

Project Brief

City of Kingston Traffic Signal Warrant Evaluation (UCTC Project 44.23.02-04)



The Ulster County Transportation Council initiated a Traffic Signal Warrant Evaluation in response to a request from the City of Kingston Department of Engineering in 2016. The engineering staff recognized that unwarranted traffic signals can create unnecessary intersection delay, increase the rerouting of traffic to less-appropriate roads, promote disrespect for traffic control devices, and result in higher crash rates. At the same time, operating and maintaining unjustified traffic signals is not an effective use of the City of Kingston's resources. In addition, the City understood that it would need a factual basis on which to rest decisions on removal of signals.

The Project evaluated the need for traffic signals at eight intersections identified by the Project's Technical Advisory Committee (TAC) based on traffic and safety warrants to justify their continued operation. Creighton Manning Engineers was hired to perform the analysis under the guidance of the TAC.

The evaluations included traffic and pedestrian volume counts at the intersection using a camera system. Traffic operations were monitored from 7:00 a.m. to 7:00 p.m. and analysis was conducted for the peak periods to determine if a traffic signal is justified based on the signal warrants established within the Manual on Uniform Traffic Control Devices (MUTCD). In addition, conditions at the intersection including sight lines or unusual configuration were also included in the analysis. Finally, if a signal was not needed the Project evaluated the alternative traffic controls to be used.

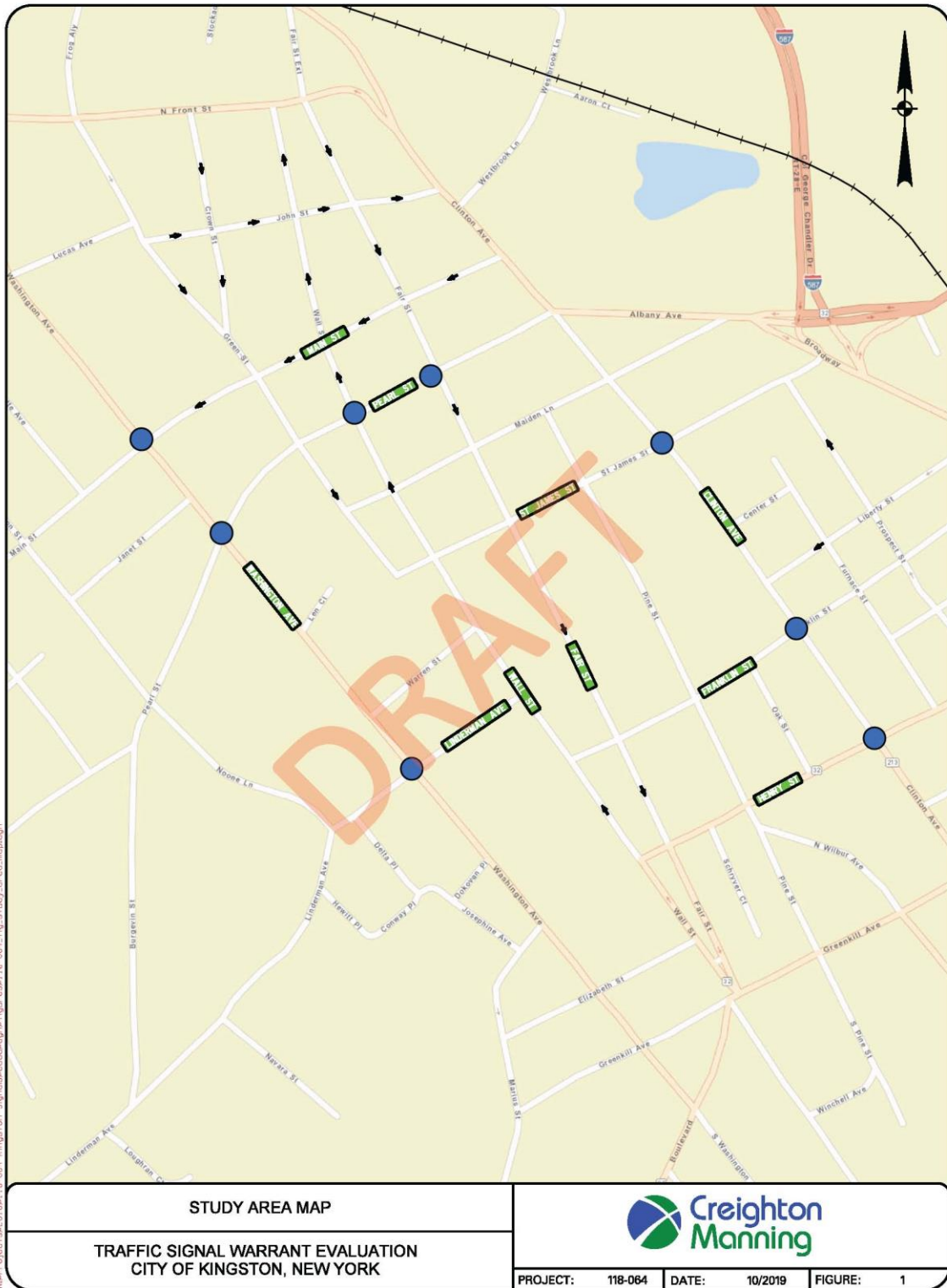
Preliminary findings indicate that of the eight signals analyzed, none met any of the MUTCD warrants for the use of a signal (Table 3). These factors coupled with pedestrian counts led to the conclusion that all eight traffic signals could be removed without increased risk to public safety or impact on traffic operations. The removal of traffic signals offers significant cost savings to the City as most of these signals are older and parts for repairs are not readily available and the signals themselves are not energy efficient. Furthermore, the removal of signals offers the opportunity for the City to restructure the one-way traffic pattern in the Uptown area at far less cost should it decide to do so.

The Federal Highway Administration has noted that the removal of unwarranted traffic signals at intersections with high accident rates located in urban areas has been shown to **decrease all types of accidents by 24 percent** based on an assessment of 199 intersections.

The study area is shown on Figure 1 on the following page; the specific intersections analyzed included:

1. Washington Avenue/Linderman Avenue (Pre-Timed Traffic Signal)
2. Washington Avenue/Pearl Street (Pre-Timed Traffic Signal)
3. Washington Avenue/Main Street (Traffic Signal set to Flash)
4. Wall Street/Pearl Street (Pre-Timed Traffic Signal)
5. Fair Street/Pearl Street (Pre-Timed Traffic Signal)
6. Clinton Avenue/St. James Street (Traffic Signal set to Flash)
7. Clinton Avenue/Franklin Street (Traffic Signal set to Flash)
8. Clinton Avenue/Henry Street (Traffic Signal set to Flash)

Project Brief - City of Kingston Traffic Signal Warrant Evaluation (UCTC Project 44.23.02-04)



<http://www.kingston.gov/DocumentCenter/View/118-064-fig-study-area-map-dm>

Data Collection & Methodology

Traffic Volumes

Intersection turning movement counts were conducted at the eight study area intersections on Wednesday, May 8, 2019 from 7:00 a.m. to 7:00 p.m. Bicycle and pedestrian counts were also conducted as part of this analysis.

Traffic Speed

Speed data collected by NYSDOT on various roadways in the project area indicates that 85th percentile speeds range from 24-mph to 28-mph, as shown in Table 1 below.

Table 1 – Speed Data

Approach	Posted Speed Limit	Average Speed		85 th Percentile Speed	
		NB/EB	SB/WB	NB/EB	SB/WB
Clinton Avenue (N. Front Street to Henry Street)	30	23	16	28	24
Fair Street (Henry Street to N. Front Street)	30	--	16	--	24
Henry Street (Henry Street to NY Route 32)	30	16	22	24	27
St James Street (Green Street to Broadway)	30	22	22	27	26
Wall Street (Henry Street to N. Front Street)	30	20	21	24	24

Crash History

An accident analysis was performed at the eight study area intersections in accordance with NYS Highway Design Manual Chapter 5. Accident data was requested from NYSDOT to quantify the number of accidents, determine an accident rate, and identify any accident patterns or concentrations at the intersections. Safety Information Management System (SIMS) and Accident Location Information System (ALIS) data was provided by NYSDOT at each intersection for a three-year period from June 1, 2015 through May 31, 2018. Table 2 below

Table 2 – Accident Type, Severity, and Crash Rate

Intersection	Collision Severity				Collision Type												Crash Rate (ACC/MEV)
	Non-Reportable ¹	Property Damage	Injury	Fatal	Backing	Right Turn	Left-Turn	Rear-End	Overtaking	Right-Angle	Fixed Object	Parked Car	Pedestrian	Bicycle	Unknown	Total	
Washington Ave/Linderman Ave	1	4	1	0	0	0	1	1	1	2	1	0	0	0	0	6	0.69
Washington Ave/Pearl St	1	1	0	0	0	0	0	1	1	0	0	0	0	0	0	2	0.17
Washington Ave/Main St	4	1	1	0	0	0	0	2	0	0	0	3	0	0	1	6	0.52
Wall St/Pearl St	2	0	6	0	0	0	1	6	0	1	0	0	0	0	0	8	1.00
Fair St/Pearl St	6	2	2	0	2	1	1	1	1	0	0	3	1	0	0	10	1.31
Clinton Ave/St. James St	2	2	1	0	0	0	1	1	0	2	0	0	0	1	0	5	0.83
Clinton Ave/Franklin St	3	1	1	0	0	0	0	1	1	0	0	1	0	2	0	5	0.80
Clinton Ave/Henry St	2	1	1	0	0	0	1	0	0	2	0	0	0	0	1	4	0.60

¹ A non-reportable accident indicates no personal injuries occurred and property damages totaled less than \$1,000.

MEV = Million Entering Vehicles

Project Brief - City of Kingston Traffic Signal Warrant Evaluation (UCTC Project 44.23.02-04)

summarizes the predominant crash types for the intersections and also provides the intersection crash rates which can be compared to the State-wide average crash rates for similar intersections. The statewide average accident rate for a four-way, signalized intersection with single lane approaches is **0.52 accidents** per million entering vehicles (ACC/MEV) and is used for comparison to all eight study area intersections. It is noted that the character of city streets may be different than state highways; therefore, the comparison to the statewide average crash rate may not be as applicable to city streets, but nonetheless offers a useful frame of reference.

MUTCD Traffic Signal Warrants¹

- Warrant 1 – Eight Hour Vehicular Volume
- Warrant 2 – Four Hour Vehicular Volume
- Warrant 3 – Peak Hour Vehicular Volume
- Warrant 4 – Pedestrian Volume
- Warrant 5 – School Crossing
- Warrant 6 – Coordinated Signal System
- Warrant 7 – Crash Experience
- Warrant 8 – Roadway System

Preliminary Results

Table 3 summarizes the preliminary results of the signal warrant assessment for the eight study area intersections.

Table 3 – Summary of Signal Warrant Analysis

Intersection	Signal Warrant Satisfied?								At Least One Warrant Met?
	#1	#2	#3	#4	#5	#6	#7	#8	
Washington Avenue/Linderman Avenue	No	No	No	No	No	No	No	No	No
Washington Avenue/Pearl Street	No	No	No	No	No	No	No	No	No
Washington Avenue/Main Street	No	No	No	No	No	No	No	No	No
Wall Street/Pearl Street	No	No	No	No	No	No	No	No	No
Fair Street/Pearl Street	No	No	No	No	No	No	No	No	No
Clinton Avenue/Henry Street	No	No	No	No	No	No	No	No	No
Clinton Avenue/Franklin Street	No	No	No	No	No	No	No	No	No
Clinton Avenue/St. James Street	No	No	No	No	No	No	No	No	No

¹ Manual on Uniform Traffic Control Devices, Chapter 4C. Traffic Control Signal Needs Studies, Studies and Factors for Justifying Traffic Control Signals. <https://mutcd.fhwa.dot.gov/htm/2009/part4/part4c.htm>