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UPPER GREAT PLAINS TRANSPORTATION INSTITUTE
ADVANCED TRAFFIC ANALYSIS CENTER

Grand Forks Continuing Traffic Data Collection Support

Final Report

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Grand Forks-East Grand Forks MPO

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INTRODUCTION

Prior to this project, the Grand Forks-East Grand Forks MPO and the City of Grand Forks were using approximately 250 (64 intersections) of the city's existing traffic detection cameras for traffic data collection. These cameras were set up during previous phases of the study. Models of cameras at these intersections included Encore, Terra, and VISION.

Recent reconstruction of the Grand Forks transportation network included upgrades of some of the older models of cameras. The MPO intended to:

1. Continue utilizing the reconstructed intersections for traffic data collection
2. Utilize available API commands to download traffic data, and
3. Minimize data loss and disruptions

OBJECTIVES

As part of this study, 9 intersections with 36 cameras were to be configured/re-configured to collect traffic volumes and speeds. The intersections included in this phase of the study are listed in Table 1. These included a mix of VISION and non-VISION cameras.

Table 1. Study intersections

#	Main St	Cross St
1	Demers Ave	3rd St
2	Demers Ave	4th St
3	Demers Ave	5th St
4	17th Ave S	S 20th St
5	17th Ave. S	34th St
6	S Columbia Rd	43rd Ave. S
7	University Ave	Oxford St
8	S Columbia Rd	13th Ave. S
9	4th Ave. S	Cherry St

METHODOLOGY

This study was divided into four major tasks:

1. Intersection Data Collection Set Up
2. Manual VISION Data Download
3. API Commands Set Up
4. Non-VISION Data Collection Restarts

These tasks are discussed in detail below.

Intersection Data Collection Set Up

In this task, cameras at intersections were set to collect turning movement counts and mean speeds. Based on the type of camera, appropriate programs were used for this process – Supervisor program for the VISION cameras and the Autoscope suite of programs for older cameras (Encore, Terra etc.).

It was ensured that all of the intersections set up in this phase of the study conformed to the standards used on the rest of the network of signalized intersections. Refer to Table 2 for detailed information on lane assignments and detector stations set per approach. The updated archive files were saved on the external drive connected to the communications server.

Table 2. Set up of intersection lane assignments and detectors per approach*

#	Main Street	Cross Street	NB			EB			SB			WB		
			L	T	R	L	T	R	L	T	R	L	T	R
1	Demers Ave	3rd St	↰		↱→	↰		↱→		N/A		↰		↱→
2	Demers Ave	4th St	↰		↱→	↰		↱→	↰		↱→	↰		↱→
3	Demers Ave	5th St	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰		↱→
4	S 5th St	Kittson Ave		↰↑	↱		↰↑	↱	↰	↑	↱		↕	
5	17th Ave S	34th St	↰	↑	↱	↰	↑	↱	↰		↱→	↰		↱→
6	S Columbia Rd	43rd Ave S	↰	↑	↱	↰		↱→	↰	↑	↱	↰		↱→
7	University Ave	Oxford St		↕		↰		↱→		↰↑	↱	↰		↱→
8	S Columbia Rd	13th Ave S	↰		↱→	↰	↑	↱	↰	↑	↱	↰	↑	↱
9	4th Ave S	Cherry St		↕			↰↑	↱		↰↑	↱		↰↑	↱

Manual Vision Data Download
The VISION cameras required data to be manually downloaded. This was done at least once a month by ATAC throughout the API Commands Setup.

API Commands Set Up
ATAC has automated the data download process using API commands. This eliminates the need for manual downloading for VISION intersections included in this project and also those set up in the previous phases of traffic data collection projects. This particular task required:
- City of Grand Forks to enter into an agreement with equipment manufacturer Econolite to get permission to use API commands on the detection cameras and communication manager devices.
- Upper Great Plains Transportation Institute/Advanced Traffic Analysis Center to enter into a similar agreement with Econolite to use the provided API Programmer's Guide to create the required scripts.
- Installation of program compilers to enable troubleshooting of automation scripts. Python was used for the scripting portion.

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* Notes:
1. Each arrow corresponds to a lane group and may represent multiple lanes.
2. Each dot represents a separate zone that counts the corresponding movement(s).

- Customization of Microsoft Open Database connectivity settings on the Grand Forks data collection server in order to create required database connections to the UGPTI server.

Non-VISION Data Collection Restarts

Throughout the project, events such as power outages, communication outages, and server restarts disrupted the traffic data collection process for non-VISION intersections. An automated "log-check" and subsequent email notification on UGPTI's end prompted the data collection process to be restarted. Restarts were done on or around the following dates:

- June 11, 2020
- July 10, 2020
- July 22, 2020
- August 10, 2020
- October 9, 2020
- November 1, 2020
- November 30, 2020
- January 18, 2021
- June 17, 2021
- July 19, 2021
- July 22, 2021
- August 12, 2021
- September 1, 2021

Note that not all of these data collection restarts were prompted due to power or communication outages. At times, necessary server restarts required the data collection to be restarted.

NEXT STEPS

Because of ongoing or recently completed projects, detection cameras at the following intersections have been upgraded or replaced.

1. 32nd Ave S @ NB I-29 Ramps
2. 32nd Ave S @ SB I-29 Ramps
3. 32nd Ave S @ S 20th St
4. 32nd Ave S @ S 24th St
5. 32nd Ave S @ S 31st St
6. 32nd Ave S @ S 34th St
7. 32nd Ave S @ S 38th St
8. 32nd Ave S @ S Columbia Rd
9. Demers Ave @ S 20th St
10. N 42nd St @ University Ave
11. N Columbia Rd @ 2nd Ave N
12. N Columbia Rd @ University Ave
13. S Columbia Rd @ 47th Ave S
14. S Washington St @ 40th Ave S
15. S Washington St @ 47th Ave S

To minimize loss at these intersections, it is imperative that the traffic data collection be re-set. It is highly recommended to verify and include these intersections in the next phase of traffic data collection projects.