

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	1.1	0.0	0.5
Total Del/Veh (s)	6.7	6.2	9.8	10.3	9.5
Stop Del/Veh (s)	5.4	3.8	3.2	5.9	4.6
Stop/Veh	0.81	0.60	0.56	0.56	0.58
Avg Speed (kph)	13	19	29	18	23
HC Emissions (g)	0	0	5	3	8
CO Emissions (g)	5	6	223	85	319
NOx Emissions (g)	1	1	19	10	31

2: Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.4	0.0	0.0	0.2
Total Del/Veh (s)	2.7	1.0	3.2	2.5
Stop Del/Veh (s)	0.0	0.0	2.4	0.7
Stop/Veh	0.01	0.01	0.34	0.11
Avg Speed (kph)	36	46	15	35
HC Emissions (g)	4	4	1	8
CO Emissions (g)	139	67	14	220
NOx Emissions (g)	12	10	2	23

3: Performance by approach

Approach	NB	NE	SW	All
Denied Del/Veh (s)	0.0	0.0	0.1	0.1
Total Del/Veh (s)	0.5	0.2	0.5	0.4
Stop Del/Veh (s)	0.0	0.0	0.0	0.0
Stop/Veh	0.00	0.00	0.00	0.00
Avg Speed (kph)	22	49	46	45
HC Emissions (g)	0	2	6	8
CO Emissions (g)	2	35	154	192
NOx Emissions (g)	0	5	18	23

4: Performance by approach

Approach	EB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.3	0.3
Stop Del/Veh (s)	0.0	0.0
Stop/Veh	0.00	0.00
Avg Speed (kph)	46	46
HC Emissions (g)	4	4
CO Emissions (g)	224	224
NOx Emissions (g)	13	13

5: Performance by approach

Approach	EB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.5	1.1	1.6	1.4
Stop Del/Veh (s)	0.0	0.3	0.0	0.1
Stop/Veh	0.00	0.01	0.02	0.01
Avg Speed (kph)	32	32	37	33
HC Emissions (g)	0	4	2	6
CO Emissions (g)	7	273	37	317
NOx Emissions (g)	1	20	5	26

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	10.5
Stop Del/Veh (s)	3.5
Stop/Veh	0.43
Avg Speed (kph)	37
HC Emissions (g)	110
CO Emissions (g)	3908
NOx Emissions (g)	376

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca

Anexa 1 - nod 16 - an 2025

Intersection: 1:

Movement	NB	NB	SB	SB	SE	SE	SE	NW	NW	NW
Directions Served	L	L	L	>	ULT	T	>	L	T	>
Maximum Queue (m)	15.5	16.2	9.0	15.1	22.9	38.8	15.0	58.1	51.6	9.2
Average Queue (m)	8.6	12.5	3.6	11.8	12.7	30.7	10.1	26.5	34.0	8.4
95th Queue (m)	16.8	17.5	10.9	16.8	22.1	46.5	14.1	56.5	62.8	9.7
Link Distance (m)	25.5	25.5	50.4	50.4	194.5	194.5		63.1	63.1	
Upstream Blk Time (%)								0		
Queuing Penalty (veh)								0		
Storage Bay Dist (m)							1.0			1.0
Storage Blk Time (%)						8	6		8	2
Queuing Penalty (veh)						13	18		6	11

Intersection: 2:

Movement	WB	SB
Directions Served	T	R
Maximum Queue (m)	7.5	32.0
Average Queue (m)	1.5	22.0
95th Queue (m)	6.4	41.6
Link Distance (m)	199.8	21.9
Upstream Blk Time (%)		8
Queuing Penalty (veh)		49
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3:

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4:

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca

Anexa 1 - nod 16 - an 2025

Intersection: 5:

Movement	NW
Directions Served	T
Maximum Queue (m)	14.2
Average Queue (m)	2.8
95th Queue (m)	12.2
Link Distance (m)	50.7
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 98

Intersection					
Intersection Delay, s/veh	12.6				
Intersection LOS	B				
Approach	EB	WB	NB	SB	SE
Entry Lanes	0	0	2	2	3
Conflicting Circle Lanes	2	2	2	2	2
Adj Approach Flow, veh/h	0	0	237	193	0
Demand Flow Rate, veh/h	0	0	242	197	0
Vehicles Circulating, veh/h	1032	1560	1032	1560	600
Vehicles Exiting, veh/h	706	219	0	0	1157
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	0.0	10.1	15.7	0.0
Approach LOS	-	-	B	C	-
Lane	Left	Right	Left	Right	
Designated Moves	L	LTR	L	TR	
Assumed Moves	L	LTR	L	TR	
RT Channelized					
Lane Util	0.529	0.471	0.315	0.685	
Critical Headway, s	4.293	4.113	4.293	4.113	
Entry Flow, veh/h	128	114	62	135	
Cap Entry Lane, veh/h	521	549	351	379	
Entry HV Adj Factor	0.981	0.977	0.984	0.978	
Flow Entry, veh/h	126	111	61	132	
Cap Entry, veh/h	511	536	345	371	
V/C Ratio	0.246	0.208	0.177	0.356	
Control Delay, s/veh	10.5	9.5	13.5	16.8	
LOS	B	A	B	C	
95th %tile Queue, veh	1	1	1	2	

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	NW
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Entry Lanes	3
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	0
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Demand Flow Rate, veh/h	0
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Vehicles Circulating, veh/h	512
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Vehicles Exiting, veh/h	762
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	0.0
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Approach LOS	-
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Lane

Designated Moves

Assumed Moves

RT Channelized

Lane Util

Critical Headway, s

Entry Flow, veh/h

Cap Entry Lane, veh/h

Entry HV Adj Factor

Flow Entry, veh/h

Cap Entry, veh/h

V/C Ratio

Control Delay, s/veh

LOS

95th %tile Queue, veh

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	82.4	0.0	38.4
Total Del/Veh (s)	2.8	11.4	107.0	26.8	53.8
Stop Del/Veh (s)	1.5	8.7	105.7	24.0	51.7
Stop/Veh	0.32	0.96	0.84	0.88	0.82
Avg Speed (kph)	19	13	5	9	6
HC Emissions (g)	0	0	9	6	15
CO Emissions (g)	12	7	359	157	535
NOx Emissions (g)	2	1	28	19	50

2: Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.2
Total Del/Veh (s)	2.8	1.0	3.1	2.4
Stop Del/Veh (s)	0.0	0.0	2.4	0.5
Stop/Veh	0.00	0.00	0.27	0.06
Avg Speed (kph)	37	45	15	37
HC Emissions (g)	5	3	1	8
CO Emissions (g)	202	48	12	261
NOx Emissions (g)	18	8	1	27

3: Performance by approach

Approach	NB	NE	SW	All
Denied Del/Veh (s)	0.0	0.0	0.2	0.1
Total Del/Veh (s)	5.0	0.9	0.7	1.5
Stop Del/Veh (s)	4.4	0.0	0.0	0.7
Stop/Veh	0.44	0.00	0.00	0.07
Avg Speed (kph)	12	48	45	43
HC Emissions (g)	0	6	5	11
CO Emissions (g)	6	101	138	245
NOx Emissions (g)	1	17	14	32

4: Performance by approach

Approach	EB	All
Denied Del/Veh (s)	0.0	0.0
Total Del/Veh (s)	0.4	0.4
Stop Del/Veh (s)	0.0	0.0
Stop/Veh	0.00	0.00
Avg Speed (kph)	46	46
HC Emissions (g)	4	4
CO Emissions (g)	205	205
NOx Emissions (g)	12	12

5: Performance by approach

Approach	EB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.5	1.8	21.1	12.8
Stop Del/Veh (s)	0.0	0.7	14.7	8.6
Stop/Veh	0.00	0.02	0.55	0.32
Avg Speed (kph)	33	31	11	17
HC Emissions (g)	0	7	3	11
CO Emissions (g)	6	278	88	373
NOx Emissions (g)	1	25	10	36

Total Network Performance

Denied Del/Veh (s)	26.2
Total Del/Veh (s)	45.0
Stop Del/Veh (s)	36.5
Stop/Veh	0.81
Avg Speed (kph)	25
HC Emissions (g)	138
CO Emissions (g)	4603
NOx Emissions (g)	457

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca

Anexa 2 - nod 16 - an 2045

Intersection: 1:

Movement	NB	NB	SB	SB	SE	SE	SE	NW	NW	NW
Directions Served	L	L	L	>	ULT	T	>	L	T	>
Maximum Queue (m)	9.2	13.2	33.2	16.9	204.9	199.1	9.1	61.8	67.5	9.2
Average Queue (m)	9.0	10.2	11.9	15.6	200.3	199.1	6.6	43.2	64.6	7.2
95th Queue (m)	9.4	12.8	30.3	17.0	204.1	199.1	12.3	59.9	68.1	13.1
Link Distance (m)	25.5	25.5	50.4		194.5	194.5		64.9	64.9	
Upstream Blk Time (%)					87	63		0	6	
Queuing Penalty (veh)					0	0		1	33	
Storage Bay Dist (m)				10.0			1.0			1.0
Storage Blk Time (%)			10	44		1	2		32	2
Queuing Penalty (veh)			23	39		2	7		38	14

Intersection: 2:

Movement	SB	B16
Directions Served	R	T
Maximum Queue (m)	37.0	13.4
Average Queue (m)	24.6	2.7
95th Queue (m)	35.5	11.5
Link Distance (m)	21.9	177.8
Upstream Blk Time (%)	5	
Queuing Penalty (veh)	33	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca

Anexa 2 - nod 16 - an 2045

Intersection: 3:

Movement	NB
Directions Served	R
Maximum Queue (m)	35.4
Average Queue (m)	24.3
95th Queue (m)	36.5
Link Distance (m)	20.4
Upstream Blk Time (%)	8
Queuing Penalty (veh)	32
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4:

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - nod 16 - an 2045

Intersection: 5:

Movement	NW	B18
Directions Served	T	T
Maximum Queue (m)	89.3	151.0
Average Queue (m)	86.9	100.1
95th Queue (m)	89.3	159.8
Link Distance (m)	64.3	205.0
Upstream Blk Time (%)	45	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 223

Intersection					
Intersection Delay, s/veh	25.7				
Intersection LOS	D				
Approach	EB	WB	NB	SB	SE
Entry Lanes	0	0	2	2	3
Conflicting Circle Lanes	2	2	2	2	2
Adj Approach Flow, veh/h	0	0	309	349	0
Demand Flow Rate, veh/h	0	0	315	356	0
Vehicles Circulating, veh/h	1384	1702	1384	1702	611
Vehicles Exiting, veh/h	730	421	0	0	1447
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186
Ped Vol Crossing Leg, #/h	0	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000
Approach Delay, s/veh	0.0	0.0	16.3	34.0	0.0
Approach LOS	-	-	C	D	-
Lane	Left	Right	Left	Right	
Designated Moves	L	LTR	L	TR	
Assumed Moves	L	LTR	L	TR	
RT Channelized					
Lane Util	0.530	0.470	0.281	0.719	
Critical Headway, s	4.293	4.113	4.293	4.113	
Entry Flow, veh/h	167	148	100	256	
Cap Entry Lane, veh/h	400	429	315	343	
Entry HV Adj Factor	0.981	0.981	0.980	0.980	
Flow Entry, veh/h	164	145	98	251	
Cap Entry, veh/h	392	421	309	337	
V/C Ratio	0.417	0.345	0.317	0.746	
Control Delay, s/veh	17.7	14.7	18.6	40.1	
LOS	C	B	C	E	
95th %tile Queue, veh	2	2	1	6	

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	NW
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Entry Lanes	3
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	0
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Demand Flow Rate, veh/h	0
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Vehicles Circulating, veh/h	845
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Vehicles Exiting, veh/h	854
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	0.0
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Approach LOS	-
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Lane

Designated Moves

Assumed Moves

RT Channelized

Lane Util

Critical Headway, s

Entry Flow, veh/h

Cap Entry Lane, veh/h

Entry HV Adj Factor

Flow Entry, veh/h

Cap Entry, veh/h

V/C Ratio

Control Delay, s/veh

LOS

95th %tile Queue, veh

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	1.5	2.2	0.7
Total Del/Veh (s)	2.2	2.5	3.8	7.3	3.1
Stop Del/Veh (s)	0.6	0.0	0.0	4.8	0.2
Stop/Veh	0.22	0.06	0.31	1.00	0.22
Avg Speed (kph)	21	29	34	23	31
HC Emissions (g)	0	1	2	0	3
CO Emissions (g)	7	21	79	0	107
NOx Emissions (g)	1	3	8	0	11

2: Performance by approach

Approach	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.4	0.5	1.2	0.5
Stop Del/Veh (s)	0.0	0.0	0.7	0.1
Stop/Veh	0.00	0.00	0.10	0.01
Avg Speed (kph)	45	48	20	45
HC Emissions (g)	2	2	0	4
CO Emissions (g)	93	28	2	123
NOx Emissions (g)	7	5	0	13

3: Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	0.6	0.6	2.2	0.9
Stop Del/Veh (s)	0.0	0.0	1.4	0.3
Stop/Veh	0.00	0.00	0.25	0.05
Avg Speed (kph)	48	41	20	42
HC Emissions (g)	2	3	0	4
CO Emissions (g)	31	84	6	121
NOx Emissions (g)	5	7	1	14

Total Network Performance

Denied Del/Veh (s)	0.5
Total Del/Veh (s)	3.7
Stop Del/Veh (s)	0.5
Stop/Veh	0.15
Avg Speed (kph)	42
HC Emissions (g)	52
CO Emissions (g)	1681
NOx Emissions (g)	161

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 17 - an 2025

Intersection: 1:

Movement	NB	SB	SE	NW	NW
Directions Served	L	>	>	LT	>
Maximum Queue (m)	9.2	12.4	7.1	8.8	8.4
Average Queue (m)	7.0	4.7	6.6	3.0	1.7
95th Queue (m)	12.8	14.1	7.0	9.2	7.3
Link Distance (m)	19.6	56.1		99.1	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)			1.0		1.0
Storage Blk Time (%)	1		0	1	1
Queuing Penalty (veh)	0		0	0	0

Intersection: 2:

Movement	SE
Directions Served	R
Maximum Queue (m)	7.7
Average Queue (m)	4.5
95th Queue (m)	10.6
Link Distance (m)	23.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3:

Movement	NB
Directions Served	R
Maximum Queue (m)	19.8
Average Queue (m)	16.1
95th Queue (m)	19.7
Link Distance (m)	34.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

HCM 2010 Roundabout
Intersectia 1:

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 17 - an 2025

Intersection						
Intersection Delay, s/veh	6.1					
Intersection LOS	A					
Approach	EB	WB	NB	SB	SE	
Entry Lanes	0	0	2	1	2	
Conflicting Circle Lanes	2	2	2	2	2	
Adj Approach Flow, veh/h	0	0	184	345	409	
Demand Flow Rate, veh/h	0	0	188	352	417	
Vehicles Circulating, veh/h	243	193	243	193	5	
Vehicles Exiting, veh/h	179	243	0	0	540	
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186	
Ped Vol Crossing Leg, #/h	0	0	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000	
Approach Delay, s/veh	0.0	0.0	5.8	7.6	5.0	
Approach LOS	-	-	A	A	A	
Lane	Left	Right	Left	Left	Right	Left
Designated Moves	L	TR	R	LT	R	LT
Assumed Moves	L	TR	R	LT	R	LT
RT Channelized						
Lane Util	0.973	0.027	1.000	0.583	0.417	0.667
Critical Headway, s	4.293	4.113	4.113	4.293	4.113	4.293
Entry Flow, veh/h	183	5	352	243	174	10
Cap Entry Lane, veh/h	942	953	987	1126	1126	824
Entry HV Adj Factor	0.978	1.000	0.980	0.979	0.983	0.990
Flow Entry, veh/h	179	5	345	238	171	10
Cap Entry, veh/h	921	953	968	1102	1107	816
V/C Ratio	0.194	0.005	0.357	0.216	0.155	0.012
Control Delay, s/veh	5.8	3.8	7.6	5.2	4.6	4.5
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	0	2	1	1	0

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach NW

Entry Lanes 2

Conflicting Circle Lanes 2

Adj Approach Flow, veh/h 15

Demand Flow Rate, veh/h 15

Vehicles Circulating, veh/h 421

Vehicles Exiting, veh/h 10

Follow-Up Headway, s 3.186

Ped Vol Crossing Leg, #/h 0

Ped Cap Adj 1.000

Approach Delay, s/veh 4.5

Approach LOS A

Lane Right

Designated Moves R

Assumed Moves R

RT Channelized

Lane Util 0.333

Critical Headway, s 4.113

Entry Flow, veh/h 5

Cap Entry Lane, veh/h 842

Entry HV Adj Factor 1.000

Flow Entry, veh/h 5

Cap Entry, veh/h 842

V/C Ratio 0.006

Control Delay, s/veh 4.3

LOS A

95th %tile Queue, veh 0

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	2.0	1.3	1.0
Total Del/Veh (s)	4.5	2.9	4.9	4.0	4.3
Stop Del/Veh (s)	2.8	0.1	0.3	1.0	0.7
Stop/Veh	0.59	0.08	0.44	0.43	0.37
Avg Speed (kph)	14	27	32	29	29
HC Emissions (g)	0	1	4	0	5
CO Emissions (g)	6	32	136	2	176
NOx Emissions (g)	1	5	13	0	20

2: Performance by approach

Approach	NB	SB	SE	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.9	0.8	3.7	1.3
Stop Del/Veh (s)	0.0	0.0	3.1	0.5
Stop/Veh	0.00	0.00	0.39	0.06
Avg Speed (kph)	45	47	14	43
HC Emissions (g)	5	4	0	9
CO Emissions (g)	144	82	5	231
NOx Emissions (g)	15	13	1	29

3: Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.1
Total Del/Veh (s)	0.8	1.1	6.2	1.9
Stop Del/Veh (s)	0.0	0.0	5.4	0.9
Stop/Veh	0.00	0.00	0.55	0.09
Avg Speed (kph)	47	40	13	39
HC Emissions (g)	5	5	0	11
CO Emissions (g)	95	155	10	261
NOx Emissions (g)	15	16	1	32

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	5.9
Stop Del/Veh (s)	1.4
Stop/Veh	0.27
Avg Speed (kph)	41
HC Emissions (g)	92
CO Emissions (g)	2728
NOx Emissions (g)	296

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 17 - an 2045

Intersection: 1:

Movement	NB	SB	SE	SE	NW	NW
Directions Served	L	>	LT	>	LT	>
Maximum Queue (m)	21.6	12.3	23.3	8.7	8.8	9.0
Average Queue (m)	16.8	7.2	6.3	7.9	1.8	3.5
95th Queue (m)	24.4	16.8	21.2	9.1	7.6	10.5
Link Distance (m)	19.6	56.1	150.0		99.1	
Upstream Blk Time (%)	2					
Queuing Penalty (veh)	5					
Storage Bay Dist (m)				1.0		1.0
Storage Blk Time (%)	8		0	1	0	0
Queuing Penalty (veh)	0		1	2	0	0

Intersection: 2:

Movement	SE
Directions Served	R
Maximum Queue (m)	25.2
Average Queue (m)	15.6
95th Queue (m)	29.8
Link Distance (m)	23.2
Upstream Blk Time (%)	2
Queuing Penalty (veh)	4
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 17 - an 2045

Intersection: 3:

Movement	NB
Directions Served	R
Maximum Queue (m)	32.9
Average Queue (m)	22.6
95th Queue (m)	36.2
Link Distance (m)	34.9
Upstream Blk Time (%)	1
Queuing Penalty (veh)	3
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 15

Intersection						
Intersection Delay, s/veh	7.8					
Intersection LOS	A					
Approach	EB	WB	NB	SB	SE	
Entry Lanes	0	0	2	1	2	
Conflicting Circle Lanes	2	2	2	2	2	
Adj Approach Flow, veh/h	0	0	258	421	690	
Demand Flow Rate, veh/h	0	0	263	429	704	
Vehicles Circulating, veh/h	444	268	444	268	5	
Vehicles Exiting, veh/h	265	444	0	0	692	
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186	
Ped Vol Crossing Leg, #/h	0	0	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000	
Approach Delay, s/veh	0.0	0.0	8.2	9.5	6.6	
Approach LOS	-	-	A	A	A	
Lane	Left	Right	Left	Left	Right	Left
Designated Moves	L	TR	R	LT	R	LT
Assumed Moves	L	TR	R	LT	R	LT
RT Channelized						
Lane Util	0.981	0.019	1.000	0.631	0.369	0.667
Critical Headway, s	4.293	4.113	4.113	4.293	4.113	4.293
Entry Flow, veh/h	258	5	429	444	260	10
Cap Entry Lane, veh/h	810	828	937	1126	1126	670
Entry HV Adj Factor	0.981	1.000	0.981	0.980	0.981	0.990
Flow Entry, veh/h	253	5	421	435	255	10
Cap Entry, veh/h	794	828	919	1103	1104	663
V/C Ratio	0.319	0.006	0.458	0.394	0.231	0.015
Control Delay, s/veh	8.2	4.4	9.5	7.3	5.4	5.6
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	0	2	2	1	0

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach NW

Entry Lanes 2

Conflicting Circle Lanes 2

Adj Approach Flow, veh/h 15

Demand Flow Rate, veh/h 15

Vehicles Circulating, veh/h 697

Vehicles Exiting, veh/h 10

Follow-Up Headway, s 3.186

Ped Vol Crossing Leg, #/h 0

Ped Cap Adj 1.000

Approach Delay, s/veh 5.5

Approach LOS A

Lane Right

Designated Moves R

Assumed Moves R

RT Channelized

Lane Util 0.333

Critical Headway, s 4.113

Entry Flow, veh/h 5

Cap Entry Lane, veh/h 694

Entry HV Adj Factor 1.000

Flow Entry, veh/h 5

Cap Entry, veh/h 694

V/C Ratio 0.007

Control Delay, s/veh 5.3

LOS A

95th %tile Queue, veh 0

1: Performance by approach

Approach	NB	SB	NE	SW	All
Denied Del/Veh (s)	3.0	0.9	0.0	0.0	1.6
Total Del/Veh (s)	4.4	2.5	3.0	2.1	3.3
Stop Del/Veh (s)	0.2	0.0	0.9	0.6	0.4
Stop/Veh	0.71	0.17	0.75	0.20	0.49
Avg Speed (kph)	29	31	18	20	27
HC Emissions (g)	2	0	0	0	3
CO Emissions (g)	80	1	1	14	97
NOx Emissions (g)	8	0	0	2	10

2: Performance by approach

Approach	EB	WB	SW	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.1
Total Del/Veh (s)	0.2	0.5	0.8	0.3
Stop Del/Veh (s)	0.0	0.0	0.4	0.0
Stop/Veh	0.00	0.00	0.10	0.00
Avg Speed (kph)	47	48	22	46
HC Emissions (g)	2	3	0	5
CO Emissions (g)	56	45	1	102
NOx Emissions (g)	6	8	0	14

3: Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	0.8	1.3	1.9	1.2
Stop Del/Veh (s)	0.0	0.0	1.5	0.3
Stop/Veh	0.00	0.00	0.36	0.07
Avg Speed (kph)	47	40	15	40
HC Emissions (g)	4	5	0	9
CO Emissions (g)	75	143	5	223
NOx Emissions (g)	11	14	1	26

Total Network Performance

Denied Del/Veh (s)	0.8
Total Del/Veh (s)	4.2
Stop Del/Veh (s)	0.5
Stop/Veh	0.26
Avg Speed (kph)	41
HC Emissions (g)	53
CO Emissions (g)	1694
NOx Emissions (g)	166

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 18 - an 2025

Intersection: 1:

Movement	NB	SB	NE	NE	SW	SW
Directions Served	>	>	L	>	L	>
Maximum Queue (m)	14.5	6.6	9.1	6.9	16.1	6.8
Average Queue (m)	8.8	1.3	1.8	5.4	11.2	2.7
95th Queue (m)	13.7	5.7	7.8	9.9	21.4	8.1
Link Distance (m)			20.5		16.9	
Upstream Blk Time (%)					1	
Queuing Penalty (veh)					4	
Storage Bay Dist (m)	1.0	1.0		1.0		1.0
Storage Blk Time (%)	0		1		2	
Queuing Penalty (veh)	0		0		0	

Intersection: 2:

Movement	SW
Directions Served	R
Maximum Queue (m)	5.8
Average Queue (m)	1.2
95th Queue (m)	5.0
Link Distance (m)	14.4
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 18 - an 2025

Intersection: 3:

Movement	NB
Directions Served	R
Maximum Queue (m)	27.8
Average Queue (m)	16.8
95th Queue (m)	30.8
Link Distance (m)	14.2
Upstream Blk Time (%)	4
Queuing Penalty (veh)	16
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 21

Intersection								
Intersection Delay, s/veh	6.8							
Intersection LOS	A							
Approach	EB	WB	NB	SB	NE			
Entry Lanes	0	0	2	2	2			
Conflicting Circle Lanes	2	2	2	2	2			
Adj Approach Flow, veh/h	0	0	479	33	63			
Demand Flow Rate, veh/h	0	0	488	33	64			
Vehicles Circulating, veh/h	429	74	22	459	429			
Vehicles Exiting, veh/h	63	436	471	33	0			
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186			
Ped Vol Crossing Leg, #/h	0	0	0	0	0			
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000			
Approach Delay, s/veh	0.0	0.0	6.8	4.7	4.9			
Approach LOS	-	-	A	A	A			
Lane	Left	Right	Left	Right	Left	Right	Left	Left
Designated Moves	LT	R	LT	R	L	TR	L	L
Assumed Moves	LT	R	LT	R	L	TR	L	L
RT Channelized								
Lane Util	0.129	0.871	0.667	0.333	0.172	0.828	0.974	
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	
Entry Flow, veh/h	63	425	22	11	11	53	407	
Cap Entry Lane, veh/h	1111	1113	801	819	819	837	1069	
Entry HV Adj Factor	0.981	0.981	0.990	1.000	1.000	0.981	0.980	
Flow Entry, veh/h	62	417	22	11	11	52	399	
Cap Entry, veh/h	1090	1092	793	819	819	821	1048	
V/C Ratio	0.057	0.382	0.027	0.013	0.013	0.063	0.381	
Control Delay, s/veh	3.8	7.2	4.8	4.5	4.5	5.0	7.4	
LOS	A	A	A	A	A	A	A	
95th %tile Queue, veh	0	2	0	0	0	0	2	

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	SW
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Entry Lanes	2
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	410
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Demand Flow Rate, veh/h	418
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Vehicles Circulating, veh/h	74
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Vehicles Exiting, veh/h	0
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	7.3
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Approach LOS	A
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Lane	Right
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Designated Moves	TR
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Assumed Moves	TR
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RT Channelized

Lane Util	0.026
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Critical Headway, s	4.113
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Entry Flow, veh/h	11
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Cap Entry Lane, veh/h	1073
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Entry HV Adj Factor	1.000
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Flow Entry, veh/h	11
-------------------	----

Cap Entry, veh/h	1073
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V/C Ratio	0.010
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Control Delay, s/veh	3.4
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LOS	A
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95th %tile Queue, veh	0
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1: Performance by approach

Approach	NB	SB	NE	SW	All
Denied Del/Veh (s)	3.1	1.5	0.0	0.0	1.5
Total Del/Veh (s)	6.1	3.1	3.6	2.6	4.4
Stop Del/Veh (s)	0.9	0.4	1.6	1.0	1.0
Stop/Veh	0.79	0.17	0.90	0.27	0.57
Avg Speed (kph)	26	30	17	18	23
HC Emissions (g)	4	0	0	1	5
CO Emissions (g)	109	1	2	29	141
NOx Emissions (g)	12	0	0	5	17

2: Performance by approach

Approach	EB	WB	SW	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.6	0.9	6.5	1.1
Stop Del/Veh (s)	0.0	0.0	6.3	0.4
Stop/Veh	0.00	0.00	0.71	0.04
Avg Speed (kph)	44	46	11	43
HC Emissions (g)	3	3	0	6
CO Emissions (g)	100	59	5	164
NOx Emissions (g)	9	9	1	19

3: Performance by approach

Approach	EB	WB	NB	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.2
Total Del/Veh (s)	1.2	2.8	7.1	3.1
Stop Del/Veh (s)	0.0	0.0	6.8	1.3
Stop/Veh	0.00	0.01	0.57	0.11
Avg Speed (kph)	46	36	8	35
HC Emissions (g)	5	5	1	11
CO Emissions (g)	104	199	15	318
NOx Emissions (g)	16	17	2	35

Total Network Performance

Denied Del/Veh (s)	0.8
Total Del/Veh (s)	7.8
Stop Del/Veh (s)	2.0
Stop/Veh	0.38
Avg Speed (kph)	39
HC Emissions (g)	91
CO Emissions (g)	3050
NOx Emissions (g)	296

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 18 - an 2045

Intersection: 1:

Movement	NB	NB	SB	NE	NE	SW	SW
Directions Served	LT	>	LT	L	>	L	>
Maximum Queue (m)	25.1	14.7	8.7	16.2	9.0	16.6	6.9
Average Queue (m)	16.9	10.8	1.7	5.0	6.6	9.7	1.4
95th Queue (m)	32.0	15.8	7.5	15.9	12.2	22.9	5.9
Link Distance (m)	106.0		87.7	20.5		16.9	
Upstream Blk Time (%)				0		4	
Queuing Penalty (veh)				0		22	
Storage Bay Dist (m)		1.0			1.0		1.0
Storage Blk Time (%)		3	0	2	1	5	
Queuing Penalty (veh)		3	0	2	0	1	

Intersection: 2:

Movement	SW
Directions Served	R
Maximum Queue (m)	17.5
Average Queue (m)	10.6
95th Queue (m)	17.8
Link Distance (m)	14.4
Upstream Blk Time (%)	3
Queuing Penalty (veh)	3
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 18 - an 2045

Intersection: 3:

Movement	WB	NB	B15
Directions Served	TR	R	T
Maximum Queue (m)	16.4	33.0	27.8
Average Queue (m)	3.3	29.8	13.3
95th Queue (m)	14.1	32.6	28.0
Link Distance (m)	140.4	14.2	215.5
Upstream Blk Time (%)	39		
Queuing Penalty (veh)	230		
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 260

HCM 2010 Roundabout
Intersectia 1:

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 18 - an 2045

Intersection								
Intersection Delay, s/veh	10.4							
Intersection LOS	B							
Approach	EB	WB	NB	SB	NE			
Entry Lanes	0	0	2	2	2			
Conflicting Circle Lanes	2	2	2	2	2			
Adj Approach Flow, veh/h	0	0	737	33	129			
Demand Flow Rate, veh/h	0	0	752	33	131			
Vehicles Circulating, veh/h	664	112	22	732	664			
Vehicles Exiting, veh/h	101	662	773	33	0			
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186			
Ped Vol Crossing Leg, #/h	0	0	0	0	0			
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000			
Approach Delay, s/veh	0.0	0.0	9.9	5.8	6.9			
Approach LOS	-	-	A	A	A			
Lane	Left	Right	Left	Right	Left	Right	Left	Left
Designated Moves	LT	R	LT	R	L	TR	L	L
Assumed Moves	LT	R	LT	R	L	TR	L	L
RT Channelized								
Lane Util	0.134	0.866	0.667	0.333	0.084	0.916	0.983	0.983
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.293
Entry Flow, veh/h	101	651	22	11	11	120	642	642
Cap Entry Lane, veh/h	1111	1113	653	677	687	710	1039	1039
Entry HV Adj Factor	0.978	0.980	0.990	1.000	1.000	0.983	0.980	0.980
Flow Entry, veh/h	99	638	22	11	11	118	629	629
Cap Entry, veh/h	1087	1090	646	677	687	698	1018	1018
V/C Ratio	0.091	0.585	0.034	0.016	0.016	0.169	0.618	0.618
Control Delay, s/veh	4.1	10.8	5.9	5.5	5.4	7.0	12.2	12.2
LOS	A	B	A	A	A	A	B	B
95th %tile Queue, veh	0	4	0	0	0	1	4	4

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	SW
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Entry Lanes	2
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	640
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Demand Flow Rate, veh/h	653
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Vehicles Circulating, veh/h	112
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Vehicles Exiting, veh/h	0
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	12.0
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Approach LOS	B
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Lane	Right
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Designated Moves	TR
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Assumed Moves	TR
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RT Channelized

Lane Util	0.017
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Critical Headway, s	4.113
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Entry Flow, veh/h	11
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Cap Entry Lane, veh/h	1045
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Entry HV Adj Factor	1.000
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Flow Entry, veh/h	11
-------------------	----

Cap Entry, veh/h	1045
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V/C Ratio	0.011
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Control Delay, s/veh	3.5
----------------------	-----

LOS	A
-----	---

95th %tile Queue, veh	0
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1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	2.2	1.5	1.0
Total Del/Veh (s)	2.6	2.1	3.3	3.5	3.0
Stop Del/Veh (s)	0.2	0.2	0.0	0.1	0.1
Stop/Veh	0.80	0.28	0.00	0.29	0.36
Avg Speed (kph)	21	23	39	37	35
HC Emissions (g)	0	0	0	3	3
CO Emissions (g)	2	4	2	79	88
NOx Emissions (g)	0	1	0	8	9

2: Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.2	0.0	0.0	0.1
Total Del/Veh (s)	0.6	1.2	3.1	1.1
Stop Del/Veh (s)	0.0	0.0	2.8	0.2
Stop/Veh	0.00	0.00	0.48	0.04
Avg Speed (kph)	47	47	14	46
HC Emissions (g)	5	4	0	10
CO Emissions (g)	147	84	2	232
NOx Emissions (g)	16	13	0	29

3: Performance by approach

Approach	NB	SB	NW	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	0.9	0.8	2.2	0.9
Stop Del/Veh (s)	0.0	0.0	1.7	0.1
Stop/Veh	0.00	0.00	0.37	0.02
Avg Speed (kph)	46	47	17	46
HC Emissions (g)	5	6	0	12
CO Emissions (g)	90	160	3	253
NOx Emissions (g)	16	19	0	35

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	4.3
Stop Del/Veh (s)	0.3
Stop/Veh	0.12
Avg Speed (kph)	45
HC Emissions (g)	67
CO Emissions (g)	1782
NOx Emissions (g)	203

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 19 - an 2025

Intersection: 1:

Movement	NB	SB	SB	NW	NW
Directions Served	>	L	>	LT	>
Maximum Queue (m)	7.1	9.0	6.9	8.8	12.6
Average Queue (m)	6.9	1.8	4.1	1.8	7.8
95th Queue (m)	7.1	7.7	9.6	7.6	11.8
Link Distance (m)		24.7		196.8	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	1.0		1.0		1.0
Storage Blk Time (%)		0		0	
Queuing Penalty (veh)		0		0	

Intersection: 2:

Movement	SB
Directions Served	R
Maximum Queue (m)	14.8
Average Queue (m)	11.9
95th Queue (m)	17.1
Link Distance (m)	16.8
Upstream Blk Time (%)	1
Queuing Penalty (veh)	2
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 19 - an 2025

Intersection: 3:

Movement	NW
Directions Served	R
Maximum Queue (m)	14.3
Average Queue (m)	9.5
95th Queue (m)	13.5
Link Distance (m)	22.5
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 2

Intersection								
Intersection Delay, s/veh	4.5							
Intersection LOS	A							
Approach	EB	WB	NB	SB	SE			
Entry Lanes	0	0	2	2	2			
Conflicting Circle Lanes	2	2	2	2	2			
Adj Approach Flow, veh/h	0	0	123	106	33			
Demand Flow Rate, veh/h	0	0	125	108	33			
Vehicles Circulating, veh/h	119	188	119	188	263			
Vehicles Exiting, veh/h	177	105	0	0	33			
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186			
Ped Vol Crossing Leg, #/h	0	0	0	0	0			
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000			
Approach Delay, s/veh	0.0	0.0	4.4	4.6	4.1			
Approach LOS	-	-	A	A	A			
Lane	Left	Right	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LT	R	LT	LT
Assumed Moves	L	TR	L	TR	LT	R	LT	LT
RT Channelized								
Lane Util	0.088	0.912	0.898	0.102	0.667	0.333	0.653	0.653
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.293
Entry Flow, veh/h	11	114	97	11	22	11	177	177
Cap Entry Lane, veh/h	1033	1040	981	991	928	940	1111	1111
Entry HV Adj Factor	1.000	0.982	0.979	1.000	0.990	1.000	0.982	0.982
Flow Entry, veh/h	11	112	95	11	22	11	174	174
Cap Entry, veh/h	1033	1021	961	991	919	940	1091	1091
V/C Ratio	0.011	0.110	0.099	0.011	0.024	0.012	0.159	0.159
Control Delay, s/veh	3.6	4.5	4.7	3.7	4.1	3.9	4.7	4.7
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	0	0	0	0	0	1	1

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	NW
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Entry Lanes	2
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	266
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Demand Flow Rate, veh/h	271
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Vehicles Circulating, veh/h	22
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Vehicles Exiting, veh/h	222
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	4.5
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Approach LOS	A
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Lane	Right
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Designated Moves	R
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Assumed Moves	R
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RT Channelized	
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Lane Util	0.347
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Critical Headway, s	4.113
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Entry Flow, veh/h	94
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Cap Entry Lane, veh/h	1113
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Entry HV Adj Factor	0.979
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Flow Entry, veh/h	92
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Cap Entry, veh/h	1089
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V/C Ratio	0.084
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Control Delay, s/veh	4.0
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LOS	A
-----	---

95th %tile Queue, veh	0
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1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	1.3	0.9	0.5
Total Del/Veh (s)	2.6	3.4	5.1	4.0	3.5
Stop Del/Veh (s)	0.3	1.3	2.0	0.1	0.4
Stop/Veh	0.69	0.39	0.60	0.16	0.39
Avg Speed (kph)	21	18	34	36	33
HC Emissions (g)	1	0	0	3	4
CO Emissions (g)	14	2	6	112	134
NOx Emissions (g)	2	0	0	11	14

2: Performance by approach

Approach	EB	WB	SB	All
Denied Del/Veh (s)	0.3	0.0	0.0	0.2
Total Del/Veh (s)	1.7	1.4	8.2	2.4
Stop Del/Veh (s)	0.0	0.0	8.2	1.1
Stop/Veh	0.00	0.00	0.55	0.07
Avg Speed (kph)	44	46	8	41
HC Emissions (g)	8	9	0	17
CO Emissions (g)	242	162	6	411
NOx Emissions (g)	26	26	1	53

3: Performance by approach

Approach	NB	SB	NW	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	1.3	0.9	3.8	1.2
Stop Del/Veh (s)	0.0	0.0	3.5	0.1
Stop/Veh	0.00	0.00	0.82	0.03
Avg Speed (kph)	46	47	14	46
HC Emissions (g)	5	12	0	17
CO Emissions (g)	100	267	3	370
NOx Emissions (g)	17	34	0	51

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	6.9
Stop Del/Veh (s)	1.4
Stop/Veh	0.22
Avg Speed (kph)	43
HC Emissions (g)	113
CO Emissions (g)	3083
NOx Emissions (g)	350

Queuing and Blocking Report

Baseline

Centura metropolitana Cluj - Napoca

Anexa 2 - Nod 19 - an 2045

Intersection: 1:

Movement	NB	SB	SB	SE	SE	NW	NW
Directions Served	>	L	>	LT	>	LT	>
Maximum Queue (m)	18.8	9.2	6.6	9.0	6.7	9.1	12.1
Average Queue (m)	10.9	5.4	1.3	5.4	2.6	3.6	6.5
95th Queue (m)	18.1	12.6	5.7	12.6	7.8	10.8	12.9
Link Distance (m)		24.7		174.3		196.8	
Upstream Blk Time (%)	0						
Queuing Penalty (veh)	0						
Storage Bay Dist (m)	1.0		1.0		1.0		1.0
Storage Blk Time (%)	1	2		2		1	
Queuing Penalty (veh)	0	0		0		0	

Intersection: 2:

Movement	SB	B16
Directions Served	R	T
Maximum Queue (m)	39.2	31.8
Average Queue (m)	23.5	8.9
95th Queue (m)	41.0	29.4
Link Distance (m)	16.8	249.2
Upstream Blk Time (%)	22	
Queuing Penalty (veh)	78	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 19 - an 2045

Intersection: 3:

Movement	NW
Directions Served	R
Maximum Queue (m)	15.0
Average Queue (m)	9.7
95th Queue (m)	14.1
Link Distance (m)	22.5
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 80

Intersection								
Intersection Delay, s/veh	6.6							
Intersection LOS	A							
Approach	EB	WB	NB	SB	SE			
Entry Lanes	0	0	2	2	2			
Conflicting Circle Lanes	2	2	2	2	2			
Adj Approach Flow, veh/h	0	0	400	100	66			
Demand Flow Rate, veh/h	0	0	408	102	66			
Vehicles Circulating, veh/h	124	424	124	424	460			
Vehicles Exiting, veh/h	402	102	0	0	66			
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186			
Ped Vol Crossing Leg, #/h	0	0	0	0	0			
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000			
Approach Delay, s/veh	0.0	0.0	7.3	5.3	4.9			
Approach LOS	-	-	A	A	A			
Lane	Left	Right	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LT	R	LT	LT
Assumed Moves	L	TR	L	TR	LT	R	LT	LT
RT Channelized								
Lane Util	0.054	0.946	0.784	0.216	0.667	0.333	0.834	0.834
Critical Headway, s	4.293	4.113	4.293	4.113	4.293	4.113	4.293	4.293
Entry Flow, veh/h	22	386	80	22	44	22	402	402
Cap Entry Lane, veh/h	1030	1036	822	840	800	819	1093	1093
Entry HV Adj Factor	1.000	0.979	0.975	1.000	0.990	1.000	0.982	0.982
Flow Entry, veh/h	22	378	78	22	44	22	395	395
Cap Entry, veh/h	1030	1015	802	840	792	819	1073	1073
V/C Ratio	0.021	0.373	0.097	0.026	0.055	0.027	0.368	0.368
Control Delay, s/veh	3.7	7.5	5.5	4.5	5.1	4.7	7.1	7.1
LOS	A	A	A	A	A	A	A	A
95th %tile Queue, veh	0	2	0	0	0	0	2	2

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach NW

Entry Lanes 2

Conflicting Circle Lanes 2

Adj Approach Flow, veh/h 473

Demand Flow Rate, veh/h 482

Vehicles Circulating, veh/h 44

Vehicles Exiting, veh/h 488

Follow-Up Headway, s 3.186

Ped Vol Crossing Leg, #/h 0

Ped Cap Adj 1.000

Approach Delay, s/veh 6.6

Approach LOS A

Lane Right

Designated Moves R

Assumed Moves R

RT Channelized

Lane Util 0.166

Critical Headway, s 4.113

Entry Flow, veh/h 80

Cap Entry Lane, veh/h 1096

Entry HV Adj Factor 0.975

Flow Entry, veh/h 78

Cap Entry, veh/h 1068

V/C Ratio 0.073

Control Delay, s/veh 4.0

LOS A

95th %tile Queue, veh 0

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	1.3	3.8	1.7
Total Del/Veh (s)	1.3	2.3	3.6	3.7	3.0
Stop Del/Veh (s)	0.0	0.0	0.3	0.1	0.1
Stop/Veh	0.00	0.03	0.29	0.67	0.32
Avg Speed (kph)	23	27	40	40	37
HC Emissions (g)	0	0	0	1	1
CO Emissions (g)	0	9	4	32	45
NOx Emissions (g)	0	1	1	3	5

2: Performance by approach

Approach	SB	NE	SW	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	0.3	0.9	1.5	1.2
Stop Del/Veh (s)	0.0	0.0	0.0	0.0
Stop/Veh	0.00	0.00	0.00	0.00
Avg Speed (kph)	29	48	47	48
HC Emissions (g)	0	14	5	19
CO Emissions (g)	0	285	91	377
NOx Emissions (g)	0	39	16	55

3: Performance by approach

Approach	NB	SB	NW	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	1.7	0.8	3.5	1.4
Stop Del/Veh (s)	0.0	0.0	2.8	0.2
Stop/Veh	0.00	0.00	0.41	0.03
Avg Speed (kph)	46	46	18	45
HC Emissions (g)	10	3	0	13
CO Emissions (g)	169	129	2	299
NOx Emissions (g)	27	11	0	39

Total Network Performance

Denied Del/Veh (s)	0.4
Total Del/Veh (s)	5.3
Stop Del/Veh (s)	0.2
Stop/Veh	0.07
Avg Speed (kph)	46
HC Emissions (g)	86
CO Emissions (g)	2083
NOx Emissions (g)	262

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 20 - an 2025

Intersection: 1:

Movement	SB	SE	SE	NW
Directions Served	>	LT	>	>
Maximum Queue (m)	6.7	9.0	6.7	7.9
Average Queue (m)	1.3	1.8	1.3	7.1
95th Queue (m)	5.8	7.8	5.8	7.8
Link Distance (m)	259.4			
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	1.0		1.0	1.0
Storage Blk Time (%)		0		0
Queuing Penalty (veh)		0		0

Intersection: 2:

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 20 - an 2025

Intersection: 3:

Movement	NW
Directions Served	R
Maximum Queue (m)	15.4
Average Queue (m)	12.4
95th Queue (m)	17.0
Link Distance (m)	37.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

HCM 2010 Roundabout
Intersectia 1:

Centura metropolitana Cluj - Napoca
Anexa 1 - Nod 17 - an 2025

Intersection						
Intersection Delay, s/veh	6.1					
Intersection LOS	A					
Approach	EB	WB	NB	SB	SE	
Entry Lanes	0	0	2	1	2	
Conflicting Circle Lanes	2	2	2	2	2	
Adj Approach Flow, veh/h	0	0	184	345	409	
Demand Flow Rate, veh/h	0	0	188	352	417	
Vehicles Circulating, veh/h	243	193	243	193	5	
Vehicles Exiting, veh/h	179	243	0	0	540	
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186	
Ped Vol Crossing Leg, #/h	0	0	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000	
Approach Delay, s/veh	0.0	0.0	5.8	7.6	5.0	
Approach LOS	-	-	A	A	A	
Lane	Left	Right	Left	Left	Right	Left
Designated Moves	L	TR	R	LT	R	LT
Assumed Moves	L	TR	R	LT	R	LT
RT Channelized						
Lane Util	0.973	0.027	1.000	0.583	0.417	0.667
Critical Headway, s	4.293	4.113	4.113	4.293	4.113	4.293
Entry Flow, veh/h	183	5	352	243	174	10
Cap Entry Lane, veh/h	942	953	987	1126	1126	824
Entry HV Adj Factor	0.978	1.000	0.980	0.979	0.983	0.990
Flow Entry, veh/h	179	5	345	238	171	10
Cap Entry, veh/h	921	953	968	1102	1107	816
V/C Ratio	0.194	0.005	0.357	0.216	0.155	0.012
Control Delay, s/veh	5.8	3.8	7.6	5.2	4.6	4.5
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	0	2	1	1	0

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach NW

Entry Lanes 2

Conflicting Circle Lanes 2

Adj Approach Flow, veh/h 15

Demand Flow Rate, veh/h 15

Vehicles Circulating, veh/h 421

Vehicles Exiting, veh/h 10

Follow-Up Headway, s 3.186

Ped Vol Crossing Leg, #/h 0

Ped Cap Adj 1.000

Approach Delay, s/veh 4.5

Approach LOS A

Lane Right

Designated Moves R

Assumed Moves R

RT Channelized

Lane Util 0.333

Critical Headway, s 4.113

Entry Flow, veh/h 5

Cap Entry Lane, veh/h 842

Entry HV Adj Factor 1.000

Flow Entry, veh/h 5

Cap Entry, veh/h 842

V/C Ratio 0.006

Control Delay, s/veh 4.3

LOS A

95th %tile Queue, veh 0

1: Performance by approach

Approach	NB	SB	SE	NW	All
Denied Del/Veh (s)	0.0	0.0	1.3	0.3	0.2
Total Del/Veh (s)	4.5	2.5	5.2	3.6	3.3
Stop Del/Veh (s)	3.3	0.1	1.6	0.1	0.3
Stop/Veh	0.50	0.08	0.57	0.06	0.11
Avg Speed (kph)	12	27	38	40	37
HC Emissions (g)	0	1	0	3	4
CO Emissions (g)	1	22	4	100	127
NOx Emissions (g)	0	3	0	11	15

2: Performance by approach

Approach	SB	NE	SW	All
Denied Del/Veh (s)	0.0	0.2	0.0	0.1
Total Del/Veh (s)	1.6	1.2	2.1	1.6
Stop Del/Veh (s)	1.4	0.0	0.0	0.0
Stop/Veh	0.50	0.00	0.00	0.00
Avg Speed (kph)	25	47	46	46
HC Emissions (g)	0	15	11	25
CO Emissions (g)	0	299	165	464
NOx Emissions (g)	0	41	29	70

3: Performance by approach

Approach	NB	SB	NW	All
Denied Del/Veh (s)	0.0	0.3	0.0	0.2
Total Del/Veh (s)	2.5	1.8	13.7	3.5
Stop Del/Veh (s)	0.0	0.0	12.7	1.5
Stop/Veh	0.00	0.00	0.67	0.08
Avg Speed (kph)	44	42	9	39
HC Emissions (g)	10	8	0	19
CO Emissions (g)	186	232	11	429
NOx Emissions (g)	29	26	1	56

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	8.1
Stop Del/Veh (s)	1.3
Stop/Veh	0.09
Avg Speed (kph)	44
HC Emissions (g)	137
CO Emissions (g)	3265
NOx Emissions (g)	402

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 20 - an 2045

Intersection: 1:

Movement	NB	SB	SB	SE	SE	NW
Directions Served	L	L	>	LT	>	>
Maximum Queue (m)	9.2	9.2	7.0	9.0	8.5	9.3
Average Queue (m)	3.7	1.8	1.4	1.8	3.0	5.5
95th Queue (m)	11.2	7.9	6.0	7.7	9.3	13.0
Link Distance (m)	12.1	36.9		259.5		275.2
Upstream Blk Time (%)	1					
Queuing Penalty (veh)	0					
Storage Bay Dist (m)			1.0		1.0	
Storage Blk Time (%)	2	0		1	0	
Queuing Penalty (veh)	0	0		0	0	

Intersection: 2:

Movement	SB
Directions Served	R
Maximum Queue (m)	7.3
Average Queue (m)	1.5
95th Queue (m)	6.3
Link Distance (m)	56.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report Baseline

Centura metropolitana Cluj - Napoca
Anexa 2 - Nod 20 - an 2045

Intersection: 3:

Movement	NW
Directions Served	R
Maximum Queue (m)	46.9
Average Queue (m)	33.6
95th Queue (m)	55.7
Link Distance (m)	37.8
Upstream Blk Time (%)	9
Queuing Penalty (veh)	30
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 31

Intersection						
Intersection Delay, s/veh	7.8					
Intersection LOS	A					
Approach	EB	WB	NB	SB	SE	
Entry Lanes	0	0	2	1	2	
Conflicting Circle Lanes	2	2	2	2	2	
Adj Approach Flow, veh/h	0	0	258	421	690	
Demand Flow Rate, veh/h	0	0	263	429	704	
Vehicles Circulating, veh/h	444	268	444	268	5	
Vehicles Exiting, veh/h	265	444	0	0	692	
Follow-Up Headway, s	3.186	3.186	3.186	3.186	3.186	
Ped Vol Crossing Leg, #/h	0	0	0	0	0	
Ped Cap Adj	1.000	1.000	1.000	1.000	1.000	
Approach Delay, s/veh	0.0	0.0	8.2	9.5	6.6	
Approach LOS	-	-	A	A	A	
Lane	Left	Right	Left	Left	Right	Left
Designated Moves	L	TR	R	LT	R	LT
Assumed Moves	L	TR	R	LT	R	LT
RT Channelized						
Lane Util	0.981	0.019	1.000	0.631	0.369	0.667
Critical Headway, s	4.293	4.113	4.113	4.293	4.113	4.293
Entry Flow, veh/h	258	5	429	444	260	10
Cap Entry Lane, veh/h	810	828	937	1126	1126	670
Entry HV Adj Factor	0.981	1.000	0.981	0.980	0.981	0.990
Flow Entry, veh/h	253	5	421	435	255	10
Cap Entry, veh/h	794	828	919	1103	1104	663
V/C Ratio	0.319	0.006	0.458	0.394	0.231	0.015
Control Delay, s/veh	8.2	4.4	9.5	7.3	5.4	5.6
LOS	A	A	A	A	A	A
95th %tile Queue, veh	1	0	2	2	1	0

Intersection

Intersection Delay, s/veh

Intersection LOS

Approach	NW
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Entry Lanes	2
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Conflicting Circle Lanes	2
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Adj Approach Flow, veh/h	15
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Demand Flow Rate, veh/h	15
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Vehicles Circulating, veh/h	697
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Vehicles Exiting, veh/h	10
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Follow-Up Headway, s	3.186
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Ped Vol Crossing Leg, #/h	0
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Ped Cap Adj	1.000
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Approach Delay, s/veh	5.5
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Approach LOS	A
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Lane	Right
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Designated Moves	R
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Assumed Moves	R
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RT Channelized

Lane Util	0.333
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Critical Headway, s	4.113
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Entry Flow, veh/h	5
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Cap Entry Lane, veh/h	694
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Entry HV Adj Factor	1.000
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Flow Entry, veh/h	5
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Cap Entry, veh/h	694
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V/C Ratio	0.007
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Control Delay, s/veh	5.3
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LOS	A
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95th %tile Queue, veh	0
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