



September 30, 2024

Mr. Chris Fellows
Windler Public Improvement Authority
9155 E. Nicholls Ave, Suite 360
Greenwood Village, CO 80112

**RE: Windler – Master Plan Amendment
FHU Project No. 122259-01**

Dear Mr. Fellows:

Felsburg Holt & Ullevig (FHU) prepared a traffic impact study for the Windler Homestead development in July 2023. The initial master plan has been adjusted to represent current aspirations for the development. These adjustments to the initial master plan include refinements to the residential unit counts and provide refinements to commercial development summarized below:

- PA-1:
 - One 125 room hotel
 - One 16 pump gas station and convenience store
- PA-14:
 - Commercial will include a Supermarket
- PA-16:
 - Three 125 room hotels
 - One 16 pump gas station and convenience store

These uses have been analyzed under the assumption that the hotels would occupy 3-acre sites, and the gas stations would occupy 2-acre sites with the balance of developable acreage analyzed using the standard commercial land uses identified in the *Institute of Transportation Engineers' (ITE) publication Trip Generation Manual, 11th Edition, 2021*.

It should also be noted that the single-family housing was split into 60% single-family attached housing and 40% single-family detached housing across the entire development which is consistent with prior Windler site plan submittals. NCHRP Report 684 for internal capture trips and pass-by trips were also updated.

Traffic Volume Analysis

2040 average daily traffic (ADT) volumes and peak hour volumes are illustrated in **Figure 1**. These volumes are a product of the 2040 background volumes from the Master TIS (MTIS) and the updated external and internal site-generated traffic volumes. A comparison of 2040 volumes along Denali Boulevard, Biloxi Street, 48th Avenue, and 56th Avenue can be found in **Table 1**.

Table 1. 2040 ADT Comparison

Location	MTIS 2040 ADT	Master Plan Amendment 2040 ADT
Denali Boulevard	14,100 - 15,700	14,300 - 17,400
Biloxi Street	2,600 - 3,100	2,800 - 3,800
48 th Avenue	34,500 - 55,400	34,500 - 56,800
56 th Avenue	20,000 - 34,200	20,200 - 35,000

Trip Generation Analysis

The MTIS used the *Institute of Transportation Engineers' (ITE) publication Trip Generation Manual, 11th Edition, 2021* to forecast vehicle-trips based on the land use types and sizes. Land use types and sizes were modified based on the amendment to the master site plan. **Table 2** displays the comparison of total external site generated trips for the MTIS and the updated trip generation. A more detailed table of the site generated trips can be found in the **Appendix**.

Table 2. ITE Trip Generation Comparison

	Daily	AM Peak Hour			PM Peak Hour		
	Total	In	Out	Total	In	Out	Total
MTIS Site Trips	88,699	2,346	2,755	5,101	3,580	3,236	6,816
Updated Site Trips	95,213	2,734	3,057	5,821	3,508	3,107	6,614

Master Plan Amendment Impact

A minor adjustment to the internal roadway network involves the removal of 54th Place between Buchanan Street and Biloxi Street. This change is not anticipated to have a significant impact on travel patterns. It should be noted that internal site intersections were not evaluated due to the limited details available for the internal site network, and because these intersections are considered less critical.

Detailed Intersection Analysis

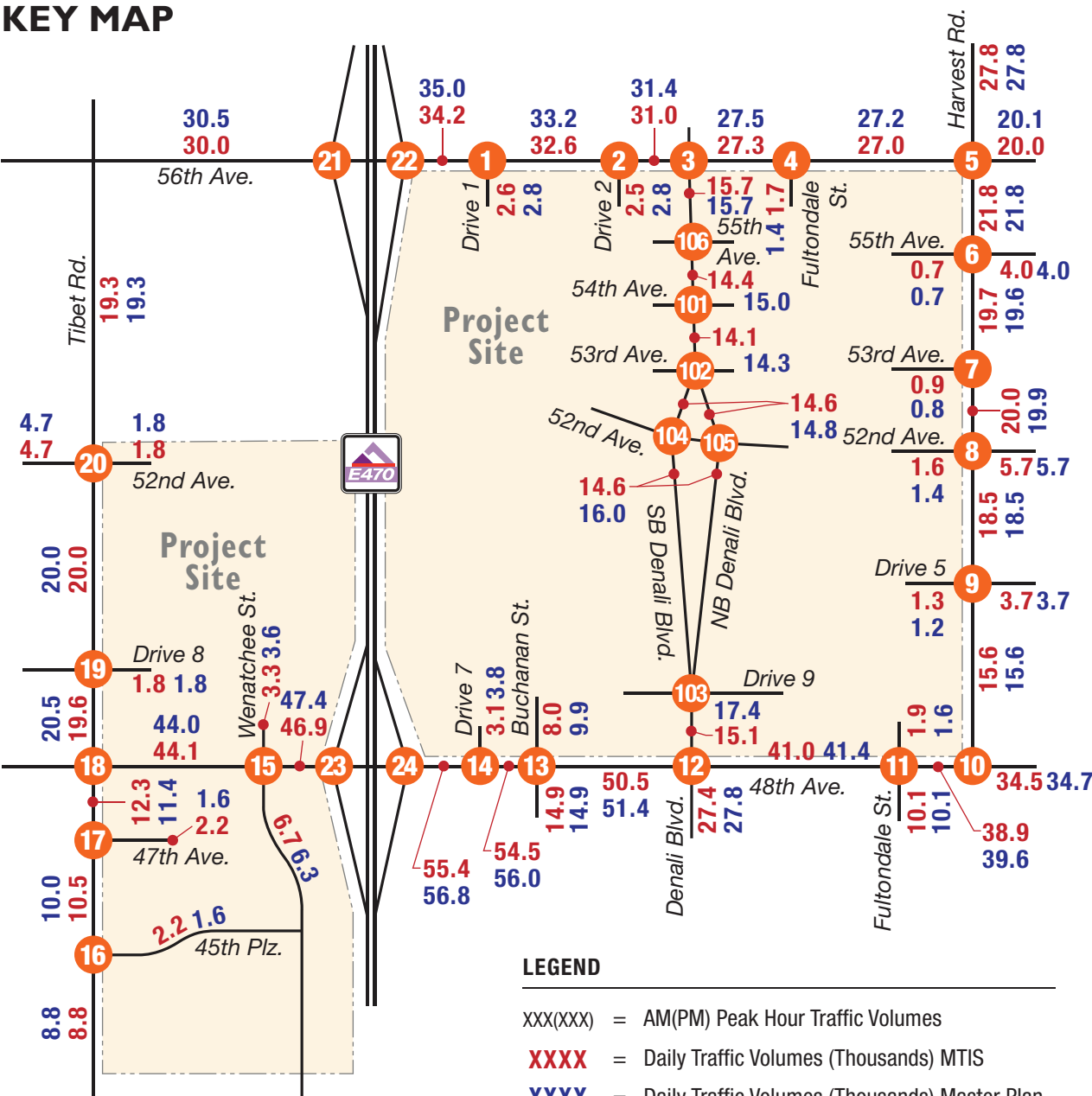
As part of the amendment analysis, the following intersections were further analyzed:

- 56th Avenue & Biloxi Street
- 56th Avenue & Denali Boulevard
- 48th Avenue & Denali Boulevard
- 48th Avenue & Biloxi Street
- Northern and Southern roundabouts along Denali Boulevard

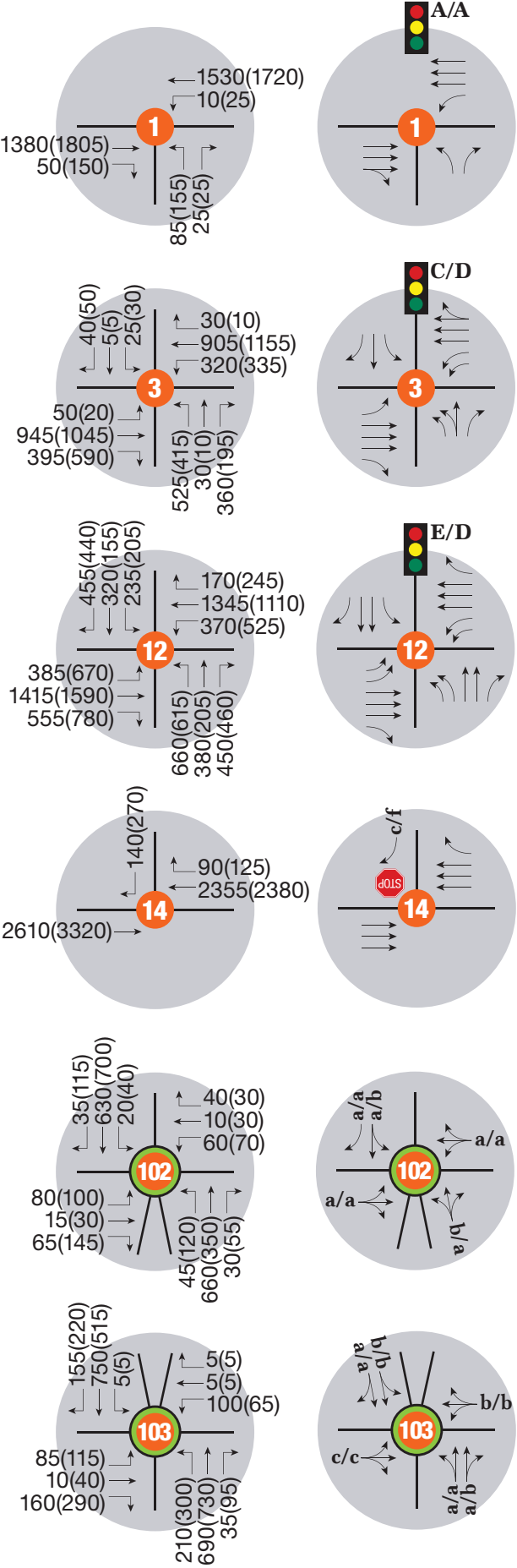
The evaluation of these intersections included Level of Service (LOS), delay, and queueing. **Figure 1** illustrates the comparison of the LOS at the analyzed intersections under MTIS conditions and the updated conditions. As illustrated, updated traffic conditions do not have a significant impact on the LOS at the intersections analyzed at the City of Aurora staff request. All intersections operate at LOS D or better with the exception of the signalized intersection of 48th Avenue with Denali Boulevard which is projected to operate at LOS E during the AM peak hour which is consistent with the findings of the MTIS.

In general, the changes in anticipated land use proposed in this master plan amendment do not adversely impact traffic operations when compared to the previous MTIS. However, given the variability in traffic generation for commercial uses it would be recommended to further evaluate as site plans are developed, in particular for intersections along 56th and 48th Avenues between E-470 and Denali Boulevard.

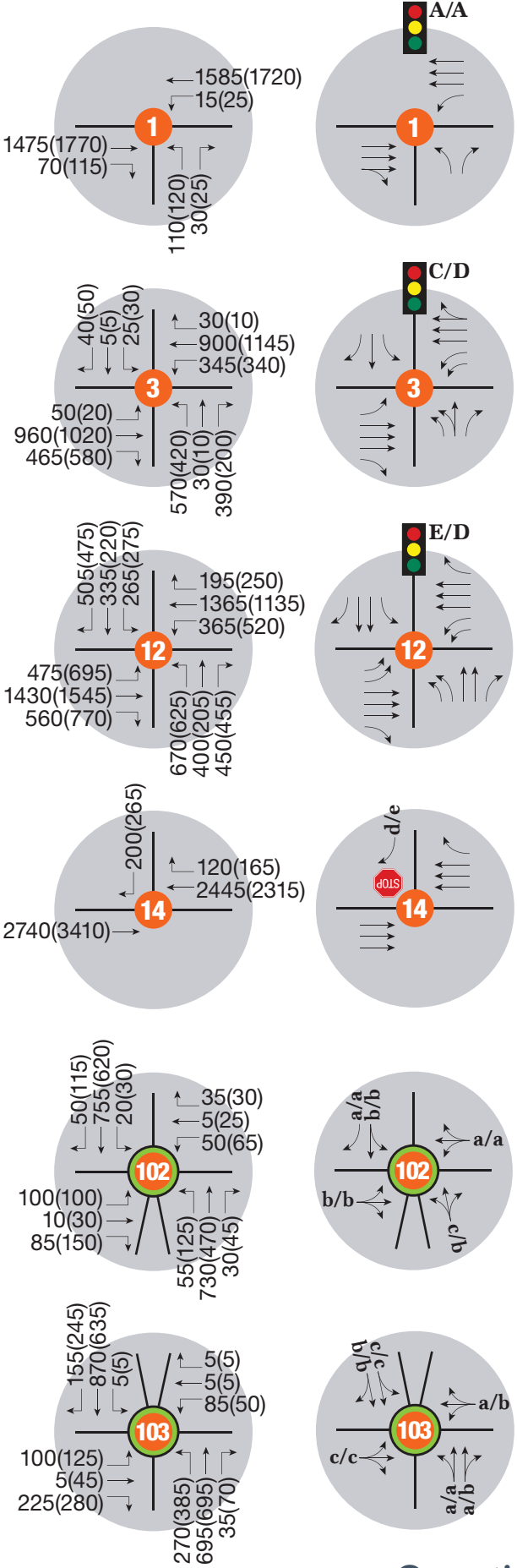
KEY MAP



Windler MTIS



Master Plan Amendment



Pedestrian Connectivity Analysis

The development should provide adequate sidewalk connectivity throughout the site. Midblock crossing should be considered along Denali Boulevard to enhance pedestrian access to Discovery Park. In addition to the access to Discovery Park, the sidewalk should provide connectivity to the regional trail network including the trail west of E-470.

The removal of 54th Place discussed in master plan amendment impact section will have negligible impacts on pedestrian connectivity.

Traffic Calming Measures

The development should be designed to adhere to the City of Aurora traffic calming guidelines. The guidelines include using design tools such as automated speed radar signs, curb extensions/neckdowns, speed cushions, and mini roundabouts. In addition to the City of Aurora guidance, on-street parking, narrowing of roadways and intersection bump-outs should be incorporated into the roadway network design in accordance with the FHWA traffic calming toolkit.

Conclusions

The study resulted in the following conclusions:

- The newly proposed master plan generates more traffic as compared to the values analyzed in the master TIS. These increases are approximately 6,514 daily trips and 720 in the AM peak hours. During the PM peak hour, trips decreased by 202 trips. This equates to a roughly 6 percent increase in daily traffic, a 14 percent increase in the AM peak hour and a 3 percent decrease during the PM peak hour. With PM being the heavier of the two peak hours
- The analyzed intersections are anticipated to continue to operate acceptably with the recommendations provided in the Windler Master TIS.

Please let me know if you have any questions about this letter or need any additional information.



Philip Dunham, PE, PTOE
Transportation Engineer

Site Trip Generation

Map Code	ITE Code	Land Use Description	Size	Unit	Daily	AM Peak Hour			AM Peak Hour			AM Peak Hour			AM Pass-By %	AM Pass-By Trips	PM Peak Hour			PM Peak Hour			PM Peak Hour			PM Pass-By %	PM Pass-By Trips
					Total	In	Out	Total	In	Out	Total	In	Out	Total			In	Out	Total	In	Out	Total	In	Out	Total		
PA-1.1	820	Shopping Center	270.0	KSF	12,913	182	111	293	7	2	9	175	109	284	-	-	554	600	1,154	64	166	230	490	434	924	29%	142
PA-1.2	310	Hotel	125	Rooms	931	31	24	55	0	3	3	31	21	52	-	-	33	32	65	9	5	14	24	27	51	-	-
PA-1.3	945	Gas Station	16	Pumps	3,383	128	129	257	0	0	0	128	129	257	63%	81	147	148	295	0	0	0	147	148	295	57%	84
PA-2	220	Multifamily Housing (Low-Rise)	303	DU	2,018	28	89	117	1	2	3	27	87	114	-	-	95	56	151	20	8	28	75	48	123	-	-
PA-3.1	210	Single Family Detached Housing	160	DU	1,555	28	86	114	1	2	3	27	84	111	-	-	98	57	155	21	8	29	77	49	126	-	-
PA-3.2	215	Single Family Attached Housing	240	DU	1,778	30	89	119	1	2	3	29	87	116	-	-	79	55	134	17	8	25	62	47	109	-	-
PA-3.3	822	Strip Retail Plaza	25.0	KSF	1,285	35	24	59	1	1	2	34	23	57	-	-	75	75	149	9	21	30	66	54	119	40%	26
PA-4.1	210	Single Family Detached Housing	126	DU	1,248	23	69	92	0	1	1	23	68	91	-	-	77	46	123	17	6	23	60	40	100	-	-
PA-4.2	215	Single Family Attached Housing	190	DU	1,397	23	70	93	0	1	1	23	69	92	-	-	61	43	104	13	6	19	48	37	85	-	-
PA-5	220	Multifamily Housing (Low-Rise)	228	DU	1,537	23	71	94	0	1	1	23	70	93	-	-	75	44	119	16	6	22	59	38	97	-	-
PA-6	220	Multifamily Housing (Low-Rise)	322	DU	2,139	30	93	123	1	1	2	29	92	121	-	-	100	59	159	22	8	30	78	51	129	-	-
PA-7.1	210	Single Family Detached Housing	108	DU	1,083	20	60	80	1	1	2	19	59	78	-	-	67	40	107	14	6	20	53	34	87	-	-
PA-7.2	215	Single Family Attached Housing	161	DU	1,176	20	58	78	1	1	2	19	57	76	-	-	51	36	87	11	5	16	40	31	71	-	-
PA-7.3	822	Strip Retail Plaza	5.0	KSF	441	7	5	12	0	0	0	7	5	12	-	-	24	24	48	3	7	10	21	17	38	40%	8
PA-8.1	210	Single Family Detached Housing	64	DU	669	13	37	50	0	0	0	13	37	50	-	-	41	24	65	9	3	12	32	21	53	-	-
PA-8.2	215	Single Family Attached Housing	96	DU	681	11	33	44	0	0	0	11	33	44	-	-	28	20	48	2	1	3	26	19	45	-	-
PA-9	520	Elementary School	300	Students	681	120	102	222	0	0	0	120	102	222	-	-	22	26	48	0	0	0	22	26	48	-	-
PA-10.1	210	Single Family Detached Housing	74	DU	765	14	43	57	0	0	0	14	43	57	-	-	47	28	75	10	4	14	37	24	61	-	-
PA-10.2	215	Single Family Attached Housing	111	DU	795	13	39	52	0	0	0	13	39	52	-	-	34	23	57	7	3	10	27	20	47	-	-
PA-11.1	210	Single Family Detached Housing	82	DU	841	16	46	62	0	0	0	16	46	62	-	-	52	30	82	11	4	15	41	26	67	-	-
PA-11.2	215	Single Family Attached Housing	124	DU	894	15	44	59	0	0	0	15	44	59	-	-	38	26	64	8	4	12	30	22	52	-	-
PA-12.1	210	Single Family Detached Housing	82	DU	841	16	46	62	0	0	0	16	46	62	-	-	52	30	82	11	4	15	41	26	67	-	-
PA-12.2	215	Single Family Attached Housing	123	DU	887	15	43	58	0	0	0	15	43	58	-	-	38	26	64	8	4	12	30	22	52	-	-
PA-13.1	210	Single Family Detached Housing	64	DU	669	13	37	50	0	0	0	13	37	50	-	-	41	24	65	9	3	12	32	21	53	-	-
PA-13.2	215	Single Family Attached Housing	96	DU	681	11	33	44	0	0	0	11	33	44	-	-	28	20	48	6	3	9	22	17	39	-	-
PA-13.3	220	Multifamily Housing (Low-Rise)	338	DU	2,242	31	97	128	1	1	2	30	96	126	-	-	105	61	166	23	9	32	82	52	134	-	-
PA-14.1	210	Single Family Detached Housing	34	DU	374	7	21	28	0	0	0	7	21	28	-	-	23	13	36	5	2	7	18	11	29	-	-
PA-14.2	215	Single Family Attached Housing	52	DU	346	5	16	21	0	0	0	5	16	21	-	-	12	9	21	3	1	4	9	8	17	-	-
PA-14.3	220	Multifamily Housing (Low-Rise)	320	DU	2,127	29	93	122	1	1	2	28	92	120	-	-	100	58	158	22	8	30	78	50	128	-	-
PA-14.4	821	Shopping Plaza	130	KSF	11,418	285	174	459	11	4	15	274	170	444	-	-	536	580	1,116	62	160	222	474	420	894	-	-
PA-15.1	210	Single Family Detached Housing	279	DU	2,593	48	142	190	1	1	2	47	141	188	-	-	164	97	261	35	14	49	129	83	212	-	-
PA-15.2	215	Single Family Attached Housing	418	DU	3,135	53	159	212	1	2	3	52	157	209	-	-	142	99	241	30	15	45	112	84	196	-	-
PA-15.3	220	Multifamily Housing (Low-Rise)	90	DU	652	12	39	51	0	0	0	12	39	51	-	-	37	22	59	8	3	11	29	19	48	-	-
PA-16.1	220	Multifamily Housing (Low-Rise)	345	DU	2,287	31	99	130	1	1	2	30	98	128	-	-	106	63	169	23	9	32	83	54	137	-	-
PA-16.2	822	Strip Retail Plaza	257	KSF	11,075	364	243	607	15	6	21	349	237	586	-	-	390	390	780	45	107	152	345	283	628	40%	138
PA-16.3	310	Hotel	375	Rooms	3,641	101	79	180	0	11	11	101	68	169	-	-	127	123	250	37	20	57	90	103	193	-	-
PA-16.4	945	Gas Station	16	Pumps	3,383	128	129	257	0	0	0	128	129	257	63%	81	147	148	295	0	0	0	147	148	295	57%	84
PA-17.1	210	Single Family Detached Housing	84	DU	860	16	48	64	0	0	0	16	48	64	-	-	53	31	84	11	4	15	42	27	69	-	-
PA-17.2	215	Single Family Attached Housing	125	DU	902	15	44	59	0	0	0	15	44	59	-	-	38	27	65	8	4	12	30	23	53	-	-
PA-18.1	210	Single Family Detached Housing	47	DU	504	9	28	37	0	0	0	9	28	37	-	-	31	18	49	7	3	10	24	15	39	-	-
PA-18.2	215	Single Family Attached Housing	71	DU	491	8	23	31	0	0	0	8	23	31	-	-	19	14	33	4	2	6	15	12	27	-	-
PA-19.1	210	Single Family Detached Housing	96	DU	972	18	54	72	1	1	2	17	53	70	-	-	60	36	96	13	5	18	47	31	78	-	-
PA-19.2	215	Single Family Attached Housing	144	DU	1,047	17	52	69	1	1	2	16	51	67	-	-	45	31	76	10	4	14	35	27	62	-	-
PA-20.1	154	High-Cube Transload and Short-Term Storage Warehouse	250	KSF	350	15	5	20	0	0	0	15	5	20	-	-	7	18	25	0	0	0	7	18	25	-	-
PA-20.2	110	General Light Industrial	250	KSF	990	153	21	174	0	0	0	153	21	174	-	-	11	67	78	0	0	0	11	67	78	-	-
PA-21.1	154	High-Cube Transload and Short-Term Storage Warehouse	100	KSF	140	6	2	8	0	0	0	6	2	8	-	-	3	7	10	0	0	0	3	7	10	-	-
PA-21.2	110	General Light Industrial	100	KSF	426	63	9	72	0	0	0	63	9	72	-	-	6	34	40	0	0	0	6	34	40	-	-
PA-22.1	154	High-Cube Transload and Short-Term Storage Warehouse	375	KSF	525	23	7	30	0	0	0	23	7	30	-	-	11	27	38	0	0	0	11	27	38	-	-
PA-22.2	110	General Light Industrial	375	KSF	1,460	228	31	259	0	0	0	228	31	259	-	-	15	89	104	0	0	0	15	89	104	-	-
PA-23.1	154	High-Cube Transload and Short-Term Storage Warehouse	375	KSF	525	23	7	30	0	0	0	23	7	30	-	-	11	27	38	0	0	0	11	27	38	-	-
PA-23.2	110	General Light Industrial	375	KSF	1,460	228	31	259	0	0	0	228	31	259	-	-	15	89	104	0	0	0	15	89	104	-	-
Total Vehicles					95,213	2,781	3,134	5,915	47	47	94	2,734	3,087	5,821	-	162	4,171	3,770	7,940	663	663	1,326	3,508	3,107	6,614	-	482

Location	Movement	95% Queue Length (ft)		Recommended Storage Length (ft) MTIS/Update	SHAC Recommendation (ft)
		Future (2040) MTIS (AM Peak/PM Peak)	Future (2040) Update (AM Peak/PM Peak)		
Drive I & 56th Avenue	NB Left-turn	120 / 151	147 / 157	175	175
	NB Right-turn	28 / 27	30 / 27	Continuous	Continuous
	EB Through*	83 / 598	100 / 591	Continuous	Continuous
	WB Through	138 / 189	164 / 193	Continuous	Continuous
	WB Left-turn	5 / 11	7 / 11	50	50
Denali Boulevard & 56th Avenue	NB Left-turn	331 / 255	341 / 258	325 / 350	750
	NB Through*	327 / 256	333 / 261	Continuous	Continuous
	NB Right-turn	89 / 44	73 / 45	Continuous	Continuous
	EB Left-turn	64 / 29	61 / 29	75	75
	EB Through	314 / 312	306 / 302	Continuous	Continuous
	EB Right-turn	20 / 46	21 / 44	150	775
	SB Left-turn	46 / 58	51 / 58	50	50
	SB Through	16 / 17	17 / 17	Continuous	Continuous
	SB Right-turn	0 / 8	0 / 8	50	75
	WB Left-turn**	m151 / m193	m160 / m197	225	450
Denali Boulevard & 48th Avenue	WB Through*	168 / 317	166 / 316	Continuous	Continuous
	NB Left-turn**	#401 / #389	#411 / #392	400 / 425	875
	NB Through	206 / 126	218 / 126	Continuous	Continuous
	NB Right-turn	410 / #387	410 / #375	425	600
	EB Left-turn**	m150 / m#357	m174 / m#384	300 / 400	925
	EB Through	m449 / m#542	m446 / m#491	Continuous	Continuous
	EB Right-turn	m32 / m93	m42 / m108	675	1025
	SB Left-turn	204 / 242	#262 / #357	375	375
	SB Through	187 / 97	195 / 133	Continuous	Continuous
	SB Right-turn	#296 / 206	#332 / #273	350	675
Drive 7 & 48th Avenue	WB Left-turn**	m#243 / #346	m#239 / #341	350	700
	WB Through	428 / 331	#531 / 343	Continuous	Continuous
	WB Right-turn	m38 / 16	m51 / 16	50 / 75	350
Denali Boulevard & 53rd Avenue	SB Right-turn	20 / 68	20 / 68	Continuous	Continuous
	NB Through*	98 / 340	98 / 340	Continuous	Continuous
	EB Through*	18 / 75	18 / 75	Continuous	Continuous
	SB Through*	90 / 215	90 / 215	Continuous	Continuous
	SB Right-turn*	3 / 13	3 / 13	Continuous	Continuous
Denali Boulevard & Drive 9	WB Through*	8 / 23	8 / 23	Continuous	Continuous
	NB Through*	120 / 565	120 / 565	Continuous	Continuous
	NB Right-turn*	25 / 10	25 / 10	Continuous	Continuous
	EB Through*	33 / 205	33 / 205	Continuous	Continuous
	SB Through*	353 / 1433	353 / 1433	Continuous	Continuous
	WB Through*	10 / 18	10 / 18	Continuous	Continuous

*shared lane **dual turn lane SHAC values based on a HV% of ten percent.
 # - 95th percentile volume exceeds capacity, queues may be longer
 m - volume for 95th percentile queue is metered by upstream signal

HCM 6th Signalized Intersection Summary

1: Drive 1 & 56th Avenue

Windler Homestead
Future Total (2040)

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱		↙	↑↑↑	↙	↗
Traffic Volume (veh/h)	1475	70	15	1585	110	30
Future Volume (veh/h)	1475	70	15	1585	110	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1603	76	16	1723	120	33
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3922	186	322	4289	151	135
Arrive On Green	1.00	1.00	0.02	0.84	0.09	0.09
Sat Flow, veh/h	5163	237	1781	5274	1781	1585
Grp Volume(v), veh/h	1092	587	16	1723	120	33
Grp Sat Flow(s),veh/h/ln	1702	1828	1781	1702	1781	1585
Q Serve(g_s), s	0.0	0.0	0.2	9.8	7.9	2.3
Cycle Q Clear(g_c), s	0.0	0.0	0.2	9.8	7.9	2.3
Prop In Lane		0.13	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2673	1435	322	4289	151	135
V/C Ratio(X)	0.41	0.41	0.05	0.40	0.79	0.24
Avail Cap(c_a), veh/h	2673	1435	417	4289	364	324
HCM Platoon Ratio	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.92	0.92	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	2.0	2.3	53.9	51.3
Incr Delay (d2), s/veh	0.4	0.8	0.1	0.3	8.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.3	0.0	1.7	3.9	0.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.4	0.8	2.1	2.6	62.8	52.2
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	1679			1739	153	
Approach Delay, s/veh	0.5			2.6	60.5	
Approach LOS	A			A	E	
Timer - Assigned Phs	2		3	4	8	
Phs Duration (G+Y+Rc), s	14.7		6.6	98.7	105.3	
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	
Max Green Setting (Gmax), s	24.5		8.5	73.5	86.5	
Max Q Clear Time (g_c+I1), s	9.9		2.2	2.0	11.8	
Green Ext Time (p_c), s	0.3		0.0	17.3	20.0	
Intersection Summary						
HCM 6th Ctrl Delay			4.1			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Denali Boulevard & 56th Avenue

Windler Homestead
Future Total (2040)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (veh/h)	50	960	465	345	900	30	570	30	390	25	5	40
Future Volume (veh/h)	50	960	465	345	900	30	570	30	390	25	5	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	54	1043	505	375	978	33	644	0	424	27	5	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	214	1213	724	1220	2820	95	782	0	907	71	75	119
Arrive On Green	0.03	0.24	0.24	0.71	1.00	1.00	0.22	0.00	0.22	0.04	0.04	0.04
Sat Flow, veh/h	1781	5106	1585	3456	5073	171	3563	0	1585	1781	1870	1585
Grp Volume(v), veh/h	54	1043	505	375	656	355	644	0	424	27	5	43
Grp Sat Flow(s), veh/h/ln	1781	1702	1585	1728	1702	1840	1781	0	1585	1781	1870	1585
Q Serve(g_s), s	2.9	23.5	28.5	4.9	0.0	0.0	20.7	0.0	0.0	1.8	0.3	3.1
Cycle Q Clear(g_c), s	2.9	23.5	28.5	4.9	0.0	0.0	20.7	0.0	0.0	1.8	0.3	3.1
Prop In Lane	1.00		1.00	1.00		0.09	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	214	1213	724	1220	1892	1023	782	0	907	71	75	119
V/C Ratio(X)	0.25	0.86	0.70	0.31	0.35	0.35	0.82	0.00	0.47	0.38	0.07	0.36
Avail Cap(c_a), veh/h	234	1213	724	1220	1892	1023	1084	0	1042	275	288	299
HCM Platoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.92	0.92	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.0	43.8	25.4	12.1	0.0	0.0	44.6	0.0	15.0	56.1	55.4	52.8
Incr Delay (d2), s/veh	0.6	7.5	5.1	0.1	0.5	0.9	3.7	0.0	0.4	3.3	0.4	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	10.7	16.4	1.7	0.1	0.3	9.5	0.0	6.7	0.9	0.2	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	51.3	30.5	12.3	0.5	0.9	48.4	0.0	15.3	59.4	55.8	54.7
LnGrp LOS	D	D	C	B	A	A	D	A	B	E	E	D
Approach Vol, veh/h	1602			1386			1068			75		
Approach Delay, s/veh	44.3			3.8			35.3			56.5		
Approach LOS	D			A			D			E		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	30.8			46.9			33.0			9.3		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	36.5			18.5			28.5			18.5		
Max Q Clear Time (g_c+I1), s	22.7			6.9			30.5			5.1		
Green Ext Time (p_c), s	3.7			1.1			0.0			0.1		

Intersection Summary

HCM 6th Ctrl Delay	28.6
HCM 6th LOS	C

Notes













User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary

12: Denali Boulevard & 48th Avenue

Windler Homestead
Future Total (2040)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	475	1430	560	365	1365	195	670	400	450	265	335	505
Future Volume (veh/h)	475	1430	560	365	1365	195	670	400	450	265	335	505
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	516	1554	0	397	1484	212	728	435	0	288	364	549
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	587	1787		446	1580	841	763	532		483	533	507
Arrive On Green	0.06	0.12	0.00	0.04	0.10	0.10	0.22	0.15	0.00	0.22	0.15	0.15
Sat Flow, veh/h	3456	5106	1585	3456	5106	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	516	1554	0	397	1484	212	728	435	0	288	364	549
Grp Sat Flow(s),veh/h/ln	1728	1702	1585	1728	1702	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	17.8	35.9	0.0	13.7	34.6	4.5	25.0	14.2	0.0	10.8	11.6	18.0
Cycle Q Clear(g_c), s	17.8	35.9	0.0	13.7	34.6	4.5	25.0	14.2	0.0	10.8	11.6	18.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	587	1787		446	1580	841	763	532		483	533	507
V/C Ratio(X)	0.88	0.87		0.89	0.94	0.25	0.95	0.82		0.60	0.68	1.08
Avail Cap(c_a), veh/h	648	1787		446	1580	841	763	720		483	533	507
HCM Platoon Ratio	0.33	0.33	0.33	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.24	0.24	0.00	0.72	0.72	0.72	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.4	50.4	0.0	56.6	52.8	7.3	46.1	49.4	0.0	38.7	48.3	17.8
Incr Delay (d2), s/veh	3.4	1.6	0.0	14.9	9.4	0.5	22.0	5.4	0.0	2.0	3.6	64.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	16.7	0.0	7.3	17.2	2.1	13.0	6.7	0.0	7.6	5.4	15.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.9	51.9	0.0	71.5	62.2	7.8	68.1	54.8	0.0	40.7	51.9	82.1
LnGrp LOS	E	D		E	E	A	E	D		D	D	F
Approach Vol, veh/h	2070			2093			1163			1201		
Approach Delay, s/veh	53.7			58.4			63.2			63.0		
Approach LOS	D			E			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	31.0	22.5	20.0	46.5	31.0	22.5	24.9	41.6				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	20.2	24.3	15.5	42.0	26.5	18.0	22.5	35.0				
Max Q Clear Time (g_c+1/2), s	11.2	16.2	15.7	37.9	27.0	20.0	19.8	36.6				
Green Ext Time (p_c), s	0.5	1.7	0.0	3.2	0.0	0.0	0.6	0.0				

Intersection Summary

HCM 6th Ctrl Delay 58.6

HCM 6th LOS E

Notes

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑↑	↑↑↑↑	↗		↗
Traffic Vol, veh/h	0	2740	2445	120	0	200
Future Vol, veh/h	0	2740	2445	120	0	200
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	300	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2978	2658	130	0	217
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1329
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	*337
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		1
Mov Cap-1 Maneuver	-	-	-	-	-	*337
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		SB	
HCM Control Delay, s	0		0		33.2	
HCM LOS					D	
Minor Lane/Major Mvmt	EBT		WBT	WBR	SBLn1	
Capacity (veh/h)	-		-	-	337	
HCM Lane V/C Ratio	-		-	-	0.645	
HCM Control Delay (s)	-		-	-	33.2	
HCM Lane LOS	-		-	-	D	
HCM 95th %tile Q(veh)	-		-	-	4.2	
Notes						
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon						

HCM 6th Signalized Intersection Summary

1: Drive 1 & 56th Avenue

Windler Homestead
Future Total (2040)


















	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱		↙	↑↑↑	↙	↗
Traffic Volume (veh/h)	1770	155	25	1720	120	25
Future Volume (veh/h)	1770	155	25	1720	120	25
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1924	168	27	1870	130	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	3695	321	256	4262	161	143
Arrive On Green	1.00	1.00	0.02	0.83	0.09	0.09
Sat Flow, veh/h	4952	416	1781	5274	1781	1585
Grp Volume(v), veh/h	1366	726	27	1870	130	27
Grp Sat Flow(s),veh/h/ln	1702	1796	1781	1702	1781	1585
Q Serve(g_s), s	0.0	0.0	0.3	11.5	8.6	1.9
Cycle Q Clear(g_c), s	0.0	0.0	0.3	11.5	8.6	1.9
Prop In Lane		0.23	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2629	1387	256	4262	161	143
V/C Ratio(X)	0.52	0.52	0.11	0.44	0.81	0.19
Avail Cap(c_a), veh/h	2629	1387	323	4262	334	297
HCM Platoon Ratio	1.33	1.33	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.79	0.90	0.90	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	2.1	2.6	53.6	50.5
Incr Delay (d2), s/veh	0.6	1.1	0.2	0.3	9.2	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.4	0.1	2.1	4.3	0.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.6	1.1	2.3	2.9	62.7	51.1
LnGrp LOS	A	A	A	A	E	D
Approach Vol, veh/h	2092			1897	157	
Approach Delay, s/veh	0.8			2.9	60.7	
Approach LOS	A			A	E	
Timer - Assigned Phs	2		3	4	8	
Phs Duration (G+Y+Rc), s	15.3		7.5	97.2	104.7	
Change Period (Y+Rc), s	4.5		4.5	4.5	4.5	
Max Green Setting (Gmax), s	22.5		7.5	76.5	88.5	
Max Q Clear Time (g_c+l1), s	10.6		2.3	2.0	13.5	
Green Ext Time (p_c), s	0.3		0.0	27.6	23.7	
Intersection Summary						
HCM 6th Ctrl Delay			4.0			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Denali Boulevard & 56th Avenue

Windler Homestead
Future Total (2040)















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		 	  						 	
Traffic Volume (veh/h)	20	1020	580	340	1145	10	420	10	200	30	5	50
Future Volume (veh/h)	20	1020	580	340	1145	10	420	10	200	30	5	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	1109	630	370	1245	11	465	0	217	33	5	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	113	1523	726	1186	3236	29	570	0	798	86	91	111
Arrive On Green	0.02	0.30	0.30	0.11	0.20	0.20	0.16	0.00	0.16	0.05	0.05	0.05
Sat Flow, veh/h	1781	5106	1585	3456	5220	46	3563	0	1585	1781	1870	1585
Grp Volume(v), veh/h	22	1109	630	370	812	444	465	0	217	33	5	54
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	1728	1702	1862	1781	0	1585	1781	1870	1585
Q Serve(g_s), s	1.1	23.4	35.8	11.8	24.7	24.7	15.1	0.0	0.0	2.2	0.3	3.9
Cycle Q Clear(g_c), s	1.1	23.4	35.8	11.8	24.7	24.7	15.1	0.0	0.0	2.2	0.3	3.9
Prop In Lane	1.00		1.00	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	113	1523	726	1186	2110	1154	570	0	798	86	91	111
V/C Ratio(X)	0.19	0.73	0.87	0.31	0.38	0.38	0.82	0.00	0.27	0.38	0.06	0.49
Avail Cap(c_a), veh/h	150	1523	726	1186	2110	1154	858	0	926	267	281	272
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.86	0.86	0.86	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.8	37.7	27.3	40.2	28.0	28.0	48.7	0.0	17.2	55.4	54.5	53.7
Incr Delay (d2), s/veh	0.7	2.7	11.7	0.1	0.5	1.0	3.8	0.0	0.2	2.8	0.3	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	10.0	21.5	5.5	11.4	12.7	7.0	0.0	3.5	1.0	0.2	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.6	40.4	39.0	40.3	28.5	28.9	52.5	0.0	17.3	58.1	54.7	57.0
LnGrp LOS	D	D	D	D	C	C	D	A	B	E	D	E
Approach Vol, veh/h	1761			1626			682			92		
Approach Delay, s/veh	39.8			31.3			41.3			57.3		
Approach LOS	D			C			D			E		
Timer - Assigned Phs	2		3	4		6	7	8				
Phs Duration (G+Y+Rc), s	23.7		45.7	40.3		10.3	7.1	78.9				
Change Period (Y+Rc), s	4.5		4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s	28.9		19.3	35.8		18.0	5.1	50.0				
Max Q Clear Time (g_c+I1), s	17.1		13.8	37.8		5.9	3.1	26.7				
Green Ext Time (p_c), s	2.1		0.7	0.0		0.2	0.0	9.4				
Intersection Summary												
HCM 6th Ctrl Delay			37.1									
HCM 6th LOS			D									
Notes												

HCM 6th Signalized Intersection Summary

12: Denali Boulevard & 48th Avenue

Windler Homestead
Future Total (2040)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	695	1545	770	520	1135	250	625	205	455	275	220	475
Future Volume (veh/h)	695	1545	770	520	1135	250	625	205	455	275	220	475
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	755	1679	0	565	1234	272	679	223	0	299	239	516
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	787	1754		567	1430	851	706	304		517	491	580
Arrive On Green	0.46	0.69	0.00	0.05	0.09	0.09	0.20	0.09	0.00	0.26	0.14	0.14
Sat Flow, veh/h	3456	5106	1585	3456	5106	1585	3456	3554	1585	1781	3554	1585
Grp Volume(v), veh/h	755	1679	0	565	1234	272	679	223	0	299	239	516
Grp Sat Flow(s),veh/h/ln	1728	1702	1585	1728	1702	1585	1728	1777	1585	1781	1777	1585
Q Serve(g_s), s	25.4	36.1	0.0	19.6	28.6	0.0	23.4	7.3	0.0	13.1	7.5	14.0
Cycle Q Clear(g_c), s	25.4	36.1	0.0	19.6	28.6	0.0	23.4	7.3	0.0	13.1	7.5	14.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	787	1754		567	1430	851	706	304		517	491	580
V/C Ratio(X)	0.96	0.96		1.00	0.86	0.32	0.96	0.73		0.58	0.49	0.89
Avail Cap(c_a), veh/h	787	1754		567	1430	851	706	592		517	515	591
HCM Platoon Ratio	2.00	2.00	2.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.29	0.29	0.00	0.78	0.78	0.78	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.1	18.0	0.0	56.7	52.2	20.7	47.3	53.5	0.0	36.7	47.8	14.2
Incr Delay (d2), s/veh	9.6	5.2	0.0	32.3	5.7	0.8	24.9	3.4	0.0	1.6	0.8	15.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	8.4	0.0	11.7	13.8	5.7	12.4	3.4	0.0	7.7	3.4	8.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.7	23.2	0.0	89.0	57.9	21.5	72.2	56.9	0.0	38.3	48.5	29.5
LnGrp LOS	D	C		F	E	C	E	E		D	D	C
Approach Vol, veh/h	2434			2071			902			1054		
Approach Delay, s/veh	28.9			61.6			68.4			36.3		
Approach LOS	C			E			E			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	35.3	14.8	24.2	45.7	29.0	21.1	31.8	38.1				
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Max Green Setting (Gmax), s	31.9	20.0	19.7	40.4	24.5	17.4	26.5	33.6				
Max Q Clear Time (g_c+T1), s	11.5	9.3	21.6	38.1	25.4	16.0	27.4	30.6				
Green Ext Time (p_c), s	0.5	0.9	0.0	2.0	0.0	0.6	0.0	2.3				

Intersection Summary

HCM 6th Ctrl Delay 46.1
HCM 6th LOS D

Notes

User approved pedestrian interval to be less than phase max green.

Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

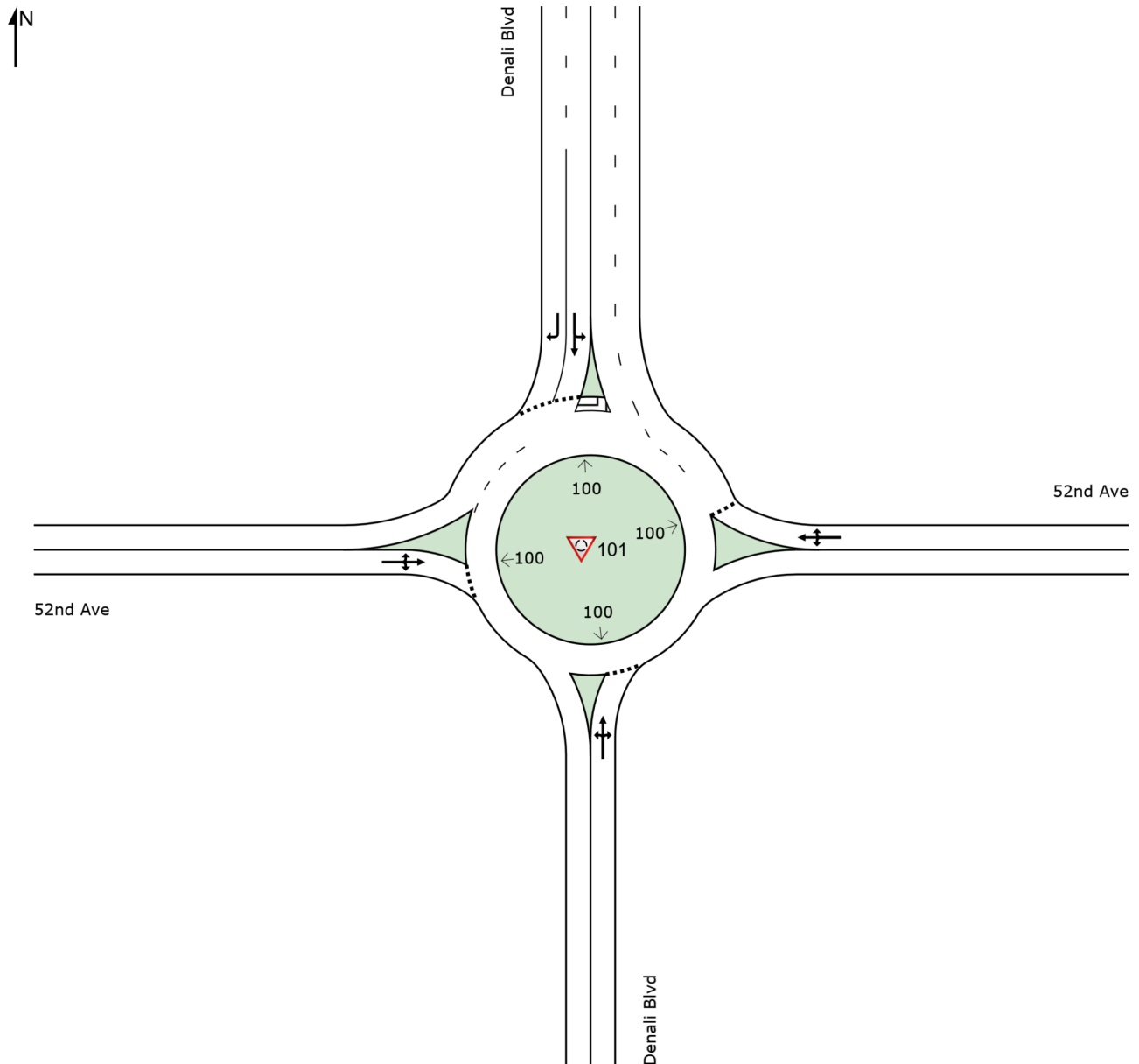
Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑↑	↑↑↑↑	↗		↗
Traffic Vol, veh/h	0	3410	2315	165	0	265
Future Vol, veh/h	0	3410	2315	165	0	265
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	300	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	3707	2516	179	0	288
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	1258
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	*359
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		1
Mov Cap-1 Maneuver	-	-	-	-	-	*359
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		45.4		
HCM LOS	E					
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	359		
HCM Lane V/C Ratio	-	-	-	0.802		
HCM Control Delay (s)	-	-	-	45.4		
HCM Lane LOS	-	-	-	E		
HCM 95th %tile Q(veh)	-	-	-	6.9		
Notes						
~: Volume exceeds capacity		\$: Delay exceeds 300s		+: Computation Not Defined		*: All major volume in platoon

SITE LAYOUT

 Site: 101 [AM_2040_Future Total (Site Folder: INT # 102 - 52nd Ave & Denali Blvd)]

Intersection #102
AM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [AM_2040_Future Total (Site Folder: INT # 102 - 52nd Ave & Denali Blvd)]**

Intersection #102
AM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] ft				
South: Denali Blvd														
3	L2	55	2.0	60	2.0	0.772	16.5	LOS C	13.6	346.6	0.78	0.62	0.94	29.9
8	T1	730	2.0	793	2.0	0.772	16.5	LOS C	13.6	346.6	0.78	0.62	0.94	29.9
18	R2	45	2.0	49	2.0	0.772	16.5	LOS C	13.6	346.6	0.78	0.62	0.94	29.1
Approach		830	2.0	902	2.0	0.772	16.5	LOS C	13.6	346.6	0.78	0.62	0.94	29.8
East: 52nd Ave														
1	L2	50	2.0	54	2.0	0.197	10.0	LOS A	0.7	19.0	0.69	0.69	0.69	31.3
6	T1	5	2.0	5	2.0	0.197	10.0	LOS A	0.7	19.0	0.69	0.69	0.69	31.3
16	R2	35	2.0	38	2.0	0.197	10.0	LOS A	0.7	19.0	0.69	0.69	0.69	30.5
Approach		90	2.0	98	2.0	0.197	10.0	LOS A	0.7	19.0	0.69	0.69	0.69	31.0
North: Denali Blvd														
7	L2	20	2.0	22	2.0	0.676	12.1	LOS B	6.2	157.5	0.55	0.33	0.55	31.7
4	T1	755	2.0	821	2.0	0.676	12.1	LOS B	6.2	157.5	0.55	0.33	0.55	31.6
14	R2	50	2.0	54	2.0	0.044	3.2	LOS A	0.2	4.3	0.23	0.11	0.23	34.8
Approach		825	2.0	897	2.0	0.676	11.5	LOS B	6.2	157.5	0.53	0.32	0.53	31.8
West: 52nd Ave														
5	L2	100	2.0	109	2.0	0.398	13.2	LOS B	1.9	49.1	0.74	0.81	0.97	30.2
2	T1	10	2.0	11	2.0	0.398	13.2	LOS B	1.9	49.1	0.74	0.81	0.97	30.1
12	R2	85	2.0	92	2.0	0.398	13.2	LOS B	1.9	49.1	0.74	0.81	0.97	29.3
Approach		195	2.0	212	2.0	0.398	13.2	LOS B	1.9	49.1	0.74	0.81	0.97	29.8
All Vehicles		1940	2.0	2109	2.0	0.772	13.8	LOS B	13.6	346.6	0.66	0.51	0.76	30.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [PM_2040_Future Total (Site Folder: INT # 102 - 52nd Ave & Denali Blvd)]**

Intersection #102
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] ft				
South: Denali Blvd														
3	L2	125	2.0	136	2.0	0.616	11.2	LOS B	5.0	126.5	0.61	0.43	0.61	31.8
8	T1	470	2.0	511	2.0	0.616	11.2	LOS B	5.0	126.5	0.61	0.43	0.61	31.8
18	R2	45	2.0	49	2.0	0.616	11.2	LOS B	5.0	126.5	0.61	0.43	0.61	30.9
Approach		640	2.0	696	2.0	0.616	11.2	LOS B	5.0	126.5	0.61	0.43	0.61	31.7
East: 52nd Ave														
1	L2	65	2.0	71	2.0	0.212	8.5	LOS A	0.9	21.6	0.65	0.65	0.65	32.1
6	T1	25	2.0	27	2.0	0.212	8.5	LOS A	0.9	21.6	0.65	0.65	0.65	32.0
16	R2	30	2.0	33	2.0	0.212	8.5	LOS A	0.9	21.6	0.65	0.65	0.65	31.1
Approach		120	2.0	130	2.0	0.212	8.5	LOS A	0.9	21.6	0.65	0.65	0.65	31.8
North: Denali Blvd														
7	L2	30	2.0	33	2.0	0.630	11.7	LOS B	6.8	172.2	0.64	0.59	0.82	31.9
4	T1	620	2.0	674	2.0	0.630	11.7	LOS B	6.8	172.2	0.64	0.59	0.82	31.7
14	R2	125	2.0	136	2.0	0.121	4.3	LOS A	0.5	12.5	0.35	0.23	0.35	34.2
Approach		775	2.0	842	2.0	0.630	10.5	LOS B	6.8	172.2	0.59	0.53	0.74	32.1
West: 52nd Ave														
5	L2	100	2.0	109	2.0	0.505	14.4	LOS B	3.1	78.0	0.77	0.89	1.15	30.0
2	T1	30	2.0	33	2.0	0.505	14.4	LOS B	3.1	78.0	0.77	0.89	1.15	29.9
12	R2	150	2.0	163	2.0	0.505	14.4	LOS B	3.1	78.0	0.77	0.89	1.15	29.1
Approach		280	2.0	304	2.0	0.505	14.4	LOS B	3.1	78.0	0.77	0.89	1.15	29.5
All Vehicles		1815	2.0	1973	2.0	0.630	11.2	LOS B	6.8	172.2	0.63	0.56	0.75	31.5

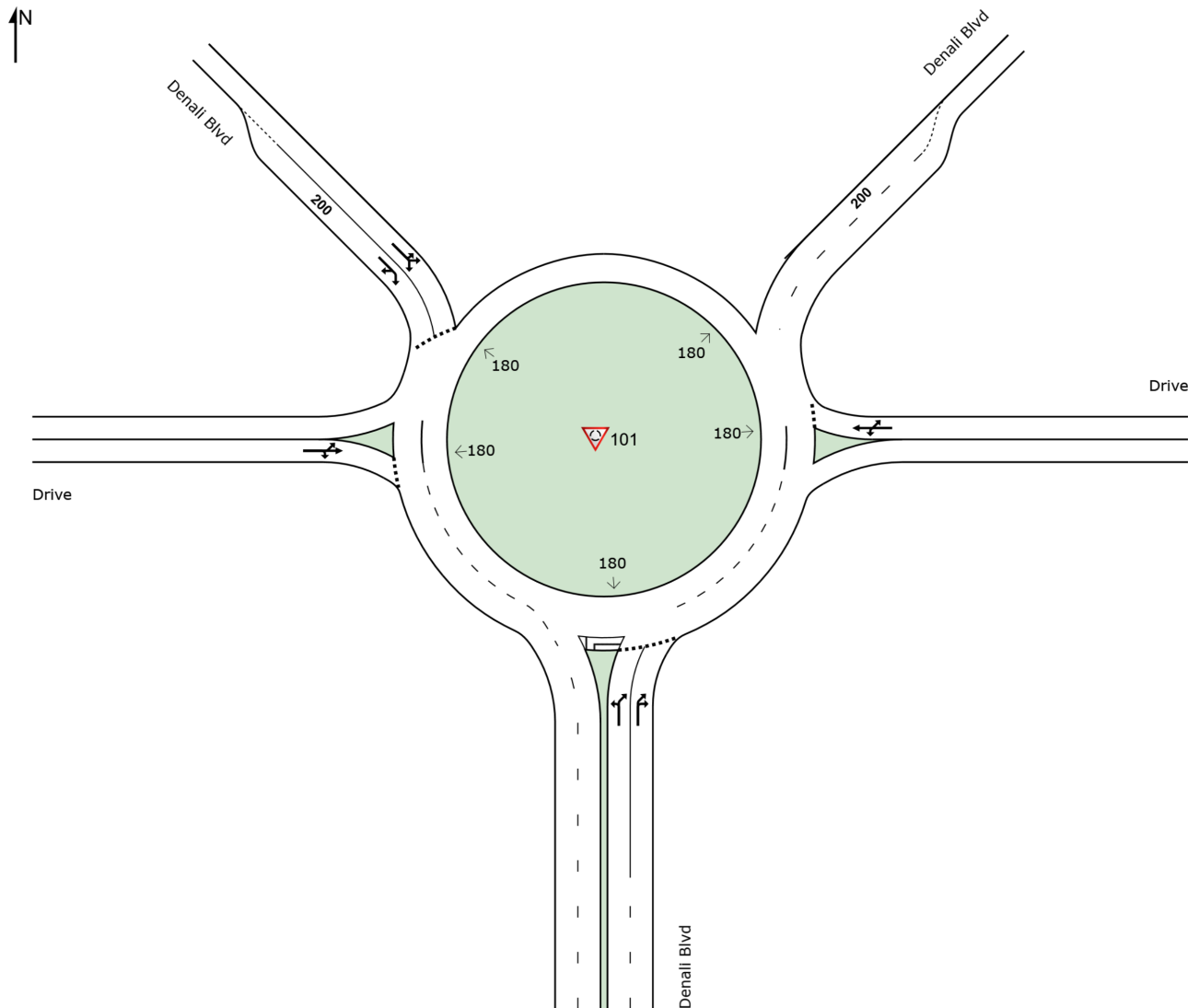
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [AM_2040_Future Total_2-lane (Site Folder: INT # 103 - Denali Blvd)]

Intersection #103
AM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

 **Site: 101 [AM_2040_Future Total_2-lane (Site Folder: INT # 103 - Denali Blvd)]**

Intersection #103
AM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: Denali Blvd														
3	L2	270	2.0	293	2.0	0.302	5.7	LOS A	1.5	39.0	0.30	0.17	0.30	34.5
18a	R1	695	2.0	755	2.0	0.571	9.6	LOS A	4.3	108.3	0.43	0.26	0.43	34.1
18	R2	35	2.0	38	2.0	0.571	9.5	LOS A	4.3	108.3	0.45	0.27	0.45	33.2
Approach		1000	2.0	1087	2.0	0.571	8.5	LOS A	4.3	108.3	0.40	0.24	0.40	34.2
East: Drive														
1	L2	85	2.0	92	2.0	0.203	9.9	LOS A	0.7	17.5	0.68	0.68	0.68	32.2
6	T1	5	2.0	5	2.0	0.203	9.9	LOS A	0.7	17.5	0.68	0.68	0.68	31.6
16b	R3	5	2.0	5	2.0	0.203	9.9	LOS A	0.7	17.5	0.68	0.68	0.68	30.0
Approach		95	2.0	103	2.0	0.203	9.9	LOS A	0.7	17.5	0.68	0.68	0.68	32.0
NorthWest: Denali Blvd														
7x	L2	1	1.9	1	1.9	0.579	15.9	LOS C	5.3	134.5	0.69	0.77	1.02	34.3
7ax	L1	5	2.0	5	2.0	0.579	11.6	LOS B	5.3	134.5	0.69	0.77	1.02	33.7
14ax	R1	870	2.0	946	2.0	0.579	11.6	LOS B	5.3	134.5	0.69	0.77	1.02	33.2
14bx	R3	155	2.0	168	2.0	0.579	11.6	LOS B	5.3	134.5	0.69	0.77	1.02	31.7
Approach		1031	2.0	1121	2.0	0.579	11.6	LOS B	5.3	134.5	0.69	0.77	1.02	32.9
West: Drive														
5a	L1	100	2.0	109	2.0	0.637	24.4	LOS C	4.1	103.9	0.80	1.00	1.51	29.0
2	T1	5	2.0	5	2.0	0.637	20.1	LOS C	4.1	103.9	0.80	1.00	1.51	29.0
12	R2	225	2.0	245	2.0	0.637	20.1	LOS C	4.1	103.9	0.80	1.00	1.51	28.0
Approach		330	2.0	359	2.0	0.637	21.4	LOS C	4.1	103.9	0.80	1.00	1.51	28.3
All Vehicles		2456	2.0	2670	2.0	0.637	11.6	LOS B	5.3	134.5	0.58	0.58	0.82	32.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 **Site: 101 [PM_2040_Future Total_2-lane (Site Folder: INT # 103 - Denali Blvd)]**

Intersection #103
PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] ft				
South: Denali Blvd														
3	L2	385	2.0	418	2.0	0.371	6.8	LOS A	2.0	50.2	0.41	0.28	0.41	33.3
18a	R1	695	2.0	755	2.0	0.701	13.4	LOS B	10.0	253.2	0.67	0.61	0.89	32.3
18	R2	70	2.0	76	2.0	0.701	13.5	LOS B	10.0	253.2	0.68	0.61	0.90	31.4
Approach		1150	2.0	1250	2.0	0.701	11.2	LOS B	10.0	253.2	0.59	0.50	0.73	32.6
East: Drive														
1	L2	50	2.0	54	2.0	0.146	10.2	LOS B	0.5	12.1	0.71	0.71	0.71	32.3
6	T1	5	2.0	5	2.0	0.146	10.2	LOS B	0.5	12.1	0.71	0.71	0.71	31.7
16b	R3	5	2.0	5	2.0	0.146	10.2	LOS B	0.5	12.1	0.71	0.71	0.71	30.0
Approach		60	2.0	65	2.0	0.146	10.2	LOS B	0.5	12.1	0.71	0.71	0.71	32.0
NorthWest: Denali Blvd														
7x	L2	1	1.9	1	1.9	0.539	15.5	LOS C	4.2	106.1	0.69	0.81	1.01	34.5
7ax	L1	5	2.0	5	2.0	0.539	11.3	LOS B	4.2	106.1	0.69	0.81	1.01	33.8
14ax	R1	635	2.0	690	2.0	0.539	11.3	LOS B	4.2	106.1	0.69	0.81	1.01	33.3
14bx	R3	245	2.0	266	2.0	0.539	11.3	LOS B	4.2	106.1	0.69	0.81	1.01	31.6
Approach		886	2.0	963	2.0	0.539	11.3	LOS B	4.2	106.1	0.69	0.81	1.01	32.8
West: Drive														
5a	L1	125	2.0	136	2.0	0.674	22.1	LOS C	5.8	146.5	0.80	1.05	1.56	30.0
2	T1	45	2.0	49	2.0	0.674	17.9	LOS C	5.8	146.5	0.80	1.05	1.56	30.0
12	R2	280	2.0	304	2.0	0.674	17.9	LOS C	5.8	146.5	0.80	1.05	1.56	28.9
Approach		450	2.0	489	2.0	0.674	19.1	LOS C	5.8	146.5	0.80	1.05	1.56	29.3
All Vehicles		2546	2.0	2767	2.0	0.701	12.6	LOS B	10.0	253.2	0.66	0.71	0.97	32.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Geometric Delay is not included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.