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REPORT ON THE VEHICLE OCCUPANCY RATE (VOR)

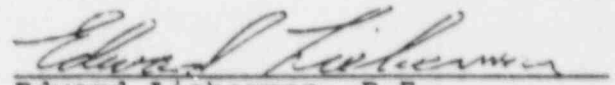
SURVEY PROCESS

Prepared for

New Hampshire Yankee
Seabrook Station
Seabrook, NH 03874

Prepared by

KLD Associates, Inc.
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Huntington Station, NY 11746



Edward Lieberman, P.E.
President

August 1987

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ABSTRACT

Two large-scale surveys were undertaken on the main access roads to Plum Island and Salisbury Beach, Mass. and to Seabrook and Hampton Beaches, N.H. These surveys, conducted on July 11, 1987 and July 18, 1987, both Saturdays, obtained data for the primary purpose of estimating mean vehicle person occupancy. The survey methodology consisted of observers standing at the edge of selected roads, peering into the interior of passing vehicles and announcing the number of persons observed. This announcement was recorded on audio tape and was also recorded, in writing, by a second observer, on a form prepared for that purpose.

Over the two days of data collection, a total of 56,040 persons were observed in 24,637 vehicles, to yield a mean occupancy of 2.275 persons. This figure is in essential agreement with the results of a similar smaller-scale, survey, conducted a year earlier, on July 4th and 5th, 1986.

1. INTRODUCTION

In order to estimate the population in the beach areas along the New Hampshire coast, a series of data collection activities were undertaken:

- o In August, 1985
- o On July 4th and 5th, 1986
- o On July 11th and 18th, 1987.

The primary purpose of these surveys was to establish the distribution of vehicle occupancies in vehicles travelling toward the beach areas. The mean value of vehicle occupancy is applied to the estimate of the maximum number of vehicles parked in the beach areas, to yield the maximum number of people who occupy the beach area, at a point in time.

The survey conducted in late August, 1985 was undertaken on days when the weather conditions were less than appealing to beach-goers. As a result, the mean vehicle occupancy of under 2.2 persons was regarded as suspect.

Consequently, a second survey was conducted on the July 4th weekend in 1986, under generally good weather conditions. This survey yielded a mean vehicle occupancy of 2.338 persons, based on a total sample size of 5,165 vehicles. For planning purposes, then, a mean occupancy value of 2.4 persons was applied to the estimated vehicle population to obtain estimates of beach population. The results were documented in Volume 6 of the NHRERP, on pages 4-6, 4-7 and 4-8.

It was decided to update this data with even more extensive surveys in 1987 during the heat wave in mid-July. This report documents the 1987 surveys.

2. OVERVIEW OF THE SURVEY

A comprehensive effort was undertaken to update the existing data quantifying the peak transient and permanent population of the larger beach areas in the vicinity of Seabrook Station. This effort consisted of close-up vehicle and occupancy counts by trained observers at all major approaches to the beaches along the beach access roadways. This effort, called the Vehicle Occupancy Rate (VOR) survey, was conducted by planning personnel assigned to Seabrook Station. Guidance was provided throughout the VOR survey process by KLD Associates, a consulting firm which developed an update to the Evacuation Time Estimate (ETE) for the Seabrook Emergency Planning Zone (EPZ).

The purpose of the VOR survey was to obtain a mean occupancy rate for all the vehicles counted. This value was needed as a check on the current estimate of 2.4 persons per vehicle, documented in Volume 6 of the NHRERP. This mean occupancy rate multiplies the number of estimated parking spaces obtained from aerial photographs taken on July 18, 1987 to provide emergency planners with a factual and carefully documented planning base for estimating peak weekend beach populations.

The results of the VOR survey are as follows: a combined total of 24,637 vehicles (including buses) were counted on July 11th and 18th, both Saturdays. These vehicles contained a total of 56,040 occupants. The mean occupancy rate of the vehicles surveyed was 2.274 occupants per vehicle. This figure differs from the result of a similar survey taken on July 4th and 5th, 1986, by approximately 0.06, or 2.6 percent.

The following is a chronological summary of the entire VOR survey process. It will be divided into three sections: a description of the preparatory steps taken prior to the actual survey periods; an explanation of the survey procedures; and a description of the survey data analysis.

3. PREPARATION OF THE SURVEY

On July 2, 1987, an instructional meeting was held for all the VOR observers by the senior consultants coordinating the operation. This meeting immediately preceded the first scheduled survey period of Friday and Saturday, July 3 and 4. (NOTE: Due to inclement weather on both days, it was decided to defer the survey to a weekend where hot weather would attract a high beach population.) The purpose of this meeting was to discuss the VOR Survey Instructions to Observers, a step-by-step guide developed to ensure that all data was recorded in a uniform manner (see Attachment 1), and to issue any equipment necessary to conduct the survey. Each item on the instruction outline was discussed in detail, with ample time allotted for all participants to ask questions and/or make suggestions for improvement in the survey process. Equipment was then issued (including portable recording devices with back-up power sources) and tested to ensure trouble-free operation in the field.

Immediately following this meeting, observer teams were dispatched to their assigned VOR locations to conduct a trial survey run. Teams were instructed to follow all procedures exactly as they would during the actual survey periods. During the trial run, "rover" teams comprised of survey coordinators visited all the VOR locations to observe team activities and generally be available to respond to questions, provide back-up equipment or provide any other assistance as needed. The trial run afforded an opportunity to determine if the survey logistics were workable and manageable under actual field conditions.

As was the case throughout the survey preparation phase, observers' opinions and/or suggestions were again solicited after the trial run was completed.

Conducting the Survey

The VOR survey was conducted on two successive Saturdays, July 11 and 18. During the July 11 survey, observers manned all six VOR locations depicted on the VOR Observer Location Map (see Attachment 2). A more detailed depiction of each location is provided by Attachments C through H of Attachment 1. These locations were carefully selected to ensure the widest possible sampling of traffic ingress to the Hampton (NH), Seabrook (NH), Plum Island (MA) and Salisbury (MA) beach areas. On July 18, observers were located at VOR Locations 2, 3A and 5 only. The July 11 survey commenced at 9:00 AM and ended at 1:00 PM. The July 18 sampling ran from 9:30 AM to 12:30 PM. Personnel assignments for both survey dates can be found on the attached VOR Assignment Sheet (7/11) and the 7/16 Memorandum (see Attachment 3).

There are several factors which led to the decision to conduct a supplemental survey on July 18. Foremost was the desire to obtain traffic data to coincide with the aerial

photography effort taking place at the same time. (NOTE: Aerial photographs of all the coastal areas within the EPZ were taken between 12 Noon and 1:20 PM on July 18.) This desire was partially motivated by past complaints from intervenors in the Seabrook Station licensing process. These complaints allege that information gleaned from previous aerial photographs (taken July 4, 1986) was rendered invalid because a very limited sampling of vehicle occupancy data, gathered via a field survey of narrower scope, was obtained during the corresponding period.

Another factor was the desire to expand the overall VOR database with the additional data gathered on July 18. Obviously, the survey results and any assumptions based on them will be more conclusive if they are substantiated by a large and varied data base, provided in this case by an expanded sampling period.

The three VOR locations used for the July 18 survey were chosen based on the results of the previous week's sampling. These three locations consistently displayed the highest mean occupancy rates and, in most cases, experienced the heaviest traffic volume (see Vehicle Occupancy Rate Surveys for Major Beach Access Roads, Attachment 4 for a detailed account of the results for both VOR surveys).

On both survey dates, the prevailing weather conditions were noted by each observation team at all locations. The weather conditions were both recorded verbally on tape and noted in writing on the VOR tally sheets. Further documentation on the weather conditions was obtained from the National Weather Service for both survey periods (see Attachment 5). Conditions were periodically updated for the duration of the survey. Similarly, each observation team periodically noted the time on the tape recorders and on paper. This was done to simplify the tallying process and to facilitate an hourly breakdown of the results.

As described in the VOR survey instructions (Attachment 1), the procedures for recording both vehicular volume and occupancy were simple and straightforward. Each observer team was supplied with a tape recorder and printed tally sheets to record the required data. Documenting the information using these two distinct recording modes was done to provide a cross-reference capability when the data was eventually tabulated. By employing two separate methods of recording (oral and written), each method could be used to substantiate and augment the other during the tabulation phase.

Item number 4 on the instruction sheets (Attachment 1) lists the four classes of information needed for each vehicle counted. They are in order of priority: number of persons (in vehicle); vehicle type; turn movement and license plate. In the vast majority of cases, both the oral and written recorders were able to document all four classes of information. During periods of heaviest traffic volume, however, recording of all four data

items sometimes proved difficult. At these times, the prioritization system was employed to ensure that the two most critical pieces of information, occupancy and vehicle type, were always recorded. This information was, in fact, recorded for every vehicle.

Tabulating the Survey Data

After the field survey was completed, each observation team was responsible for reviewing their own recorded tapes and data sheets. The primary purpose of the review was to ensure consistency between both methods of recording. To this end, each team played back the audio tape while following along line by line on the tally sheets. If any inconsistencies were discovered between the two data sources, they were noted in the appropriate place on the tally sheets.

Given the extensive scope of the survey and the large amount of information recorded, there were relatively few instances of inconsistencies of any type. The most common ones discovered in the review were cases where the tally sheet recorder was having difficulty keeping pace with the tape recorder observer. In these cases, the data which was present on the tape and not found on the tally sheets was inserted where it belonged. For example, if the data recorded on tape for four vehicles was "PC-2-right-NH, PC-3-left-MASS, Truck-2-left-MASS, VAN-5-right-MASS" and the data recorded on the tally sheets for the corresponding time frame read "PC-2-right-NH, PC-3-left-MASS, Van-5-right-MASS", it was concluded that the tally sheet recorder was unable to note the third entry on the tape recorder (Truck-2-left-MASS) because of the rapidity of the dictation. To rectify the inconsistency, the observer/reviewer then inserted "Truck-2-left-MASS" between "PC-3-left-MASS" and "Van-5-right-MASS" on the tally sheet. When the tape recording obviously reflected periods of heavy traffic (i.e. the speaker's rate of speech increased), reviewers were automatically alerted to the possibility of inconsistencies of this nature.

Conversely, there were a few cases where information on the tally sheets was not evidenced on the tape. In these instances, this information was deleted from the tally sheet, since the writer was instructed to tally only the data dictated by the tape recording observer.

In addition to periodically noting the time on the audio tape, each such observation was also noted on the tally sheets. This was done to provide a common point of reference for review purposes and to enable the data to be tabulated on an hourly basis.

After the data review process was completed, the reviewers entered the data on the Summary Sheet for VOR Tally Sheets (see Attachment I of Attachment 1). These summary sheets were used to determine a mean vehicle occupancy rate for each hour of the

survey, and to tally the total vehicle number by type. The methodology for these calculations is indicated on the sheets themselves.

The bus data observed on both survey dates were treated differently from those for other vehicle types. Although the number of buses counted was entered in the appropriate space on the Summary Sheet for VOR Tally Sheets, the number of passengers on each bus is not reflected in the occupancy section. This is so because the number of passengers per bus varied greatly (from empty to apparently filled to capacity) and because an accurate head count on such a large vehicle was nearly impossible to obtain. The relatively small number of buses (a total of 30 or approximately 0.1 percent) did not have a significant impact on the mean occupancy rate figures.

The final step in the data tabulation process was the development of Vehicle Occupancy Rate Surveys for Major Beach Access Roads (Attachment 4) which summarizes in detail the results of both survey dates. The summary provides an hourly breakdown on vehicle occupancy for each of the VOR locations manned. It also provides an hourly mean occupancy rate for each location. Using the summary, one can easily extract any information they require and do so for any hour of the survey.

ATTACHMENT 1

July 1, 1967

Vehicle Occupancy Rate (VOR) Survey

INSTRUCTIONS TO OBSERVERS

The vehicle occupancy rate survey is intended to establish a first-hand, accurate account of occupancy data over the course of the survey time frames. The information obtained during this survey will supplement data previously obtained for the Seabrook area.

1. A Vehicle Occupancy Rate observation team will be assigned to specific major intersections as indicated on the attached assignment sheet (Attachment A). Each team will consist of two members; one member will record on-going observations of vehicle occupancy on a dictaphone, while the second member records the information on formal tally sheets (Attachment B).
2. Each team should establish itself at the appropriate locations as indicated on the VOR Location Diagrams (Attachment C through H). These locations have been selected to assist the teams in viewing as many incoming vehicles as possible. Many cars at these locations will be traveling at a reduced rate of speed, which will also facilitate observations of vehicle occupants. Observation teams should stand as close to the edge of the road as is necessary to ensure clear visibility of vehicle occupants.
3. To begin each recording session, record your name, affiliation, date/time, specifically where you are located (both VOR number and Street names), and a brief description of current weather conditions. Be sure to hold the microphone close to your mouth in order to limit interfering traffic sounds. Talk clearly and distinctly.
4. There are four (4) classes of information needed for each vehicle counted. These classes, and the associated recorded information, are listed below.

<u>Information Needed</u>	<u>Spoken/Recorded Data</u>
a) Vehicle Type	"PC" (Passenger Car) "Pick-up" (Truck) "Van" "RV" "Truck" "Bus" "Cycle" "Bike"
b) Number of Persons	"1" "2" "3" "4" etc.

Information Needed

Spoken/Recorded Data

c) Turn Movement

"Through"
"Right"
"Left"

d) License Plate

"New Hampshire"
"Massachusetts"
"Other"

The above information should be recorded in the order listed as a vehicle approaches and passes the observer. An example of recorded data, then, may sound somewhat as follows:

"PC...3...Right...Mass:...Van...1...through....Other;
...Cycle...2...Left...New Hampshire;..." Note, however that the primary purpose of the survey is to record data regarding vehicle occupancy rates. As such, should traffic become too heavy to record all of the above information for each vehicle, ensure at a minimum that data regarding the number of persons is always recorded. Vehicle type, turn movement, and license plate origin are of decreasing priority for the purposes of this survey, but should be recorded if at all possible.

5. During times of heavy traffic, record the current time on the tape at approximately 10 minute intervals. This will provide an indication of the "running time" of the tape. If a long "lull" in the traffic should occur, you may not wish to continue running the tape needlessly; instead place the recorder on pause until traffic resumes. Be sure to note the time when the recorder is turned back on! If weather should change significantly, record the time and nature of the change.
6. The traffic entering the coast area is expected to be the heaviest between 9:30 and 11:00. In order to ensure as complete coverage of incoming vehicles as is possible, teams will record continuously from 9:00 AM to 11:00 AM; please note the time at 10:00 AM to assist with compilation of the data following the survey. A fifteen-minute break will be taken at 11:00 am. Please record the time on both the tape and the tally sheets when recording resumes at 11:15 AM. All tapes should be labeled on both sides regarding times and VOR Location Number, as appropriate.
7. It is not anticipated that our field activities during this survey will attract undue attention from civil or legal authorities. If however, you are questioned as to the nature of your activities, simply reply that you are an observer for a local vehicle survey. Remain cordial and friendly at all times. Should any situation arise which is beyond your capability to control, remove yourself from the location and report by phone to the designated contact person.
8. If the weather is pleasant and hot, you may wish to bring some refreshments with you to your site. Under no circumstances should alcoholic beverages be brought to the intersection or ingested during the course of the survey.

9. Schedule - Pre-Survey Sample. A pre-survey meeting and sample run has been scheduled for July 2nd, 1987. The pre-survey meeting will begin in the Red Room at 1:30; all teams will be provided equipment and further instructions at that time. Teams will then be dispatched to their respective intersections in order to record a sample run of activity at these sites. This sample run will allow you to familiarize yourself with your location and the procedures detailed above. If your team is not provided with mechanical recording devices until Friday, mimic the use of this machinery during the trial run, and practice completing the tally sheets. A coordinating "Rover" team will observe your trial set-up procedures at your intersection; the Rovers will begin at VOR Observer Location No. 1, and move south to Observer Location No. 15. Please remain at your designated location until you are observed by the Roving Team.

Survey. The Survey itself is scheduled to be conducted on July 3 and July 4, 1987. However, in the case of inclement weather, the survey may have to be delayed until the following weekend for more attractive weather conditions.

Friday, July 3, 1987: All survey members should report to the Red Room at 7:30 AM. Outstanding equipment will be distributed at that time and any questions raised by the trial run conducted the previous day will be answered. Any decision to cancel the July 3 activities due to inclement weather will be made at that time.

Saturday, July 4, 1987: All survey members should again report to the Red Room at 7:30 AM. Cancellation due to inclement weather will be made at that time, if necessary.

During the survey, the "Rover" team will again be observing team activities, and will thereby be available to respond to any questions team members may have, provide backup tapes, sheets, etc, or to assist in any way.

Post-Survey. Team members should review all recorded tapes and data sheets for consistency of recorded information, and complete the VOR Summary Sheets (Attachment I) by July 10, 1987. Once this is complete, return all recorders, tapes, and data sheets to Karen Larson.

"Thank You fer yer support!"

VOR TALLY SHEET

Time: _____

Page No _____

TYPE VEHICLE								NO. PERSONS							TURN			LICENSE				
P	V	R	T	B	C	K	C										T	R	L	N	M	O
u	a	v	r	u	c	y	b	1	2	3	4	5	6	7+	h	h	e	H	S	r		
p	n	v	k	s	e	k	i								r	t	f					
P	V	R	T	B	C	K	C	1	2	3	4	5	6	7	T	R	L	N	M	O		
P	V	R	T	B	C	K	C	1	2	3	4	5	6	7	T	R	L	N	M	O		
P	V	R	T	B	C	K	C	1	2	3	4	5	6	7	T	R	L	N	M	O		
P	V	R	T	B	C	K	C	1	2	3	4	5	6	7	T	R	L	N	M	O		
P	V	R	T	B	C	K	C	1	2	3	4	5	6	7	T	R	L	N	M	O		
P	V	R	T	B	C	K	C	1	2	3	4	5	6	7	T	R	L	N	M	O		
P	V	R	T	B	C	K	C	1	2	3	4	5	6	7	T	R	L	N	M	O		
P	V	R	T	B	C	K	C	1	2	3	4	5	6	7	T	R	L	N	M	O		
P	V	R	T	B	C	K	C	1	2	3	4	5	6	7	T	R	L	N	M	O		
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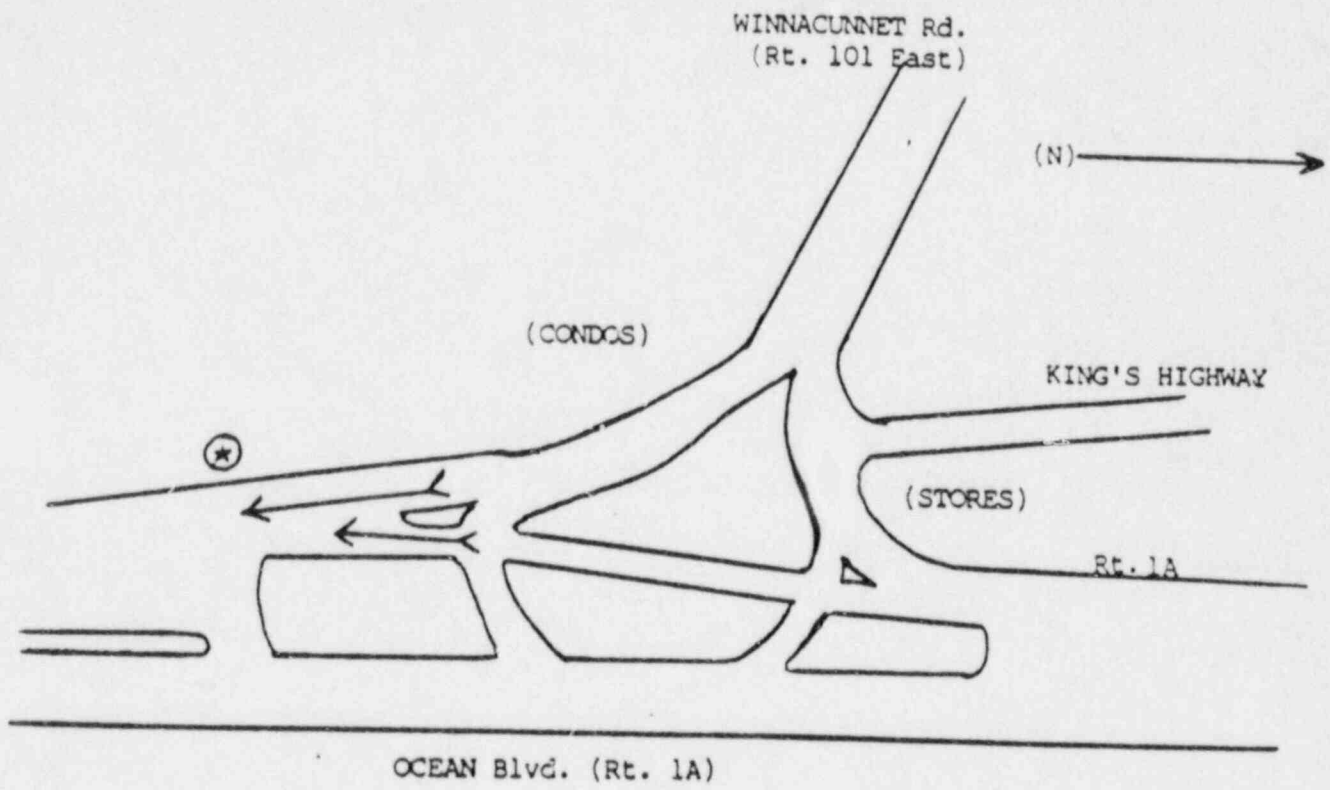
VOR Location _____ Date _____

VOR OBSERVER LOCATION NO. 1

TOWN: HAMPTON

LOCATION: Rt. 1A and Rt. 101E

TCP NO: D-HA-04



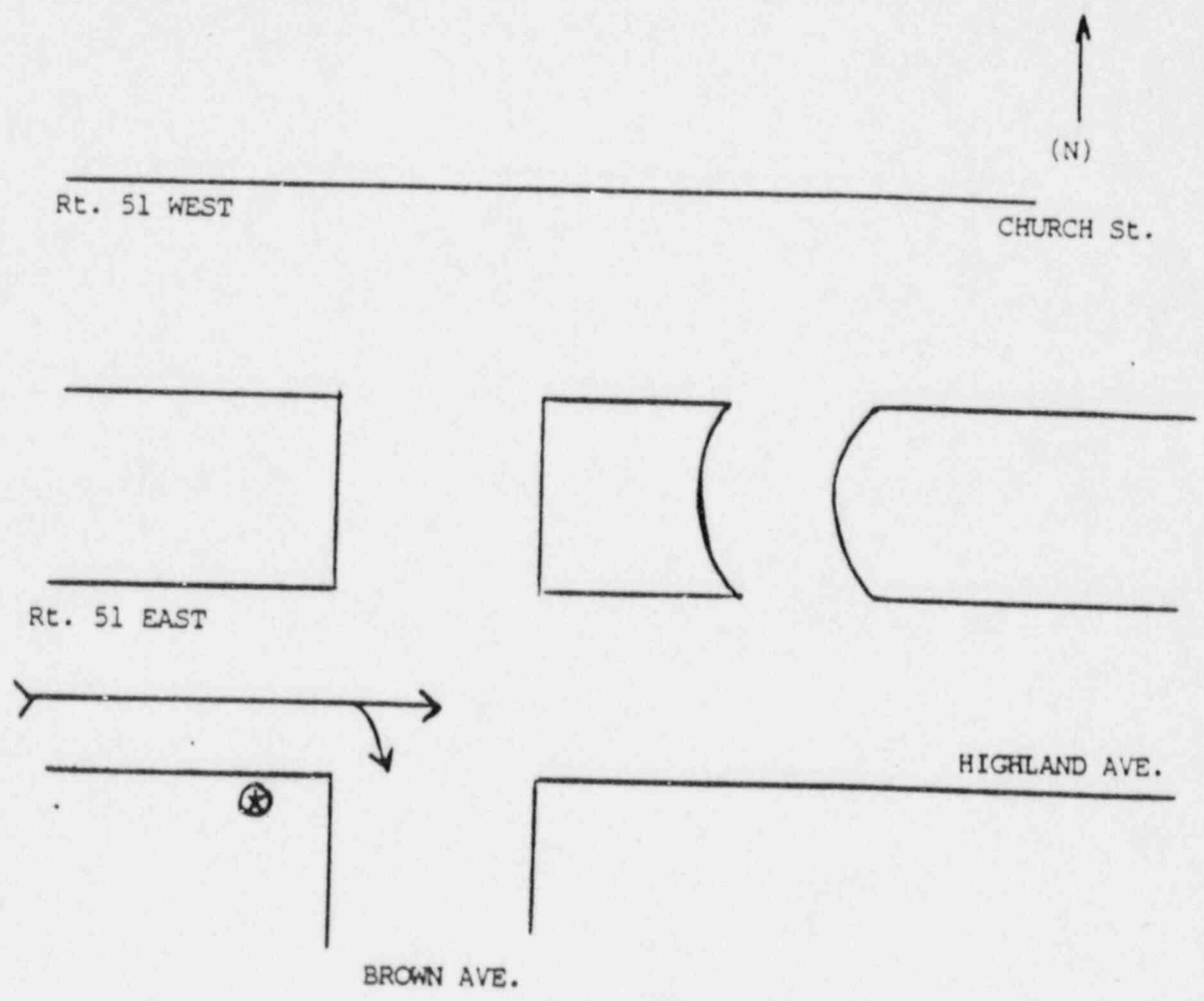
⊛ VOR OBSERVER LOCATION

➤ TRAFFIC DIRECTION to be OBSERVED

VOR OBSERVER LOCATION NO. 2

TOWN: HAMPTON (HAMPTON BEACH)
LOCATION: HIGHLAND AVE. and Rt. 51 EAST
at BROWN AVENUE

TCP NO: A-HB-03



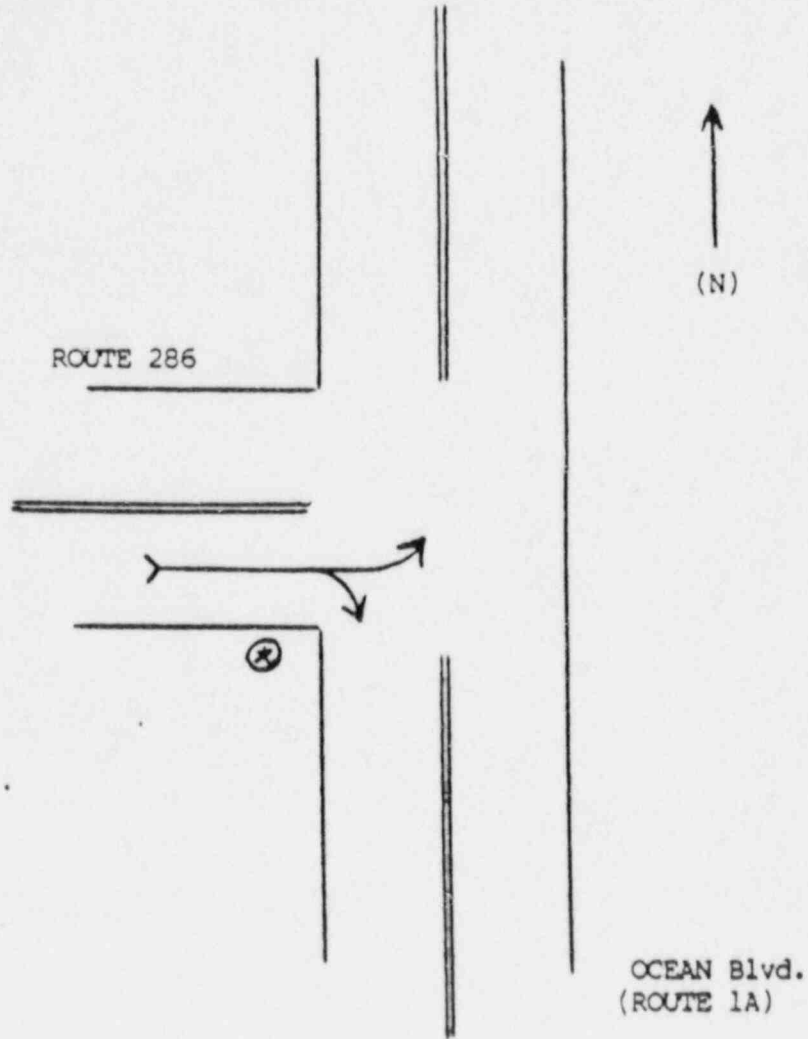
⊛ VOR OBSERVER LOCATION
➤ TRAFFIC DIRECTION to be observed

VOR OBSERVER LOCATION NO: 3A

TOWN: SEABROOK

LOCATION: OCEAN Blvd. (Rt. 1A) and Rt. 286

TCP No: A-SE-06



⊗ VOR OBSERVER LOCATION

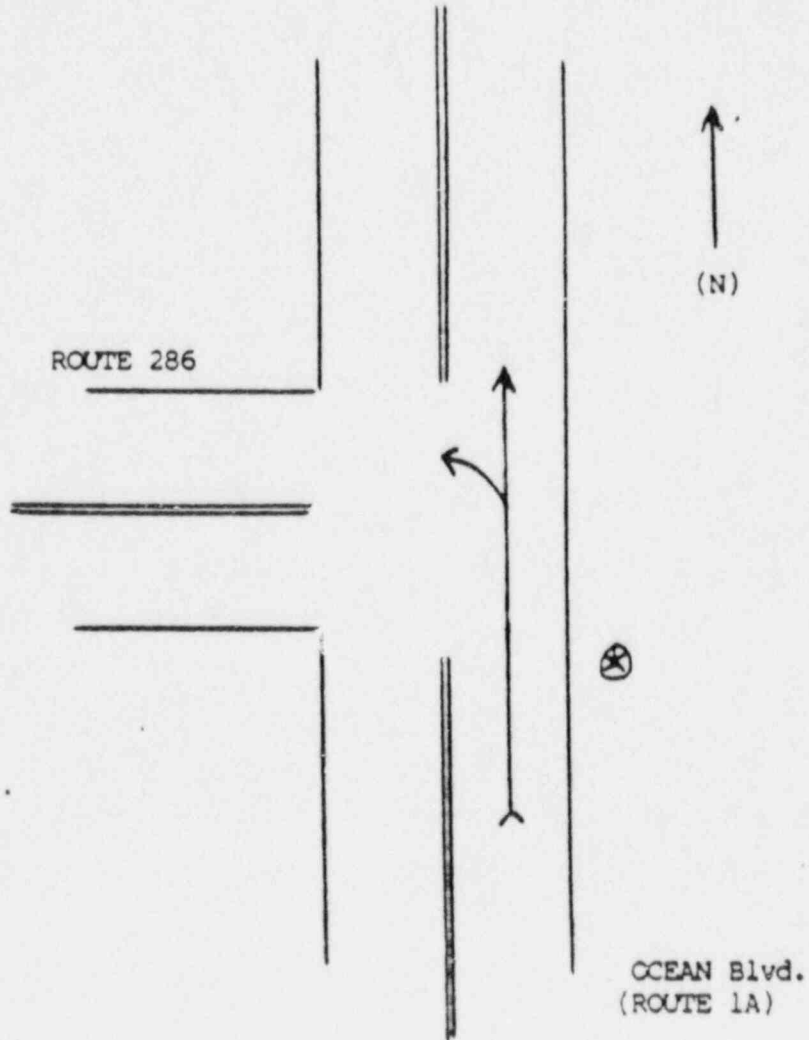
→ TRAFFIC DIRECTION to be OBSERVED

VOR OBSERVER LOCATION NO: 3B

TOWN: SEABROOK

LOCATION: OCEAN Blvd. (Rt. 1A) and Rt. 286

TCP No: A-SE-06



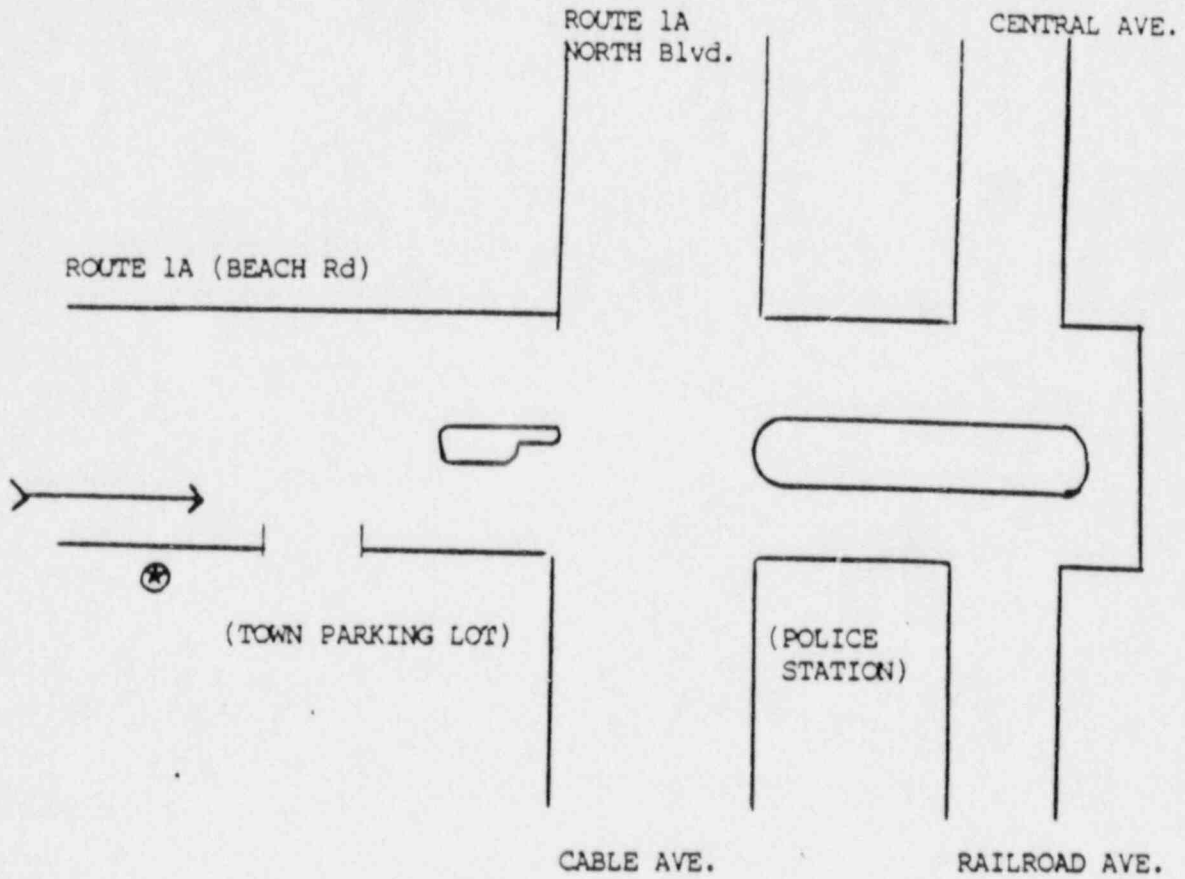
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↪ TRAFFIC DIRECTION to be OBSERVED

VOR OBSERVER LOCATION NO. 4

TOWN: SALISBURY

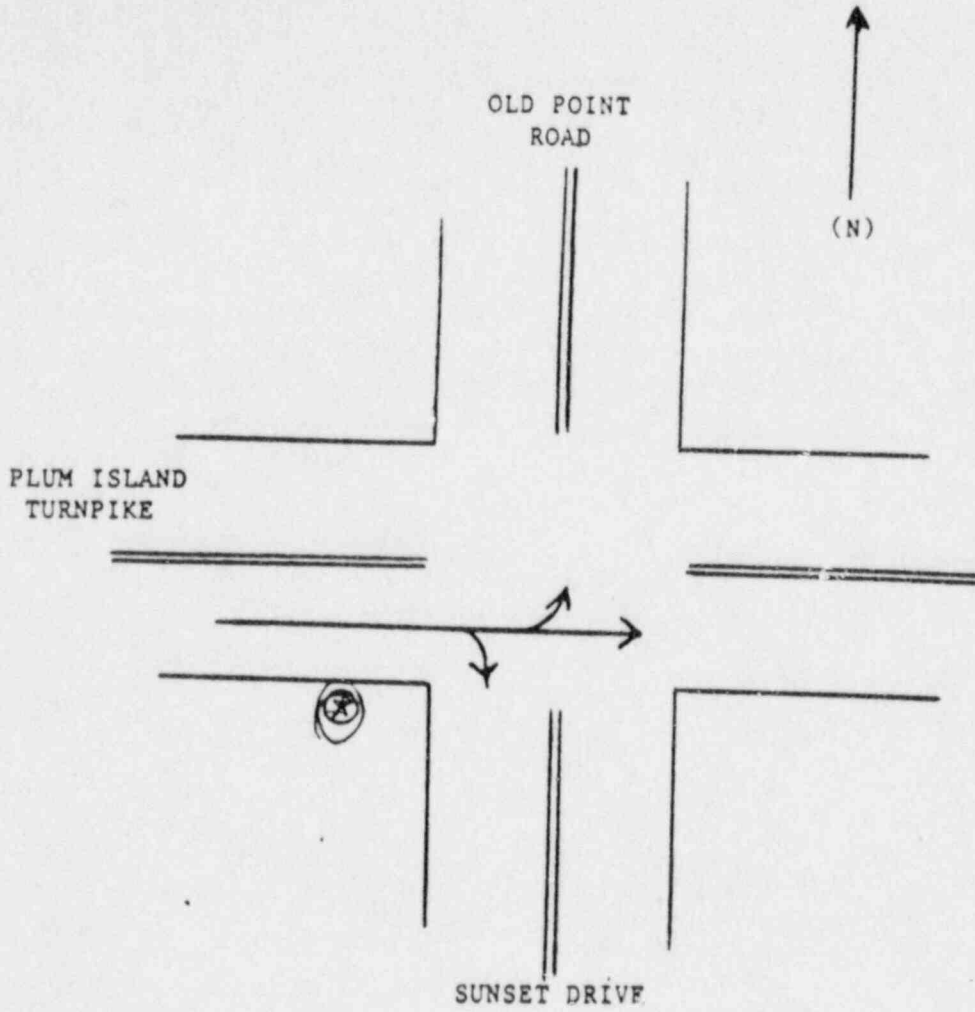
LOCATION: ROUTE 1A and NORTH BOULEVARD

TCP NO: B-SA-04

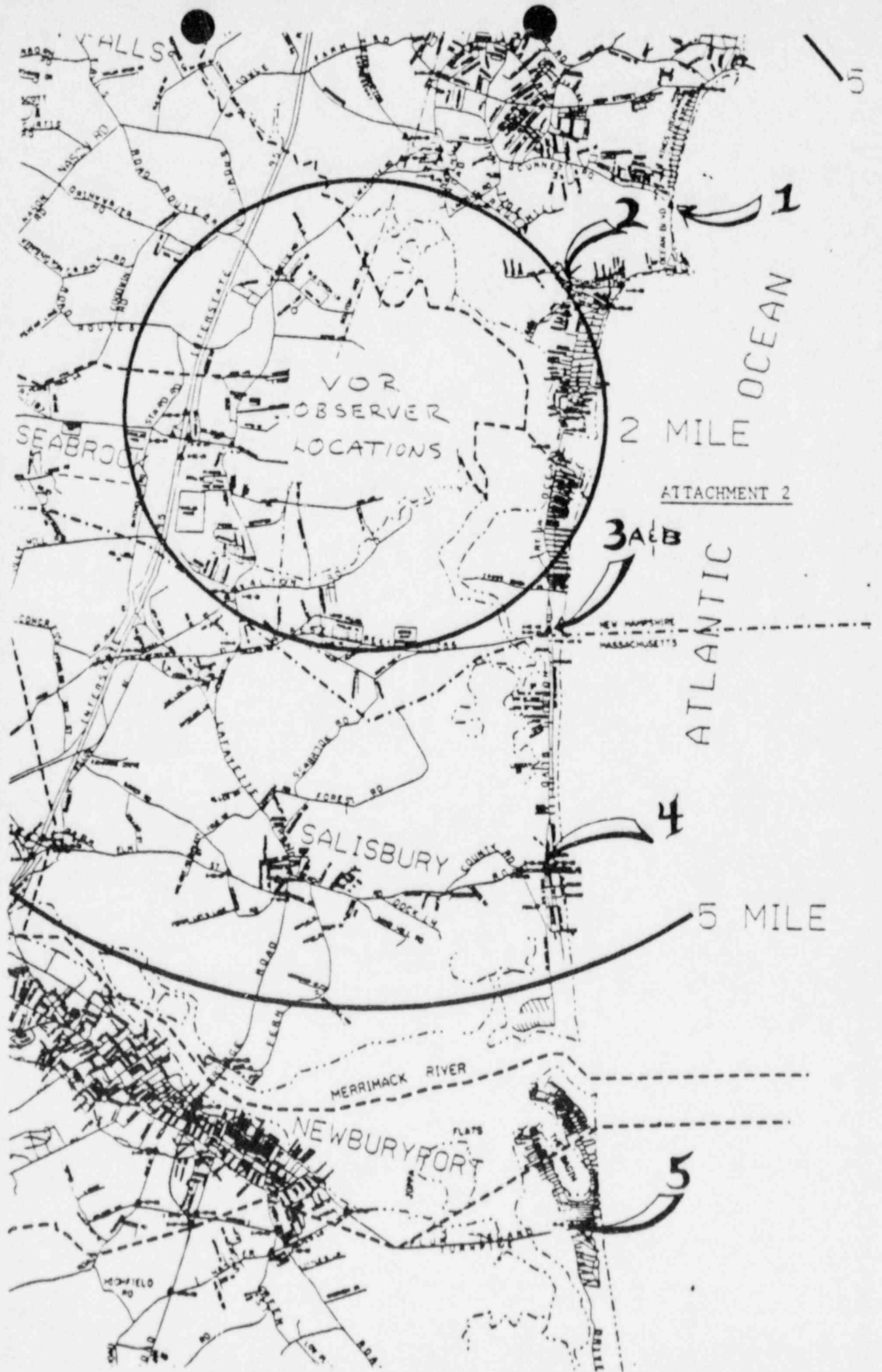


- ⊛ VOR OBSERVER LOCATION
- TRAFFIC DIRECTION to be OBSERVED

TOWN: NEWBURY
LOCATION: PLUM ISLAND TURNPIKE AND
OLD POINT RD./SUNSET DRIVE
TCP NO. E-NB-01



⊕ VOR OBSERVER LOCATION
→ TRAFFIC DIRECTION TO BE OBSERVED



ATTACHMENT 2

2 MILE

3A&B

ATLANTIC OCEAN

5 MILE

5

VOR
OBSERVER
LOCATIONS

SALISBURY

NEWBURYPORT

MERRIMACK RIVER

NEW HAMPSHIRE
MASSACHUSETTS

YALLOTT'S FALLS

SEABROOK

ATTACHMENT 3

VOR ASSIGNMENT SHEET
JULY 11, 1987

<u>VOR Observer Location Number</u>	<u>Assigned Observers</u>
<u>No. 1</u> Hampton Route 1A and Route 101E (Winnicunnet)	 Joe Enoch Marilyn Sullivan
<u>No. 2</u> Hampton Beach Highland Avenue and Route 51	 Karen Larson Lesley Tilston
<u>No. 3A</u> Seabrook Route 1A and Route 286	 John Spead Bill Kollar
<u>No. 3B</u> Seabrook Route 1A and Route 286	 Bill Thorpe Kathy VonWald
<u>No. 4</u> Salisbury Route 1A and North Boulevard	 Cathy Frank Bruce Musico
<u>No. 5</u> Newbury Plum Island TnPk. and Old Pt. Road	 Craig Starkman Neal Boucher
<u>Rovers</u>	 John Hart John Baer Ed Lieberman
<u>Back-ups</u>	 Loretta Garcia Ken O'Gara

HELP LINE: 474-9521, x2762

MEMORANDUM

TO: KATHY FRANK, ED HARTNETT, BILL KOLLAR, KAREN LARSON, JOHN SPEED,
LESLEY TILSTON

FROM: JOHN HART

DATE: JULY 16, 1987

SUBJECT: VOR SURVEY REVISITED

As you know we will be conducting a "mini" VOR Survey on Saturday July 18, 1987 between the hours of 9:30 am and 12:30 pm.

Thanks once again for your continuing support in this activity. No survey activities are planned for the following day, Sunday, regardless of weather.

This survey will include only three locations:

Rt. 51 and Rt. 1A (John Speed, Bill Kollar)
Rt. 286 and Rt. 1A (Lesley Tilston, Karen Larson)
Beach Road and Rt. 1A (Ed Hartnett, Kathy Frank) *(Marilyn Sullivan)*

I will be moving between sites to assist as necessary.

Please meet in the Red Room by 8:30 Saturday morning. Equipment will be distributed at that time.

Vehicle Occupancy Rate Surveys
Major Beach Access Roads

July 11, 1987

<u>Location</u>	<u>Time</u>	Vehicles Occupied by Indicated # of persons								<u>Mean Occupancy</u>
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7+</u>		
Route 101E	9:00-10:00	172	182	54	40	16	6	1	2.03	
Rt. 51	9:00-10:00	190	382	162	132	36	6	6	2.44	
Rt. 286 (A)	9:00-10:00	213	307	91	63	22	5	6	2.15	
Rt. 286 (B)	9:00-10:00	148	213	71	45	12	3	2	2.13	
N. Boulevard	9:00-10:00	179	182	83	57	27	8	4	1.92	
Plum Is. Tnpk	9:00-10:00	142	115	25	20	8	4	2	1.91	
Rt. 101E	10:00-11:00	198	276	69	57	21	8	2	2.16	
Rt. 51	10:00-11:00	166	373	155	128	34	12	6	2.49	
Rt. 286 (A)	10:00-11:00	196	282	108	59	19	6	4	2.18	
Rt. 286 (B)	10:00-11:00	172	303	89	44	22	5	3	2.15	
N. Boulevard	10:00-11:00	199	358	126	69	32	13	4	2.24	
Plum Is. Tnpk	10:00-11:00	177	265	45	23	10	--	1	1.94	
Rt. 101E	11:15-12:00	188	310	85	61	15	6	2	2.14	
Rt. 51	11:05-12:00	162	361	159	117	38	11	4	2.46	
Rt. 286 (A)	11:00-11:55	258	365	104	74	17	7	2	2.09	
Rt. 286 (B)	11:15-12:00	115	219	67	36	16	4	3	2.23	
N. Boulevard	11:00-12:00	224	375	105	84	46	13	4	2.66	
Plum Is. Tnpk	11:00-12:00	142	137	36	27	12	2	5	2.05	
Rt. 101E	12:00- 1:00	213	338	90	76	20	4	2	2.14	
Rt. 51	12:00- 1:00	164	357	136	101	41	12	5	2.45	
Rt. 286 (A)	12:05- 1:00	231	337	116	72	26	11	4	2.21	
Rt. 286 (B)	12:00- 1:00	172	276	82	49	15	3	4	2.12	
N. Boulevard	12:00- 1:00	228	400	162	103	35	7	8	2.34	
Plum Is. Tnpk	12:00- 1:00	178	203	69	28	16	7	1	2.04	

July 18, 1987

<u>Location</u>	<u>Time</u>	Vehicles Occupied by Indicated # of persons								<u>Mean Occupancy</u>
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7+</u>		
Rt. 51	9:30-10:30	132	420	114	90	52	13	6	2.48	
Rt. 286 (A)	9:30-10:30	280	463	156	93	33	7	1	2.18	
N. Boulevard	9:30-10:30	273	423	131	80	35	7	8	2.26	
Rt. 51	10:30-11:30	167	473	168	163	69	20	9	2.62	
Rt. 286 (A)	10:30-11:30	265	407	134	94	23	11	4	2.21	
N. Boulevard	10:30-11:30	247	481	140	108	51	13	5	2.29	
Rt. 51	11:30-12:30	148	389	142	122	49	12	7	2.53	
Rt. 286 (A)	11:30-12:30	269	428	127	106	26	10	9	2.24	
N. Boulevard	11:30-12:30	240	416	168	94	38	10	7	2.31	

NOTE: A total of 30 buses were observed; the number of persons on buses ranged from apparent capacity to no passengers. These vehicles were not included in mean occupancy figures as numbers of passengers could not be accurately perceived from a curbside survey.

WF 1-10A 15-831		U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE										STATION NWSFO BOSTON, MA	
SURFACE WEATHER OBSERVATIONS										DATE 11 JUL 1987		TO CONVERT LIST TO GMT ADD 5 HRS. SUBTRACT	
TIME	TIME (MST)	SEA AND CEILING (Number of Feet)	VISIBILITY (Miles)		WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESS.	TEMP DBP	WIND				ALTITUDE FEET	REMARKS AND SUPPLEMENTAL CODED DATA
			SMALL	GRAND				DIR	SPEED	MAX	MIN		
RS	0651	W 2 X 31/30 11-17	0		F	146	66	07	07			996	RVR 2000 / 003 15
SA	0750	W 2 X	0		F	146	66	06	04			996	RVR 2000
SA	0753	W 2 X	0		F	146	66	09	04			996	RVR 2000 / 48517
SA	0754	W 2 X	0		F	146	66	07	04			996	RVR 2000 / 400
SA	0755	W 2 X	0		F	146	66	06	05			997	RVR 2000
SA	0758	W 2 X	0		F	146	66	13	04			997	RVR 2000
SA	0852	W 2 X	1/2	0	F	152	68	07	06			998	R04VR06 SFC VSBY VR / 207 66 CHH R04NT 59142
RS	0750	W 2 X	1/2	0	F	153	68	07	06			999	R04VR24V28 SFC VSBY V2
RS	0850	W 2 X	1/2	0	F	159	69	07	08			000	R04VR10V12 SFC VSBY V2
SA	0922	W 3 X	3/4	1/4	F			09	08			000	R04VR35V50 SFC VSBY 3/4
SA	0950	W 3 X	3/4	1/4	F	159	69	07	09			000	R04VR35V45 SFC VSBY 3/4 / 107
SA	1034	W 4 X	1	+	F			15	08			000	R04VR75
SA	1050	W 4 X	1		F	159	71	08	08			000	R04VR55
SA	1130	-X M5 OVC	3	2	F			15	08			999	H7 SFC VSBY 3
SA	1150	-X M5 OVC	3	2	FH	156	77	09	08			999	H7 SFC VSBY 3
SA	1228	-X 5-OVC	3	2	H			13	09			998	H4 SFC VSBY 3
SA	1252	-X 5-OVC	4	2	H	152	80	07	09			998	H3 SFC VSBY 3 / 80' 1600 766
RS	0750	31232 81409 10267 20206 30142 40152 58407 70544 86600 337 10267 20189 =	3	2	H	149	78	08	11	10		997	H3 SFC VSBY 4
SA	1350	-X 8-BKN	4	2	H	146	77	09	11			996	H2
SA	1452	-X 8-SCT	3		H	139	72	07	09	12		994	H4 / 814
SA	1550	-X	1/2	1	H			09	13			994	H4 SFC VSBY 1 1/2
SA	1600	-X	1/4		FH			09	12			994	RVR 2000 VSBY SUN 400' 2' H2 F6
SA	1651	-X	1/4		FH	139	68	07	08	11		994	R04VR08V35 F9
SA	1735	-X M1 BKN	1/4		F			07	11			993	R04VR10V35 F7
SA	1754	-X M1 BKN	1/4		F	136	67	06	07	11		993	R04VR14V45 F7
SA	1851	-X M1 BKN	1/2		F	134	68	06	09			994	R04VR28V50 F7 / 500 1600 30 CHH R04T 61141
RS	0750	31109 60609 10100 20184 30134 40134 55000 70441 87600 337 10267 20189 =	1		F	142	69	06	06			995	R04VR60 F4
SA	0817	-X 3 SCT M13 OVC	3		F			06	06			996	F3
SA	0853	-X 3 SCT M13 BKN	3		F	149	69	06	06			997	F3
SA	0916	-X 12 SCT	4		F			10	04			997	F4
SA	0953	-X M3 BKN	4		F	149	70	05	11	06		997	F4 / 110 1600
SA	1004	-X M4 BKN	2		F			18	06			998	F2
SA	1050	-X M4 OVC	1/2	1	FH	149	69	07	08			997	F3 1100000 SFC VSBY 1/2
SA	1050	-X M4 OVC	1		FH	152	71	08	22	09		998	F3 RVR 2000

A synoptic observation using WMO code "412-VII" as described in FMM-2, is entered on line following related Bear observation.

FM12-VII: IIII -X,XYV Neat 1s,TTT 2s,TdTd 3P,PoPo,Po 4PPPP Seapp 6RRR, 7uuW,W2 Bb,C,LCuCH plus regional and national data groups.
SUPERSEDES WF 1-2A 11-12B WHICH MAY BE USED. U.S.G.P.O. 1986-0-700-0200000

TIME		SEA AND CEILING (Number of Feet)	VISIBILITY (Miles)	WEATHER AND OBSTRUCTIONS TO VISION	SEA LEVEL PRESSURE	TEMPERATURE AT SURFACE	WIND DIRECTION SPEED	WIND GUSTS	ALTITUDE CORRECTION	REMARKS AND SUPPLEMENTAL CODES DATA	CORRECTION
LOCAL	GMT										
0000	0000	100 SCT 200 SCT	15		29.56	53	21	108	017	808 1051 76	JW
0054	0054	250 -SCT	15		29.63	53	23	109	014		JW
0150	0150	250 -BRN	15		29.65	53	25	107	014	FEW AC / 98886	JW
0254	0254	100 SCT 200 SCT	15		29.64	53	22	09	013	610 1051	JW
0350	0350	100 SCT 200 -BRN	15		29.65	53	23	09	013		JW
0454	0454	100 SCT 200 -BRN	15		29.69	54	30	10	013		JW
0550	0550	100 SCT 250 BRN	15		29.72	55	30	10	013	603 1051 64 CUN RADAT 55131	TE
0654	0654	250 -SCT	15		29.75	56	27	11	011		TE
0750	0750	350 -SCT	15		29.71	57	24	09	010		TE
0854	0854	150 SCT 250 SCT	15		29.84	57	31	11	007	612 1071	TE
0950	0950	150 SCT	15		29.86	57	29	11	007		TE
1054	1054	150 SCT	15		29.88	57	27	05	007		TE
1150	1150	150 SCT 250 SCT	15		29.90	60	26	08	000	830 1051 64	TE
1254	1254	150 SCT 250 BRN	15		29.91	60	27	08	000	830 1051 64	TE
1350	1350	150 SCT 250 -BRN	15		29.92	60	28	12	000		TE
1454	1454	250 -BRN	15		29.93	61	30	15	000	024 420 / 720 1008	GB
1550	1550	250 -OVC	15		29.94	61	27	14	000	024 420 WND 28Y32	GB
1654	1654	250 -OVC	15		29.96	61	29	14	000	024 420 WND 24Y31	GB
1750	1750	250 -OVC	15		29.95	62	27	11	000	503 06 93	GB
1854	1854	E 250 OVC	5		29.96	62	29	10	000	024 420 WND 28Y32	GB
1950	1950	E 220 OVC	10		29.94	64	27	11	000		GB
2054	2054	E 200 OVC	10		29.93	64	27	12	000	207 1006 WND RADAT 52136	GB
2150	2150	SCT SCT E 200 OVC	10		29.92	64	28	10	000		JW
2254	2254	1700 BRN 200 OVC	10		29.91	65	30	15	000		JW

A sample observation using WMO code FM12-VII, as described in P-MN-2, is entered on line following related Basic observation.

FM12-VII: IIII R12HYV HddI 12hTTT 24hTdTdTd 3P0P0P0P0 4PPPP 5pppp 6RRRrRg 7mmW1W2 8hCLCwCh plus regional and national data groups.
 SUPERSEDES MP 1, MAIL 1-8 08H CH MAY OR USED. U.S.G.P.O. 1985-6-754-025-0008