

Fargo-Moorhead Metro Traffic Data Collection and Reporting – Phase II

Final Report

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Prepared for:
Fargo-Moorhead Metropolitan
Council of Governments

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INTRODUCTION

With the objective of compiling reliable traffic information using existing infrastructure, the Fargo-Moorhead Metropolitan Council of Governments (Metro COG) along with area transportation agencies championed traffic data collection by cosponsoring a pilot project in 2019. Collaborating agencies included:

- North Dakota Department of Transportation (NDDOT)
- Minnesota Department of Transportation (MnDOT)
- City of Fargo
- City of Moorhead
- City of West Fargo

Traffic data from 28 intersections included in the pilot project can be processed using the Upper Great Plains Transportation Institute's (UGPTI) web-based Traffic Analysis Tool. Note that 15-minute binned traffic volumes and mean speeds (wherever available) are consistently imported into the corresponding database on a daily basis. In continuation of its support to area transportation agencies, Phase II of the traffic data collection was initiated in early 2023. The agencies participating in this phase are:

- MnDOT
- City of Fargo
- City of Moorhead
- City of West Fargo

Note that the NDDOT continued its traffic data collection efforts under a separate project.

OBJECTIVE

For the current Phase II project, 42 additional intersections were set up for data collection and analysis, bringing the total area locations reporting data to more than 70 (considering those from NDDOT as well). The intersections for each agency are listed in tables below. Note again that similar to the pilot project, this phase of traffic data collection and reporting used already-existing infrastructure without the need to purchase or maintain any additional traffic data collection devices. The mostly under-utilized or un-utilized capabilities of the existing transportation infrastructure devices combined with UGPTI's capabilities and innovative approach have made it possible to gather traffic data 24 hours per day, 7 days per week, and 365 days per year.

METHODOLOGY

This project was divided into major tasks by agency such as equivalency table/data collection setup, scripting to automate data import, reporting capabilities setup, data quality audits etc. These tasks are discussed in detail below.

City of Fargo

City of Fargo selected 20 of its intersections for inclusion in this project. These locations are listed in Table 1. First, an equivalency table of detector-to-lane relationships and corresponding turning movement count formulae were created. Considerations for these formulae included signalized intersection cabinet drawings, traffic signal controller programming, vehicle detector assignments plans etc. It was found that a majority of the detectors at the selected intersections did not have traffic

data logging turned on. Therefore, during field visits and by using the remote connection capabilities of the city's Advanced Traffic Management System, the corresponding settings were updated at those locations and data logging was turned on. However, historical data that had not been logged could not be downloaded for most of these intersections. Note that the ATMS database appears to store approximately 6 months' worth of traffic data per intersection.

Second, working with the city's detection technology vendor, the traffic data download process for loop-based intersections was automated. Note that unlike the pilot project, the vendor decided to take a hands-off approach during the current project. Furthermore, because of the limitations of the reporting functionality of the ATMS, approximately 33 individual reports were required to cover the 20 intersections selected in this project.

Finally, scripting for the import of loop-based raw data for 29 intersections (including 9 from the pilot project) and for the data download from 1 camera-based intersection (from the pilot project) was completed, automating both processes. With these scripts, in combination with the relevant scheduled tasks on the Department of Transportation Support Center's (DOTSC) servers housed at North Dakota State University (NDSU), the data availability on the Traffic Analysis Tool for the city's intersections should ideally remain up to date as of the day prior on any given day. Based on the existing practices and intersection traffic detection design criteria followed at the city, traffic speed data was available at all of the agency's intersections included in the project.

Table 1. City of Fargo intersections

#	Main Street	Cross Street	Detector Type	Detector Model
1	13th Ave S	38th St S	Loop	EDI
2	25th St S	13th Ave S	Loop	EDI
3	32nd Ave S	39th St S	Loop	EDI
4	32nd Ave S	42nd St S	Loop	EDI
5	42nd St S	17th Ave S	Loop	EDI
6	45th St S	13th Ave S	Loop	EDI
7	45th St S	19th Ave S	Loop	EDI
8	45th St S	32nd Ave S	Loop	EDI
9	45th St S	40th Ave S	Loop	EDI
10	52nd Ave S	25th St S	Loop	EDI
11	52nd Ave S	38th St S	Loop	EDI
12	52nd Ave S	45th St S	Loop	EDI
13	52nd Ave S	63rd St S	Loop	EDI
14	52nd Ave S	Timber Pkwy S/31st St S	Loop	EDI
15	52nd Ave S	Veterans Blvd	Loop	EDI
16	Main Ave	25th St	Loop	EDI
17	Main Ave	45th St	Loop	EDI
18	N University Dr	12th Ave N	Loop	EDI
19	S University Dr	13th Ave S	Loop	EDI
20	S University Dr	32nd Ave S	Loop	EDI

The intersection lane group assignments and the corresponding detector setup is shown in Table 2.

Table 2. City of Fargo intersection lane group assignments and detector setup

#	Main Street	Cross Street	NB			EB			SB			WB		
			L	T	R	L	T	R	L	T	R	L	T	R
1	13th ave S	38th St S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
2	25th St S	13th Ave S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
3	32nd Ave S	39th St S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
4	32nd Ave S	42nd St S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
5	42nd St S	17th Ave S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
6	45th St S	13th Ave S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
7	45th St S	19th Ave S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
8	45th St S	32nd Ave S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
9	45th St S	40th Ave S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
10	52nd Ave S	25th St S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
11	52nd Ave S	38th St S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
12	52nd Ave S	45th St S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
13	52nd Ave S	63rd St S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
14	52nd Ave S	Timber Pkwy/31st St S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
15	52nd Ave S	Veterans Blvd	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
16	Main Ave	25th St S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
17	Main Ave	45th St S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
18	N University Dr	12th Ave N	N/A			N/A	↑	↱	↰	↑	↱	↰	↑	N/A
19	S University Dr	13th Ave S	↰	N/A	↱	N/A	↑	↱	↰	↑	↱	↰	↑	N/A
20	S University Dr	32nd Ave S	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱

Minnesota Department of Transportation

MnDOT District 4 selected 1 of its high-volume intersections for this project. The location is listed in Table 3. Although not previously planned, a camera-based intersection was selected. For each of the four cameras installed at the intersection, assistance in lens calibration and other tasks was carried out by measuring actual in-field distances along the edges of the detection zones as they translate to the distances between the corresponding pixels in the view. The City of Moorhead Traffic Engineer led all of these tasks with assistance from UGPTI staff. Next, zone sizes and locations were edited to enable more reliable traffic counting while maintaining a high degree of accuracy in traffic detection. Finally, the zone labels were updated to ensure they follow the agreed upon conventions, streamlining the data import process. Because of the lack of fiber interconnect between the City of Moorhead Engineering offices to this particular intersection, tasks which are generally completed remotely had to be accomplished on site. For the same reasons, the data download process at this intersection has to be carried out via direct connection. Traffic speed data was available at this intersection.

Also, during this project, a sample Secure File Transfer Protocol (SFTP)-based script was provided to City of Moorhead Engineering and IT staff to enable data download from the one intersection included in the pilot project. Corresponding SFTP setup was completed on the DOTSC server. Guidance and assistance were also provided in scheduling and troubleshooting of the data download and transfer processes. As a result, the data availability on the Traffic Analysis Tool for the city's intersections should ideally remain up to date as of the day prior on any given day. As noted, the data download process from the intersection included in this project needs to be completed during a field visit, so the data from this intersection may not be as up to date as data from other intersections.

Table 3. MnDOT intersection

#	Main Street	Cross Street	Detector Type	Detector Model
1	Center Ave	8th St N	Camera	VISION

The intersection lane group assignments and the corresponding detector setup is shown in Table 4.

Table 4. MnDOT intersection lane group assignments and detector setup

#	Main Street	Cross Street	NB			EB			SB			WB		
			L	T	R	L	T	R	L	T	R	L	T	R
1	Center Ave	8th St N	↶	↷	↷	↶	↷	↷	↶	↷	↷	↶	↷	↷

City of Moorhead

The City of Moorhead selected 8 of its intersections instrumented with a variety of camera-based traffic detection technology devices, which were then set up for traffic data collection. The intersection locations are listed in Table 5. Wherever deemed necessary, assistance in lens calibration and other tasks was carried out by measuring aerial-imagery-based distances along the edges of the detection zones as they translate to the distances between the corresponding pixels in the view. The City of Moorhead Traffic Engineer led all of these tasks with assistance from UGPTI staff. Zone sizes and locations were also edited to enable more reliable traffic counting while maintaining a high degree of accuracy in traffic detection. For VISION cameras, the zone labels were updated to ensure they follow the agreed-upon conventions, streamlining the data import process.

Table 5. City of Moorhead intersections

#	Main Street	Cross Street	Detector Type	Detector Model
1	20th St	12th Ave S	Camera	VISION
2	21st St S	2nd Ave S	Camera	Gridsmart
3	21st St S	4th Ave S	Camera	Gridsmart
4	34th St S	28th Ave S	Camera	VISION
5	Center Ave	4th St	Camera	Miovision
6	Center Ave	5th St N	Camera	Miovision
7	Main Ave SE/Hwy 52	20th St/21st St	Camera	VISION
8	Main Ave SE/Hwy 52	30th Ave S/Village Green Blvd	Camera	VISION

An API data download script was created for 6 VISION camera based intersections (including 2 from the pilot project) and handed over to city staff for installation and scheduled to run on the relevant IT server. On that server, data download and transfer tasks are scheduled to run once daily. Note that the data transfer uses the same SFTP setup completed for MnDOT. Approximately a day's worth of sample data from the Gridsmart camera based intersections was imported into the Traffic Analysis Tool database. Note that because of installation errors that were discovered and corrected during this project, sample data from the Miovision based intersections had not been downloaded at the time of the writing this report. Therefore, for these 2 locations, after completion of the user interface side of the intersection setup on the Traffic Analysis Tool website, actual data from 2 hours of manual turning movement counts were imported into the database. Because of the automated download, transfer, and import of data completed for the city's VISION-based locations, the data from those intersections on the Traffic Analysis Tool should ideally remain up to date as of the day prior on any given day. The intersection lane group assignments and the corresponding detector setup is shown in Table 6.

Table 6. City of Moorhead intersection lane group assignments and detector setup

#	Main Street	Cross Street	NB			EB			SB			WB		
			L	T	R	L	T	R	L	T	R	L	T	R
1	20th St	12th Ave S												
2	21st St S	2nd Ave S												
3	21st St S	4th Ave S	N/A			N/A					N/A		N/A	
4	34th St S	28th Ave S												
5	Center Ave	4th St												
6	Center Ave	5th St N		N/A		N/A			N/A					N/A
7	Main Ave SE/HWY 52	20th St/21st St												
8	Main Ave SE/HWY 52	30th Ave S/Village Green Blvd												

City of West Fargo

City of West Fargo selected 13 of its intersections to be set up for traffic data collection. These intersection locations are listed in Table 7. All of these intersections are using VISION camera based traffic detection technology. Using existing remote connections which were established during the pilot project, the calibration, zone labels and locations were updated wherever deemed necessary. New zones were added to approaches where right-turn lanes were missing detection. These newly added zones do not impact traffic signal operations and are required to count vehicles utilizing the dedicated turn lane. Traffic speed data was also available for all of these intersections.

Table 7. City of West Fargo intersections

#	Main Street	Cross Street	Detector Type	Detector Model
1	13th Ave E	6th St E	Camera	VISION
2	9th St E	17th Ave E	Camera	VISION
3	Main Ave	Center St/1st St	Camera	VISION
4	Main Ave E	17th St E	Camera	VISION
5	Main Ave E	9th St	Camera	VISION
6	Main Ave W	Sheyenne St	Camera	VISION
7	Sheyenne St	13th Ave W	Camera	VISION
8	Sheyenne St	17th Ave W	Camera	VISION
9	Veterans Blvd	23rd Ave S	Camera	VISION
10	Veterans Blvd	26th Ave S	Camera	VISION
11	Veterans Blvd	32nd Ave S	Camera	VISION
12	Veterans Blvd	36th Ave S	Camera	VISION
13	Veterans Blvd	37th Ave S	Camera	VISION

An API data download script was created for the 26 VISION camera based intersections (including 13 from the pilot project). With assistance from the city's IT department, the related tasks for data download and transfer were scheduled to run on the shared virtual server. As a result, the data from all of the city's intersections on the Traffic Analysis Tool should ideally remain up to date as of the day prior to any given day. The intersection lane group assignments and the corresponding detector setup are shown in Table 8.

Table 8. City of West Fargo intersection lane group assignments and detector setup

#	Main Street	Cross Street	NB			EB			SB			WB		
			L	T	R	L	T	R	L	T	R	L	T	R
1	13th Ave E	6th St E												
2	9th St E	17th Ave E												
3	Main Ave	Center St/1st St												
4	Main Ave E	17th St E												
5	Main Ave E	9th St												
6	Main Ave W	Sheyenne St		N/A		N/A			N/A					N/A
7	Sheyenne St	13th Ave W												
8	Sheyenne St	17th Ave W												
9	Veterans Blvd	23rd Ave S												
10	Veterans Blvd	26th Ave S												
11	Veterans Blvd	32nd Ave S												
12	Veterans Blvd	36th Ave S												
13	Veterans Blvd	37th Ave S												

DATA QUALITY AUDITS

Similar to the pilot project, random data quality audits were performed, and traffic volumes were collected manually in 15-minute intervals at each of the approaches at the selected intersections. These manually collected traffic counts were then compared to data collected by the respective traffic detection technology. Hourly traffic volumes from both sources of data were compared using GEH statistic, which is computed as follows:

$$GEH = \sqrt{\frac{(A - M)^2}{(A + M)/2}}$$

Where:

A = detected traffic count

M = manual traffic count

Also, peak hour factors (PHF) were compared for the detected and manual hourly traffic volumes. For intersection turning movement counts, PHF is computed as follows:

$$PHF = \frac{V}{4 \times V_{15}}$$

Where:

V = hourly volume

V₁₅ = volume during the peak 15 minutes of flow

For detailed results of these audits please refer to Appendix A.

TRAFFIC ANALYSIS TOOL CAPABILITIES

The NDSU Traffic Analysis Tool, which the aforementioned agencies have had access to since the pilot project, has the following reporting capabilities:

- Volume Profile
Line chart of 15-minute volumes for the selected intersection over a 24-hour period
- Speed Profile
Line chart of 15-minute mean through movement speeds for the selected intersection over a 24-hour period
- Monthly Seasonal Factors
Bar chart of monthly average daily traffic volumes and corresponding factors (in comparison to AADT) for the selected intersection
- Day-of-the-Week Seasonal Factors
Bar chart showing ADT for each day of the week for a given month
- Peak Hour Volume/Factor
Intersection turning movement count diagram with approach and intersection factors for peak hour within the selected peak period(s)
- Annual Average Daily Traffic (AADT)
Intersection turning movement count diagram for the immediate past 12 months or any selected calendar year with available data, averaged over the number of days under consideration
- Monthly Average Daily Traffic (MADT)
Intersection turning movement count diagram for any selected calendar month and year with available data, averaged over the number of days under consideration
- Average Daily Traffic (ADT)
Intersection turning movement count diagram for any selected calendar month and year with available data, averaged over the number of days under consideration

For more details on these reports please refer to the Fargo-Moorhead Metro Traffic Data Collection and Reporting Final Report¹. Sample reports from each category are shown in figures 1 through 8.

¹ Sharma, K. (2021). "Fargo-Moorhead Metro Traffic Data Collection and Reporting." Upper Great Plains Transportation Institute, North Dakota State University, Fargo. <https://www.ugpti.org/resources/reports/downloads/atac-2021-09-fm-traffic-data-collection-and-reporting.pdf>

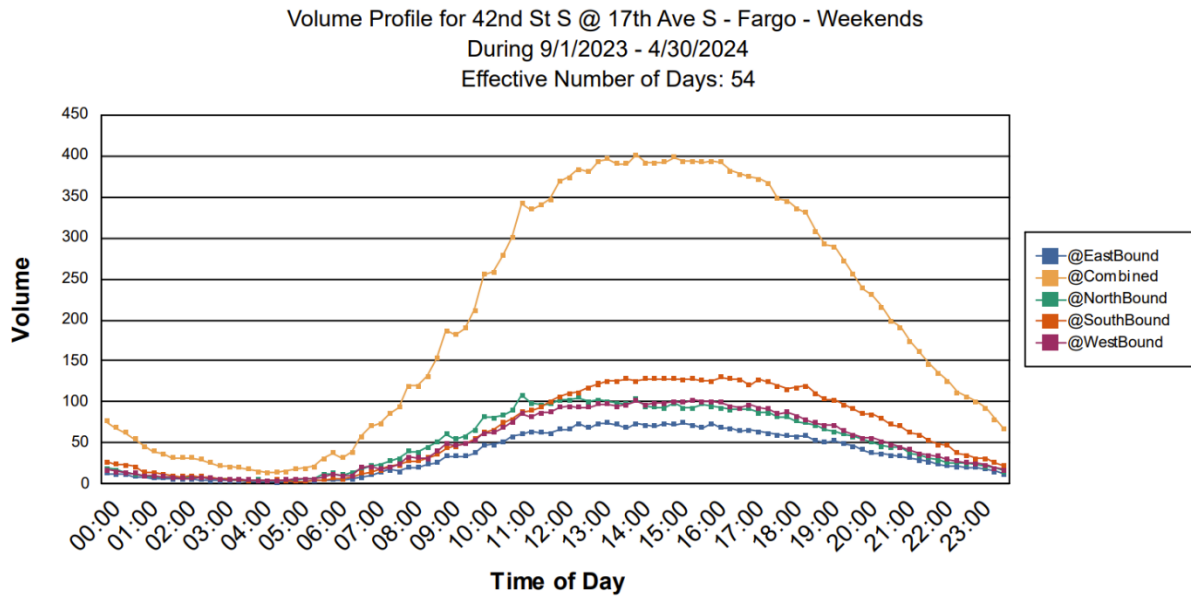


Figure 1. Sample Volume Profile report for 42nd St S at 17th Ave S, Fargo, for weekends between September 1, 2023 and April 30, 2024

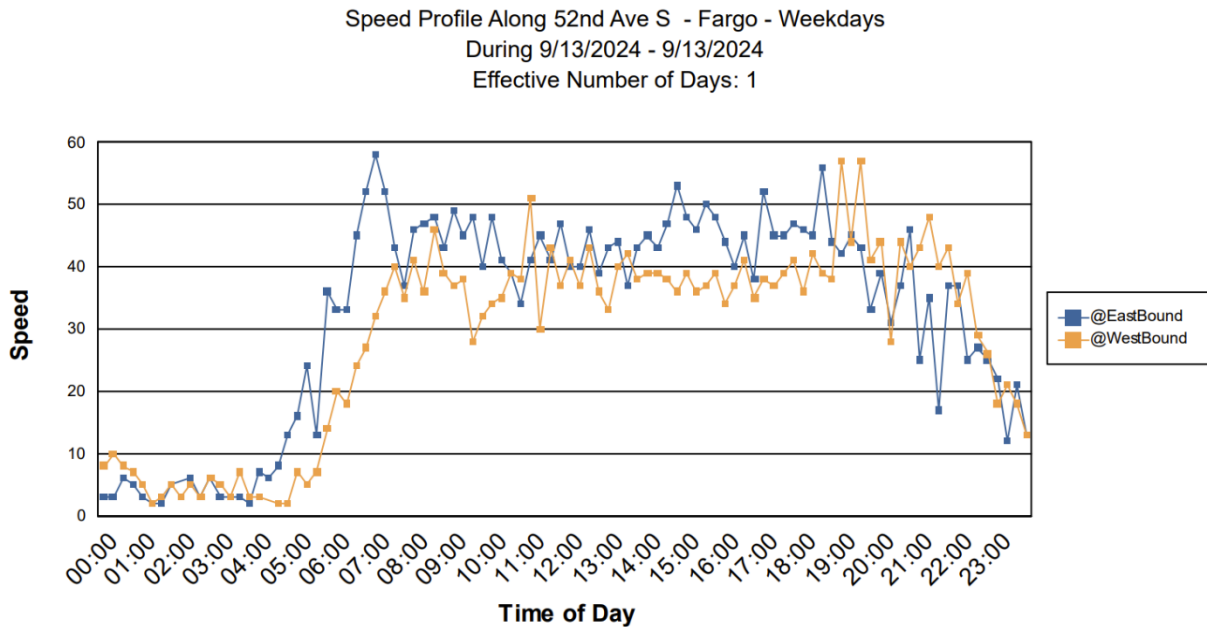


Figure 2. Sample Speed Profile report for traffic along 52nd Ave S at its intersection with Veterans Blvd, Fargo

2023 Monthly Seasonal Factors for Main Ave E @ 9th St - West Fargo
Effective Number of Days: 365

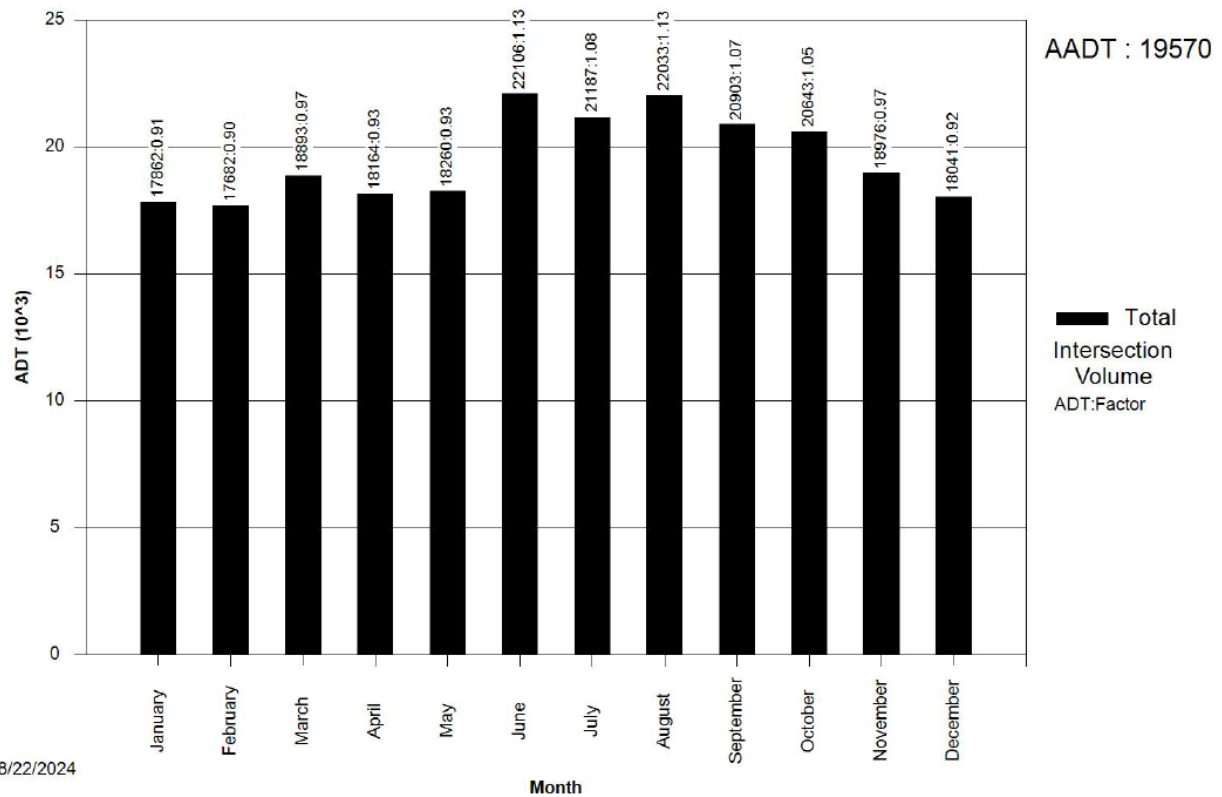


Figure 3. Sample 2023 Monthly Seasonal Factors report for Main Ave E at 9th St, West Fargo

April 2024 Day of the Week Seasonal Factors for Main Ave SE/Hwy 52 @ 20th St/21st St - Moorhead
Effective Number of Days: 30

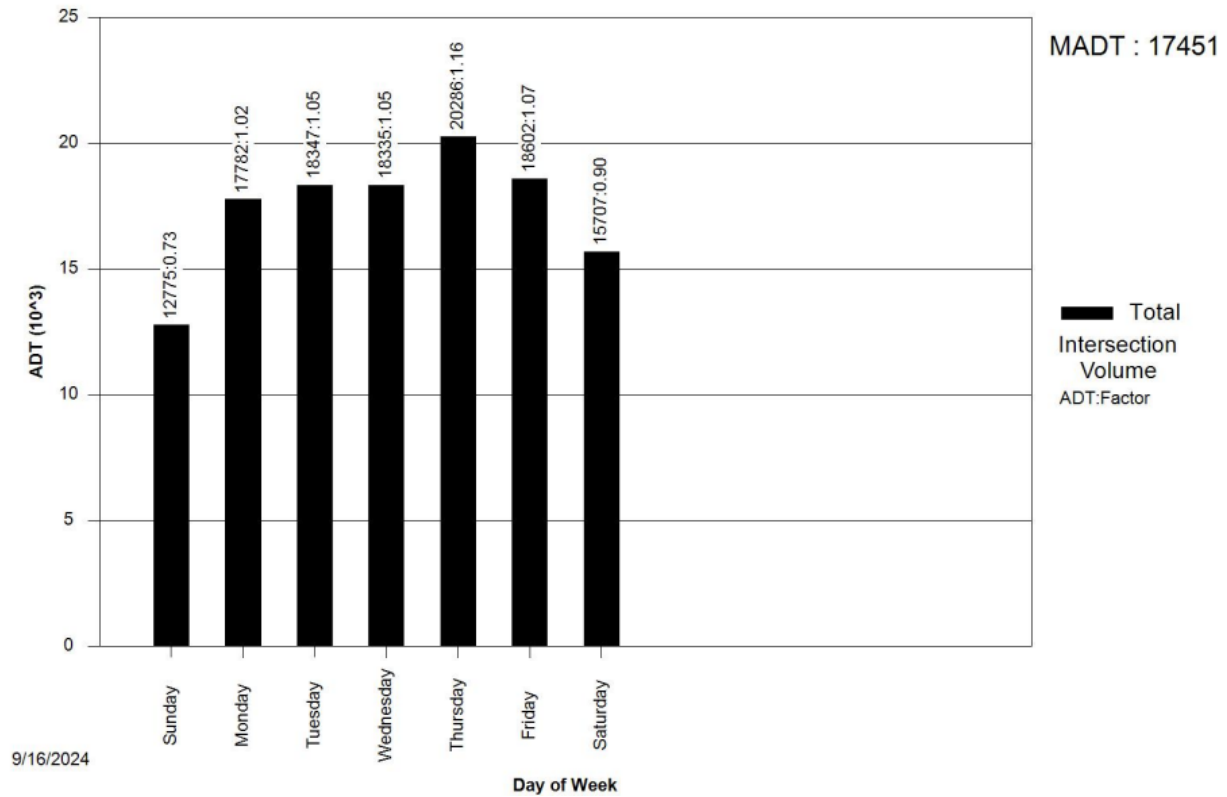
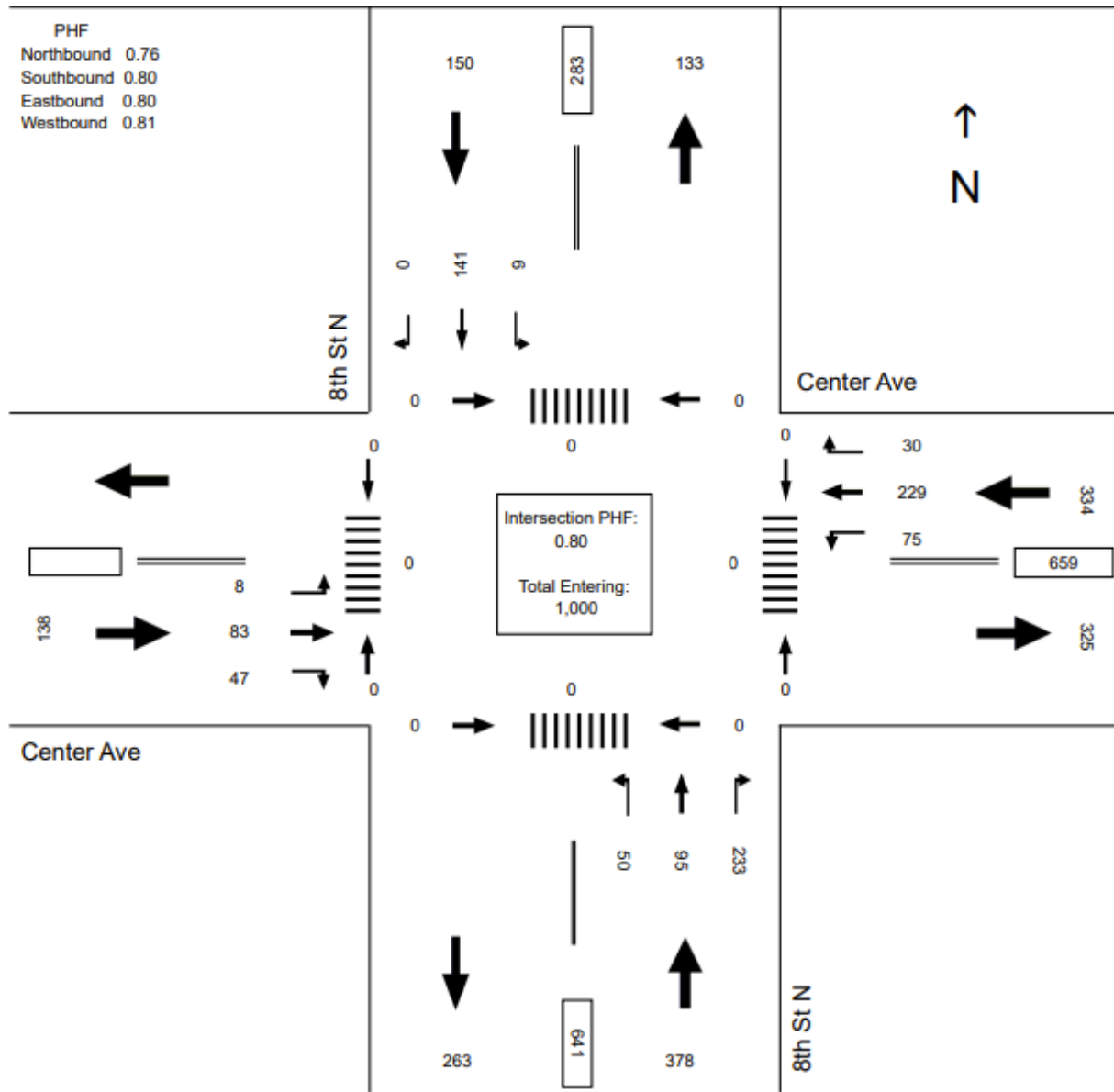


Figure 4. Sample Day-of-the-week Seasonal Factor report for Main Ave SE/Hwy 52 at 20th St/21st St, Moorhead

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Peak Hour Volume/Factor for Center Ave @ 8th St N - MnDOT - Weekdays
During 2023-11-20 - 2024-04-30
Effective Number of Days: 102
AM (6 - 10 AM)



The information generated by this calculator is for estimation uses only. The Upper Great Plains Transportation Institute and North Dakota State University make no representation or warranty, expressed or implied, regarding the accuracy or reliability of the results.

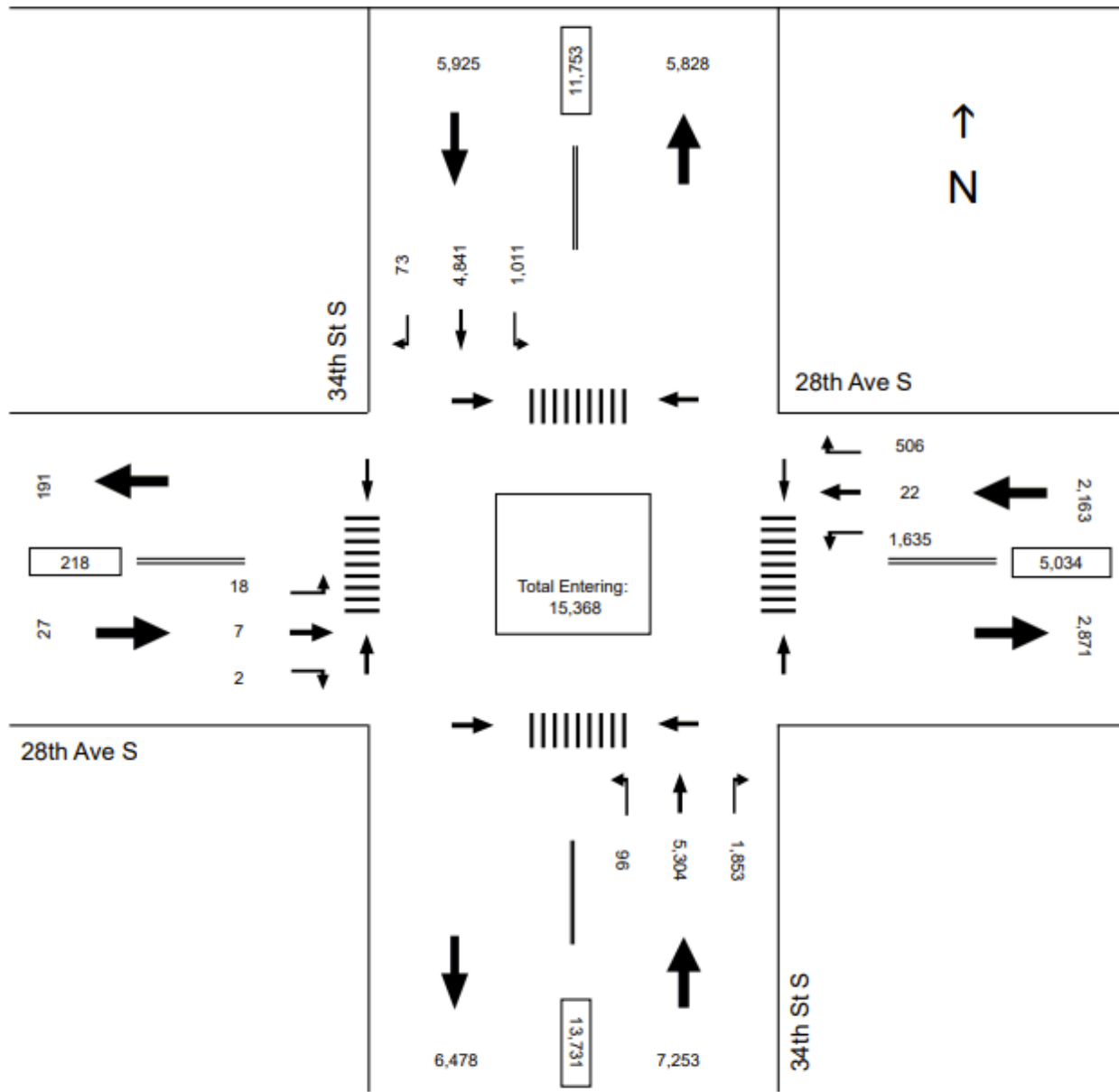
9/17/2024

1

Figure 5. Peak Hour Volume/Factor Report for Center Ave at 8th St N, Moorhead (MnDOT)

NDSU UPPER GREAT PLAINS TRANSPORTATION INSTITUTE

AADT TMC Diagram for 34th St S @ 28th Ave S - Moorhead - Weekdays and Weekends
During 01/01/2023 - 12/31/2023
Effective Number of Days: 365



The information generated by this calculator is for estimation uses only. The Upper Great Plains Transportation Institute and North Dakota State University make no representation or warranty, expressed or implied, regarding the accuracy or reliability of the results.

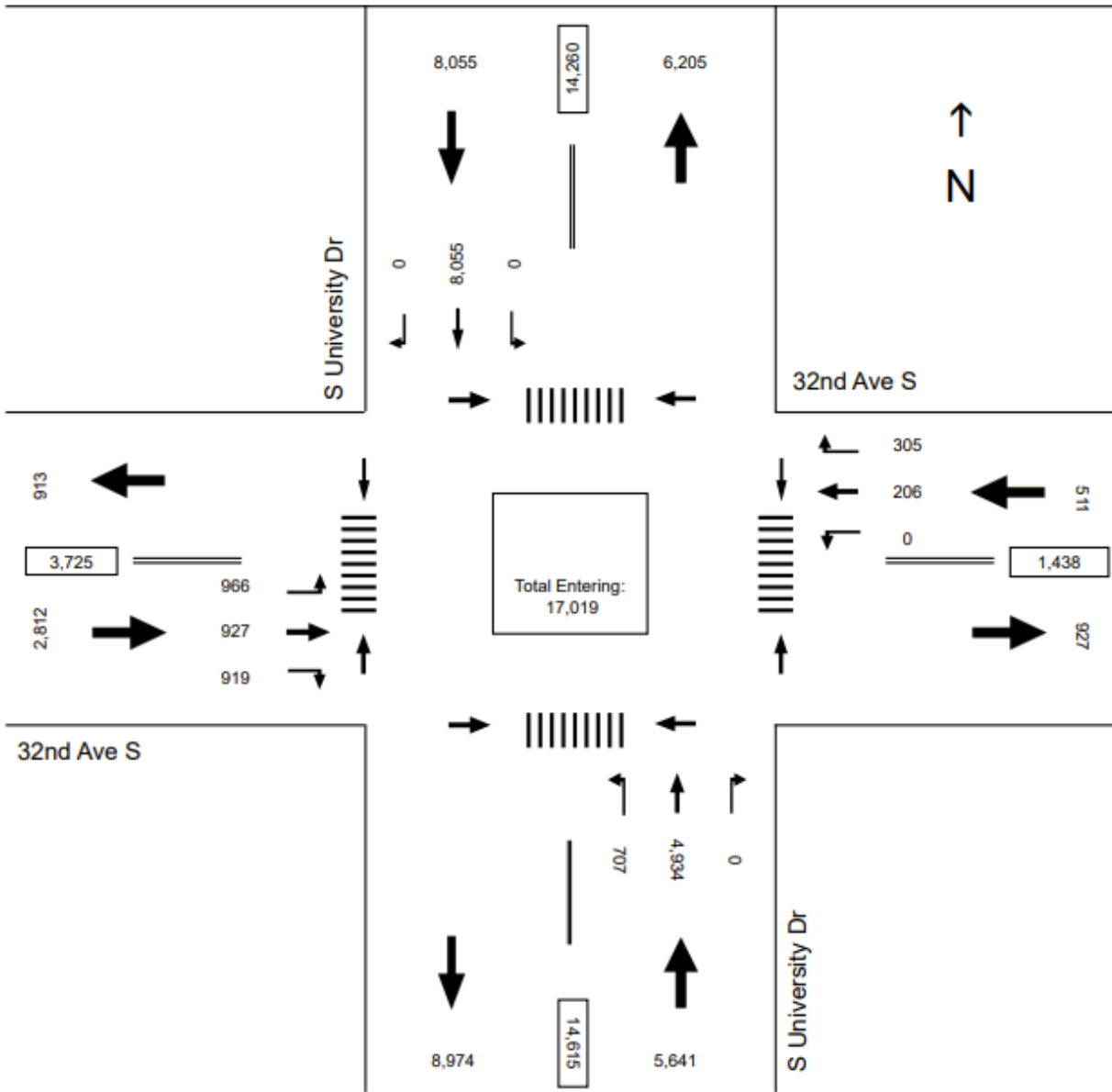
9/17/2024

1

Figure 6. Annual Average Daily Traffic (2023) report for 34th St S at 28th Ave S, Moorhead

NDSU UPPER GREAT PLAINS TRANSPORTATION INSTITUTE

November MADT TMC Diagram for S University Dr @ 32nd Ave S - Fargo - Weekdays and Weekends
During 11/01/2023 - 11/30/2023
Effective Number of Days: 30



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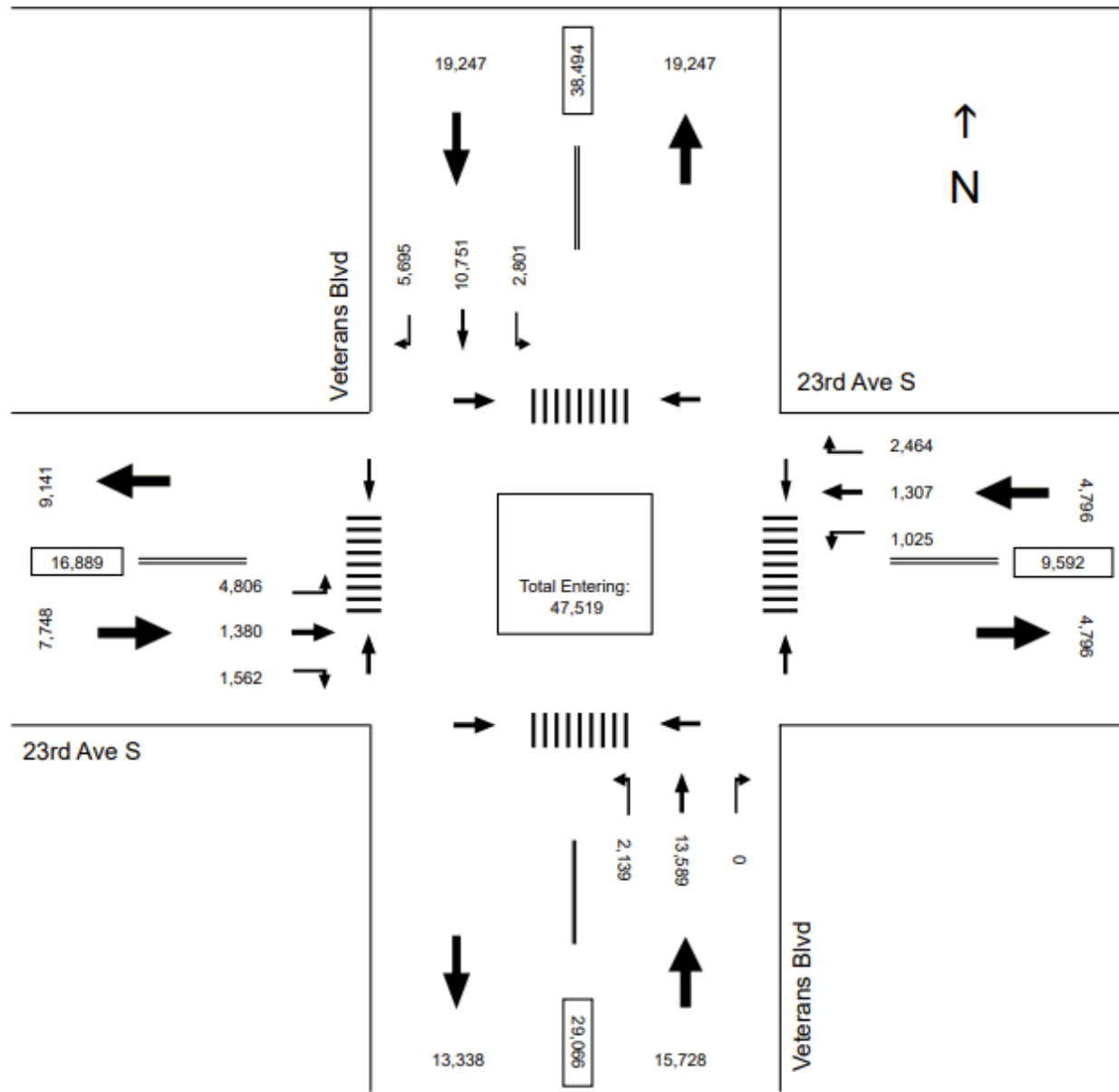
9/17/2024

1

Figure 7. November 2023 MADT report for S University Dr at 32nd Ave S, Fargo

NDSU UPPER GREAT PLAINS TRANSPORTATION INSTITUTE

ADT TMC Diagram for Veterans Blvd @ 23rd Ave S - West Fargo - Weekdays and Weekends
During 6/28/2023 - 6/30/2023
Effective Number of Days: 3



The information generated by this calculator is for estimation uses only. The Upper Great Plains Transportation Institute and North Dakota State University make no representation or warranty, expressed or implied, regarding the accuracy or reliability of the results.

9/17/2024

1

Figure 8. Sample ADT report (June 28th – 30th, 2023) for Veterans Blvd at 23rd Ave S, West Fargo

Pedestrian Counting

In order to continue using the existing infrastructure to its highest capability, Upper Great Plains Transportation Institute staff is working to “turning on” the currently unutilized capability of camera-based signalized intersections to capture pedestrian counts from the corresponding crosswalks. In the near future, sample data from one such regional intersection will be made available for reporting purposes on the NDSU Traffic Analysis Tool website. The pedestrian counts would be imported in the already established database with 15-minute bins and the reporting would be integrated into the existing reports. Creation of new non-motorized road user count based reports would also be considered.

RECOMMENDATIONS

Based on the findings of this project for the area agencies, several next steps have been identified and the corresponding recommendations are discussed below.

City of Fargo

Consider:

- Set up more intersections for traffic data collection mainly to include other signalized intersections within Fargo’s jurisdiction.
- Add detectors wherever turning traffic cannot be captured due to lack of instrumentation.
 - Alternatively, other available detection technologies such as video may be considered
- Add stopbar detection for through lane groups to capture traffic as it enters the intersection
 - Alternatively, other available detection technologies such as video may be considered
- Coordinate with UGPTI staff to continue troubleshooting detection issues identified during the course of this project
- Despite ideal frequency and sensitivity settings of the inductive loop monitoring devices, several detectors are being activated by vehicles traveling in the adjoining lanes. Replace all such loops with alternate placement to avoid such instances
 - This impacts not only traffic data collection but is also responsible for false calls in to the phases where demand is nonexistent (during a cycle) resulting in increased control delay experienced by all of road users at the affected intersection(s).
 - Alternatively, other available detection technologies such as video may be considered
- Edit detector settings to log volume and occupancy data on a default basis, streamlining any future traffic data collection efforts

Minnesota Department of Transportation

Consider:

- Set up more intersections for traffic data collection, mainly to include intersections along US 75 and US 10 within District 4's jurisdiction within Moorhead and Dilworth
- Add detectors wherever turning traffic cannot be captured due to lack of instrumentation.
 - Alternatively, as is the case in this project, other available detection technologies such as video may be considered
- At the Center Ave at 8th St intersection
 - Add passive pedestrian detection as a backup option to physical pedestrian push buttons
 - Add pedestrian detection across all crosswalks for counting purposes
 - Add bicycle detection based actuation for lane groups and signal phases where such non-motorized traffic is expected to travel
 - Enable API script based process(es) to automate daily data download and transfer to the DOTSC server at NDSU
 - Take static snapshots from traffic detection cameras for operational and pavement condition monitoring. A sample API script from UGPTI may be used for automating such efforts.

City of Moorhead

Consider:

- Set up more intersections for traffic data collection mainly to include other signalized intersections within Moorhead's jurisdiction.
- Periodically review existing detection technology devices (timeclock settings, detector faults etc.) to ensure continued reliable performance
- Edit existing SFTP based scripts to begin downloading data from other signalized intersections which may be setup for traffic data processing in the upcoming years
- At all VISION based intersections:
 - Add passive pedestrian detection as a backup option to physical pedestrian push buttons
 - Add pedestrian detection across all crosswalks for counting purposes
 - Add bicycle detection based actuation for lane groups and signal phases where such non-motorized traffic is expected to travel

City of West Fargo

Consider:

- Set up more intersections for traffic data collection mainly to include other signalized intersections within West Fargo's jurisdiction.
- At all intersections:
 - Add passive pedestrian detection as a backup option to physical pedestrian push buttons
 - Add pedestrian detection across all crosswalks for counting purposes
 - Add bicycle detection based actuation for lane groups and signal phases where such non-motorized traffic is expected to travel
- At Main Ave E at 17th St E
 - Reposition eastbound and westbound cameras so that they are between the through- and left-turning lane groups
- At other intersections
 - Consider repositioning cameras especially those currently mounted on luminaire extensions
 - Reset zoom levels to manufacturer-recommended levels

APPENDIX A

52nd Ave S @ Timber Pkwy/31st St S															
Interval	Source	Southbound				Westbound			Northbound				Eastbound		
		Right	Thru	Left	Total	T+RT	Left	Total	Right	Thru	Left	Total	T+RT	Left	Total
15-min interval	Manual	49	11	36	96	174	8	182	8	1	11	20	145	54	199
	Loop	42	8	38	88	231	9	240	7	2	9	18	169	56	225
15-min interval	Manual	40	10	32	82	185	11	196	6	4	30	40	181	43	224
	Loop	46	8	30	84	217	11	228	8	4	33	45	220	47	267
15-min interval	Manual	41	6	38	85	195	5	200	9	8	16	33	160	56	216
	Loop	39	5	46	90	248	5	253	10	7	17	34	179	62	241
15-min interval	Manual	42	8	59	109	168	8	176	3	5	16	24	200	62	262
	Loop	48	5	48	101	229	5	234	5	5	15	25	220	66	286
Hourly Totals	Manual	172	35	165	372	722	32	754	26	18	73	117	686	215	901
	Loop	175	26	162	363	925	30	955	30	18	74	122	788	231	1019
	Difference	0.2	1.6	0.2	0.5	7.1	0.4	6.9	0.8	0.0	0.1	0.5	3.8	1.1	3.8
Loop PHF		0.88	0.80	0.70	0.85	0.93	0.73	0.94	0.72	0.56	0.61	0.73	0.86	0.87	0.86
Autoscope PHF		0.91	0.81	0.84	0.90	0.93	0.68	0.94	0.75	0.64	0.56	0.68	0.90	0.88	0.89

N University Dr @ 12th Ave N										
Interval	Source	Southbound			Westbound			Eastbound		
		Right	T+LT	Total	Thru	Left	Total	Right	Thru	Total
15-min interval	Manual	15	89	104	51	21	72	7	42	49
	Loop	29	83	112	67	21	88	9	42	51
15-min interval	Manual	12	113	125	53	18	71	10	55	65
	Loop	17	106	123	66	20	86	9	55	64
15-min interval	Manual	14	102	116	51	20	71	12	54	66
	Loop	16	106	122	68	21	89	12	61	73
15-min interval	Manual	15	124	139	45	14	59	18	66	84
	Loop	21	118	139	62	19	81	20	64	84
Hourly Totals	Manual	56	428	484	200	73	273	47	217	264
	Loop	83	413	496	263	81	344	50	222	272
	Difference	3.2	0.7	0.5	4.1	0.9	4.0	0.4	0.3	0.5
Manual PHF		0.93	0.86	0.87	0.94	0.87	0.95	0.65	0.82	0.79
Autoscope PHF		0.72	0.88	0.89	0.97	0.96	0.97	0.63	0.87	0.81

S University Dr @ 13th Ave S														
Interval	Source	Southbound				Westbound			Northbound			Eastbound		
		Right	Thru	Left	Total	Thru	Left	Total	Right	Left	Total	Right	Thru	Total
15-min interval	Manual	48	239	N/A	287	22	24	46	139	45	184	N/A	92	92
	Loop	49	218	N/A	267	31	30	61	156	45	201	N/A	92	92
15-min interval	Manual	42	246	N/A	288	24	16	40	174	44	218	N/A	106	106
	Loop	46	224	N/A	270	30	29	59	184	46	230	N/A	77	77
15-min interval	Manual	55	258	N/A	313	28	24	52	167	33	200	N/A	92	92
	Loop	57	231	N/A	288	37	33	70	175	41	216	N/A	103	103
15-min interval	Manual	49	230	N/A	279	24	26	50	152	51	203	N/A	92	92
	Loop	46	187	N/A	233	28	31	59	158	49	207	N/A	70	70
Hourly Totals	Manual	194	973	N/A	1167	98	90	188	632	173	805	N/A	382	382
	Loop	198	860	N/A	1058	126	123	249	673	181	854	N/A	342	342
	Difference	0.3	3.7	N/A	3.3	2.6	3.2	4.1	1.6	0.6	1.7	N/A	2.1	2.1
Loop PHF		0.88	0.94	N/A	0.93	0.88	0.87	0.90	0.91	0.85	0.92	N/A	0.90	0.90
Autoscope PHF		0.87	0.93	N/A	0.92	0.85	0.93	0.89	0.91	0.92	0.93	N/A	0.83	0.83

S University Dr @ 32nd Ave S															
Interval	Source	Southbound			Westbound			Northbound				Eastbound			
		T+RT	Left	Total	Right	T+LT	Total	Right	Thru	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	238	9	247	8	8	16	0	95	22	117	17	48	79	144
	Loop	207	0	207	6	5	11	0	98	17	115	20	17	34	71
15-min interval	Manual	211	12	223	10	3	13	2	115	18	135	27	35	79	141
	Loop	187	0	187	10	4	14	0	105	18	123	19	17	38	74
15-min interval	Manual	251	4	255	0	7	7	1	96	31	128	21	46	106	173
	Loop	201	0	201	3	2	5	0	99	22	121	24	26	44	94
15-min interval	Manual	177	5	182	7	1	8	0	103	12	115	21	27	68	116
	Loop	195	0	195	9	4	13	0	118	15	133	23	19	38	80
Hourly Totals	Manual	877	30	907	25	19	44	3	409	83	495	86	156	332	574
	Loop	790	0	790	28	15	43	0	420	72	492	86	79	154	319
	Difference	3.0	7.7	4.0	0.6	1.0	0.2	2.4	0.5	1.2	0.1	0.0	7.1	11.4	12.1
Loop PHF		0.87	0.63	0.89	0.63	0.59	0.69	0.05	0.89	0.67	0.92	0.80	0.33	0.78	0.83
Autoscope PHF		0.95	#DIV/0!	0.95	0.70	0.75	0.77	#DIV/0!	0.89	0.82	0.92	0.90	0.76	0.88	0.85

25th St S @ 13th Ave																
Interval	Source	Southbound				Westbound			Northbound				Eastbound			
		Right	Thru	Left	Total	T+RT	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	30	92	12	134	124	29	153	33	95	41	169	79	122	37	238
	Loop	27	72	15	114	126	23	149	33	87	43	163	65	133	42	240
15-min interval	Manual	53	73	17	143	142	23	165	24	76	42	142	61	119	45	225
	Loop	55	82	14	151	150	26	176	20	91	37	148	60	119	37	216
15-min interval	Manual	41	98	9	148	119	31	150	25	100	56	181	48	134	34	216
	Loop	41	100	8	149	115	35	150	25	116	50	191	51	138	43	232
15-min interval	Manual	39	100	11	150	117	34	151	20	74	40	134	67	133	49	249
	Loop	41	94	11	146	129	26	155	25	90	39	154	66	133	41	240
Hourly Totals	Manual	163	363	49	575	502	117	619	102	345	179	626	255	508	165	928
	Loop	164	348	48	560	520	110	630	103	384	169	656	242	523	163	928
	Difference	0.1	0.8	0.1	0.6	0.8	0.7	0.4	0.1	2.0	0.8	1.2	0.8	0.7	0.2	0.0
Loop PHF		0.77	0.91	0.72	0.96	0.88	0.86	0.94	0.17	0.86	0.80	0.86	0.81	0.95	0.52	0.93
Autoscope PHF		0.75	0.87	0.80	0.93	0.87	0.79	0.89	0.78	0.83	0.85	0.86	0.92	0.95	0.95	0.97

13th Ave S @ 38th St S																
Interval	Source	Southbound				Westbound				Northbound				Eastbound		
		Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total	Thru	Left	Total
15-min interval	Manual	73	43	43	159	45	231	57	333	56	30	19	105	209	31	240
	Loop	73	39	32	144	34	259	37	330	48	28	18	94	201	32	233
15-min interval	Manual	91	34	44	169	25	253	32	310	32	32	11	75	239	69	308
	Loop	85	31	40	156	25	261	27	313	36	32	9	77	244	53	297
15-min interval	Manual	89	62	39	190	24	207	33	264	38	32	20	90	238	61	299
	Loop	78	50	39	167	23	201	22	246	43	33	19	95	241	35	276
15-min interval	Manual	84	34	44	162	27	232	28	287	33	37	18	88	230	61	291
	Loop	85	35	43	163	29	228	26	283	35	32	18	85	234	40	274
Hourly Totals	Manual	337	173	170	680	121	923	150	1194	159	131	68	358	916	222	1138
	Loop	321	155	154	630	111	949	112	1172	162	125	64	351	920	160	1080
	Difference	0.9	1.4	1.3	2.0	0.9	0.8	3.3	0.6	0.2	0.5	0.5	0.4	0.1	4.5	1.7
Loop PHF		0.93	0.70	0.97	0.89	0.67	0.91	0.66	0.90	0.12	0.58	0.85	0.85	0.96	0.80	0.92
Autoscope PHF		0.94	0.78	0.90	0.94	0.82	0.91	0.76	0.89	0.84	0.95	0.84	0.92	0.94	0.75	0.91

45th St S @ 13th Ave S																	
Interval	Source	Southbound				Westbound				Northbound				Eastbound			
		Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	39	160	38	237	37	192	68	297	53	162	60	275	35	152	20	207
	Loop	29	177	52	258	44	217	62	323	64	186	58	308	51	163	61	275
15-min interval	Manual	49	155	49	253	57	190	57	304	63	139	62	264	45	150	23	218
	Loop	30	157	49	236	40	194	71	305	46	187	59	292	68	162	60	290
15-min interval	Manual	25	140	50	215	35	170	64	269	57	151	60	268	47	161	26	234
	Loop	33	157	50	240	37	190	76	303	57	204	54	315	48	170	47	265
15-min interval	Manual	27	150	59	236	66	175	79	320	71	132	73	276	55	152	32	239
	Loop	20	162	35	217	25	180	35	240	49	147	55	251	31	160	20	211
Hourly Totals	Manual	140	605	196	941	195	727	268	1190	244	584	255	1083	182	615	101	898
	Loop	112	653	186	951	146	781	244	1171	216	724	226	1166	198	655	188	1041
	Difference	2.5	1.9	0.7	0.3	3.8	2.0	1.5	0.6	1.8	5.5	1.9	2.5	1.2	1.6	7.2	4.6
Loop PHF		0.71	0.95	0.83	0.93	0.74	0.95	0.85	0.93	0.86	0.90	0.87	0.98	0.83	0.95	0.72	0.94
Autoscope PHF		0.85	0.92	0.89	0.92	0.83	0.90	0.80	0.91	0.84	0.89	0.96	0.93	0.73	0.96	0.77	0.90

42nd St S @ 17th Ave S														
Interval	Source	Southbound				Westbound			Northbound			Eastbound		
		Right	Thru	Left	Total	T+RT	Left	Total	T+RT	Left	Total	Thru	Left	Total
15-min interval	Manual	32	113	24	169	85	28	113	15	13	28	56	43	99
	Loop	32	75	18	125	80	18	98	15	14	29	48	21	69
15-min interval	Manual	21	119	23	163	95	32	127	33	11	44	66	45	111
	Loop	22	104	20	146	74	25	99	25	12	37	55	24	79
15-min interval	Manual	29	122	31	182	94	37	131	25	14	39	88	41	129
	Loop	27	97	25	149	74	21	95	18	16	34	70	28	98
15-min interval	Manual	23	106	23	152	72	29	101	23	9	32	82	33	115
	Loop	24	86	16	126	63	18	81	23	8	31	71	21	92
Hourly Totals	Manual	105	460	101	666	346	126	472	96	47	143	292	162	454
	Loop	105	362	79	546	291	82	373	81	50	131	244	94	338
	Difference	0.0	4.8	2.3	4.9	3.1	4.3	4.8	1.6	0.4	1.0	2.9	6.0	5.8
Loop PHF		0.82	0.94	0.81	0.91	0.91	0.85	0.90	0.73	0.84	0.81	0.83	0.90	0.88
Autoscope PHF		0.82	0.87	0.79	0.92	0.91	0.82	0.94	0.81	0.78	0.89	0.86	0.84	0.86

Main Ave @ 45th St																
Interval	Source	Southbound				Westbound			Northbound				Eastbound			
		Right	Thru	Left	Total	T+RT	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	22	57	28	107	164	34	198	47	99	23	169	22	123	24	169
	Loop	24	93	27	144	167	44	211	43	98	20	161	24	124	30	178
15-min interval	Manual	27	91	31	149	148	50	198	41	108	12	161	18	126	38	182
	Loop	25	112	31	168	158	50	208	33	103	14	150	19	134	35	188
15-min interval	Manual	23	103	25	151	115	37	152	47	93	21	161	22	120	38	180
	Loop	23	123	21	167	119	39	158	50	93	16	159	24	131	43	198
15-min interval	Manual	25	86	26	137	131	46	177	38	94	18	150	14	117	39	170
	Loop	23	123	21	167	134	44	178	38	88	20	146	16	114	43	173
Hourly Totals	Manual	97	337	110	544	558	167	725	173	394	74	641	76	486	139	701
	Loop	95	451	100	646	578	177	755	164	382	70	616	83	503	151	737
	Difference	0.2	5.7	1.0	4.2	0.8	0.8	1.1	0.7	0.6	0.5	1.0	0.8	0.8	1.0	1.3
Loop PHF		0.90	0.82	0.89	0.90	0.85	0.84	0.92	0.92	0.91	0.80	0.95	0.86	0.96	0.89	0.96
Autoscope PHF		0.95	0.92	0.81	0.96	0.87	0.89	0.89	0.82	0.93	0.88	0.96	0.86	0.94	0.88	0.93

32nd Ave S @ 42nd St S															
Interval	Source	Southbound				Westbound			Northbound				Eastbound		
		Right	Thru	Left	Total	T+RT	Left	Total	Right	Thru	Left	Total	T+RT	Left	Total
15-min interval	Manual	27	71	41	139	207	26	233	28	61	9	98	181	19	200
	Loop	27	70	46	143	201	26	227	24	59	11	94	183	18	201
15-min interval	Manual	34	68	52	154	210	20	230	28	58	19	105	146	28	174
	Loop	34	65	47	146	203	25	228	24	55	17	96	163	33	196
15-min interval	Manual	20	58	35	113	231	46	277	28	38	17	83	159	23	182
	Loop	21	66	40	127	201	38	239	26	44	17	87	165	24	189
15-min interval	Manual	29	72	52	153	185	29	214	37	50	10	97	143	20	163
	Loop	24	72	55	151	199	35	234	31	49	9	89	147	20	167
Hourly Totals	Manual	110	269	180	559	833	121	954	120	217	87	424	629	90	719
	Loop	106	273	188	567	804	124	928	105	207	54	366	658	95	753
	Difference	0.4	0.2	0.6	0.3	1.0	0.3	0.8	1.4	0.7	3.9	2.9	1.1	0.5	1.3
Loop PHF		0.81	0.93	0.87	0.91	0.90	0.66	0.86	0.81	0.89	1.14	1.01	0.87	0.80	0.90
Autoscope PHF		0.78	0.95	0.85	0.94	0.99	0.82	0.97	0.85	0.88	0.79	0.95	0.90	0.72	0.94

32nd Ave S @ 39th St S														
Interval	Source	Southbound			Westbound			Northbound				Eastbound		
		T+RT	Left	Total	T+RT	Left	Total	Right	Thru	Left	Total	T+RT	Left	Total
15-min interval	Manual	11	22	33	193	46	239	70	5	29	104	190	5	195
	Loop	8	9	17	212	35	247	45	2	11	58	201	7	208
15-min interval	Manual	12	28	40	214	55	269	56	2	13	71	171	5	176
	Loop	12	29	41	212	61	273	59	2	14	75	176	4	180
15-min interval	Manual	4	25	29	224	62	286	46	3	20	69	219	3	222
	Loop	2	19	21	212	29	241	26	1	17	44	210	3	213
15-min interval	Manual	7	27	34	195	70	265	61	4	16	81	289	6	295
	Loop	2	19	21	219	58	277	49	4	12	65	289	7	296
Hourly Totals	Manual	34	102	136	826	233	1059	233	14	78	325	869	19	888
	Loop	24	76	100	855	183	1038	179	9	54	242	876	21	897
	Difference	1.9	2.8	3.3	1.0	3.5	0.6	3.8	1.5	3.0	4.9	0.2	0.4	0.3
Loop PHF		0.71	0.91	0.85	0.92	0.83	0.93	0.83	0.70	0.67	0.78	0.75	0.79	0.75
Autoscope PHF		0.50	0.66	0.61	0.98	0.75	0.94	0.76	0.56	0.79	0.81	0.76	0.75	0.76

52nd Ave S @ 25th St S															
Interval	Source	Southbound			Westbound				Northbound			Eastbound			
		Thru	Left	Total	Right	Thru	Left	Total	Thru	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	85	9	94	12	73	12	97	95	83	178	65	82	34	181
	Loop	89	9	98	12	81	10	103	65	69	134	68	56	33	157
15-min interval	Manual	70	9	79	17	115	13	145	74	123	197	66	86	32	184
	Loop	76	9	85	17	109	14	140	75	102	177	68	48	32	148
15-min interval	Manual	122	19	141	9	81	25	115	46	100	146	70	81	24	175
	Loop	128	19	147	9	81	25	115	53	74	127	71	45	27	143
15-min interval	Manual	113	15	128	13	74	9	96	62	88	150	76	96	36	208
	Loop	101	15	116	12	83	9	104	54	76	130	77	58	39	174
Hourly Totals	Manual	390	52	442	51	343	59	453	277	394	671	277	345	126	748
	Loop	394	52	446	50	354	58	462	247	321	568	284	207	131	622
	Difference	0.2	0.0	0.2	0.1	0.6	0.1	0.4	1.9	3.9	4.1	0.4	8.3	0.4	4.8
Loop PHF		0.80	0.68	0.78	0.75	0.75	0.59	0.78	0.73	0.80	0.85	0.91	0.90	0.48	0.90
Autoscope PHF		0.77	0.68	0.76	0.74	0.81	0.58	0.83	0.82	0.79	0.80	0.92	0.89	0.84	0.89

52nd Ave S @ 38th St S																
Interval	Source	Southbound			Westbound				Northbound				Eastbound			
		T+RT	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	24	21	45	25	95	52	172	48	13	36	97	35	144	9	188
	Loop	26	21	47	23	94	53	170	49	13	19	81	36	125	9	170
15-min interval	Manual	11	30	41	24	66	39	129	53	10	35	98	29	124	4	157
	Loop	9	31	40	23	77	42	142	54	10	33	97	27	106	5	138
15-min interval	Manual	17	22	39	23	92	67	182	56	15	29	100	43	155	11	209
	Loop	16	26	42	24	94	65	183	59	14	30	103	37	121	10	168
15-min interval	Manual	26	33	59	28	83	62	173	55	18	36	109	27	130	7	164
	Loop	27	32	59	26	98	65	189	54	19	32	105	27	114	7	148
Hourly Totals	Manual	78	106	184	100	336	220	656	212	56	136	404	134	553	31	718
	Loop	78	110	188	96	363	225	684	216	56	114	386	127	466	31	624
	Difference	0.0	0.4	0.3	0.4	1.4	0.3	1.1	0.3	0.0	2.0	0.9	0.6	3.9	0.0	3.6
Loop PHF		0.75	0.80	0.78	0.89	0.88	0.82	0.90	0.95	0.78	0.94	0.93	0.78	0.89	0.22	0.86
Autoscope PHF		0.72	0.86	0.80	0.92	0.93	0.87	0.90	0.92	0.74	0.86	0.92	0.86	0.93	0.78	0.92

52nd Ave S @ 63rd St S															
Interval	Source	Southbound			Westbound				Northbound			Eastbound			
		T+RT	Left	Total	Right	Thru	Left	Total	T+RT	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	6	5	11	3	3	27	33	40	0	40	1	8	0	9
	Loop	6	5	11	3	2	29	34	38	8	46	1	9	0	10
15-min interval	Manual	6	4	10	7	3	51	61	43	0	43	1	4	2	7
	Loop	5	6	11	7	5	50	62	42	7	49	1	4	2	7
15-min interval	Manual	6	2	8	8	4	54	66	38	1	39	3	6	0	9
	Loop	2	6	8	8	6	54	68	40	20	60	2	6	0	8
15-min interval	Manual	6	8	14	4	7	55	66	55	0	55	1	0	1	2
	Loop	8	6	14	4	9	55	68	55	15	70	0	1	1	2
Hourly Totals	Manual	24	19	43	22	17	187	226	176	1	177	6	18	3	27
	Loop	21	23	44	22	22	188	232	175	50	225	4	20	3	27
	Difference	0.6	0.9	0.2	0.0	1.1	0.1	0.4	0.1	9.7	3.4	0.9	0.5	0.0	0.0
Loop PHF		1.00	0.59	0.77	0.69	0.61	0.85	0.86	0.80	0.25	0.80	0.50	0.56	0.38	0.75
Autoscope PHF		0.66	0.96	0.79	0.69	0.61	0.85	0.85	0.80	0.63	0.80	0.50	0.56	0.38	0.68

45th St S @ 40th Ave S														
Interval	Source	Southbound			Westbound			Northbound			Eastbound			
		T+RT	Left	Total	T+RT	Left	Total	T+RT	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	156	25	181	74	16	90	117	22	139	22	40	55	117
	Loop	183	19	202	67	11	78	110	25	135	26	48	53	127
15-min interval	Manual	157	16	173	78	11	89	86	17	103	25	51	56	132
	Loop	184	17	201	62	18	80	87	23	110	22	34	53	109
15-min interval	Manual	134	24	158	59	15	74	106	9	115	15	52	48	115
	Loop	168	15	183	53	12	65	130	14	144	29	48	43	120
15-min interval	Manual	180	21	201	62	8	70	100	24	124	26	45	45	116
	Loop	156	15	171	47	15	62	104	26	130	31	53	61	145
Hourly Totals	Manual	627	86	713	273	50	323	409	72	481	88	188	204	480
	Loop	691	66	757	229	56	285	431	88	519	108	183	210	501
	Difference	2.5	2.3	1.6	2.8	0.8	2.2	1.1	1.8	1.7	2.0	0.4	0.4	0.9
Loop PHF		0.87	0.86	0.89	0.88	0.78	0.90	0.87	0.75	0.87	0.85	0.90	0.91	0.91
Autoscope PHF		0.94	0.87	0.94	0.85	0.78	0.89	0.83	0.85	0.90	0.87	0.86	0.86	0.86

45th St S @ 19th Ave S																	
Interval	Source	Southbound				Westbound				Northbound				Eastbound			
		Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	N/A	344	4	348	12	10	17	39	N/A	390	52	442	57	11	22	90
	Loop	N/A	359	4	363	13	11	11	35	N/A	403	30	433	47	14	11	72
15-min interval	Manual	N/A	345	5	350	9	6	23	38	N/A	399	40	439	63	13	21	97
	Loop	N/A	358	6	364	6	7	11	24	N/A	401	23	424	52	15	15	82
15-min interval	Manual	N/A	369	8	377	14	15	25	54	N/A	343	56	399	61	10	23	94
	Loop	N/A	391	5	396	13	13	15	41	N/A	346	24	370	44	10	14	68
15-min interval	Manual	N/A	348	6	354	10	11	21	42	N/A	346	57	403	59	9	20	88
	Loop	N/A	343	5	348	12	12	11	35	N/A	361	23	384	46	10	7	63
Hourly Totals	Manual	N/A	1406	23	1429	45	42	86	173	N/A	1478	205	1683	240	43	86	369
	Loop	N/A	1451	20	1471	44	43	48	135	N/A	1511	100	1611	189	49	47	285
	Difference	N/A	1.2	0.6	1.1	0.1	0.2	4.6	3.1	N/A	0.9	8.5	1.8	3.5	0.9	4.8	4.6
Loop PHF		N/A	0.95	0.72	0.95	0.80	0.70	0.86	0.80	N/A	0.93	0.90	0.95	0.95	0.83	0.93	0.95
Autoscope PHF		N/A	0.93	0.83	0.93	0.85	0.83	0.80	0.82	N/A	0.94	0.83	0.93	0.91	0.82	0.78	0.87

Main Ave @25th St																
Interval	Source	Southbound				Westbound			Northbound				Eastbound			
		Right	Thru	Left	Total	T+RT	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	N/A	119	12	131	141	41	182	N/A	114	28	142	N/A	138	33	171
	Loop	N/A	118	13	131	130	50	180	N/A	96	27	123	N/A	122	34	156
15-min interval	Manual	N/A	111	18	129	148	44	192	N/A	117	28	145	N/A	166	60	226
	Loop	N/A	117	20	137	147	41	188	N/A	103	28	131	N/A	167	56	223
15-min interval	Manual	N/A	105	8	113	149	28	177	N/A	104	29	133	N/A	161	47	208
	Loop	N/A	103	9	112	149	30	179	N/A	86	29	115	N/A	132	38	170
15-min interval	Manual	N/A	113	13	126	132	34	166	N/A	100	23	123	N/A	172	51	223
	Loop	N/A	107	12	119	135	34	169	N/A	83	22	105	N/A	166	46	212
Hourly Totals	Manual	N/A	448	51	499	570	147	717	N/A	435	108	543	N/A	637	191	828
	Loop	N/A	445	54	499	561	155	716	N/A	368	106	474	N/A	587	174	761
	Difference	N/A	0.1	0.4	0.0	0.4	0.7	0.0	N/A	3.3	0.2	3.1	N/A	2.0	1.3	2.4
Loop PHF		N/A	0.94	0.71	0.97	0.96	0.84	0.93	N/A	0.93	0.93	0.94	N/A	0.93	0.80	0.92
Autoscope PHF		N/A	0.94	0.68	0.91	0.94	0.78	0.95	N/A	0.89	0.91	0.90	N/A	0.88	0.78	0.85

45th St S @ 32nd Ave S															
Interval	Source	Southbound			Westbound				Northbound			Eastbound			
		T+RT	Left	Total	Right	Thru	Left	Total	T+RT	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	175	34	209	34	76	38	148	140	18	158	19	79	29	127
	Loop	191	38	229	42	57	36	135	142	18	160	19	83	31	133
15-min interval	Manual	200	36	236	61	81	26	168	166	13	179	19	98	30	147
	Loop	217	32	249	40	44	39	123	172	11	183	19	113	29	161
15-min interval	Manual	188	34	222	45	64	31	140	128	15	143	20	115	35	170
	Loop	202	35	237	46	51	50	147	208	20	228	21	108	36	165
15-min interval	Manual	176	39	215	84	102	59	245	161	14	175	28	98	24	150
	Loop	204	43	247	63	72	53	188	176	14	190	29	97	26	152
Hourly Totals	Manual	739	143	882	224	323	154	701	595	60	655	86	390	118	594
	Loop	814	148	962	191	224	178	593	698	63	761	88	401	122	611
	Difference	2.7	0.4	2.6	2.3	6.0	1.9	4.2	4.1	0.4	4.0	0.2	0.6	0.4	0.7
Loop PHF		0.92	0.92	0.93	0.67	0.79	0.65	0.72	0.90	0.83	0.91	0.77	0.85	0.84	0.87
Autoscope PHF		0.94	0.86	0.97	0.76	0.78	0.84	0.79	0.84	0.79	0.83	0.76	0.89	0.85	0.93

52nd Ave S @45th St S																	
Interval	Source	Southbound				Westbound				Northbound				Eastbound			
		Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total	Right	Thru	Left	Total
15-min interval	Manual	21	42	49	112	49	97	13	159	37	32	12	81	5	100	9	114
	Loop	27	45	72	144	50	109	18	177	41	27	13	81	6	98	15	119
15-min interval	Manual	18	41	75	134	56	77	17	150	25	22	14	61	4	63	16	83
	Loop	21	56	60	137	57	106	24	187	29	19	13	61	11	66	12	89
15-min interval	Manual	20	36	50	106	53	77	17	147	35	18	3	56	7	69	11	87
	Loop	14	38	72	124	48	105	31	184	36	19	3	58	10	73	14	97
15-min interval	Manual	16	44	73	133	58	90	20	168	24	35	7	66	0	64	18	82
	Loop	20	53	74	147	55	107	16	178	27	34	6	67	7	66	8	81
Hourly Totals	Manual	75	163	247	485	216	341	67	624	121	107	36	264	16	296	54	366
	Loop	82	192	278	552	210	427	89	726	133	99	35	267	34	303	49	386
	Difference	0.8	2.2	1.9	2.9	0.4	4.4	2.5	3.9	1.1	0.8	0.2	0.2	3.6	0.4	0.7	1.0
Loop PHF		0.89	0.93	0.82	0.90	0.93	0.88	0.84	0.93	0.82	0.76	0.64	0.81	0.57	0.74	0.75	0.80
Autoscope PHF		0.76	0.86	0.94	0.94	0.92	0.98	0.72	0.97	0.81	0.73	0.67	0.82	0.77	0.77	0.82	0.81

52nd Ave S @ Veterans Blvd															
Interval	Source	Southbound				Westbound				Northbound		Eastbound			
		Right	Thru	Left	Total	Right	Thru	Left	Total	T+RT+LT	Total	Right	Thru	Left	Total
15-min interval	Manual	10	3	25	38	34	16	1	51	7	7	0	38	13	51
	Loop	9	4	24	37	18	35	1	54	5	5	0	36	14	50
15-min interval	Manual	16	1	25	42	27	39	1	67	0	0	1	41	9	51
	Loop	14	2	26	42	26	33	0	59	0	0	0	41	12	53
15-min interval	Manual	14	4	20	38	32	50	4	86	12	12	0	44	10	54
	Loop	18	4	21	43	26	66	5	97	3	3	0	44	13	57
15-min interval	Manual	26	8	21	55	34	55	4	93	7	7	0	43	15	58
	Loop	23	5	28	56	35	60	5	100	4	4	0	41	14	55
Hourly Totals	Manual	66	16	91	173	127	160	10	297	26	26	1	166	47	214
	Loop	64	15	99	178	105	194	11	310	12	12	0	162	53	215
	Difference	0.2	0.3	0.8	0.4	2.0	2.6	0.3	0.7	3.2	3.2	1.4	0.3	0.8	0.1
Loop PHF		0.63	0.50	0.91	0.79	0.93	0.73	0.63	0.80	0.54	0.54	0.25	0.94	0.78	0.92
Autoscope PHF		0.70	0.75	0.88	0.79	0.75	0.73	0.55	0.78	0.60	0.60	#DIV/0!	0.92	0.95	0.94