

Niven Lake Phase V Traffic Impact Study

Prepared for

City of Yellowknife



Prepared by



SEPTEMBER 2012

84a moody street
port moody, bc
canada v3h 2p5

604.936.6190

604.936.6175


www.cts-bc.com

NIVEN LAKE PHASE V TRAFFIC IMPACT STUDY

Prepared for:

CITY OF YELLOWKNIFE

P.O. Box 580
4807-52nd Street
Yellowknife, NT
V1A 2N4

PERMIT TO PRACTICE CREATIVE TRANSPORTATION SOLUTIONS LTD.	
Signature	
Date	<u>30 Sept 2012</u>
PERMIT NUMBER: P 706 NWT/NU Association of Professional Engineers and Geoscientists	

Prepared by:

CREATIVE TRANSPORTATION SOLUTIONS LTD.
84A Moody Street
Port Moody, BC
V3H 2P5
(604) 936-6190



30 September 2012

File no: 3989-101



TABLE OF CONTENTS

EXECUTIVE SUMMARY	v
1 BACKGROUND.....	1
1.1 The Site.....	1
2 EXISTING CONDITIONS	3
2.1 Study Area.....	3
2.2 The Road Network	3
3 BASE TRAFFIC VOLUMES	4
3.1 2012 Base Traffic Volumes	4
3.2 2017 Future Base Traffic Volumes.....	4
3.3 2022 Future Base Traffic Volumes.....	7
4 SITE TRAFFIC VOLUMES.....	12
4.1 Traffic Generation.....	12
4.2 Trip Distribution	13
5 TOTAL PROJECTED TRAFFIC VOLUMES	16
6 TRAFFIC ENGINEERING ANALYSIS	21
6.1 Intersection Capacity Analysis	21
6.2 Intersection Laning.....	28
6.3 Pavement Marking and Signage Plan.....	30
6.4 Truck Access and Circulation Plan	30
6.5 Emergency Vehicle Access and Circulation Plan.....	30
6.6 Pedestrian Circulation Plan	30
6.7 Bicycle Circulation Plan.....	30
7 CONCLUSIONS & RECOMMENDATIONS	36
7.1 Conclusions.....	36
7.2 Recommendations	36



LIST OF TABLES

TABLE 1	
SUMMARY OF SITE GENERATED TRAFFIC FROM OTHER DEVELOPMENTS (2017)	4
TABLE 2	
SUMMARY OF SITE GENERATED TRAFFIC FROM OTHER DEVELOPMENTS (2022)	7
TABLE 3	
SUMMARY OF SITE GENERATED TRAFFIC	12
TABLE 4	
TRIP DISTRIBUTION PERCENTAGES FOR SITE GENERATED TRAFFIC	13
TABLE 5	
TRIP DISTRIBUTION VEHICLE VOLUMES FOR SITE GENERATED TRAFFIC.....	13
TABLE 6	
VEHICLE DELAY BY INDIVIDUAL MOVEMENTS FOR UNSIGNALIZED INTERSECTIONS...	22

LIST OF FIGURES

FIGURE 1	
STUDY AREA & ROAD NETWORK	2
FIGURE 2	
2012 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES	5
FIGURE 3	
2012 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES	6
FIGURE 4	
2017 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES	8
FIGURE 5	
2017 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES	9
FIGURE 6	
2022 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES	10
FIGURE 7	
2022 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES	11
FIGURE 8	
SITE TRAFFIC VOLUMES FOR THE WEEKDAY MORNING PEAK HOUR	14
FIGURE 9	
SITE TRAFFIC VOLUMES FOR THE WEEKDAY AFTERNOON PEAK HOUR	15
FIGURE 10	
2017 MORNING PEAK HOUR BASE + SITE TRAFFIC VOLUMES	17
FIGURE 11	
2017 AFTERNOON PEAK HOUR BASE + SITE TRAFFIC VOLUMES	18
FIGURE 12	
2022 MORNING PEAK HOUR BASE + SITE TRAFFIC VOLUMES	19
FIGURE 13	
2022 AFTERNOON PEAK HOUR BASE + SITE TRAFFIC VOLUMES	20
FIGURE 14	
RECOMMENDED LANING CONFIGURATION FOR FULL BUILDOUT	29
FIGURE 15	
PAVEMENT MARKING AND SIGNAGE PLAN - PARCEL E	31

FIGURE 16
TRUCK ACCESS AND CIRCULATION PLAN - PARCEL E.....32

FIGURE 17
EMERGENCY VEHICLE ACCESS CIRCULATION PLAN - PARCEL E33

FIGURE 18
PEDESTRIAN CIRCULATION PLAN - PARCEL E34

FIGURE 19
BICYCLE CIRCULATION PLAN - PARCEL E35

EXECUTIVE SUMMARY

Creative Transportation Solutions Ltd. (CTS) was retained by the City of Yellowknife on 23 April 2012 to conduct a traffic impact study of a proposed residential development known as Niven Lake Phase V near Niven Lake in Yellowknife. Currently, Niven Lake Phase V contains five parcels of development sites, which is proposed to consist of up to 156 residential dwelling units (Parcel A - 64 units, Parcel B – 14 units, Parcel C – 14 units, Parcel D – 48 units, and Parcel E – 16 units). For the purposes of this study, it was assumed that the five parcels would be constructed and fully occupied by the year 2017.

A Scope Development Meeting with City of Yellowknife officials was held on Tuesday, 1 May 2012 to discuss and confirm the study parameters for this project. As well, CTS staff conducted a detailed site visit and collected traffic volume data to document existing conditions.

The site is estimated to generate a total of 73 vehicle trips during the weekday morning in peak hour (i.e. 12 inbound and 61 outbound) and 84 vehicle trips during the weekday afternoon in peak hour (i.e. 56 inbound and 28 outbound). This is equivalent to an average of 1.4 vehicle movements per minute during the busier afternoon peak hour, which from a traffic engineering point of view is not considered significant.

The traffic impact assessment determined that by the year 2022 (i.e. 5 years post build out), separate left and right turning lanes will be warranted on Niven Gate at Highway 4 due to the increase in projected traffic volumes. As well, the west approach of the intersection of Franklin Avenue & 43rd Street will need to be restriped to provide for separate eastbound left and right turn lanes by the year 2022.

Based on the findings of this study, the following is recommended:

- 1) That the City of Yellowknife monitor traffic volumes at the intersection of Franklin Avenue & 43rd Street to determine when restriping of the east approach is required to provide for separate left and right turn lanes on 43rd Street.
- 2) That the Northwest Territorial Department of Transportation and the City of Yellowknife monitor the intersection of Highway 4 & Niven Gate to determine when Niven Gate should be widened and/or restriped to provide for separate westbound left and right turn lanes.

SECTION
1

BACKGROUND

Creative Transportation Solutions Ltd. (CTS) was retained by the City of Yellowknife on 23 April 2012 to conduct a traffic impact study of a proposed residential development known as Niven Lake Phase V near Niven Lake in Yellowknife.

1.1 The Site

The proposed housing development is located in the Niven Lake Phase V subdivision on the north side of Niven Drive in the City of Yellowknife as illustrated in **FIGURE 1**. Currently, there are five proposed parcel sites for the whole development, which is proposed to consist of up to 156 residential dwelling units (Parcel A - 64 units, Parcel B – 14 units, Parcel C – 14 units, Parcel D – 48 units, and Parcel E – 16 units).

A copy of the available site plans used for this traffic impact assessment are included in **APPENDIX A**. The proposed five parcels are anticipated to be constructed and fully occupied by the year 2017.

**FIGURE 1
STUDY AREA & ROAD NETWORK**





EXISTING CONDITIONS

2.1 Study Area

A Scope Development Meeting with City of Yellowknife officials was held on Tuesday, 1 May 2012 to discuss the study parameters for this project. At this meeting, CTS presented a draft study terms of reference which have been included in **APPENDIX B**. The weekday morning and afternoon peak hour was selected as the design hour for the traffic impact assessment.

The study area is bounded by Niven Drive to the east, Franklin Avenue to the south, Highway 4 to the west and site boundary to the north. The following intersections were included in the traffic impact assessment:

1. Highway 4 & Niven Gate (unsignalized);
2. Haener Drive & Niven Gate (unsignalized);
3. Driscoll Road & Niven Drive (unsignalized);
4. Ballantyne Court & Niven Drive (unsignalized);
5. 49th Avenue & Niven Drive/43rd Street (unsignalized);
6. Franklin Avenue & 43rd Street (*unsignalized*); and
7. All site accesses.

2.2 The Road Network

Franklin Avenue is an arterial roadway (ranked priority #1) connecting downtown to the south area with Old Town to the north. Within the study area, a two lane urban cross section is provided. The speed limit is 45 km/h southbound and 30km/h northbound.

Highway 4 is a major roadway (ranked priority #1) connecting downtown to the south with Highway 3 to the north. Within the study area, a two lane cross section is provided. At the intersection with Niven Gate, auxiliary lanes are provided to facilitate turning movements. The posted speed limit is 45km/h in both directions.

43rd Street is a two lane municipal local street with curb, gutter and sidewalk on both sides. The speed limit is 45 km/hr in both directions.

Niven Drive is a two lane municipal local street with curb, gutter and sidewalk on both sides. The speed limit is 45 km/hr in both directions.

SECTION
3

BASE TRAFFIC VOLUMES

3.1 2012 Base Traffic Volumes

In conjunction with a site visit that was undertaken by CTS staff from Tuesday, 1 May 2012 to Thursday, 3 May 2012, CTS undertook intersection traffic counts at six (6) key locations in order to document existing conditions during peak times. The traffic count data was tabulated and reviewed to ensure data integrity and validity. The tabulated traffic movement count data sheets are included in **APPENDIX C**. The traffic volumes are illustrated in **FIGURE 2** and **FIGURE 3** for the weekday morning and afternoon peak hours respectively.

3.2 2017 Future Base Traffic Volumes

For the future base traffic volumes, the 2012 base traffic volumes were factored up by an approved traffic volume growth rate of 2% per annum (simple straight line) to develop the initial base year 2017 volumes. Then, traffic volumes were estimated from the following two nearby potential developments which municipal staff anticipate being completed by the year 2017:

- Niven Heights development is located in the Niven Lake Phase 7 subdivision on the north side of Moyle Drive (illustrated as #1 on **FIGURES 2-14**).
- Other developments in the Niven Lake Phase 7 along on Moyle Drive (illustrated as #2, #3 & #4 on **FIGURES 2-14**)

TABLE 1 summarizes the forecast site generation traffic for the above developments which are projected to be completed by the year 2017.

TABLE 1
SUMMARY OF SITE GENERATED TRAFFIC FROM OTHER DEVELOPMENTS (2017)

Land Use	Peak Hour	Trip Generation Variable	Horizon Year	Trip Rate Source	Peak Hour Volumes (vph)		
					in	out	total
Niven Heights Development (Site 1)	Weekday Morning	Dwelling Units	2017	Recent CTS Study	12	47	59
	Weekday Afternoon				45	24	69
Niven Lake Phase 7 (Site 2,3 & 4)	Weekday Morning	Dwelling Units	2017	Provided by city staff	11	38	49
	Weekday Afternoon				42	23	65
TOTAL WEEKDAY MORNING PEAK HOUR					33	85	108
TOTAL WEEKDAY AFTERNOON PEAK HOUR					87	47	134

FIGURE 2
2012 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES

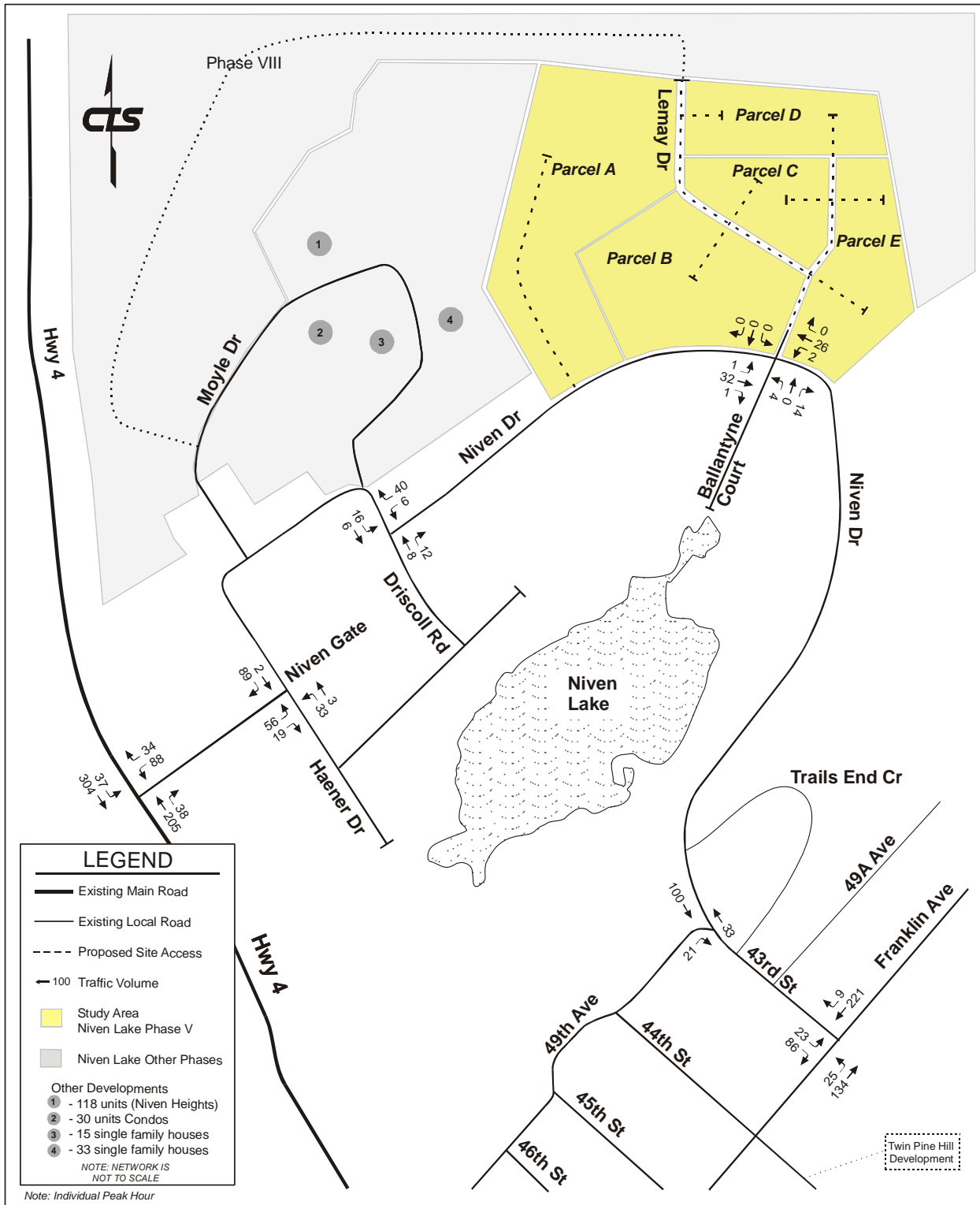
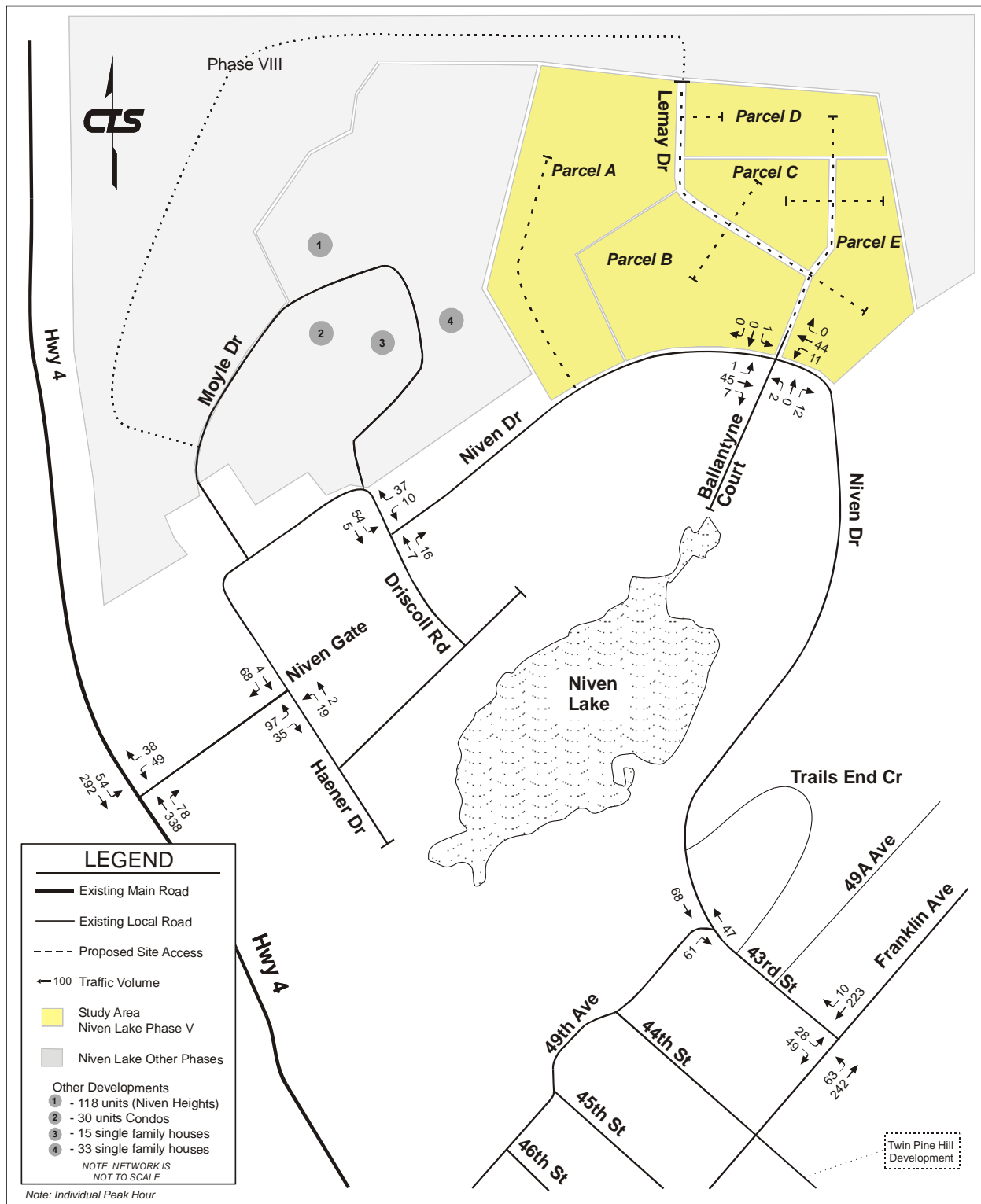


FIGURE 3
2012 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES



The traffic volumes from the above two developments were then superimposed on the initial base volumes to estimate the total 2017 future base traffic volumes. **FIGURE 4** and **FIGURE 5** illustrate the projected 2017 weekday morning and weekday afternoon peak hour volumes for base conditions.

3.3 2022 Future Base Traffic Volumes

The 2022 future base traffic volumes were factored up by an approved traffic volume growth rate of 2% per annum (simple straight line) to develop the initial base year 2022 volumes. Then, traffic volumes were estimated from the following other developments potential which municipal staff anticipate being completed by the year 2022:

- Future Phase 8 of Niven Lake development → 250 units (illustrated as Phase 8 on **FIGURES 2-14**).
- Twin Pine Hill development → 120 rooms hotel and two commercial buildings located off 44th Street east of Franklin Avenue

TABLE 2 summarizes the forecast site generation traffic for the above two developments.

TABLE 2
SUMMARY OF SITE GENERATED TRAFFIC FROM OTHER DEVELOPMENTS (2022)

Land Use	Peak Hour	Trip Generation Variable	Horizon Year	Trip Rate Source	Peak Hour Volumes (vph)		
					in	out	total
Twin Pine Hill Development	Weekday Morning	Dwelling Units	2022	Recent CTS Study	161	68	229
	Weekday Afternoon				118	91	209
Niven Lake Phase 8	Weekday Morning	Dwelling Units	2022	Provided by city staff	31	112	143
	Weekday Afternoon				118	64	182
TOTAL WEEKDAY MORNING PEAK HOUR					192	180	372
TOTAL WEEKDAY AFTERNOON PEAK HOUR					237	155	392

The traffic volumes from both **TABLE 1** and **TABLE 2** were then superimposed on the initial 2022 base volumes to estimate the total 2022 future base traffic volumes. **FIGURE 6** and **FIGURE 7** illustrate the projected 2022 weekday morning and weekday afternoon peak hour volumes for base conditions including the traffic from the other nearby five developments.

FIGURE 4
2017 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES

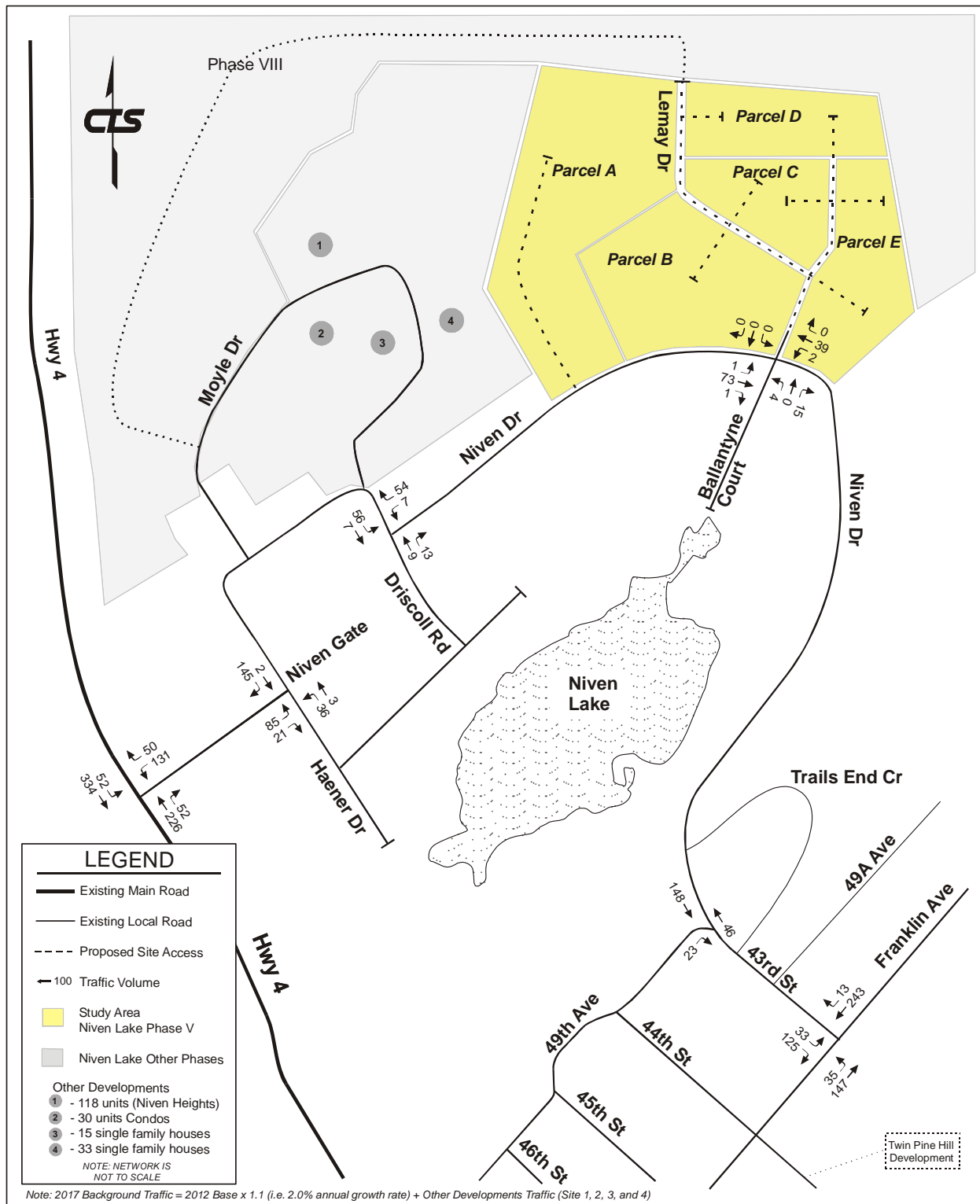


FIGURE 5
2017 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES

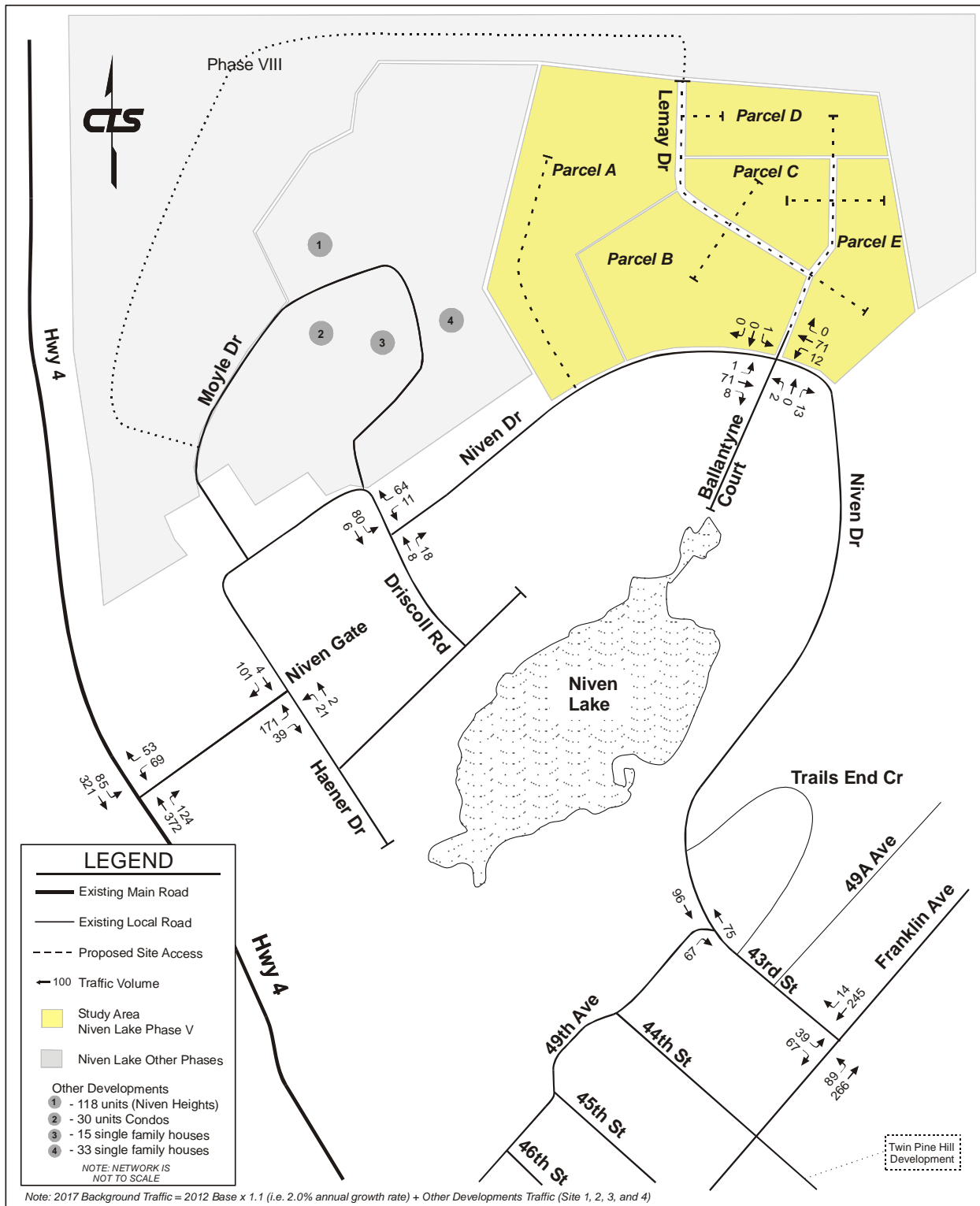


FIGURE 6
2022 WEEKDAY MORNING PEAK HOUR BASE TRAFFIC VOLUMES

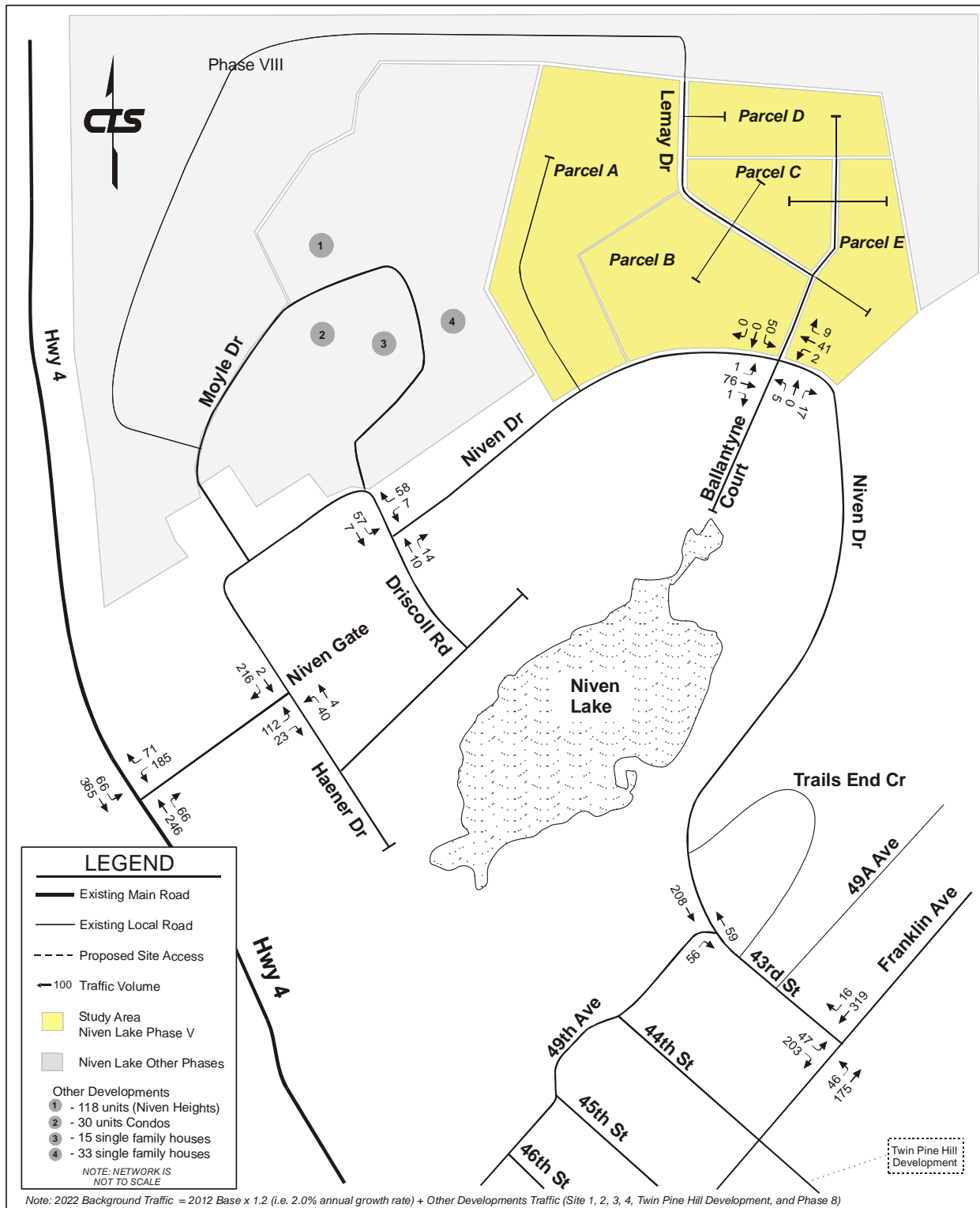
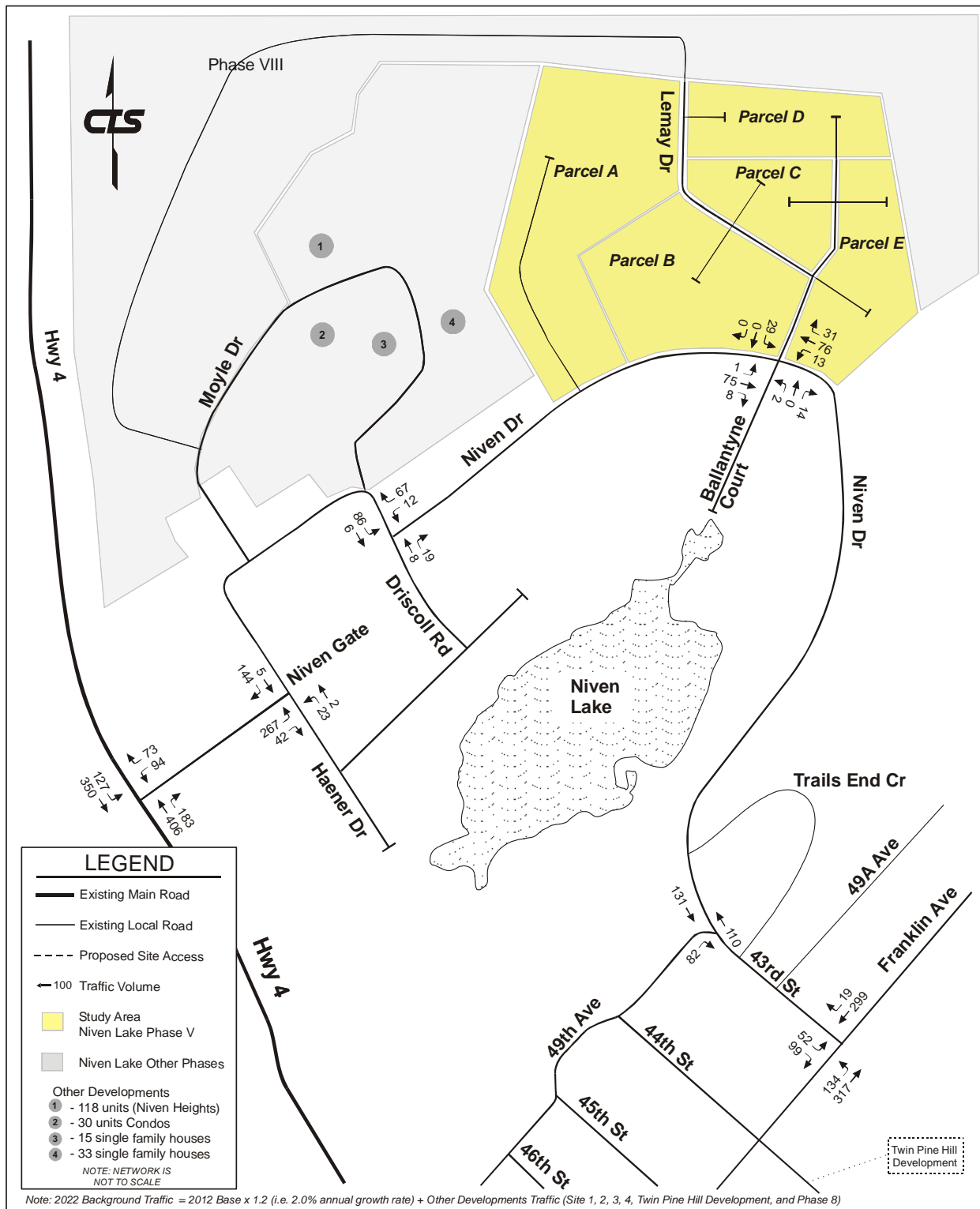


FIGURE 7
2022 WEEKDAY AFTERNOON PEAK HOUR BASE TRAFFIC VOLUMES





SITE TRAFFIC VOLUMES

4.1 Traffic Generation

The published vehicle trip generation rates (8th edition) from the Institute of Transportation Engineers (ITE) were used to forecast the site generated traffic volumes in accordance with the agreed to scope of work. Of note, use of these rates constitutes the “worst case scenario” for the generated traffic as it assumes that the majority of person trips to or from the site use an automobile. **TABLE 3** summarizes the forecast site generated traffic for full buildout which is projected to be completed by the year 2017.

**TABLE 3
SUMMARY OF SITE GENERATED TRAFFIC**

Land Use	Peak Hour	Trip Generation Variable	Horizon Year	Scope of Development*	Vehicle Trip Generation Rate	Trip Rate Source	Directional Split		Peak Hour Volumes (vph)		
							% in	% out	in	out	total
Parcel A - Condominium	Weekday Morning	Dwelling Units	2017	64	0.44	ITE 8th Edition - Code 230	17%	83%	5	24	29
	Weekday Afternoon				0.52		67%	33%	23	11	34
Parcel B - Condominium	Weekday Morning	Dwelling Units	2017	14	0.44	ITE 8th Edition - Code 230	17%	83%	1	6	7
	Weekday Afternoon				0.52		67%	33%	5	3	8
Parcel C - Condominium	Weekday Morning	Dwelling Units	2017	14	0.44	ITE 8th Edition - Code 230	17%	83%	1	6	7
	Weekday Afternoon				0.52		67%	33%	5	3	8
Parcel D - Condominium	Weekday Morning	Dwelling Units	2017	48	0.44	ITE 8th Edition - Code 230	17%	83%	4	18	22
	Weekday Afternoon				0.52		67%	33%	17	8	25
Parcel E - Condominium	Weekday Morning	Dwelling Units	2017	16	0.44	ITE 8th Edition - Code 230	17%	83%	1	7	8
	Weekday Afternoon				0.52		67%	33%	6	3	9
TOTAL WEEKDAY MORNING PEAK HOUR									12	61	73
TOTAL WEEKDAY AFTERNOON PEAK HOUR									56	28	84

From **TABLE 3**, all sites are estimated to generate a total of 73 vehicle trips during the weekday morning in peak hour (i.e. 12 inbound and 61 outbound) and 84 vehicle trips during the weekday afternoon in peak hour (i.e. 56 inbound and 28 outbound). This is equivalent to an average of 1.4 vehicle movements per minute during the busier afternoon peak hour, which from a traffic engineering point of view is not considered significant.

4.2 Trip Distribution

Trip distribution parameters to distribute the site generated vehicle trips to/from the site were developed from existing traffic patterns entering and exiting the study area for the morning and afternoon peak hour. The trip distribution parameters used in this study are summarized in **TABLE 4** while the associated traffic volumes assignment is summarized in **TABLE 5**.

**TABLE 4
TRIP DISTRIBUTION PERCENTAGES
FOR SITE GENERATED TRAFFIC**

FROM / TO	WEEKDAY MORNING PEAK HOUR		WEEKDAY AFTERNOON PEAK HOUR	
	INBOUND	OUTBOUND	INBOUND	OUTBOUND
West - Niven Gate	69.4%	55.0%	73.7%	56.1%
South - Niven Drive	30.6%	45.0%	26.3%	43.9%

**TABLE 5
TRIP DISTRIBUTION VEHICLE VOLUMES
FOR SITE GENERATED TRAFFIC**

FROM / TO	WEEKDAY MORNING PEAK HOUR		WEEKDAY AFTERNOON PEAK HOUR	
	INBOUND	OUTBOUND	INBOUND	OUTBOUND
West - Niven Gate	8	34	41	16
South - Niven Drive	4	27	15	12
TOTAL	12	61	56	28
	73		84	

FIGURE 8 and **FIGURE 9** illustrate the projected site generated volumes on the road network for Buildout (Year 2017) weekday morning peak hour and weekday afternoon peak hours respectively.

FIGURE 8
SITE TRAFFIC VOLUMES FOR THE WEEKDAY MORNING PEAK HOUR

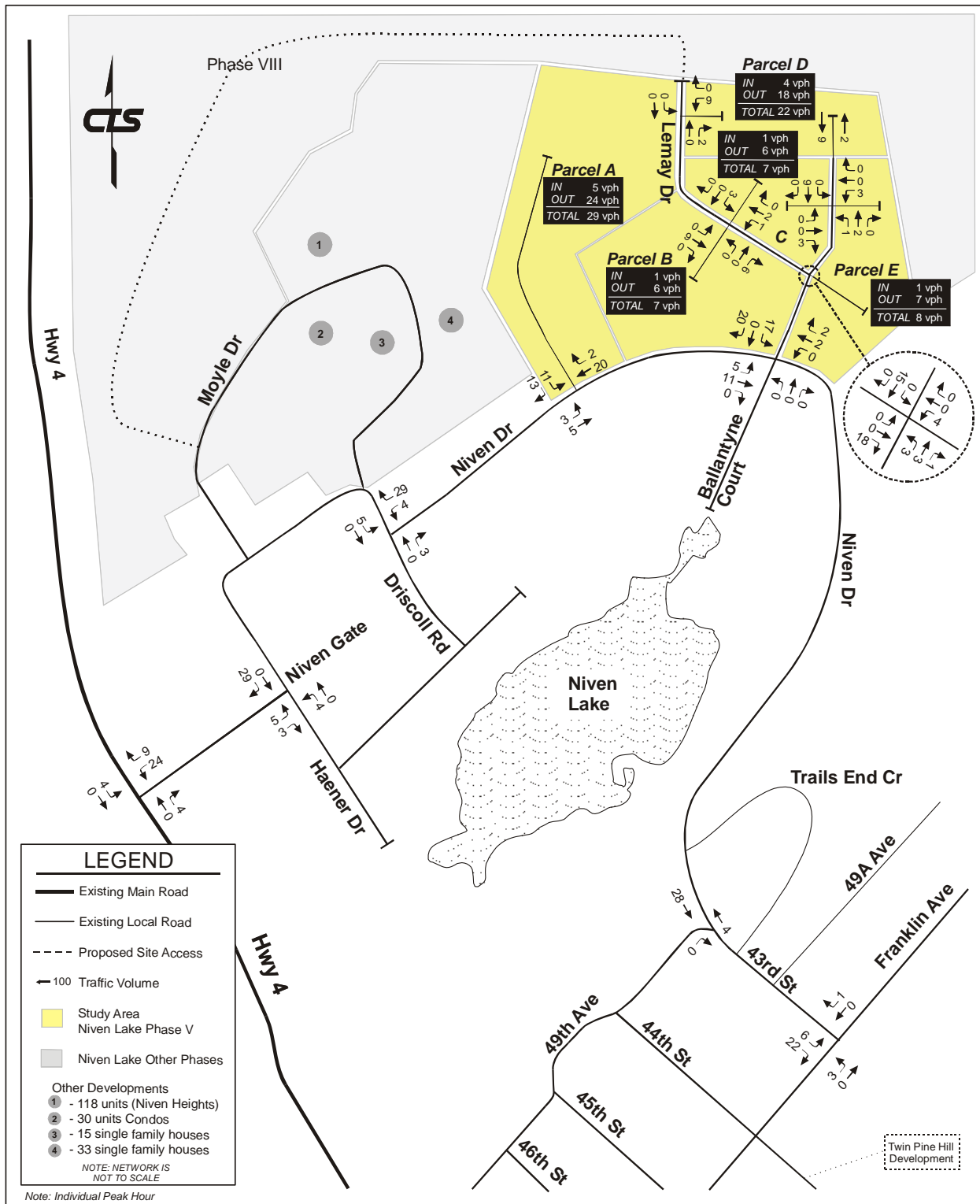
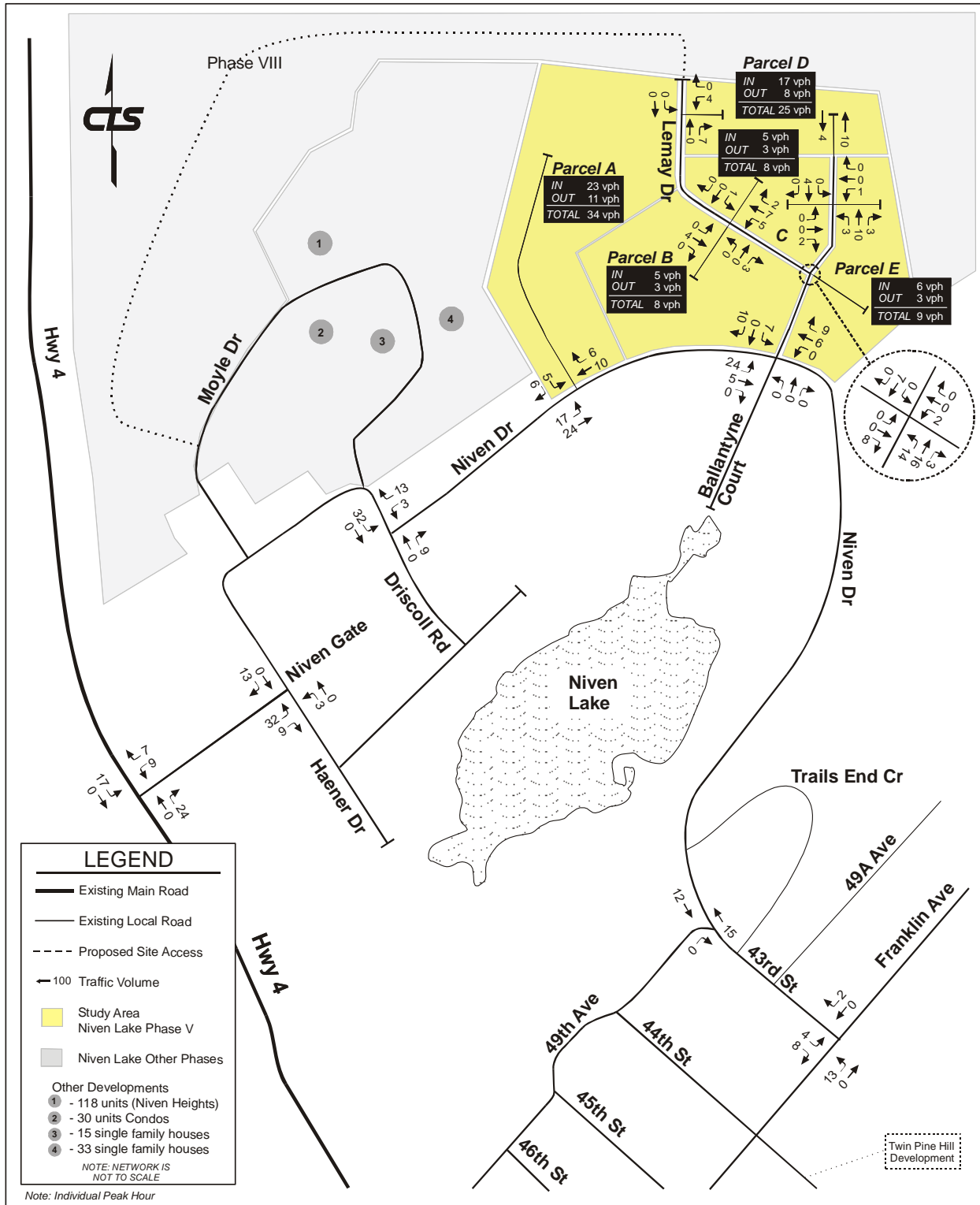


FIGURE 9
SITE TRAFFIC VOLUMES FOR THE WEEKDAY AFTERNOON PEAK HOUR



SECTION
5

TOTAL PROJECTED TRAFFIC VOLUMES

FIGURE 10 illustrates the total projected traffic for the year 2017 weekday morning peak hour consisting of both base and site traffic resulting from the proposed development. It is the result of superimposing **FIGURE 4** onto **FIGURE 8**.

FIGURE 11 illustrates the total projected traffic for the year 2017 weekday afternoon peak hour consisting of both base and site traffic resulting from the proposed development. It is the result of superimposing **FIGURE 5** onto **FIGURE 9**.

FIGURE 12 illustrates the total projected traffic for the year 2022 weekday morning peak hour consisting of both base and site traffic resulting from the proposed development. It is the result of superimposing **FIGURE 6** onto **FIGURE 8**.

FIGURE 13 illustrates the total projected traffic for the year 2022 weekday afternoon peak hour consisting of both base and site traffic resulting from the proposed development. It is the result of superimposing **FIGURE 7** onto **FIGURE 9**.

FIGURE 10
2017 MORNING PEAK HOUR BASE + SITE TRAFFIC VOLUMES

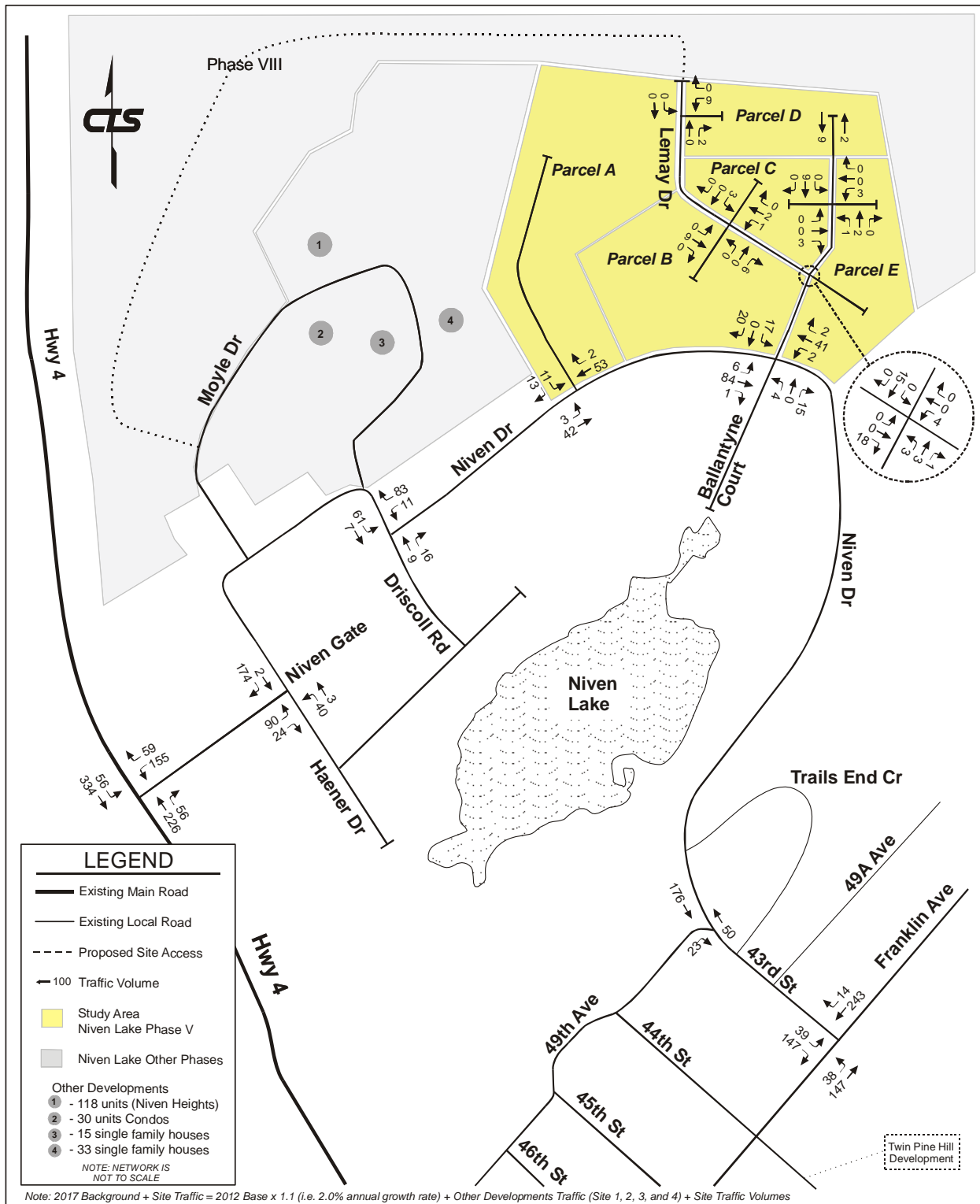


FIGURE 11
2017 AFTERNOON PEAK HOUR BASE + SITE TRAFFIC VOLUMES

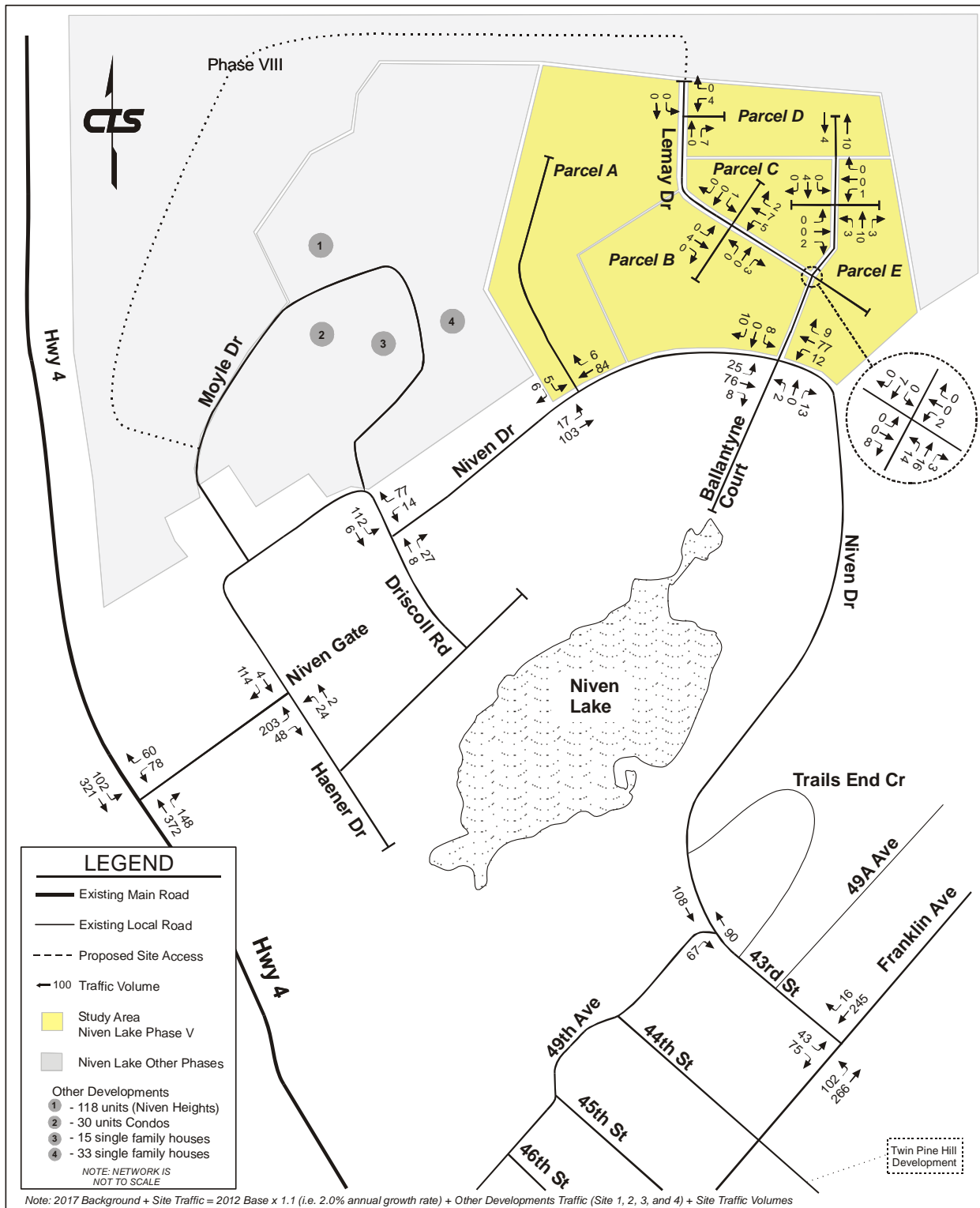


FIGURE 12
2022 MORNING PEAK HOUR BASE + SITE TRAFFIC VOLUMES

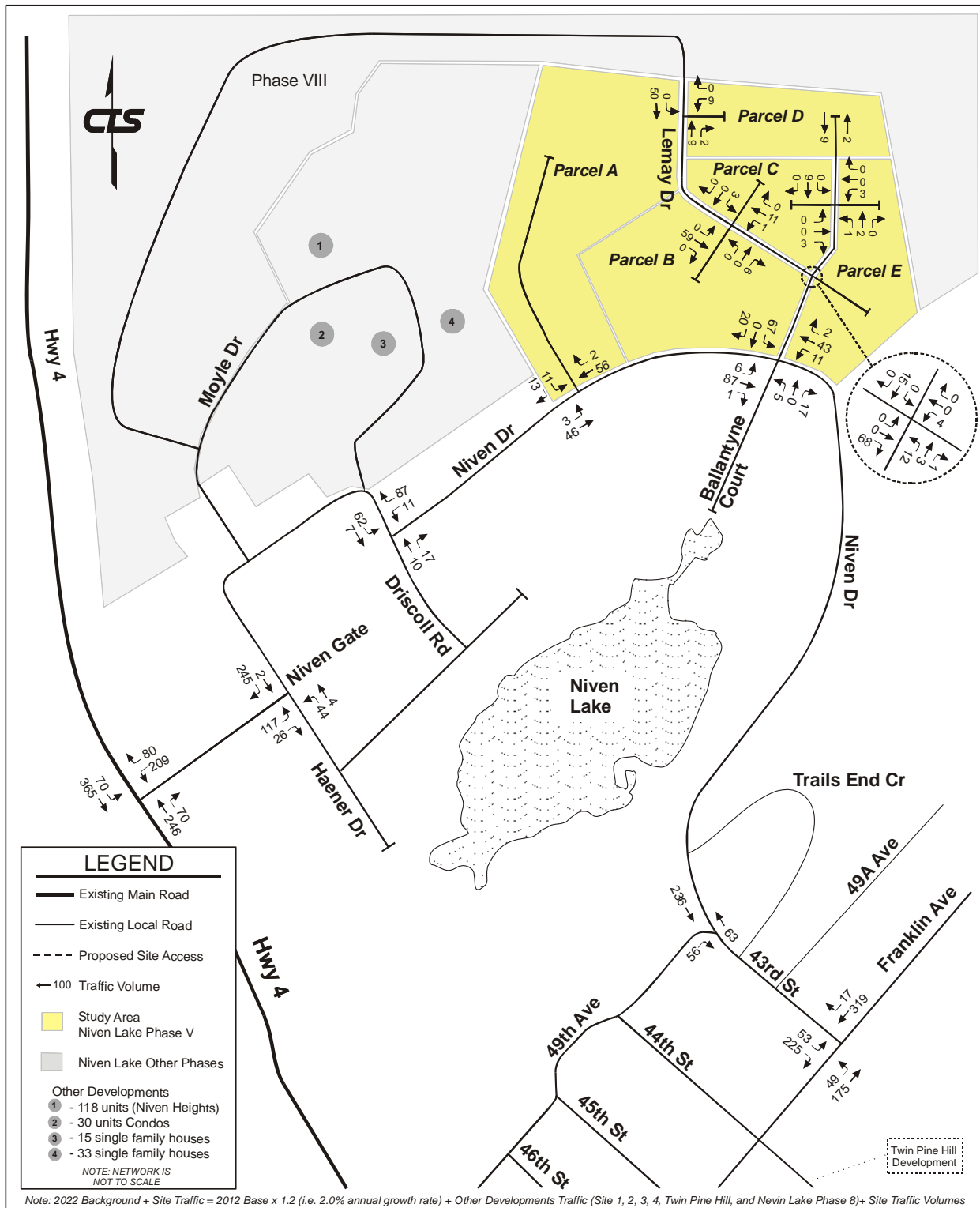
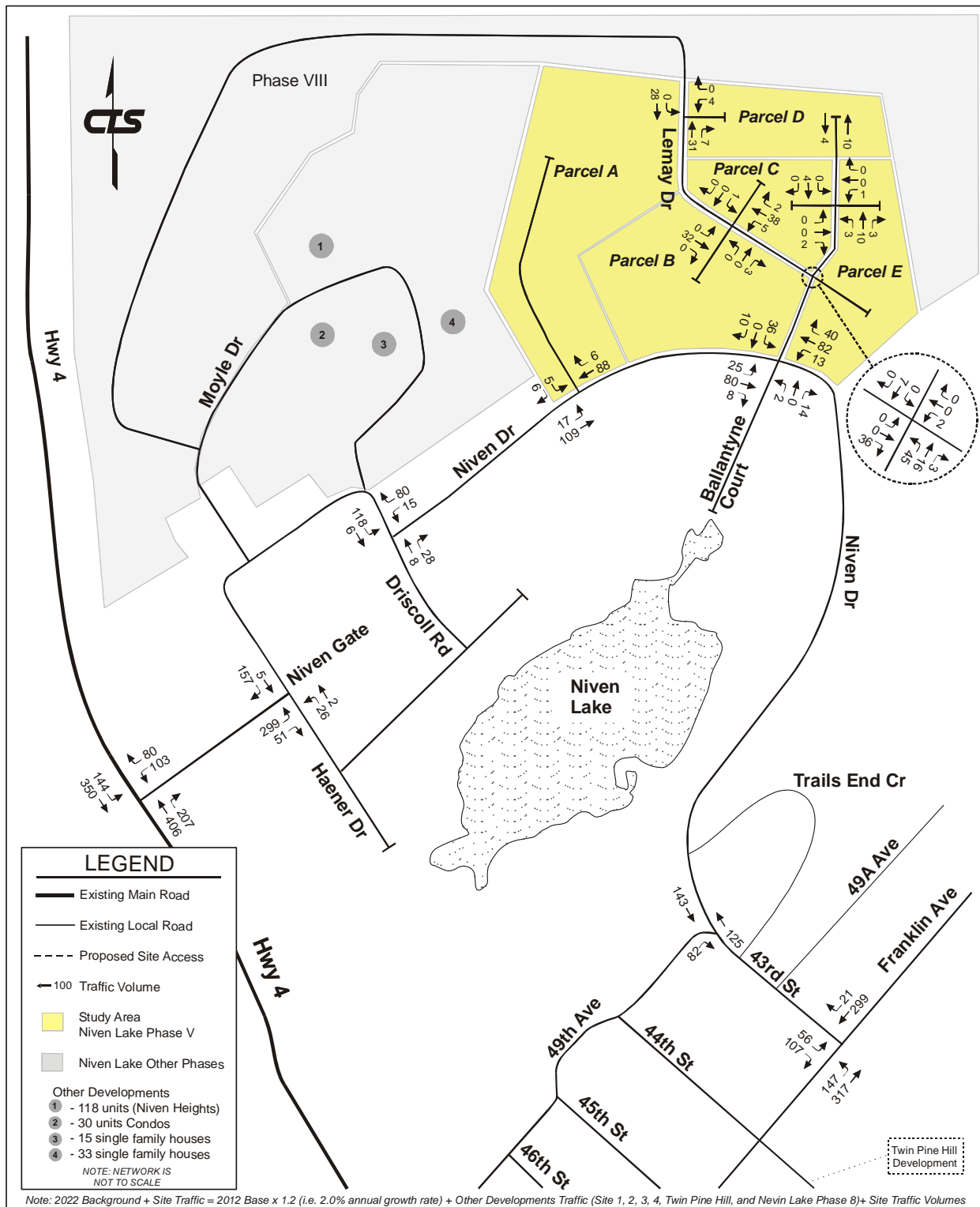


FIGURE 13
2022 AFTERNOON PEAK HOUR BASE + SITE TRAFFIC VOLUMES





TRAFFIC ENGINEERING ANALYSIS

6.1 Intersection Capacity Analysis

Capacity analysis was performed at each of the locations in order to determine the intersection levels of service (LOS) that is provided to motorists. LOS for intersections is defined in terms of delay (seconds per vehicle), which is a measure of driver discomfort and frustration, fuel consumption and lost travel time.

An intersection or movement LOS can range from "A" (which is excellent) to "E" (which is capacity). A LOS of "F" indicates that an intersection or movement capacity is failing because vehicle delays are excessive. A LOS of "D" during the critical peak hours is considered acceptable by many public agencies in large urban areas for overall intersection operation and a LOS of "E" or better is considered acceptable for left turn movements as it recognizes that the intersections normally perform much better the remaining 90% of the day. However, for a community like the City of Yellowknife where motorists typically have a lower level of tolerance to traffic congestion, a LOS of "C" or better during the critical peak hours is considered acceptable for overall intersection operation and a LOS of "D" or better is considered acceptable for left turn movements at signalized intersections.

The volume to capacity (v/c) ratio typically ranges from 0.25 to 1.20 with a v/c ratio of 1.0 indicating the movement, approach or intersection is at capacity.

Highway Capacity Software (HCS2010) was used for the unsignalized intersection analysis and Synchro (version 8) was used to analyze the signalized intersections. The following assumptions were made with respect to the intersection capacity analysis:

- Saturation flow rate = 1,800 passenger cars/hour of green time/lane (pcphgpl)
- Heavy vehicle percentage for roads = 2%
- Peak hour factor (PHF) = 0.65 for the morning and 0.78 for the afternoon which are the average PHF from the surveyed intersections.

TABLE 6 summarizes and compares the main performance parameters including the Level of Service and the delay per vehicle (in seconds) of the intersection capacity analysis for unsignalized intersections. Wherever necessary, attempts at improvements have been made to maintain intersection and approach movement level of service standards for each of the post-development scenarios. The capacity analysis worksheets are included in **APPENDIX D**.

**TABLE 6
VEHICLE DELAY BY INDIVIDUAL MOVEMENTS FOR UNSIGNALIZED INTERSECTIONS**

INTERSECTION	TIME OF DAY	SCENARIO	PERFORMANCE MEASURE	EASTBOUND			WESTBOUND			SOUTHBOUND			NORTHBOUND			LOS	NOTES
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Highway 4 (NB/SB) and Niven Gate (WB)	Weekday Morning Peak Hour	2012 Base	Volumes				88		34	37	304			205	38	A	Okay.
			Delay				16.9		16.9	7.9	7.9			0.0	0.0		
		2017 Base	Volumes				131		50	52	334			226	52	C	Okay. Westbound movements are over capacity
			Delay				76.6		76.6	8.4	8.4			0.0	0.0		
		2017 Base + Site	Volumes				155		59	56	334			226	56	E	Westbound movements are over capacity. Overall is approaching capacity
			Delay				133.2		133.2	8.5	8.5			0.0	0.0		
	2022 Base + Site	Volumes				209		80	70	365			246	70	F	Westbound movements are over capacity. Overall is over capacity	
		Delay				416.9		416.9	8.7	8.7			0.0	0.0			
	Weekday Afternoon Peak Hour	2012 Base	Volumes				49		38	54	292			338	78	A	Okay.
			Delay				21.1		21.1	8.8	8.8			0.0	0.0		
		2017 Base	Volumes				69		53	85	321			372	124	A	Okay. Westbound movements are approaching capacity
			Delay				31.2		31.2	9.3	9.3			0.0	0.0		
		2017 Base + Site	Volumes				78		60	102	321			372	148	A	Okay. Westbound movements are approaching capacity
			Delay				41.2		41.2	9.5	9.5			0.0	0.0		
	2022 Base + Site	Volumes				103		80	114	350			406	207	D	Westbound movements are over capacity. Overall is approaching capacity	
		Delay				170.6		170.6	10.6	10.6			0.0	0.0			
	Haener Drive (NB/SB) and Niven Gate (EB)	Weekday Morning Peak Hour	2012 Base	Volumes	56		19					3	89	33	3	A	Okay.
				Delay	7.9		7.9					7.2	7.2	7.8	7.8		
2017 Base			Volumes	85		21					2	145	36	3	A	Okay.	
			Delay	8.8		8.8					8.0	8.0	8.2	8.2			
2017 Base + Site			Volumes	90		24					2	174	40	4	A	Okay.	
			Delay	9.0		9.0					8.4	8.4	8.3	8.3			
2022 Base + Site		Volumes	117		26					2	245	44	4	A	Okay.		
		Delay	10.1		10.1					10.0	10.0	8.7	8.7				
Weekday Afternoon Peak Hour		2012 Base	Volumes	97		35					4	68	19	2	A	Okay.	
			Delay	8.0		8.0					7.0	7.0	7.6	7.6			
		2017 Base	Volumes	171		39					4	101	21	2	A	Okay.	
			Delay	9.4		9.4					7.7	7.7	8.1	8.1			
	2017 Base + Site	Volumes	203		48					4	114	24	2	A	Okay.		
		Delay	10.2		10.2					8.0	8.0	8.3	8.3				
2022 Base + Site	Volumes	299		51					5	157	26	2	B	Okay.			
	Delay	13.6		13.6					9.1	9.1	8.9	8.9					
Driscoll Road (NB/SB) and Niven Gate (WB)	Weekday Morning Peak Hour	2012 Base	Volumes				6		40	16	6			8	12	A	Okay.
			Delay				8.6		8.6	7.3	7.3			0.0	0.0		
		2017 Base	Volumes				7		54	56	7			9	13	A	Okay.
			Delay				8.9		8.9	7.4	7.4			0.0	0.0		
		2017 Base + Site	Volumes				11		83	61	7			9	16	A	Okay.
			Delay				9.2		9.2	7.4	7.4			0.0	0.0		
	2022 Base + Site	Volumes				11		87	62	7			10	17	A	Okay.	
		Delay				9.2		9.2	7.4	7.4			0.0	0.0			
	Weekday Afternoon Peak Hour	2012 Base	Volumes				10		37	54	5			7	16	A	Okay.
			Delay				9.1		9.1	7.4	7.4			0.0	0.0		
		2017 Base	Volumes				11		64	80	6			8	18	A	Okay.
			Delay				9.1		9.1	7.5	7.5			0.0	0.0		
		2017 Base + Site	Volumes				14		77	112	6			8	27	A	Okay.
			Delay				9.4		9.4	7.6	7.6			0.0	0.0		
2022 Base + Site		Volumes				15		80	116	6			8	28	A	Okay.	
		Delay				9.5		9.5	7.6	7.6			0.0	0.0			

Delay = Average Delay (seconds/vehicle)

Yellow background: Intersection approaching capacity (LOS 'D' or 'E'); ; or medium approach delays (25sec to <50sec)

Red background: Intersection equals or exceeds capacity (LOS 'F'); ; or high approach delays (>= 50sec)

TABLE 6 (con't)
VEHICLE DELAY BY INDIVIDUAL MOVEMENTS FOR UNSIGNALIZED INTERSECTIONS

INTERSECTION	TIME OF DAY	SCENARIO	PERFORMANCE MEASURE	EASTBOUND			WESTBOUND			SOUTHBOUND			NORTHBOUND			LOS	NOTES
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Ballantyne Court (NB/SB) and Niven Gate (EB/WB)	Weekday Morning Peak Hour	2012 Base	Volumes	1	32	1	2	26	0	0	0	0	4	0	14	A	Okay.
			Delay	7.3	7.3	7.3	7.3	7.3	7.3	0.0	0.0	0.0	8.7	8.7	8.7		
		2017 Base	Volumes	1	73	1	2	39	0	0	0	0	4	0	15	A	Okay.
			Delay	7.3	7.3	7.3	7.5	7.5	7.5	0.0	0.0	0.0	9.1	9.1	9.1		
		2017 Base + Site	Volumes	6	84	1	2	41	2	17	0	20	4	0	15	A	Okay.
			Delay	7.4	7.4	7.4	7.5	7.5	7.5	9.6	9.6	9.6	9.3	9.3	9.3		
		2022 Base + Site	Volumes	6	87	1	2	43	11	67	0	20	5	0	17	A	Okay.
			Delay	7.4	7.4	7.4	7.5	7.5	7.5	11.0	11.0	11.0	9.4	9.4	9.4		
	Weekday Afternoon Peak Hour	2012 Base	Volumes	1	45	7	11	44	0	1	0	0	2	0	12	A	Okay.
			Delay	7.4	7.4	7.4	7.4	7.4	7.4	10.0	10.0	10.0	8.9	8.9	8.9		
		2017 Base	Volumes	1	71	8	12	71	0	1	0	0	2	0	13	A	Okay.
			Delay	7.4	7.4	7.4	7.4	7.4	7.4	10.3	10.3	10.3	9.0	9.0	9.0		
		2017 Base + Site	Volumes	25	76	8	12	77	9	8	0	10	2	0	13	A	Okay.
			Delay	7.5	7.5	7.5	7.5	7.5	7.5	10.0	10.0	10.0	9.2	9.2	9.2		
		2022 Base + Site	Volumes	25	80	8	13	82	40	36	0	10	2	0	14	A	Okay.
			Delay	7.6	7.6	7.6	7.5	7.5	7.5	11.5	11.5	11.5	9.2	9.2	9.2		
49th Avenue (NB) and Niven Drive/43rd Street (EB/WB)	Weekday Morning Peak Hour	2012 Base	Volumes		100			33						21	A	Okay.	
			Delay		0.0			0.0									9.0
		2017 Base	Volumes		148			46							23	A	Okay.
			Delay		0.0			0.0							9.7		
		2017 Base + Site	Volumes		176			50							23	A	Okay.
			Delay		0.0			0.0							9.9		
		2022 Base + Site	Volumes		236			63							56	A	Okay.
			Delay		0.0			0.0							11.0		
	Weekday Afternoon Peak Hour	2012 Base	Volumes		68			47							61	A	Okay.
			Delay		0.0			0.0							9.1		
		2017 Base	Volumes		96			75							67	A	Okay.
			Delay		0.0			0.0							9.5		
		2017 Base + Site	Volumes		108			90							67	A	Okay.
			Delay		0.0			0.0							9.6		
		2022 Base + Site	Volumes		143			125							82	A	Okay.
			Delay		0.0			0.0							10.0		
Franklin Avenue (NB/SB) and 43rd Street (EB/WB)	Weekday Morning Peak Hour	2012 Base	Volumes	23		86					221	9	25	134	A	Okay.	
			Delay	12.1		12.1						0.0	0.0	8.0			8.0
		2017 Base	Volumes	33		125						243	13	35	147	A	Okay.
			Delay	16.6		16.6						0.0	0.0	8.3	8.3		
		2017 Base + Site	Volumes	39		147						243	14	38	147	A	Okay.
			Delay	18.6		18.6						0.0	0.0	8.4	8.4		
		2022 Base + Site	Volumes	53		225						319	17	49	175	C	Okay. Eastbound movements are over capacity
			Delay	58.5		58.5						0.0	0.0	8.8	8.8		
	Weekday Afternoon Peak Hour	2012 Base	Volumes	28		49					223	10	63	242	A	Okay.	
			Delay	12.4		12.4						0.0	0.0	8.0			8.0
		2017 Base	Volumes	39		67						245	14	89	266	A	Okay.
			Delay	17.0		17.0						0.0	0.0	8.4	8.4		
		2017 Base + Site	Volumes	43		75						245	16	102	226	A	Okay.
			Delay	17.4		17.4						0.0	0.0	8.4	8.4		
		2022 Base + Site	Volumes	56		107						299	21	147	317	B	Okay. Eastbound movements are approaching capacity
			Delay	34.5		34.5						0.0	0.0	8.9	8.9		

Delay = Average Delay (seconds/vehicle)

Yellow background: Intersection approaching capacity (LOS 'D' or 'E'); or medium approach delays (25sec to <50sec)

Red background: Intersection equals or exceeds capacity (LOS 'F'); or high approach delays (=> 50sec)

TABLE 6 (con't)
VEHICLE DELAY BY INDIVIDUAL MOVEMENTS FOR UNSIGNALIZED INTERSECTIONS

INTERSECTION	TIME OF DAY	SCENARIO	PERFORMANCE MEASURE	EASTBOUND			WESTBOUND			SOUTHBOUND			NORTHBOUND			LOS	NOTES
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Ballantyne Court (NB/SB) & Lemay Drive (EB,WB)	Weekday Morning Peak Hour	2017 Base + Site	Volumes	0	0	18	4	0	0	0	15	0	3	3	1	A	Okay.
			Delay	8.8	8.8	8.8	8.8	8.8	8.8	7.2	7.2	7.2	7.3	7.3	7.3		
	2022 Base + Site	Volumes	0	0	68	4	0	0	0	15	0	12	3	1	A	Okay.	
		Delay	9.4	9.4	9.4	9.3	9.3	9.3	7.3	7.3	7.3	7.4	7.4	7.4			
	Weekday Afternoon Peak Hour	2017 Base + Site	Volumes	0	0	8	2	0	0	0	7	0	14	16	3	A	Okay.
			Delay	9.0	9.0	9.0	8.9	8.9	8.9	7.3	7.3	7.3	7.3	7.3	7.3		
2022 Base + Site	Volumes	0	0	36	2	0	0	0	7	0	45	16	3	A	Okay.		
	Delay	9.4	9.4	9.4	9.4	9.4	9.4	7.3	7.3	7.3	7.3	7.3	7.3				
Parcel A Site Access (SB) & Niven Drive (EB,WB)	Weekday Morning Peak Hour	2017 Base + Site	Volumes	3	42			53	2	11		13			A	Okay.	
			Delay	7.4	7.4			0.0	0.0	9.1		9.1					
	2022 Base + Site	Volumes	3	46			56	2	11		13			A	Okay.		
		Delay	7.4	7.4			0.0	0.0	9.2		9.2						
	Weekday Afternoon Peak Hour	2017 Base + Site	Volumes	17	103			84	6	5		6			A	Okay.	
			Delay	7.5	7.5			0.0	0.0	9.5		9.5					
2022 Base + Site	Volumes	17	109			88	6	5		6			A	Okay.			
	Delay	7.5	7.5			0.0	0.0	9.6		9.6							
Parcel B/C Site Access (NB/SB) & Lemay Dr (EB,WB)	Weekday Morning Peak Hour	2017 Base + Site	Volumes	0	9	0	1	2	0	3	0	0	0	0	6	A	Okay.
			Delay	7.2	7.2	7.2	7.2	7.2	7.2	8.7	8.7	8.7	8.4	8.4	8.4		
	2022 Base + Site	Volumes	0	59	0	1	11	0	3	0	0	0	0	6	A	Okay.	
		Delay	7.2	7.2	7.2	7.4	7.4	7.4	9.2	9.2	9.2	8.8	8.8	8.8			
	Weekday Afternoon Peak Hour	2017 Base + Site	Volumes	0	4	0	5	7	2	1	0	0	0	0	3	A	Okay.
			Delay	7.2	7.2	7.2	7.2	7.2	7.2	8.7	8.7	8.7	8.3	8.3	8.3		
2022 Base + Site	Volumes	0	32	0	5	38	2	1	0	0	0	0	3	A	Okay.		
	Delay	7.3	7.3	7.3	7.3	7.3	7.3	9.1	9.1	9.1	8.5	8.5	8.5				
Lemay Drive (NB/SB) and Parcel D Site Access (WB)	Weekday Morning Peak Hour	2017 Base + Site	Volumes				9		0	0				0	2	A	Okay.
			Delay				8.6		8.6	7.2	7.2				0.0		
	2022 Base + Site	Volumes				9		0	0	50				9	2	A	Okay.
		Delay				9.0		9.0	7.2	7.2				0.0	0.0		
	Weekday Afternoon Peak Hour	2017 Base + Site	Volumes				4		0	0				0	7	A	Okay.
			Delay				8.6		8.6	7.2	7.2				0.0		
2022 Base + Site	Volumes				4		0	0	28				31	7	A	Okay.	
	Delay				8.9		8.9	7.3	7.3				0.0	0.0			
Ballantyne Court (NB/SB) and Parcel C/E Site Access (EB/WB)	Weekday Morning Peak Hour	2017 Base + Site	Volumes	0	0	3	3	0	0	0	9	0	1	2	0	A	Okay.
			Delay	8.4	8.4	8.4	8.7	8.7	8.7	7.2	7.2	7.2	7.2	7.2	7.2		
	2022 Base + Site	Volumes	0	0	3	3	0	0	0	9	0	1	2	0	A	Okay.	
		Delay	8.4	8.4	8.4	8.7	8.7	8.7	7.2	7.2	7.2	7.2	7.2	7.2			
	Weekday Afternoon Peak Hour	2017 Base + Site	Volumes	0	0	2	1	0	0	0	4	0	3	10	3	A	Okay.
			Delay	8.3	8.3	8.3	8.7	8.7	8.7	7.2	7.2	7.2	7.2	7.2	7.2		
2022 Base + Site	Volumes	0	0	2	1	0	0	0	4	0	3	10	3	A	Okay.		
	Delay	8.3	8.3	8.3	8.7	8.7	8.7	7.2	7.2	7.2	7.2	7.2	7.2				

Delay = Average Delay (seconds/vehicle)

Yellow Intersection approaching capacity (LOS 'D' or 'E'); ; or medium approach delays (25sec to <50sec)

Red Intersection equals or exceeds capacity (LOS 'F'); ; or high approach delays (>= 50sec)

From **TABLE 6**, the following observations can be made:

1. Highway 4 (NS) & Niven Gate (EW)

- The intersection currently operates at LOS A (excellent) during the morning and the afternoon peak hours. By the year 2017 under base conditions and with other development traffic condition, the overall level of service is projected to decrease LOS C (fair) during the morning peak hour and to remain unchanged for the afternoon peak hour. During the weekday morning peak, westbound traffic on Niven Gate trying to enter Highway 4 is over capacity due to the higher traffic volumes on Highway 4 and the fact that Niven Gate is stop sign controlled.
- With the additional site traffic in 2017 base condition, it does not result in a change as the overall LOS remains at A (excellent) during the weekday afternoon peak hour. However, the overall LOS decreases to E (approaching capacity) during the weekday morning peak hour. Westbound approach on Niven Gate is over capacity during the morning peak and approaching capacity during the afternoon peak under stop sign traffic control.
- Addition of the site traffic to the base 2022 volumes changes the overall LOS to F (failing) during the morning peak hour and D (poor) during the afternoon peak hour. Of note, the westbound approach on Niven Gate is over capacity in the both morning and afternoon peak under stop sign traffic control. Widening this approach to provide for separate left and right turn lanes will reduce approach delays on Niven Gate. **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.
- It is recommended that the Northwest Territories Department of Transportation monitor this intersection and add separate westbound left and right turn lanes on Niven Gate when warranted.

2. Haener Drive (NS) & Niven Gate (EW)

- The intersection operates at an overall LOS A (excellent) under existing conditions and no operational problems were noted. By the year 2017 under base conditions and with other developments traffic, the overall level of service is projected to remain at LOS A (excellent) during the morning and afternoon peak hours.
- Addition of site traffic to the base 2017 volumes does not result in a change as the overall LOS remains at A (excellent) during the morning and afternoon peak hours. For the year 2022 (i.e. 5 years post buildout), the overall intersection is projected to remain at LOS A (excellent) during the morning peak and at LOS B (good) during the afternoon peak.

- Therefore, no operational and/or capital improvements are recommended for this intersection.

3. Driscoll Road (NS) & Niven Drive (EW)

- The intersection operates at an overall LOS A (excellent) under existing conditions and no operational problems were noted. By the year 2017 under base conditions and with other developments traffic, the overall level of service is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.
- Addition of the site traffic to the base 2017 volumes does not result in a change as the overall LOS remains at A (excellent) during the morning and afternoon peak hour. For the year 2022 (i.e. 5 years post buildout), the overall intersection is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.
- No operational and/or geometrical improvements are recommended at this location.

4. Ballantyne Court (NS) & Niven Drive (EW)

- The intersection currently operates at an overall LOS A (excellent) under existing conditions and no operational problems were noted. By the year 2017 under base conditions and with other developments traffic, the overall level of service is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.
- Addition of the site traffic to the base 2017 volumes does not result in a change as the overall LOS remains at A (excellent) during the morning and afternoon peak hour. For the year 2022 (i.e. 5 years post buildout), the overall intersection is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.
- No operational and/or geometrical improvements are recommended at this location.

5. 49th Avenue (NS) & Niven Drive / 43rd Street (EW)

- The intersection currently operates at an overall LOS A (excellent) under existing conditions and no operational problems were noted. By the year 2017 under base conditions and with other developments traffic, the overall level of service is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.
- Addition of the site traffic to the base 2017 volumes does not result in a change as the overall LOS remains at A (excellent) during the morning and afternoon peak hour. For the year 2022 (i.e. 5 years post buildout),

the overall intersection is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.

- No operational and/or geometrical improvements are recommended at this location.

6. Franklin Avenue (NS) & 43rd Street (EW)

- The intersection currently operates at an overall LOS A (excellent) under existing conditions during the weekday morning and afternoon peak hours and no operational issues were noted in the capacity analysis. By the year 2017 under base conditions and with other developments traffic, the overall level of service is projected to remain at LOS A (excellent) during the morning and afternoon peak hour.
- Addition of site traffic to the base 2017 volumes does not result in a change as the overall LOS remains at A (excellent) during the morning and afternoon peak hours.
- For the year 2022, the addition of site traffic to the base traffic volumes decreases the LOS from A (excellent) to C (poor) during the morning peak and from A (excellent) to C (good) during the afternoon peak. Of note, the west approach (for eastbound traffic) on 43rd Street will be over the capacity for the morning peak and approaching the capacity for the afternoon peak. Restriping this approach to provide for separate left and right turn lanes will increase the capacity of this approach when warranted. **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.
- It is recommended that the City of Yellowknife monitor traffic volumes at the intersection of Franklin Avenue & 43rd Street to determine when restriping of the east approach is required to provide for separate left and right turn lanes on 43rd Street.

7. Ballantyne Court (NS) & Lemay Drive / Parcel E Site Access (EW)

- This is the proposed new site access for the Parcel E. The proposed stop sign controls are in the north approach and east approach. The intersection is forecast to operate at an overall LOS A (excellent) for 2017 base + site and 2022 base + site traffic volumes and no capacity problems were identified requiring mitigation.
- **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.

8. Parcel A Site Access (NS) & Niven Drive (EW)

- This is the proposed new site access for the Parcel A development to service the condominiums. The intersection is forecast to operate at an

overall LOS A (excellent) for 2017 base + site and 2022 base + site traffic volumes and no capacity problems were identified requiring mitigation.

- **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.

9. Parcel B/C Site Access (NS) & Lemay Drive (EW)

- This is the proposed new site access for the Parcel B and Parcel C developments to service the condominiums. The intersection is forecast to operate at an overall LOS A (excellent) for 2017 base + site and 2022 base + site traffic volumes and no capacity problems were identified requiring mitigation.
- **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.

10. Lemay Drive (NS) & Parcel D Site Access (EW)

- This is the proposed new site access for the Parcel D development to service the condominiums. The intersection is forecast to operate at an overall LOS A (excellent) for 2017 base + site and 2022 base + site traffic volumes and no capacity problems were identified requiring mitigation.
- **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.

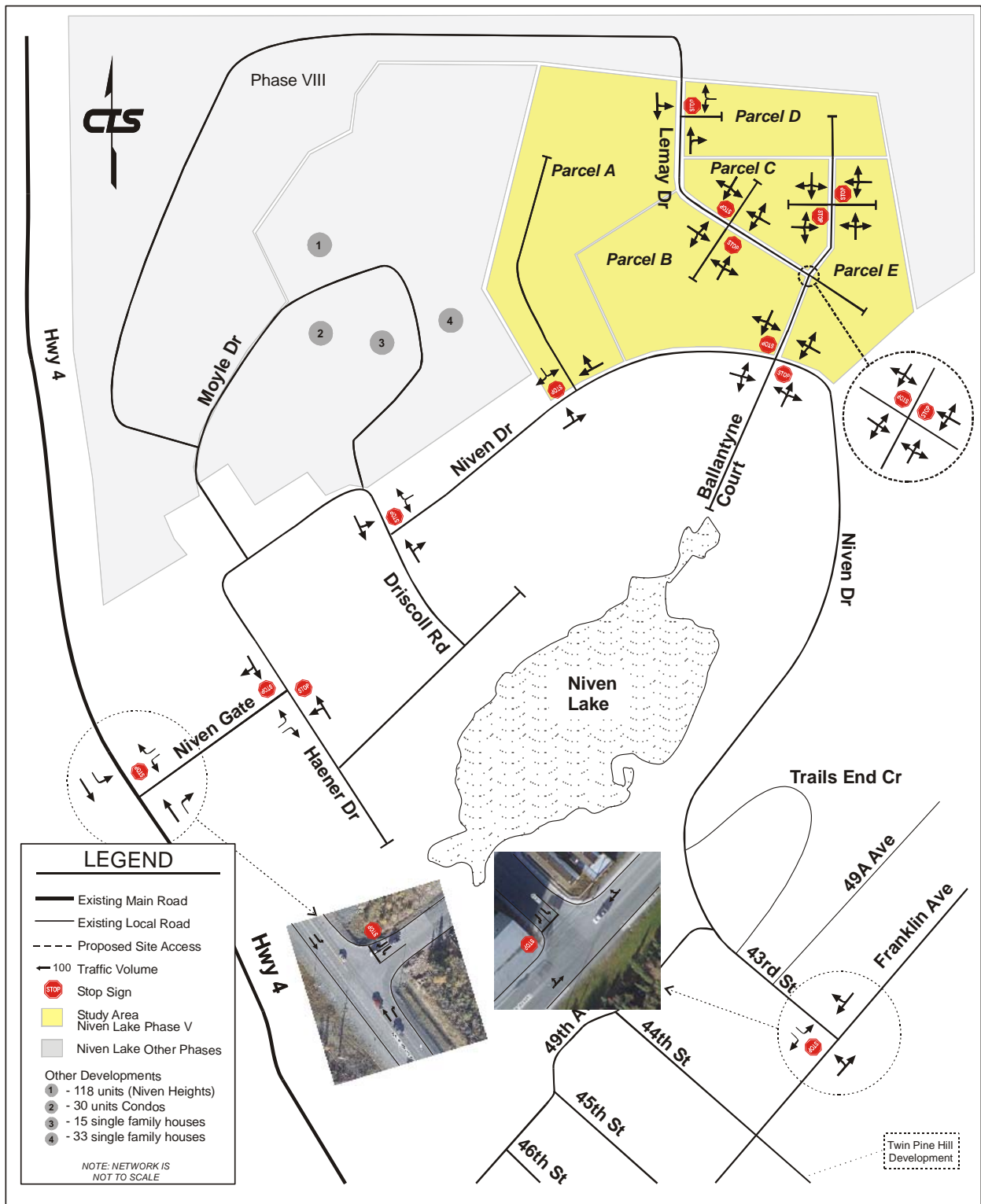
11. Ballantyne Court (NS) & Parcel C/E Site Access (EW)

- This is the proposed new site access for the Parcel C and Parcel E development to service the condominiums. The intersection is forecast to operate at an overall LOS A (excellent) for 2017 base + site and 2022 base + site traffic volumes and no capacity problems were identified requiring mitigation.
- **FIGURE 14** illustrates the recommended laning configuration and traffic control for this intersection.

6.2 Intersection Laning

Based on the results of the intersection and access capacity analysis, the recommended intersection / access laning and traffic control for the year 2022 was developed and these are illustrated in **FIGURE 14**.

**FIGURE 14
RECOMMENDED LANING CONFIGURATION FOR FULL BUILDOUT**



6.3 Pavement Marking and Signage Plan

A conceptual pavement marking and signage plan for Parcel E site was subsequently prepared and this is illustrated in **FIGURE 15**.

6.4 Truck Access and Circulation Plan

FIGURE 16 illustrates the recommended truck access and circulation plan for Parcel E site. The design truck selected is Heavy Single Unit (HSU) truck with 2 rear axles which replicates the vehicle path of the typical garbage truck emptying large bins. From the analysis, it was determined that both accesses are wide enough and the design vehicle can enter, exist, and maneuver on site.

6.5 Emergency Vehicle Access and Circulation Plan

FIGURE 17 illustrates the recommended emergency vehicle access and circulation plan for Parcel E site. The design truck is a Yellowknife fire truck that is 38 feet long and which was measured at Fire Hall #1. From the analysis, it was determined that both accesses are wide enough and the design vehicle can enter, exist, and maneuver on site.

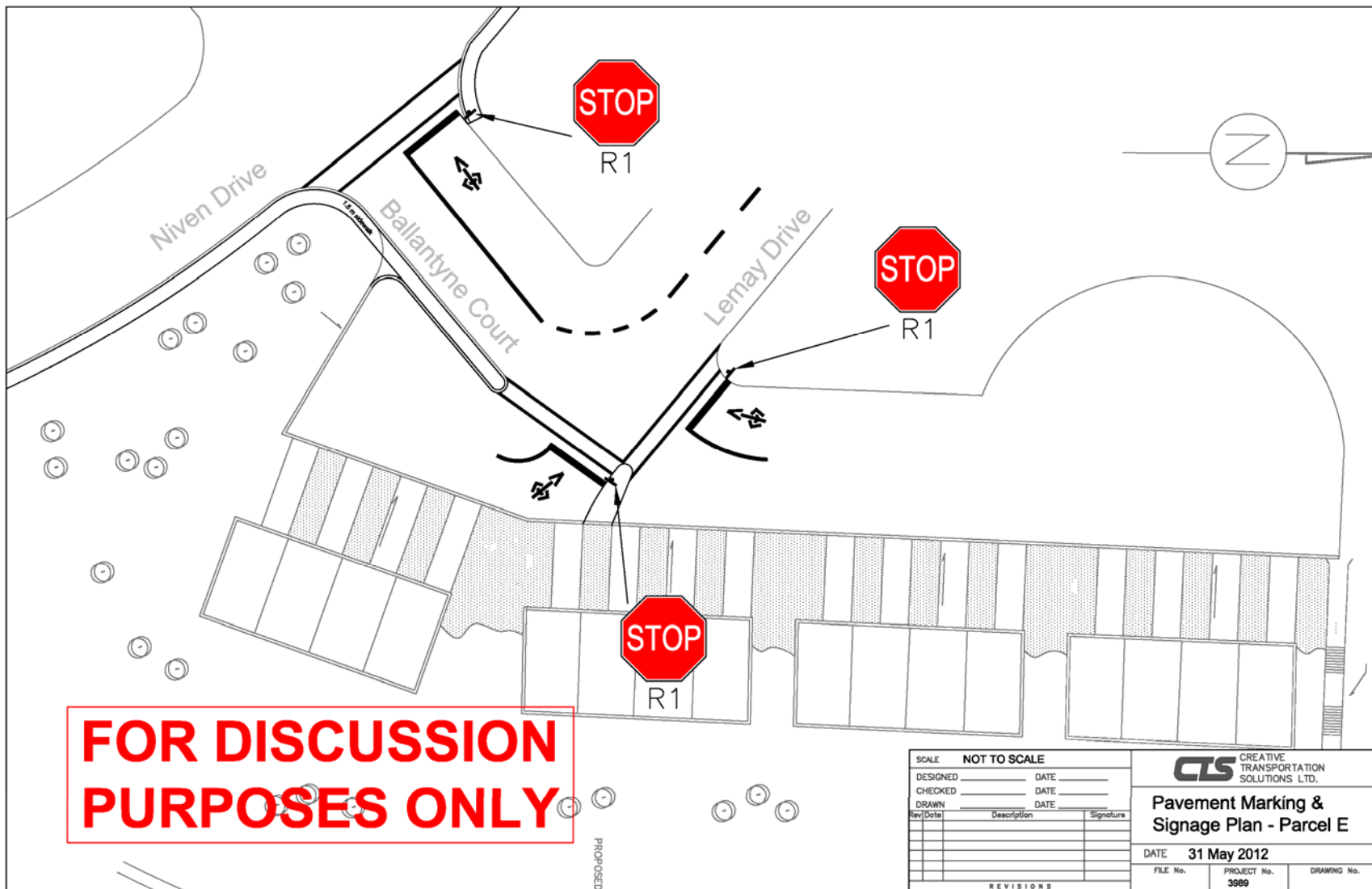
6.6 Pedestrian Circulation Plan

FIGURE 18 illustrates the recommended pedestrian circulation plan for Parcel E site.

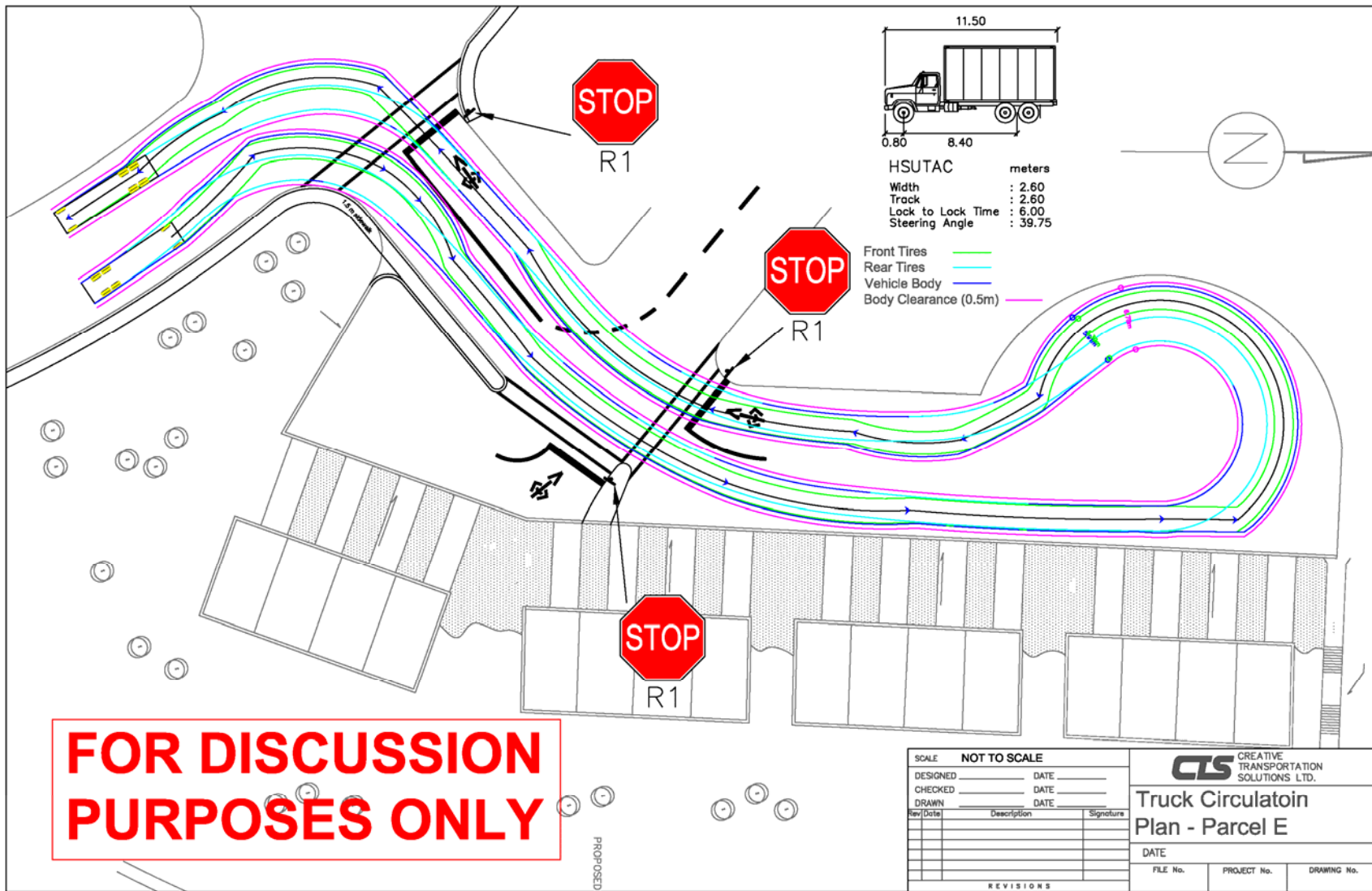
6.7 Bicycle Circulation Plan

FIGURE 19 illustrates the recommended bicycle circulation plan for Parcel E site. It is assumed that cyclists will share the internal roads with motor vehicles.

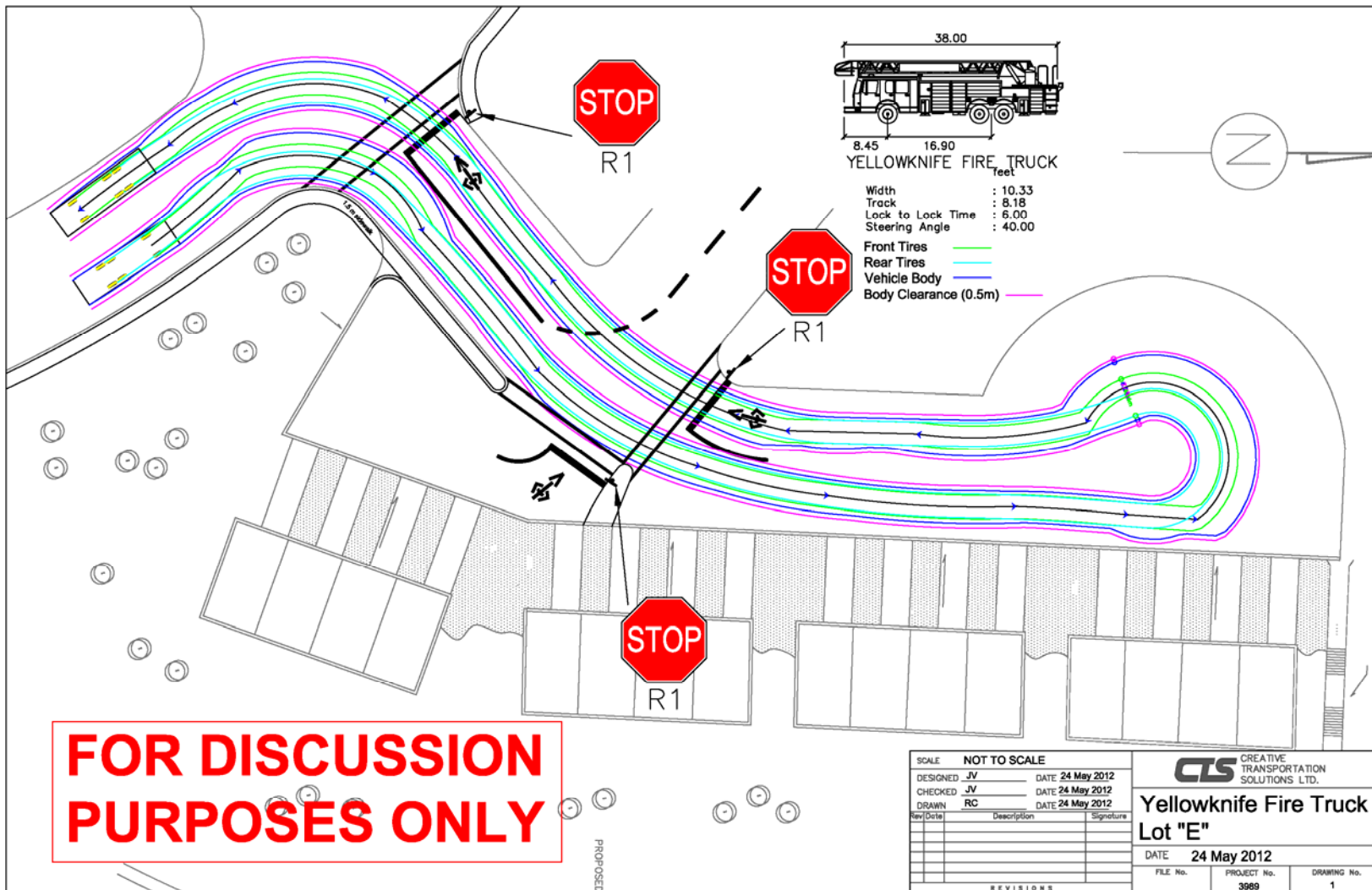
**FIGURE 15
PAVEMENT MARKING AND SIGNAGE PLAN – PARCEL E**



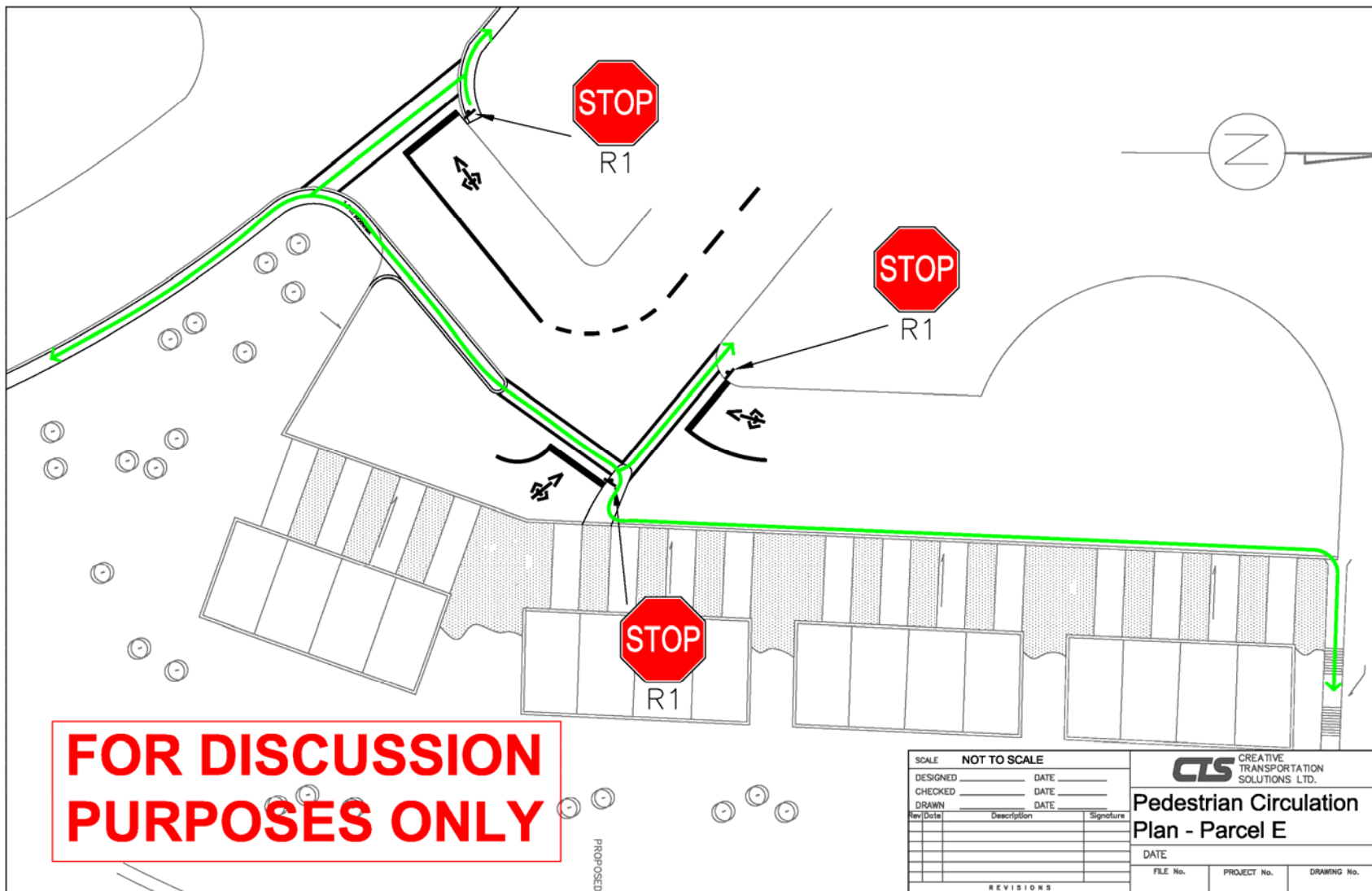
**FIGURE 16
TRUCK ACCESS AND CIRCULATION PLAN – PARCEL E**



**FIGURE 17
EMERGENCY VEHICLE ACCESS CIRCULATION PLAN – PARCEL E**



**FIGURE 18
PEDESTRIAN CIRCULATION PLAN – PARCEL E**



SCALE NOT TO SCALE		
DESIGNED _____	DATE _____	
CHECKED _____	DATE _____	
DRAWN _____	DATE _____	
No. / Date	Description	Signature
REVISIONS		

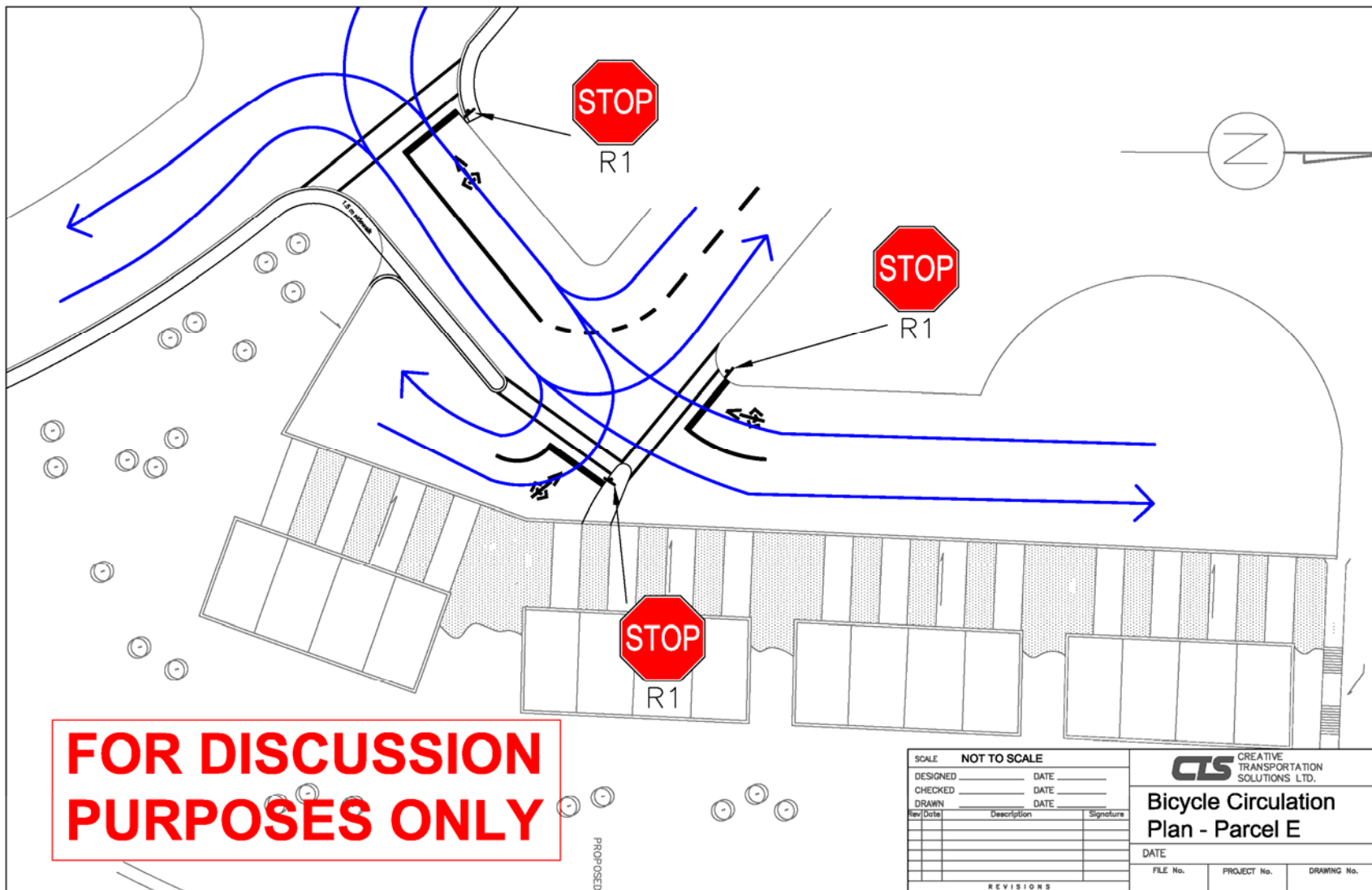
CTS CREATIVE TRANSPORTATION SOLUTIONS LTD.

Pedestrian Circulation Plan - Parcel E

DATE _____

FILE No. _____	PROJECT No. _____	DRAWING No. _____
----------------	-------------------	-------------------

**FIGURE 19
BICYCLE CIRCULATION PLAN – PARCEL E**



SECTION
7**CONCLUSIONS & RECOMMENDATIONS****7.1 Conclusions**

- 1) Creative Transportation Solutions Ltd. (CTS) was retained by the City of Yellowknife. on 23 April 2012 to conduct a traffic impact study of a proposed residential development known as Niven Lake Phase V near Niven Lake in Yellowknife. Currently, there are five proposed parcel sites for the Phase V development, which is proposed to consist of up to 156 residential dwelling units in total comprised of Parcel A (64 units), Parcel B (14 units), Parcel C (14 units), Parcel D (48 units), and Parcel E (16 units). For the purposes of this study, it was assumed that all five parcels would be constructed and fully occupied by the year 2017.
- 2) A Scope Development Meeting with City of Yellowknife officials was held from Tuesday, 1 May 2012 to Thursday, 3 May 2012 to discuss and confirm the study parameters for this project. As well, CTS staff conducted a detailed site visit and collected traffic volume data to document existing conditions.
- 3) The five parcels combined are estimated to generate a total of 73 vehicle trips during the weekday morning in peak hour (i.e. 12 inbound and 61 outbound) and 84 vehicle trips during the weekday afternoon in peak hour (i.e. 53 inbound and 28 outbound). This is equivalent to an average of 1.4 vehicle movements per minute during the busier afternoon peak hour, which from a traffic engineering point of view is not considered significant.
- 4) The traffic impact assessment determined that by the year 2022 (i.e. 5 years post buildout), separate left and right turning lanes will be warranted on Niven Gate at Highway 4. As well, the west approach of the intersection of Franklin Avenue & 43rd Street will need to be restriped to provide for separate eastbound left and right turn lanes by the year 2022.

7.2 Recommendations

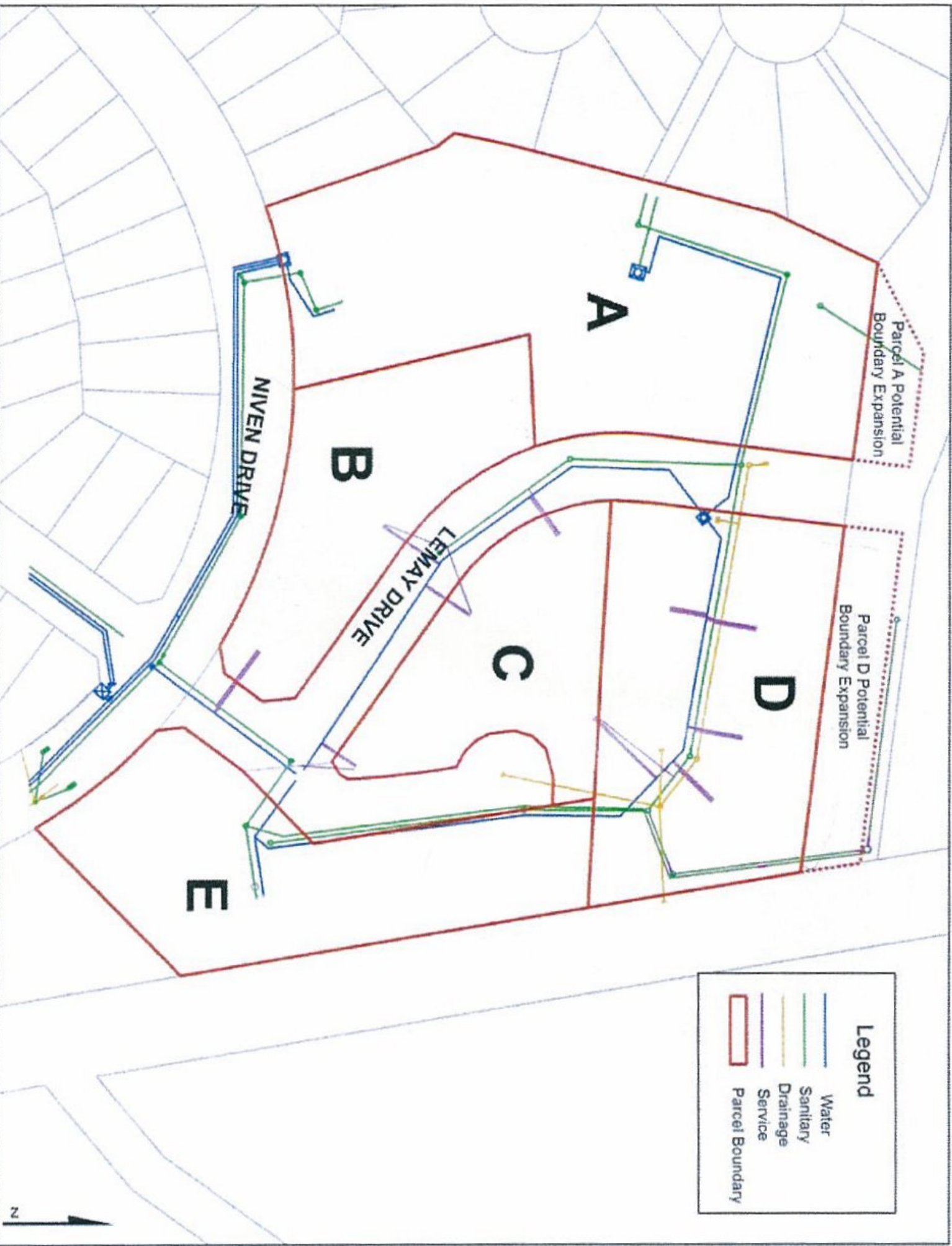
Based on the findings of this study, the following is recommended:

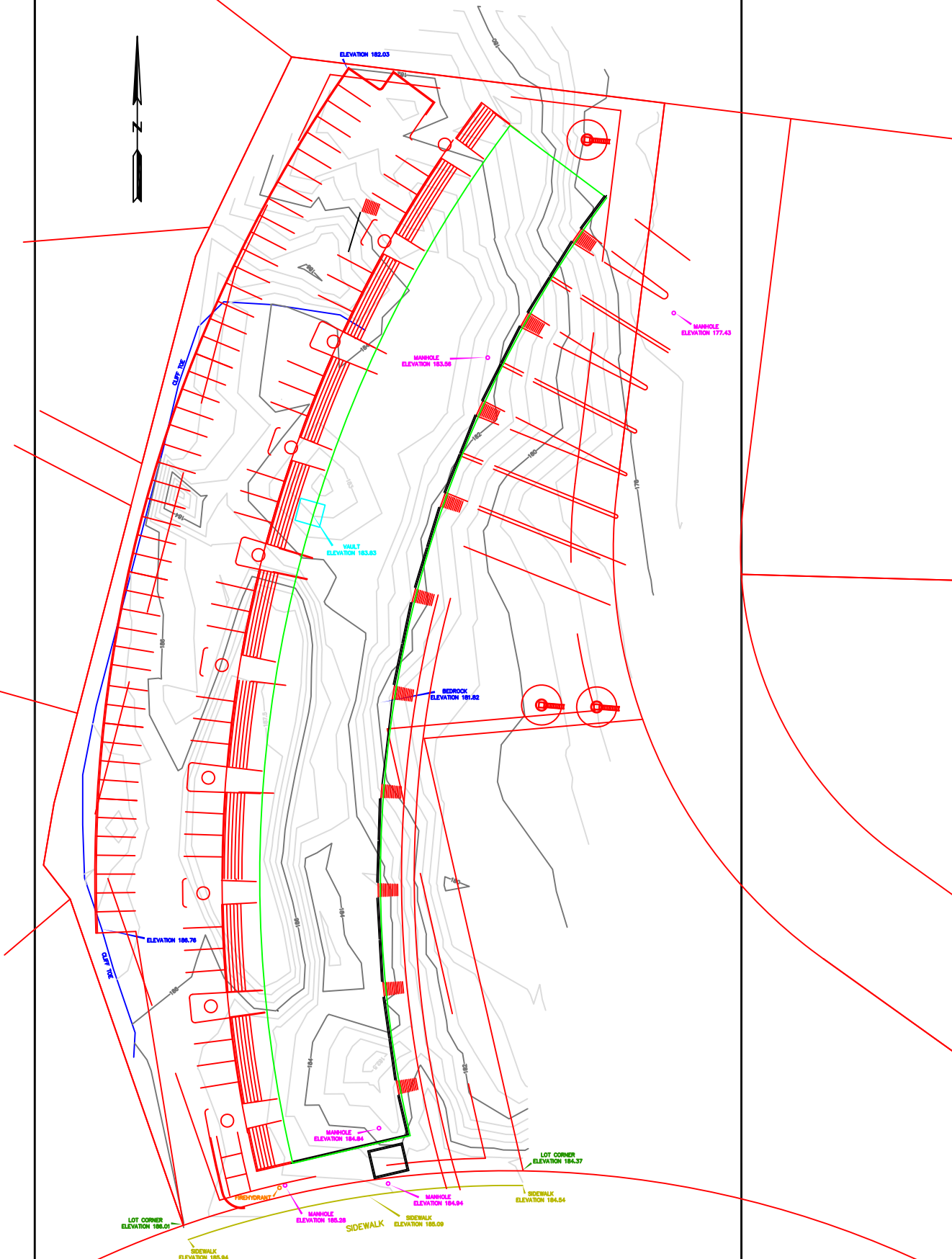
- 1) That City of Yellowknife monitor traffic volumes at the intersection of Franklin Avenue & 43rd Street to determine when restriping of the east approach is required to provide for separate left and right turn lanes on 43rd Street.
- 2) That the Northwest Territorial Department of Transportation and the City of Yellowknife monitor the intersection of Highway 4 & Niven Gate to determine when Niven Gate should be widened to provide for separate westbound left and right turn lanes.

APPENDIX A

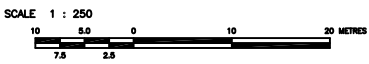
Site Plan

Figure 4 – Existing and Proposed Niven Phase V Servicing



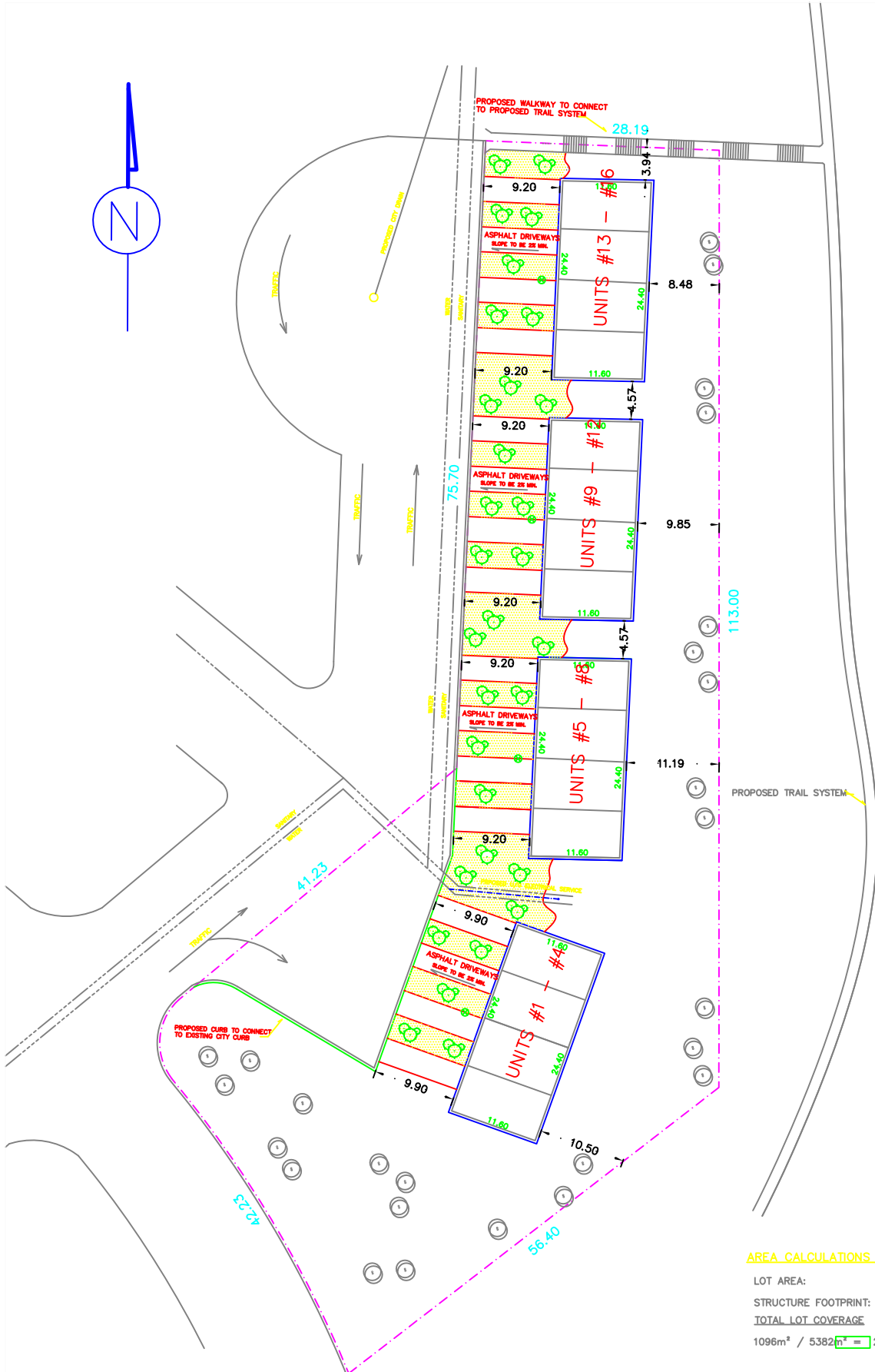


TOPOGRAPHIC SURVEY OF
PART OF LOT 39, BLOCK 308
YELLOWKNIFE, NORTHWEST TERRITORIES
DATE OF SURVEY - APRIL 30, 2012



NOTE: -CONTOUR INTERVAL IS 0.50 METRES.




OLLERHEAD & ASSOCIATES LTD.
CANADA LANDS SURVEYORS
AND ENGINEERS
BOX 1148
YELLOWKNIFE, NT
X1A 5W5
PH: (867)873-8880
FAX: (867)868-8334
PROJECT NUMBER: 12-18-GA



AREA CALCULATIONS FOR LOT "E" :

LOT AREA:	5382.00m ²
STRUCTURE FOOTPRINT:	1096.m ²
TOTAL LOT COVERAGE	
1096m ² / 5382m ² =	20.40%

PLAN LEGEND

-  PROPOSED SHRUB (CLIMATE HARDY)
-  EXISTING TREES TO REMAIN
-  EXISTING LAMP TO BE RELOCATED

LOT "E" SITE PLAN
SCALE : NOT TO SCALE

APPENDIX B

Scope Development Meeting

TERMS OF REFERENCE (1 May 2012)

Niven Lake Phase V Traffic Impact Study Yellowknife, NT

A Confirm study area limits and list of intersections to analyse

Study area to encompass all roads immediately adjacent to the development. The intersections to analyse are as follows:

- Niven Drive & Lemay Drive / Ballantyne Court
- Niven Drive & 49th Avenue / 43rd Street
- Franklin Avenue & 43rd Street
- Niven Drive & Driscoll Road
- Niven Gate & Haener Drive
- Highway 4 & Niven Gate
- All site accesses

B Confirm the existing and future base road network in study area

There are no known geometrical and/or operational changes (e.g. new traffic signal, new left turn bay, etc.) scheduled by the City of Yellowknife that would either improve network capacity and/or redirect base traffic volumes in the study area. Therefore, CTS to use the existing network for both current and future base conditions.

C Obtain relevant background material

City of Yellowknife to confirm density to be used by CTS for each parcel (tentatively: Parcel A = 64 units, Parcel B = 14 units, Parcel C = 14 units, Parcel D = 48 units and Parcel E = 16 units)

City of Yellowknife / Property owners to forward to CTS a copy of the most recent site plan for each parcel (if available).

D Confirm any anticipated future developments within study horizon that are above and beyond what can be assumed to be built into an annual traffic volume growth rate.

CTS to include traffic from the following anticipated developments as they will add background traffic to the road network:

- Niven Heights (from recent CTS traffic impact study)
- Twin Pine Hill development (from recent CTS study)
- Phase 7 for year 2017
- Phase 8 for year 2022

E Confirm design peak hour for analysis

CTS to examine the weekday morning and afternoon commuter peak hours for the impact assessment.

F Confirm horizon years for analysis

CTS to examine the following years:

1. 2012 (i.e. existing base) →
2. 2017 (future base)
3. 2017 (future base+ traffic from full development of site)
4. 2022 (i.e. 5 years post buildout)

G Confirm traffic volume growth rate

CTS to use 2.0% per year (simple straight line) to factor up existing base volumes to future horizon years (*NOTE: This is identical to the growth rate used by CTS on previous traffic impact studies in Yellowknife.*)

H Confirm traffic projection methodology

CTS to use current accepted traffic engineering practices for traffic projections and to document any assumptions in the report.

I Confirm trip generation methodology

CTS to use Institute of Transportation Engineers (ITE) vehicle trip generation rates (8th edition) to estimate site traffic volumes as would represent the “worst case scenario” for the impact assessment.

J Confirm trip distribution and traffic assignment parameters

CTS to use existing travel patterns in the study area to develop trip distribution and traffic assignment parameters.

K Confirm traffic engineering methodology for analysis

CTS to use latest Highway Capacity Manual methodologies for all intersection capacity analysis. (HCS software for unsignalized intersections and Synchro for signalized intersections).

L Confirm engineering standards to be adhered to

CTS to use City of Yellowknife standards for municipal roadways and NWT standards (likely TAC) for Highway 4

M Confirm traffic impact study report format

CTS to submit the final report in a bound letter report format with appendices.

N Confirm number of report copies required

- City of Yellowknife (1 bound copy + 1 full digital in pdf format, both with NAPEG seal)
- Property owners (1 bound copy per parcel → 5 total = pdf)

O Confirm no other issues to be analysed in study

1. CTS to include a table of contents and executive summary to the report
2. CTS to add PDF tabs in table of contents
3. CTS to include the following drawings in the final report:
 - Recommended pavement marking and signage plan for site;
 - Recommended circulation plans (4) for garbage trucks, emergency vehicles, pedestrians and bicycles entering and exiting the site.
4. CTS to circulate draft report to staff before issuing the final (and sealed) report.

DRAFT

APPENDIX C

Traffic Movement Count Summary Sheets



Vehicle Classification Summary

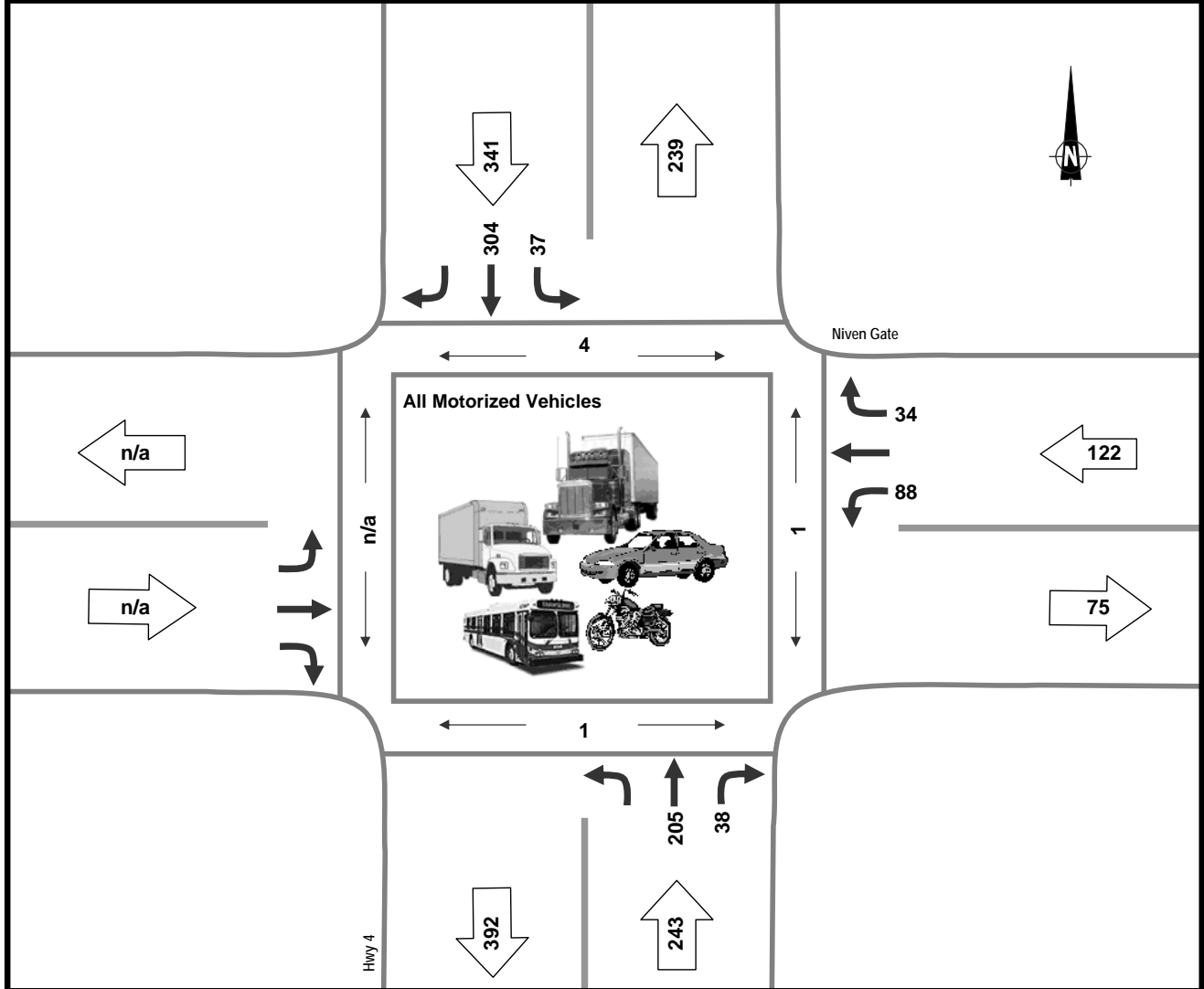
Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny

Time Period	Entering Intersection	Vehicle Classification				Total
		Passenger Cars	Heavy Trucks			
Morning (07:00 - 09:00)	Volume	1,037	7			1,044
	%	99.3%	0.7%			100.0%
Afternoon (16:00 - 18:00)	Volume	1,423	2			1,425
	%	99.9%	0.1%			100.0%
Total (4 Hours)	Volume	2,460	9			2,469
	%	99.6%	0.4%			100.0%

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: All Motorized Vehicles

Morning Peak Period

Peak Hour Traffic by Movement 7:45 AM to 8:45 AM

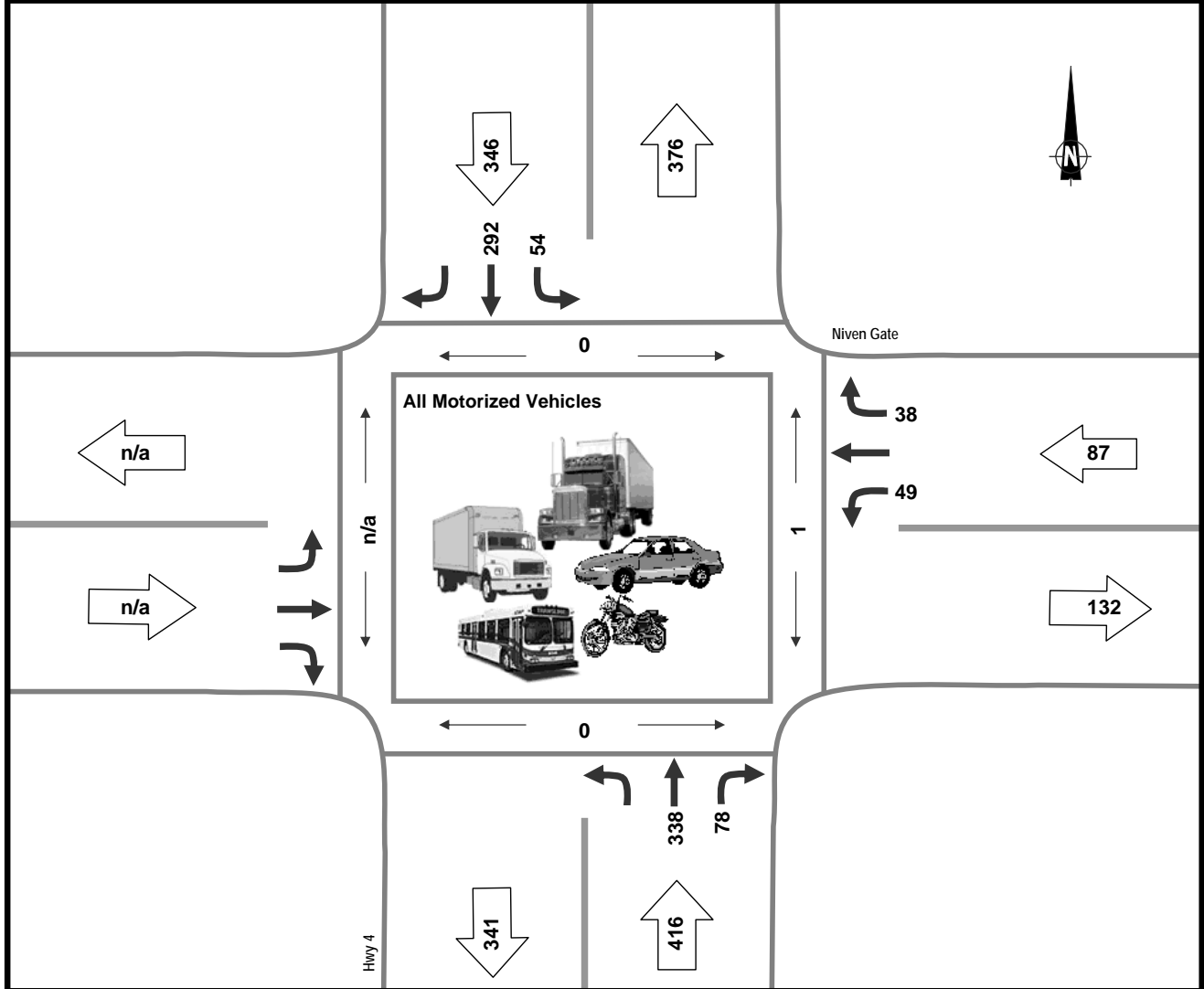


Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	37	304			205	38				88		34	4	1		1	706
PH Factor	0.84	0.72			0.75	0.43				0.82		0.57	0.25	0.25		0.25	0.82
Peak 15 X 4	44	424			272	88				108		60	16	4		4	856
Average Hour	22	214			168	27				59		34	2	1		1	522
Survey Total	43	428			335	53				118		67	4	1		2	1,044
7:00	0	11			18	1				3		4	0	0		0	37
7:15	3	24			22	3				2		5	0	0		1	59
7:30	3	37			42	3				10		13	0	0		0	108
7:45	11	41			61	22				27		15	0	0		0	177
8:00	10	94			39	2				26		9	4	1		0	180
8:15	9	106			68	2				23		6	0	0		1	214
8:30	7	63			37	12				12		4	0	0		0	135
8:45	0	52			48	8				15		11	0	0		0	134

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: All Motorized Vehicles

Afternoon Peak Period

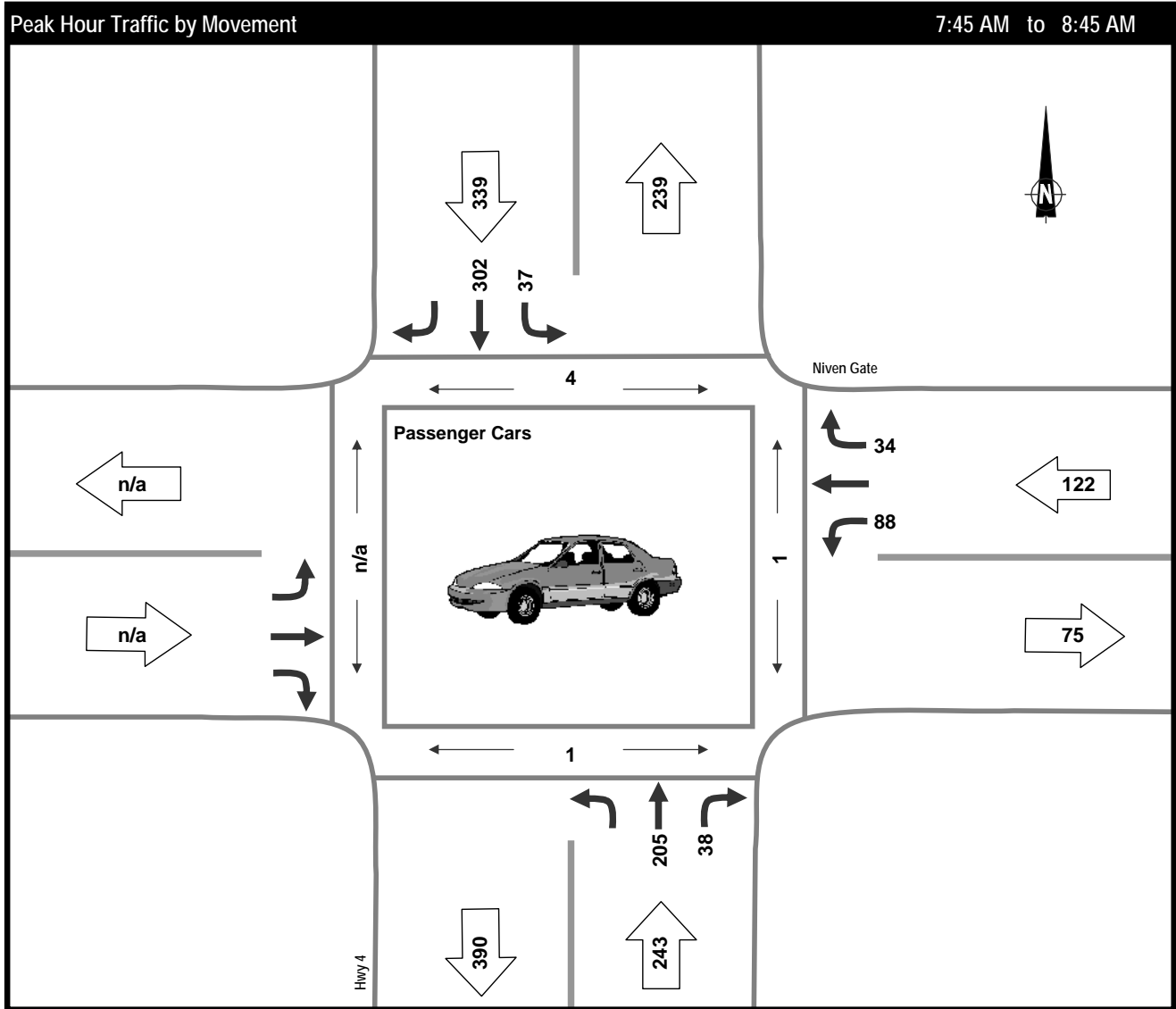
Peak Hour Traffic by Movement 4:30 PM to 5:30 PM



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	54	292			338	78				49		38	0	0		1	849
PH Factor	0.84	0.90			0.62	0.89				0.82		0.63	0.00	0.00		0.25	0.74
Peak 15 X 4	64	324			548	88				60		60	0	0		4	1,132
Average Hour	54	265			263	61				42		29	6	5		7	713
Survey Total	108	529			526	122				83		57	11	9		14	1,425
16:00	12	49			55	17				7		5	0	0		1	145
16:15	11	61			58	7				9		6	0	0		0	152
16:30	16	75			67	18				11		9	0	0		0	196
16:45	11	65			61	17				10		7	0	0		0	171
17:00	15	81			137	22				13		15	0	0		1	283
17:15	12	71			73	21				15		7	0	0		0	199
17:30	18	74			42	9				11		2	0	0		0	156
17:45	13	53			33	11				7		6	11	9		12	123

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Passenger Cars

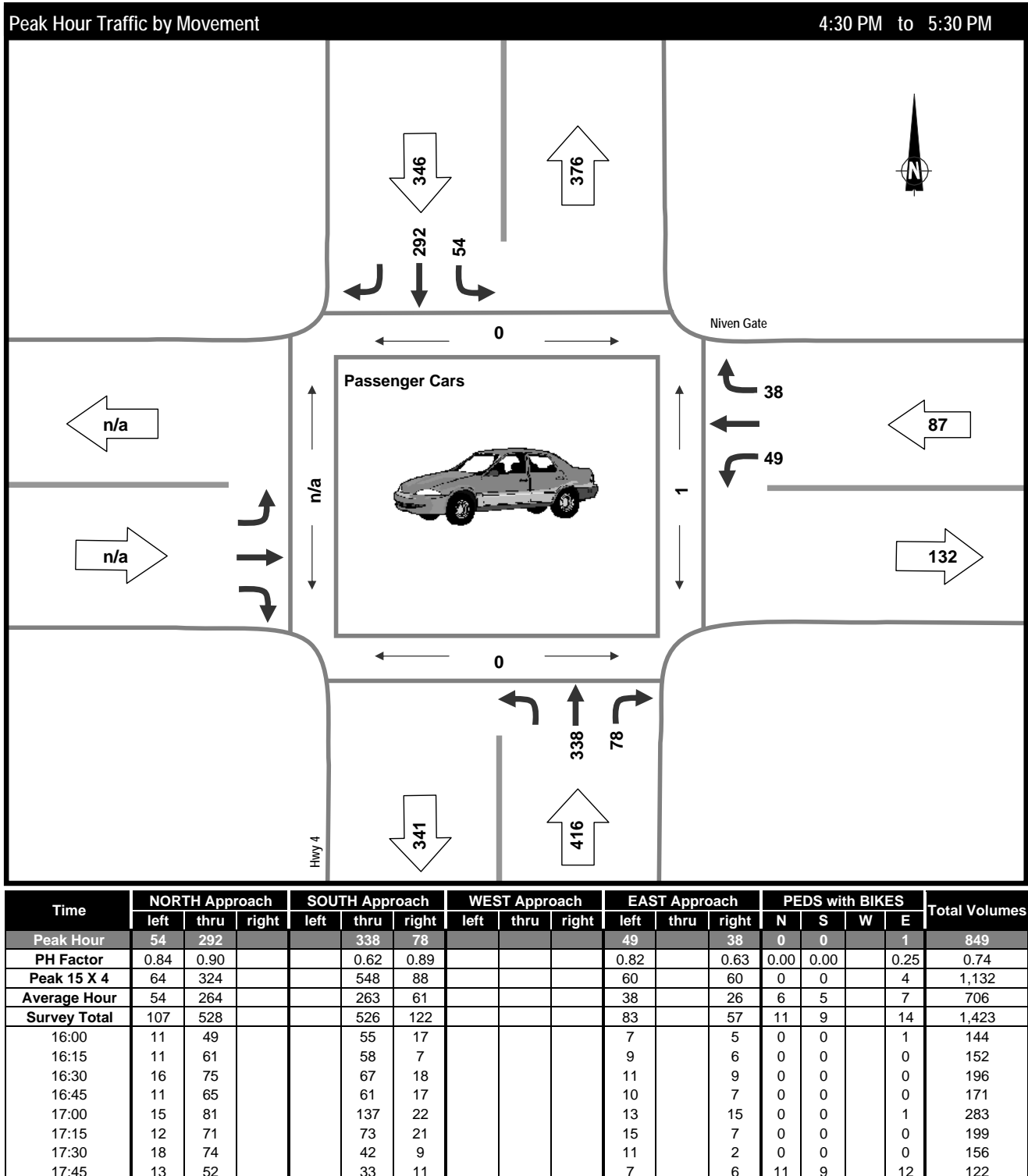
Morning Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	37	302			205	38				88		34	4	1		1	704
PH Factor	0.84	0.71			0.75	0.43				0.82		0.57	0.25	0.25		0.25	0.82
Peak 15 X 4	44	424			272	88				108		60	16	4		4	856
Average Hour	22	213			166	27				59		34	2	1		1	519
Survey Total	43	425			331	53				118		67	4	1		2	1,037
7:00	0	11			17	1				3		4	0	0		0	36
7:15	3	23			21	3				2		5	0	0		1	57
7:30	3	37			41	3				10		13	0	0		0	107
7:45	11	41			61	22				27		15	0	0		0	177
8:00	10	92			39	2				26		9	4	1		0	178
8:15	9	106			68	2				23		6	0	0		1	214
8:30	7	63			37	12				12		4	0	0		0	135
8:45	0	52			47	8				15		11	0	0		0	133

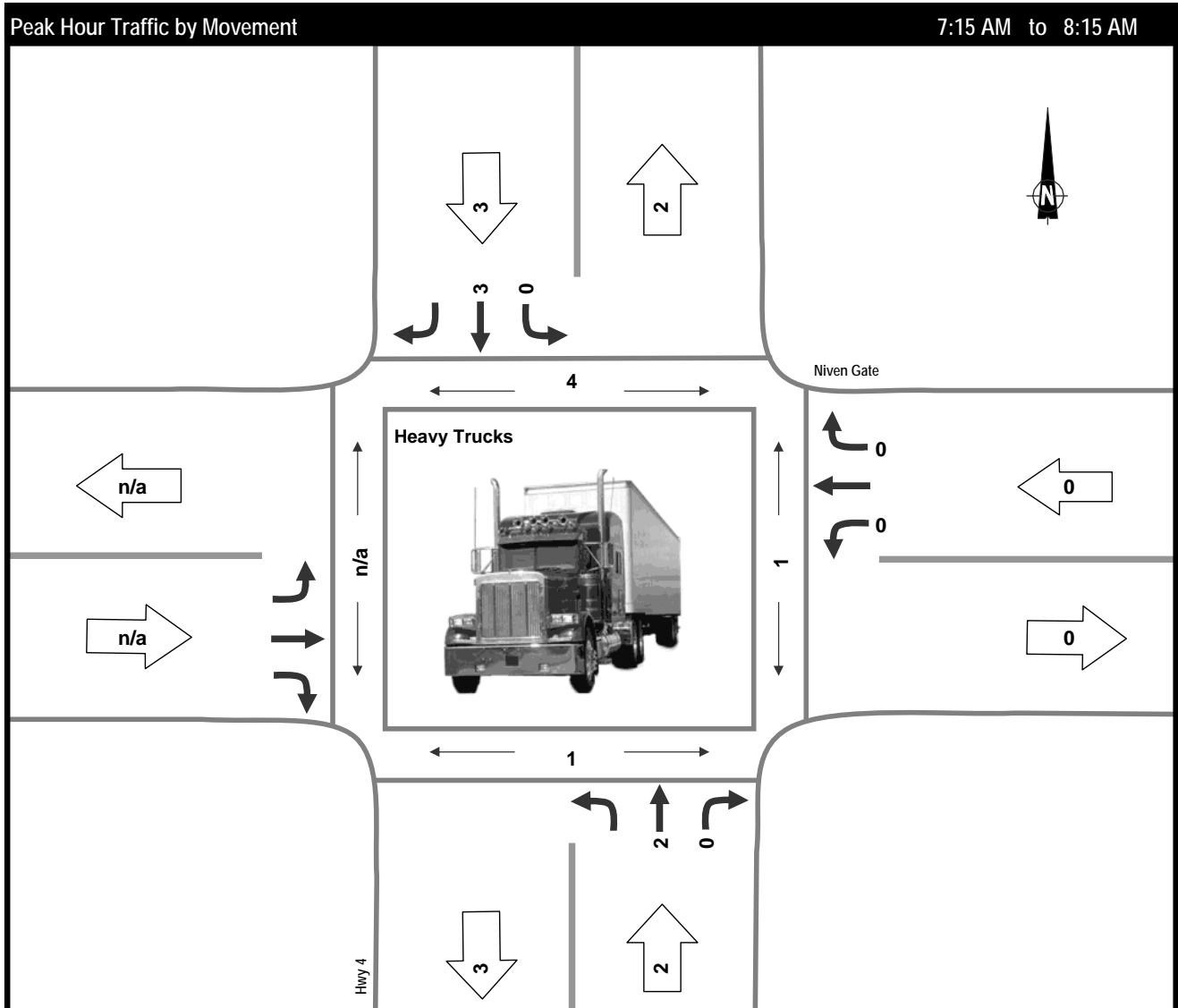
Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Passenger Cars

Afternoon Peak Period



Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Heavy Trucks

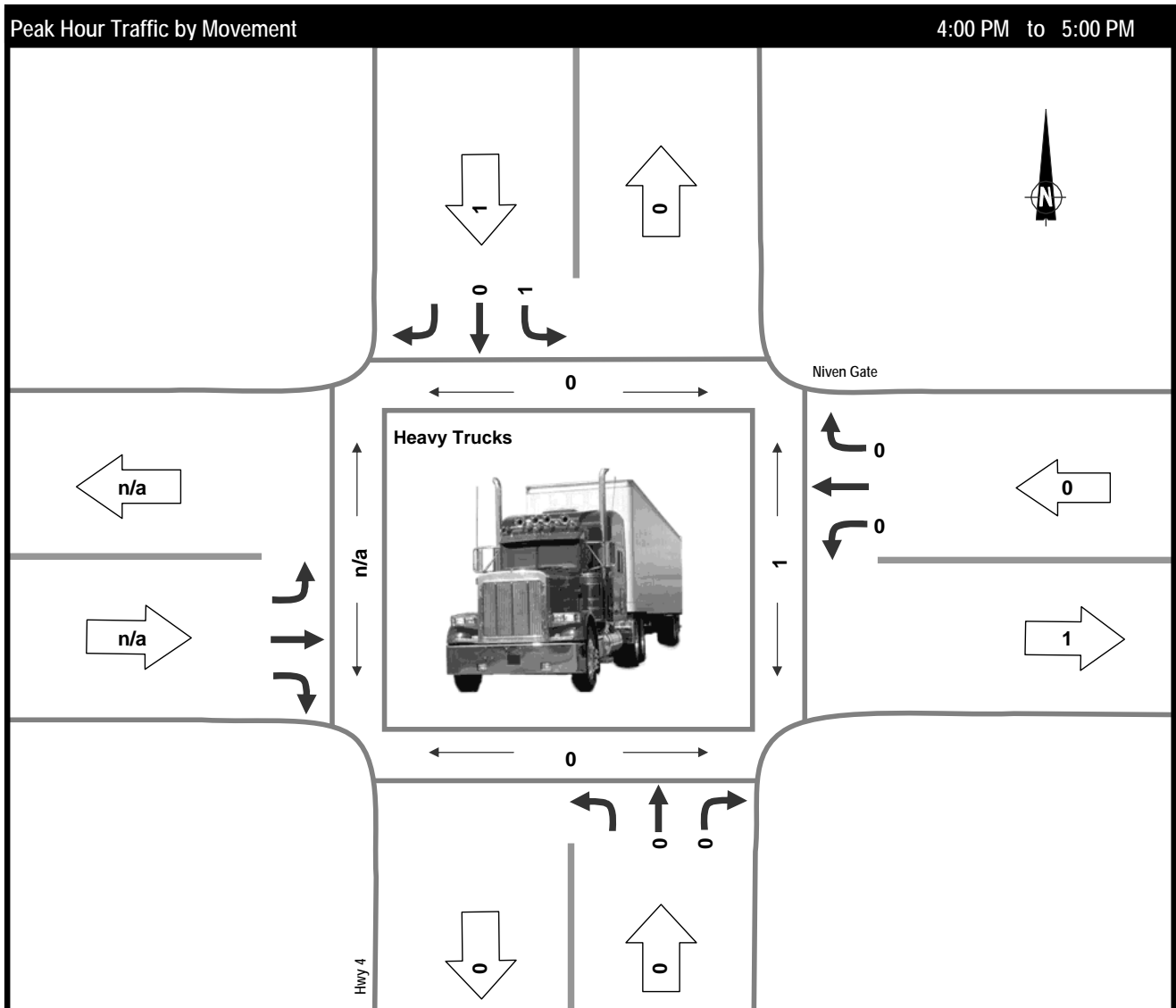
Morning Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	0	3			2	0				0		0	4	1		1	5
PH Factor	0.00	0.38			0.50	0.00				0.00		0.00	0.25	0.25		0.25	0.63
Peak 15 X 4	0	8			4	0				0		0	16	4		4	8
Average Hour	0	2			2	0				0		0	2	1		1	4
Survey Total	0	3			4	0				0		0	4	1		2	7
7:00	0	0			1	0				0		0	0	0		0	1
7:15	0	1			1	0				0		0	0	0		1	2
7:30	0	0			1	0				0		0	0	0		0	1
7:45	0	0			0	0				0		0	0	0		0	0
8:00	0	2			0	0				0		0	4	1		0	2
8:15	0	0			0	0				0		0	0	0		1	0
8:30	0	0			0	0				0		0	0	0		0	0
8:45	0	0			1	0				0		0	0	0		0	1

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Heavy Trucks

Afternoon Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	1	0			0	0				0		0	0	0		1	1
PH Factor	0.25	0.00			0.00	0.00				0.00		0.00	0.00	0.00		0.25	0.25
Peak 15 X 4	4	0			0	0				0		0	0	0		4	4
Average Hour	1	1			0	0				0		0	6	5		7	2
Survey Total	1	1			0	0				0		0	11	9		14	2
16:00	1	0			0	0				0		0	0	0		1	1
16:15	0	0			0	0				0		0	0	0		0	0
16:30	0	0			0	0				0		0	0	0		0	0
16:45	0	0			0	0				0		0	0	0		0	0
17:00	0	0			0	0				0		0	0	0		1	0
17:15	0	0			0	0				0		0	0	0		0	0
17:30	0	0			0	0				0		0	0	0		0	0
17:45	0	1			0	0				0		0	11	9		12	1



Vehicle Classification Summary

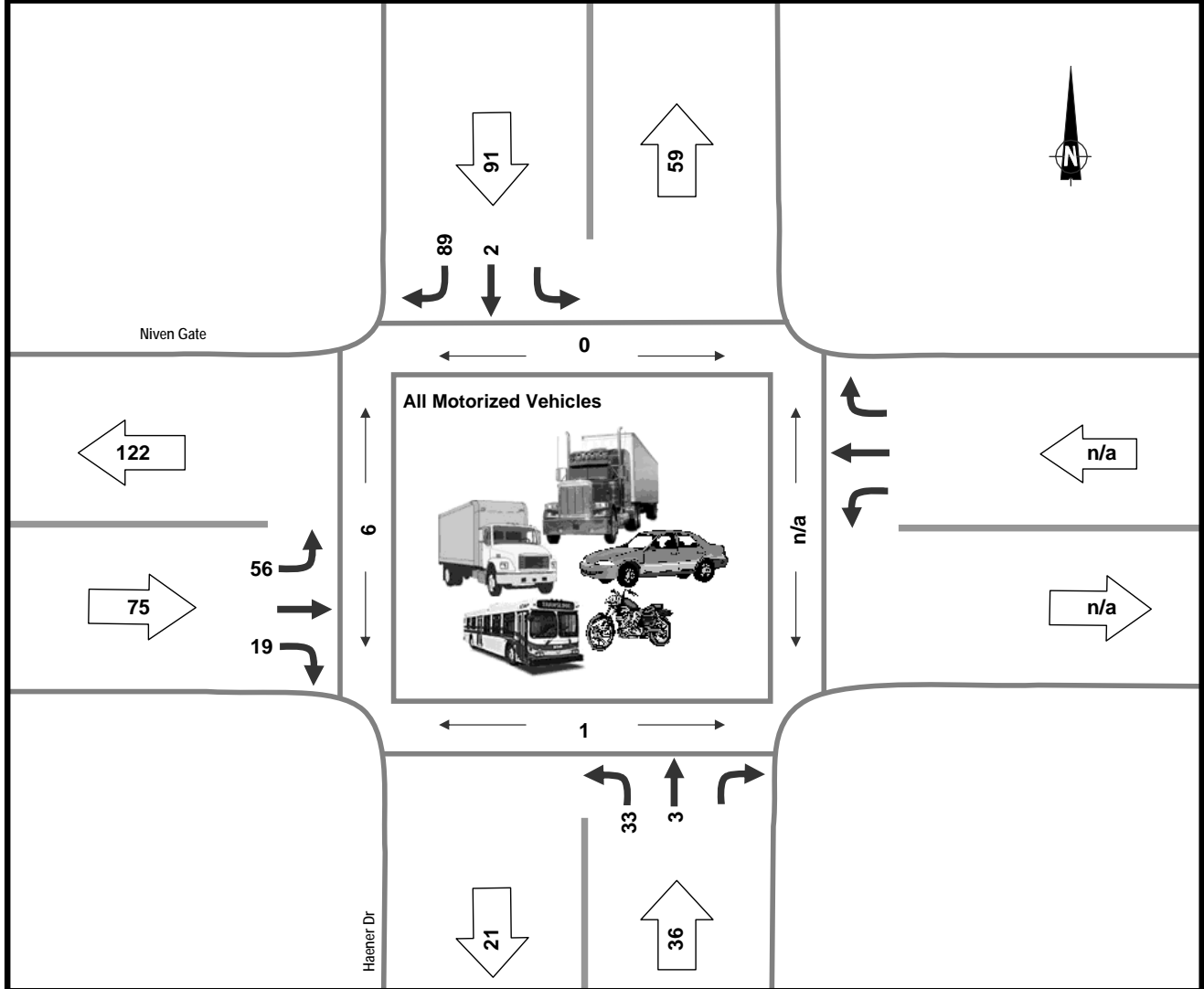
Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny

Time Period	Entering Intersection	Vehicle Classification					Total
		Passenger Car	Heavy Truck				
Morning (07:00 - 09:00)	Volume	286	0				286
	%	100.0%	0.0%				100.0%
Afternoon (16:00 - 18:00)	Volume	375	1				376
	%	99.7%	0.3%				100.0%
Total (4 Hours)	Volume	661	1				662
	%	99.8%	0.2%				100.0%

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: All Motorized Vehicles

Morning Peak Period

Peak Hour Traffic by Movement 7:45 AM to 8:45 AM



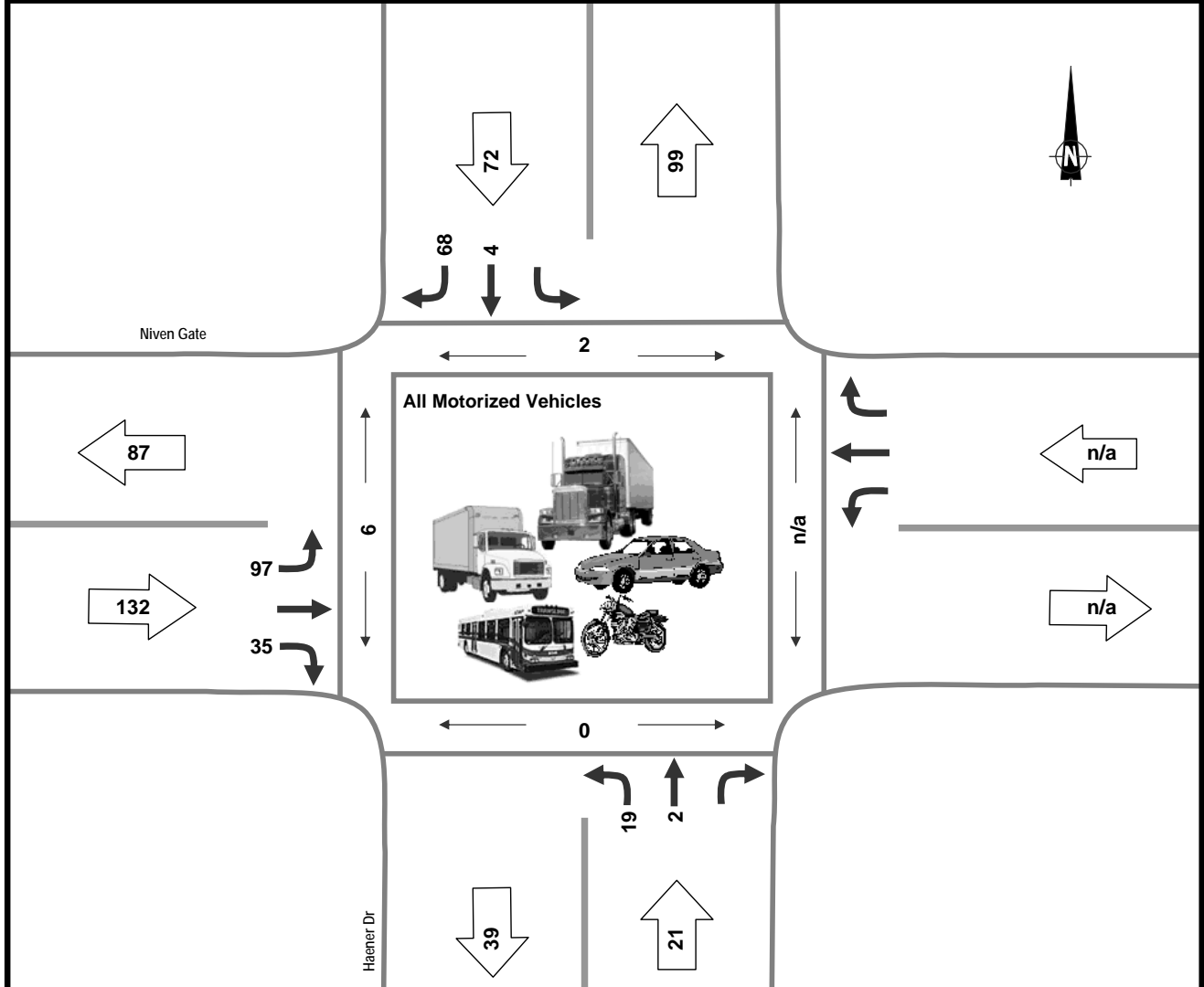
Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour		2	89	33	3		56		19				0	1	6		202
PH Factor		0.50	0.65	0.63	0.75		0.64		0.43				0.00	0.25	0.75		0.66
Peak 15 X 4		4	136	52	4		88		44				0	4	8		304
Average Hour		1	65	28	2		38		11				0	1	3		143
Survey Total		2	130	55	3		75		21				0	2	6		286
7:00		0	5	2	0		1		0				0	0	0		8
7:15		0	5	2	0		6		0				0	1	0		13
7:30		0	14	9	0		4		2				0	0	0		29
7:45		0	34	8	1		22		11				0	1	1		76
8:00		1	22	13	1		9		3				0	0	2		49
8:15		0	22	7	1		9		2				0	0	1		41
8:30		1	11	5	0		16		3				0	0	2		36
8:45		0	17	9	0		8		0				0	0	0		34

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: All Motorized Vehicles

Afternoon Peak Period

Peak Hour Traffic by Movement

4:30 PM to 5:30 PM



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour		4	68	19	2		97		35				2	0	6		225
PH Factor		0.50	0.77	0.79	0.50		0.78		0.67				0.25	0.00	0.38		0.87
Peak 15 X 4		8	88	24	4		124		52				8	0	16		260
Average Hour		2	55	15	1		82		33				1	1	9		188
Survey Total		4	110	30	2		164		66				2	2	18		376
16:00		0	9	3	0		16		13				0	0	7		41
16:15		0	13	2	0		15		3				0	0	2		33
16:30		1	15	5	0		21		13				2	0	0		55
16:45		1	13	4	1		19		9				0	0	4		47
17:00		0	22	6	0		31		6				0	0	1		65
17:15		2	18	4	1		26		7				0	0	1		58
17:30		0	10	3	0		23		4				0	2	0		40
17:45		0	10	3	0		13		11				0	0	3		37



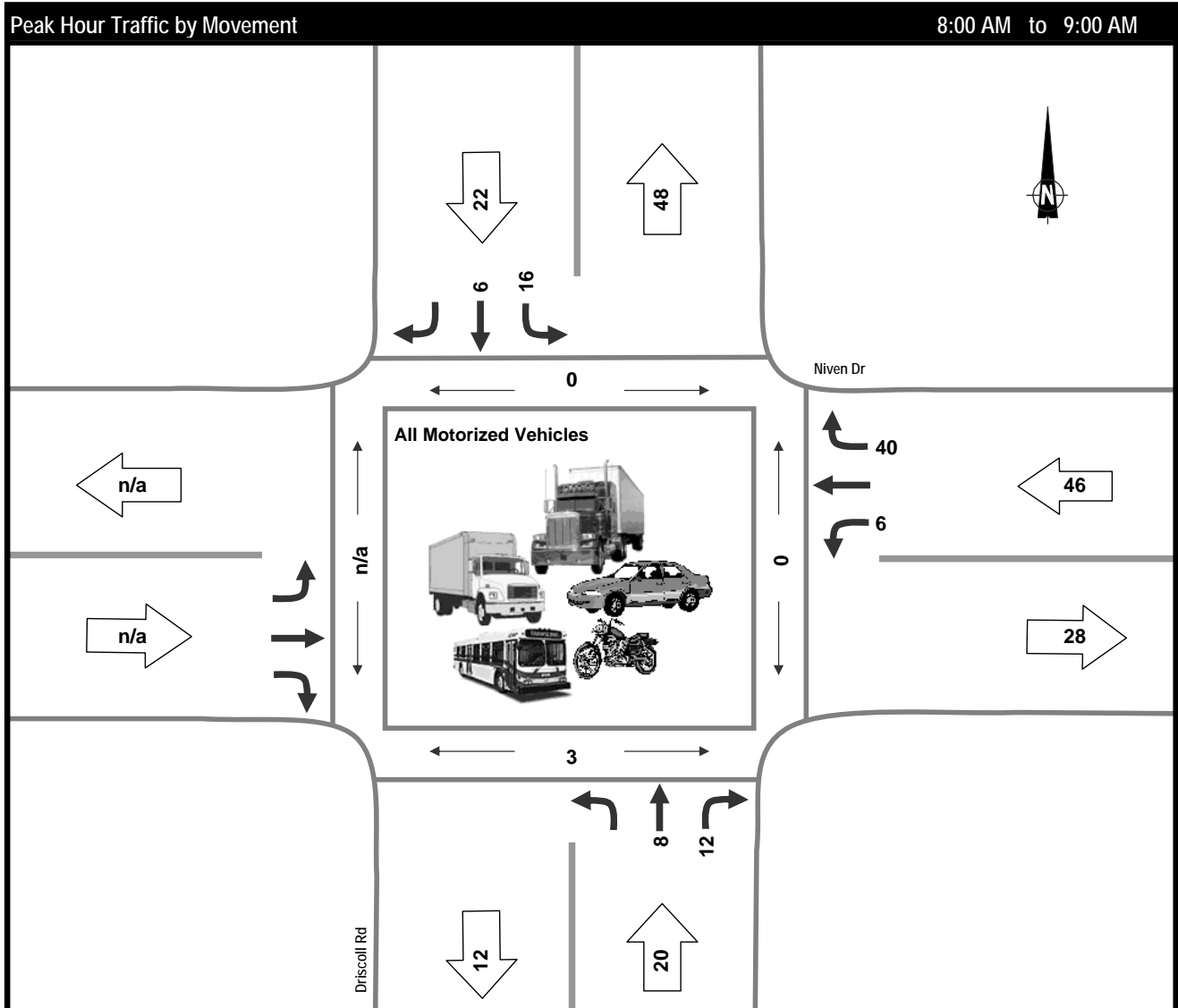
Vehicle Classification Summary

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny

Time Period	Entering Intersection	Vehicle Classification				Total
		Passenger Cars	Heavy Trucks			
Morning (07:00 - 09:00)	Volume	128	1			129
	%	99.2%	0.8%			100.0%
Total (2 Hours)	Volume	128	1			129
	%	99.2%	0.8%			100.0%

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny
Vehicle Class: All Motorized Vehicles

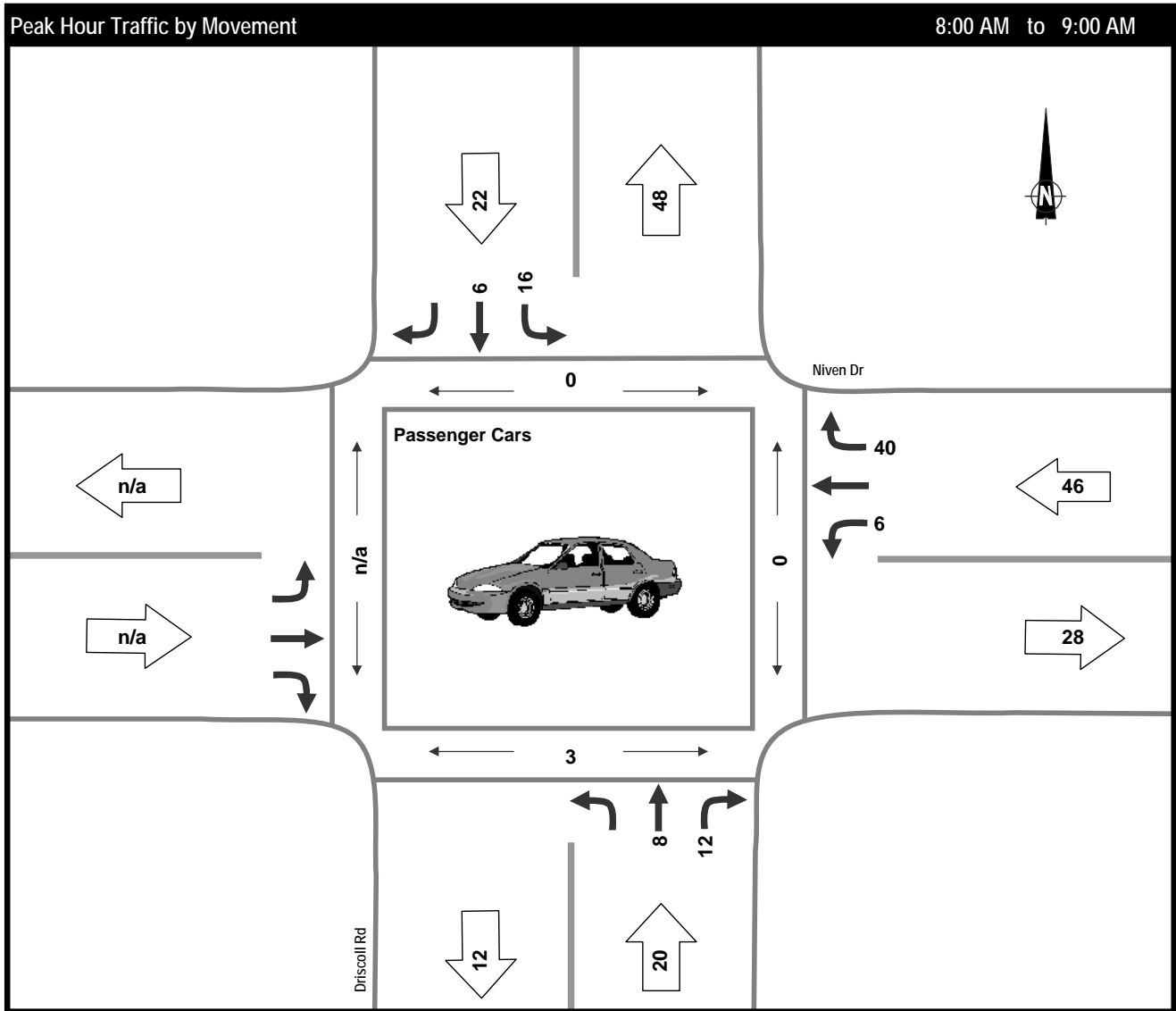
Morning Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	16	6			8	12				6		40	0	3		0	88
PH Factor	0.80	0.50			0.67	0.75				0.50		0.67	0.00	0.25		0.00	0.88
Peak 15 X 4	20	12			12	16				12		60	0	12		0	100
Average Hour	12	4			6	8				4		32	1	2		4	66
Survey Total	23	8			12	15				7		64	1	4		8	129
7:00	1	0			0	0				0		3	1	0		1	4
7:15	1	0			1	1				0		1	0	0		0	4
7:30	0	2			2	1				0		9	0	1		3	14
7:45	5	0			1	1				1		11	0	0		4	19
8:00	5	3			2	4				3		8	0	3		0	25
8:15	3	0			2	4				0		15	0	0		0	24
8:30	3	0			3	0				1		8	0	0		0	15
8:45	5	3			1	4				2		9	0	0		0	24

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny
Vehicle Class: Passenger Cars

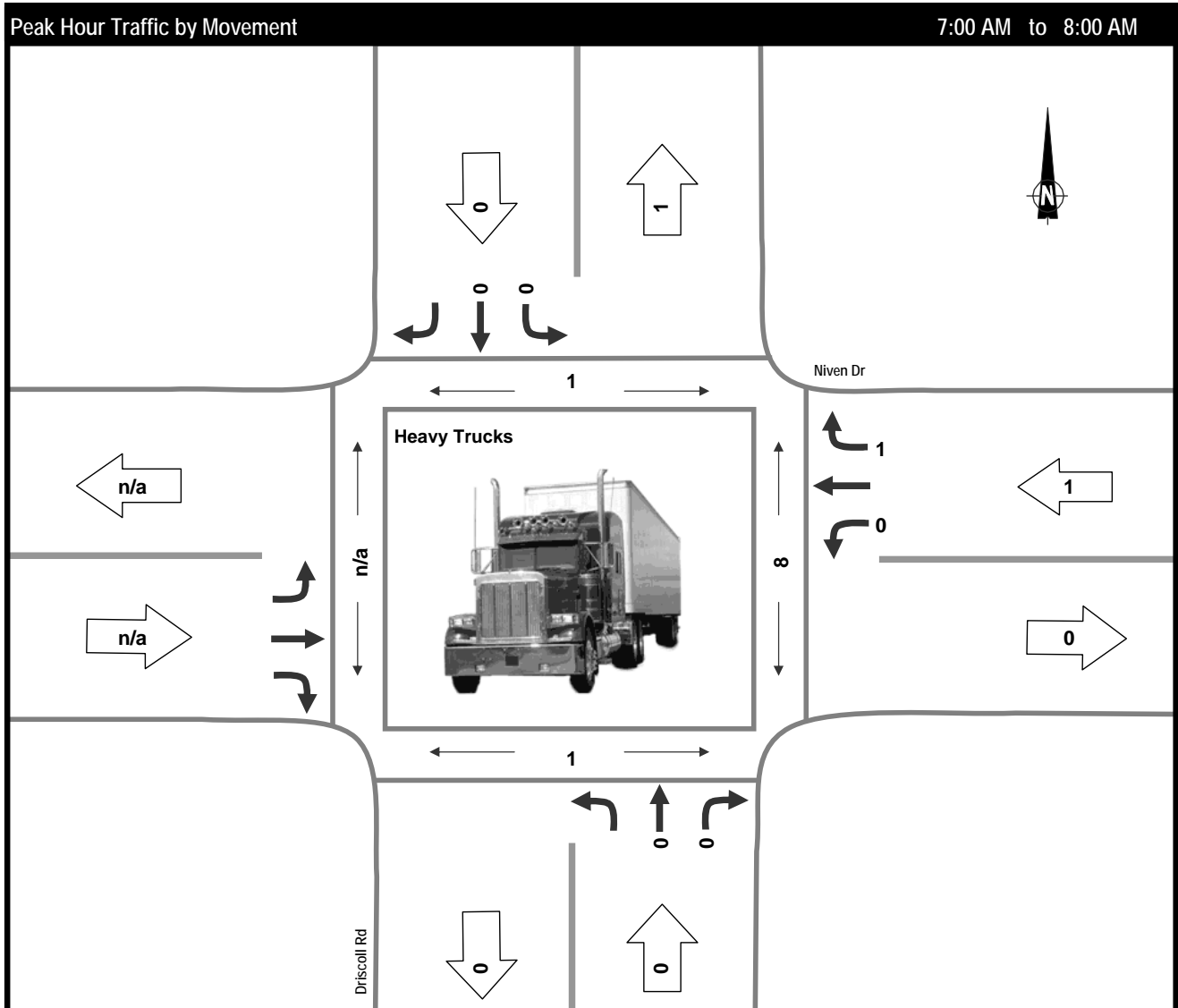
Morning Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	16	6			8	12				6		40	0	3		0	88
PH Factor	0.80	0.50			0.67	0.75				0.50		0.67	0.00	0.25		0.00	0.88
Peak 15 X 4	20	12			12	16				12		60	0	12		0	100
Average Hour	12	4			6	8				4		32	1	2		4	66
Survey Total	23	8			12	15				7		63	1	4		8	128
7:00	1	0			0	0				0		3	1	0		1	4
7:15	1	0			1	1				0		1	0	0		0	4
7:30	0	2			2	1				0		9	0	1		3	14
7:45	5	0			1	1				1		10	0	0		4	18
8:00	5	3			2	4				3		8	0	3		0	25
8:15	3	0			2	4				0		15	0	0		0	24
8:30	3	0			3	0				1		8	0	0		0	15
8:45	5	3			1	4				2		9	0	0		0	24

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny
Vehicle Class: Heavy Trucks

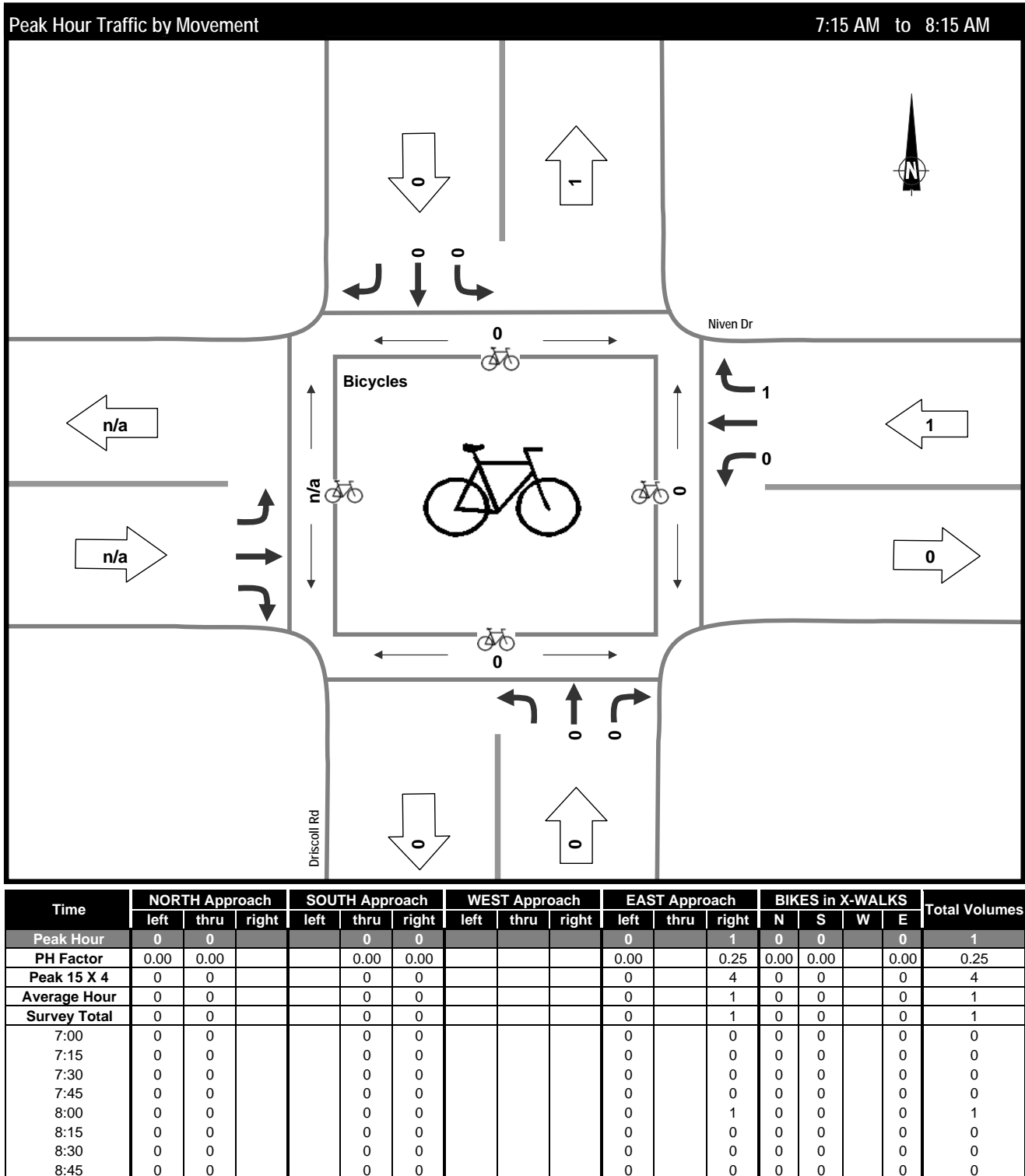
Morning Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	0	0			0	0				0		1	1	1		8	1
PH Factor	0.00	0.00			0.00	0.00				0.00		0.25	0.25	0.25		0.50	0.25
Peak 15 X 4	0	0			0	0				0		4	4	4		16	4
Average Hour	0	0			0	0				0		1	1	2		4	1
Survey Total	0	0			0	0				0		1	1	4		8	1
7:00	0	0			0	0				0		0	1	0		1	0
7:15	0	0			0	0				0		0	0	0		0	0
7:30	0	0			0	0				0		0	0	1		3	0
7:45	0	0			0	0				0		1	0	0		4	1
8:00	0	0			0	0				0		0	0	3		0	0
8:15	0	0			0	0				0		0	0	0		0	0
8:30	0	0			0	0				0		0	0	0		0	0
8:45	0	0			0	0				0		0	0	0		0	0

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny
Vehicle Class: Bicycles

Morning Peak Period





Vehicle Classification Summary

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny

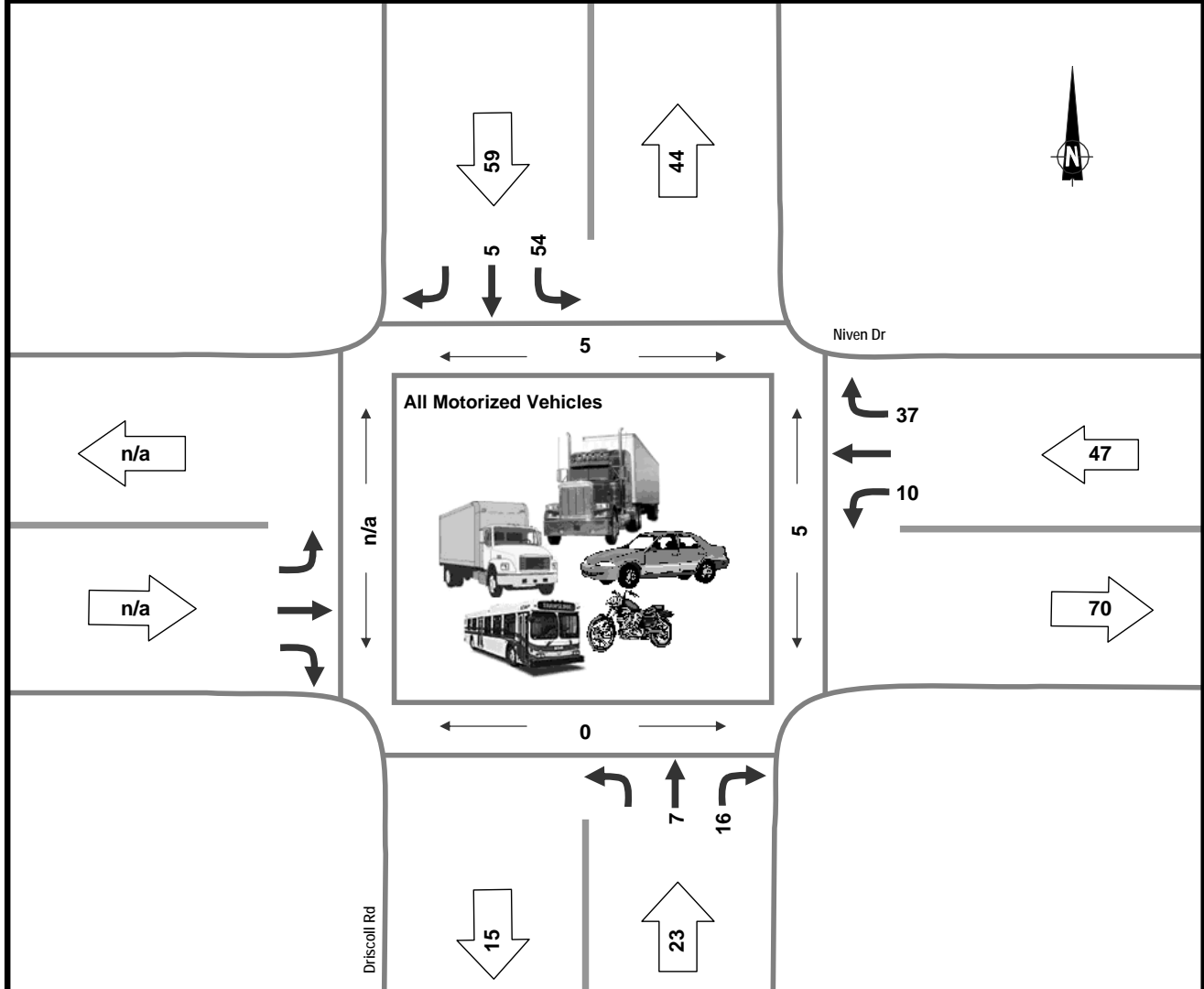
Time Period	Entering Intersection	Vehicle Classification				Total
		Passenger Cars	Heavy Trucks			
Afternoon (16:00 - 18:00)	Volume	211	1			212
	%	99.5%	0.5%			100.0%
Total (2 Hours)	Volume	211	1			212
	%	99.5%	0.5%			100.0%

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: All Motorized Vehicles

Afternoon Peak Period

Peak Hour Traffic by Movement

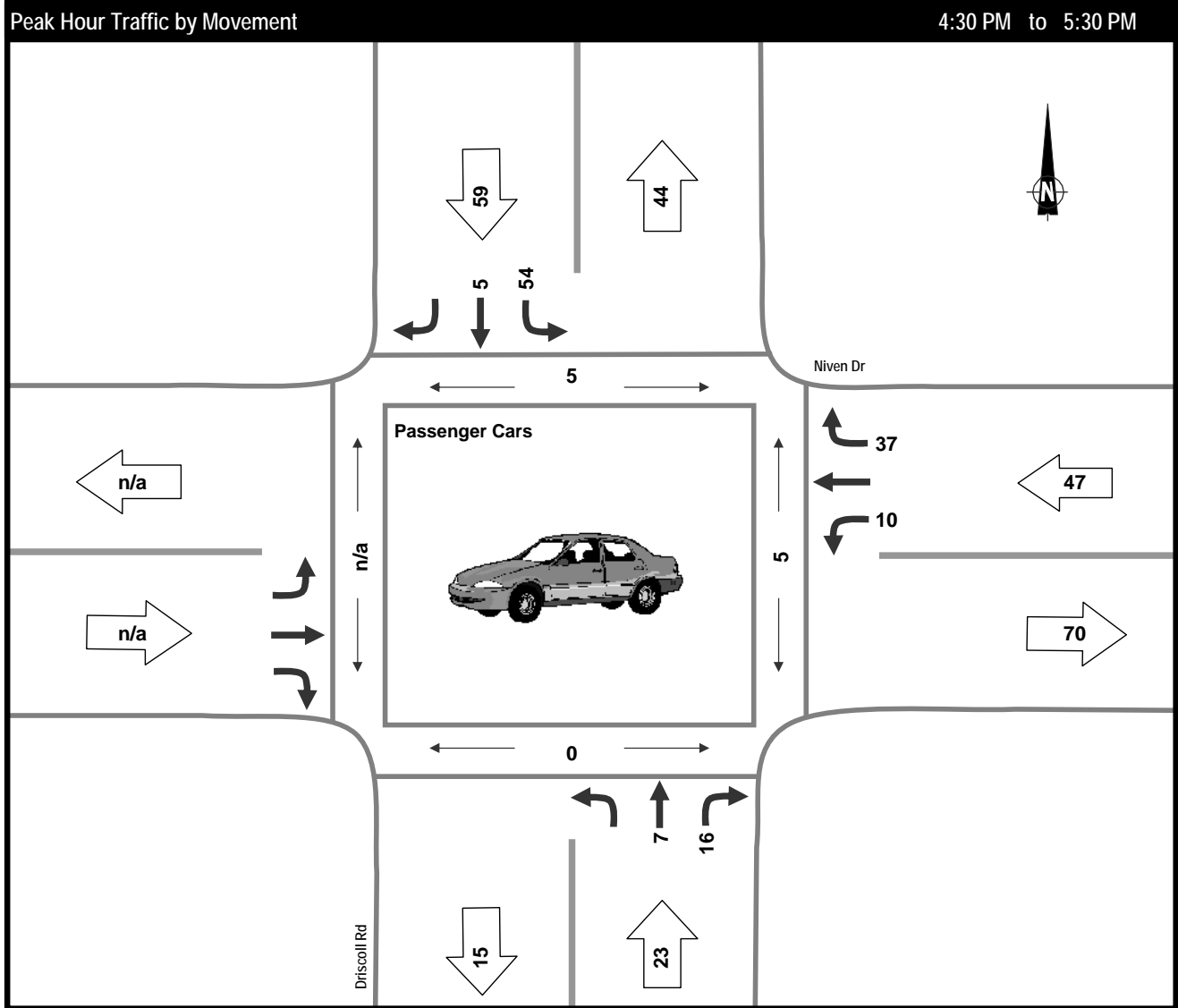
4:30 PM to 5:30 PM



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	54	5			7	16				10		37	5	0		5	129
PH Factor	0.71	0.63			0.58	0.50				0.63		0.58	0.42	0.00		0.63	0.66
Peak 15 X 4	76	8			12	32				16		64	12	0		8	196
Average Hour	42	5			5	15				7		33	3	0		3	107
Survey Total	84	9			10	29				14		66	5	0		6	212
16:00	2	1			1	5				2		6	0	0		0	17
16:15	9	1			1	6				1		5	0	0		0	23
16:30	7	1			0	7				4		6	3	0		0	25
16:45	9	1			3	1				2		6	0	0		2	22
17:00	19	2			3	8				1		16	0	0		2	49
17:15	19	1			1	0				3		9	2	0		1	33
17:30	9	1			0	2				0		10	0	0		1	22
17:45	10	1			1	0				1		8	0	0		0	21

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Passenger Cars

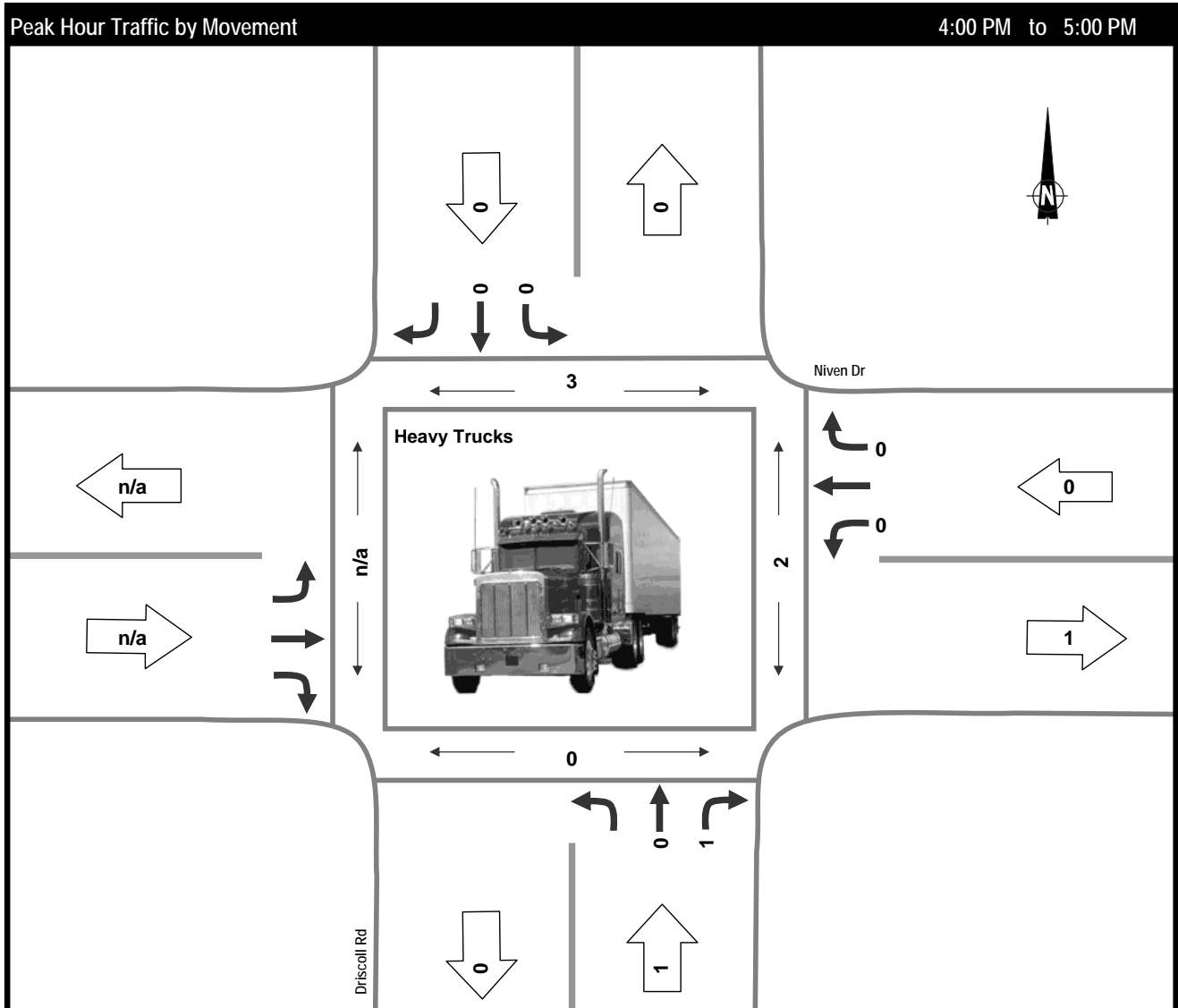
Afternoon Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	54	5			7	16				10		37	5	0		5	129
PH Factor	0.71	0.63			0.58	0.50				0.63		0.58	0.42	0.00		0.63	0.66
Peak 15 X 4	76	8			12	32				16		64	12	0		8	196
Average Hour	42	5			5	14				7		33	3	0		3	106
Survey Total	84	9			10	28				14		66	5	0		6	211
16:00	2	1			1	5				2		6	0	0		0	17
16:15	9	1			1	5				1		5	0	0		0	22
16:30	7	1			0	7				4		6	3	0		0	25
16:45	9	1			3	1				2		6	0	0		2	22
17:00	19	2			3	8				1		16	0	0		2	49
17:15	19	1			1	0				3		9	2	0		1	33
17:30	9	1			0	2				0		10	0	0		1	22
17:45	10	1			1	0				1		8	0	0		0	21

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Heavy Trucks

Afternoon Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	0	0			0	1				0		0	3	0		2	1
PH Factor	0.00	0.00			0.00	0.25				0.00		0.00	0.25	0.00		0.25	0.25
Peak 15 X 4	0	0			0	4				0		0	12	0		8	4
Average Hour	0	0			0	1				0		0	3	0		3	1
Survey Total	0	0			0	1				0		0	5	0		6	1
16:00	0	0			0	0				0		0	0	0		0	0
16:15	0	0			0	1				0		0	0	0		0	1
16:30	0	0			0	0				0		0	3	0		0	0
16:45	0	0			0	0				0		0	0	0		2	0
17:00	0	0			0	0				0		0	0	0		2	0
17:15	0	0			0	0				0		0	2	0		1	0
17:30	0	0			0	0				0		0	0	0		1	0
17:45	0	0			0	0				0		0	0	0		0	0



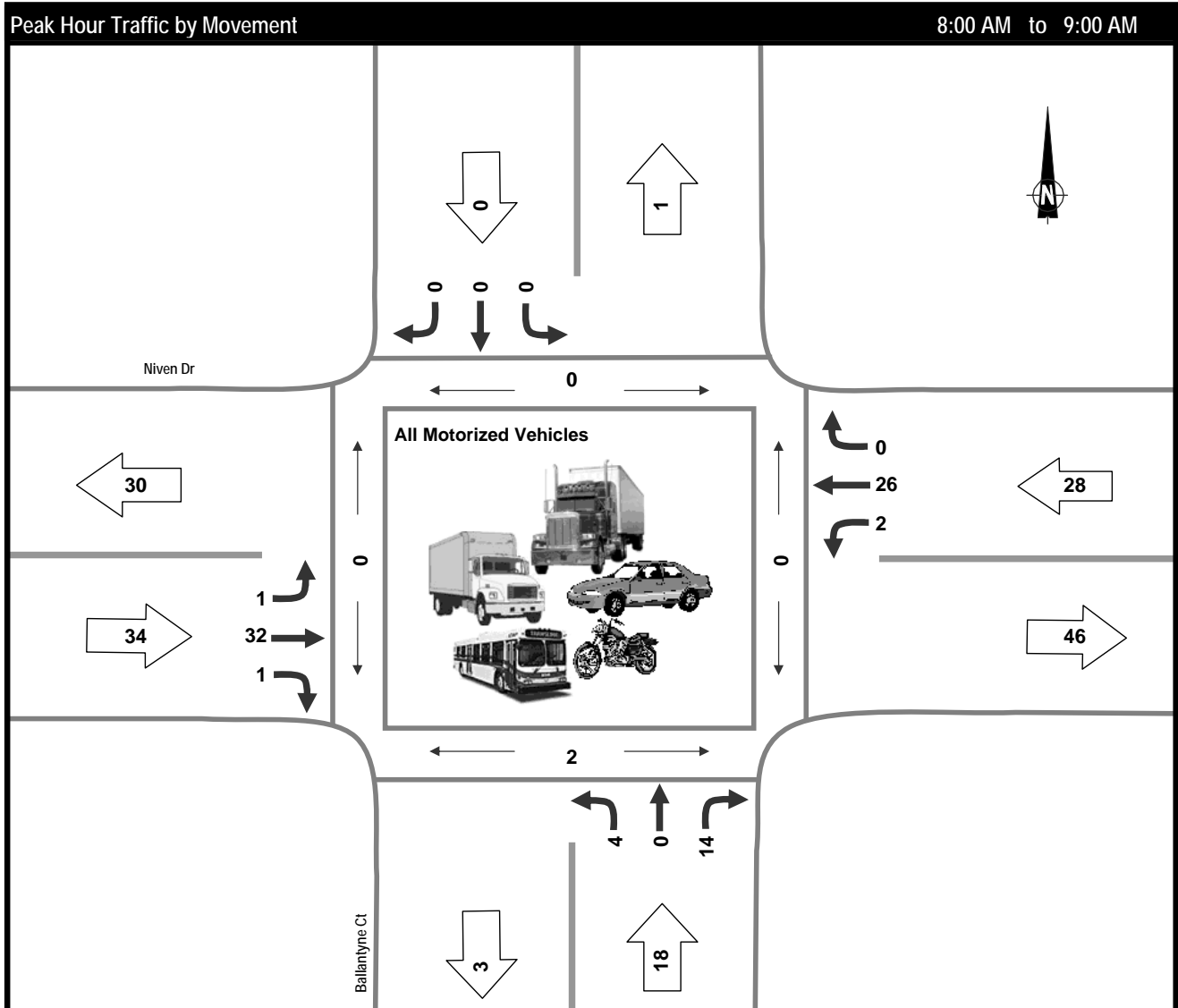
Vehicle Classification Summary

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny

Time Period	Entering Intersection	Vehicle Classification				Total
		Passenger Cars	Heavy Trucks			
Moring (07:00 - 09:00)	Volume	115	1			116
	%	99.1%	0.9%			100.0%
Total (2 Hours)	Volume	115	1			116
	%	99.1%	0.9%			100.0%

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny
Vehicle Class: All Motorized Vehicles

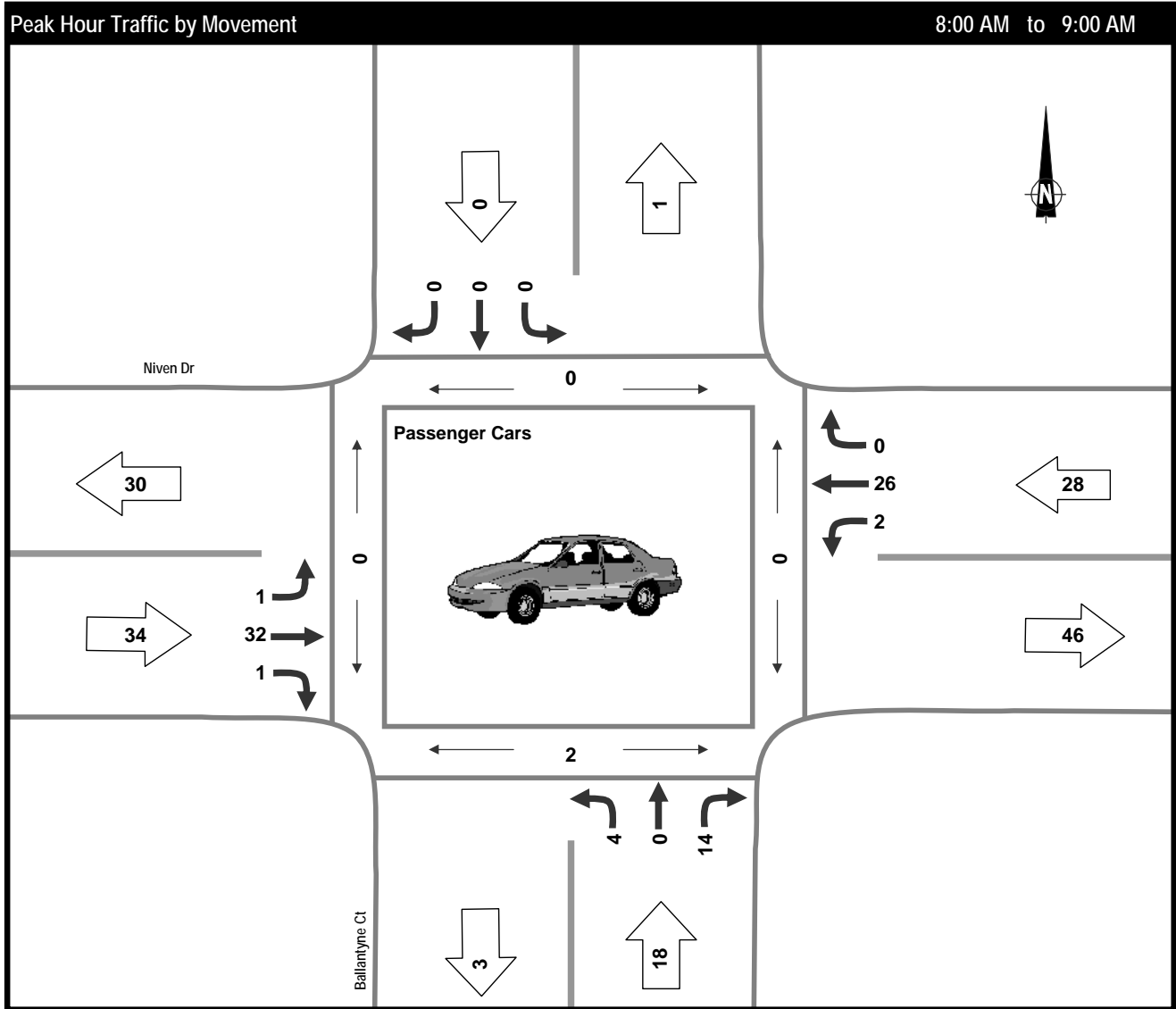
Morning Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	0	0	0	4	0	14	1	32	1	2	26	0	0	2	0	0	80
PH Factor	0.00	0.00	0.00	0.50	0.00	0.39	0.25	0.80	0.25	0.50	0.65	0.00	0.00	0.50	0.00	0.00	0.80
Peak 15 X 4	0	0	0	8	0	36	4	40	4	4	40	0	0	4	0	0	100
Average Hour	0	0	0	4	0	8	1	22	1	2	22	0	1	3	0	2	60
Survey Total	0	0	0	8	0	16	1	43	1	4	43	0	1	5	0	3	116
7:00	0	0	0	0	0	1	0	2	0	0	3	0	0	0	0	0	6
7:15	0	0	0	0	0	0	0	2	0	0	2	0	0	3	0	0	4
7:30	0	0	0	1	0	1	0	3	0	0	5	0	1	0	0	1	10
7:45	0	0	0	3	0	0	0	4	0	2	7	0	0	0	0	2	16
8:00	0	0	0	1	0	4	0	10	1	0	8	0	0	1	0	0	24
8:15	0	0	0	2	0	9	0	10	0	0	4	0	0	1	0	0	25
8:30	0	0	0	1	0	0	0	5	0	1	4	0	0	0	0	0	11
8:45	0	0	0	0	0	1	1	7	0	1	10	0	0	0	0	0	20

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny
Vehicle Class: Passenger Cars

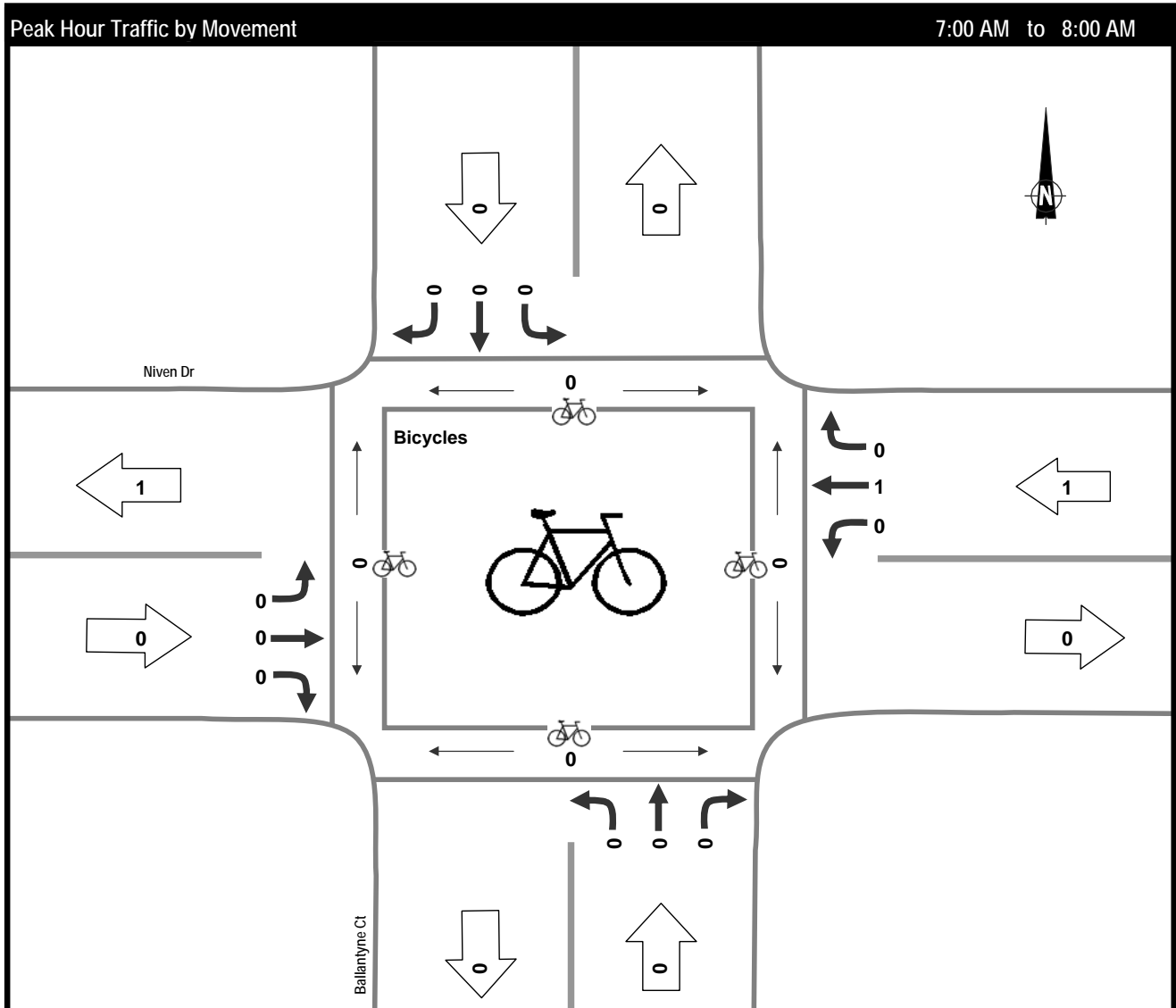
Morning Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	0	0	0	4	0	14	1	32	1	2	26	0	0	2	0	0	80
PH Factor	0.00	0.00	0.00	0.50	0.00	0.39	0.25	0.80	0.25	0.50	0.65	0.00	0.00	0.50	0.00	0.00	0.80
Peak 15 X 4	0	0	0	8	0	36	4	40	4	4	40	0	0	4	0	0	100
Average Hour	0	0	0	4	0	8	1	22	1	2	21	0	1	3	0	2	59
Survey Total	0	0	0	8	0	16	1	43	1	4	42	0	1	5	0	3	115
7:00	0	0	0	0	0	1	0	2	0	0	3	0	0	0	0	0	6
7:15	0	0	0	0	0	0	0	2	0	0	2	0	0	3	0	0	4
7:30	0	0	0	1	0	1	0	3	0	0	5	0	1	0	0	1	10
7:45	0	0	0	3	0	0	0	4	0	2	6	0	0	0	0	2	15
8:00	0	0	0	1	0	4	0	10	1	0	8	0	0	1	0	0	24
8:15	0	0	0	2	0	9	0	10	0	0	4	0	0	1	0	0	25
8:30	0	0	0	1	0	0	0	5	0	1	4	0	0	0	0	0	11
8:45	0	0	0	0	0	1	1	7	0	1	10	0	0	0	0	0	20

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny
Vehicle Class: Bicycles

Morning Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			BIKES in X-WALKS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
PH Factor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.25
Peak 15 X 4	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
Average Hour	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Survey Total	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Vehicle Classification Summary

Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny

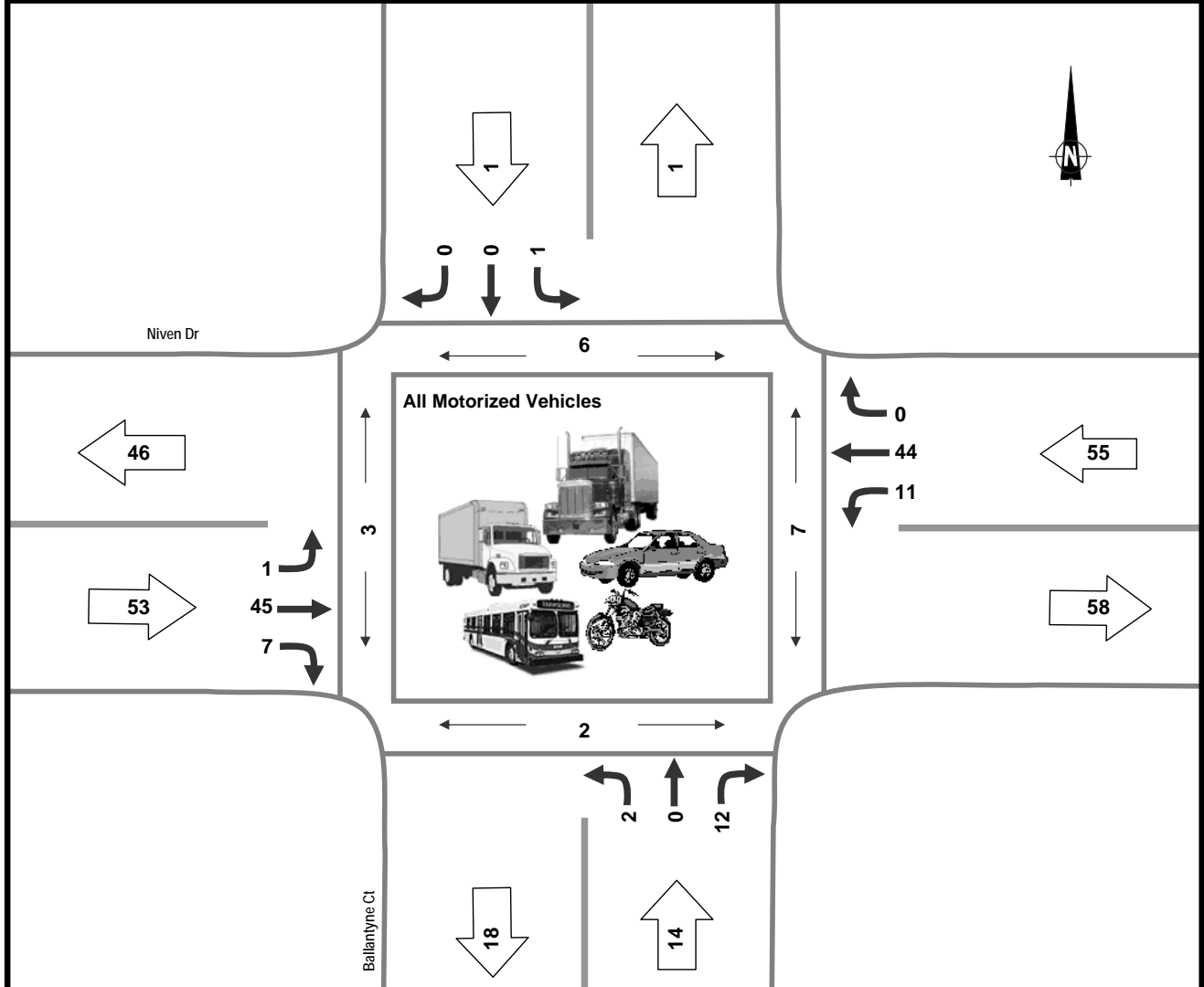
Time Period	Entering Intersection	Vehicle Classification				Total
		Passenger Cars	Heavy Trucks			
Afternoon (16:00 - 18:00)	Volume	202	1			203
	%	99.5%	0.5%			100.0%
Total (2 Hours)	Volume	202	1			203
	%	99.5%	0.5%			100.0%

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: All Motorized Vehicles

Afternoon Peak Period

Peak Hour Traffic by Movement

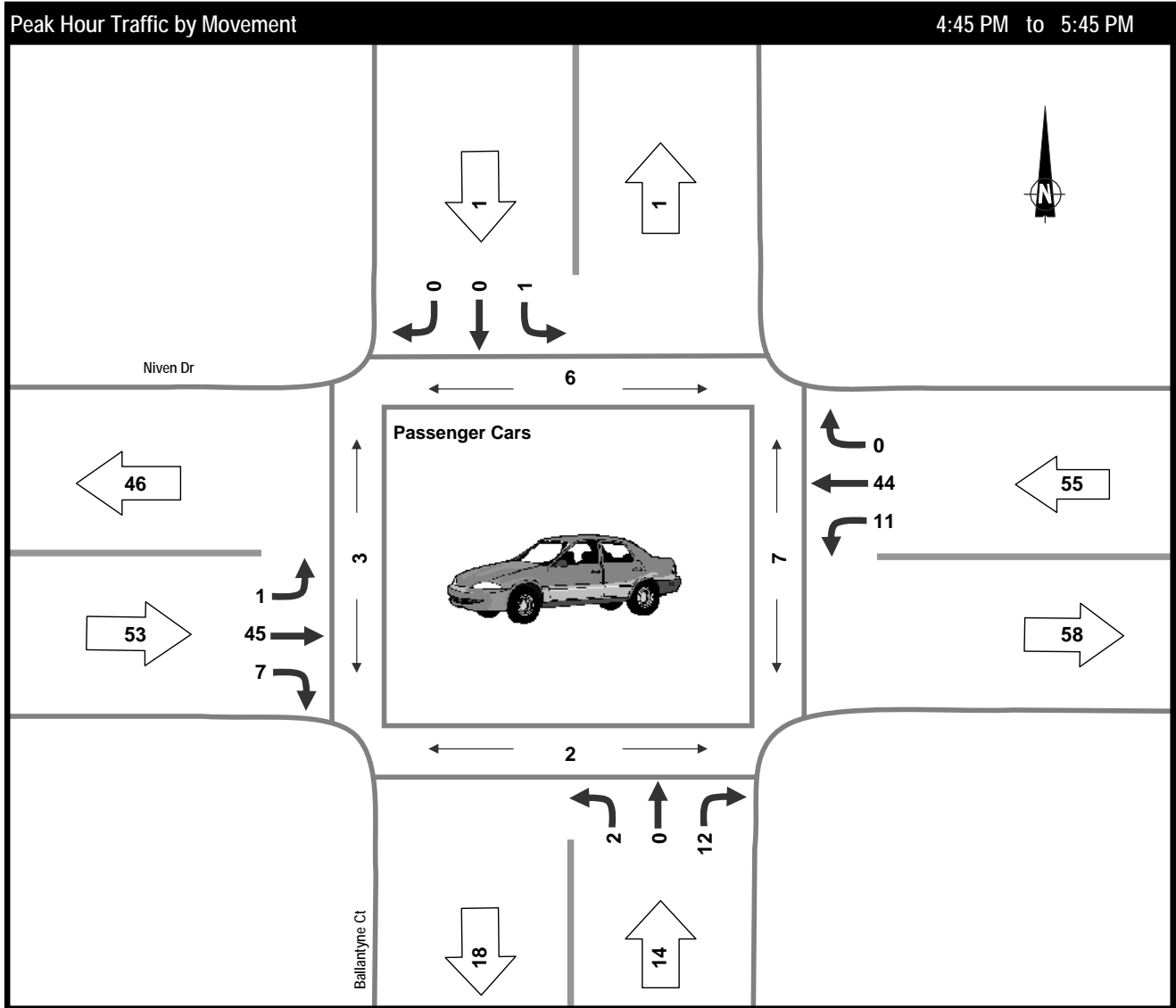
4:45 PM to 5:45 PM



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	1	0	0	2	0	12	1	45	7	11	44	0	6	2	3	7	123
PH Factor	0.25	0.00	0.00	0.50	0.00	0.50	0.25	0.51	0.44	0.55	0.55	0.00	0.30	0.50	0.38	0.58	0.64
Peak 15 X 4	4	0	0	4	0	24	4	88	16	20	80	0	20	4	8	12	192
Average Hour	1	0	0	3	0	9	1	40	4	11	35	0	7	7	7	5	104
Survey Total	1	0	0	5	0	17	1	80	8	21	70	0	13	13	14	10	203
16:00	0	0	0	0	0	2	0	6	0	4	8	0	0	7	0	0	20
16:15	0	0	0	2	0	2	0	14	0	4	6	0	7	2	9	0	28
16:30	0	0	0	1	0	0	0	10	0	0	9	0	0	0	2	3	20
16:45	1	0	0	0	0	1	1	7	0	2	9	0	0	1	1	3	21
17:00	0	0	0	0	0	2	0	22	4	0	20	0	1	0	0	0	48
17:15	0	0	0	1	0	3	0	7	2	5	6	0	5	1	2	3	24
17:30	0	0	0	1	0	6	0	9	1	4	9	0	0	0	0	1	30
17:45	0	0	0	0	0	1	0	5	1	2	3	0	0	2	0	0	12

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Passenger Cars

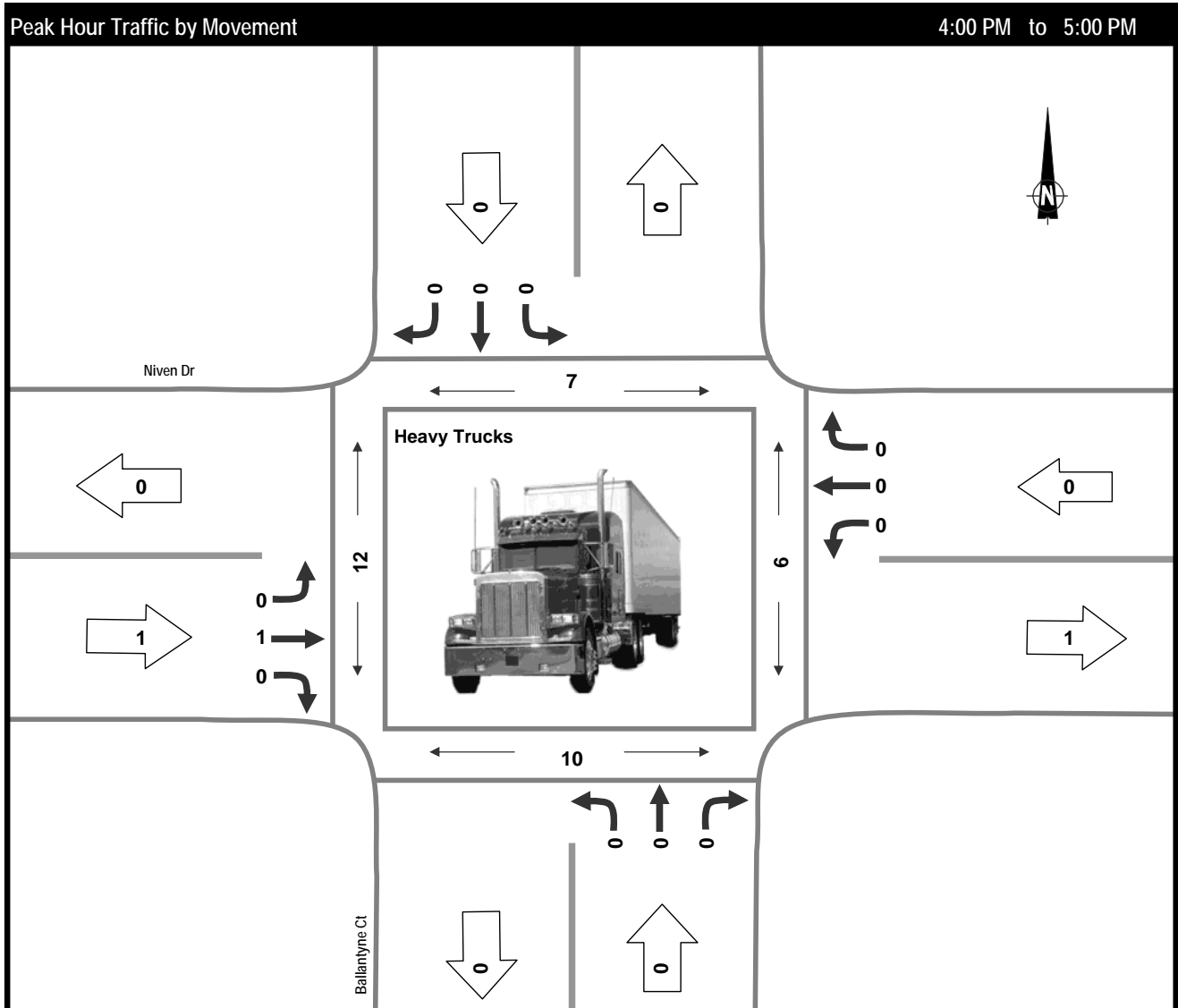
Afternoon Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	1	0	0	2	0	12	1	45	7	11	44	0	6	2	3	7	123
PH Factor	0.25	0.00	0.00	0.50	0.00	0.50	0.25	0.51	0.44	0.55	0.55	0.00	0.30	0.50	0.38	0.58	0.64
Peak 15 X 4	4	0	0	4	0	24	4	88	16	20	80	0	20	4	8	12	192
Average Hour	1	0	0	3	0	9	1	40	4	11	35	0	7	7	7	5	104
Survey Total	1	0	0	5	0	17	1	79	8	21	70	0	13	13	14	10	202
16:00	0	0	0	0	0	2	0	6	0	4	8	0	0	7	0	0	20
16:15	0	0	0	2	0	2	0	13	0	4	6	0	7	2	9	0	27
16:30	0	0	0	1	0	0	0	10	0	0	9	0	0	0	2	3	20
16:45	1	0	0	0	0	1	1	7	0	2	9	0	0	1	1	3	21
17:00	0	0	0	0	0	2	0	22	4	0	20	0	1	0	0	0	48
17:15	0	0	0	1	0	3	0	7	2	5	6	0	5	1	2	3	24
17:30	0	0	0	1	0	6	0	9	1	4	9	0	0	0	0	1	30
17:45	0	0	0	0	0	1	0	5	1	2	3	0	0	2	0	0	12

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Heavy Trucks

Afternoon Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	0	0	0	0	0	0	0	1	0	0	0	0	7	10	12	6	1
PH Factor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.25	0.36	0.33	0.50	0.25
Peak 15 X 4	0	0	0	0	0	0	0	4	0	0	0	0	28	28	36	12	4
Average Hour	0	0	0	0	0	0	0	1	0	0	0	0	7	7	7	5	1
Survey Total	0	0	0	0	0	0	0	1	0	0	0	0	13	13	14	10	1
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0
16:15	0	0	0	0	0	0	0	1	0	0	0	0	7	2	9	0	1
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	5	1	2	3	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0



Vehicle Classification Summary

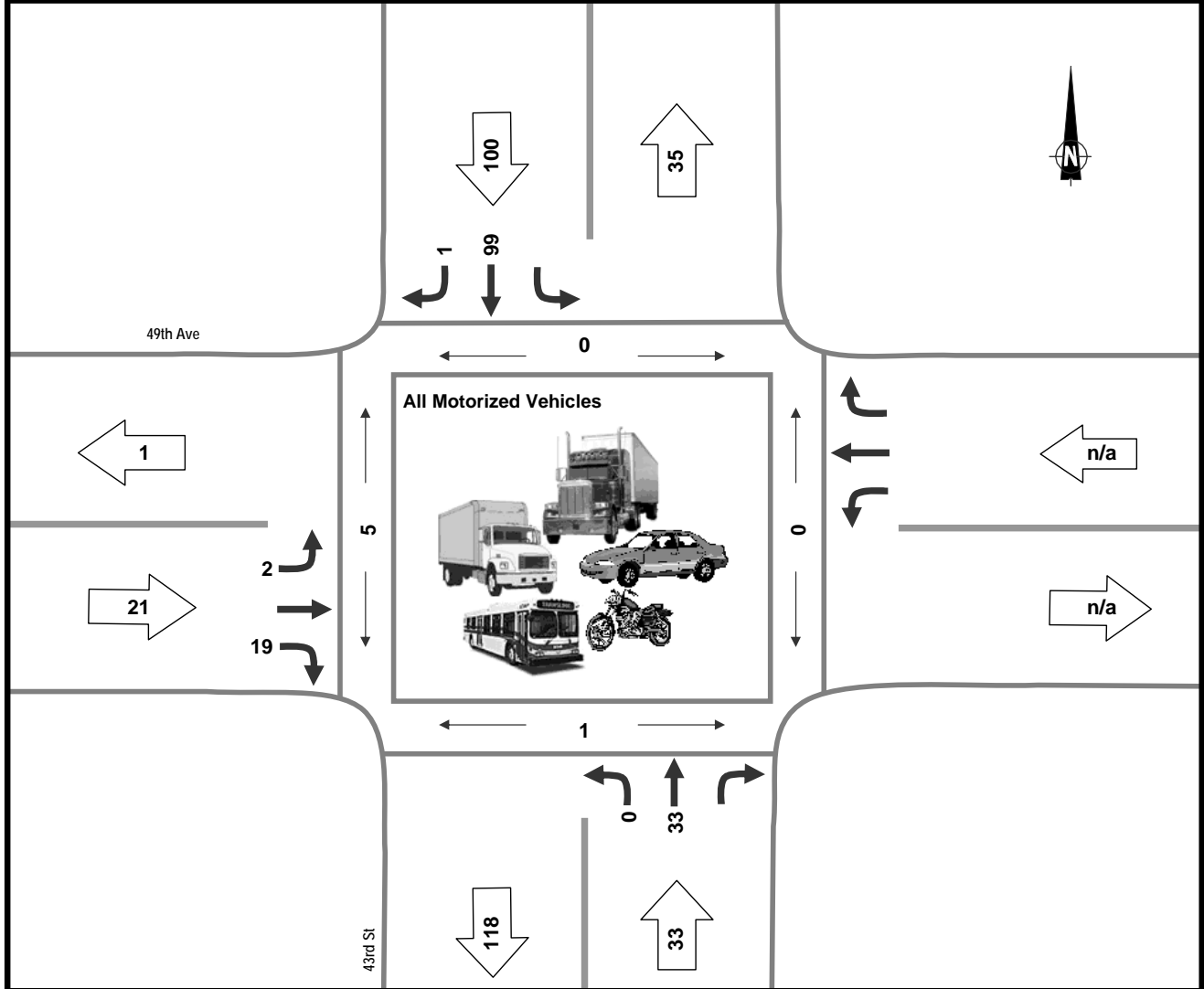
Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny

Time Period	Entering Intersection	Vehicle Classification				Total
		All Motorized Vehicles				
Morning (07:00 - 09:00)	Volume	213				213
	%	100.0%				100.0%
Afternoon (16:00 - 18:00)	Volume	296				296
	%	100.0%				100.0%
Total (4 Hours)	Volume	509				509
	%	100.0%				100.0%

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: All Motorized Vehicles

Morning Peak Period

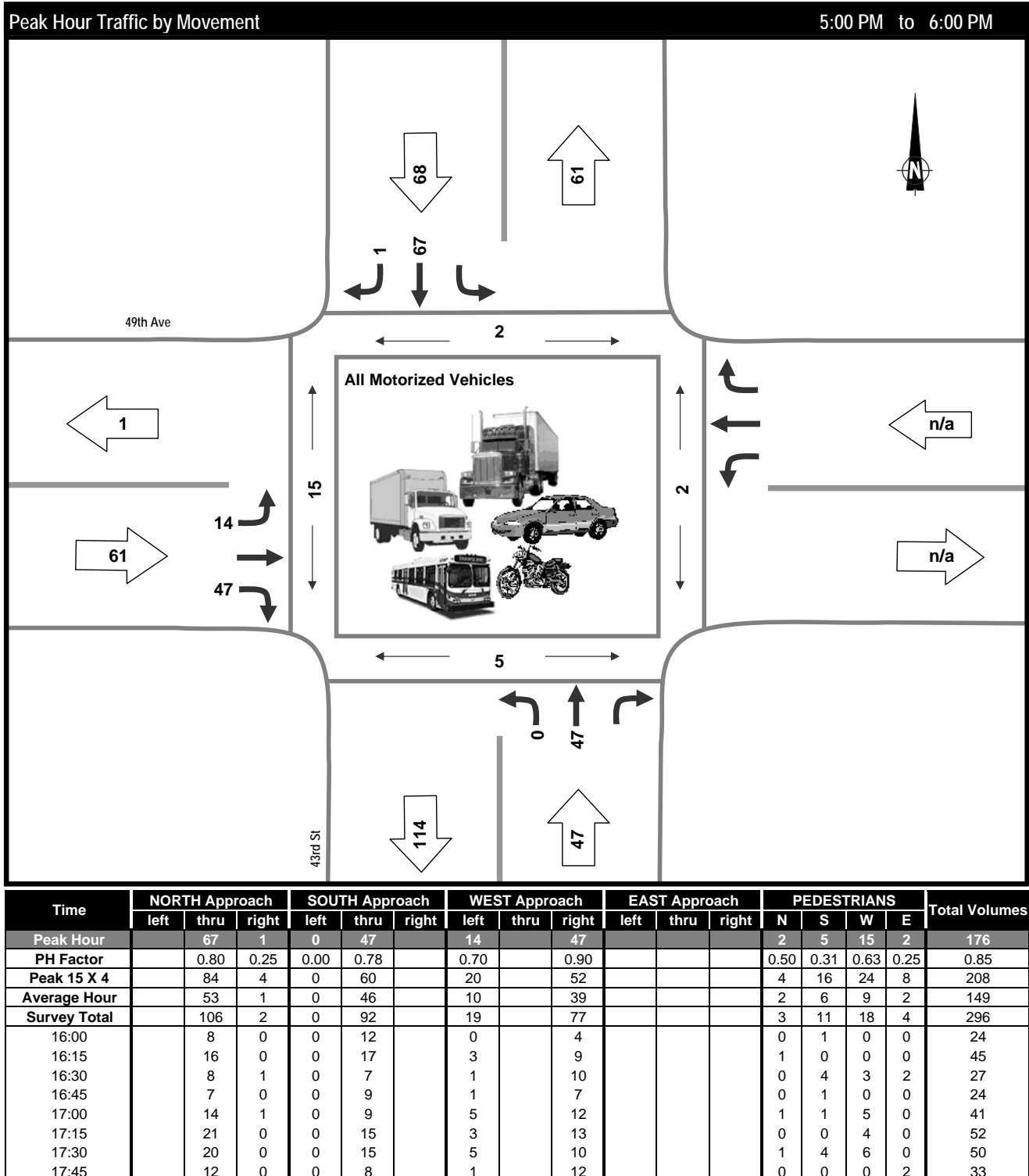
Peak Hour Traffic by Movement 7:45 AM to 8:45 AM



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour		99	1	0	33		2		19				0	1	5	0	154
PH Factor		0.63	0.25	0.00	0.69		0.50		0.68				0.00	0.25	0.31	0.00	0.79
Peak 15 X 4		156	4	0	48		4		28				0	4	16	0	196
Average Hour		67	2	0	23		2		15				1	2	4	2	109
Survey Total		133	3	0	45		3		29				2	4	8	4	213
7:00		5	0	0	0		0		3				0	0	1	0	8
7:15		8	0	0	1		0		1				2	0	0	1	10
7:30		10	0	0	5		1		0				0	3	2	2	16
7:45		17	0	0	10		0		4				0	0	1	0	31
8:00		33	0	0	12		1		3				0	0	4	0	49
8:15		39	0	0	3		0		7				0	0	0	0	49
8:30		10	1	0	8		1		5				0	1	0	0	25
8:45		11	2	0	6		0		6				0	0	0	1	25

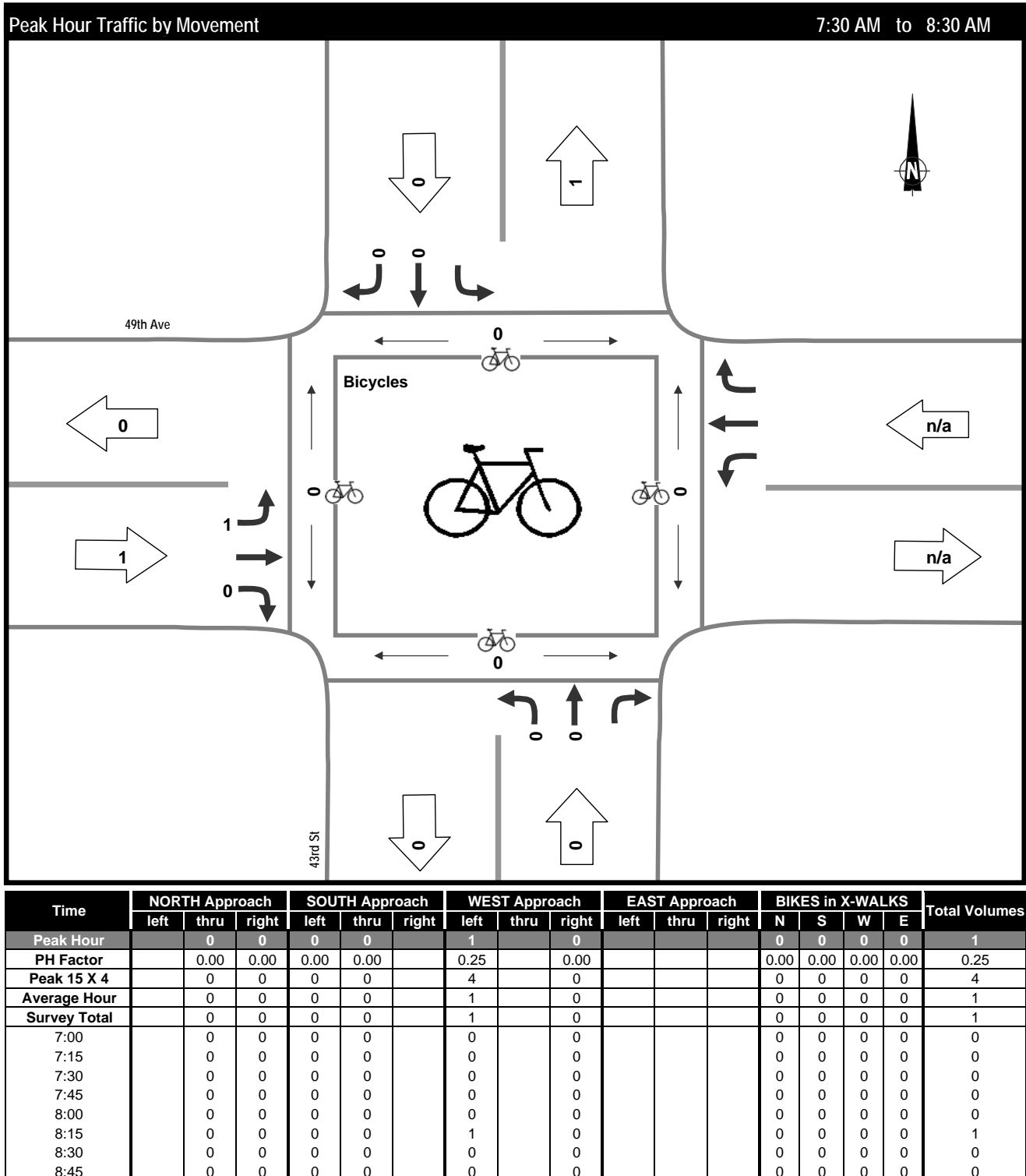
Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny
Vehicle Class: All Motorized Vehicles

Afternoon Peak Period



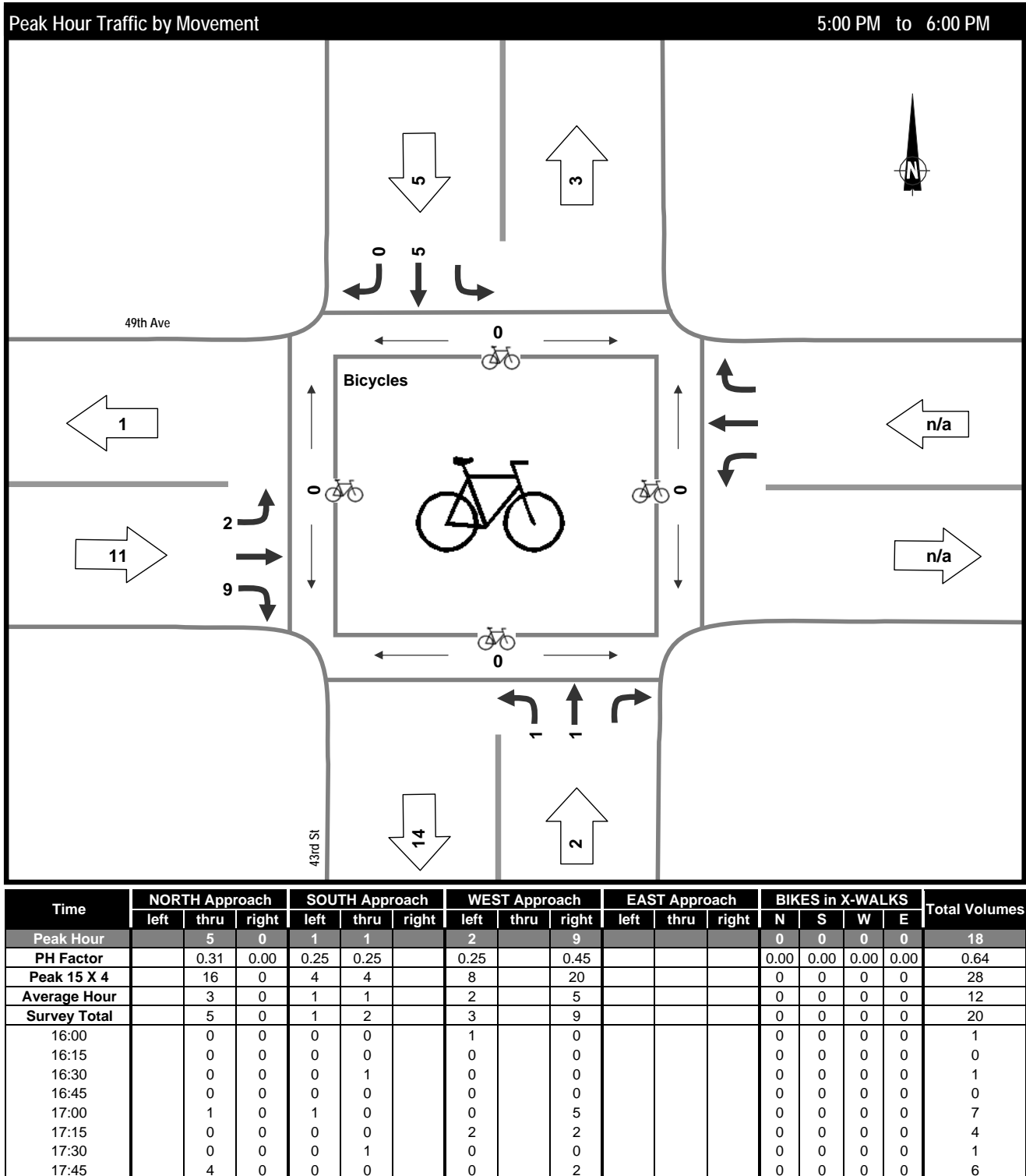
Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Bicycles

Morning Peak Period



Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Bicycles

Afternoon Peak Period





Vehicle Classification Summary

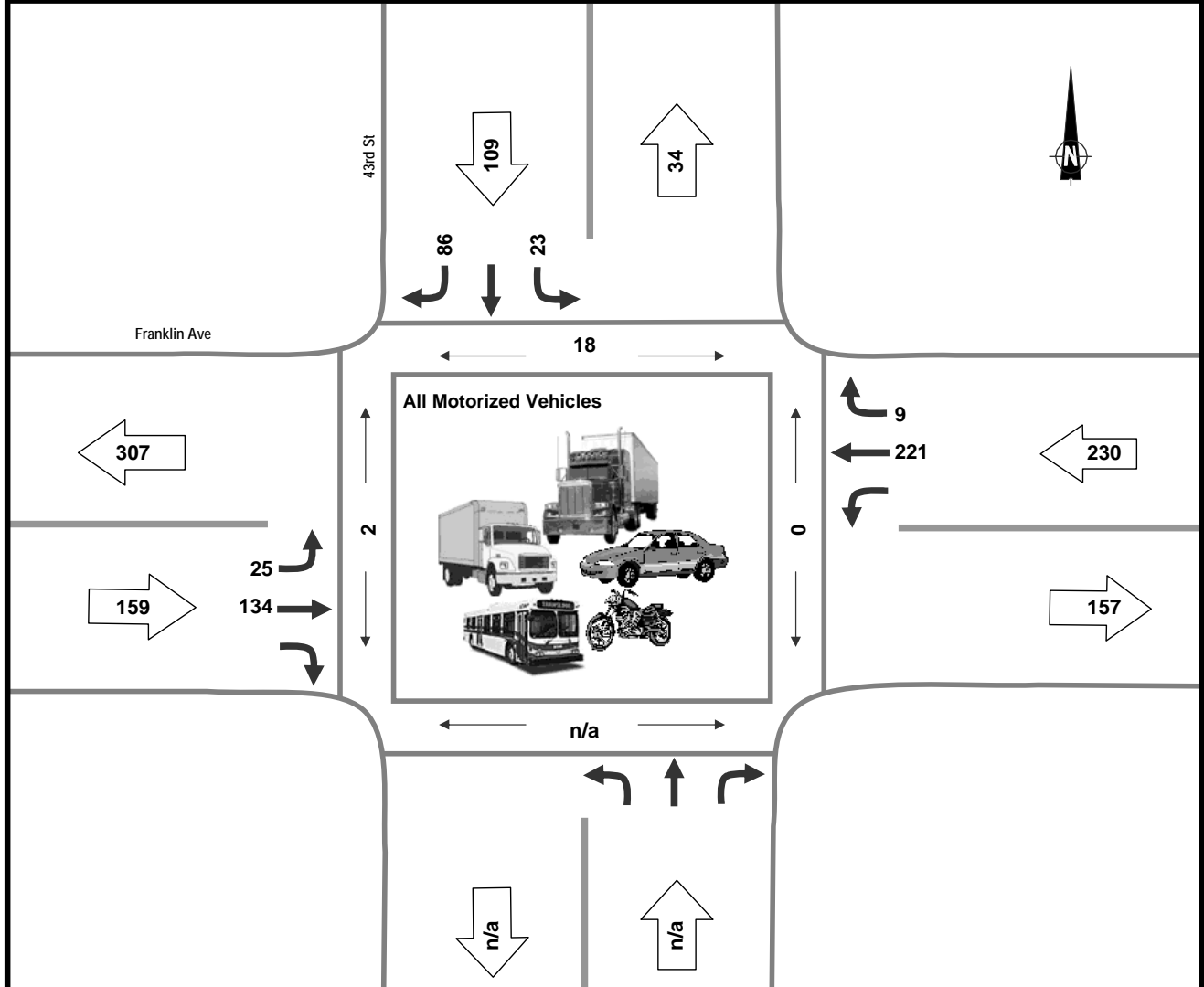
Project: #3989: Niven Lake Phase V Traffic Impact Study
Municipality: Yellowknife, NWT
Weather: Sunny

Time Period	Entering Intersection	Vehicle Classification				Total
		All Motorized Vehicles				
Morning (07:00 - 09:00)	Volume	720				720
	%	100.0%				100.0%
Afternoon (16:00 - 18:00)	Volume	1,083				1,083
	%	100.0%				100.0%
Total (4 Hours)	Volume	1,803				1,803
	%	100.0%				100.0%

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: All Motorized Vehicles

Morning Peak Period

Peak Hour Traffic by Movement 8:00 AM to 9:00 AM



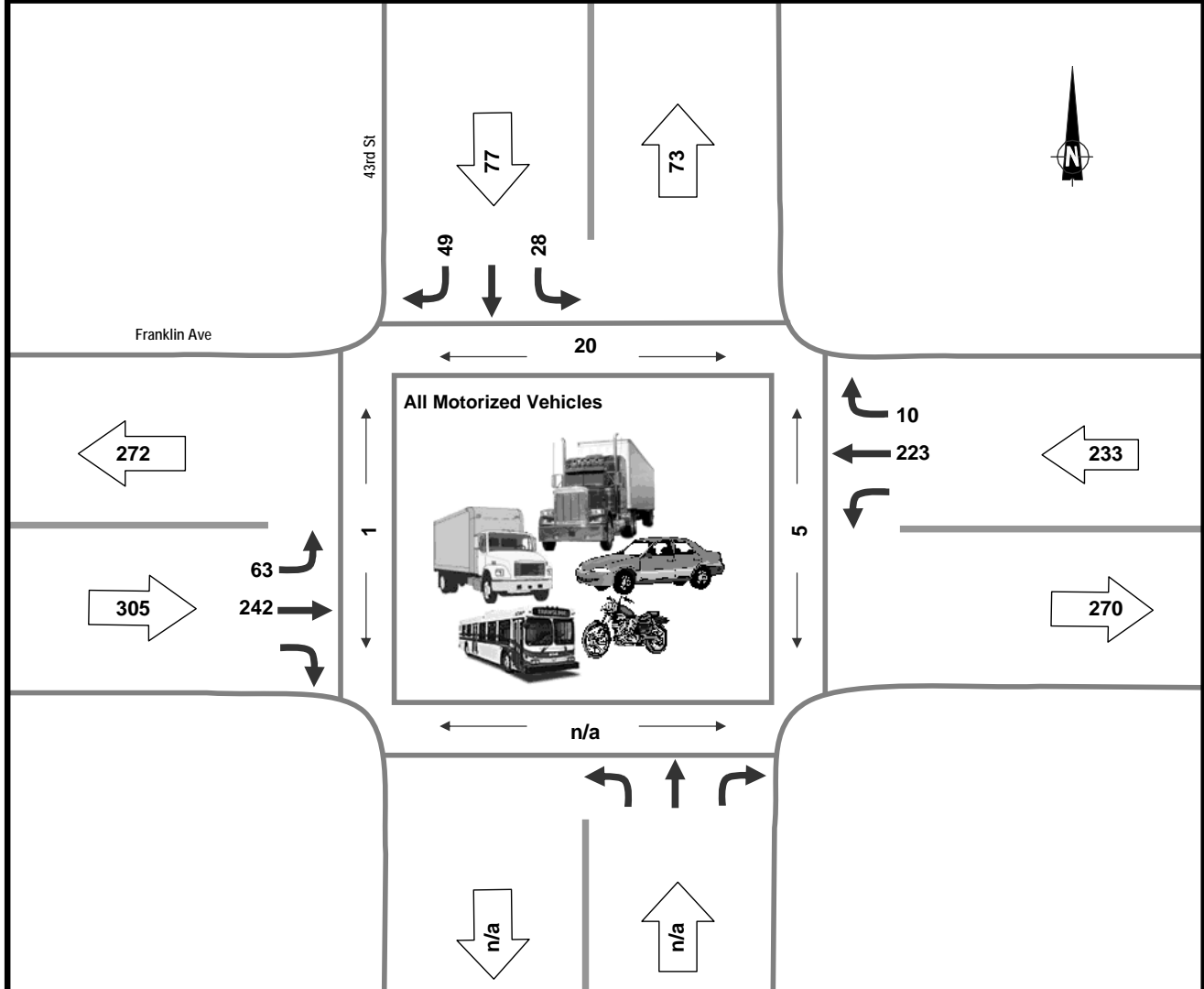
Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	23		86				25	134			221	9	18		2	0	498
PH Factor	0.58		0.60				0.78	0.76			0.82	0.75	0.50		0.25	0.00	0.76
Peak 15 X 4	40		144				32	176			268	12	36		8	0	652
Average Hour	15		62				18	100			159	8	15		2	0	362
Survey Total	29		123				36	200			317	15	29		3	0	720
7:00	1		5				0	11			12	0	0		1	0	29
7:15	0		8				1	19			14	0	2		0	0	42
7:30	1		10				3	16			38	3	1		0	0	71
7:45	4		14				7	20			32	3	8		0	0	80
8:00	5		30				8	31			53	3	5		2	0	130
8:15	10		36				5	44			67	1	9		0	0	163
8:30	5		10				6	29			44	3	4		0	0	97
8:45	3		10				6	30			57	2	0		0	0	108

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: All Motorized Vehicles

Afternoon Peak Period

Peak Hour Traffic by Movement

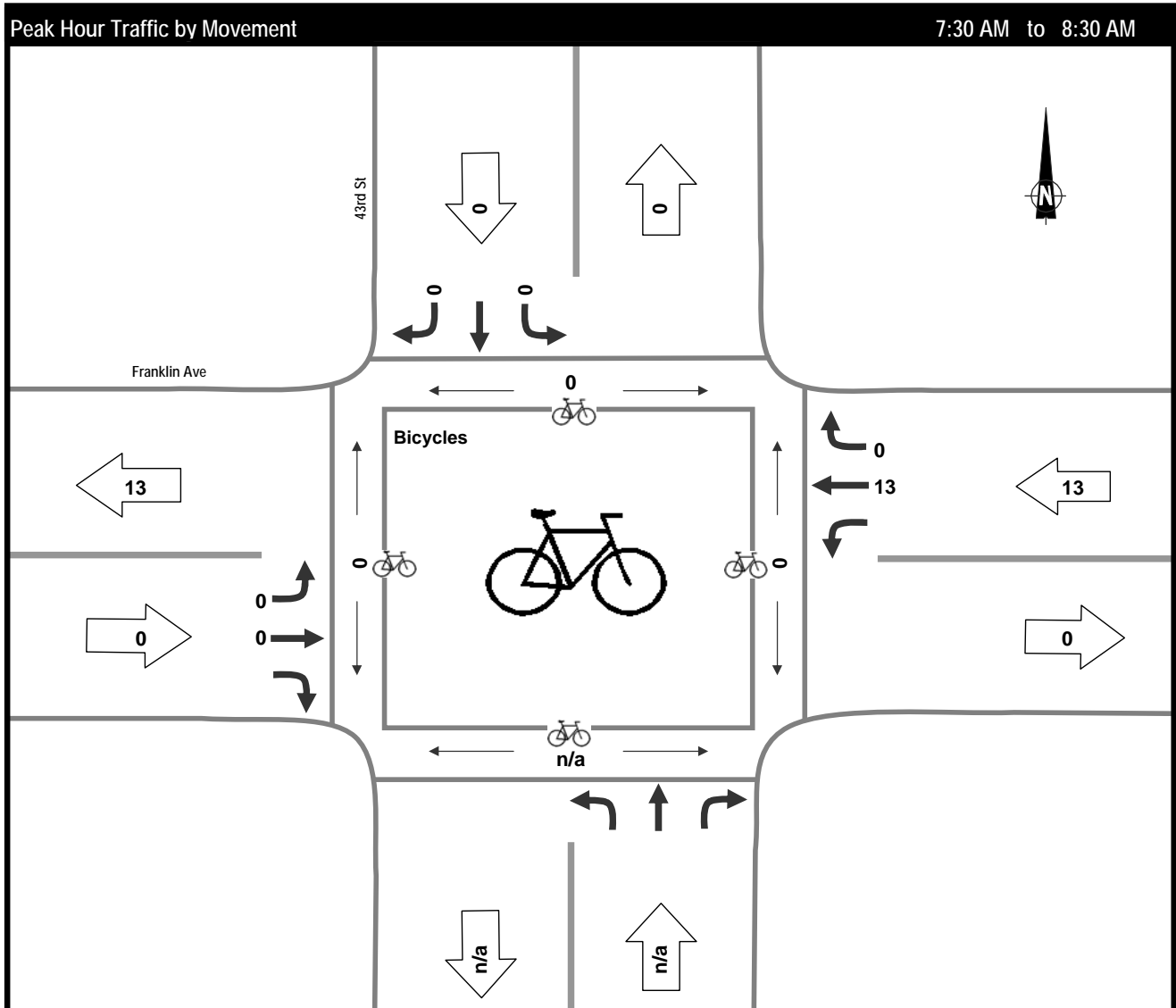
4:30 PM to 5:30 PM



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	28		49				63	242			223	10	20		1	5	615
PH Factor	0.54		0.72				0.83	0.83			0.83	0.83	0.63		0.25	0.31	0.92
Peak 15 X 4	52		68				76	292			268	12	32		4	16	668
Average Hour	29		44				62	214			182	12	20		1	4	543
Survey Total	58		87				123	428			364	23	40		1	7	1,083
16:00	0		5				13	45			42	3	3		0	0	108
16:15	10		10				15	40			29	4	3		0	2	108
16:30	5		10				12	63			56	3	6		1	4	149
16:45	4		7				14	50			60	2	3		0	0	137
17:00	6		17				19	56			67	2	3		0	0	167
17:15	13		15				18	73			40	3	8		0	1	162
17:30	10		10				22	57			41	4	5		0	0	144
17:45	10		13				10	44			29	2	9		0	0	108

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Bicycles

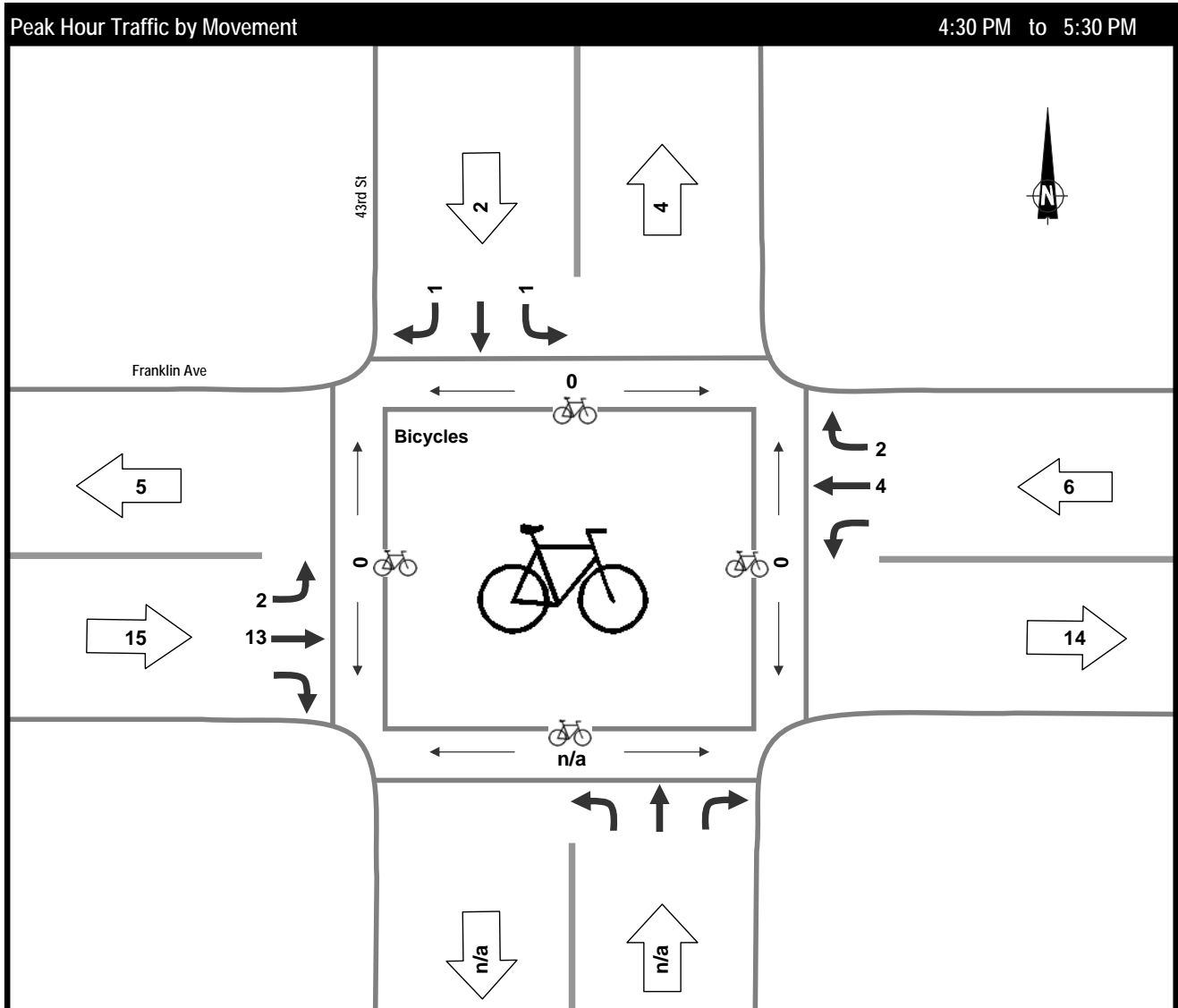
Morning Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			BIKES in X-WALKS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	0		0				0	0			13	0	0	0	0	0	13
PH Factor	0.00		0.00				0.00	0.00			0.46	0.00	0.00	0.00	0.00	0.00	0.46
Peak 15 X 4	0		0				0	0			28	0	0	0	0	0	28
Average Hour	0		0				0	0			8	0	0	0	0	0	8
Survey Total	0		0				0	0			16	0	0	0	0	0	16
7:00	0		0				0	0			0	0	0	0	0	0	0
7:15	0		0				0	0			2	0	0	0	0	0	2
7:30	0		0				0	0			1	0	0	0	0	0	1
7:45	0		0				0	0			1	0	0	0	0	0	1
8:00	0		0				0	0			4	0	0	0	0	0	4
8:15	0		0				0	0			7	0	0	0	0	0	7
8:30	0		0				0	0			1	0	0	0	0	0	1
8:45	0		0				0	0			0	0	0	0	0	0	0

Project: #3989: Niven Lake Phase V Traffic Impact Study
 Municipality: Yellowknife, NWT
 Weather: Sunny
 Vehicle Class: Bicycles

Afternoon Peak Period



Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			BIKES in X-WALKS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	1		1				2	13			4	2	0		0	0	23
PH Factor	0.25		0.25				0.50	0.46			0.33	0.50	0.00		0.00	0.00	0.48
Peak 15 X 4	4		4				4	28			12	4	0		0	0	48
Average Hour	1		1				1	9			3	1	0		0	0	16
Survey Total	2		1				2	18			5	2	0		0	0	30
16:00	0		0				0	2			0	0	0		0	0	2
16:15	0		0				0	0			0	0	0		0	0	0
16:30	0		0				1	3			0	0	0		0	0	4
16:45	0		1				0	0			0	0	0		0	0	1
17:00	1		0				0	7			3	1	0		0	0	12
17:15	0		0				1	3			1	1	0		0	0	6
17:30	0		0				0	2			1	0	0		0	0	3
17:45	1		0				0	1			0	0	0		0	0	2

APPENDIX D

Intersection Capacity Analysis Worksheets

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Highway 4 & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Highway 4
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street: Approach Movement	Vehicle Volumes and Adjustments					
	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume		205	36	37	304	
Peak-Hour Factor, PHF		0.82	0.82	0.82	0.82	
Hourly Flow Rate, HFR		250	43	45	370	
Percent Heavy Vehicles		--	--	1	--	--
Median Type/Storage	Undivided			/		
RT Channelized?	1 No		1			
Lanes	1	1		1	1	
Configuration	T	R		L	T	
Upstream Signal?	No				No	

Minor Street: Approach Movement	Westbound			Eastbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	88		34			
Peak Hour Factor, PHF	0.82		0.82			
Hourly Flow Rate, HFR	107		41			
Percent Heavy Vehicles	1		1			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage	0 No		/			/
Lanes	0		0			
Configuration	LR					

Approach Movement	Delay, Queue Length, and Level of Service					
	NB	SB	Westbound		Eastbound	
	1	4	7	8	9	10
Lane Config	L	L	LR	LR		10
v (vph)	45		148			
C(m) (vph)	1272		449			
v/c	0.04		0.33			
95% queue length	0.11		1.42			
Control Delay	7.9		16.9			
LOS	A		C			
Approach Delay			16.9			
Approach LOS			C			

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Highway 4 & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Highway 4
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street: Approach Movement	Vehicle Volumes and Adjustments					
	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume		226	52	52	334	
Peak-Hour Factor, PHF		0.65	0.65	0.65	0.65	
Hourly Flow Rate, HFR		347	80	80	513	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?	1 No		1			
Lanes	1	1		1	1	
Configuration	T	R		L	T	
Upstream Signal?	No				No	

Minor Street: Approach Movement	Westbound			Eastbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	131		50			
Peak Hour Factor, PHF	0.65		0.65			
Hourly Flow Rate, HFR	201		76			
Percent Heavy Vehicles	2		1			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage	0 No		/			/
Lanes	0		0			
Configuration	LR					

Approach Movement	Delay, Queue Length, and Level of Service					
	NB	SB	Westbound		Eastbound	
	1	4	7	8	9	10
Lane Config	L	L	LR	LR		10
v (vph)	80		277			
C(m) (vph)	1130		295			
v/c	0.07		0.94			
95% queue length	0.23		9.13			
Control Delay	8.4		76.6			
LOS	A		F			
Approach Delay			76.6			
Approach LOS			F			

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Highway 4 & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Highway 4
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume			226	56	56	334	
Peak-Hour Factor, PHF			0.65	0.65	0.65	0.65	
Hourly Flow Rate, HFR			347	86	86	513	
Percent Heavy Vehicles			--	--	2	--	--
Median Type/Storage		Undivided			/		
RT Channelized?		No					
Lanes		1	1		1	1	
Configuration		T	R		L	T	
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Westbound			Eastbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume		155		59			
Peak Hour Factor, PHF		0.65		0.65			
Hourly Flow Rate, HFR		238		90			
Percent Heavy Vehicles		2		1			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage		0		No	/		/
Lanes		0		0			
Configuration		LR					

Approach Movement	Delay, Queue Length, and Level of Service											
	NB	SB	Westbound			Eastbound						
	1	4	7	8	9	10	11	12				
Lane Config	L	L	L	LR	L	L	L	L				
v (vph)	86			328								
C(m) (vph)	1125			289								
v/c	0.08			1.13								
95% queue length	0.25			13.79								
Control Delay	8.5			133.2								
LOS	A			F								
Approach Delay				133.2								
Approach LOS				F								

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Highway 4 & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Highway 4
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume			246	70	70	365	
Peak-Hour Factor, PHF			0.65	0.65	0.65	0.65	
Hourly Flow Rate, HFR			378	107	107	561	
Percent Heavy Vehicles			--	--	2	--	--
Median Type/Storage		Undivided			/		
RT Channelized?		No					
Lanes		1	1		1	1	
Configuration		T	R		L	T	
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Westbound			Eastbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume		209		80			
Peak Hour Factor, PHF		0.65		0.65			
Hourly Flow Rate, HFR		321		123			
Percent Heavy Vehicles		2		1			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage		0		No	/		/
Lanes		0		0			
Configuration		LR					

Approach Movement	Delay, Queue Length, and Level of Service											
	NB	SB	Westbound			Eastbound						
	1	4	7	8	9	10	11	12				
Lane Config	L	L	L	LR	L	L	L	L				
v (vph)	107			444								
C(m) (vph)	1076			244								
v/c	0.10			1.82								
95% queue length	0.33			30.47								
Control Delay	8.7			418.9								
LOS	A			F								
Approach Delay				418.9								
Approach LOS				F								

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Highway 4 & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Highway 4
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume			338	78	54	292	
Peak-Hour Factor, PHF			0.74	0.74	0.74	0.74	
Hourly Flow Rate, HFR			456	105	72	394	
Percent Heavy Vehicles			--	--	1	--	--
Median Type/Storage		Undivided			/		
RT Channelized?		No					
Lanes		1	1		1	1	
Configuration		T	R		L	T	
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Westbound			Eastbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume		49		38			
Peak Hour Factor, PHF		0.74		0.74			
Hourly Flow Rate, HFR		66		51			
Percent Heavy Vehicles		1		1			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage		0		No	/		/
Lanes		0		0			
Configuration		LR					

Approach Movement	Delay, Queue Length, and Level of Service											
	NB	SB	Westbound			Eastbound						
	1	4	7	8	9	10	11	12				
Lane Config	L	L	L	LR	L	L	LR	L				
v (vph)	72		117									
C(m) (vph)	1013		339									
v/c	0.07		0.35									
95% queue length	0.23		1.50									
Control Delay	8.8		21.1									
LOS	A		C									
Approach Delay			21.1									
Approach LOS			C									

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Highway 4 & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Highway 4
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume			372	124	85	321	
Peak-Hour Factor, PHF			0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR			476	158	108	411	
Percent Heavy Vehicles			--	--	2	--	--
Median Type/Storage		Undivided			/		
RT Channelized?		No					
Lanes		1	1		1	1	
Configuration		T	R		L	T	
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Westbound			Eastbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume		69		53			
Peak Hour Factor, PHF		0.78		0.78			
Hourly Flow Rate, HFR		88		67			
Percent Heavy Vehicles		2		2			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage		0		No	/		/
Lanes		0		0			
Configuration		LR					

Approach Movement	Delay, Queue Length, and Level of Service											
	NB	SB	Westbound			Eastbound						
	1	4	7	8	9	10	11	12				
Lane Config	L	L	L	LR	L	L	LR	L				
v (vph)	108		155									
C(m) (vph)	947		288									
v/c	0.11		0.54									
95% queue length	0.38		2.97									
Control Delay	9.3		31.2									
LOS	A		D									
Approach Delay			31.2									
Approach LOS			D									

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Highway 4 & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Highway 4
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street: Approach Movement	Vehicle Volumes and Adjustments					
	Northbound			Southbound		
	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		372	148	102	321	
Peak-Hour Factor, PHF		0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR		476	189	130	411	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?	No			/		
Lanes	1	1		1	1	
Configuration	T	R		L	T	
Upstream Signal?	No			No		

Minor Street: Approach Movement	Westbound			Eastbound		
	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	78		60			
Peak Hour Factor, PHF	0.78		0.78			
Hourly Flow Rate, HFR	100		76			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage	No		/	/		/
Lanes	0		0			
Configuration	LR					

Approach Movement	Delay, Queue Length, and Level of Service					
	NB	SB	Westbound		Eastbound	
	1	4	7	8	9	10
	L	L	LR	LR		11
						12
v (vph)	130		176			
C(m) (vph)	922		267			
v/c	0.14		0.66			
95% queue length	0.49		4.23			
Control Delay	9.5		41.2			
LOS	A		E			
Approach Delay			41.2			
Approach LOS			E			

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Highway 4 & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Highway 4
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street: Approach Movement	Vehicle Volumes and Adjustments					
	Northbound			Southbound		
	1	2	3	4	5	6
	L	T	R	L	T	R
Volume		406	207	144	350	
Peak-Hour Factor, PHF		0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR		520	265	184	448	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?	No			/		
Lanes	1	1		1	1	
Configuration	T	R		L	T	
Upstream Signal?	No			No		

Minor Street: Approach Movement	Westbound			Eastbound		
	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	103		80			
Peak Hour Factor, PHF	0.78		0.78			
Hourly Flow Rate, HFR	132		102			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage	No		/	/		/
Lanes	0		0			
Configuration	LR					

Approach Movement	Delay, Queue Length, and Level of Service					
	NB	SB	Westbound		Eastbound	
	1	4	7	8	9	10
	L	L	LR	LR		11
						12
v (vph)	184		234			
C(m) (vph)	832		198			
v/c	0.22		1.18			
95% queue length	0.84		11.88			
Control Delay	10.6		170.6			
LOS	B		F			
Approach Delay			170.6			
Approach LOS			F			

HCS+: Unsignalized Intersections Release 5.6

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Haener Dr & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Haener Drive

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	56	0	19	0	0	0	33	3	0	0	2	89
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LR				LT		TR	
PHF	0.66				0.66		0.66	
Flow Rate	112				53		137	
% Heavy Veh	0				0		0	
No. Lanes		1				1		1
Opposing-Lanes		0				1		1
Conflicting-lanes		1				1		1
Geometry group		1				1		1
Duration, T	0.25	hrs.						

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	112				53		137	
Left-Turn	84				49		0	
Right-Turn	28				0		134	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.3				0.0		1.0	
Prop. Heavy Vehicle	0.0				0.0		0.0	
Geometry Group		1				1		1
Adjustments Exhibit 17-33:								
hLT-adj		0.2				0.2		0.2
hRT-adj		-0.6				-0.6		-0.6
hHV-adj		1.7				1.7		1.7
hadj, computed		-0.0				0.2		-0.6

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	112				53		137	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.10				0.05		0.12	
hd, final value	4.29				4.47		3.63	
x, final value	0.13				0.07		0.14	
Move-up time, m		2.0				2.0		2.0
Service Time		2.3				2.5		1.6

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	112				53		137	
Service Time	2.3				2.5		1.6	
Utilization, x	0.13				0.07		0.14	
Dep. headway, hd	4.29				4.47		3.63	
Capacity	362				303		387	
Delay	7.94				7.78		7.21	
LOS	A				A		A	
Approach:								
Delay		7.94				7.78		7.21
LOS		A				A		A
Intersection Delay	7.58							
Intersection LOS					A			

HCS+: Unsignalized Intersections Release 5.6

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Haener Dr & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Haener Drive

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	85	0	21	0	0	0	36	3	0	0	2	145
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LR				LT		TR	
PHF	0.65				0.65		0.65	
Flow Rate	162				59		226	
% Heavy Veh	2				2		2	
No. Lanes		1			1		1	
Opposing-Lanes		0			1		1	
Conflicting-lanes		1			1		1	
Geometry group		1			1		1	
Duration, T	0.25	hrs.						

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	162				59		226	
Left-Turn	130				55		0	
Right-Turn	32				0		223	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.2				0.0		1.0	
Prop. Heavy Vehicle	0.0				0.0		0.0	
Geometry Group	1				1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2				0.2		0.2	
hRT-adj	-0.6				-0.6		-0.6	
hHV-adj	1.7				1.7		1.7	
hadj, computed	0.1				0.2		-0.6	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	162				59		226	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.14				0.05		0.20	
hd, final value	4.57				4.75		3.81	
x, final value	0.21				0.08		0.24	
Move-up time, m		2.0				2.0		2.0
Service Time	2.6				2.7		1.8	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	162				59		226	
Service Time	2.6				2.7		1.8	
Utilization, x	0.21				0.08		0.24	
Dep. headway, hd	4.57				4.75		3.81	
Capacity	412				309		476	
Delay	8.75				8.15		8.01	
LOS	A				A		A	
Approach:								
Delay		8.75				8.15		8.01
LOS		A				A		A
Intersection Delay	8.30				Intersection LOS	A		

HCS+: Unsignalized Intersections Release 5.6

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Haener Dr & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Haener Drive

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	90	0	24	0	0	0	40	3	0	0	2	174
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LR				LT		TR	
PHF	0.65				0.65		0.65	
Flow Rate	174				65		270	
% Heavy Veh	2				2		2	
No. Lanes		1				1		1
Opposing-Lanes		0				1		1
Conflicting-lanes		1				1		1
Geometry group		1				1		1
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	174				65		270	
Left-Turn	138				61		0	
Right-Turn	36				0		267	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.2				0.0		1.0	
Prop. Heavy Vehicle	0.0				0.0		0.0	
Geometry Group		1				1		1
Adjustments Exhibit 17-33:								
hLT-adj		0.2				0.2		0.2
hRT-adj		-0.6				-0.6		-0.6
hHV-adj		1.7				1.7		1.7
hadj, computed	0.1				0.2		-0.6	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	174				65		270	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.15				0.06		0.24	
hd, final value	4.68				4.84		3.86	
x, final value	0.23				0.09		0.29	
Move-up time, m		2.0				2.0		2.0
Service Time	2.7				2.8		1.9	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	174				65		270	
Service Time	2.7				2.8		1.9	
Utilization, x	0.23				0.09		0.29	
Dep. headway, hd	4.68				4.84		3.86	
Capacity	424				315		520	
Delay	9.04				8.30		8.43	
LOS	A				A		A	
Approach:								
Delay		9.04				8.30		8.43
LOS		A				A		A
Intersection Delay	8.62				Intersection LOS		A	

HCS+: Unsignalized Intersections Release 5.6

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Haener Dr & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Haener Drive

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	117	0	26	0	0	0	44	4	0	0	2	245
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LR				LT		TR	
PHF	0.65				0.65		0.65	
Flow Rate	220				73		379	
% Heavy Veh	2				2		2	
No. Lanes		1			1		1	
Opposing-Lanes		0		1	1		1	
Conflicting-lanes		1			1		1	
Geometry group		1			1		1	
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	220				73		379	
Left-Turn	180				67		0	
Right-Turn	40				0		376	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.2				0.0		1.0	
Prop. Heavy Vehicle	0.0				0.0		0.0	
Geometry Group	1				1		1	
Adjustments Exhibit 17-33:								
hLT-adj	0.2				0.2		0.2	
hRT-adj	-0.6				-0.6		-0.6	
hHV-adj	1.7				1.7		1.7	
hadj, computed	0.1				0.2		-0.6	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	220				73		379	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.20				0.06		0.34	
hd, final value	4.97				5.12		4.03	
x, final value	0.30				0.10		0.42	
Move-up time, m		2.0				2.0		2.0
Service Time	3.0				3.1		2.0	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	220				73		379	
Service Time	3.0				3.1		2.0	
Utilization, x	0.30				0.10		0.42	
Dep. headway, hd	4.97				5.12		4.03	
Capacity	470				323		629	
Delay	10.13				8.72		9.97	
LOS	B				A		A	
Approach:								
Delay		10.13				8.72		9.97
LOS		B				A		A
Intersection Delay	9.89				Intersection LOS		A	

HCS+: Unsignalized Intersections Release 5.6

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Haener Dr & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Haener Drive

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	97	0	35	0	0	0	19	2	0	0	4	68
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LR				LT		TR	
PHF	0.87				0.87		0.87	
Flow Rate	151				23		82	
% Heavy Veh	0				0		0	
No. Lanes		1			1		1	
Opposing-Lanes		0			1		1	
Conflicting-lanes		1			1		1	
Geometry group		1			1		1	
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	151				23		82	
Left-Turn	111				21		0	
Right-Turn	40				0		78	
Prop. Left-Turns	0.7				0.9		0.0	
Prop. Right-Turns	0.3				0.0		1.0	
Prop. Heavy Vehicle	0.0				0.0		0.0	
Geometry Group		1			1		1	
Adjustments Exhibit 17-33:								
hLT-adj		0.2			0.2		0.2	
hRT-adj		-0.6			-0.6		-0.6	
hHV-adj		1.7			1.7		1.7	
hadj, computed		-0.0			0.2		-0.6	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	151				23		82	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.13				0.02		0.07	
hd, final value	4.10				4.50		3.69	
x, final value	0.17				0.03		0.08	
Move-up time, m		2.0				2.0		2.0
Service Time		2.1				2.5		1.7

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	151				23		82	
Service Time	2.1				2.5		1.7	
Utilization, x	0.17				0.03		0.08	
Dep. headway, hd	4.10				4.50		3.69	
Capacity	401				273		332	
Delay	7.95				7.63		7.03	
LOS	A				A		A	
Approach:								
Delay		7.95				7.63		7.03
LOS		A				A		A
Intersection Delay	7.63				Intersection LOS		A	

HCS+: Unsignalized Intersections Release 5.6

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Haener Dr & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Haener Drive

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	171	0	39	0	0	0	21	2	0	0	4	101
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LR				LT		TR	
PHF	0.78				0.78		0.78	
Flow Rate	269				28		134	
% Heavy Veh	2				2		2	
No. Lanes		1			1		1	
Opposing-Lanes		0			1		1	
Conflicting-lanes		1			1		1	
Geometry group		1			1		1	
Duration, T	0.25	hrs.						

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	269				28		134	
Left-Turn	219				26		0	
Right-Turn	50				0		129	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.2				0.0		1.0	
Prop. Heavy Vehicle	0.0				0.0		0.0	
Geometry Group		1			1		1	
Adjustments Exhibit 17-33:								
hLT-adj		0.2			0.2		0.2	
hRT-adj		-0.6			-0.6		-0.6	
hHV-adj		1.7			1.7		1.7	
hadj, computed	0.1				0.2		-0.5	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	269				28		134	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.24				0.02		0.12	
hd, final value	4.34				4.90		4.03	
x, final value	0.32				0.04		0.15	
Move-up time, m		2.0				2.0		2.0
Service Time	2.3				2.9		2.0	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	269				28		134	
Service Time	2.3				2.9		2.0	
Utilization, x	0.32				0.04		0.15	
Dep. headway, hd	4.34				4.90		4.03	
Capacity	519				278		384	
Delay	9.41				8.10		7.74	
LOS	A				A		A	
Approach:								
Delay		9.41				8.10		7.74
LOS		A				A		A
Intersection Delay	8.81							
Intersection LOS						A		

HCS+: Unsignalized Intersections Release 5.6

ALL-WAY STOP CONTROL (AWSC) ANALYSIS

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Haener Dr & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Haener Drive

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	203	0	48	0	0	0	24	2	0	0	4	114
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LR				LT		TR	
PHF	0.78				0.78		0.78	
Flow Rate	321				32		151	
% Heavy Veh	2				2		2	
No. Lanes		1				1		1
Opposing-Lanes		0				1		1
Conflicting-lanes		1				1		1
Geometry group		1				1		1
Duration, T	0.25	hrs.						

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	321				32		151	
Left-Turn	260				30		0	
Right-Turn	61				0		146	
Prop. Left-Turns	0.8				0.9		0.0	
Prop. Right-Turns	0.2				0.0		1.0	
Prop. Heavy Vehicle	0.0				0.0		0.0	
Geometry Group		1				1		1
Adjustments Exhibit 17-33:								
hLT-adj		0.2				0.2		0.2
hRT-adj		-0.6				-0.6		-0.6
hHV-adj		1.7				1.7		1.7
hadj, computed	0.1				0.2		-0.5	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	321				32		151	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.29				0.03		0.13	
hd, final value	4.40				5.07		4.17	
x, final value	0.39				0.05		0.17	
Move-up time, m		2.0				2.0		2.0
Service Time	2.4				3.1		2.2	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	321				32		151	
Service Time	2.4				3.1		2.2	
Utilization, x	0.39				0.05		0.17	
Dep. headway, hd	4.40				5.07		4.17	
Capacity	571				282		401	
Delay	10.21				8.31		8.04	
LOS	B				A		A	
Approach:								
Delay		10.21				8.31		8.04
LOS		B				A		A
Intersection Delay	9.44					Intersection LOS	A	

HCS+: Unsignalized Intersections Release 5.6

ALL-WAY STOP CONTROL(AWSC) ANALYSIS

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Haener Dr & Niven Gate
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Gate
 North/South Street: Haener Drive

Worksheet 2 - Volume Adjustments and Site Characteristics

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	299	0	51	0	0	0	26	2	0	0	5	157
% Thrus Left Lane												

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LR				LT		TR	
PHF	0.78				0.78		0.78	
Flow Rate	448				35		207	
% Heavy Veh	2				2		2	
No. Lanes		1				1		1
Opposing-Lanes		0				1		1
Conflicting-lanes		1				1		1
Geometry group		1				1		1
Duration, T	0.25 hrs.							

Worksheet 3 - Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rates:								
Total in Lane	448				35		207	
Left-Turn	383				33		0	
Right-Turn	65				0		201	
Prop. Left-Turns	0.9				0.9		0.0	
Prop. Right-Turns	0.1				0.0		1.0	
Prop. Heavy Vehicle	0.0				0.0		0.0	
Geometry Group		1				1		1
Adjustments Exhibit 17-33:								
hLT-adj		0.2				0.2		0.2
hRT-adj		-0.6				-0.6		-0.6
hHV-adj		1.7				1.7		1.7
hadj, computed	0.1				0.2		-0.5	

Worksheet 4 - Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow rate	448				35		207	
hd, initial value	3.20	3.20	3.20	3.20	3.20	3.20	3.20	3.20
x, initial	0.40				0.03		0.18	
hd, final value	4.61				5.54		4.53	
x, final value	0.57				0.05		0.26	
Move-up time, m		2.0				2.0		2.0
Service Time	2.6				3.5		2.5	

Worksheet 5 - Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Flow Rate	448				35		207	
Service Time	2.6				3.5		2.5	
Utilization, x	0.57				0.05		0.26	
Dep. headway, hd	4.61				5.54		4.53	
Capacity	698				285		457	
Delay	13.64				8.85		9.12	
LOS	B				A		A	
Approach:								
Delay		13.64				8.85		9.12
LOS		B				A		A
Intersection Delay	12.04					Intersection LOS B		

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak
 Intersection: Driscoll Rd & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Driscoll Road
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street: Approach Movement	Northbound				Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R	
Volume	8	12	16	6			
Peak-Hour Factor, PHF	0.88	0.88	0.88	0.88			
Hourly Flow Rate, HFR	9	13	18	6			
Percent Heavy Vehicles	--	--	1	--	--		
Median Type/Storage	Undivided			/			
RT Channelized?							
Lanes	1	0		0	1		
Configuration		TR		LT			
Upstream Signal?	No				No		

Minor Street: Approach Movement	Westbound			Eastbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	6		40			
Peak Hour Factor, PHF	0.88		0.88			
Hourly Flow Rate, HFR	6		45			
Percent Heavy Vehicles	1		1			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage	No		/			/
Lanes	0		0			
Configuration	LR					

Approach Movement	Delay, Queue Length, and Level of Service							
	NB 1	SB 4	Westbound 7 8		Eastbound 9 10 11 12			
Lane Config	LT	LT	LR	LR				
v (vph)	18		51					
C(m) (vph)	1600		1049					
v/c	0.01		0.05					
95% queue length	0.03		0.15					
Control Delay	7.3		8.6					
LOS	A		A					
Approach Delay			8.6					
Approach LOS			A					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak
 Intersection: Driscoll Rd & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Driscoll Road
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street: Approach Movement	Northbound				Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R	
Volume	9	13	56	7			
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65			
Hourly Flow Rate, HFR	13	20	86	10			
Percent Heavy Vehicles	--	--	2	--	--		
Median Type/Storage	Undivided			/			
RT Channelized?							
Lanes	1	0		0	1		
Configuration		TR		LT			
Upstream Signal?	No				No		

Minor Street: Approach Movement	Westbound			Eastbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	7		54			
Peak Hour Factor, PHF	0.65		0.65			
Hourly Flow Rate, HFR	10		83			
Percent Heavy Vehicles	2		2			
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage	No		/			/
Lanes	0		0			
Configuration	LR					

Approach Movement	Delay, Queue Length, and Level of Service							
	NB 1	SB 4	Westbound 7 8		Eastbound 9 10 11 12			
Lane Config	LT	LT	LR	LR				
v (vph)	86		93					
C(m) (vph)	1579		1007					
v/c	0.05		0.09					
95% queue length	0.17		0.30					
Control Delay	7.4		8.9					
LOS	A		A					
Approach Delay			8.9					
Approach LOS			A					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak
 Intersection: Driscoll Rd & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Driscoll Road
 Intersection Orientation: NS
 Study period (hrs): 0.25

		Vehicle Volumes and Adjustments					
Major Street:	Approach Movement	Northbound			Southbound		
		1 L	2 T	3 R	4 L	5 T	6 R
Volume		9	16	61	7		
Peak-Hour Factor, PHF		0.65	0.65	0.65	0.65		
Hourly Flow Rate, HFR		13	24	93	10		
Percent Heavy Vehicles		--	--	2	--	--	
Median Type/Storage		Undivided		/			
RT Channelized?							
Lanes		1	0		0	1	
Configuration			TR		LT		
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Westbound			Eastbound		
		7 L	8 T	9 R	10 L	11 T	12 R
Volume		11		83			
Peak Hour Factor, PHF		0.65		0.65			
Hourly Flow Rate, HFR		16		127			
Percent Heavy Vehicles		2		2			
Percent Grade (%)		0			0		
Flared Approach: Exists?/Storage		0		No	/		/
Lanes		0		0			
Configuration		LR					

Delay, Queue Length, and Level of Service									
Approach Movement	NB	SB	Westbound			Eastbound			
	1	4	7	8	9	10	11	12	
Lane Config		LT		LR					
v (vph)		93		143					
C(m) (vph)		1574		999					
v/c		0.06		0.14					
95% queue length		0.19		0.50					
Control Delay		7.4		9.2					
LOS		A		A					
Approach Delay				9.2					
Approach LOS				A					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak
 Intersection: Driscoll Rd & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Driscoll Road
 Intersection Orientation: NS
 Study period (hrs): 0.25

		Vehicle Volumes and Adjustments					
Major Street:	Approach Movement	Northbound			Southbound		
		1 L	2 T	3 R	4 L	5 T	6 R
Volume		10	17	62	7		
Peak-Hour Factor, PHF		0.65	0.65	0.65	0.65		
Hourly Flow Rate, HFR		15	26	95	10		
Percent Heavy Vehicles		--	--	2	--	--	
Median Type/Storage		Undivided		/			
RT Channelized?							
Lanes		1	0		0	1	
Configuration			TR		LT		
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Westbound			Eastbound		
		7 L	8 T	9 R	10 L	11 T	12 R
Volume		11		87			
Peak Hour Factor, PHF		0.65		0.65			
Hourly Flow Rate, HFR		16		133			
Percent Heavy Vehicles		2		2			
Percent Grade (%)		0			0		
Flared Approach: Exists?/Storage		0		No	/		/
Lanes		0		0			
Configuration		LR					

Delay, Queue Length, and Level of Service									
Approach Movement	NB	SB	Westbound			Eastbound			
	1	4	7	8	9	10	11	12	
Lane Config		LT		LR					
v (vph)		95		149					
C(m) (vph)		1568		996					
v/c		0.06		0.15					
95% queue length		0.19		0.53					
Control Delay		7.4		9.2					
LOS		A		A					
Approach Delay				9.2					
Approach LOS				A					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak
 Intersection: Driscoll Rd & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Driscoll Road
 Intersection Orientation: NS
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	7	16	54	5		
Peak-Hour Factor, PHF	0.66	0.66	0.66	0.66		
Hourly Flow Rate, HFR	10	24	81	7		
Percent Heavy Vehicles	--	--	1	--	--	
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	1	0		0	1	
Configuration		TR		LT		
Upstream Signal?	No			No		

Minor Street: Approach Movement						
Westbound	Eastbound					
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	10		37			
Peak Hour Factor, PHF	0.66		0.66			
Hourly Flow Rate, HFR	15		56			
Percent Heavy Vehicles	1		1			
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage		No	/			/
Lanes	0	0				
Configuration	LR					

Delay, Queue Length, and Level of Service									
Approach Movement	NB	SB	Westbound			Eastbound			
	1	4	7	8	9	10	11	12	
Lane Config		LT		LR					
v (vph)		81		71					
C(m) (vph)		1570		959					
v/c		0.05		0.07					
95% queue length		0.16		0.24					
Control Delay		7.4		9.1					
LOS		A		A					
Approach Delay				9.1					
Approach LOS				A					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak
 Intersection: Driscoll Rd & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Driscoll Road
 Intersection Orientation: NS
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume		8	18	80	6	
Peak-Hour Factor, PHF		0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR		10	23	102	7	
Percent Heavy Vehicles		--	--	2	--	--
Median Type/Storage		Undivided		/		
RT Channelized?						
Lanes		1	0		0	1
Configuration			TR		LT	
Upstream Signal?		No			No	

Minor Street: Approach Movement						
Westbound	Eastbound					
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	11		64			
Peak Hour Factor, PHF	0.78		0.78			
Hourly Flow Rate, HFR	14		82			
Percent Heavy Vehicles	2		2			
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage		No	/			/
Lanes	0	0				
Configuration	LR					

Delay, Queue Length, and Level of Service									
Approach Movement	NB	SB	Westbound			Eastbound			
	1	4	7	8	9	10	11	12	
Lane Config		LT		LR					
v (vph)		102		96					
C(m) (vph)		1565		966					
v/c		0.07		0.10					
95% queue length		0.21		0.33					
Control Delay		7.5		9.1					
LOS		A		A					
Approach Delay				9.1					
Approach LOS				A					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak
 Intersection: Driscoll Rd & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Driscoll Road
 Intersection Orientation: NS
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	8	27		112	6	
Peak-Hour Factor, PHF	0.78	0.78		0.78	0.78	
Hourly Flow Rate, HFR	10	34		143	7	
Percent Heavy Vehicles	--	--		2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	1	0		0	1	
Configuration	TR			LT		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Westbound			Eastbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	14		77			
Peak Hour Factor, PHF	0.78		0.78			
Hourly Flow Rate, HFR	17		98			
Percent Heavy Vehicles	2		2			
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No		/	/		
Lanes	0	0				
Configuration	LR					

Delay, Queue Length, and Level of Service								
Approach Movement	NB	SB	Westbound			Eastbound		
	1	4 LT	7	8 LR	9	10	11	12
v (vph)		143		115				
C(m) (vph)		1552		930				
v/c		0.09		0.12				
95% queue length		0.30		0.42				
Control Delay		7.6		9.4				
LOS		A		A				
Approach Delay				9.4				
Approach LOS				A				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak
 Intersection: Driscoll Rd & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Driscoll Road
 Intersection Orientation: NS
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	8	28		118	6	
Peak-Hour Factor, PHF	0.78	0.78		0.78	0.78	
Hourly Flow Rate, HFR	10	35		151	7	
Percent Heavy Vehicles	--	--		2	--	--
Median Type/Storage	Undivided		/			
RT Channelized?						
Lanes	1	0		0	1	
Configuration	TR			LT		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Westbound			Eastbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	15		80			
Peak Hour Factor, PHF	0.78		0.78			
Hourly Flow Rate, HFR	19		102			
Percent Heavy Vehicles	2		2			
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No		/	/		
Lanes	0	0				
Configuration	LR					

Delay, Queue Length, and Level of Service								
Approach Movement	NB	SB	Westbound			Eastbound		
	1	4 LT	7	8 LR	9	10	11	12
v (vph)		151		121				
C(m) (vph)		1551		918				
v/c		0.10		0.13				
95% queue length		0.32		0.45				
Control Delay		7.6		9.5				
LOS		A		A				
Approach Delay				9.5				
Approach LOS				A				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Ballantyne Ct & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Ballantyne Court
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	1	32	1	2	26	0
Peak-Hour Factor, PHF	0.80	0.80	0.88	0.88	0.88	0.88
Hourly Flow Rate, HFR	1	39	1	2	29	0
Percent Heavy Vehicles	1	--	--	1	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street: Approach Movement						
Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	4	0	14	0	0	0
Peak Hour Factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Hourly Flow Rate, HFR	4	0	15	0	0	0
Percent Heavy Vehicles	1	1	1	1	1	1
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	Exists?/Storage		No	/	No	/
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Delay, Queue Length, and Level of Service						
Approach Movement Lane Config	EB	WB	Northbound		Southbound	
	1 LTR	4 LTR	7 LTR	8 LTR	9 LTR	10 LTR
v (vph)	1	2	19		0	
C(m) (vph)	1591	1570	1002			
v/c	0.00	0.00	0.02			
95% queue length	0.00	0.00	0.06			
Control Delay	7.3	7.3	8.7			
LOS	A	A	A			
Approach Delay			8.7			
Approach LOS			A			

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Ballantyne Ct & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Ballantyne Court
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	1	73	1	2	39	0
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	1	112	1	3	60	0
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street: Approach Movement						
Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	4	0	15	0	0	0
Peak Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	6	0	23	0	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	Exists?/Storage		No	/	No	/
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Delay, Queue Length, and Level of Service						
Approach Movement Lane Config	EB	WB	Northbound		Southbound	
	1 LTR	4 LTR	7 LTR	8 LTR	9 LTR	10 LTR
v (vph)	1	3	29		0	
C(m) (vph)	1544	1472	898			
v/c	0.00	0.00	0.03			
95% queue length	0.00	0.01	0.10			
Control Delay	7.3	7.5	9.1			
LOS	A	A	A			
Approach Delay			9.1			
Approach LOS			A			

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Ballantyne Ct & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Ballantyne Court
 Intersection Orientation: EW
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	6	84	1	2	41	2
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	9	129	1	3	63	3
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	4	0	15	17	0	20
Peak Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	6	0	23	26	0	30
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No			/		
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Approach Movement	Delay, Queue Length, and Level of Service					
	EB 1 LTR	WB 4 LTR	Northbound 7 LTR		Southbound 10 LTR	
v (vph)	9	3	29		56	
C(m) (vph)	1536	1451	857		835	
v/c	0.01	0.00	0.03		0.07	
95% queue length	0.02	0.01	0.10		0.22	
Control Delay	7.4	7.5	9.3		9.6	
LOS	A	A	A		A	
Approach Delay	9.3			9.6		
Approach LOS	A			A		

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Ballantyne Ct & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Ballantyne Court
 Intersection Orientation: EW
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	6	87	1	2	43	11
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	9	133	1	3	66	16
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	5	0	17	67	0	20
Peak Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	7	0	26	103	0	30
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No			/		
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Approach Movement	Delay, Queue Length, and Level of Service					
	EB 1 LTR	WB 4 LTR	Northbound 7 LTR		Southbound 10 LTR	
v (vph)	9	3	33		133	
C(m) (vph)	1515	1446	849		735	
v/c	0.01	0.00	0.04		0.18	
95% queue length	0.02	0.01	0.12		0.66	
Control Delay	7.4	7.5	9.4		11.0	
LOS	A	A	A		B	
Approach Delay	9.4			11.0		
Approach LOS	A			B		

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Ballantyne Ct & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Ballantyne Court
 Intersection Orientation: EW
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments							
Major Street: Approach Movement	Eastbound			Westbound			
	1 L	2 T	3 R	4 L	5 T	6 R	
Volume	1	45	7	11	44	0	
Peak-Hour Factor, PHF	0.64	0.64	0.64	0.64	0.64	0.64	
Hourly Flow Rate, HFR	1	70	10	17	68	0	
Percent Heavy Vehicles	1	--	--	1	--	--	
Median Type/Storage	Undivided			/			
RT Channelized?							
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			
Upstream Signal?	No			No			

Minor Street: Approach Movement	Northbound			Southbound			
	7 L	8 T	9 R	10 L	11 T	12 R	
Volume	2	0	12	1	0	0	
Peak Hour Factor, PHF	0.64	0.64	0.64	0.64	0.64	0.64	
Hourly Flow Rate, HFR	3	0	18	1	0	0	
Percent Heavy Vehicles	1	1	1	1	1	1	
Percent Grade (%)	0			0			
Flared Approach: Exists?/Storage	No			/			No /
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			

Approach Movement	Delay, Queue Length, and Level of Service						
	EB LTR	WB LTR	Northbound			Southbound	
Lane Config	1	4	7	8	9	10	11 LTR
v (vph)	1	17	21			1	
C(m) (vph)	1524	1519	935			727	
v/c	0.00	0.01	0.02			0.00	
95% queue length	0.00	0.03	0.07			0.00	
Control Delay	7.4	7.4	8.9			10.0-	
LOS	A	A	A			B	
Approach Delay	8.9			10.0-			
Approach LOS	A			A			

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Ballantyne Ct & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Ballantyne Court
 Intersection Orientation: EW
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments							
Major Street: Approach Movement	Eastbound			Westbound			
	1 L	2 T	3 R	4 L	5 T	6 R	
Volume	1	71	8	12	71	0	
Peak-Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR	1	91	10	15	91	0	
Percent Heavy Vehicles	2	--	--	2	--	--	
Median Type/Storage	Undivided			/			
RT Channelized?							
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			
Upstream Signal?	No			No			

Minor Street: Approach Movement	Northbound			Southbound			
	7 L	8 T	9 R	10 L	11 T	12 R	
Volume	2	0	13	1	0	0	
Peak Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR	2	0	16	1	0	0	
Percent Heavy Vehicles	2	2	2	2	2	2	
Percent Grade (%)	0			0			
Flared Approach: Exists?/Storage	No			/			No /
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			

Approach Movement	Delay, Queue Length, and Level of Service						
	EB LTR	WB LTR	Northbound			Southbound	
Lane Config	1	4	7	8	9	10	11 LTR
v (vph)	1	15	18			1	
C(m) (vph)	1489	1487	911			685	
v/c	0.00	0.01	0.02			0.00	
95% queue length	0.00	0.03	0.06			0.00	
Control Delay	7.4	7.4	9.0			10.3	
LOS	A	A	A			B	
Approach Delay	9.0			10.3			
Approach LOS	A			B			

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Ballantyne Ct & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Ballantyne Court
 Intersection Orientation: EW
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	6	84	1	2	41	2
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	9	129	1	3	63	3
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	4	0	15	17	0	20
Peak Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	6	0	23	26	0	30
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No			/		
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Approach Movement	Delay, Queue Length, and Level of Service					
	EB 1 LTR	WB 4 LTR	Northbound 7 LTR		Southbound 11 LTR	
Lane Config			8	9	10	12
v (vph)	9	3	29		56	
C(m) (vph)	1536	1451	857		835	
v/c	0.01	0.00	0.03		0.07	
95% queue length	0.02	0.01	0.10		0.22	
Control Delay	7.4	7.5	9.3		9.6	
LOS	A	A	A		A	
Approach Delay			9.3		9.6	
Approach LOS			A		A	

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Ballantyne Ct & Niven Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive
 North/South Street: Ballantyne Court
 Intersection Orientation: EW
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	25	80	8	13	82	40
Peak-Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Hourly Flow Rate, HFR	32	102	10	16	105	51
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	2	0	14	36	0	10
Peak Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Hourly Flow Rate, HFR	2	0	17	46	0	12
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No			/		
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Approach Movement	Delay, Queue Length, and Level of Service					
	EB 1 LTR	WB 4 LTR	Northbound 7 LTR		Southbound 11 LTR	
Lane Config			8	9	10	12
v (vph)	32	16	19		58	
C(m) (vph)	1410	1473	873		612	
v/c	0.02	0.01	0.02		0.09	
95% queue length	0.07	0.03	0.07		0.31	
Control Delay	7.6	7.5	9.2		11.5	
LOS	A	A	A		B	
Approach Delay			9.2		11.5	
Approach LOS			A		B	

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Ballantyne Court & Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Lemay Dr WB, Ballantyne Ct SB
 North/South Street: Ballantyne Ct NB, Lemay Dr EB
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street: Approach Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	3	3	1	0	18	0
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	4	4	1	0	27	0
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Westbound			Eastbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	4	0	0	15	0	0
Peak Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	6	0	0	23	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No		/	No		/
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Approach Movement Lane Config	Delay, Queue Length, and Level of Service					
	NB 1 LTR	SB 4 LTR	Westbound 7 LTR		Eastbound 10 LTR	
v (vph)	4	0	6		23	
C(m) (vph)	1587	1616	964		964	
v/c	0.00	0.00	0.01		0.02	
95% queue length	0.01	0.00	0.02		0.07	
Control Delay	7.3	7.2	8.8		8.8	
LOS	A	A	A		A	
Approach Delay			8.8		8.8	
Approach LOS			A		A	

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Ballantyne Court & Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Lemay Dr WB, Ballantyne Ct SB
 North/South Street: Ballantyne Ct NB, Lemay Dr EB
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street: Approach Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	3	12	1	0	68	0
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	4	18	1	0	104	0
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Westbound			Eastbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	4	0	0	15	0	0
Peak Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	6	0	0	23	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No		/	No		/
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Approach Movement Lane Config	Delay, Queue Length, and Level of Service					
	NB 1 LTR	SB 4 LTR	Westbound 7 LTR		Eastbound 10 LTR	
v (vph)	4	0	6		23	
C(m) (vph)	1488	1597	841		841	
v/c	0.00	0.00	0.01		0.03	
95% queue length	0.01	0.00	0.02		0.08	
Control Delay	7.4	7.3	9.3		9.4	
LOS	A	A	A		A	
Approach Delay			9.3		9.4	
Approach LOS			A		A	

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Ballantyne Court & Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Lemay Dr WB, Ballantyne Ct SB
 North/South Street: Ballantyne Ct NB, Lemay Dr EB
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:		Vehicle Volumes and Adjustments					
Approach	Movement	Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume		16	14	3	0	8	0
Peak-Hour Factor, PHF		0.78	0.78	0.78	0.78	0.78	0.78
Hourly Flow Rate, HFR		20	17	3	0	10	0
Percent Heavy Vehicles		2	--	--	2	--	--
Median Type/Storage		Undivided			/		
RT Channelized?							
Lanes		0	1	0	0	1	0
Configuration		LTR			LTR		
Upstream Signal?		No			No		

Minor Street:		Westbound			Eastbound		
Approach	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume		2	0	0	7	0	0
Peak Hour Factor, PHF		0.78	0.78	0.78	0.78	0.78	0.78
Hourly Flow Rate, HFR		2	0	0	8	0	0
Percent Heavy Vehicles		2	2	2	2	2	2
Percent Grade (%)		0			0		
Flared Approach: Exists?/Storage		No			/		
Lanes		0	1	0	0	1	0
Configuration		LTR			LTR		

		Delay, Queue Length, and Level of Service							
Approach	Movement	NB	SB	Westbound			Eastbound		
		1	4	7	8	9	10	11	12
		LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR
v (vph)		20	0	2			8		
C(m) (vph)		1610	1596	916			916		
v/c		0.01	0.00	0.00			0.01		
95% queue length		0.04	0.00	0.01			0.03		
Control Delay		7.3	7.3	8.9			9.0		
LOS		A	A	A			A		
Approach Delay		8.9			9.0				
Approach LOS		A			A				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Ballantyne Court & Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Lemay Dr WB, Ballantyne Ct SB
 North/South Street: Ballantyne Ct NB, Lemay Dr EB
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:		Vehicle Volumes and Adjustments					
Approach	Movement	Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume		16	45	3	0	36	0
Peak-Hour Factor, PHF		0.78	0.78	0.78	0.78	0.78	0.78
Hourly Flow Rate, HFR		20	57	3	0	46	0
Percent Heavy Vehicles		2	--	--	2	--	--
Median Type/Storage		Undivided			/		
RT Channelized?							
Lanes		0	1	0	0	1	0
Configuration		LTR			LTR		
Upstream Signal?		No			No		

Minor Street:		Westbound			Eastbound		
Approach	Movement	7	8	9	10	11	12
		L	T	R	L	T	R
Volume		2	0	0	7	0	0
Peak Hour Factor, PHF		0.78	0.78	0.78	0.78	0.78	0.78
Hourly Flow Rate, HFR		2	0	0	8	0	0
Percent Heavy Vehicles		2	2	2	2	2	2
Percent Grade (%)		0			0		
Flared Approach: Exists?/Storage		No			/		
Lanes		0	1	0	0	1	0
Configuration		LTR			LTR		

		Delay, Queue Length, and Level of Service							
Approach	Movement	NB	SB	Westbound			Eastbound		
		1	4	7	8	9	10	11	12
		LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR
v (vph)		20	0	2			8		
C(m) (vph)		1562	1544	817			817		
v/c		0.01	0.00	0.00			0.01		
95% queue length		0.04	0.00	0.01			0.03		
Control Delay		7.3	7.3	9.4			9.4		
LOS		A	A	A			A		
Approach Delay		9.4			9.4				
Approach LOS		A			A				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: 49th Ave & Niven Dr/43rd St
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive / 43rd Street
 North/South Street: 49th Avenue
 Intersection Orientation: EW Study period (hrs): 0.25

Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R

Volume	100			33		
Peak-Hour Factor, PHF	0.79			0.79		
Hourly Flow Rate, HFR	126			41		
Percent Heavy Vehicles	--			--		
Median Type/Storage	Undivided			/		
RT Channelized?	1			1		
Lanes	T			T		
Configuration	No			No		
Upstream Signal?						

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R

Volume	21			0		
Peak Hour Factor, PHF	0.79					
Hourly Flow Rate, HFR	26					
Percent Heavy Vehicles	0					
Percent Grade (%)	-1			/		
Flared Approach: Exists?/Storage	1			/		
Lanes	R					
Configuration						

Approach Movement	Northbound			Southbound			
	EB 1	WB 4	7	8	9 R	10	11

v (vph)	26					
C(m) (vph)	921					
v/c	0.03					
95% queue length	0.09					
Control Delay	9.0					
LOS	A					
Approach Delay	9.0					
Approach LOS	A					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: 49th Ave & Niven Dr/43rd St
 Jurisdiction: Yellowknife
 Units: U. S. Metric

Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive / 43rd Street
 North/South Street: 49th Avenue
 Intersection Orientation: EW Study period (hrs): 0.25

Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R

Volume	148			46		
Peak-Hour Factor, PHF	0.65			0.65		
Hourly Flow Rate, HFR	227			70		
Percent Heavy Vehicles	--			--		
Median Type/Storage	Undivided			/		
RT Channelized?	1			1		
Lanes	T			T		
Configuration	No			No		
Upstream Signal?						

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R

Volume	23			0		
Peak Hour Factor, PHF	0.65					
Hourly Flow Rate, HFR	35					
Percent Heavy Vehicles	2					
Percent Grade (%)	-1			/		
Flared Approach: Exists?/Storage	1			/		
Lanes	R					
Configuration						

Approach Movement	Northbound			Southbound			
	EB 1	WB 4	7	8	9 R	10	11

v (vph)	35					
C(m) (vph)	807					
v/c	0.04					
95% queue length	0.14					
Control Delay	9.7					
LOS	A					
Approach Delay	9.7					
Approach LOS	A					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: 49th Ave & Niven Dr/43rd St
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive / 43rd Street
 North/South Street: 49th Avenue
 Intersection Orientation: EW Study period (hrs): 0.25

Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R

Volume	176			50		
Peak-Hour Factor, PHF	0.65			0.65		

Hourly Flow Rate, HFR 270 76
 Percent Heavy Vehicles -- --
 Median Type/Storage Undivided /
 RT Channelized?
 Lanes 1 1
 Configuration T T
 Upstream Signal? No No

Minor Street: Approach Northbound Southbound
 Movement 7 8 9 10 11 12
 L T R L T R

Volume 23
 Peak Hour Factor, PHF 0.65
 Hourly Flow Rate, HFR 35
 Percent Heavy Vehicles 2
 Percent Grade (%) -1 0
 Flared Approach: Exists?/Storage / /
 Lanes 1
 Configuration R

Delay, Queue Length, and Level of Service
 Approach EB WB Northbound Southbound
 Movement 1 4 7 8 9 10 11 12
 Lane Config R

v (vph) 35
 C(m) (vph) 765
 v/c 0.05
 95% queue length 0.14
 Control Delay 9.9
 LOS A
 Approach Delay 9.9
 Approach LOS A

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: 49th Ave & Niven Dr/43rd St
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive / 43rd Street
 North/South Street: 49th Avenue
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments
 Major Street: Approach Eastbound Westbound
 Movement 1 2 3 4 5 6
 L T R L T R

Volume 236 63
 Peak-Hour Factor, PHF 0.65 0.65
 Hourly Flow Rate, HFR 363 96
 Percent Heavy Vehicles -- --
 Median Type/Storage Undivided /
 RT Channelized?
 Lanes 1 1
 Configuration T T
 Upstream Signal? No No

Minor Street: Approach Northbound Southbound
 Movement 7 8 9 10 11 12
 L T R L T R

Volume 56
 Peak Hour Factor, PHF 0.65
 Hourly Flow Rate, HFR 86
 Percent Heavy Vehicles 2
 Percent Grade (%) -1 0
 Flared Approach: Exists?/Storage / /
 Lanes 1
 Configuration R

Delay, Queue Length, and Level of Service
 Approach EB WB Northbound Southbound
 Movement 1 4 7 8 9 10 11 12
 Lane Config R

v (vph) 86
 C(m) (vph) 681
 v/c 0.13
 95% queue length 0.43
 Control Delay 11.0
 LOS B
 Approach Delay 11.0
 Approach LOS B

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: 49th Ave & Niven Dr/43rd St
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive / 43rd Street
 North/South Street: 49th Avenue
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	68			47		
Peak-Hour Factor, PHF	0.85			0.85		
Hourly Flow Rate, HFR	79			55		
Percent Heavy Vehicles	--			--		
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	1			1		
Configuration	T			T		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	61					
Peak Hour Factor, PHF	0.85					
Hourly Flow Rate, HFR	71					
Percent Heavy Vehicles	0					
Percent Grade (%)	-1			0		
Flared Approach: Exists?/Storage	1			/		
Lanes	R					
Configuration						

Approach Movement	Delay, Queue Length, and Level of Service					
	EB	WB	Northbound		Southbound	
Lane Config	1	4	7	8	9 R	10 11 12
v (vph)				71		
C(m) (vph)				949		
v/c				0.07		
95% queue length				0.24		
Control Delay				9.1		
LOS				A		
Approach Delay				9.1		
Approach LOS				A		

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: 49th Ave & Niven Dr/43rd St
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive / 43rd Street
 North/South Street: 49th Avenue
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	96			75		
Peak-Hour Factor, PHF	0.78			0.78		
Hourly Flow Rate, HFR	123			96		
Percent Heavy Vehicles	--			--		
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	1			1		
Configuration	T			T		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	67					
Peak Hour Factor, PHF	0.78					
Hourly Flow Rate, HFR	85					
Percent Heavy Vehicles	2					
Percent Grade (%)	-1			0		
Flared Approach: Exists?/Storage	1			/		
Lanes	R					
Configuration						

Approach Movement	Delay, Queue Length, and Level of Service					
	EB	WB	Northbound		Southbound	
Lane Config	1	4	7	8	9 R	10 11 12
v (vph)				85		
C(m) (vph)				893		
v/c				0.10		
95% queue length				0.31		
Control Delay				9.5		
LOS				A		
Approach Delay				9.5		
Approach LOS				A		

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: 49th Ave & Niven Dr/43rd St
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive / 43rd Street
 North/South Street: 49th Avenue
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	108			90		
Peak-Hour Factor, PHF	0.78			0.78		
Hourly Flow Rate, HFR	138			115		
Percent Heavy Vehicles	--			--		
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	1			1		
Configuration	T			T		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	67			0		
Peak Hour Factor, PHF	0.78					
Hourly Flow Rate, HFR	85					
Percent Heavy Vehicles	2					
Percent Grade (%)	-1			0		
Flared Approach: Exists?/Storage	1			/		
Lanes	R					
Configuration						

Approach Movement	Delay, Queue Length, and Level of Service					
	EB	WB	Northbound		Southbound	
Lane Config	1	4	7	8	9	10 11 12
v (vph)				85		
C(m) (vph)				876		
v/c				0.10		
95% queue length				0.32		
Control Delay				9.6		
LOS				A		
Approach Delay				9.6		
Approach LOS				A		

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: 49th Ave & Niven Dr/43rd St
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Niven Drive / 43rd Street
 North/South Street: 49th Avenue
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	143			125		
Peak-Hour Factor, PHF	0.78			0.78		
Hourly Flow Rate, HFR	183			160		
Percent Heavy Vehicles	--			--		
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	1			1		
Configuration	T			T		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	82			0		
Peak Hour Factor, PHF	0.78					
Hourly Flow Rate, HFR	105					
Percent Heavy Vehicles	2					
Percent Grade (%)	-1			0		
Flared Approach: Exists?/Storage	1			/		
Lanes	R					
Configuration						

Approach Movement	Delay, Queue Length, and Level of Service					
	EB	WB	Northbound		Southbound	
Lane Config	1	4	7	8	9	10 11 12
v (vph)				105		
C(m) (vph)				828		
v/c				0.13		
95% queue length				0.43		
Control Delay				10.0-		
LOS				A		
Approach Delay				10.0-		
Approach LOS				A		

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Franklin Ave & 43rd St
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2012 Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: 43rd Street
 North/South Street: Franklin Avenue
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street: Approach Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	25	134		221	9	
Peak-Hour Factor, PHF	0.76	0.76		0.76	0.76	
Hourly Flow Rate, HFR	32	176		290	11	
Percent Heavy Vehicles	0	--	--	--	--	
Median Type/Storage	Undivided /					
RT Channelized?						
Lanes	0	1		1	0	
Configuration	LT			TR		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Westbound			Eastbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume				23	86	
Peak Hour Factor, PHF				0.76	0.76	
Hourly Flow Rate, HFR				30	113	
Percent Heavy Vehicles				0	0	
Percent Grade (%)	0					
Flared Approach: Exists?/Storage	/			No /		
Lanes				0	0	
Configuration	LR					

Approach Movement	Delay, Queue Length, and Level of Service					
	NB 1	SB 4	Westbound 7 8		Eastbound 10 11 12	
Lane Config	LT					LR
v (vph)	32					143
C(m) (vph)	1233					649
v/c	0.03					0.22
95% queue length	0.08					0.84
Control Delay	8.0					12.1
LOS	A					B
Approach Delay						12.1
Approach LOS						B

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Franklin Ave & 43rd St
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: 43rd Street
 North/South Street: Franklin Avenue
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street: Approach Movement	Northbound			Southbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	35	147		243	13	
Peak-Hour Factor, PHF	0.65	0.65		0.65	0.65	
Hourly Flow Rate, HFR	53	226		373	20	
Percent Heavy Vehicles	2	--	--	--	--	
Median Type/Storage	Undivided /					
RT Channelized?						
Lanes	0	1		1	0	
Configuration	LT			TR		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Westbound			Eastbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume				33	125	
Peak Hour Factor, PHF				0.65	0.65	
Hourly Flow Rate, HFR				50	192	
Percent Heavy Vehicles				2	2	
Percent Grade (%)	0					
Flared Approach: Exists?/Storage	/			0 No /		
Lanes				0	0	
Configuration	LR					

Approach Movement	Delay, Queue Length, and Level of Service					
	NB 1	SB 4	Westbound 7 8		Eastbound 10 11 12	
Lane Config	LT					LR
v (vph)	53					242
C(m) (vph)	1131					551
v/c	0.05					0.44
95% queue length	0.15					2.22
Control Delay	8.3					16.6
LOS	A					C
Approach Delay						16.6
Approach LOS						C

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Parcel B,C Access on Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Lemay Drive
 North/South Street: Parcel B, C Site Access
 Intersection Orientation: EW Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Eastbound			Westbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume		0	9	0	1	2	0
Peak-Hour Factor, PHF		0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR		0	13	0	1	3	0
Percent Heavy Vehicles		2	--	--	2	--	--
Median Type/Storage		Undivided			/		
RT Channelized?							
Lanes		0	1	0	0	1	0
Configuration		LTR			LTR		
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Northbound			Southbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume		0	0	6	3	0	0
Peak Hour Factor, PHF		0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR		0	0	9	4	0	0
Percent Heavy Vehicles		2	2	2	2	2	2
Percent Grade (%)		0			0		
Flared Approach: Exists?/Storage		0		No	/	0	
Lanes		0	1	0	0	1	0
Configuration		LTR			LTR		

Approach Movement	Delay, Queue Length, and Level of Service										
	EB	WB	Northbound			Southbound					
	1	4	7	8	9	10	11	12			
Lane Config	LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR
v (vph)	0	1	9				4				
C(m) (vph)	1619	1606	1067				980				
v/c	0.00	0.00	0.01				0.00				
95% queue length	0.00	0.00	0.03				0.01				
Control Delay	7.2	7.2	8.4				8.7				
LOS	A	A	A				A				
Approach Delay			8.4				8.7				
Approach LOS			A				A				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Parcel B,C Access on Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Lemay Drive
 North/South Street: Parcel B, C Site Access
 Intersection Orientation: EW Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Eastbound			Westbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume		0	59	0	1	11	0
Peak-Hour Factor, PHF		0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR		0	90	0	1	16	0
Percent Heavy Vehicles		2	--	--	2	--	--
Median Type/Storage		Undivided			/		
RT Channelized?							
Lanes		0	1	0	0	1	0
Configuration		LTR			LTR		
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Northbound			Southbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume		0	0	6	3	0	0
Peak Hour Factor, PHF		0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR		0	0	9	4	0	0
Percent Heavy Vehicles		2	2	2	2	2	2
Percent Grade (%)		0			0		
Flared Approach: Exists?/Storage		0		No	/	0	
Lanes		0	1	0	0	1	0
Configuration		LTR			LTR		

Approach Movement	Delay, Queue Length, and Level of Service										
	EB	WB	Northbound			Southbound					
	1	4	7	8	9	10	11	12			
Lane Config	LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR	LTR
v (vph)	0	1	9				4				
C(m) (vph)	1602	1505	968				858				
v/c	0.00	0.00	0.01				0.00				
95% queue length	0.00	0.00	0.03				0.01				
Control Delay	7.2	7.4	8.8				9.2				
LOS	A	A	A				A				
Approach Delay			8.8				9.2				
Approach LOS			A				A				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Parcel B,C Access on Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Lemay Drive
 North/South Street: Parcel B, C Site Access
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	0	4	0	5	7	2
Peak-Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Hourly Flow Rate, HFR	0	5	0	6	8	2
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	0	0	3	1	0	0
Peak Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Hourly Flow Rate, HFR	0	0	3	1	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No /			No /		
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Approach Movement	Delay, Queue Length, and Level of Service					
	EB 1	WB 4	Northbound 7 8		Southbound 10 11	
Lane Config	LTR	LTR	LTR	9	10	11
v (vph)	0	6	3		1	
C(m) (vph)	1610	1616	1078		977	
v/c	0.00	0.00	0.00		0.00	
95% queue length	0.00	0.01	0.01		0.00	
Control Delay	7.2	7.2	8.3		8.7	
LOS	A	A	A		A	
Approach Delay	8.3			8.7		
Approach LOS	A			A		

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Parcel B,C Access on Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Lemay Drive
 North/South Street: Parcel B, C Site Access
 Intersection Orientation: EW Study period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street: Approach Movement	Eastbound			Westbound		
	1 L	2 T	3 R	4 L	5 T	6 R
Volume	0	32	0	5	38	2
Peak-Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Hourly Flow Rate, HFR	0	41	0	6	48	2
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street: Approach Movement	Northbound			Southbound		
	7 L	8 T	9 R	10 L	11 T	12 R
Volume	0	0	3	1	0	0
Peak Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Hourly Flow Rate, HFR	0	0	3	1	0	0
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No /			No /		
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Approach Movement	Delay, Queue Length, and Level of Service					
	EB 1	WB 4	Northbound 7 8		Southbound 10 11	
Lane Config	LTR	LTR	LTR	9	10	11
v (vph)	0	6	3		1	
C(m) (vph)	1557	1568	1030		872	
v/c	0.00	0.00	0.00		0.00	
95% queue length	0.00	0.01	0.01		0.00	
Control Delay	7.3	7.3	8.5		9.1	
LOS	A	A	A		A	
Approach Delay	8.5			9.1		
Approach LOS	A			A		

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Parcel C, E Site Access on Ballantyne Ct
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Parcel C, E Site Access
 North/South Street: Ballantyne Court
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:	Vehicle Volumes and Adjustments					
	Approach Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	2	0	0	9	0
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	1	3	0	0	13	0
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street:	Approach Westbound			Eastbound		
	7	8	9	10	11	12
Movement	L	T	R	L	T	R
Volume	3	0	0	0	0	3
Peak Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	4	0	0	0	0	4
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No		/	No		/
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Approach Movement	Delay, Queue Length, and Level of Service					
	NB	SB	Westbound		Eastbound	
Lane Config	1	4	7	8	10	11
	LTR	LTR	LTR	LTR	LTR	LTR
v (vph)	1	0	4		4	
C(m) (vph)	1606	1619	989		1067	
v/c	0.00	0.00	0.00		0.00	
95% queue length	0.00	0.00	0.01		0.01	
Control Delay	7.2	7.2	8.7		8.4	
LOS	A	A	A		A	
Approach Delay			8.7		8.4	
Approach LOS			A		A	

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Parcel C, E Site Access on Ballantyne Ct
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Parcel C, E Site Access
 North/South Street: Ballantyne Court
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:	Vehicle Volumes and Adjustments					
	Approach Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	1	2	0	0	9	0
Peak-Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	1	3	0	0	13	0
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type/Storage	Undivided			/		
RT Channelized?						
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal?	No			No		

Minor Street:	Approach Westbound			Eastbound		
	7	8	9	10	11	12
Movement	L	T	R	L	T	R
Volume	3	0	0	0	0	3
Peak Hour Factor, PHF	0.65	0.65	0.65	0.65	0.65	0.65
Hourly Flow Rate, HFR	4	0	0	0	0	4
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach: Exists?/Storage	No		/	No		/
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		

Approach Movement	Delay, Queue Length, and Level of Service					
	NB	SB	Westbound		Eastbound	
Lane Config	1	4	7	8	10	11
	LTR	LTR	LTR	LTR	LTR	LTR
v (vph)	1	0	4		4	
C(m) (vph)	1606	1619	989		1067	
v/c	0.00	0.00	0.00		0.00	
95% queue length	0.00	0.00	0.01		0.01	
Control Delay	7.2	7.2	8.7		8.4	
LOS	A	A	A		A	
Approach Delay			8.7		8.4	
Approach LOS			A		A	

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Parcel C, E Site Access on Ballantyne Ct
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Parcel C, E Site Access
 North/South Street: Ballantyne Court
 Intersection Orientation: NS
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments									
Major Street: Approach Movement	Northbound			Southbound					
	1 L	2 T	3 R	4 L	5 T	6 R			
Volume	3	10	3	0	4	0			
Peak-Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78			
Hourly Flow Rate, HFR	3	12	3	0	5	0			
Percent Heavy Vehicles	2	--	--	2	--	--			
Median Type/Storage	Undivided			/					
RT Channelized?									
Lanes	0	1	0	0	1	0			
Configuration	LTR			LTR					
Upstream Signal?	No			No					

Minor Street: Approach Movement	Westbound			Eastbound					
	7 L	8 T	9 R	10 L	11 T	12 R			
Volume	1	0	0	0	0	2			
Peak Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78			
Hourly Flow Rate, HFR	1	0	0	0	0	2			
Percent Heavy Vehicles	2	2	2	2	2	2			
Percent Grade (%)	0			0					
Flared Approach: Exists?/Storage	No			/			No /		
Lanes	0	1	0	0	1	0			
Configuration	LTR			LTR					

Delay, Queue Length, and Level of Service									
Approach Movement	NB	SB	Westbound			Eastbound			
	1 LTR	4 LTR	7 LTR	8 LTR	9	10	11 LTR	12	
v (vph)	3	0	1			2			
C(m) (vph)	1616	1603	981			1078			
v/c	0.00	0.00	0.00			0.00			
95% queue length	0.01	0.00	0.00			0.01			
Control Delay	7.2	7.2	8.7			8.3			
LOS	A	A	A			A			
Approach Delay	8.7			8.3					
Approach LOS	A			A					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Parcel C, E Site Access on Ballantyne Ct
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Parcel C, E Site Access
 North/South Street: Ballantyne Court
 Intersection Orientation: NS
 Study period (hrs): 0.25

Vehicle Volumes and Adjustments									
Major Street: Approach Movement	Northbound			Southbound					
	1 L	2 T	3 R	4 L	5 T	6 R			
Volume	3	10	3	0	4	0			
Peak-Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78			
Hourly Flow Rate, HFR	3	12	3	0	5	0			
Percent Heavy Vehicles	2	--	--	2	--	--			
Median Type/Storage	Undivided			/					
RT Channelized?									
Lanes	0	1	0	0	1	0			
Configuration	LTR			LTR					
Upstream Signal?	No			No					

Minor Street: Approach Movement	Westbound			Eastbound					
	7 L	8 T	9 R	10 L	11 T	12 R			
Volume	1	0	0	0	0	2			
Peak Hour Factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78			
Hourly Flow Rate, HFR	1	0	0	0	0	2			
Percent Heavy Vehicles	2	2	2	2	2	2			
Percent Grade (%)	0			0					
Flared Approach: Exists?/Storage	No			/			No /		
Lanes	0	1	0	0	1	0			
Configuration	LTR			LTR					

Delay, Queue Length, and Level of Service									
Approach Movement	NB	SB	Westbound			Eastbound			
	1 LTR	4 LTR	7 LTR	8 LTR	9	10	11 LTR	12	
v (vph)	3	0	1			2			
C(m) (vph)	1616	1603	981			1078			
v/c	0.00	0.00	0.00			0.00			
95% queue length	0.01	0.00	0.00			0.01			
Control Delay	7.2	7.2	8.7			8.3			
LOS	A	A	A			A			
Approach Delay	8.7			8.3					
Approach LOS	A			A					

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Parcel D Site Access on Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Parcel D Site Access
 North/South Street: Lemay Drive
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume			0	2	0	0	
Peak-Hour Factor, PHF			0.65	0.65	0.65	0.65	
Hourly Flow Rate, HFR			0	3	0	0	
Percent Heavy Vehicles			--	--	2	--	--
Median Type/Storage		Undivided			/		
RT Channelized?							
Lanes			1	0	0	1	
Configuration			TR		LT		
Upstream Signal?			No		No		

Minor Street:	Approach Movement	Westbound			Eastbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume		9		0			
Peak Hour Factor, PHF		0.65		0.65			
Hourly Flow Rate, HFR		13		0			
Percent Heavy Vehicles		2		2			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage		Exists?/Storage		No	/		/
Lanes		0		0			
Configuration		LR					

Approach Movement	Delay, Queue Length, and Level of Service							
	NB	SB	Westbound		Eastbound			
	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		0		13				
C(m) (vph)		1619		1021				
v/c		0.00		0.01				
95% queue length		0.00		0.04				
Control Delay		7.2		8.6				
LOS		A		A				
Approach Delay				8.6				
Approach LOS				A				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday AM Peak Hour
 Intersection: Parcel D Site Access on Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Parcel D Site Access
 North/South Street: Lemay Drive
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume			9	2	0	50	
Peak-Hour Factor, PHF			0.65	0.65	0.65	0.65	
Hourly Flow Rate, HFR			13	3	0	76	
Percent Heavy Vehicles			--	--	2	--	--
Median Type/Storage		Undivided			/		
RT Channelized?							
Lanes			1	0	0	1	
Configuration			TR		LT		
Upstream Signal?			No		No		

Minor Street:	Approach Movement	Westbound			Eastbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume		9		0			
Peak Hour Factor, PHF		0.65		0.65			
Hourly Flow Rate, HFR		13		0			
Percent Heavy Vehicles		2		2			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage		Exists?/Storage		No	/		/
Lanes		0		0			
Configuration		LR					

Approach Movement	Delay, Queue Length, and Level of Service							
	NB	SB	Westbound		Eastbound			
	1	4	7	8	9	10	11	12
Lane Config		LT		LR				
v (vph)		0		13				
C(m) (vph)		1602		910				
v/c		0.00		0.01				
95% queue length		0.00		0.04				
Control Delay		7.2		9.0				
LOS		A		A				
Approach Delay				9.0				
Approach LOS				A				

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Parcel D Site Access on Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2017 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Parcel D Site Access
 North/South Street: Lemay Drive
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume		0	7	0	0		
Peak-Hour Factor, PHF		0.78	0.78	0.78	0.78		
Hourly Flow Rate, HFR		0	8	0	0		
Percent Heavy Vehicles		--	--	2	--	--	--
Median Type/Storage		Undivided		/			
RT Channelized?							
Lanes		1	0		0	1	
Configuration			TR			LT	
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Westbound			Eastbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume		4		0			
Peak Hour Factor, PHF		0.78		0.78			
Hourly Flow Rate, HFR		5		0			
Percent Heavy Vehicles		2		2			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage		0	No	/		/	
Lanes		0	0				
Configuration		LR					

Approach Movement	Delay, Queue Length, and Level of Service						
	NB	SB	Westbound		Eastbound		
	1	4	7	8	9	10	11 12
Lane Config		LT		LR			
v (vph)	0			5			
C(m) (vph)	1612			1018			
v/c	0.00			0.00			
95% queue length	0.00			0.01			
Control Delay	7.2			8.6			
LOS	A			A			
Approach Delay				8.6			
Approach LOS				A			

HCS+: Unsignalized Intersections Release 5.6

TWO-WAY STOP CONTROL SUMMARY

Analyst: RC
 Agency/Co.: CTS
 Date Performed:
 Analysis Time Period: Weekday PM Peak Hour
 Intersection: Parcel D Site Access on Lemay Dr
 Jurisdiction: Yellowknife
 Units: U. S. Metric
 Analysis Year: 2022 Future Base + Site
 Project ID: 3989 - Niven Lake Phase V Traffic Impact Study
 East/West Street: Parcel D Site Access
 North/South Street: Lemay Drive
 Intersection Orientation: NS Study period (hrs): 0.25

Major Street:	Approach Movement	Vehicle Volumes and Adjustments					
		Northbound			Southbound		
		1	2	3	4	5	6
		L	T	R	L	T	R
Volume			31	7	0	28	
Peak-Hour Factor, PHF			0.78	0.78	0.78	0.78	
Hourly Flow Rate, HFR			39	8	0	35	
Percent Heavy Vehicles			--	--	2	--	--
Median Type/Storage			Undivided		/		
RT Channelized?							
Lanes			1	0		0	1
Configuration				TR		LT	
Upstream Signal?			No			No	

Minor Street:	Approach Movement	Westbound			Eastbound		
		7	8	9	10	11	12
		L	T	R	L	T	R
Volume		4		0			
Peak Hour Factor, PHF		0.78		0.78			
Hourly Flow Rate, HFR		5		0			
Percent Heavy Vehicles		2		2			
Percent Grade (%)			0			0	
Flared Approach: Exists?/Storage		0	No	/		/	
Lanes		0	0				
Configuration		LR					

Approach Movement	Delay, Queue Length, and Level of Service						
	NB	SB	Westbound		Eastbound		
	1	4	7	8	9	10	11 12
Lane Config		LT		LR			
v (vph)	0			5			
C(m) (vph)	1560			925			
v/c	0.00			0.01			
95% queue length	0.00			0.02			
Control Delay	7.3			8.9			
LOS	A			A			
Approach Delay				8.9			
Approach LOS				A			