanita Dr NE/NE 141st Street</i>	0.64%	NO
1000	<i>84th Ave NE/NE 132nd Street</i>	1.94%	YES
2000	<i>Juanita Dr NE/NE 132nd Street</i>	2.28%	YES

Input appropriate information in green cells

¹ See "Intersection Description" worksheet for descriptions

Project Name:	FHMS Addition		Through Lanes ¹
Intersection No.	502		
Major Street ¹	Juanita Dr NE	# of Lanes*=	1
Minor Street ¹	South Holmes Pt Dr NE	# of Lanes*=	1

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

DATE:

10/15/2022

Daily Project Traffic Entering the Intersection

(Total of both approaches divided by two)

Major Street Volume $V_1 =$

Daily Volumes

Entering Leg Volumes *

(Total of both approaches divided by two)

Minor Street Volume $V_2 =$

51.5	37	66
3	3	

Major

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

$P_1 = V_1 / (10,000 \times f_1) =$	0.62%
$P_2 = V_2 / (5,000 \times f_2) =$	0.06%
$P_3 = V_1 / (15,000 \times f_3) =$	0.41%
$P_4 = V_2 / (2,500 \times f_4) =$	0.12%

Calculate Proportional Share

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

Intersection Proportional Share = Maximum of S_1 and $S_2 =$ 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:	ALW
Company:	TENW

Input appropriate information in green cells

¹ See "Intersection Description" worksheet for descriptions

Project Name:	FHMS Addition		Through Lanes ¹
Intersection No.	503		
Major Street ¹	Juanita Dr NE	# of Lanes*=	1
Minor Street ¹	NE 141st St	# of Lanes*=	1

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

DATE:

10/15/2022

Daily Project Traffic Entering the Intersection

(Total of both approaches divided by two)

Major Street Volume $V_1 =$

Daily Volumes

Entering Leg Volumes *

(Total of both approaches divided by two)

Minor Street Volume $V_2 =$

45	40	50
23	6	40

Major

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

$$P_1 = V_1 / (10,000 \times f_1) = 0.54\%$$

$$P_2 = V_2 / (5,000 \times f_2) = 0.46\%$$

$$P_3 = V_1 / (15,000 \times f_3) = 0.36\%$$

$$P_4 = V_2 / (2,500 \times f_4) = 0.92\%$$

Calculate Proportional Share

$$S_1 = (P_1 + P_2) / 2 = 0.50\%$$

$$S_2 = (P_3 + P_4) / 2 = 0.64\%$$

Intersection Proportional Share = Maximum of S1 and S2 = 0.64%

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: ALW

Company: TENW

Input appropriate information in green cells

¹ See "Intersection Description" worksheet for descriptions

Project Name:	FHMS Addition		Through Lanes ¹
Intersection No.	1000		
Major Street ¹	84th Ave NE	# of Lanes*=	1
Minor Street ¹	NE 132nd Street	# of Lanes*=	1

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

DATE:

10/15/2022

Daily Project Traffic Entering the Intersection

(Total of both approaches divided by two)

	Daily Volumes	Entering Leg Volumes *		
Major Street Volume V_1 =	91.5	13	170	Major
Minor Street Volume V_2 =	78.5	39	118	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

$P_1 = V_1 / (10,000 \times f_1) =$	1.10%
$P_2 = V_2 / (5,000 \times f_2) =$	1.57%
$P_3 = V_1 / (15,000 \times f_3) =$	0.73%
$P_4 = V_2 / (2,500 \times f_4) =$	3.14%

Calculate Proportional Share

$S_1 = (P_1 + P_2) / 2 =$	1.33%
$S_2 = (P_3 + P_4) / 2 =$	1.94%

Intersection Proportional Share = Maximum of S_1 and S_2 = 1.94%

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: ALW
Company: TENW

Input appropriate information in green cells

¹ See "Intersection Description" worksheet for descriptions

Project Name:	FHMS Addition		Through Lanes ¹
Intersection No.	2000		
Major Street ¹	Juanita Dr NE	# of Lanes*=	1
Minor Street ¹	NE 132nd Street	# of Lanes*=	1

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

DATE:

10/15/2022

Daily Project Traffic Entering the Intersection

(Total of both approaches divided by two)

Major Street Volume $V_1 =$

Daily Volumes

Entering Leg Volumes *

(Total of both approaches divided by two)

Minor Street Volume $V_2 =$

46	39	53
105		105

Major

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

$P_1 = V_1 / (10,000 \times f_1) =$	0.55%
$P_2 = V_2 / (5,000 \times f_2) =$	2.10%
$P_3 = V_1 / (15,000 \times f_3) =$	0.37%
$P_4 = V_2 / (2,500 \times f_4) =$	4.20%

Calculate Proportional Share

$S_1 = (P_1 + P_2) / 2 =$	1.33%
$S_2 = (P_3 + P_4) / 2 =$	2.28%

Intersection Proportional Share = Maximum of S_1 and $S_2 =$ 2.28%

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: ALW
Company: TENW

Finn Hill Middle School Addition
Proportional Share Summary

TEST 840 DAILY TRIPS

Proportional Share Results

Code	Intersection	Intersection Proportional Share	Significant Intersection?
1000	84th Ave NE/NE 132nd Street	3.11%	YES

Finn Hill Middle School Addition
PM and Daily Trip Assignment

New Trips

	Daily Trip Generation	
	420 IN	420 OUT

Code	Study Int	Intersection	Turning Volumes											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
1000		84th Ave NE/NE 132nd Street	minor						major					
		Estimated Daily Trips =	21	42			189		21			63	21	189

Finn Hill Middle School Addition
Distribution based on existing volumes
TEST 840 DAILY TRIPS

Code	Intersection	Daily Trip Distribution											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
1000	84th Ave NE/NE 132nd Street	minor						major					
		5%	10%			45%		5%			15%	5%	45%

Input appropriate information in green cells

¹ See "Intersection Description" worksheet for descriptions

Project Name:	FHMS Addition -Sensitivity Test for 840 daily trips		Through Lanes ¹
Intersection No.	1000		
Major Street ¹	84th Ave NE	# of Lanes*= 1	
Minor Street ¹	NE 132nd Street	# of Lanes*= 1	

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

DATE:

2/8/2023

Daily Project Traffic Entering the Intersection

(Total of both approaches divided by two)

Major Street Volume $V_1 =$

Daily Volumes

Entering Leg Volumes *

(Total of both approaches divided by two)

Minor Street Volume $V_2 =$

147	21	273
126	63	189

Major

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

$P_1 = V_1 / (10,000 \times f_1) =$	1.76%
$P_2 = V_2 / (5,000 \times f_2) =$	2.52%
$P_3 = V_1 / (15,000 \times f_3) =$	1.18%
$P_4 = V_2 / (2,500 \times f_4) =$	5.04%

Calculate Proportional Share

$S_1 = (P_1 + P_2) / 2 =$	2.14%
$S_2 = (P_3 + P_4) / 2 =$	3.11%

Intersection Proportional Share = Maximum of S1 and S2 = 3.11%

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: ALW
Company: TENW

Finn Hill Middle School Addition

Proportional Share Summary

TEST 840 DAILY TRIPS AND ADDITIONAL 15% OF EXITING TRIPS USING 132ND TO JUANITA DRIVE

Proportional Share Results

Code	Intersection	Intersection Proportional Share	Significant Intersection?
1000	84th Ave NE/NE 132nd Street	3.19%	YES

Finn Hill Middle School Addition
Distribution based on existing volumes
TEST 840 DAILY TRIPS AND ADDITIONAL 15% OF EXITING TRIPS USING 132ND TO JUANITA DRIVE TO HEAD NORTH INSTEAD OF USING 84TH

Code	Intersection	Daily Trip Distribution											
		Eastbound			Westbound			Northbound			Southbound		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
1000	84th Ave NE/NE 132nd Street	minor						major					
		5%	10%			45%		5%			15%	5%	60%

Finn Hill Middle School Addition
PM and Daily Trip Assignment

New Trips									Daily Trip Generation					
									420 IN			420 OUT		
Code	Study Int	Intersection	Turning Volumes											
			Eastbound			Westbound			Northbound			Southbound		
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
1000		84th Ave NE/NE 132nd Street	minor						major					
		Estimated Daily Trips =		21	42			189		21			63	21

Input appropriate information in green cells

¹ See "Intersection Description" worksheet for descriptions

Project Name:	FHMS Addition- Sensitivity Test		Through Lanes ¹
Intersection No.	1000		
Major Street ¹	84th Ave NE	# of Lanes*=	1
Minor Street ¹	NE 132nd Street	# of Lanes*=	1

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

DATE:

5/10/2023

Daily Project Traffic Entering the Intersection

(Total of both approaches divided by two)

	Daily Volumes	Entering Leg Volumes *	
Major Street Volume V_1 =	178.5	21	336
Minor Street Volume V_2 =	126	63	189

Major

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

$P_1 = V_1 / (10,000 \times f_1) =$	2.14%
$P_2 = V_2 / (5,000 \times f_2) =$	2.52%
$P_3 = V_1 / (15,000 \times f_3) =$	1.43%
$P_4 = V_2 / (2,500 \times f_4) =$	5.04%

Calculate Proportional Share

$S_1 = (P_1 + P_2) / 2 =$	2.33%
$S_2 = (P_3 + P_4) / 2 =$	3.23%

Intersection Proportional Share = Maximum of S_1 and S_2 = 3.23%
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: ALW
Company: TENW

Appendix L

Future Year 2024 Volume Adjustments

AM PEAK HOUR VOLUME ADJUSTMENTS FOR MODIFIED CIRCULATION ROUTE

2022 Existing	ADJUSTMENTS FOR NEW EXIT ROUTE	Additional Shift FOR NEW EXIT ROUTE	TOTAL ADJUSTMENTS FOR NEW EXIT ROUTE	2024 Baseline WITH ADJUSTMENTS
1 Juanita Dr NE/NE 132nd Street 	1 Juanita Dr NE/NE 132nd Street 	1 Juanita Dr NE/NE 132nd Street 	1 Juanita Dr NE/NE 132nd Street 	1 Juanita Dr NE/NE 132nd Street
2 84th Ave NE/NE 132nd Street 	2 84th Ave NE/NE 132nd Street 	2 84th Ave NE/NE 132nd Street 	2 84th Ave NE/NE 132nd Street 	2 84th Ave NE/NE 132nd Street
3 NE 132nd St / 82nd Ave / Main Driveway 	3 NE 132nd St / 82nd Ave / Main Driveway 	3 NE 132nd St / 82nd Ave / Main Driveway 	3 NE 132nd St / 82nd Ave / Main Driveway 	3 NE 132nd St / 82nd Ave / Main Driveway
4 NE 132nd St / Bus Driveway 	4 NE 132nd St / Bus Driveway 	4 NE 132nd St / Bus Driveway 	4 NE 132nd St / Bus Driveway 	4 NE 132nd St / Bus Driveway
5 84th Ave NE / Driveway 	5 84th Ave NE / Driveway 	5 84th Ave NE / Driveway 	5 84th Ave NE / Driveway 	5 84th Ave NE / Driveway

AFTERNOON PEAK HOUR VOLUME ADJUSTMENTS FOR MODIFIED CIRCULATION ROUTE

2022 Existing	ADJUSTMENTS FOR NEW EXIT ROUTE	Additional Shift FOR NEW EXIT ROUTE	TOTAL ADJUSTMENTS FOR NEW EXIT ROUTE	2024 Baseline WITH ADJUSTMENTS
84th Ave NE/NE 132nd Street stop-controlled	84th Ave NE/NE 132nd Street 11 0	84th Ave NE/NE 132nd Street 0 0	84th Ave NE/NE 132nd Street 11 0	84th Ave NE/NE 132nd Street 155 134
NE 132nd St / 82nd Ave / Main Driveway stop-controlled	NE 132nd St / 82nd Ave / Main Driveway -11 0	NE 132nd St / 82nd Ave / Main Driveway 0 0	NE 132nd St / 82nd Ave / Main Driveway -11 0	NE 132nd St / 82nd Ave / Main Driveway 44 41 X = no growth
NE 132nd St / Bus Driveway stop-controlled	NE 132nd St / Bus Driveway 0 0	NE 132nd St / Bus Driveway 0 0	NE 132nd St / Bus Driveway 0 0	NE 132nd St / Bus Driveway 0 0 X = no growth
84th Ave NE / Driveway stop-controlled	84th Ave NE / Driveway 66 -4	84th Ave NE / Driveway -14 0	84th Ave NE / Driveway 52 -4	84th Ave NE / Driveway 163 121 X = no growth



August 26, 2022

Ina Holzer
Senior Project Manager, Lake Washington School District
15212 NE 95th Street
Redmond, WA 98052

Re: Arborist Report – LWSD Finn Hill Middle School

The Watershed Company Reference Number: 220510

Dear Ina:

We are pleased to present you with the findings of our tree inventory and assessment for the new classroom addition at Finn Hill Middle School (parcel # 2426049128). ISA Certified Arborist® and Qualified Tree Risk Assessor (TRAQ) Jake Robertson with The Watershed Company, visited the property on July 28, 2022, to inventory and assess trees within the study area.

Tree attributes, including species, size, and condition, were assessed during the on-site inventory, and are summarized in the enclosed Tree Inventory Table. The following document is included with this letter:

- Annotated Tree Map

Site Characterization

The subject parcel is approximately 28.52 acres in size; however, the study area is reduced to approximately 1.42 acres to encompass only the new area of development. The parcel is developed with the middle school and associated landscape and impervious developments. There is an identified wetland to the north of the parcel per King County iMap. There are large groupings of trees along the northern border and the south-western corner of the parcel. The

parcel is zoned Low Density Residential Zone (RSA-6).. See Figure 1 for a map of the study area and site vicinity.

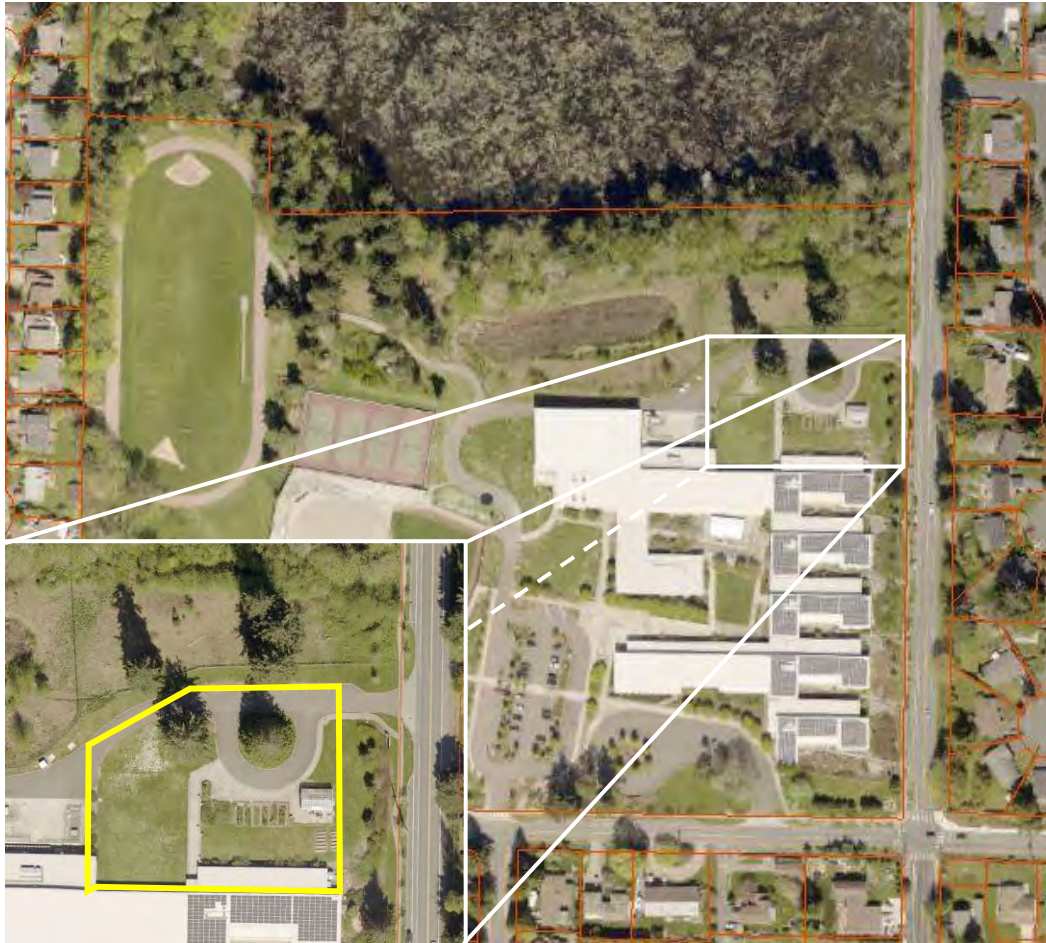


Figure 1. Vicinity map showing the approximate location of the study area (outlined in yellow). *(Image courtesy of King County iMap, 2019.)*

Project Description

The project proposes to construct a new addition for classrooms in the northeast corner of the study area outlined in yellow from Figure 1. The goal of the project is to retain inventoried trees, minimizing impacts as much as possible. Per the Tree Protection Plan, prepared by Integrus Architecture (dated June 17, 2022), there are no planned alterations to the driveway or turnaround.

Tree Assessment Methods

The trees within the study area were determined to be significant using the definition in the Kirkland Zoning Code (KZC) Chapter 95. The City of Kirkland defines a significant tree as any evergreen or deciduous tree, six inches in diameter or greater, measured four-and-a-half feet above existing grade. For the purpose of this study, the health of significant trees shall be depicted using a rating system of Excellent, Good, Fair, and Poor (Table 1).

All significant trees were assigned a unique identification number. Each assessed tree was tagged with a rectangular aluminum, write-on tag that was affixed to the trunk of the tree.

Diameter

The diameter-at-breast-height (DBH) of all subject trees was measured at four-and-a-half feet above the surface of the ground.

Estimated Height

Tree height was determined by a visual estimate.

Canopy Radius

Canopy radius, also known as dripline, was measured horizontally from the center of the trunk to the outermost branch tips. For trees with uneven crowns, the average of two perpendicular radii was recorded.

Tree Protection Zone (TPZ)

The TPZ is a boundary that denotes the location of tree protection fencing where all construction activities are prohibited. This boundary is determined outside the Interior Critical Root Zone (ICRZ).

Critical Root Zone

The area encircling the trunk of a tree equal to one foot radius for every inch of DBH.

Interior Critical Root Zone (ICRZ)

An area half the distance of the CRZ that, when impacted, may compromise the structural integrity of the tree.

Condition

A Level 1 visual assessment was used to evaluate the health and condition of all trees within the study area in accordance with ISA and CTLA standards. The condition determination was based on the criteria outlined in Kirkland Zoning Code (KZC) Chapter 95.30 – Tree Retention Associated with Development Activity.

The ratings can be summarized in Table 1 below from the City code. Each tree was given a rating from 1-6 (Excellent – Dead/Poor) as summarized below in Table 1.

Table 1. Assessment of tree health and condition derived from KZC 95.30.1 – Tree Condition Ratings.

Condition Rating	Tree Health <i>Twig and leaf density, size and growth, pest/pathogen issues</i>	Tree Structure <i>Root flare, trunk condition. Branch assembly</i>
Excellent	High or above average vigor with little or no twig dieback, discoloration or defoliation.	Trunk and root flare exhibit no visible defects or cavities. Branch structure and attachments are normal for species and free of defects.
Good	Vigor is normal for species. No significant damage due to disease or pests. Any twig dieback, defoliation or discoloration is minor (up to 10% of the crown)	Well-developed structure. Defects are minor and can be corrected. Codominant stem formation may be present. Trees in groves may have asymmetric/deviations from an open-grown form of the same species.
Fair	Reduced vigor. Twig dieback, defoliation, discoloration, and/or dead branches up to 30% of the crown. Obvious signs of pest problems contribute to a lesser condition but is not likely to be fatal.	Visible evidence of trunk damage or cavities, large girdling roots or branch attachments that may require correction.
Poor	Poor vigor, unhealth and declining. Low foliage density with extensive (more than 50%) twig and/or branch dieback. Smaller-than-normal leaf size and little evidence of new growth.	Structural problems cannot be corrected, such as recent change in tree orientation, extensive trunk decay or poor branch attachment. Tree/tree part failure may occur at any time.

Tree Assessment Results

A total of two (2) trees were inventoried and assessed as part of this study (Table 2). Trees were identified using the tree tags #1 & #2. Species inventoried were Douglas-fir (*Pseudotsuga menziesii*) and western red cedar (*Thuja plicata*).

Diameter

On-site assessed trees range in DBH from 40.6 inches to 50.4 inches. The average diameter is 45.5 inches.

Height

The estimated height of on-site trees within the study area was 95 feet.

Canopy Radius

The canopy radii of on-site assessed trees range from 21 feet to 27 feet, with an average radius of 24 feet.

Condition

Tree #1 is a viable tree in *Fair* condition; this tree had healthy foliage but there was some basal swelling that is uncharacteristic of the species. Tree #2 is a viable tree in *Excellent* condition; there were no structural defects, and the foliage was healthy.

Table 2. Summary of on-site significant trees.

Tree #	Scientific Name / Common Name	DBH (in)	Height (ft)	Canopy Radius (ft)	Condition	Viable (Y/N)	TPZ (ft)	Retention Value	Tree Credits
1	<i>Pseudotsuga menziesii</i> (Douglas-fir)	40.6	95	21	Fair	Y	21	High	11
2	<i>Thuja plicata</i> (Western red cedar)	50.4	95	27	Excellent	Y	25	High	11
Grand Total									22

Tree #1 is a Landmark Douglas-fir (*Pseudotsuga menziesii*) with a diameter of 40.6 inches. This tree was found to be in *Excellent* Health and have *Fair* Structure with some basal swelling within the first three feet of height. This tree is of High Retention Value due to size and is viable for retention. The CRZ is 41 feet from the trunk. This tree is closest to the designed classroom addition but is still planned to not be impacted by development. Tree Protection Fencing should be placed around the TPZ, which is at a minimum, 21-feet from the trunk.



Figure 2. Landmark Tree #1 with basal swelling (left) and a full canopy (right).

Tree #2 is a Landmark western red cedar (*Thuja plicata*) with a diameter of 50.4 inches. This tree was found to be in *Excellent* Health and have *Excellent* Structure. This tree is of High Retention Value due to size and is viable for retention. The CRZ is 51 feet from the trunk. This tree is not planned to be impacted by development. Tree Protection Fencing should be placed around the TPZ, which is at a minimum, 25-feet from the trunk.



Figure 3. Landmark Tree #2 with Excellent Health and Structure.

Tree Protection Measures

To ensure the survival of the significant trees assessed within this study, these best management practices should be followed during the development phase:

- **Tree protection barriers:** Per KZM 95.34, temporary protective tree fencing should be erected around the Tree Protection Zone, which should not infringe in the interior critical root zone (ICRZ) of protected trees. Protective tree fencing should consist of 6-foot-high chain link fence with signs that state: “Tree and Soil Protection Area, Entrance Prohibited” on all sides of the fence and provide the city phone number for code enforcement to report violations. Protection barriers are to remain on-site until the Planning Official authorizes their removal.
- **Minimize root zone disturbance:** All construction activities, including staging and driving machinery, should be located outside of the ICRZ. If temporary impacts in the critical root zone (CRZ) are unavoidable, the arborist recommends using one of the following temporary measures to minimize soil compaction and root damage:
 - Install six to 12 inches of wood chip mulch over the CRZ.
 - Lay down a ¾-inch thick plywood sheet or steel plates over at least four inches of wood chip mulch.
 - Apply four to six inches of gravel over staked geotextile fabric.
 - Place commercial logging mats on top of a 4-inch mulch layer.

The plywood, steel plates, gravel, geotextile fabric, mats, and all mulch over four-inches thick **must** be removed after the temporary disturbance is finished.

- **Root pruning:** If mechanical excavation occurs near a tree to remain, the arborist recommends using an air or water excavator and root pruning by hand, or by using a mechanical root pruning tool designed to cut roots. Any roots over one inch that are exposed after mechanical excavation should be clean cut by hand.
- **Maintenance:** The impacts of construction are stressful to trees, which may not show the signs of stress for up to five to ten years after being impacted. Applying one to two inches of water to the root zones each week in the summer during construction will help the trees stay healthy throughout construction.

- **Monitoring:** After construction is complete, the tree protection fencing can be removed. Any branches accidentally broken during construction should be pruned. An ISA certified arborist could assist with health assessment, monitoring, and provide management recommendations for the trees post-construction as the trees recover from the impacts of construction and adapt to their new conditions.

Limitations of This Study

The findings of this report are based on the best available science and are limited to the scope, budget, and site conditions at the time of the assessment. Although the information in this report is based on sound methodology, internal physical flaws (such as cracking or root rot) or other conditions that are not visible cannot be detected with this limited basic visual screening. Trees are inherently unpredictable. Even vigorous and healthy trees can fail due to high winds, heavy snow, ice storms, rain, age, or other causes.

This report is based on the current observable conditions and may not represent future conditions of the trees. Changes in site conditions, including clearing and grading, will alter the condition of remaining trees in a way that is not predictable.

The conclusions contained within this report have been made for permitting purposes only and are not intended for tree risk assessment purposes.

Please call if you have any questions or if we can provide you with any additional information.

Sincerely,



Jake Robertson

ISA Certified Arborist® PN-8934A

TRAQ

References

- Dunster, J. 2017. Tree Risk Assessment Manual, Second Edition. Champaign, IL: International Society of Arboriculture.
- Fite K., and E.T. Smiley. 2008. Best Management Practices: Managing Trees During Construction. Champaign, IL: International Society of Arboriculture.

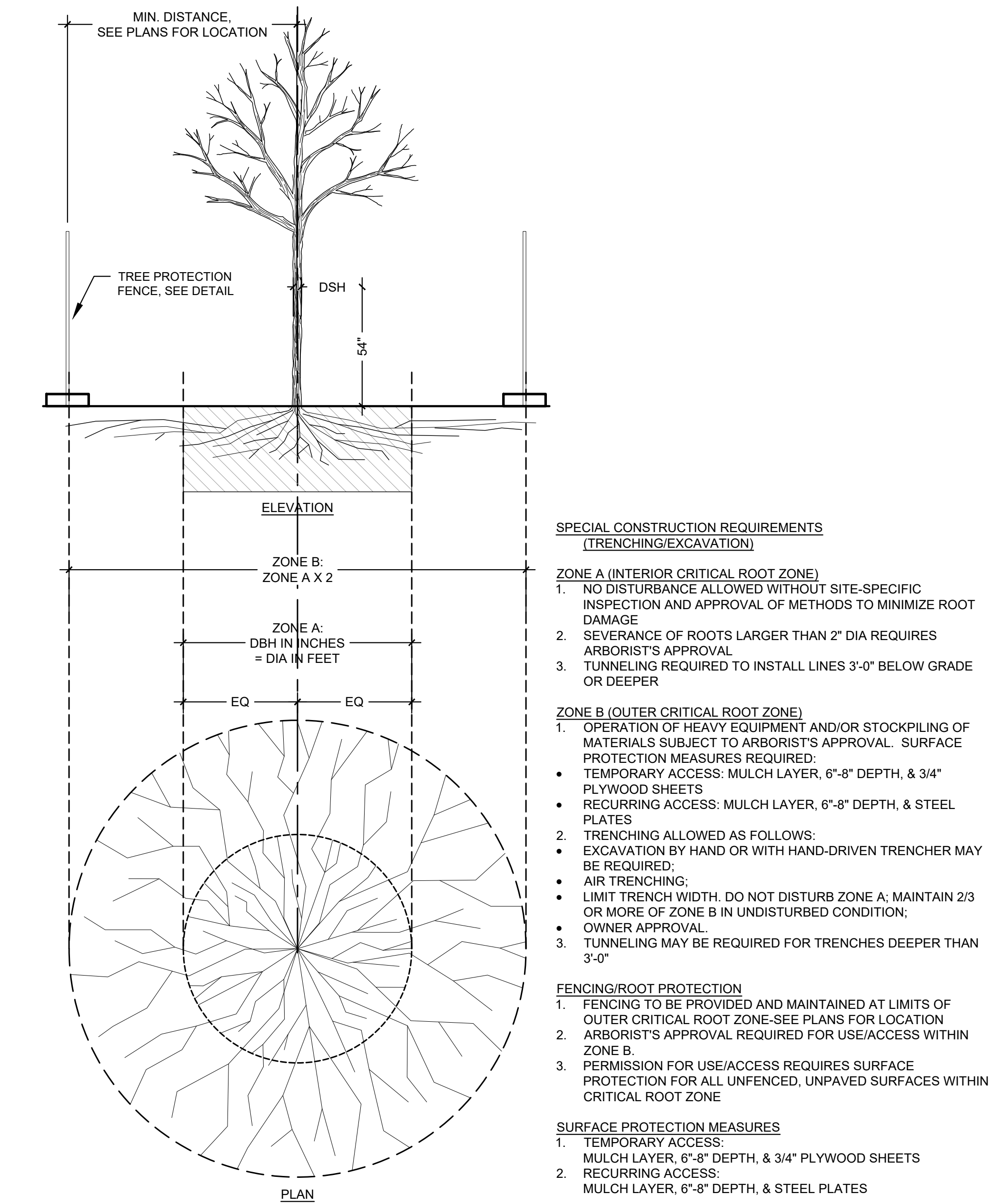
Annotated Tree Map

8040 NE 132nd St.
Kirkland, WA 98034

TREE PROTECTION PLAN

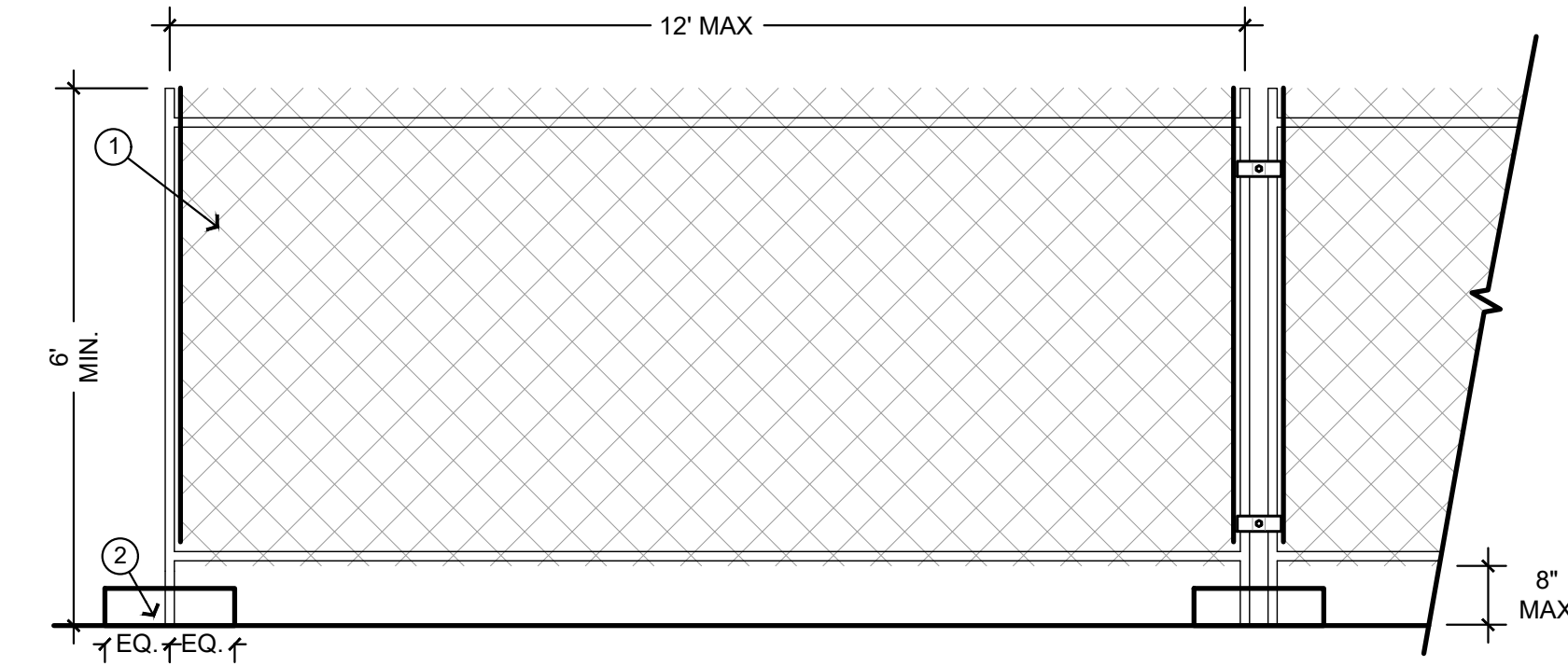
SCHEMATIC DESIGN





1 TREE PROTECTION

1. TREE PROTECTION FENCING PER SEC 015639.
 2. CONCRETE BLOCK OR STEEL BASE STAND.
- NOTES:**
- A. PROVIDE TREE PROTECTION SIGNAGE 50' O.C. ALONG FENCING INSTALLATION PER SEC 015639
 - B. WHERE TREE PROTECTION MATCHES CONSTRUCTION LIMITS, USE CIVIL CONSTRUCTION LIMIT FENCE AND DETAIL
 - C. WHERE TREE PROTECTION IS SEPARATE FROM CONSTRUCTION LIMITS, USE TREE PROTECTION FENCE DETAIL AS SHOWN
 - D. SEE STREET IMPROVEMENT PERMIT FOR TREE PROTECTION WITHIN STREET RIGHT-OF-WAY



2 TREE PROTECTION FENCING

SCALE: 1/2"=1'

LAKE WASHINGTON SCHOOL DISTRICT
FINN HILL MS ADDITION

8040 NE 132nd St.
Kirkland, WA 98034

Date:	08/17/22
Job No.:	22216.00
Drawn By:	Author
Checked by:	Checker

Revisions		
#	Date	Description

TREE
PROTECTION
DETAILS

TP1.01

SUBMITTED TO:

Lake Washington School
District
15212 NE 95th Street
Redmond, Washington
98052



BY:

Shannon & Wilson, Inc.
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CRITICAL AREAS REPORT

Finn Hill Middle School Addition Project

CITY OF KIRKLAND, WASHINGTON



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Submitted To: Lake Washington School District
15212 NE 95th Street
Redmond, Washington 98052
Attn: Mr. Ryan Ota

Subject: CRITICAL AREAS REPORT, FINN HILL MIDDLE SCHOOL ADDITION
PROJECT, CITY OF KIRKLAND, WASHINGTON

Shannon & Wilson prepared this report and participated in this project as a consultant to the Lake Washington School District. Our scope of services was specified in an agreement dated May 1, 2023, under a notice to proceed provided by Ryan Ota on May 1, 2023. This report presents the findings of our delineation site visit and addresses the wetlands, streams, minor lakes, fish and wildlife habitat conservation areas, and frequently flooded areas critical areas identified within the project area and was prepared by the undersigned.

We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report, or we may be of further service, please contact us.

Sincerely,

SHANNON & WILSON, INC.



Sarah Corbin, PWS, MSES
Associate, Senior Biologist/Permitting Specialist



Olivia Sohn
Biologist

SCC: KLW/scc:ols

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1 INTRODUCTION

Shannon & Wilson was contracted by the Lake Washington School District (the District) to conduct a wetland delineation and complete a critical areas report for the Finn Hill Middle School Addition project (Project) site in the City of Kirkland (City), Washington (Township 26N, Range 4E, Southeast $\frac{1}{4}$ Section 24). The Project site consists of King County parcel number 2426049128 (Figure 1). The District is proposing to construct a classroom addition that would extend north off of the existing school building. The addition would be south of the paved access road and would be nestled into the general area of the existing school building matrix.

This report is compliant with Kirkland Zoning Code (KZC) 90.110 and addresses the following critical areas: (a) wetlands, (b) streams, (c) minor lakes, (d) fish and wildlife habitat conservation areas, and (e) frequently flooded areas. This report has been prepared in accordance with Kirkland Zoning Code (KZC) 90.110.

2 PROJECT LOCATION AND SETTING

The Project is located just over a mile east of Lake Washington, in the northwest corner of the City. The Project parcel was under the jurisdiction of King County (County) until 2011 when the area was annexed by the City (Kirkland, 2023a). Two large parks containing recreation spaces and naturally vegetated areas are in the project vicinity - Saint Edward State Park to the northwest and Big Finn Hill Park to the north. A large wetland complex and trail system in Big Finn Hill Park is adjacent to the north Project site boundary. The remaining surrounding area consists of single-family housing developments, elementary schools, a church, and riparian corridors. The Project is within the Denny Creek drainage basin (Kirkland, 2023c).

The Project parcel is developed and contains the Finn Hill Middle School buildings and other school-related facilities including a track and field, baseball field, tennis court, and a rain garden. Forested and shrub communities are mainly limited to the narrow strips on the north and west parcel boundaries and school landscape areas. The topography on the Project parcel generally slopes away from the southeast corner of the property down to the northern and western site boundaries.

3 WETLANDS

3.1 Background Information Review

Background information pertaining to the Project site was collected and reviewed prior to the wetland delineation fieldwork. These information sources are summarized in Exhibit 3-1.

Exhibit 3-1: Background Information Review Findings

Information	Key Findings
King County iMap Interactive Mapping Tool, wetland inventory layer (King County, 2023)	The County's wetland inventory map identifies a large wetland complex that extends into the Project area along a portion of Project area's north boundary.
U.S. Department of Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) (USFWS, 2023a)	<p>The USFWS NWI maps two wetlands on the Project area. One is identified as a large complex containing a freshwater pond and a forested, seasonally inundated, palustrine wetland directly north of the Project area.</p> <p>A second smaller, forested, seasonally inundated, palustrine wetland is mapped in the southwest corner of the Project area. A narrow, linear finger is shown extending north from the main body of the wetland along the western edge of the track field. The NWI map identifies the finger in proximity, but not connecting to, the larger wetland mapped to the north.</p>
City of Kirkland Maps Portal, Wetlands layer (Kirkland, 2023b) and City of Kirkland Sensitive Areas Map (2023c)	<p>The City's wetland layer identifies both wetlands shown on the NWI map. However, unlike the NWI map, the smaller wetland in the Project area's southwest corner does not extend north along the western track and field edge.</p> <p>The City also maps a stream identified as Denny Creek in the center of the large wetland complex to the north. After leaving the wetland, Denny Creek is mapped flowing 1.5 miles to the southwest before entering Lake Washington. The City maps the Project area as within the Denny Creek drainage basin.</p>
U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey interactive mapping system (USDA NRCS, 2023)	The USDA NRCS maps the soil associated with the large wetland at the Project area's northern boundary as a Seattle Muck (hydric). The remainder of the Project area is mapped as Alderwood gravelly sandy loam, 8 to 15 percent slopes. This map unit is not rated as hydric but contains 5% hydric soil components/inclusions.
Washington State Department of Natural Resources (WDNR) Natural Heritage Program Data Explorer, Rare Plant and Ecosystem Locations (WDNR, 2023)	The Washington Natural Heritage Program Data Explorer does not identify high-value wetlands within the project site.
Northwest Indian Fisheries Commission (NWIFC) Statewide Integrated Fish Distribution (SWIFD) Web Map (NWIFC, 2023)	This mapping resource identifies a Type F stream associated with the large wetland complex to the north (same location as Denny Creek on the City map). The interactive map documents presence/use of resident coastal cutthroat, fall Chinook salmon, coho salmon, sockeye salmon, and winter steelhead trout approximately 0.9 mile downstream of the wetland.

Information	Key Findings
Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) on the Web (WDFW, 2023)	The WDFW PHS on the Web viewer maps both wetlands shown on the City's sensitive areas map as priority aquatic habitat. The occurrence of little brown bat (<i>Myotis lucifugus</i>) is also mapped for the township. The forested portions of Saint Edward State Park, Big Finn Hill Park, and the Denny Creek riparian corridor are identified as a Biodiversity Area and Corridor. In the lower 0.6 mile of the stream, WDFW documents coho rearing, sockeye presence, and documents that Denny Creek is gradient-accessible to winter steelhead.
Impact and Conceptual Mitigation Plan Sheets for the Finn Hill Junior High Environmental and Adventure School (Watershed, 2009).	The impact and mitigation plan sheets for the previous Finn Hill project identify three wetlands on the Project area: a Category I wetland to the north in the same area identified on the City and NWI maps, and two wetlands in the southwest corner. The smaller of these two is identified as a Category III and the other is identified as a Category II wetland. The plan sheets also identified that buffer averaging and buffer enhancement mitigation has been implemented in the wetland buffer in the northeast corner of the Project area.
USFWS Information for Planning and Consultation (IPAC) Online Mapper (USFWS, 2023b) and USFWS Critical Habitat Online Mapper (USFWS, 2023c)	No designated critical habitat is identified in the Project area; the closest mapped critical habitat is Lake Washington (bull trout). IPAC identifies the potential presence of North American wolverine, marbled murrelet, yellow-billed cuckoo, bull trout, and the monarch butterfly.
National Marine Fisheries Service (NMFS) Endangered Species Act Critical Habitat Mapper, West Coast (NMFS, 2023)	No designated critical habitat is identified in the Project area.

In addition to the above resources, monthly totals and departures from normal precipitation data were collected from the Seattle Sand Point WFO station (U.S. National Oceanic and Atmospheric Administration [NOAA], 2023) for the three months preceding the early May 2023 delineation site visit. According to the Seattle station data, monthly precipitation totals demonstrated normal conditions for the three-month period preceding the site visit (Exhibit 3-2).

Exhibit 3-2: Three-Month Precipitation Analysis for 2023

Month	30% Chance Will Have		Precipitation (inches)	Condition (Dry, Normal, Wet)	Condition Value ¹	Weighted Value	Product (Condition Value x Weighted Value)
	Less Than	More Than					
Feb	2.4	4.05	2.46	Normal	2	1	2
Mar	2.79	4.47	2.93	Normal	2	2	4
Apr	2.02	3.45	3.15	Normal	2	3	6
Sum							12 ²

NOTES:

Source: NOAA Regional Climate Centers, Weather Station: Seattle Sand Point WFO, Period of Record: 1992-2022 (NOAA Regional Climate Centers, 2023)

Table methodology adapted from NRCS Engineering Field Handbook, Chapter 19 (U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), 1997)

1 Condition Value: Dry = 1, Normal = 2, Wet = 3

2 If sum is 6-9, then period has been drier than normal; if sum is 10-14, then period has been normal; and if sum is 15-18, then period has been wetter than normal.

3.2 Methodology

Shannon & Wilson wetland biologists conducted the delineation fieldwork on May 2 and 3, 2023. Wetlands were identified using methods described in the 1987 *Corps Wetland Delineation Manual* (U.S. Army Corps of Engineers [Corps], 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (U.S. Army Engineer Research and Development Center, 2010). Appendix A includes a description of the delineation methodology. Offsite portions of wetlands located within 300 feet of the Project area were approximated using field observations from the Project area and public right-of-way, aerial photography, and light detection and ranging (lidar).

Wetland areas were determined using the triple-parameter approach, which considers vegetation types, soil conditions, and hydrologic conditions. Areas were considered to be wetland if they displayed the following wetland indicators: (a) dominant plant species that are considered hydrophytic by the accepted classification indicators, (b) soils that are considered hydric under the federal definition, and (c) indications of wetland hydrology based on federal definition.

Data plots were characterized within wetland and upland plant community types to help describe the general conditions at the site. The data is provided in Appendix B. Wetland boundaries were flagged with pink “wetland boundary” flagging and wetland data plots were identified with orange flagging.

3.3 Results

Portions of two wetlands, Wetlands A and B, were identified and delineated on the Project site. A description of the wetlands follows. Vegetation is described below by common name, with the scientific name and wetland indicator status in parentheses. Soils are described with the associated Munsell® Color Charts color in parentheses.

3.3.1 Wetland A

Wetland A (approximately 0.33 acre/14,600 square feet), located in the southwest corner of the site, is a palustrine, forested, permanently flooded-seasonally flooded-saturated wetland according to the Cowardin System, as described in *Classification of Wetlands and Deepwater Habitats of the United States* (Federal Geographic Data Committee, 2013). The wetland is depressional under the hydrogeomorphic (HGM) classification system (Brinson, 1993). Wetland A is surrounded by slopes with development uphill on all sides, wedged between NE 132nd Street directly to the south, a church parking lot to the west, school ballfields to the east, and a residential neighborhood to the northwest (Figure 2).

Wetland hydrology is primarily driven by runoff from the surrounding slopes. Two stormwater pipes contribute water to the wetland: one from NE 132nd Street and another from the church parking lot. No outlet was observed during the site visit and water is impounded in the closed depression.

The wetland was rated using Ecology's *Washington State Wetland Rating System for Western Washington* (Hruby, 2014), and is a Category III wetland (Appendix C). As described below and shown in the wetland rating forms, the wetland's functions are not degraded such that restoration would be required.


The rationale for the rating is outlined below.

- Wetland A was assigned a moderate water quality functions score (7 points) due to the high coverage of dense vegetation that helps filter stormwater and lack of an outlet, which retains pollutants in the wetland, preventing them from flowing to downgradient waterbodies. Additionally, the surrounding development introduces pollutants (e.g., stormwater runoff) and provides the wetland with an opportunity to sequester them. Also, downstream 303(d)-impaired waterbody listings for Denny Creek and Lake Washington increase the wetland's water quality function and value.
- The wetland received a moderate hydrologic functions score (7 points) due to its limited storage capacity and lack of an outlet. The wetland is in a depression surrounded by development impervious surface, receives stormwater discharges, and has a high potential to store flood water. Issues with flooding lower in the basin add to this wetland's value to the surrounding area by mitigating downgradient flooding.

- Wetland A received a low habitat functions score (4 points) because its extensive forested community constitutes one structure. Wetland A has a variety of hydroperiods/hydric regimes and contains standing snags and downed wood. However, the amount of high intensity land use in the surrounding area also decreases the wetland's potential to provide connectivity to other habitat.

The KZC Table 90.55.1 requires Category III wetlands with a habitat score of 4 points to maintain a 60-foot buffer. Exhibit 3-3 provides a summary of wetland conditions.

Exhibit 3-3: Wetland A

Wetland A – Information Summary		
	WRIA	WRIA 8 Cedar-Sammamish
	Location Within Project Area	Wetland is located in the southwest corner of the Project area and extends off site to the west.
	Buffer Width	60 feet
	Ecology Rating (Hruby, 2014)	Category III
	Wetland Size	Approximately 0.33 acre/14,600 square feet
	Cowardin Classification	Palustrine Forested
	HGM Classification	Depressional
	Wetland Data Sheet(s)	Data Plot DP-1 and DP-2
Photo taken in May 2023 by Shannon & Wilson.		
Dominant Vegetation	The tree stratum is dominated by red alder (<i>Alnus rubra</i> , FAC). The shrub stratum is dominated by spiraea (<i>Spiraea douglasii</i> , FACW), Himalayan blackberry (<i>Rubus armeniacus</i> , FAC), and salmonberry (<i>Rubus spectabilis</i> , FAC). The herbaceous stratum dominant species is western lady fern (<i>Athyrium cyclosorum</i> , FAC).	
Soils	<p>The soil profile was examined to a depth of 17 inches below ground surface (bgs). The upper soil horizon was very dark brown (10YR 2/2) silt loam with 30 percent (%) dark reddish brown (5YR 3/4) redoximorphic concentrations extending to 7 inches bgs. This is underlain by a dark grayish brown (10YR 4/2) and black (10YR 2/1) silt loam with 20% brown (7.5YR 4/4) redoximorphic concentrations in the matrix.</p> <p>A hydrogen sulfide odor was observed within 12 inches bgs.</p> <p>The soil profile meets the Hydrogen Sulfide (A4), Depleted Below Dark Surface (A11), and Redox Dark Surface (F6) hydric soil indicators.</p>	
Hydrology/Hydroperiods	The dominant source of hydrology is runoff that is discharged from two stormwater pipes and overland runoff from the surrounding slopes, where the water is then impounded. The High Water Table (A2), Saturation (A3), and Hydrogen Sulfide Odor (C1) primary hydrology indicators were observed.	