

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
PB80-145915

Impact Program Evaluation 55 MPH. Phase I Summary Report

Connecticut State Police Dept, Meriden Traffic Div

Prepared for

National Highway Traffic Safety Administration, Washington, DC

31 Oct 79

87359

P880-145915

DOT HS-805-213

55 MPH IMPACT PROGRAM EVALUATION PHASE I SUMMARY REPORT

Connecticut State Police Department
Traffic Division
294 Colony Street
Meriden, Connecticut 06450

NCJRS

NOV 12 1982

ACQUISITIONS

Contract No. DOT HS-8-02048
Contract Amt. \$760,138



OCTOBER 1979
FINAL REPORT

This document is available to the U.S. public through the
National Technical Information Service,
Springfield, Virginia 22161

Prepared For
U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Washington, D.C. 20590

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. DOT-HS-805-213		2. Government Accession No.		3. Recipient's Catalog No. PB 80 145915	
4. Title and Subtitle 55 MPH Impact Program Evaluation Phase I Summary Report				5. Report Date October 31, 1979	
7. Author(s)				6. Performing Organization Code	
9. Performing Organization Name and Address Connecticut State Police Department Traffic Division 294 Colony Street Meriden, Conn. 06450				8. Performing Organization Report No.	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration 400 Seventh Street, S.W. Washington, D. C. 20590				10. Work Unit No.	
17. Supplementary Notes				11. Contract or Grant No. DOT-HS-8-02048	
				13. Type of Report and Period Covered Interim Report April-July 1979	
				14. Sponsoring Agency Code	
16. Abstract Phase I of the 55 MPH Impact Program Evaluation, conducted in Connecticut, was a pilot test of the procedures, instrumentation and methods to be employed in the overall demonstration project. The purpose of the demonstration is to assess the relationship between specific levels of police patrol strength on limited access highways and motorists' compliance with the 55 mph speed limit. The present report describes actual experience with the speed measuring equipment to be employed, the utility of data collection procedures and forms, and scheduling enforcement patrols. In addition, summary data are presented on the enforcement activity recorded by baseline and increased levels of patrol.					
17. Key Words Speed Enforcement			18. Distribution Statement This document is available to the U.S. public through the National Technical Information Service, Springfield VA 22161		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages	22. Price

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
m	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
AREA				
m ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha
MASS (weight)				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
VOLUME				
teaspoon	teaspoons	5	milliliters	ml
Tablespoon	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
p	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³
TEMPERATURE (exact)				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in. = 2.54 exactly. For other exact conversions and more detailed tables, see NBS Misc. Publ. 26b, Units of Weights and Measures; Price \$2.25; SD Catalog No. C13.10.26b.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
km	kilometers	1.1	yards	yd
		0.6	miles	mi
AREA				
cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	
MASS (weight)				
g	grams	0.025	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
VOLUME				
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.05	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³
TEMPERATURE (exact)				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F

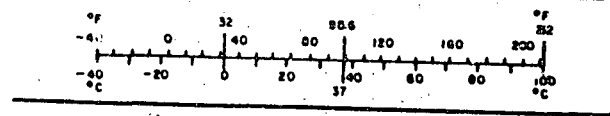
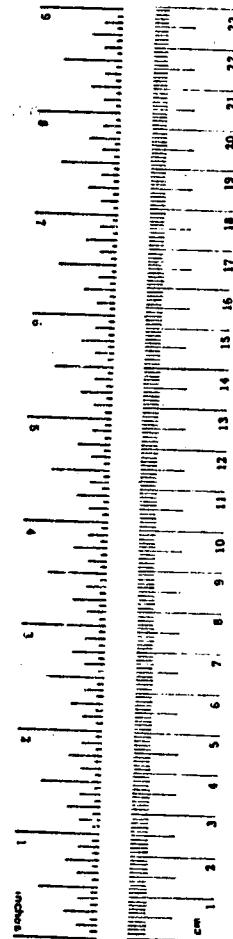


TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. DESCRIPTION OF THE PILOT TEST	2
A. Phase I Road Segments	2
B. Enforcement Levels	7
III. RESULTS	22
A. Speed Classifier Data	22
B. Enforcement Patrols	24
C. Enforcement Levels Attained	25
D. Other Data Collection	34
IV. EVALUATION DISCUSSION	46
A. Managerial and Operational Problems	46
B. Enforcement Applications	47
C. Data Acquisition	47
D. Sensor Performance	47
E. Confounding Factors	48

LIST OF TABLES AND FIGURES

Table 1.	Off Segment Reports	27
Table 2.	Enforcement Summary--Segment 1 - Route 2	29
Table 3.	Enforcement Summary--Segment 2 - I84	30
Table 4.	Enforcement Summary--Segment 3 - Route 8	31
Table 5.	Enforcement Summary--Segment 4 - I91	32
Table 6.	Average Number of Speeding Arrests per Patrol	33
Figure 1.	Typical Speed Classifier Installation	10
Figure 2.	Speed Classifier Data Collection Form	19
Figure 3.	Daily Activity Report	35
Figure 4.	C. S. P. Dispatch Card	37
Figure 5.	Sample Dispatch Card System Output	39
Figure 6.	Sample Dispatch Card System Output	40
Figure 7.	Miscellaneous Data Form	42
Figure 8.	Subsystem Information Form	44
Figure 9.	Subsystems, Components and Activities Used on the Subsystem Information Form	45

I. INTRODUCTION

The purpose of this report is to present the results of Phase I of the "55 MPH Impact Program Evaluation" as conducted by the Connecticut State Police Department during the spring and summer of 1979. This particular project is part of a demonstration sponsored by the National Highway Traffic Safety Administration (NHTSA) to systematically determine the relationship between enforcement levels and motorists' compliance with the 55 mph speed limit.

The Phase I effort in Connecticut was a pilot test intended to assess the procedures, instrumentation and evaluation methods to be employed in Phase II, which will involve Connecticut and other locales participating in the overall demonstration.

The basic structure of the demonstration is to systematically vary the number of patrol units on specific segments of limited access highways and observe the effects, if any, on the speeds of vehicles travelling on the segments. Speed measurement is accomplished by automatic recorders positioned at the mid-points of the segments. Other data gathered from various record systems include enforcement contacts made (citations, warnings, etc.) on the segments, adjudication information, accident data, etc.

II. DESCRIPTION OF THE PILOT TEST

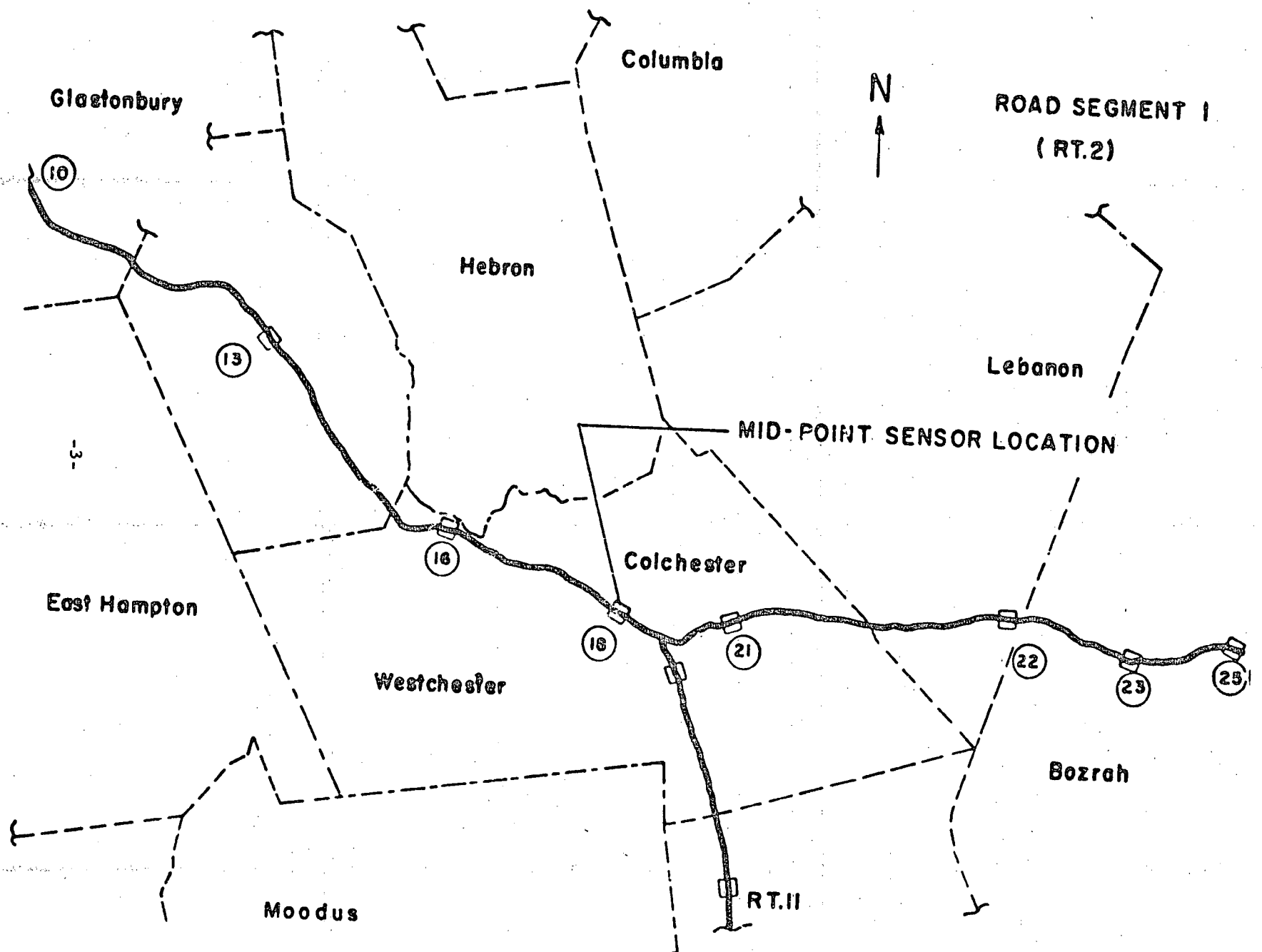
A. Phase I Road Segments

During Phase I four road segments were employed in the pilot test.

These were:

- Segment 1--Rural: Connecticut Route 2, Bozrah/Norwich town line (Exit 25) to the Glastonbury/Marlborough town line (Exit 11).
Length--24.5 miles
Four lane divided highway.
ADT 6,700
- Segment 2--Urban: I84, Exit 26 to Exit 34.
Length--8.3 miles
Four/six/eight lane divided interstate
ADT 52,300
- Segment 3--Rural: Connecticut Route 8, Exit 37 to Exit 48
Length--25.7 miles
Four lane divided highway
ADT 10,200
- Segment 4: Urban: I91, Baldwin Avenue Meriden to Exit 13
Length--12 miles
Four and six lane divided highway
ADT 50,600

The following four sheets are maps of the road segments.



Glastonbury

Columbia

ROAD SEGMENT I
(RT.2)



Hebron

Lebanon

MID-POINT SENSOR LOCATION

-3-

East Hampton

Colchester

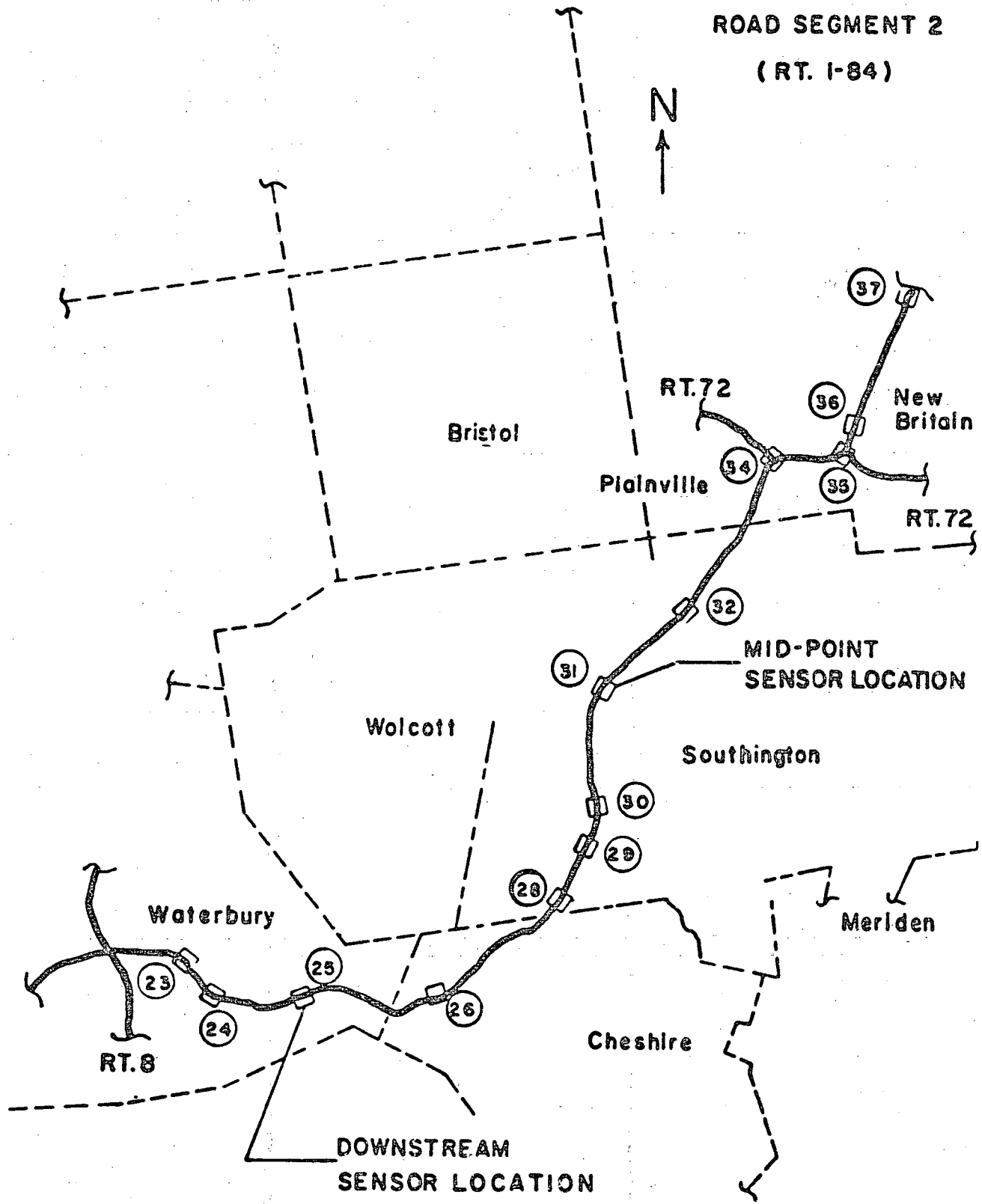
Westchester

Bozrah

Moodus

RT. II

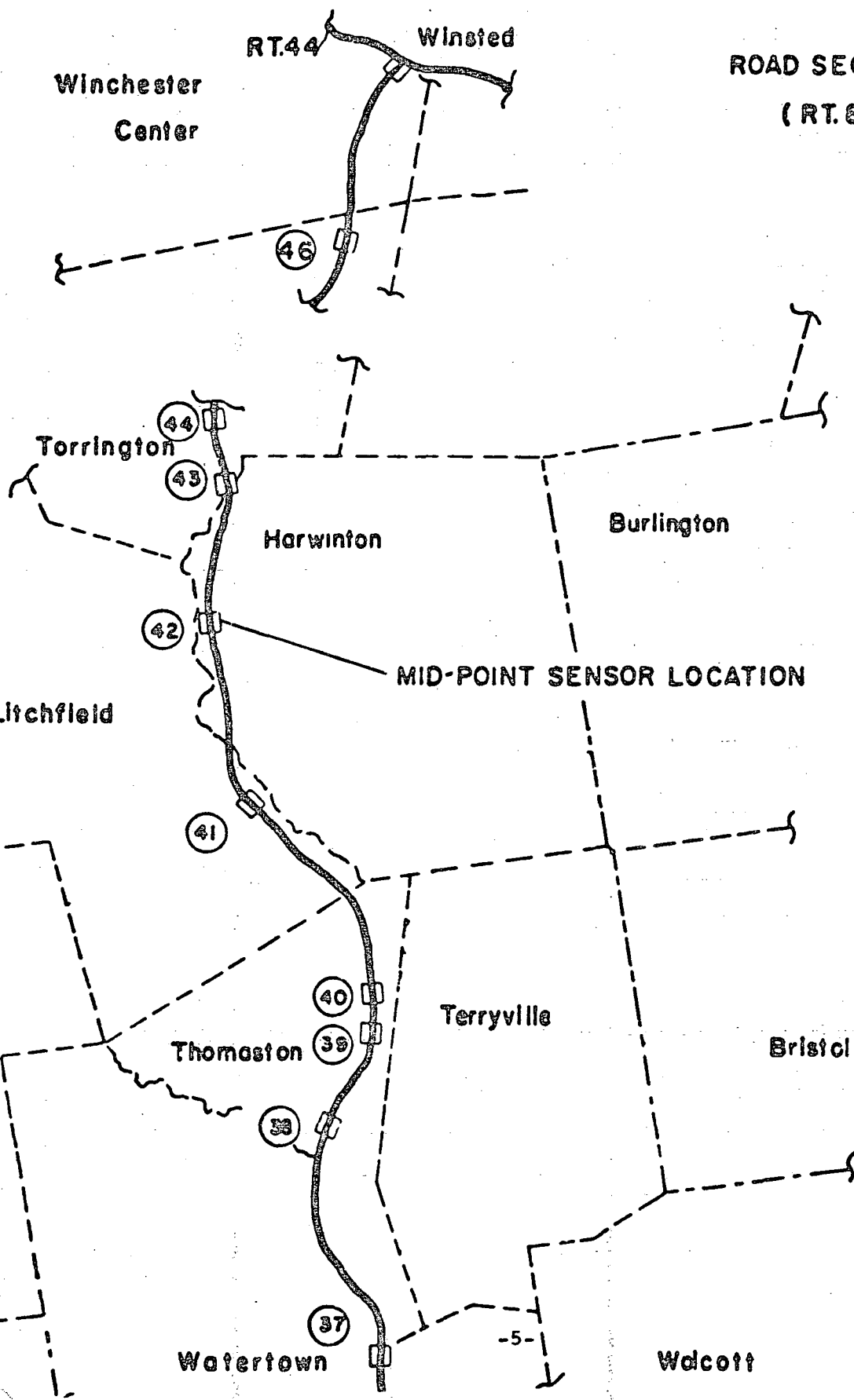
**ROAD SEGMENT 2
(RT. 1-84)**



**ROAD SEGMENT 3
(RT. 8)**

Winchester
Center

RT.44 Winsted



MID-POINT SENSOR LOCATION

ROAD SEGMENT 4

(RT. I-91)

RT. 66

19

Cheshire

RT. 15

MIDPOINT SENSOR LOCATION

(RT. 68)

19

Wallingford

14

14

13

12

11

North Haven

10

North

Branford

9

DOWNSTREAM SENSOR LOCATION

Hamden

New Haven

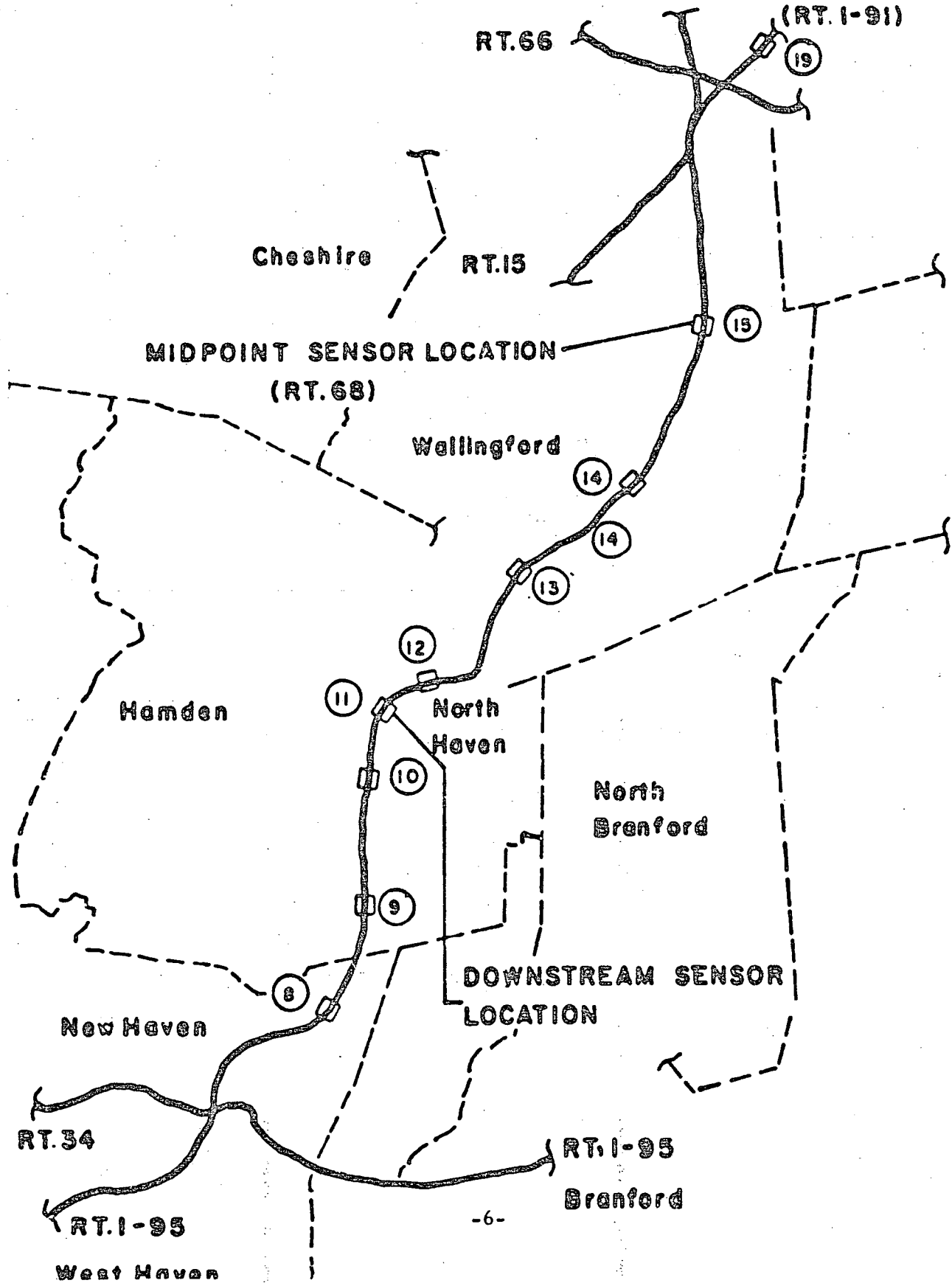
RT. 34

RT. I-95

Branford

RT. I-95

West Haven



B. Enforcement Levels

The pilot test conducted during Phase I involved varying enforcement levels during three four-week periods. The basic enforcement schedule was as follows:

	Base 4/26 - 5/23	Increased Enforcement 5/24 - 6/20	Base 6/21 - 7/18
Segment 1	E1	E6	E1
Segment 2	E1	E2	E1
Segment 3	E1	E4	E1
Segment 4	E1	E1	E1

In this matrix, E1 refers to one trooper patrolling the highway segment, E2 means two troopers, etc. Thus, for example, Segment 1 had one trooper on patrol for the first four weeks of the pilot test, six troopers on patrol during the middle four weeks and then one trooper on patrol during the final four weeks.

Prior to the start of the pilot test, State Police patrols did not exactly match the E1 conditions (one trooper covering exactly the segment). The pre-existing patrols were:

- Segment 1--three units cover portions of the segment plus abutting towns.
- Segment 2--one unit full time covers segment and several additional miles of I84.

- Segment 3--one unit covers southern two-thirds of segment full time. One unit covers northern one-third of segment and four abutting towns.
- Segment 4--one unit full time covers segment and several additional miles.

In order to accomplish the E1 base condition, patrol boundaries were reconfigured to isolate the four segments. These segments were then patrolled using overtime manpower. As the patrols operated from 8 am to 4:30 pm, the previously existing patrol patterns were in effect during other hours of the day.

In one instance, the road segment ran through two adjacent State Police troop areas. Unfortunately, a fatal accident took place during an E1 condition. The modified responsibility for the segment led to some command and control problems in response to this accident. In Connecticut in Phase II all road segments will be within individual existing troop boundaries.

C. Speed Data Recording

1. Description

The sensor/recorder system employed in Phase I to calculate and store the speeds of vehicles moving through the road segments was the Leupold and Stevens, Inc. Speed Classifier CVS-545 L/C. The Speed Classifier is capable of receiving inputs from either surface-mounted sensor cables or buried loops. Because of concerns for durability, the buried loops were selected for Connecticut.

Speed monitoring sites (installed Speed Classifiers) were located at the approximate mid-point of each of the four road segments included in the pilot phase. In addition, two "downstream" monitoring sites were installed on the two urban road segments. On I-84, the downstream site was approximately one mile west of the end of the I-84 segment. On I-91, the downstream site was approximately one mile south of the segment end.

The specific installation locations were chosen based on the following factors:

- Roadway reasonably straight and level
- Not at an exit or entrance ramp
- At an overpass (to provide a position reference and to obtain some weather protection)
- With sufficient center median to permit safe reading and servicing

A typical installation is shown in Figure 1. The individual loops are six-foot squares. The leading edges of the two loops in a lane are 16 feet apart. The pairs of loops in the two lanes are separated by 24 feet. Installation of the loops and associated cabling required grooves to be cut in the roadway surface. Standard steel traffic control boxes were installed on pre-cast concrete pads in the median. The Speed Classifiers were placed inside these boxes.

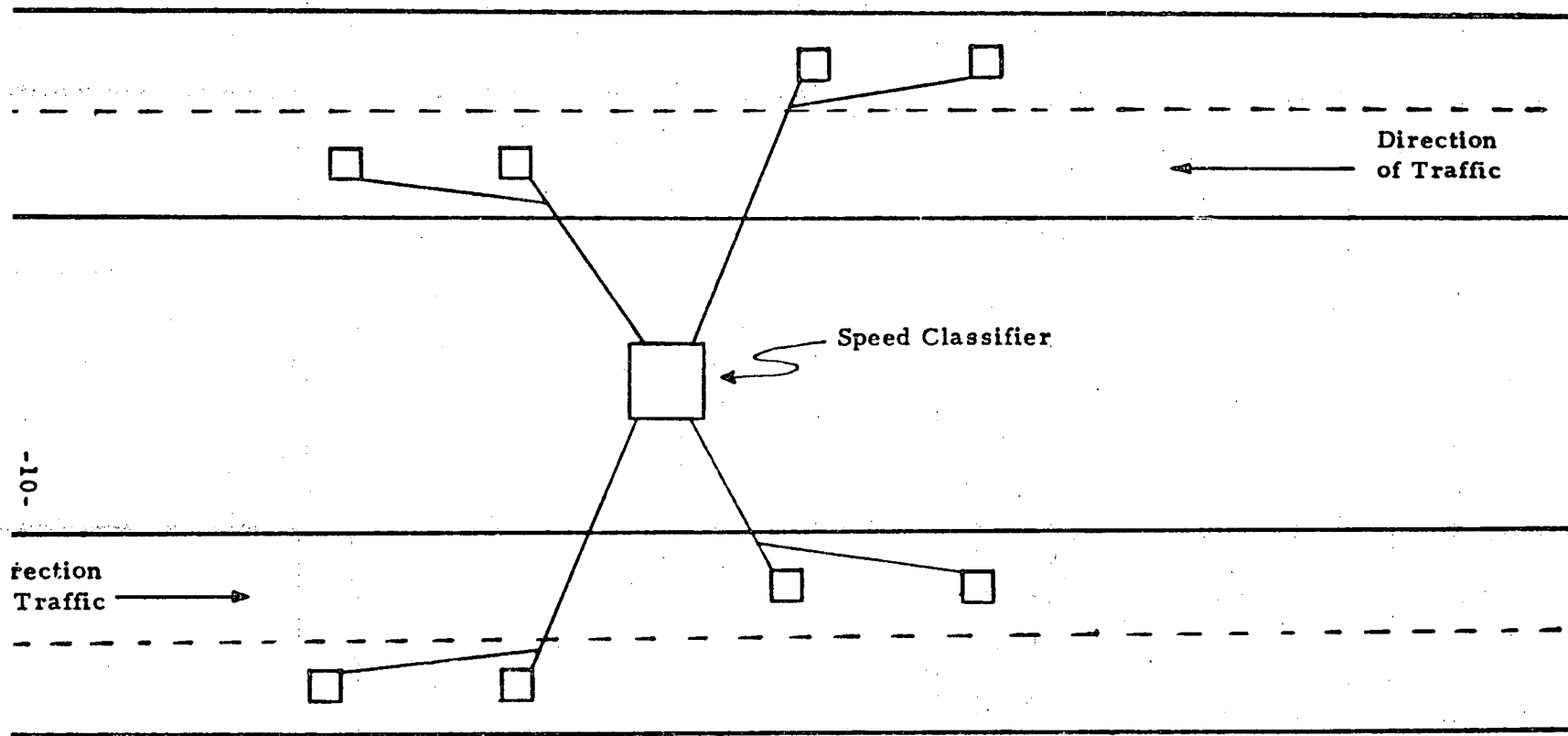


Figure 1. Typical Speed Classifier Installation

2. Installation

Installation of the Speed Classifiers was done by highway crews of the Connecticut Department of Transportation. The basic installation tasks were:

- Close a lane of traffic using signs and cones.
- Cut grooves in roadway.
- Excavate trenches and install concrete pad foundation in median. (Buried one-inch PVC conduit used to protect cabling from the roadway edge to the traffic control box.)
- Install loops and cables (an epoxy compound was used to seal the grooves in the roadway).
- Install pedestal, traffic control box and Speed Classifier.
- Complete wiring and checkout.

Installation costs for the Speed Classifiers were originally estimated in conjunction with the State Department of Transportation to be \$7,500, or \$1,250 for each site. Actual experience was that installation costs ran twice the budgeted figure (\$14,975, actual). The factors involved in this overrun are discussed below.

The project schedule for Phase I called for sensor installation to begin on April 2, 1979 and baseline patrols to begin on April 26, 1979. Leupold and Stevens personnel were to arrive in Connecticut with equipment and installation specifications on April 2nd to brief the highway crews. This schedule was delayed by one day because of travel problems. Installation

work at the first (Route 2) site, therefore, began on April 4, 1979. At the completion of the installation it was found that the system did not function. The remainder of April 4th and all of April 5th were consumed on site making various tests in an attempt to uncover the nature of the problem.

Ultimately, it was determined that the steel reinforcing rods in the concrete roadway were interfering with the detectors in the unit. (Apparently the Speed Classifiers had not previously been tested in a concrete roadway.) Leupold and Stevens air shipped new model detectors which were installed on April 7th and the unit functioned. The new detectors (Model 635) were larger than the ones replaced (Model 18B) which required the new units to be located outside the Speed Classifier cabinet. Fortunately, the traffic control boxes had been installed as these were then essential to protect the detectors.

The 635 detectors were found to draw more power than the original detectors. This was overcome initially by using two batteries in series. Each site was then surveyed regarding the possible availability of a. c. power. The solution arrived at, however, was to purchase larger batteries locally. These were also mounted in the traffic control box cabinets.

In general, the modified Speed Classifiers functioned satisfactorily throughout the pilot phase. However, there were a series of minor problems with the units, which in total required considered staff time to handle. These events included:

- April 24 and 25: Because State DOT personnel were unfamiliar with the modified sensors, they indicated a preference to not undertake the final wiring hookup. Two staff troopers devoted 38 man hours to do the wiring.
- April 25: One 635 detector on I-84, downstream, not operative. Replaced with an 18B detector.
- April 26: Hinges on traffic control box broken, unit not secure.
- May 10: I-84, downstream, all readings 26 mph. Replaced 18B detector with spare 635 detector, replaced battery.
- May 14-16: Series of battery discharge problems. Ultimately found that batteries believed to be in proper condition when purchased were not and did not contain sufficient water to hold a charge.
- June 7: Key broken off in traffic control box, I-84 downstream, afternoon data not read.
- June 9: I-91 downstream meter counts very high in bins 12 and 24.
- June 10: Problem of high counts at I-91 downstream continued at a.m. reading. Ultimately solved by replacing battery.
- June 12: Sudden voltage drop on Route 2 unit. No. p.m. data.

- June 16: Sudden voltage drop on Route 8. Only bins 1 and 13 contained data.
- June 22: Substitute trooper cleared counters by mistake.
- June 26: Unable to unlock traffic box, I-91 downstream, no readings.

3. Data Provided

The Speed Classifier calculates vehicle speeds based on the time interval between pulses received from the lead and lag loops in each lane. The device then increments a counter representing a speed range within which the particular speed calculation lies. In addition to a count of total vehicles, there are 11 counters or bins for each recording channel. These are:

1. Total vehicles
2. 35-39 mph
3. 40-44 mph
4. 45-49 mph
5. 50-54 mph
6. 55-57.4 mph
7. 57.5-59 mph
8. 60-62.4 mph
9. 62.5-64 mph
10. 65-69 mph
11. 70-74 mph
12. 75+ mph

Thus, for example, a vehicle passing through a trap at 61 mph would increment the first counter (total vehicles) and the counter for the 60-62.4 mph range. The Speed Classifiers are equipped with two separate input

channels and two separate sets of counters. In Phase I, the two channels were used to distinguish vehicle direction. For example, one channel and associated counters were used to monitor northbound traffic and the other channel and its counters to monitor southbound traffic. At each installation site, two lanes of traffic in each direction were monitored. To accomplish this, the loops in the two lanes in one direction were wired in series to one input channel of the Classifier. The resulting data at each site, therefore, can be separated by direction of travel but not by lane of travel. It is also important to note that three of the installation sites were at locations having six lanes of travel (three in each direction). These sites were the I-91 midpoint and downstream sites and the I-84 midpoint location. At these locations, the left-hand and center lanes in each direction were monitored. No data were obtained from the right-hand lanes. Thus, the data gathered from these sites do not represent the totality of information on the volumes and speed distributions of passing traffic during the study period.

During Phase I, the data from each of the six Speed Classifiers were read and recorded twice daily--at approximately 8:00 a.m. and 4:30 p.m.--with the counters then being re-set to zero. These data were transmitted to NHTSA for impact evaluation purposes. In addition, the data were provided to the Administrative Evaluation Subcontractor. Examination of these data, as well as on-site observations of the performance of the Speed Classifiers indicate the following:

- At any reading of the data in the counters, the total vehicle count provided (e.g., bin 1) and the sum of the counts in the individual speed range bins will rarely, if ever, agree exactly. Differences of small magnitude are an artifact of the data reading process; that is, as each bin total is being read out vehicles continue to pass the site, thereby changing totals and specific speed bins.
- When the Speed Classifiers experience an anomaly with regard to the speed of a vehicle, by design, it records a speed of 26 mph. As the lowest speed range bin has the limits 35-39 mph, such results are not recorded in the speed bins; however, they are recorded in the total vehicle count category (Bin 1). Thus, when major differences are noted between the total vehicle count and the sum of the speed bins, this may be a diagnostic indication of power supply or other problems with a particular Speed Classifier. During Phase I, a battery replacement/re-charge cycle was adopted which would replace batteries as they approached half-charged as indicated on the units' meters. In practice, it was found that on occasion the units behaved erratically or were subject to rapid power loss before the half-charged reading was approached. To overcome this, a fixed weekly replacement, re-charge cycle is recommended for Phase II.

- With the loops in the two lanes of travel wired in series, it is possible under some combinations of vehicle positions and speeds for the speed calculation to be started by a vehicle in one lane and ended by a vehicle in the other lane. The speed computed in this situation will be somewhere between the actual speeds of the two vehicles. This situation was discussed in detail in the project's progress report for May 1979.
- Observation of the performance of the classifiers, on site, has shown that the device, on occasion, will calculate the speed of large trucks in the multi-hundred mile per hour range. Such events are not frequent but have been observed regularly. Such readings, of course, distort the 75 mph and up counters. At all sites, the percent of vehicles in the 75 mph and up counters typically is small (less than one percent to about two percent is usual). On at least one occasion, however, the daily data indicated that nearly 20 percent of the vehicles were in the 75 mph and above counter. This disparity was noted the day before a sudden battery power drop caused a complete failure of the instrument.

4. Reading the Data

As just noted, the Speed Classifier records data (counts) in a "total" and 11 speed range categories for each of two input channels. The classifier

contains a digital display which is used to obtain the data from the counters. This is done by depressing a push button which causes the display to show, in sequence, the counter (bin) number and the count of cases recorded in the bin. The person reading the data then records the information on a form (the particular form used during Phase I is shown in Figure 2).

It is understood that NHTSA initially expected the counters to be read by the troopers who were performing the enforcement patrols. This approach was judged to be impractical, at least during Phase I. This was so because of the overtime nature of the patrols and logistic considerations regarding keys and return of completed data forms.

In Connecticut, troopers who wish to work on overtime projects make their availability known to a central Special Duty Coordinator who is charged with filling assignments on a fair and equitable basis. With this system, it is not necessarily the case that a trooper patrolling a highway segment on overtime would have worked on the segment as part of his regular duty assignment. Also, the overtime patrols generally would not be distributed among a small number of personnel.

The Speed Classifiers are relatively simple to read and re-set. However, some instruction is necessary. Given the basis of overtime assignments, no reasonable method could be developed to provide such instruction. In addition, there was concern about how reliably the data forms would be received and how the keys needed to unlock the traffic control boxes would be distributed.

ID

Date:

05 10 79
Month Day Year

Time:

08 15
24 hour clock

.8

Circle appropriate site:

- | <u>Urban</u> | <u>Rural</u> | <u>Downstream</u> |
|--------------|------------------|-------------------|
| a) I-84 | e) Rt. -2 | i) I-84 |
| b) I-91 | f) Rt. -8 | j) I-91 |
| c) _____ | g) _____ | k) _____ |
| d) _____ | h) _____ | l) _____ |

Circle conditions at time of reading, use combinations if applicable.

Road Conditions: **1) Dry** 2) Wet 3) Snow 4) Ice 5) Mud 6) Other _____

Weather Conditions: **1) Clear** 2) Rain 3) Sleet 4) Snow 5) Fog
 6) Overcast 7) Other _____

Are conditions slowing normal traffic speeds? 1) Yes **2) No** 3) Not Sure

Trap 1		Trap 2	
BIN	VOLUME	BIN	VOLUME
1	2357	13	2573
2	7	14	19
3	31	15	91
4	173	16	373
5	580	17	902
6	393	18	430
7	470	19	289
8	268	20	203
9	171	21	109
10	159	22	121
11	73	23	30
12	32	24	6

Officer: McLeod

Noted Problems or Comments:


Reproduced from best available copy. 

Figure 2. Speed Classifier Data Collection Form

As an alternative, the job of reading the Speed Classifiers was given to staff members of the Traffic Division with overtime being paid for the extra and weekend time involved. The requirement to read the recorders on a twice per day, seven day per week basis was tolerable for the 12 weeks of Phase I patrols. However, an alternative approach will be necessary for the longer term of Phase II. Basically, this approach will involve assigning the responsibility among a larger number of individuals in the Traffic Division.

It is believed to be important to capture the speed data in an accurate and reliable manner. In our opinion assigning this task to the troopers conducting patrols is not desirable. Instead, specific resources should be devoted to the data collection effort and to its administrative control.

5. Two Lane Monitoring

As noted earlier, three of the speed monitoring sites were on six lane roadways, and, that at these locations speed data were not obtained for the righthand lane in each direction. As the righthand lane generally is expected to be carrying slower moving traffic, the speed statistics from these sites, therefore, are not likely to be indicative of the actual speeds of all passing vehicles. In addition, in Connecticut, commercial vehicles are prohibited from the left hand lane of limited access roadways where there are three lanes in one direction. The "mix" of vehicles being monitored, therefore, is also likely to be different from the actual mix of vehicle types passing the scene.

Regarding the impact evaluation, there is a potential artifact in the two of three lane monitoring scheme which should be noted. This artifact stems

from the possibility that drivers influenced by enforcement will slow their speeds and drive to the right, thereby tending to disappear from the measurement system. In general, we believe that measurements taken from two of three lanes produces a potential threat to the validity of the impact evaluation. This could be overcome in Phase II with full lane monitoring.

6. Nature of the Data

Data from the Speed Classifiers can be summarized directly in such terms as "percent of vehicles at or above 55 mph." (Note, of course, that the sum of the individual speed range bins should be the denominator of such a computation rather than the total count bin.) In addition, using grouped data methods, percentile and moment statistics can be computed. However, the generation of such statistics requires assumptions to be made about the distribution of cases within class intervals and, in the case of mean speed, about the weight to be given to the 75 mph and above category.

In general, therefore, our opinion is that the specific impact measure to be employed by NHTSA should be directly computed from the data provided by the recorder, i. e., percent of vehicles over ___ mph. It is suggested that careful consideration be given to the selection of the criterion measures to be employed in the impact evaluation. That is, while the nominal intent of the demonstration is to examine compliance with the 55 mph speed limit, the measure "percent of vehicles over 55 mph" may not be especially sensitive to the effects of enforcement levels.

III. RESULTS

A. Speed Classifier Data

As noted earlier, impact evaluation is to be carried out by NHTSA based primarily on data from the Speed Classifiers. During Phase I each of the six installations was read twice daily during the 12 weeks of the pilot test. Copies of the data forms were transmitted directly to NHTSA. This procedure will be followed in Phase II. Review of the data from the devices indicates the following problems occurred during Phase I.

• Route 2 (Segment 1)

4/27 A.M. counts unusually high, counter probably not re-set previous day.

5/10 P.M. count in 75+ mph bin of trap 2 unusually high.

5/27 P.M. no data obtained.

6/12 P.M. no data obtained.

6/13 A.M. no data obtained. Problem on 6/12 and 6/13 due to sudden battery voltage drop from .5 to 0.

6/29 P.M. no data obtained.

7/1 P.M. counter read too early in day.

• I84 Midpoint (Segment 2)

4/26 P.M. large difference between total count and number classified by Trap 1.

4/27 A.M. large differences between total count and number classified by both traps. Also 4/27 P.M. on Trap 1

4/29 P.M. same problem Trap 1.

4/30 A.M. and P.M. same problem Trap 1.

5/1 A.M. and P.M. same problem Trap 1.

(the problem of wide discrepancies between the total count bin and the sum of the individual speed bins continued regularly throughout the 12 week pilot test).

5/17 P.M. no data obtained.

5/18 P.M. no data obtained.

5/21 A.M. no data obtained.

I84 Downstream

This installation also produced occasional wide differences between total counts and number of vehicles speed classified.

5/10 A.M. unusually high count in 75+ mph bin of Trap 1.

5/14 P.M. no data obtained, battery problems.

5/15 A.M. and P.M. no data obtained, battery problems.

6/7 P.M. no data obtained, key broke off in cabinet lock.

6/8 A.M. counts are for 24-hour period.

Route 8 (Segment 3)

Occasional discrepancies between total counts and number speed classified. For example, on 5/27 the following results were obtained:

	<u>Trap 1</u>	<u>Trap 2</u>
Total Count	2325	1793
Number Classified	1903	1793

6/16 Only total count data obtained.

6/17 Data erroneous, sudden battery drop in voltage.

6/18 Data erroneous, sudden battery drop in voltage.

• 191 Midpoint (Segment 4)

6/22 P.M. counters mistakenly reset prior to reading.

• 191 Downstream

6/9 P.M. unusually high counts in the 75+ mph bins.

6/10 A.M. unusually high counts in the 75+ mph bins.

6/10 P.M. counts only in 75+ mph bins, battery failure.

6/11 A.M. and P.M. counts only in 75+ mph bins, battery failure.

6/22 P.M. counters mistakenly reset prior to reading.

6/26 P.M. no data obtained--unable to unlock cabinet.

6/27 A.M. counts are for 24-hour period.

This listing translates to approximately 22 occasions out of 1008 readings when useable data were not obtained. Thus, aside from the implications, if any, of the discrepancies noted between total counts and number of vehicles classified, the Phase I system provided speed measurements approximately 98 percent of the time. Most of the problems encountered during Phase I related to the batteries used to power the instruments. Either the use of a.c. power, or more frequent battery recharging should eliminate most instances of data loss in Phase II.

B. Enforcement Patrols

The pilot test schedule called for a total of 588 overtime patrols over a 12-week period. No problems were experienced in finding personnel to take

on these assignments. However, a few last minute cancellations led to some patrols not being conducted. The extent of these loses was as follows:

- Route 2, Segment 1 (E6)

On three occasions one trooper was missing from the E6 condition. On two occasions two personnel were missing. On one occasion seven men were on patrol.

- I84, Segment 2 (E2)

On two occasions base patrols were not conducted. On one occasion one man was missing from an E2 condition.

- Route 8, Segment 3 (E4)

On one occasion a base patrol was not carried out. On three occasions one trooper was missing from the E4 condition.

- I91, Segment 4 (E1)

On two occasions no patrol was conducted.

Overall, these figures indicates that 571 of 588 scheduled patrols were actually conducted (97 percent).

C. Enforcement Levels Attained

The patrols conducted during the pilot test were structured to have the appropriate number of troopers solely responsible for each road segment between the hours of 8 a.m. and 4:30 p.m. Data from the dispatch card system (see Section D. 1 below) indicated that during the first few days of the pilot (during the first base period) other troopers were making enforcement contacts on one of the segments. This apparently occurred because of eagerness to "lend a hand" or because of misunderstanding of realigned patrol boundaries. Command

emphasis ended this situation. Thus, except for the few overtime patrols not conducted, the appropriate number of troopers were on patrol on the segments.

Throughout the pilot test, the dispatch card system indicated that contacts were made almost daily by other units on the road segments. These involved either units passing through the segment on department business (the contacts were almost all assistance to disabled motorists), or in response to accident situations.

Department orders regarding the overtime patrols indicated that troopers working the base conditions should perform "normal patrol functions" and that those working the increased enforcement schedule, "shall direct their attention to the enforcement of the national speed limit, 55 mph." The troopers involved were also instructed to limit their patrolling to the specific road segment involved, with the qualification that leaving the segment was authorized in response to police emergencies.

Based on the trooper activity reports, Table I shows the frequency with which off segment time was reported. The figures in the Table show that 15.8 percent of the patrols reported some time off the segments. The average time off the segment was 1.2 hours.

The work schedule for the overtime units called for 8 hours of patrol time to be conducted. Thus, 4,568 hours of patrol time could have been provided by 571 patrols actually conducted. Reported off segment hours accounted for less than three percent of the total hours.

Table 1.
Off Segment Reports

Segment	Number of Reports	Percent of Patrols*	Total Hours Off Segment	Avg. Time of Segment (hrs.)
1 (E6)	28	12.9%	32.25	1.15
2 (E2)	19	17.4	22.25	1.17
3 (E4)	14	8.5	15.50	1.11
4 (E1)	29	35.4	38.75	1.34
Total	90	15.8	108.75	1.21

*Percent of patrols actually conducted where off segment time was reported.

Table 2, 3, 4 and 5 show the enforcement contacts made on each segment by the project's patrols, and by regular patrols during the hours of 8 a.m. to 4:30 p.m. in the four weeks prior to the pilot test. Data are based on manual searches of the relevant dispatch cards.

The data in the tables show that on three of the four segments the base patrols conducted during the first four weeks of the project substantially increased the number of speeding summonses issued. For the fourth site (Segment 2) the presence each week of a Traffic Division Radar Squad produced high numbers of speeding citations during the pre-baseline period. It can also be seen in the tables that increased enforcement markedly increased speeding citations compared to the first base period.

It should be noted that the lower speeding totals in Week 2 of the second base period are due to a statewide 3-4 day job action by many troopers during which time they refused to issue speeding tickets.

The basic data underlying the tables (individual trooper activity) are highly variable. The following shows the percentage of single patrols (base period and the E1 condition) which generated various numbers of speeding arrests.

<u>Number of Arrests</u>	<u>Percent of Patrols</u>
None*	10.6%
1	11.0
2	14.5
3	13.2
4	12.3
5	10.1
6	6.6
7	8.4
8	3.1
9	1.8
10 or more	6.4

*Patrols conducted during the job action are excluded.

Table 2.
Enforcement Summary
Segment 1 - Route 2

		SUMMONSES		WARNINGS		Disabled/Abandoned Vehicles	OTHER
		Speed	Other	Speed	Other		
Pre Baseline							
Week	1	9	3	6	1	6	3
	2	1	1	0	4	3	2
	3	1	0	0	3	5	2
	4	12	11	2	13	7	1
Weekly Average		5.8	3.8	2.0	5.3	5.3	2.0
1st Base Period							
Week	1	101	3	13	3	12	2
	2	34	0	12	2	7	0
	3	40	2	1	9	2	1
	4	37	5	1	10	4	0
Weekly Average		53.0	2.5	6.8	6.0	6.3	0.8
Enforcement Period (E6)							
Week	1	240	5	82	20	14	5
	2	268	6	65	17	11	8
	3	256	5	76	11	13	0
	4	244	11	40	27	12	0
Weekly Average		252.0	6.8	65.8	18.8	12.5	3.3
2nd Base Period							
Week	1	45	2	33	4	2	4
	2	7	1	27	2	8	0
	3	23	0	2	17	7	2
	4	68	5	12	7	6	0
Weekly Average		35.8	2.0	18.5	7.0	5.8	1.5

Table 3.
Enforcement Summary
Segment 2 - 184

		SUMMONSES		WARNINGS		Disabled/Abandoned Vehicles	OTHER
		Speed	Other	Speed	Other		
Pre Baseline							
Week	1	124	4	0	4	14	3
	2	18	0	0	4	14	6
	3	64	11	0	6	12	1
	4	61	1	0	7	11	2
Weekly Average		66.8	4.0	0	5.3	12.8	3.0
1st Base Period							
Week	1	47	3	1	4	4	1
	2	46	11	0	2	13	5
	3	24	7	0	4	5	2
	4	23	1	3	5	13	3
Weekly Average		35.0	5.5	1.0	3.8	8.8	2.8
Enforcement Period (E2)							
Week	1	53	14	7	12	15	3
	2	50	13	3	4	10	2
	3	50	14	2	7	11	3
	4	38	9	4	5	16	1
Weekly Average		47.8	12.5	4.0	7.0	13.0	2.3
2nd Base Period							
Week	1	24	6	0	3	2	1
	2	7	0	22	0	12	3
	3	16	1	1	4	10	1
	4	21	5	2	1	5	1
Weekly Average		17.0	3.0	6.3	2.0	7.3	1.5

Table 4.
Enforcement Summary
Segment 3 - Route 8

		SUMMONSES		WARNINGS		Disabled/Abandoned Vehicles	OTHER
		Speed	Other	Speed	Other		
Pre Baseline							
Week	1	27	6	5	8	11	1
	2	14	5	0	3	9	2
	3	17	17	9	14	10	4
	4	17	2	3	1	10	2
Weekly Average		18.8	7.5	4.3	6.5	9.8	2.3
1st Base Period							
Week	1	36	5	2	7	7	2
	2	39	5	2	6	6	6
	3	33	1	3	4	6	2
	4	25	1	3	3	4	4
Weekly Average		33.3	4.0	2.5	5.0	5.8	3.5
Enforcement Period (E4)							
Week	1	113	10	16	13	8	7
	2	106	3	11	24	15	6
	3	85	1	28	5	13	6
	4	87	4	41	0	8	6
Weekly Average		97.8	4.5	24.0	10.5	11.0	6.3
2nd Base Period							
Week	1	23	2	2	2	7	4
	2	7	0	12	2	11	2
	3	27	2	8	0	4	0
	4	12	0	2	1	9	2
Weekly Average		17.3	1.0	6.0	1.3	7.8	2.0

Table 5.
Enforcement Summary
Segment 4 - I91

		SUMMONSES		WARNINGS		Disabled/Abandoned Vehicles	OTHER
		Speed	Other	Speed	Other		
Pre Baseline							
Week	1	17	3	0	0	9	1
	2	4	2	0	0	6	1
	3	0	10	0	0	13	2
	4	7	4	1	1	6	1
Weekly Average		7	4.8	.3	.3	8.5	1.3
1st Base Period							
Week	1	24	3	2	2	11	2
	2	23	10	2	4	5	2
	3	25	1	5	0	10	0
	4	15	3	2	2	6	0
Weekly Average		21.8	4.3	2.8	2.0	8.0	1.0
Enforcement Period (E1)							
Week	1	23	1	4	1	7	2
	2	30	8	5	3	9	1
	3	33	3	3	1	3	1
	4	11	0	2	1	3	2
Weekly Average		24.3	3.0	3.5	1.5	5.5	1.5
2nd Base Period							
Week	1	18	4	1	0	5	0
	2	15	4	2	0	7	1
	3	17	5	0	1	6	2
	4	8	5	1	2	5	1
Weekly Average		14.5	4.5	1.0	.8	5.8	1.0

These figures indicate that approximately 50 percent of the single patrols produced three or fewer speeding arrests while the other 50 percent produced four or more. Almost 11 percent of the single patrols yielded no speeding arrests; the highest number was 33 arrests by a single officer.

Table 6 shows the average number of arrests per patrol on each segment during base and increased enforcement conditions.

Table 6.
Average Number of Speeding Arrests per Patrol

Segment	Base*	Increased Enforcement
1 (E6)	7.10	6.26
2 (E2)	4.28	3.47
3 (E4)	4.06	3.59
4 (E1)	2.77	3.46

*Excluded is Week 2 of the second base period.

In general, it can be seen that adding additional units to a segment depresses, by a small amount, the number of speeding arrests made per unit. Within the limits of the pilot test data the effects of increasing patrol units has the following effect on speeding arrests:

Increasing units by:

Produces increase in speeding arrests of:

2 times base

1.6 times base

4 times base

3.5 times base

6 times base

5.3 times base

Thus, the efficiency of increasing number of units is on the order of 80 to 90 percent that of a single unit.

D. Other Data Collection

As part of Phase I, NHTSA requested that a number of data collection instruments be tested. These are discussed below.

1. Trooper Activity Report

This form (see Figure 3.) was to be completed by each trooper conducting a patrol. The purpose of the form was to capture basic data on the time and frequency of patrol, enforcement and other activities. Overall, the form was judged to be useful for collecting such data and especially so as a source of explanation of unusual circumstances that made any patrol other than routine (e. g., responding to an off segment emergency).

One problem experienced with the form was that it was not always turned in by individual troopers. This required the expenditure of staff time to follow up on the forms. Nevertheless, a small percentage of forms were never received. In Phase II, the activity report will be combined with the voucher for payment for overtime. This should improve the timely receipt of the forms. It should be noted, however, that in Phase II, base patrols will be conducted by regular (non-overtime) personnel. The "leverage" of the voucher, therefore, will not be available under base conditions.

55 MILE PER HOUR IMPACT DAILY ACTIVITY REPORT

SA-725-C

DATE: 7 / 17 / 79
 month / day / year

Highway Segment
 1 2 3 4
 (4 is circled)

DUTY: FROM 0800 A.M.
 TO 1030 P.M.
 (Actual Project Shift Duty Time ONLY)

OFFICER _____

BADGE NO. _____

PATROL ACTIVITY

	HOURS		Miles Traveled
	Moving	Stationary	
On Highway Segment	6	2	250
Off Highway Segment			

ENFORCEMENT ACTIVITY

	Speeding Over 55		Other Hazardous		Other	
	CITE	WARN	CITE	WARN	CITE	WARN
On Highway Segment	2	1			1	1
Off Highway Segment						

OTHER ACTIVITY

	Accident Investigation		Other Traffic Related		Other Hours	Court Hours
	NO.	HRS.	NO.	HRS.		
On Highway Segment	—	—	—	—	—	—
Off Highway Segment						

PROBLEMS

1. Use back of form to list problems encountered during the shift.
2. Examples include: equipment failure; maintenance of sensor necessary; unable to record data due to: road, weather, equipment, accident, other; other reasons; off segment for police emergency.

PROBLEMS ENCOUNTERED: YES _____
 NO

(Use back of form)

Figure 3. Daily Activity Report

Within the Connecticut State Police, methods to minimize paperwork by troopers on patrol and other personnel, are actively being sought. Key among these is a dispatch card system which became operational shortly before the pilot test. Basically, the system involves the completion of a card (Figure 4.) by a dispatcher on each request for police service and on each trooper initiated activity.

During the pilot test dispatch card system activity involving base and increased enforcement patrols were uniquely coded. A special computer program was written by the department to isolate out these cases and to provide a summary report. Because the system was relatively new at the time of the pilot test, the hard copy dispatch cards were manually searched and tabulated at each troop which had a road segment within its area. This process permitted a comparison between the activity report and the dispatch cards, and between the dispatch cards and the computer generated reports. In Phase II the following were noted:

• Activity Report vs. Dispatch Card

Data on the activity reports and the manually tabulated dispatch cards frequently did not agree. For example, during the first four weeks of the pilot test the activity reports and dispatch cards agreed regarding number of speeding arrests made, in 54 of 102 instances (53 percent).

The discrepancies were never large (usually being off by only one for any particular trooper). The differences are likely due primarily to

SP-600
Rev Q-17

C.S.P. DISPATCH CARD

NOW INITIATED Report
Required

TYPE INCIDENT

VEH. STATE REG

STOP

LOCATION OF INCIDENT

LOCATION	ROUTE	AREA	NODE
RADIO CODE	UNIT DISP.	ASSIGNMENT	BACKUPS

RECEIVED

DISPATCHED

ARRIVED

COMPLETED

OFFICE USE ONLY	PLATOON	DAY OF WK
-----------------	---------	-----------

NAME (Last, first, middle)

ADDRESS (No, street)

(city, state)

PHONE

OTHER

INCIDENT NUMBER

Figure 4. C. S. P. Dispatch Card

errors made in recording and tabulating found in any manual record system. * In general, either basis of tabulating enforcement and related activity is believed to provide a reasonably accurate portrayal of events for evaluation purposes. In Phase II it is recommended that both the activity report and the dispatch card system be continued as data sources.

The advantages of the dispatch card system are that data are available even if activity forms are not returned, that better data on activity times can be had and that direct computer processing is possible by the project. Assuming that the startup problems noted with the dispatch card system (see below) are resolved, we believe the system should be the preferred activity data source for Phase II.

• Dispatch Card vs. Computer Report

As just noted, a computer program was developed to separate out and report on road segment activity captured by the dispatch card system (see Figure 5 and 6). Comparison of manual tabulations of dispatch cards and the computer generated reports uncovered three problems. These were:

- 1) Data entry (keying) accuracy varied among the individual troops.
- 2) On some occasions the start and stop times of trooper contacts were not entered.

*During the increased enforcement phase some double counting was noted in activity reports from troopers who worked together using radar.

CONNECTICUT STATE POLICE
 PROGRAM NO. SP0035
 RUN DATE 08/03/79

TRAFFIC DIVISION 55 MPH PROJECT
 TIME ANALYSIS OF TROOPER PRODUCTIVITY
 DATES FROM 07/05/79 TO 07/11/79
 HOURS FROM 0800 TO 1630 ONLY

TROOP/SITE H 9

DATE	TROOPER	CRIMINAL HRS MIN	ACCIDENTS HRS MIN	MSRS HRS MIN	TOTAL		MOTOR VEHICLE		ENFORCEMENTS			(INCLUDES VERBAL) TROOPER TOTAL TIME HRS MIN
					SUMMONS HRS MIN	14-210A HRS MIN	14-210 HRS MIN	SPEED WARNING HRS MIN	TOTAL WARNING HRS MIN	NO-ACTION HRS MIN		
07/05/79	483 592				14 16	14 16						14 16
DAILY TOTALS					30	30						30
07/06/79	352 360			27 20					5 35			32 55
DAILY TOTALS				47					40			1 27
07/07/79	102 506				8 2							8 2
DAILY TOTALS					10							10
07/10/79	18			5	48	42	6					53
DAILY TOTALS				5	48	42	6					53
07/11/79	267				11	3	8					11
DAILY TOTALS					11	3	8					11
TROOP/SITE TOTAL				52	1 39	1 15	14		40			3 11

Figure 5. Sample Dispatch Card System Output

CONNECTICUT STATE POLICE

PROGRAM NO. 9P9034

RUN DATE 08/03/79

TRIP BACK-UP CODES M OR S EXCLUDED

TRAFFIC DIVISION 55 MPH PROJECT

SEVEN DAY PRODUCTIVITY REPORTING DATES FROM 07/05/79 TO 07/11/79

HOURS FROM 0800 TO 1630 ONLY

TROOP/SITE R S

PAGE 1

DATE	TROOPER	CRIMINAL	ACCIDENTS	MRS	TOTAL SUMMONS	MOTOR VEHICLE ENFORCEMENTS			(INCLUDES VERBAL) TROOPER TOTAL INCIDENTS
						14-218A	14-219	TOTAL SPEED WARNING	
07/05/79	483				2	2			2
07/05/79	592				3	3			3
DAILY TOTALS					5	5			5
07/06/79	352			1				1	2
07/06/79	360			1				4	3
DAILY TOTALS				2				5	7
07/07/79	102				1				1
07/07/79	506				1				1
DAILY TOTALS					2				2
07/10/79	10			1	7	6	1		8
DAILY TOTALS				1	7	6	1		8
07/11/79	267				2	1	1		2
DAILY TOTALS					2	1	1		2
TROOP/SITE TOTALS				3	16	12	2	5	24

Figure 6. Sample Dispatch Card System Output

3) Multiple events (e. g., summonses issued at a radar site) sometimes were recorded on a single dispatch card. This usually occurred when the radio channel between troopers and dispatchers was busy with other traffic.

The dispatch card system is viewed as an important management information source for the department. The problems noted are of a start up nature and should be overcome before Phase II of the project. *

2. Miscellaneous Data Form

This form (Figure 7) captures data on weekly accident experience on the road segments during daytime hours and on the status of citations issued. Given the weekly basis of the form, it is suggested that in Phase II it be divided into two separate forms, with one containing the accident information and the other the citation status information. This suggestion is made because citation disposition information cannot be obtained within the same time frame as accident data (court appearance dates may be several weeks or more after receipt of a citation).

An on-line system is in the process of development which will permit the State Police to access a court data system regarding dispositions of citations. For example, retrieval of disposition information by dispatch card number will be possible. Use of this system to obtain desired disposition information is planned for Phase II. This approach will be tested using Phase I citations as soon as practical.

* The system is a department activity which was used by the project. No project resources were invested in the system. The computer program written for the project was not funded by the project.

MISCELLANEOUS DATA FORM: PERTAINS TO ONLY ONE HIGHWAY SEGMENT BEING PATROLLED

HIGHWAY SEGMENT:

URBAN 1234 / RURAL 1234 / HALO 1234

REPORTING PERIOD:

FROM:
MO DAY YR

TO:
MO DAY YR

ACCIDENT STATUS: (0800-1630)

	MON	TUES	WED	TH	FRI	SAT	SUN
FATAL ACCIDENTS							
NO. FATALITIES							
INJURY ACCIDENTS							
NO. INJURED							
NO. PROPERTY DAMAGE							
TOTAL							

CITATION STATUS:

	TOTAL GIVEN	% PAYING	FINES (\$) COLLECTED	% DISMISSED	OTHER (SPECIFY)
Speeding over 55 mph					
Other Hazardous					
Other					
TOTAL		Avg:		Avg:	

Figure 7. Miscellaneous Data Form

3. Subsystem Information Forms

A comprehensive set of forms was employed to capture operational and administrative information regarding problems, solutions, time and costs involved in the components of the project. The originally supplied forms were redesigned locally. The general format actually used is shown in Figure 8. The subsystems, components and activities recorded are listed in Figure 9. The forms were maintained in a loose-leaf binder tabbed by subsystem.

In practice the forms were judged to be a useful management tool as they provided an organized format in which to record problems and solutions that took place. Use of the forms is recommended in Phase II.

Subsystem: _____ Component: _____

Date	Problem	Solution Tried	Time	Cost	Recommendations & Comments

-44-

Figure 8. Subsystem Information Form

Subsystem	Component	Activity	
Training	Sensors	Installation	
		Emergency Procedures	
		Maintenance	
		Reading Counters	
	Data Acquisition	Recording on Forms	
Operation	Overall	Procedures and Other	
		Scheduling	Base Enforcement
			E2 Enforcement
			E4 Enforcement
	E6 Enforcement		
	Other	Base Enforcement	
		E2 Enforcement	
		E4 Enforcement	
E6 Enforcement			
Equipment	Installation		
	Operation		
	Maintenance		
	Sensors		
Data	Validation		
	28 Day Pre-Baseline		
	Sensor Readings		
	Trooper Activity Reports		
	Accident Data		
	Summons Disposition		
	Costs		
Management Information			
Subcontracts	Evaluation		
	Conn. DOT		

Figure 9. Subsystems, Components and Activities Used on the Subsystem Information Form

IV. EVALUATION DISCUSSION

The project's Detailed Plan for Phase I delineated the objectives of the pilot test and identified specific administrative topics that would be evaluated. A number of these issues have been described in previous sections. The purpose of this section is to further discuss these and related topics within the major evaluation issues posed for Phase I.

A. Managerial and Operational Problems

The major problems in these areas during Phase I came from the Speed Classifiers. First, the installation problems discussed earlier created a considerable drain on project staff time and caused nearly a 100 percent overrun in the costs allocated to installation work.

Second, reading the data twice daily throughout the project proved to be a demanding task for the limited number of personnel assigned to this chore. The assumption that patrol units would read the devices is not a viable one, at least in Connecticut, because of the logistic problems of training, availability of keys, and quality control of the data. In Phase II sufficient resources and personnel should be assigned to this data acquisition.

Third, the amount of time required to service the sensors and to check-out problems proved to be far more than originally anticipated. In Phase II, a more frequent battery replacement cycle is recommended, i. e., weekly, rather than waiting for a particular level of voltage drop.

With regard to management, Phase I has demonstrated that considerably more staff time was required than anticipated to handle the problems that

occurred and the data flow required of the project. Additional contract funded resources should be made available in Phase II. A more systematic scheduling of site visits during Phase II would also be desirable.

B. Enforcement Applications

The use of overtime patrols, using existing department methods of assigning such work generally proceeded smoothly throughout the pilot test. A few patrols were not conducted because of last minute cancellations due to illness, etc. On two occasions troopers conducted patrols on the wrong road segment, with this indicating that extremely clear instructions must be given. Basically, however, the assignment of manpower took place without difficulty.

C. Data Acquisition

Overall, data acquisition in Phase I presented a problem because of limited staff resources. In Phase II more trained personnel will be available to read the sensors. In addition, steps such as combining the trooper activity report with the request for payment should reduce the amount of basic follow-up required. Also, the maturing of the dispatch card system and the availability of the on-line access to adjudication records should reduce the interim manual collections methods employed in Phase I.

D. Sensor Performance

Sensor installation and operation in Phase I did not proceed smoothly. Among the problems were:

• On the spot decisions being made about installation. This led to incomplete documentation being available to subsequent installation crews.

- The failure of the original version of the device to function. This led to the equipment modifications and subsequent operational problems primarily related to power supply.
- The basic two-lane, in series layout creates situations where one vehicle can start a calculation that is ended by a second vehicle. This configuration also produces occasions where large trucks produce multi-hundred mph readings.

It is recommended that complete and accurate installation instructions be provided and that a more frequent battery replacement schedule be adopted. In addition, sufficient spares should be made available along with provisions to replenish spares in a timely manner as they are consumed. It is also suggested that a quick response channel of communications be created so that the site(s) can deal with someone technically knowledgeable about the Speed Classifier.

Regarding the overall sensor layout, it is our opinion that full lane monitoring with lane isolation is the best configuration to employ. Any layout less than this, in our opinion, will reduce the utility of the data and make meaningful conclusions more difficult to draw.

E. Confounding Factors

Field studies such as the one conducted here inevitably face unanticipated situations which must be accounted for in the impact evaluation. The Phase I pilot test was "rich" in such situations. These included:

- Severe gasoline shortages during the summer of 1979. Odd-even gasoline sales were adopted on June 20, 1979 and continued until after Labor Day.
- A trooper job action during the early days of July in which few, if any, speeding citations were issued throughout the State.
- During the pilot phase, the legislature changed the basic form of the State's speeding law. Until the change, on limited access highways, persons exceeding 70 mph were charged under Section 14-219 (Speeding) and required to appear in court, while those exceeding 55 mph but not 70 mph were charged under Section 14-218 (Exceeding the Posted Limit). The latter citations could be paid by mail. Under the legislative change all violations of the 55 mph limit will be charged as Speeding and require a court appearance.

This change will be effective in October 1979 and, therefore, apply in Phase II. There also was considerable publicity about the change during the Phase I period.

- This Speed Classifier, with buried loops, would appear to be an unobtrusive method for obtaining criterion data for the project. Interestingly, however, a substantial number of inquiries were received from the public about the purpose of the installations. (Most of these asked if an ORBIS-like device was being employed.) Apparently, the installation and twice daily readings make a portion of the road user population aware that some police activity is being

carried out near the Speed Classifiers. Installation of the Phase II sites well prior to the start of operations should eliminate part of the problem. The twice daily reading, however, will remain as an artifact.

END

DATE

FILMED

4-26-80

NTIS