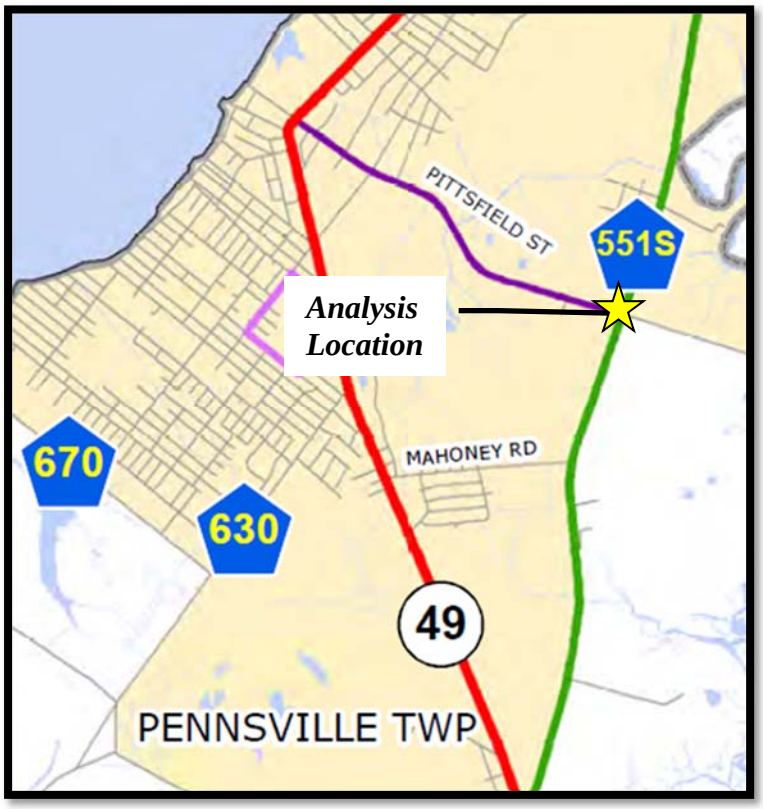
Traffic Signal Warrant Analysis



Hook Road (CR 551) & East Pittsfield Street
Pennsville Township, Salem County, New Jersey

December 8, 2017

Prepared for: **County of Salem**

Prepared by: **Remington & Vernick Engineers**
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REMINGTON & VERNICK ENGINEERS

DISCLAIMER

Table of Contents

List of Tables and Figures

Appendix

A – Traffic Count Data East Pittsfield Street & Hood Road, Pennsville, New Jersey
Collected: October 17-19, 2017

B – Signal Warrant Summaries Highway Capacity Software

C - Photos

1. Introduction

On behalf of Salem County, Remington & Vernick Engineers (RVE) has been retained to perform a traffic signal warrant analysis at the intersection of Hook Road (CR 551) and East Pittsfield Street located in Pennsville, NJ. The analysis was conducted utilizing the existing traffic data obtained by the County from Tuesday, October 17, 2017 to Thursday, October 19, 2017 and was completed using the criteria outlined in the Federal Highway Administration (FHWA) 2009 Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD). Specifically, the analysis was based on the guidelines listed in Chapter 4C of the MUTCD.

In making this determination our office:

1. Performed a site inspection of existing roadway features, adjacent land uses, driveways, travel lanes, pavement markings, traffic control devices, and anything that may affect the safety and flow of traffic.
2. Obtained traffic counts at the intersection from the County. (See Appendix A for traffic count data)
3. Performed a traffic signal warrant analysis for the intersection using the traffic volume data.

2. Background

Hook Road (CR 551) is a north-south Urban Minor Arterial that is often used as an alternate route to the congested NJ 49 corridor located to the west. Signage directs northbound NJ 49 traffic destined for the Delaware Memorial Bridge and the New Jersey Turnpike onto Hook Road. Hook Road offers two-12' wide lanes with 6' shoulders and a speed limit of 45 mph. "The Route 130/49 Corridor Study", completed in 2005 by Urban Engineers, estimated an increase of 10% of thru-traffic during the summer months on Hook Road. East Pittsfield Street is a two-lane municipal road classified as an Urban Major Collector with a 25 mph speed limit.

A traffic signal warrant analysis is an engineering study of traffic conditions, pedestrian characteristics and physical characteristics to determine whether the installation of a traffic control signal is justified at a particular intersection. The MUTCD indicates nine (9) scenarios (warrants) that would justify the installation of a traffic control signal. The investigation of the need for a traffic control signal includes an analysis of the applicable factors contained in the following traffic signal warrants and other factors related to the existing operational and safety characteristics of the study intersection:

1. Warrant 1, Eight-Hour Vehicular Volume
2. Warrant 2, Four-Hour Vehicular Volume
3. Warrant 3, Peak Hour
4. Warrant 4, Pedestrian Volume
5. Warrant 5, School Crossing
6. Warrant 6, Coordinated Signal System
7. Warrant 7, Crash Experience
8. Warrant 8, Roadway Network
9. Warrant 9, Intersection Near a Grade Crossing

A traffic signal should not control traffic movements at an intersection unless one or more of the signal warrants in the MUTCD are satisfied. However, the satisfaction of a traffic signal warrant or warrants

does not in itself justify the installation or the continued operation of a traffic control signal; it only defines the minimum conditions under which the installation of a traffic signal might be justified. A traffic signal should not be installed if its operation will seriously disrupt progression of traffic flow, overall safety or operation of the intersection.

3. Traffic Signal Warrant Analysis

Based on the reviewed traffic data for this intersection, the results of the analysis show that none of the 9 warrants are met for this location, indicating a signal is not technically warranted. A summary of each warrant is listed in Table I.

Table I – Traffic Signal Warrant Summary – East Pittsfield Street & Hook Road

Warrant #	Warrant Name	Purpose	Warrant Met?	Comments
1	Eight-Hour Vehicular Volume	A volume-based warrant that is typically intended for applications where the main street traffic is so heavy that the minor street traffic experiences excessive delay.	No	Data was collected for a typical weekday 24-hour period. The highest 8 hours of traffic volumes were tested and did not meet the criteria for Condition A or B of Warrant 1.
2	Four-Hour Vehicular Volume	A volume-based warrant that is typically used by agencies as a primary indicator for signalization. The criteria for Warrant 2 is based on Table 4C-1 and 2 from the MUTCD, and both the main street and minor street volumes must meet the specified criteria.	No	Data for a typical weekday shows that the highest 4 hours of traffic volumes do not meet the warrant criteria.
3	Peak Hour	This volume-based warrant is typically applied to situations where an intersection experiences a short-term increase in volume, usually related to shift changes, school schedule, or other recurring traffic demand.	No	Data for a typical weekday shows that the existing peak hour totals do not meet the conditions of Category B of Warrant 3.
4	Pedestrian Volume	The warrant is intended for locations where traffic volume is so heavy that pedestrians experience excessive delay in crossing the street.	No	Counts collected over a 12-hour period showed that pedestrian activity was minimal with no notable patterns or peaks in crossing activity.

Table I – Traffic Signal Warrant Summary – East Pittsfield Street & Hook Road (Cont.)

Warrant #	Warrant Name	Purpose	Warrant Met?	Comments
5	School Crossing	The warrant is intended where schoolchildren crossing the major street is the principal reason for traffic control signal.	No	No pedestrian activity related to any nearby schools was noted.
6	Coordinated Signal System	The warrant is applied where adjacent traffic controls do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.	N/A	There are no traffic signals within 2 miles of this intersection.
7	Crash Experience	The warrant is intended for applications where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.	No	Crash data obtained from the Pennsville Police Department indicate 4 crashes have occurred at this intersection over the past 3 years. Five (5) crashes are required within 12 months to satisfy the warrant.
8	Roadway Network	The warrant is considered when installing a traffic control signal at some intersections might be justified to encourage concentrated and organization of traffic flow on a roadway network.	N/A	Upon visual inspection, gaps appear adequate for side street traffic to complete turning movements. Thus, the criteria for this warrant is not met.
9	Intersection Near a Grade Crossing	The warrant is intended for use at locations where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing is the principal reason to consider installing a traffic control signal.	N/A	The criteria for this warrant is based on a case where the rail line crosses the minor street approach; thus the criteria does not apply.

For the purpose of this analysis, all MUTCD warrants were reviewed to determine which standards are met and which are not. This approach was taken to provide a more thorough review and to provide a clear understanding of the overall warrant analysis results. Each warrant provides an individual analysis based on specific considerations and requirements.

Warrants 1 and 2 are the volume based warrants that are most commonly used to support the need for signalization. Warrant 3 is also volume based, but it is used in more particular circumstances. In this case, Warrants 1, 2 and 3 are not met. As indicated by the traffic volumes, Hook Road is the major street at this intersection and Pittsfield Street is the minor street.

Figure 1 – Study Intersection

Warrant 1 - Eight-Hour Vehicular Volume

Warrant 1 is associated with the vehicular volumes during eight hours of a typical day, and can be satisfied by meeting Condition A or Condition B. Condition A is applied at intersections with a large volume of intersecting traffic. Condition B is intended for application at locations where Condition A is not satisfied and where major road vehicular traffic is so large that traffic on the minor road experiences excessive delay and/or conflicts in crossing or entering the major road. The following data summarizes the traffic data over the 12-hour count period. The traffic volumes along the approaches of the study intersection do not satisfy Condition A or B and thereby do not satisfy the conditions of Warrant 1.

No hour meets the requirement for Condition A. Three of eight required hours are met for Condition B.

Table 2 - Warrant 1, Condition A

HOUR (Beginning)	Vehicles per hour on major street (Hook Road)	Vehicles per hour on higher-volume minor-street approach (Pittsfield Street)
MUTCD Condition A(70%)	**350**	**105**
1 (7 A.M.)	651	68
2 (8 A.M.)	629	38
3 (9 A.M.)	480	40
4 (10 A.M.)	409	34
5 (11 A.M.)	490	46
6 (12 P.M.)	529	29
7 (1 P.M.)	534	50
8 (2 P.M.)	516	55
9 (3 P.M.)	717	68
10 (4 P.M.)	902	49
11 (5 P.M.)	979	63
12 (6 P.M.)	842	43

Table 2 - Warrant 1, Condition B

HOUR (Beginning)	Vehicles per hour on major street (Hook Road)	Vehicles per hour on higher-volume minor-street approach (Pittsfield Street)
MUTCD Condition B(70%)	**525**	**53**
1 (7 A.M.)	651	68
2 (8 A.M.)	629	38
3 (9 A.M.)	480	40
4 (10 A.M.)	409	34
5 (11 A.M.)	490	46
6 (12 P.M.)	529	29
7 (1 P.M.)	534	50
8 (2 P.M.)	516	55
9 (3 P.M.)	717	68
10 (4 P.M.)	902	49
11 (5 P.M.)	979	63
12 (6 P.M.)	842	43

Warrant 2 - Four-Hour Vehicular Volume

Warrant 2 is associated with vehicular volumes during any four hours of a typical day, and it is intended for application when the main reason for traffic signal installation is the volume of traffic intersecting a major street. The following graph entitled *Warrant 2, Four-hour Vehicular Volume* depicts the applicable curve as shown in the MUTCD with the plotted points representing vehicles per hour on Hood Road (the major street) and Pittsfield Street (the minor street). The graph shows only two one-hour increments of the study intersection traffic volumes plotted above the curve, indicating that signalization is not warranted based on Warrant 2.

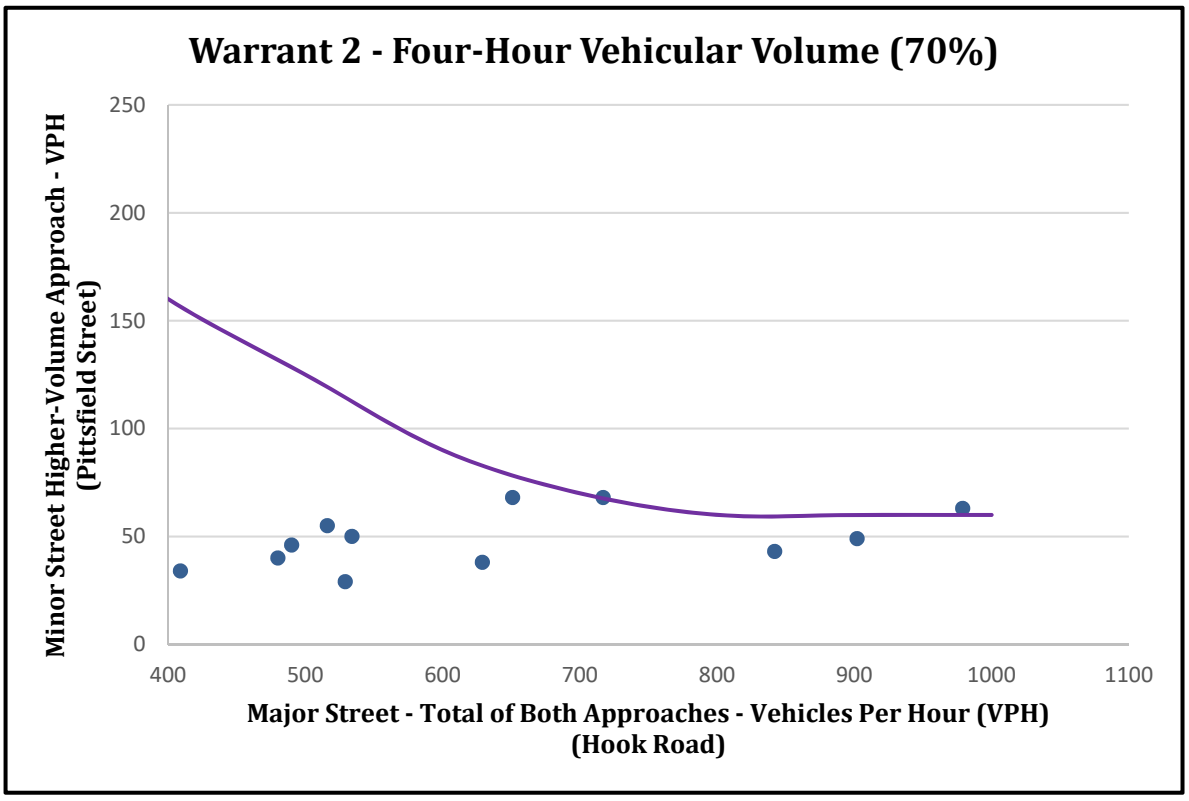

Figure 2 - Warrant 2, Four-Hour Vehicular Volume

Warrant 3 – Peak Hour

Warrant 3 is associated with the vehicular volumes during the peak hour of a typical day such that for a minimum of one (1) hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. This signal warrant is applied in cases where a large number of vehicles will be attracted or discharged over a short time. Upon investigation, no commercial, school or other land uses in the immediate area would suggest the peak hour warrant conditions are satisfied. However, the data was evaluated for completeness. The need for a traffic control signal can be considered if the traffic conditions meet the criteria of either Category A or B under this warrant. Since the volume on the minor street approach does not equal or exceed 100 vehicles per hour during any hour of an average day, Condition A does not apply. Therefore, Category B was reviewed for this warrant.

The requirements for Category B state that the plotted points representing the total vehicles per hour on the major street and the corresponding vehicles per hour on the higher-volume minor-street approach for one (1) hour of an average day must fall above the applicable curve as shown in Figure 4C-4 of the MUTCD, in order to meet the warrant. The following graph entitled *Warrant 3 – Peak Hour* depicts the applicable curve as shown in the MUTCD with the plotted points representing vehicles per hour on Hook Road (the major street) and Pittsfield Street (the minor street). The graph does not plot any one-hour increments of an average day above the curve, indicating that signalization is not warranted based on Condition B of Warrant 3.

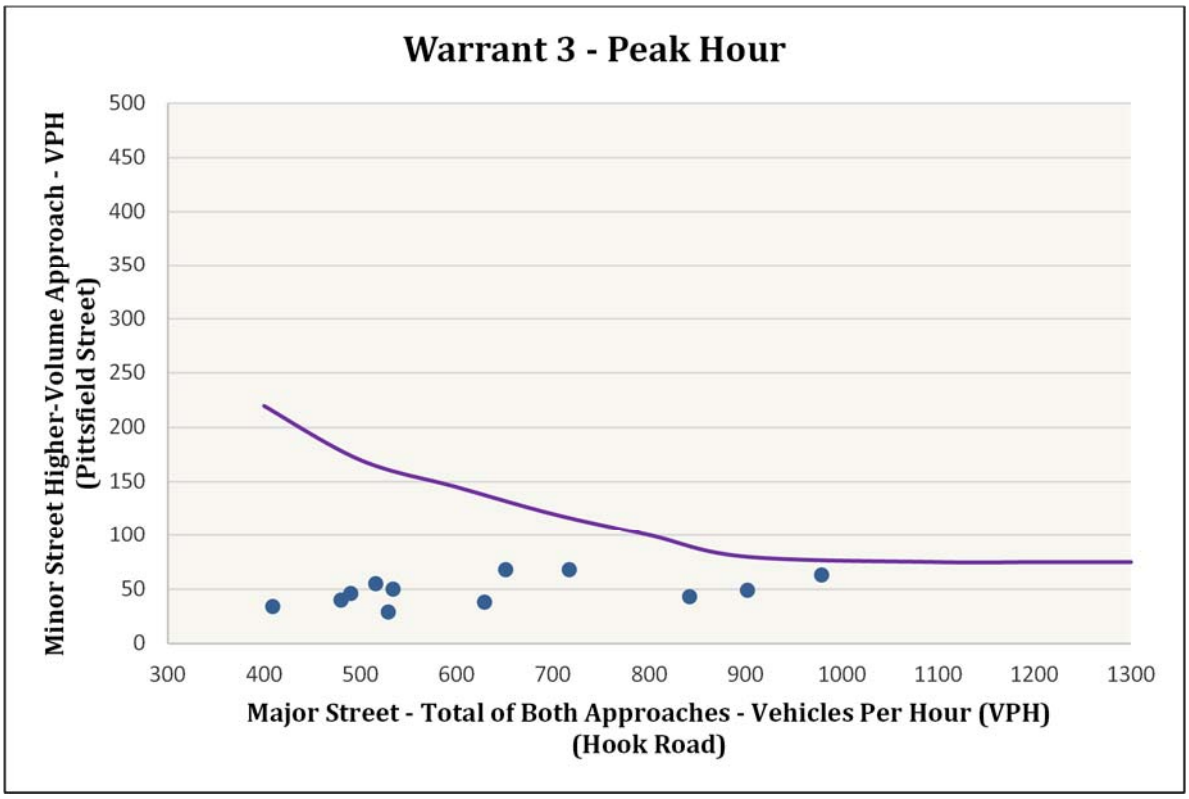

Figure 3 - Warrant 3, Peak Hour

Warrant 4 – Pedestrian Volume

The pedestrian volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street. The need for a traffic control signal can be considered if the traffic conditions meet either criteria A or B under this warrant, each of which are based on a plot of vehicles per hour versus pedestrians per hour for varying time periods of an average day. However, the volume of pedestrian volumes observed crossing the major street at the study intersection is minimal and the volumes do not exceed the amount required by the MUTCD. Therefore, this warrant is not satisfied at this intersection. Pedestrian counts can be found in the appendix of this report.

Warrant 5 – School Crossing

The school crossing signal warrant is associated with the total volume of school children crossing the major street, as well as the available gaps in major street traffic sufficient to permit crossing. The warrant requires the volume of school children crossing the major street during an average day to be at least 20 or more during the highest crossing hour. The school crossing warrant is not satisfied at the study intersection, since fewer than 20 school children were observed crossing at the intersection during the highest crossing hour of the 12-hour traffic count period.

Warrant 6 – Coordinated Signal System

Warrant 6 is typically applied when adjacent traffic controls do not provide the necessary degree of platooning along a corridor and the addition of a traffic signal is necessary to provide progressive movement in a coordinated system. There are no traffic signals within two miles of this intersection. Therefore, this warrant cannot be applied to this study intersection.

Warrant 7 – Crash Experience
The crash experience warrant is applied when the frequency and severity of vehicle crashes at the study intersection are the principal reasons to consider installing a traffic control signal. The crash reports over a three (3) year period for the study intersection have been reviewed. A total of four (4) crashes occurred in that time frame. This warrant requires that five (5) or more reported crashes have occurred within a 12-month period. Furthermore, the four reported crash types (left turn from main road, rear-end, careless driving, and animal collision) would not typically be avoided with the installation of a traffic signal. Therefore, the conditions of this warrant are not satisfied at this intersection.

Warrant 8 – Roadway Network
Warrant 8 is applied to encourage concentrated and organized traffic flow on a roadway network. This intersection does not have an existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a typical weekday. No weekend data was collected. Therefore, the conditions of this warrant are not satisfied at this intersection.

Warrant 9 – Intersection Near a Grade Crossing
This warrant is intended for use at a location where the proximity to the intersection of a grade crossing on an intersection approach controlled by a stop or yield sign is the principal reason to consider installing a traffic control signal. The study intersection is not located near a grade crossing; therefore, this signal warrant does not apply.

4. Conclusion/Recommendation

It has been determined at the conclusion of our analysis that the existing traffic and pedestrian volumes at the intersection of East Pittsfield Street and Hook Road in the Township of Pennsville, Salem County, New Jersey are not large enough to warrant a traffic signal due to Warrant 1 (Eight-Hour Vehicular Volume), Warrant 2 (Four-Hour Vehicular Volume) and Warrant 3 (Peak Hour Volume). Therefore, based on our investigation and analysis, we recommend that the intersection remain under stop control.

The 2016 "Growth Management Element of the Comprehensive County Master Plan" and the 2012 "Salem County Traffic and Transportation Plan Element" prepared by the Salem County Planning Board, both identify this area of Pennsville as being located in the "County Smart Growth Zone". In addition, the South Jersey Transportation Planning Organization (SJTPO) projects the population of Pennsville to grow 10.2% from 2010-2025. As such, the adequacy of a traffic signal at this intersection should be revisited within five years to determine whether actual increases in traffic warrant the installation of a signal at this location.

The existing flashing traffic signal beacon is operating correctly and to the standards set forth in the MUTCD. The existing stop bar location on the eastbound approach of Pittsfield Street is 22 feet away from the edge of traveled way. At this location, sight distance looking left and right is obscured by vegetation. If the existing stop bar was eradicated and a new marking was installed 10 feet from the edge of traveled way, the sight distances increase dramatically. This relocation will provide a safety benefit to users and will not require any clearing of vegetation on private property.

APPENDIX A

TRAFFIC COUNT DATA
EAST PITTSFIELD STREET AND HOOK ROAD
PENNSVILLE, NEW JERSEY
COLLECTED OCTOBER 17-19, 2017

Salem County Engineers Office

110 Fifth Street, Suite 600
Salem New Jersey 08079
Telephone (856) 935 - 7510 ext. 8549

Site Code: 55100004
Station ID:
CR 551 Hook Rd
Near Pittsfield St Pole #S17657
Latitude: 0' 0.0000 Undefined

Northbound Lane

Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/17/17	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	21	44	99	58	2	0	0	0	0	0	0	0	0	0	224	41-50	157
14:00	17	42	113	58	7	0	0	0	0	0	0	0	0	0	237	41-50	171
15:00	15	54	133	93	7	**1**	**1**	0	0	0	0	0	0	0	304	41-50	226
16:00	26	66	135	100	**10**	0	1	0	0	0	0	0	0	0	338	41-50	235
17:00	22	50	**167**	**111**	8	0	0	0	0	0	0	0	0	0	**358**	41-50	278
18:00	16	54	158	100	8	1	0	0	0	0	0	0	0	0	337	41-50	258
19:00	22	**92**	136	84	8	0	0	0	0	0	0	0	0	0	342	36-45	228
20:00	**27**	75	102	35	2	0	0	0	0	0	0	0	0	0	241	36-45	177
21:00	6	29	60	27	0	0	0	0	0	0	0	0	0	0	122	36-45	89
22:00	4	16	40	15	0	0	0	0	0	0	0	0	0	0	75	36-45	56
23:00	4	14	21	11	1	0	0	0	0	0	0	0	0	0	51	36-45	35
Total	180	536	1164	692	53	2	2	0	0	0	0	0	0	0	2629		
Percent	6.8%	20.4%	44.3%	26.3%	2.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak Vol.																	
PM Peak Vol.	20:00 27	19:00 92	17:00 167	17:00 111	16:00 10	15:00 1	15:00 1								17:00 358		

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Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/18/17	3	12	14	4	1	0	0	0	0	0	0	0	0	0	34	36-45	26
01:00	1	8	7	3	0	0	0	0	0	0	0	0	0	0	19	36-45	15
02:00	3	9	19	14	1	1	0	0	0	0	0	0	0	0	47	41-50	33
03:00	0	5	10	9	2	0	0	0	0	0	0	0	0	0	26	41-50	19
04:00	0	7	17	21	3	0	0	0	0	0	0	0	0	0	48	41-50	38
05:00	7	10	79	52	8	0	0	0	0	0	0	0	0	0	156	41-50	131
06:00	**21**	49	109	111	18	1	0	0	0	0	0	0	0	0	309	41-50	220
07:00	13	**53**	**174**	101	14	**6**	0	0	0	0	0	0	0	0	**361**	41-50	275
08:00	17	26	129	**131**	**19**	2	0	**1**	**1**	0	0	0	0	0	326	41-50	260
09:00	3	38	116	74	15	1	0	0	0	0	0	0	0	0	247	41-50	190
10:00	6	21	95	76	7	1	0	0	0	0	0	0	0	0	206	41-50	171
11:00	12	32	105	59	6	3	0	0	0	0	0	0	0	0	217	41-50	164
12 PM	11	**62**	98	59	**14**	0	0	**1**	0	0	0	0	0	0	245	36-45	160
13:00	16	38	82	**92**	6	0	0	0	0	0	0	0	0	0	234	41-50	174
14:00	17	42	**118**	63	8	**4**	0	0	0	0	0	0	0	0	**252**	41-50	181
15:00	**19**	26	82	61	7	1	0	0	0	0	0	0	0	0	196	41-50	143
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	149	438	1254	930	129	20	0	2	1	0	0	0	0	0	2923		
Percent	5.1%	15.0%	42.9%	31.8%	4.4%	0.7%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	06:00	07:00	07:00	08:00	08:00	07:00		08:00	08:00						07:00		
Vol.	21	53	174	131	19	6		1	1						361		
PM Peak	15:00	12:00	14:00	13:00	12:00	14:00		12:00							14:00		
Vol.	19	62	118	92	14	4		1							252		
Total	329	974	2418	1622	182	22	2	2	1	0	0	0	0	0	5552		
Percent	5.9%	17.5%	43.6%	29.2%	3.3%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile :	37 MPH
50th Percentile :	43 MPH
85th Percentile :	48 MPH
95th Percentile :	49 MPH

Stats

10 MPH Pace Speed :	41-50 MPH
Number in Pace :	4040
Percent in Pace :	72.8%
Number of Vehicles > 55 MPH :	27
Percent of Vehicles > 55 MPH :	0.5%
Mean Speed(Average) :	43 MPH

Salem County Engineers Office

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Southbound Lane

Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/17/17	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	**25**	34	87	107	54	3	1	0	0	0	0	0	0	0	311	41-50	194
15:00	18	34	131	174	91	13	**3**	0	0	0	0	0	0	0	464	41-50	305
16:00	9	**35**	146	232	**138**	8	3	0	0	0	0	0	0	0	571	41-50	378
17:00	10	29	**161**	**253**	117	**15**	1	0	0	0	0	0	0	0	**586**	41-50	414
18:00	23	27	160	210	81	11	1	0	0	0	0	0	0	0	513	41-50	370
19:00	6	31	142	106	26	1	3	0	0	0	0	0	0	0	315	41-50	248
20:00	1	17	92	70	23	0	0	0	0	0	0	0	0	0	203	41-50	162
21:00	0	7	57	63	26	1	0	0	0	0	0	0	0	0	154	41-50	120
22:00	3	11	35	44	14	4	2	0	0	0	0	0	0	0	113	41-50	79
23:00	0	4	33	28	13	2	0	0	0	0	0	0	0	0	80	41-50	61
Total	95	229	1044	1287	583	58	14	0	0	0	0	0	0	0	3310		
Percent	2.9%	6.9%	31.5%	38.9%	17.6%	1.8%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak Vol.																	
PM Peak Vol.	14:00 25	16:00 35	17:00 161	17:00 253	16:00 138	17:00 15	15:00 3								17:00 586		

Salem County Engineers Office
110 Fifth Street, Suite 600
Salem New Jersey 08079
Telephone (856) 935 - 7510 ext. 8549

Site Code: 55100005
Station ID:
CR 551 Hook Rd
Near Pittsfield St Pole # 5115
Latitude: 0' 0.0000 Undefined

Southbound Lane

Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/18/17	1	4	19	22	10	4	1	**1**	0	0	0	0	0	0	62	41-50	41
01:00	1	0	18	12	5	1	0	0	0	0	0	0	0	0	37	41-50	30
02:00	0	1	9	12	8	1	0	0	0	0	0	0	0	0	31	41-50	21
03:00	0	1	11	13	10	0	1	0	0	0	0	0	0	0	36	41-50	24
04:00	4	6	19	29	39	8	1	0	0	0	0	0	0	0	106	46-55	68
05:00	5	23	42	88	**81**	**15**	**5**	0	0	0	0	0	0	0	259	46-55	169
06:00	9	14	94	**120**	76	12	1	1	0	0	0	0	0	0	**327**	41-50	214
07:00	10	**34**	83	90	57	15	1	0	0	0	0	0	0	0	290	41-50	173
08:00	9	26	99	116	45	8	0	0	0	0	0	0	0	0	303	41-50	215
09:00	7	21	77	85	38	5	0	0	0	0	0	0	0	0	233	41-50	162
10:00	4	22	71	66	36	4	0	0	0	0	0	0	0	0	203	41-50	137
11:00	**17**	16	**110**	88	37	3	2	0	0	0	0	0	0	0	273	41-50	198
12 PM	9	19	80	117	53	6	0	0	0	0	0	0	0	0	284	41-50	197
13:00	9	15	94	121	56	4	1	0	0	0	0	0	0	0	300	41-50	215
14:00	**24**	23	74	86	50	7	0	0	0	0	0	0	0	0	264	41-50	160
15:00	14	41	122	165	55	**16**	0	0	0	0	0	0	0	0	413	41-50	287
16:00	23	41	189	195	100	15	1	0	0	0	0	0	0	0	564	41-50	384
17:00	13	**44**	**207**	**239**	**101**	15	2	0	0	0	0	0	0	0	**621**	41-50	446
18:00	13	30	169	202	76	14	1	0	0	0	0	0	0	0	505	41-50	371
19:00	11	24	161	101	27	0	0	0	0	0	0	0	0	0	324	41-50	262
20:00	13	25	94	73	26	1	**3**	0	0	0	0	0	0	0	235	41-50	167
21:00	6	29	71	69	22	2	0	0	0	0	0	0	0	0	199	41-50	140
22:00	4	9	53	51	28	5	2	0	0	0	0	0	0	0	152	41-50	104
23:00	2	5	22	26	10	2	0	0	0	0	0	0	0	0	67	41-50	48
Total	208	473	1988	2186	1046	163	22	2	0	0	0	0	0	0	6088		
Percent	3.4%	7.8%	32.7%	35.9%	17.2%	2.7%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	07:00	11:00	06:00	05:00	05:00	05:00	00:00							06:00		
Vol.	17	34	110	120	81	15	5	1							327		
PM Peak	14:00	17:00	17:00	17:00	17:00	15:00	20:00								17:00		
Vol.	24	44	207	239	101	16	3								621		

Salem County Engineers Office

110 Fifth Street, Suite 600
Salem New Jersey 08079

Telephone (856) 935 - 7510 ext. 8549

Site Code: 55100005
Station ID:
CR 551 Hook Rd
Near Pittsfield St Pole # 5115
Latitude: 0' 0.0000 Undefined

Southbound Lane

Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/19/17	1	4	14	24	8	2	0	0	0	0	0	0	0	0	53	41-50	38
01:00	0	1	16	6	8	0	1	0	0	0	0	0	0	0	32	41-50	22
02:00	0	1	3	12	5	2	0	0	0	0	0	0	0	0	23	46-55	17
03:00	1	0	8	12	9	0	0	0	0	0	0	0	0	0	30	46-55	21
04:00	1	3	13	36	42	10	1	0	0	0	0	0	0	0	106	46-55	78
05:00	3	3	51	103	**87**	**19**	**2**	**1**	0	0	0	0	0	0	269	46-55	190
06:00	11	16	56	**125**	66	12	0	0	0	0	0	0	0	0	286	46-55	191
07:00	23	**35**	84	104	52	9	2	0	0	0	0	0	0	0	**309**	41-50	188
08:00	7	22	88	116	49	7	2	0	0	0	0	0	0	0	291	41-50	204
09:00	17	29	**136**	90	21	1	0	0	0	0	0	0	0	0	294	41-50	226
10:00	8	18	68	88	30	5	1	0	0	0	0	0	0	0	218	41-50	156
11:00	**25**	22	95	100	37	5	1	0	0	0	0	0	0	0	285	41-50	195
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	97	154	632	816	414	72	10	1	0	0	0	0	0	0	2196		
Percent	4.4%	7.0%	28.8%	37.2%	18.9%	3.3%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	11:00	07:00	09:00	06:00	05:00	05:00	05:00	05:00							07:00		
Vol.	25	35	136	125	87	19	2	1							309		
PM Peak Vol.																	
Total	400	856	3664	4289	2043	293	46	3	0	0	0	0	0	0	11594		
Percent	3.5%	7.4%	31.6%	37.0%	17.6%	2.5%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

15th Percentile :	40 MPH
50th Percentile :	46 MPH
85th Percentile :	51 MPH
95th Percentile :	54 MPH

Stats

10 MPH Pace Speed :	41-50 MPH
Number in Pace :	7953
Percent in Pace :	68.6%
Number of Vehicles > 55 MPH :	342
Percent of Vehicles > 55 MPH :	2.9%
Mean Speed(Average) :	46 MPH

Salem County Engineers Office

110 Fifth Street, Suite 600
Salem New Jersey 08079
Telephone (856) 935 - 7510 ext. 8549

Site Code: 10171705
Station ID:
Pittsfield St
Near CR 551 Pole # 44
Latitude: 0' 0.0000 Undefined

Eastbound Lane

Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/17/17	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	41	**21**	3	0	0	0	0	0	0	0	0	0	0	0	65	31-40	27
15:00	**49**	17	3	0	0	0	0	0	0	0	0	0	0	0	**69**	31-40	24
16:00	45	14	**4**	0	0	0	0	0	0	0	0	0	0	0	63	31-40	20
17:00	44	15	2	**1**	0	0	0	0	0	0	0	0	0	0	62	31-40	21
18:00	39	6	2	0	0	0	0	0	0	0	0	0	0	0	47	31-40	12
19:00	18	7	1	0	0	0	0	0	0	0	0	0	0	0	26	31-40	10
20:00	23	6	3	0	0	0	0	0	0	0	0	0	0	0	32	35-44	9
21:00	8	3	2	0	0	0	0	0	0	0	0	0	0	0	13	36-45	5
22:00	6	3	0	0	0	0	0	0	0	0	0	0	0	0	9	31-40	4
23:00	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3	35-44	1
Total	275	93	20	1	0	0	0	0	0	0	0	0	0	0	389		
Percent	70.7%	23.9%	5.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak Vol.																	
PM Peak Vol.	15:00 49	14:00 21	16:00 4	17:00 1											15:00 69		

Salem County Engineers Office
110 Fifth Street, Suite 600
Salem New Jersey 08079
Telephone (856) 935 - 7510 ext. 8549

Site Code: 10171705
Station ID:
Pittsfield St
Near CR 551 Pole # 44
Latitude: 0' 0.0000 Undefined

Eastbound Lane

Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/18/17	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	29-38	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	35-44	*
03:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	35-44	*
04:00	2	1	0	0	1	0	0	0	0	0	0	0	0	0	4	35-44	1
05:00	9	1	2	0	0	0	0	0	0	0	0	0	0	0	12	36-45	3
06:00	15	5	0	**1**	0	0	0	0	0	0	0	0	0	0	21	31-40	7
07:00	**46**	**17**	**4**	1	0	0	0	0	0	0	0	0	0	0	**68**	31-40	24
08:00	26	9	2	1	0	0	0	0	0	0	0	0	0	0	38	31-40	13
09:00	27	11	2	0	0	0	0	0	0	0	0	0	0	0	40	31-40	15
10:00	24	7	1	1	1	0	0	0	0	0	0	0	0	0	34	31-40	10
11:00	29	11	3	1	**2**	0	0	0	0	0	0	0	0	0	46	31-40	15
12 PM	14	10	4	1	0	0	0	0	0	0	0	0	0	0	29	36-45	14
13:00	32	13	**5**	0	0	0	0	0	0	0	0	0	0	0	50	36-45	18
14:00	30	**21**	2	**2**	0	0	0	0	0	0	0	0	0	0	55	31-40	25
15:00	**47**	18	3	0	0	0	0	0	0	0	0	0	0	0	**68**	31-40	25
16:00	36	10	2	1	0	0	0	0	0	0	0	0	0	0	49	31-40	15
17:00	43	17	3	0	0	0	0	0	0	0	0	0	0	0	63	31-40	23
18:00	31	10	2	0	0	0	0	0	0	0	0	0	0	0	43	31-40	14
19:00	29	2	0	0	0	0	0	0	0	0	0	0	0	0	31	26-35	8
20:00	12	0	0	0	0	0	0	0	0	0	0	0	0	0	12	27-36	3
21:00	8	0	0	0	0	0	0	0	0	0	0	0	0	0	8	27-36	2
22:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	34-43	1
23:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	35-44	*
Total	468	163	36	9	4	0	0	0	0	0	0	0	0	0	680		
Percent	68.8%	24.0%	5.3%	1.3%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	07:00	07:00	06:00	11:00										07:00		
Vol.	46	17	4	1	2										68		
PM Peak	15:00	14:00	13:00	14:00											15:00		
Vol.	47	21	5	2											68		

Salem County Engineers Office

110 Fifth Street, Suite 600
Salem New Jersey 08079

Telephone (856) 935 - 7510 ext. 8549

Site Code: 10171705
Station ID:
Pittsfield St
Near CR 551 Pole # 44
Latitude: 0' 0.0000 Undefined

Eastbound Lane

Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/19/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	35-44	1
06:00	2	0	**2**	0	0	0	0	0	0	0	0	0	0	0	4	35-44	2
07:00	**6**	**3**	1	0	0	0	0	0	0	0	0	0	0	0	**10**	31-40	4
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
09:00	3	2	0	0	0	0	0	0	0	0	0	0	0	0	5	35-44	2
10:00	4	1	0	0	0	0	0	0	0	0	0	0	0	0	5	31-40	2
11:00	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3	*	1
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	19	7	3	0	0	0	0	0	0	0	0	0	0	0	29		
Percent	65.5%	24.1%	10.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	07:00	06:00												07:00		
Vol.	6	3	2												10		
PM Peak																	
Vol.																	
Total	762	263	59	10	4	0	0	0	0	0	0	0	0	0	1098		
Percent	69.4%	24.0%	5.4%	0.9%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	15th Percentile :	7 MPH
	50th Percentile :	25 MPH
	85th Percentile :	38 MPH
	95th Percentile :	41 MPH
Stats	10 MPH Pace Speed :	31-40 MPH
	Number in Pace :	372
	Percent in Pace :	33.9%
	Number of Vehicles > 55 MPH :	0
	Percent of Vehicles > 55 MPH :	0.0%
	Mean Speed(Average) :	25 MPH

Salem County Engineers Office

110 Fifth Street, Suite 600
Salem New Jersey 08079

Telephone (856) 935 - 7510 ext. 8549

Site Code: 10171706
Station ID:
Pittsfield St
Near CR 551 Pole # S16323
Latitude: 0' 0.0000 Undefined

Westbound Lane

Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/17/17	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	**10**	2	0	0	0	0	0	0	0	0	0	0	0	0	**12**	32-41	3
15:00	8	2	0	0	0	0	0	0	0	0	0	0	0	0	10	31-40	3
16:00	6	3	0	0	0	0	0	0	0	0	0	0	0	0	9	31-40	4
17:00	7	**4**	0	0	0	0	0	0	0	0	0	0	0	0	11	31-40	5
18:00	9	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1-10	3
19:00	6	0	0	0	0	0	0	0	0	0	0	0	0	0	6	*	2
20:00	4	1	0	0	0	0	0	0	0	0	0	0	0	0	5	31-40	2
21:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	35-44	1
22:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	35-44	*
23:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	35-44	*
Total	53	13	0	0	0	0	0	0	0	0	0	0	0	0	66		
Percent	80.3%	19.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak Vol.																	
PM Peak Vol.	14:00 10	17:00 4													14:00 12		

Salem County Engineers Office
110 Fifth Street, Suite 600
Salem New Jersey 08079
Telephone (856) 935 - 7510 ext. 8549

Site Code: 10171706
Station ID:
Pittsfield St
Near CR 551 Pole # S16323
Latitude: 0' 0.0000 Undefined

Westbound Lane

Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/18/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	35-44	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	1	**1**	0	0	0	0	0	0	0	0	0	0	0	2	34-43	2
04:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	35-44	1
05:00	1	**3**	0	0	0	0	0	0	0	0	0	0	0	0	4	35-44	3
06:00	6	1	0	0	0	0	0	0	0	0	0	0	0	0	7	*	2
07:00	**9**	1	1	0	0	0	0	0	0	0	0	0	0	0	**11**	1-10	3
08:00	8	2	0	0	0	0	0	0	0	0	0	0	0	0	10	31-40	3
09:00	7	1	0	0	0	0	0	0	0	0	0	0	0	0	8	31-40	2
10:00	7	3	0	0	0	0	0	0	0	0	0	0	0	0	10	31-40	4
11:00	9	1	0	0	0	0	0	0	0	0	0	0	0	0	10	1-10	3
12 PM	3	2	0	**1**	0	0	0	0	0	0	0	0	0	0	6	35-44	2
13:00	8	2	0	0	0	0	0	0	0	0	0	0	0	0	10	31-40	3
14:00	6	**4**	**2**	0	0	0	0	0	0	0	0	0	0	0	**12**	34-43	6
15:00	5	2	1	0	0	0	0	0	0	0	0	0	0	0	8	36-45	3
16:00	8	2	1	0	0	0	0	0	0	0	0	0	0	0	11	36-45	3
17:00	**11**	1	0	0	0	0	0	0	0	0	0	0	0	0	12	27-36	3
18:00	6	2	0	0	0	0	0	0	0	0	0	0	0	0	8	30-39	3
19:00	5	0	1	0	0	0	0	0	0	0	0	0	0	0	6	41-50	1
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
Total	101	29	7	1	0	0	0	0	0	0	0	0	0	0	138		
Percent	73.2%	21.0%	5.1%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	05:00	03:00												07:00		
Vol.	9	3	1												11		
PM Peak	17:00	14:00	14:00	12:00											14:00		
Vol.	11	4	2	1											12		

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Latitude: 0' 0.0000 Undefined

Westbound Lane

Start Time	1 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 80	81 85	86 90	91 95	96 999	Total	Pace Speed	Number in Pace
10/19/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
03:00	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	**1**	34-43	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
10:00	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	1	35-44	*
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*
12 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
13:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
14:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
15:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
16:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
17:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
18:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
19:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
20:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
21:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
22:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
23:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Total	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2		
Percent	50.0%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	10:00		03:00												03:00		
Vol.	1		1												1		
PM Peak																	
Vol.																	
Total	155	42	8	1	0	0	0	0	0	0	0	0	0	0	206		
Percent	75.2%	20.4%	3.9%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			

	15th Percentile :	6 MPH
	50th Percentile :	23 MPH
	85th Percentile :	37 MPH
	95th Percentile :	39 MPH
Stats	10 MPH Pace Speed :	31-40 MPH
	Number in Pace :	64
	Percent in Pace :	31.1%
	Number of Vehicles > 55 MPH :	0
	Percent of Vehicles > 55 MPH :	0.0%
	Mean Speed(Average) :	23 MPH

APPENDIX B
SIGNAL WARRANT SUMMARIES
HIGHWAY CAPACITY SOFTWARE

Warrants Volume

Information

Analyst	JLD, PE, PTOE	Intersection	Pittsfield St. & Hook Road
Agency/Co	Remington & Vernick Engineers	Jurisdiction	County of Salem
Date Performed	11/7/2017	Units	U.S. Customary
Project ID	1700F001	Time Period Analyzed	10/17-18/2017
East/West Street	Pittsfield Street	North/South Street	Hook Road
File Name	Warrants1	Major Street	North-South

Project Description *1700F001*

Warrant 1

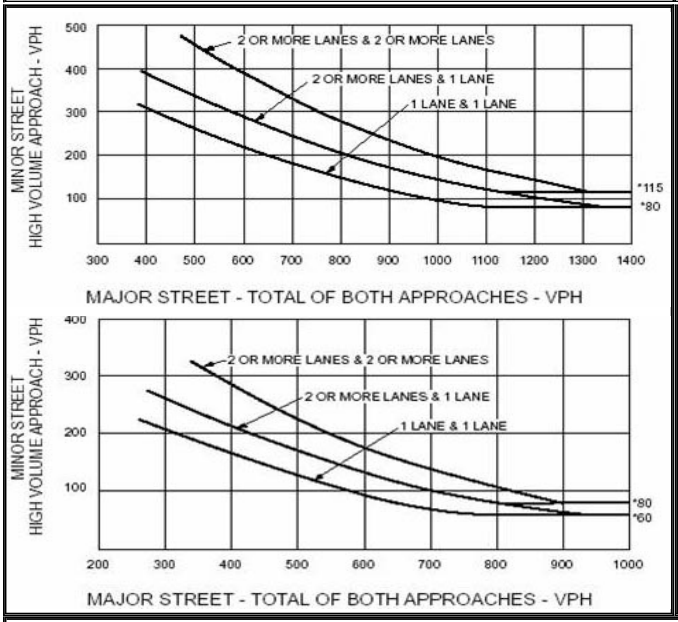
Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

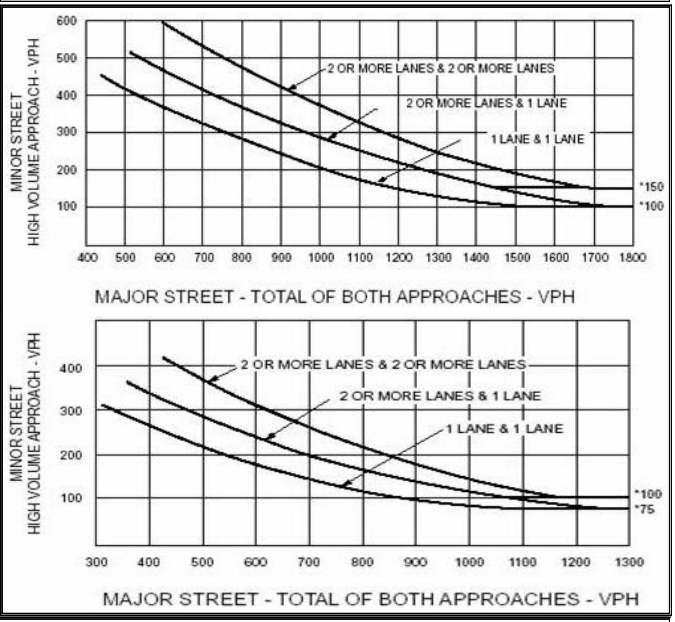
Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%	80%	70%	56%	100%	80%	70%	56%
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

Warrant 2



Warrant 3



Volume Summary

Major Street Lanes 1 **Minor Street Lanes** 1 **Speed** 45 **Population** 10000+

Hours	Major Volume	Minor Volume	Total Volume	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (70%)
07-08	651	68	730	No	No	Yes	Yes	No	No	No
08-09	629	38	677	No	No	No	No	No	No	No
09-10	480	40	528	No	No	No	No	No	No	No
10-11	409	34	453	No	No	No	No	No	No	No
11-12	490	46	546	No	No	No	Yes	No	No	No
12-13	529	29	564	No	No	No	No	No	No	No
13-14	534	50	594	No	No	No	Yes	No	No	No
14-15	516	55	583	No	No	No	Yes	No	No	No
15-16	717	68	793	No	No	Yes	Yes	Yes	No	No
16-17	902	49	962	No	No	No	Yes	No	No	No
17-18	979	63	1054	No	No	Yes	Yes	Yes	No	No
18-19	842	43	893	No	No	No	Yes	No	No	No
Totals	7678	583	8377	0	0	3	8	2	0	0

Warrants Summary

Information			
Analyst	JLD, PE, PTOE	Intersection	Pittsfield St. & Hook Road
Agency/Co	Remington & Vernick Engineers	Jurisdiction	County of Salem
Date Performed	11/7/2017	Units	U.S. Customary
Project ID	1700F001	Time Period Analyzed	10/17-18/2017
East/West Street	Pittsfield Street	North/South Street	Hook Road
File Name	Warrants1	Major Street	North-South

Project Description *1700F001*

General				Roadway Network	
Major Street Speed (mph)	45	☐	Population < 10,000	Two Major Routes	☐
Nearest Signal (ft)	0	☐	Coordinated Signal System	Weekend Count	☐
Crashes (per year)	1	☐	Adequate Trials of Alternatives	5-yr Growth Factor	0

Geometry and Traffic	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of lanes, N	0	1	0	0	1	0	0	1	0	0	1	0
Lane usage		T			T			T			T	
Vehicle Volume Averages (vph)	0	48	0	0	9	0	0	285	0	0	354	0
Peds (ped/h) / Gaps (gaps/h)	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--
Delay (s/veh) / (veh-hr)	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--	--	0 / 0	--

Warrant 1: Eight-Hour Vehicular Volume	☐
1 A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	☐
1 B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	☐
1 (56%) Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	☐
Warrant 2: Four-Hour Vehicular Volume	☐
2 A. Four-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☐
Warrant 3: Peak Hour	☐
3 A. Peak-Hour Conditions (Minor delay --and-- minor volume --and-- total volume) --or--	☐
3 B. Peak- Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	☐
Warrant 4: Pedestrian Volume	☐
4 A. Four Hour Volumes --or--	☐
4 B. One-Hour Volumes	☐
Warrant 5: School Crossing	☐
5. Student Volumes --and--	☐
5. Gaps Same Period	☐
Warrant 6: Coordinated Signal System	☐
6. Degree of Platooning (Predominant direction or both directions)	☐
Warrant 7: Crash Experience	☐
7 A. Adequate trials of alternatives, observance and enforcement failed --and--	☐
7 B. Reported crashes susceptible to correction by signal (12-month period) --and--	☐

7 C. (56%) Volumes for Warrants 1A, 1B --or-- 4 are satisfied	☑
Warrant 8: Roadway Network	☐
8 A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2 or 3) --or--	☐
8 B. Weekend Volume (Five hours total)	☐
Warrant 9: Grade Crossing	☐
9 A. Grade Crossing within 140 ft --and--	☐
9 B. Peak-Hour Vehicular Volumes	☐

APPENDIX C
PHOTOS

Looking west from Pittsfield St.

Looking east from Pittsfield St.

Looking left from Pittsfield St. eastbound approach

Looking right from Pittsfield St. eastbound approach

Stop bar offset at Pittsfield St. eastbound approach

Stop bar offset at Pittsfield St. westbound approach