

# CAPE COD COMMISSION

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1991

## ANALYSIS AND CONCEPTUAL IMPROVEMENTS

INTERSECTION OF TRAINING FIELD ROAD AND OLD QUEEN ANNE ROAD

CHATHAM, MASSACHUSETTS

\*\*\* Draft Report \*\*\*

by the

Cape Cod Commission

Transportation Staff

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Prepared in cooperation with the Massachusetts Department of  
Public Works and the United States Department of Transportation,  
Federal Highway Administration.

## EXECUTIVE SUMMARY

This report examines the intersection of Old Queen Anne Road and Training Field Road in Chatham, Massachusetts. Existing conditions were documented and conceptual improvements were developed. The level of detail in the report was possible because of the assistance of the Commission's traffic engineering intern, John W. Diaz. Mr. Diaz's internship is part of a graduate fellowship sponsored by the Federal Highway Administration through the University of Massachusetts at Amherst. The Cape Cod Commission ordinarily does not provide such detailed plans.

The proposed improvement involves a minor realignment of both Old Queen Anne Road and Training Field Road in order to eliminate confusion, improve safety, and correct the hierarchy of traffic flows through the intersection. The realignment consists of straightening the curve in Old Queen Anne Road and bringing Training Field Road into the intersection at a right angle. The curvature and width of the realigned roads would remain consistent with the rural character of Chatham's local roadways. Every effort was made to minimize disruption of adjacent woodland.

The plans provided in this report are strictly conceptual and should not be mistaken for engineering plans. A complete survey and detailed engineering drawings will be needed before implementation. These plans should be used to address issues **before** detailed engineering plans are developed. For further details or questions regarding this report contact Cornelius Andres of the transportation staff.

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3	Town of Chatham Assessors' Map
4	Existing Turning Movement Counts
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6	Turning Movements - Realigned Intersection

## **INTRODUCTION**

This report examines the existing condition and operation of the intersection of Old Queen Anne Road and Training Field Road in Chatham, Massachusetts. The study was requested by the Chatham Police Chief, Barry D. Eldredge, in a letter dated December 13, 1991. The results of the study are short term, medium term, and conceptual long term improvements to increase safety and efficiency at this intersection.

## **BACKGROUND**

Old Queen Anne Road and Training Field Road are old Cape roadways which appear on the 1858 Barnstable County Map. While the characteristics of the traffic passing through this intersection have changed considerably from horse and wagon days, the intersection geometry has not. The current operation of this intersection is inefficient and can be improved.

Old Queen Anne Road is a two lane roadway which runs from the Harwich/Chatham town line to Route 28 (Main Street) in Chatham. It is classified as a Rural Primary route by the Massachusetts Department of Public Works. Training Field Road is a two lane roadway which runs from Route 28 (Orleans Road) near the Harwich/Chatham town line to its intersection with Old Queen Anne Road. Figure 1, the intersection Location Map, illustrates the location of these roadways. Old Queen Anne Road is curving at this intersection. Training Field Road constitutes an extension of the eastern leg's tangent.

## **EXISTING CONDITIONS**

The Old Queen Anne/Training Field intersection is presently controlled by a yield sign on the western leg of Old Queen Anne Road. Training Field Road and the eastern leg of Old Queen Anne Road are currently treated as the major road. Turning movement counts, however, indicate that Training Field Road is the minor roadway. Restrictive sight distance along Queen Anne Road, however, prohibits relocation of the yield control or the placement of a stop sign at the Training Field Road approach.

Sight distance at this intersection is currently restricted by horizontal and vertical alignment. The combination of the horizontal curve in Old Queen Anne Road, a crest vertical curve south of the intersection, and an earth bank along the inside of the curve in Old Queen Anne Road cause the sight distance restrictions. Due to the present curvature of Old Queen Anne Road, sight distance cannot be increased significantly without removal of vegetation, grading, and relocation of utilities.

**Pavement condition.** Training Field Road is a hot-mix asphalt concrete roadway which is presently in good condition. Old Queen Anne Road is also constructed of hot-mix asphalt concrete. Although the riding quality of Old Queen Anne Road is still good, there is a substantial amount of load related cracking present. Geometric improvements to the intersection should be coordinated with the eventual rehabilitation of this roadway.

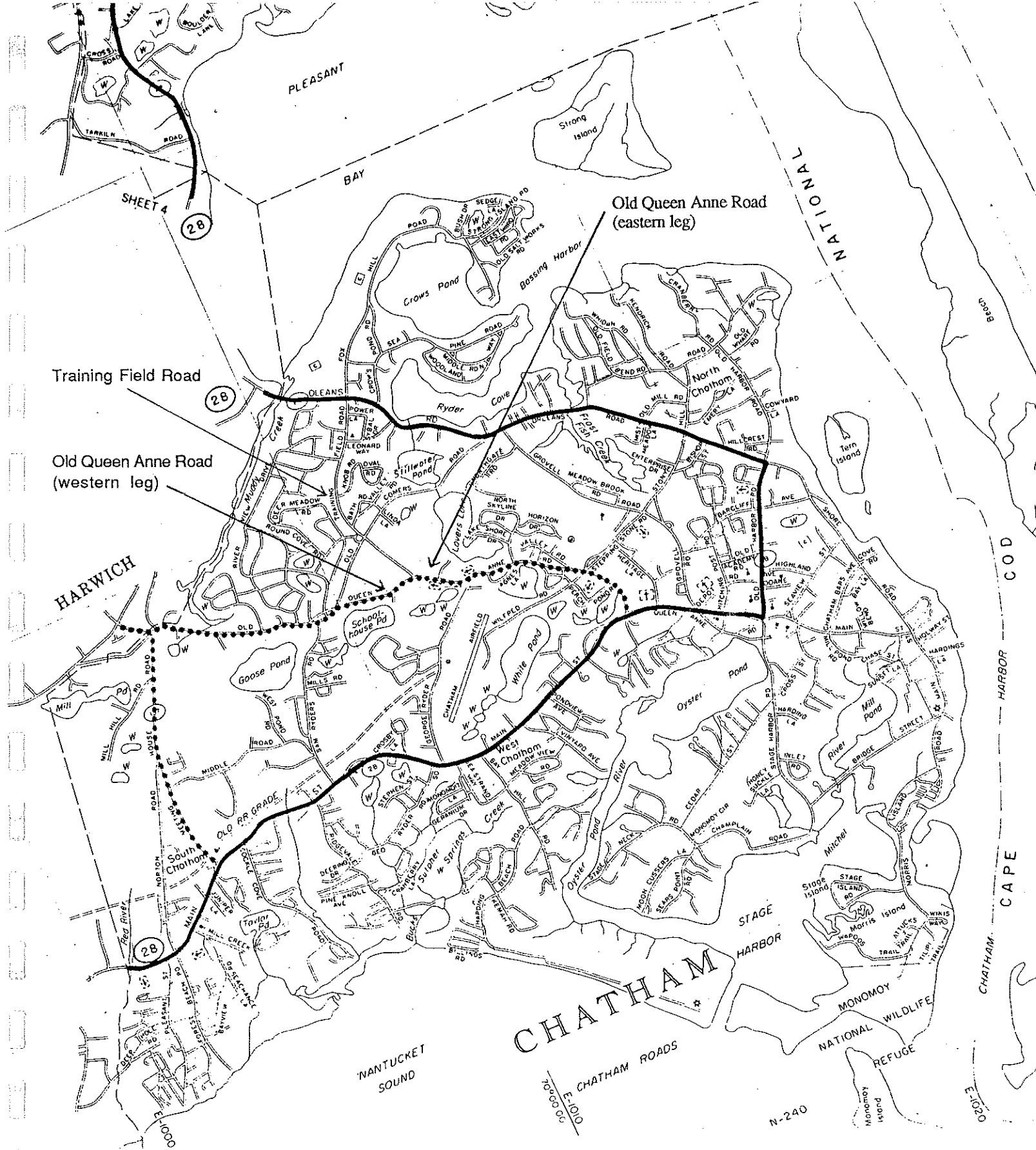


Figure 1 Intersection Location Map

From MDPW Federal-Aid Highway System Atlas

**Utilities.** Utilities present at the intersection are electric, water, gas, and underground telephone. Utility locations are shown in Figure 2.

**Land Use.** Land adjacent to the intersection is largely undeveloped. There are only two curb cuts nearby. One is for a residential driveway. The other is for a small parking area on a conservation site. The ownership of land near the intersection is shown in Figure 3, a Town of Chatham Assessors' Map.

#### **TRAFFIC VOLUMES**

AM and PM peak hour turning movement counts are summarized in Figure 4. The raw counts are contained in the Appendix. These counts indicate that Queen Anne Road is the major roadway at this intersection. The next highest volumes are between Training Field Road and the eastern leg of Old Queen Anne Road. The volume between Training Field Road and the Western leg of Old Queen Anne road was very light. It consisted primarily of people who appeared to be lost.

**Level of Service.** The operation of unsignalized intersections can be characterized using a qualitative scale which ranges from level of service (LOS) A to F. This scale, which was developed by the Transportation Research Board, is similar to the grading system used by schools. The intersection of Old Queen Anne Road and Training Field Road currently operates at LOS A. LOS analysis worksheets are contained in the Appendix.

#### **SPEED STUDY**

Speed studies were conducted on Training Field Road and Old Queen Anne Road. The studies were conducted with GK 5000 traffic recorders. This information was necessary to ensure adequate sight distance at the intersection. The results are contained in the Appendix and summarized in Table 1.

Table 1	Speed Study Results		
	Posted speed	Average speed	85% speed
Road			
Old Queen Anne	40	40	43
Training Field	35	39	48

The results indicate that many vehicles travel at a relatively high rate of speed along these local collector roadways. Inspection of Figure 1, the location map, confirms that the geographic location of these roadways, coupled with congestion along Route 28, leads to the use of these roadways for through trips. The speed of the many vehicles along Training Field Road is probably high because this roadway is straight and has few curb cuts.

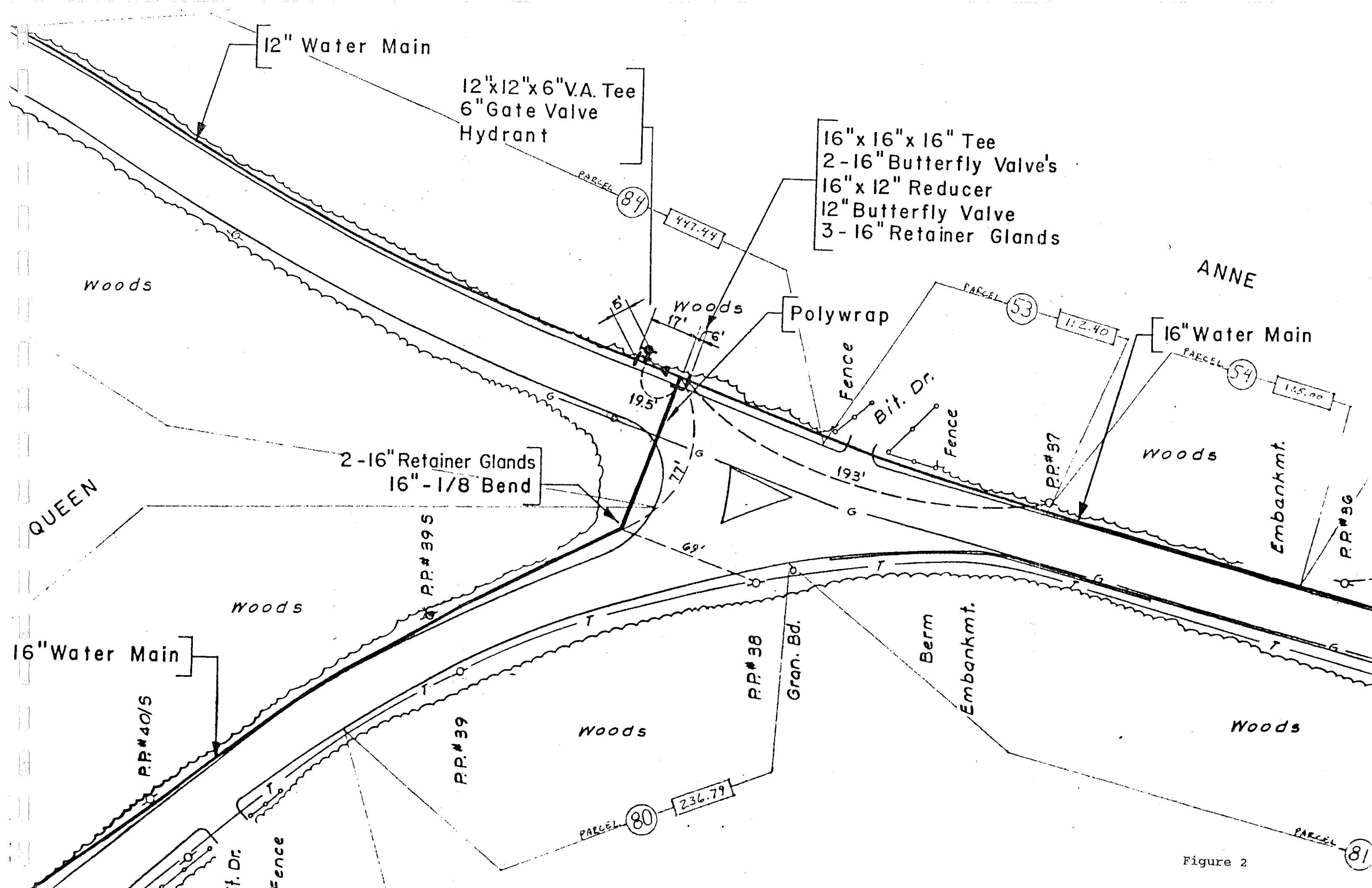


Figure 2



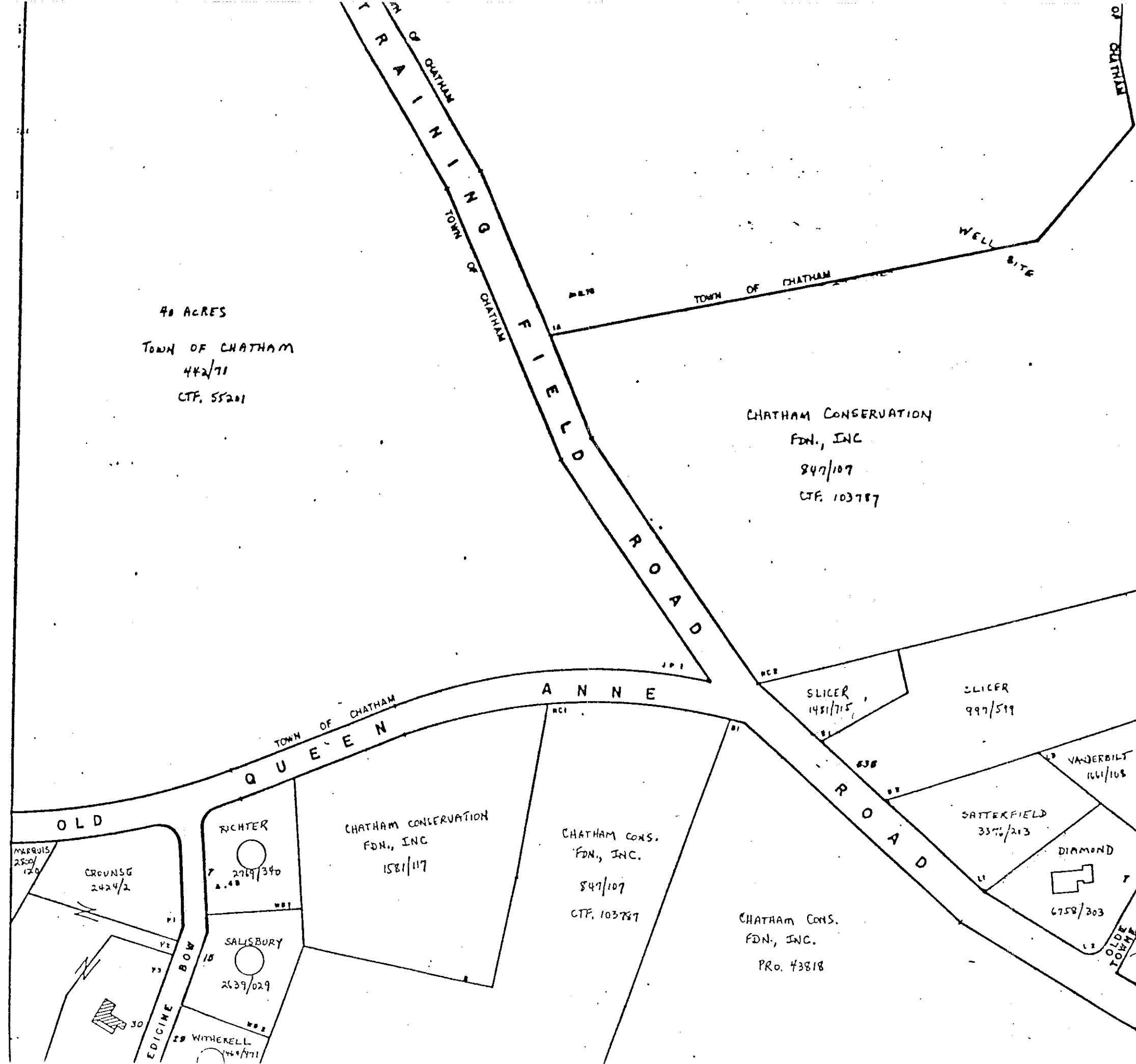


Figure 3

## EXISTING CONDITIONS

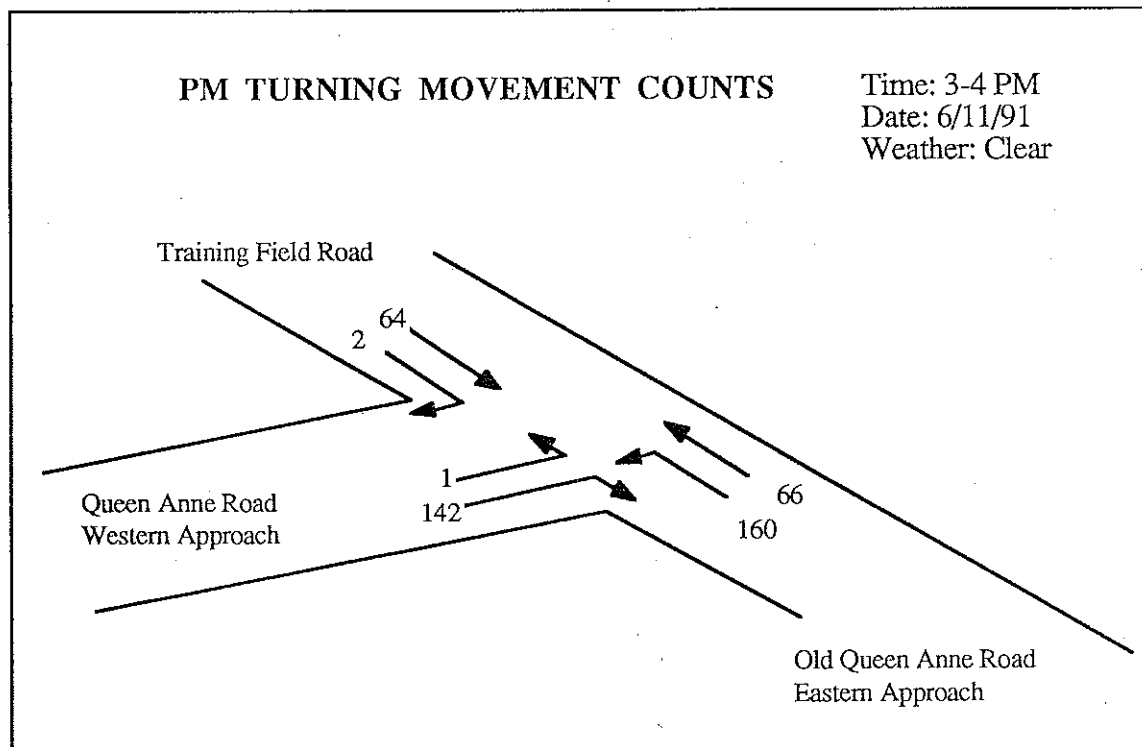
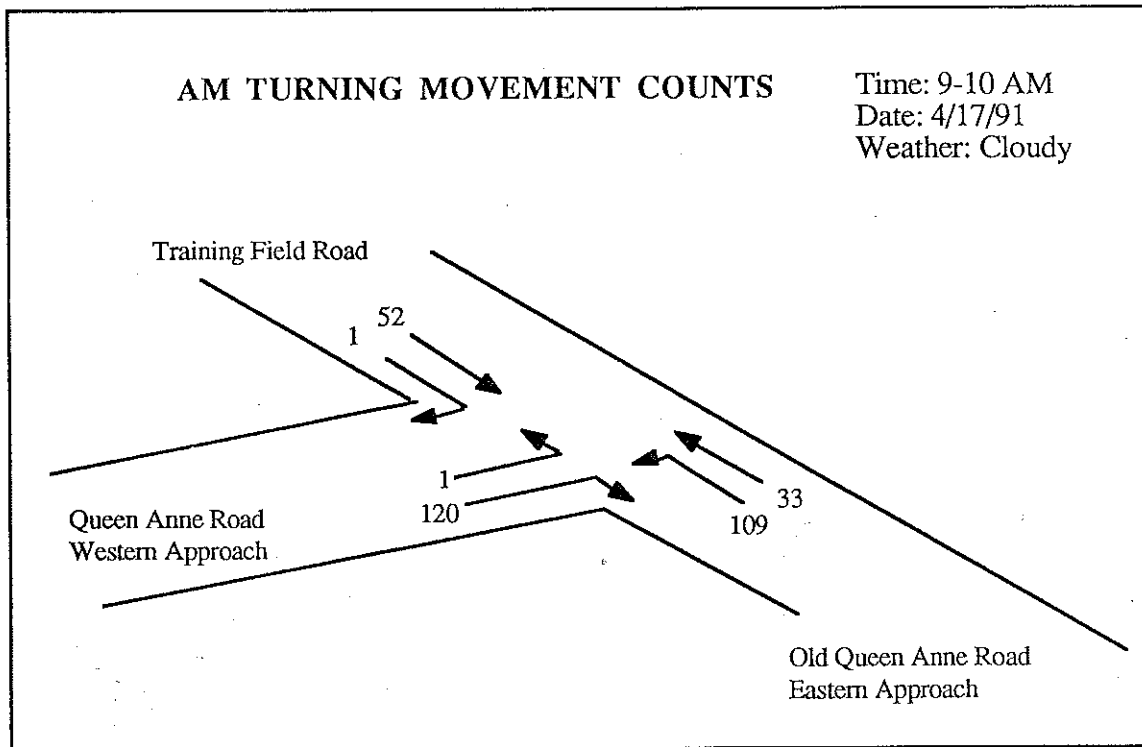


Figure 4

## ACCIDENT ANALYSIS

The transportation staff was supplied with accident data for 1990 by the Chatham Police Chief. These data indicated that there were three accidents at this intersection in 1990. The cause of one of the accidents was unclear because the vehicle(s) left the scene. The other two were rear end accidents on the western leg of Old Queen Anne Road, the approach which is controlled by a yield sign. Observation of the intersection indicated that drivers approaching from the western leg of Old Queen Anne Road were looking over their shoulders (because of the acute intersection angle) to see if the Training Field Road approach was clear. Some drivers would approach the intersection at fairly high speeds and then break rapidly at the last minute if they saw a conflicting vehicle. Several drivers which approached the intersection from Training Field Road appeared uncertain of who had the right of way.

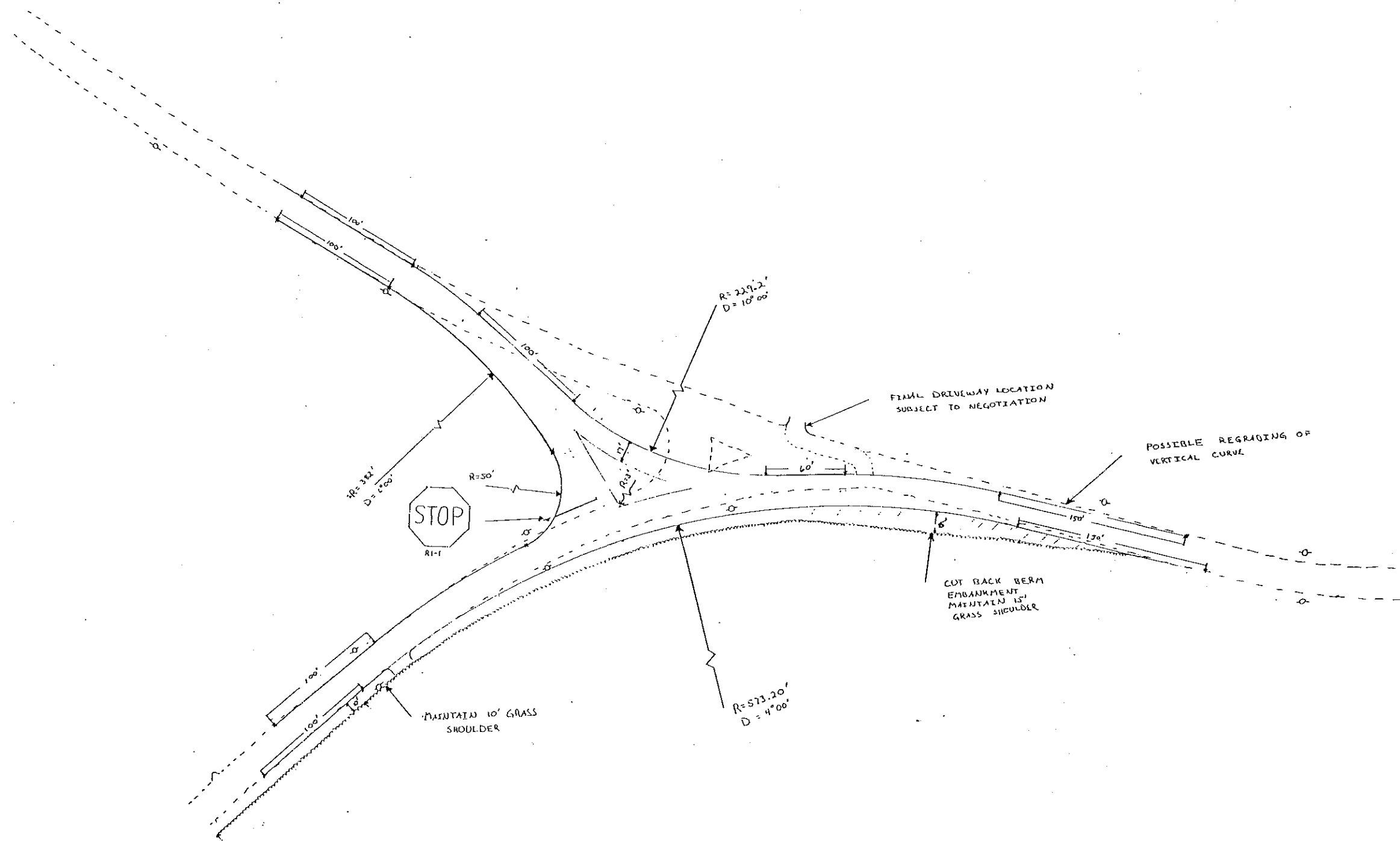
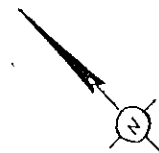
Another disturbing aspect of the operation of this intersection was the maneuver of turning from the eastern leg of Old Queen Anne Road to the western leg of Old Queen Anne Road. Sight distances of vehicles attempting this maneuver are restricted. Several vehicles were observed to abort an attempt at this maneuver when a conflicting vehicle from Training Field Road was spotted. They would then proceed down Training Field road, go around the island, and use the turning roadway to enter the western leg of old Queen Anne Road.

## PROPOSED IMPROVEMENTS

**Long Term.** The long term solution to improving the operation of this intersection is to realign Training Field Road so that it enters Old Queen Anne Road at a right angle. This improvement should be coordinated with the eventual rehabilitation of Old Queen Anne Road. A conceptual plan is illustrated in figure 5.

Implementation of this plan will require a minor realignment of Old Queen Anne Road. It would also entail grading and/or clearing of vegetation along the inside of the curve in this roadway in order to ensure adequate sight distance at the intersection. The plans used for this analysis did not show how the roadways fit inside the rights of way. A detailed survey, therefore, will be required to determine if a land taking or swap (land will become available on the other side of the road) will be necessary. A grading easement from the Chatham Conservation Foundation, however, will probably be required.

Turning movement diagrams for the proposed improvement are shown in figure 6. As can be seen by this figure, the plan would favor the major traffic flows using these roadways. Traffic along Old Queen Anne Road would no longer have to yield to a minor flow. The right-turning movements from the eastern leg of Old Queen Anne Road to Training Field Road would still flow continuously along a diagonal road. There would be degradation of the flow between Training Field Road and the eastern leg of Old Queen Anne Road. This traffic would now have to stop. The loss of



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CAPE COD COMMISSION  
BARNSTABLE, MASS

ORIGINAL FULL SIZE DRAWING=4"  
REPRODUCTIONS MAY BE REDUCED

SCALE: 1"=40' DATE: JUNE, 1991 SHEET 1 OF 1

CONCEPTUAL IMPROVEMENTS

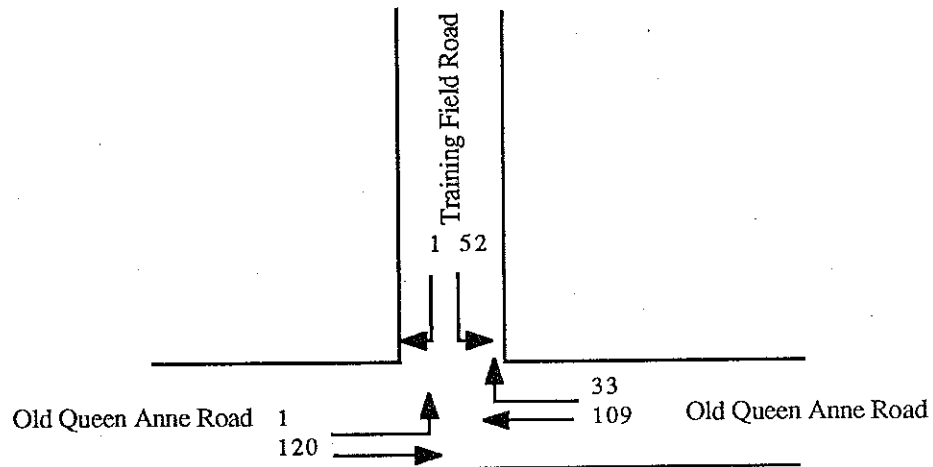
CHATHAM, MASS. Figure 5

TRAINING FIELD ROAD AND  
OLD QUEEN ANNE ROAD

# CONCEPTUAL IMPROVEMENTS

## AM TURNING MOVEMENT COUNTS

Traffic Volumes Based on Figure 4



## PM TURNING MOVEMENT COUNTS

Traffic Volumes Based on Figure 4

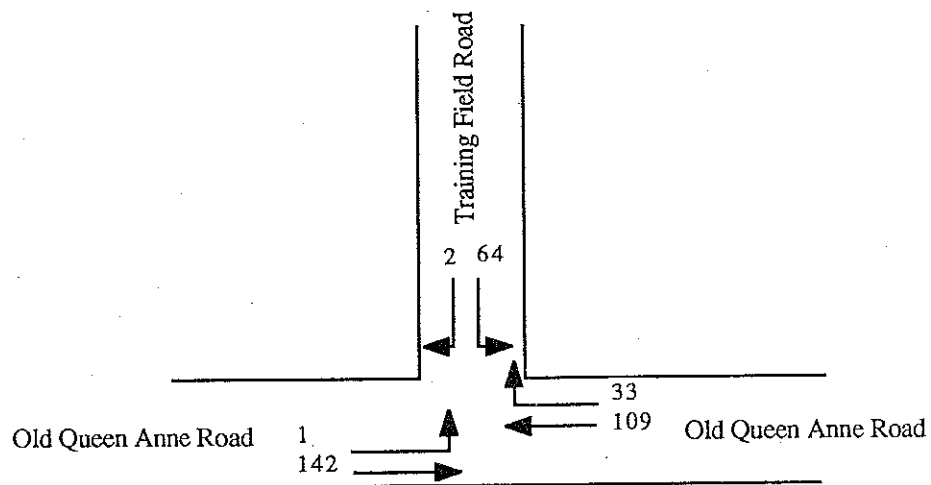


Figure 6

efficiency for this flow, however, would be more than offset by increases in efficiency for the major flows. This intersection configuration would operate at LOS A, like the present configuration, but would offer a higher level of safety.

**Medium Term.** Medium term improvements should include finalizing the plans for the long term improvements. After long term improvements are finalized, utility poles, underground telephone lines, and possibly gas lines can be relocated (implementation of the final plan should not require relocation of water mains). Shoulders along the inside of the curve in Old Queen Anne Road could then be graded. Provision of a shoulder, instead of an embankment, would provide an escape zone for drivers who follow too closely behind vehicles which suddenly brake in order to yield.

**Short Term.** Short term improvements should consist of clearing vegetation away from signs and from the town owned land in the northwest quadrant of the intersection. This will allow drivers on the western leg of Old Queen Anne road to see vehicles approaching the intersection from Training Field Road thus providing needed decision time for yielding, if required. Brush in this area should be mowed at least once a year in order to maintain visibility.

#### **CONCLUSIONS**

Safety and efficiency at the Old Queen Anne/Training Field Road intersection can be improved by correcting the hierarchy of traffic flows and improving sight distance. Currently, the western leg of Old Queen Anne Road, a major traffic flow, must yield to a minor traffic flow, Training Field Road. This situation was caused by the archaic evolution of this intersection. In order to correct this situation and provide safe sight distance, this intersection should be realigned.

Realignment should be concurrent with the anticipated rehabilitation of Old Queen Anne Road. The realignment does not need to be a complete straightening and widening of this roadway. It can be consistent with the rural character of Chatham and the curvature of the rest of this roadway yet still provide adequate sight distance. The provision of adequate sight distance is especially important given the current running speeds on these collector roadways and Chatham's relatively high percentage of nonresident and elderly drivers.

In the mean time, trees should be trimmed and brush mowed so that drivers approaching the intersection from the western leg of Old Queen Anne Road can see if they must yield to vehicles approaching from Training Field Road. Final design work on the intersection should be started as soon as possible. Please contact Cornelius Andres of the transportation staff with any questions or comments regarding this report.

TURNING MOVEMENT COUNTS

## APPENDIX

1. Turning Movement Counts  
    AM  
    PM
2. Speed Study Data  
    Old Queen Anne Road  
    Training Field Road
3. Level of Service Analysis Worksheets  
    Present Alignment  
    Conceptual Improvement
4. Accident Reports



## Cape Cod Commission

Site Code : 12345678

N-S Street: Training Field Road

E-W Street: Old Queen Anne Road

Weather : Cloudy

Movements by: Primary

PAGE: 1

FILE: cntam

DATE: 4/17/91

Time Begin	From North			From East			From West			From North			Vehicle Total
	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
9:00 AM	0	0	0	0	6	29	33	0	0	0	11	0	79
9:15	0	0	0	0	5	26	36	0	1	0	14	0	82
9:30	0	0	0	0	11	35	22	0	0	1	11	0	80
9:45	0	0	0	0	11	19	29	0	0	0	16	0	75
HR TOTAL	0	0	0	0	33	109	120	0	1	1	52	0	316

DAY TOTAL	0	0	0	0	33	109	120	0	1	1	52	0	316
-----------	---	---	---	---	----	-----	-----	---	---	---	----	---	-----

## PEAK PERIOD ANALYSIS FOR THE PERIOD: 9:00 AM - 10:00 AM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	..... VOLUMES .....				.... PERCENTS ....		
			Right	Thru	Left	Total	Right	Thru	Left
North	12:00 AM	0.00	0	0	0	0	0	0	0
East	9:00 AM	0.77	0	33	109	142	0	23	77
South	9:00 AM	0.82	120	0	1	121	99	0	1
West	9:00 AM	0.83	1	52	0	53	2	98	0

## Entire Intersection

North	9:00 AM	0.00	0	0	0	0	0	0	0
East		0.77	0	33	109	142	0	23	77
South		0.82	120	0	1	121	99	0	1
West		0.83	1	52	0	53	2	98	0

SITE CODE : SPEED COUNTS

Cape Cod Commission

PAGE: 1

FILE: CTRAININ

Location : Training Field Road Chatham

Weather : Cloudy/Rain/Sunny

DATE: 4/17/91

Operator : GO/NA

TIME BEGIN	TOTAL COUNTED	SPEED RANGES (MPH)												AVERAGE (MPH)	
		0-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	70+	
11:00	14	0	0	2	1	4	4	3	0	0	0	0	0	0	34
12:00 PM	87	0	0	1	8	22	21	8	20	7	0	0	0	0	39
1:00	100	0	0	1	8	21	19	26	16	9	0	0	0	0	40
2:00	90	0	0	1	13	31	17	11	11	6	0	0	0	0	37
3:00	85	0	0	0	11	27	16	18	6	7	0	0	0	0	38
4:00	93	0	0	0	16	27	17	18	14	1	0	0	0	0	37
5:00	107	0	0	3	14	16	16	18	24	16	0	0	0	0	40
6:00	87	0	0	0	6	33	15	11	13	9	0	0	0	0	39
7:00	57	0	0	0	2	17	7	10	15	6	0	0	0	0	41
8:00	43	0	0	0	7	11	8	7	7	3	0	0	0	0	38
9:00	19	0	0	0	2	5	5	1	5	1	0	0	0	0	39
10:00	7	0	0	0	1	2	1	1	2	0	0	0	0	0	38
11:00	9	0	0	0	0	0	3	3	2	1	0	0	0	0	43
-----															
DAY TOTAL	798	0	0	8	89	216	149	135	135	66	0	0	0	0	

SITE CODE : Chatham Mass

Cape Cod Commission

PAGE: 1

Location : Training Field Rd N of Old Corners

FILE: training

Weather : Cloudy/Rain/Sunny

DATE: 4/15/91

Operator : GO/NA

TIME BEGIN	MONDAY 15	TUESDAY 16	WEDNESDAY 17	THURSDAY 18	FRIDAY 19	WEEKDAY AVERAGE	SATURDAY 20	SUNDAY 21	WEEK AVERAGE
12:00 AM	*	*	*	4	12	8	*	*	8
1:00	*	*	*	3	1	2	*	*	2
2:00	*	*	*	0	1	0	*	*	0
3:00	*	*	*	1	0	0	*	*	0
4:00	*	*	*	0	0	0	*	*	0
5:00	*	*	*	1	2	1	*	*	1
6:00	*	*	*	4	6	5	*	*	5
7:00	*	*	*	13	22	17	*	*	17
8:00	*	*	*	39	45	42	*	*	42
9:00	*	*	*	71	68	69	*	*	69
10:00	*	*	*	73	79	76	*	*	76
11:00	*	*	*	86	102	94	*	*	94
12:00 PM	*	*	87	92	111	96	*	*	96
1:00	*	*	101	92	*	96	*	*	96
2:00	*	*	91	101	*	96	*	*	96
3:00	*	*	85	95	*	90	*	*	90
4:00	*	*	94	104	*	99	*	*	99
5:00	*	*	108	104	*	106	*	*	106
6:00	*	*	87	88	*	87	*	*	87
7:00	*	*	57	73	*	65	*	*	65
8:00	*	*	44	40	*	42	*	*	42
9:00	*	*	19	34	*	26	*	*	26
10:00	*	*	7	15	*	11	*	*	11
11:00	*	*	9	6	*	7	*	*	7
TOTALS	*	*	789	1139	449	1135	*	*	1135
% AVG WKDAY	*	*	69.5	100.4	39.6		*	*	
% AVG DAY	*	*	69.5	100.4	39.6				
AM PEAK HR	*	*	*	11:00	11:00	11:00	*	*	11:00
VOLUME	*	*	*	86	102	94	*	*	94
PM PEAK HR	*	*	17:00	16:00	12:00	17:00	*	*	17:00
VOLUME	*	*	108	104	111	106	*	*	106

SITE CODE : SPEED COUNTS

Cape Cod Commission

PAGE: 1

Location : Old Queen Anne Rd-E Old Comer

FILE: speedoqa

Weather : RAIN/SUN/SUN

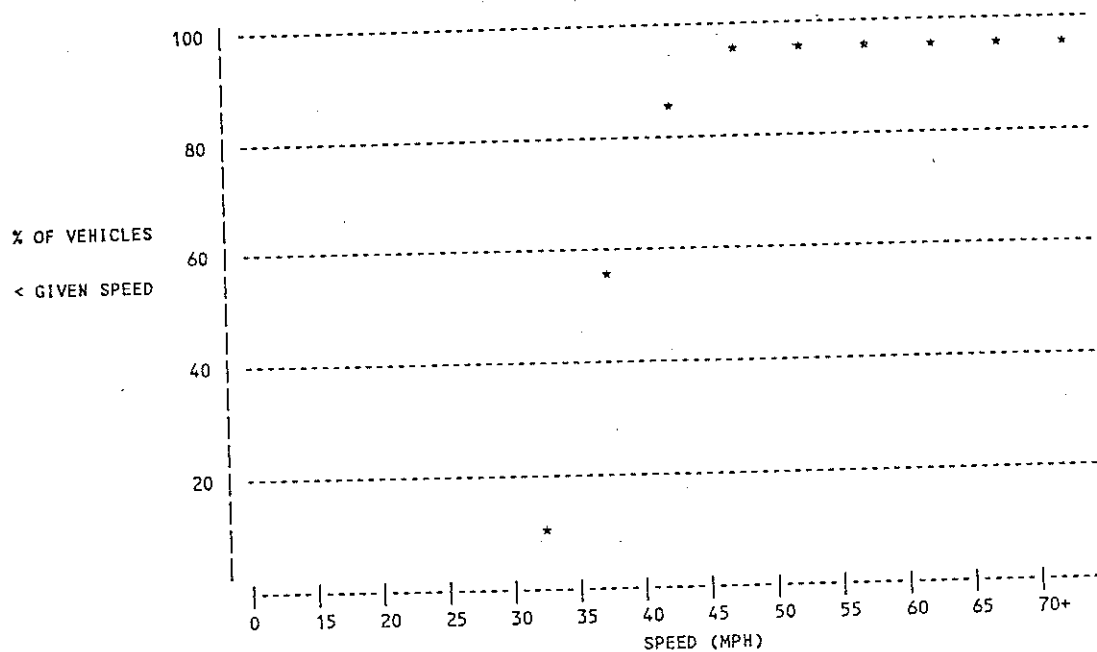
DATE: 2/20/91

Operator : GO/NA

PLOT OF SPEED DATA

FROM: 2/20/91 3:00 PM

TO: 2/22/91 2:00 PM



SPEED DATA STATISTICS

Average speed of all vehicles - 40 MPH  
Median speed (50th) - 38 MPH  
85th Percentile Speed - 43 MPH  
15th Percentile Speed - 38 MPH  
Number of vehicles > 55 MPH - 0  
Per Cent vehicles > 55 MPH - 0 %  
Pace Speed (10 MPH) - 36 - 45  
Per Cent vehicles in pace - 76 %

SITE CODE : SPEED COUNTS  
Location : Old Queen Anne Rd-E Old Comer  
Weather : RAIN/SUN/SUN  
Operator : GO/NA

Cape Cod Commission

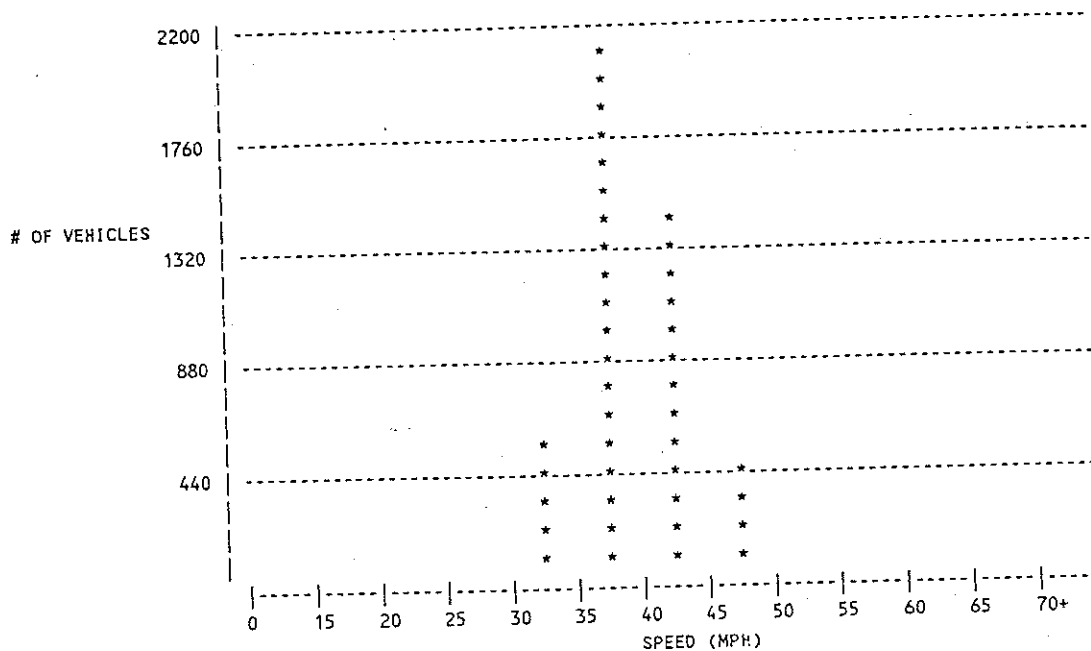
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FILE: speedoqa

DATE: 2/20/91

PLOT OF SPEED DATA

FROM: 2/20/91 3:00 PM

TO: 2/22/91 2:00 PM



SPEED DATA STATISTICS

Average speed of all vehicles - 40 MPH  
Median speed (50th) - 38 MPH  
85th Percentile Speed - 43 MPH  
15th Percentile Speed - 38 MPH  
Number of vehicles > 55 MPH - 0  
Per Cent vehicles > 55 MPH - 0 %  
Pace Speed (10 MPH) - 36 - 45  
Per Cent vehicles in pace - 76 %

SITE CODE : SPEED COUNTS

Cape Cod Commission

PAGE: 3

FILE: speedoqs

Location : Old Queen Anne Rd-E Old Comer

Weather : RAIN/SUN/SUN

DATE: 2/22/91

Operator : GO/NA

SPEED RANGES (MPH)															AVERAGE
TIME	TOTAL	0-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	70+	(MPH)
BEGIN	COUNTED														
12:00 AM	9	0	0	0	0	1	5	3	0	0	0	0	0	0	39
1:00	6	0	0	0	0	1	4	1	0	0	0	0	0	0	38
2:00	1	0	0	0	0	0	0	1	0	0	0	0	0	0	43
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	6	0	0	0	1	1	3	1	0	0	0	0	0	0	36
5:00	13	0	0	0	0	1	7	4	1	0	0	0	0	0	39
6:00	52	0	0	0	0	7	20	15	9	1	0	0	0	0	40
7:00	139	0	0	0	0	11	63	47	17	1	0	0	0	0	40
8:00	192	0	0	0	1	15	91	67	16	1	0	0	0	0	40
9:00	162	0	0	0	2	20	67	45	25	3	0	0	0	0	40
10:00	170	0	0	0	1	16	73	59	20	1	0	0	0	0	39
11:00	196	0	0	0	1	22	100	55	16	2	0	0	0	0	40
12:00 PM	222	0	0	0	0	14	94	84	29	1	0	0	0	0	39
1:00	234	0	0	0	3	32	116	65	16	2	0	0	0	0	39
2:00	201	0	0	1	4	25	83	60	28	0	0	0	0	0	39
DAY TOTAL	1603	0	0	1	13	166	726	507	177	12	0	0	0	0	

SITE CODE : SPEED COUNTS

Cape Cod Commission

PAGE: 2

Location : Old Queen Anne Rd-E Old Comer

FILE: speedoqa

Weather : RAIN/SUN/SUN

DATE: 2/21/91

Operator : GO/NA

TIME BEGIN	TOTAL COUNTED	SPEED RANGES (MPH)												AVERAGE (MPH)	
		0-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	70+	
12:00 AM	3	0	0	0	0	0	2	0	1	0	0	0	0	0	41
1:00	5	0	0	0	0	1	1	1	2	0	0	0	0	0	42
2:00	7	0	0	0	1	0	2	3	1	0	0	0	0	0	40
3:00	8	0	0	0	0	2	5	1	0	0	0	0	0	0	37
4:00	6	0	0	0	0	0	3	2	1	0	0	0	0	0	41
5:00	7	0	0	0	0	0	2	4	1	0	0	0	0	0	42
6:00	30	0	0	0	0	3	12	8	5	2	0	0	0	0	41
7:00	131	0	0	0	0	9	55	43	19	5	0	0	0	0	41
8:00	159	1	1	1	1	11	67	51	24	2	0	0	0	0	40
9:00	184	0	0	0	1	22	82	58	18	3	0	0	0	0	40
10:00	177	0	0	0	1	16	77	53	26	4	0	0	0	0	40
11:00	202	0	0	0	1	22	93	64	19	3	0	0	0	0	40
12:00 PM	196	0	0	0	4	20	81	66	22	3	0	0	0	0	39
1:00	192	0	0	0	1	31	82	55	22	1	0	0	0	0	39
2:00	201	0	0	1	1	32	88	63	15	1	0	0	0	0	40
3:00	237	0	0	0	2	18	121	73	22	1	0	0	0	0	39
4:00	218	0	0	1	1	19	114	66	17	0	0	0	0	0	39
5:00	175	0	0	1	1	24	78	50	18	3	0	0	0	0	39
6:00	95	0	0	0	0	18	43	29	5	0	0	0	0	0	39
7:00	63	0	0	0	1	9	31	14	8	0	0	0	0	0	40
8:00	35	0	0	0	0	3	17	10	5	0	0	0	0	0	39
9:00	37	0	0	0	0	4	20	10	3	0	0	0	0	0	40
10:00	34	0	0	0	1	2	16	10	5	0	0	0	0	0	38
11:00	16	0	0	0	1	2	8	3	2	0	0	0	0	0	
DAY TOTAL	2418	1	1	4	18	268	1100	737	261	28	0	0	0	0	

SITE CODE : SPEED COUNTS

Cape Cod Commission

PAGE: 1

Location : Old Queen Anne Rd-E Old Comer

FILE: speedoqa

Weather : RAIN/SUN/SUN

DATE: 2/20/91

Operator : GO/NA

TIME BEGIN	TOTAL COUNTED	SPEED RANGES (MPH)												AVERAGE (MPH)	
		0-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70		70+
3:00	170	0	1	1	3	40	66	44	15	0	0	0	0	0	38
4:00	210	1	0	1	1	17	107	68	15	0	0	0	0	0	39
5:00	140	0	0	0	2	19	58	52	9	0	0	0	0	0	39
6:00	93	0	0	0	1	12	47	25	8	0	0	0	0	0	40
7:00	68	0	0	0	1	7	31	21	8	0	0	0	0	0	39
8:00	36	0	0	0	0	6	18	9	3	0	0	0	0	0	39
9:00	40	0	0	0	0	8	17	10	5	0	0	0	0	0	40
10:00	27	0	0	0	0	5	8	12	2	0	0	0	0	0	41
11:00	18	0	0	0	1	0	6	7	4	0	0	0	0	0	

DAY TOTAL	802	1	1	2	9	114	358	248	69	0	0	0	0	0	
-----------	-----	---	---	---	---	-----	-----	-----	----	---	---	---	---	---	--



SITE CODE : CHATHAM

Cape Cod Commission

PAGE: 1

Location : Old Queen Anne-N of Old Comers

FILE: volumoqa

Weather : Rain/Sun

DATE: 2/18/91

Operator : EO/NA

TIME BEGIN	MONDAY 18	TUESDAY 19	WEDNESDAY 20	THURSDAY 21	FRIDAY 22	WEEKDAY AVERAGE	SATURDAY 23	SUNDAY 24	WEEK AVERAGE
12:00 AM	*	*	*	3	9	6	*	*	6
1:00	*	*	*	5	6	5	*	*	5
2:00	*	*	*	7	1	4	*	*	4
3:00	*	*	*	8	0	4	*	*	4
4:00	*	*	*	6	6	6	*	*	6
5:00	*	*	*	7	13	10	*	*	10
6:00	*	*	*	30	52	41	*	*	41
7:00	*	*	*	131	139	135	*	*	135
8:00	*	*	*	160	192	176	*	*	176
9:00	*	*	*	184	162	173	*	*	173
10:00	*	*	*	177	170	173	*	*	173
11:00	*	*	*	203	196	199	*	*	199
12:00 PM	*	*	*	197	222	209	*	*	209
1:00	*	*	*	192	234	213	*	*	213
2:00	*	*	*	201	201	201	*	*	201
3:00	*	*	171	237	*	204	*	*	204
4:00	*	*	210	218	*	214	*	*	214
5:00	*	*	142	175	*	158	*	*	158
6:00	*	*	93	95	*	94	*	*	94
7:00	*	*	69	63	*	66	*	*	66
8:00	*	*	38	36	*	37	*	*	37
9:00	*	*	41	37	*	39	*	*	39
10:00	*	*	27	34	*	30	*	*	30
11:00	*	*	18	19	*	18	*	*	18
TOTALS	*	*	809	2425	1603	2415	*	*	2415
% AVG WKDAY	*	*	33.5	100.4	66.4		*	*	
% AVG DAY	*	*	33.5	100.4	66.4				
AM PEAK HR	*	*	*	11:00	11:00	11:00	*	*	11:00
VOLUME	*	*	*	203	196	199	*	*	199
PM PEAK HR	*	*	16:00	15:00	13:00	16:00	*	*	16:00
VOLUME	*	*	210	237	234	214	*	*	214

SPEED STUDY DATA

## Cape Cod Commission

Site Code : 11111111

N-S Street: Training Field Road

E-W Street: Old Queen Anne Road

Weather : Clear

PAGE: 1

FILE: cntpm

Movements by: Primary

DATE: 6/11/91

Time Begin	From North			From East			From West			From North			Vehicle Total
	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
3:00 PM	0	0	0	0	21	39	40	0	1	0	21	0	122
3:15	0	0	0	0	18	45	36	0	0	0	10	0	109
3:30	0	0	0	0	11	42	31	0	0	2	18	0	104
3:45	0	0	0	0	16	34	35	0	0	0	15	0	100
HR TOTAL	0	0	0	0	66	160	142	0	1	2	64	0	435

DAY TOTAL	0	0	0	0	66	160	142	0	1	2	64	0	435
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## PEAK PERIOD ANALYSIS FOR THE PERIOD: 3:00 PM - 4:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	..... VOLUMES .....				.... PERCENTS ....		
			Right	Thru	Left	Total	Right	Thru	Left
North	12:00 AM	0.00	0	0	0	0	0	0	0
East	3:00 PM	0.90	0	66	160	226	0	29	71
South	3:00 PM	0.87	142	0	1	143	99	0	1
West	3:00 PM	0.79	2	64	0	66	3	97	0

## Entire Intersection

North	3:00 PM	0.00	0	0	0	0	0	0	0
East		0.90	0	66	160	226	0	29	71
South		0.87	142	0	1	143	99	0	1
West		0.79	2	64	0	66	3	97	0

## ACCIDENT REPORTS

DATE:05-22-1991

TIME:22:46:02

chmpr

STEP 3 LEFT TURNS FROM	C:Training Field
CONFLICTING FLOWS	259
CRITICAL GAPS	6.8
CAPACITY	647
ACTUAL CAPACITY	646

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	1	1123	1121	A	3.21	0.00
LT FROM C:	60	646	586	A	6.14	0.00
RT FROM C:	1	1067	1066	A	3.38	0.06

CINCH PROGRAM VERSION DATE 4-29-1988  
 1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)  
 DATE:05-22-1991 TIME:22:46:02  
 chimpr

LAST DATASETS LOADED OR SAVED  
 VOLUME=chimpr GEOMETRICS=cheor  
 KEY: A- -B

C

GENERAL CHARACTERISTICS  
 POPULATION GREATER THAN 250,000: YES  
 CONTROLS: FROM C: STOP  
 FROM C RT LANE: STOP  
 PREVAILING SPEED: 43 MPH  
 MAIN STREET # OF LANES: 2 LANES  
 MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: Y

MINOR STREET LANES  
 APPROACH: C: Training Field  
 SHARED LEFT AND RIGHT TURN LANE: NO  
 LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO  
 RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)  
 APPROACH A: Old Queen A B: Old Queen A C: Training Fi  
 LEFTS 0.00 0.00 0.00  
 THRS 0.00 0.00 0.00  
 RIGHTS 0.00 0.00 0.00

APPROACH	A: Old Queen A			B: Old Queen A			C: Training Fi		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	109	33	1	120	0	52	0	1
PHF	0.95			0.95			0.95		
ADJ VOLUME	0	115	35	1	126	0	55	0	1
PERCENT GRADE	0.00			0.00			0.00		
PASS CAR/HR	0			1			60 0 1		

STEP 1 RIGHT TURNS FROM C:Training Field  
 CONFLICTING FLOWS 115  
 CRITICAL GAPS 5.0  
 CAPACITY 1067  
 ACTUAL CAPACITY 1067

STEP 2 LEFT TURNS FROM B:Old Queen Anne  
 CONFLICTING FLOWS 115  
 CRITICAL GAPS 4.8  
 CAPACITY 1123  
 CAPACITY USED 0%  
 IMPEDANCE FACTOR 1.00  
 ACTUAL CAPACITY 1123

DATE:05-22-1991

TIME:22:44:03

chexist

STEP 3 LEFT TURNS FROM C:Old Queen Anne  
 CONFLICTING FLOWS 205  
 CRITICAL GAPS 6.1  
 CAPACITY 783  
 ACTUAL CAPACITY 730

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	126	1174	1048	A	3.44	0.12
ALL MOVES FROM C:	140	1284	1144	A	3.15	0.12

CINCH PROGRAM VERSION DATE 4-29-1988

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)

DATE:05-22-1991

TIME:22:44:03

chexist

LAST DATASETS LOADED OR SAVED

VOLUME=chexist GEOMETRICS=cheoex

KEY: A- -B

|  
C.

GENERAL CHARACTERISTICS

POPULATION GREATER THAN 250,000: YES

CONTROLS: FROM C: YIELD

PREVAILING SPEED: 46 MPH

MAIN STREET # OF LANES: 2 LANES

MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES

APPROACH: C: Old Queen Anne

SHARED LEFT AND RIGHT TURN LANE: YES

LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES

RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH A: Training Fi B: Old Queen A C: Old Queen A

LEFTS 0.00 0.00 0.00

THRUS 0.00 0.00 0.00

RIGHTS 0.00 0.00 0.00

APPROACH A: Training Fi B: Old Queen A C: Old Queen A

	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	52	1	109	33	0	1	0	120

PHF	0.95			0.95			0.95		
-----	------	--	--	------	--	--	------	--	--

ADJ VOLUME	0	55	1	115	35	0	1	0	126
------------	---	----	---	-----	----	---	---	---	-----

PERCENT GRADE	0.00			0.00			0.00		
---------------	------	--	--	------	--	--	------	--	--

PASS CAR/HR	0			126			1	0	139
-------------	---	--	--	-----	--	--	---	---	-----

STEP 1 RIGHT TURNS FROM C:Old Queen Anne

CONFLICTING FLOWS 55

CRITICAL GAPS 4.3

CAPACITY 1292

ACTUAL CAPACITY 1292

STEP 2 LEFT TURNS FROM B:Old Queen Anne

CONFLICTING FLOWS 56

CRITICAL GAPS 4.8

CAPACITY 1174

CAPACITY USED 11%

IMPEDANCE FACTOR 0.93

ACTUAL CAPACITY 1174



LEVEL OF SERVICE ANALYSIS WORKSHEETS

SITE CODE : SPEED COUNTS  
Location : Training Field Road Chatham  
Weather : Cloudy/Rain/Sunny  
Operator : GO/NA

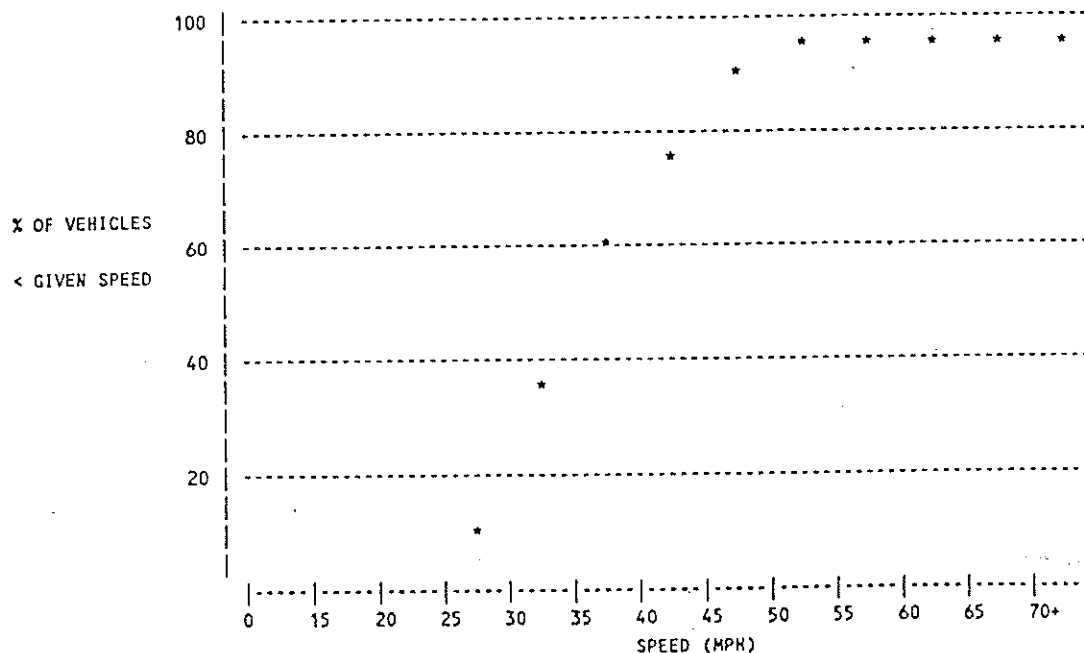
Cape Cod Commission

PAGE: 1  
FILE: CTRAIN1N  
DATE: 4/17/91

PLOT OF SPEED DATA

FROM: 4/17/91 11:00 AM

TO: 4/19/91 2:00 PM



SPEED DATA STATISTICS

Average speed of all vehicles - 38 MPH  
Median speed (50th) - 38 MPH  
85th Percentile Speed - 48 MPH  
15th Percentile Speed - 33 MPH  
Number of vehicles > 55 MPH - 0  
Per Cent vehicles > 55 MPH - 0 %  
Pace Speed (10 MPH) - 31 - 40  
Per Cent vehicles in pace - 48 %

SITE CODE : SPEED COUNTS

Cape Cod Commission

PAGE: 1

Location : Training Field Road Chatham

FILE: CTRAIN1N

Weather : Cloudy/Rain/Sunny

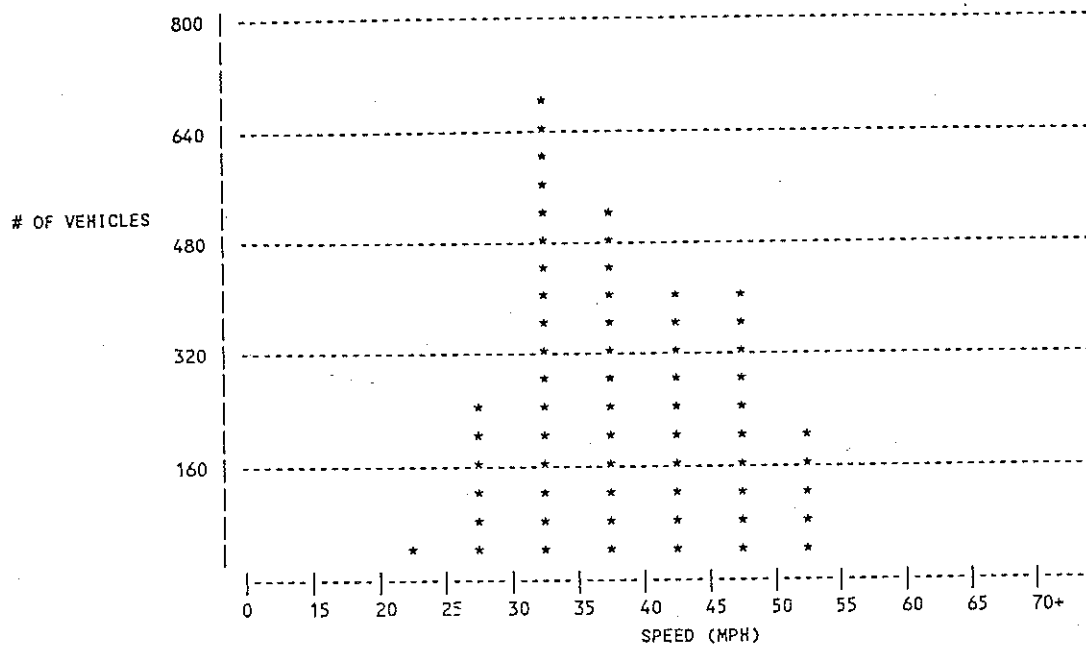
DATE: 4/17/91

Operator : GO/NA

PLOT OF SPEED DATA

FROM: 4/17/91 11:00 AM

TO: 4/19/91 2:00 PM



SPEED DATA STATISTICS

Average speed of all vehicles - 38 MPH  
Median speed (50th) - 38 MPH  
85th Percentile Speed - 48 MPH  
15th Percentile Speed - 33 MPH  
Number of vehicles > 55 MPH - 0  
Per Cent vehicles > 55 MPH - 0 %  
Pace Speed (10 MPH) - 31 - 40  
Per Cent vehicles in pace - 48 %

SITE CODE : SPEED COUNTS

Cape Cod Commission

PAGE: 3

FILE: CTRAININ

Location : Training Field Road Chatham

Weather : Cloudy/Rain/Sunny

DATE: 4/19/91

Operator : GO/NA

TIME BEGIN	TOTAL COUNTED	SPEED RANGES (MPH)												AVERAGE (MPH)	
		0-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	70+	
12:00 AM	11	0	1	0	0	4	4	0	1	1	0	0	0	0	36
1:00	1	0	0	0	0	1	0	0	0	0	0	0	0	0	33
2:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0	38
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	2	0	0	0	0	2	0	0	0	0	0	0	0	0	33
6:00	6	0	0	0	2	1	1	0	2	0	0	0	0	0	37
7:00	21	0	0	0	1	4	4	4	5	3	0	0	0	0	42
8:00	44	0	0	0	4	15	9	4	9	3	0	0	0	0	38
9:00	68	0	1	2	5	20	22	7	9	2	0	0	0	0	37
10:00	79	0	0	2	7	23	17	13	12	5	0	0	0	0	38
11:00	101	0	1	1	6	29	23	11	22	8	0	0	0	0	39
12:00 PM	110	0	0	0	4	23	27	27	17	11	0	0	0	0	40
1:00	101	0	0	1	6	23	17	17	22	15	0	0	0	0	41
2:00	67	0	0	0	3	19	10	14	8	13	0	0	0	0	41
-----															
DAY TOTAL	612	0	3	6	38	164	135	97	107	61	0	0	0	0	

## SITE CODE : SPEED COUNTS

Cape Cod Commission

PAGE: 2

FILE: CTRAININ

Location : Training Field Road Chatham

Weather : Cloudy/Rain/Sunny

DATE: 4/18/91

Operator : GO/NA

TIME BEGIN	TOTAL COUNTED	SPEED RANGES (MPH)												AVERAGE (MPH)	
		0-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	70+	
12:00 AM	4	0	0	0	0	1	0	0	2	1	0	0	0	0	45
1:00	3	0	0	0	0	1	0	1	1	0	0	0	0	0	41
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0	38
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	1	0	0	0	1	0	0	0	0	0	0	0	0	0	28
6:00	4	0	0	1	1	1	0	1	0	0	0	0	0	0	31
7:00	13	0	0	0	2	3	3	1	2	2	0	0	0	0	39
8:00	38	0	0	0	5	14	10	5	2	2	0	0	0	0	36
9:00	71	0	1	2	5	28	16	8	8	3	0	0	0	0	36
10:00	72	0	0	2	11	21	19	8	8	3	0	0	0	0	36
11:00	86	0	0	3	14	18	18	20	9	4	0	0	0	0	37
12:00 PM	91	0	0	1	13	28	14	15	16	4	0	0	0	0	38
1:00	91	0	0	1	7	28	19	14	9	13	0	0	0	0	39
2:00	99	0	0	0	11	31	19	17	19	2	0	0	0	0	38
3:00	95	0	0	2	7	29	24	16	14	3	0	0	0	0	38
4:00	101	0	0	0	9	24	21	16	28	3	0	0	0	0	39
5:00	103	0	0	2	4	29	32	15	12	9	0	0	0	0	39
6:00	87	0	0	1	6	21	20	14	16	9	0	0	0	0	40
7:00	71	0	0	3	6	22	9	15	11	5	0	0	0	0	38
8:00	38	0	0	0	6	11	12	5	3	1	0	0	0	0	36
9:00	34	0	0	0	6	10	5	8	2	3	0	0	0	0	37
10:00	15	0	0	0	1	5	4	1	2	2	0	0	0	0	39
11:00	6	0	0	0	1	1	0	2	1	1	0	0	0	0	41
-----															
DAY TOTAL	1124	0	1	18	116	326	246	182	165	70	0	0	0	0	

D

24.3

23.5

OLD QUEEN ANNE RD

Street Sign

16.6

16.7

61.2

141.9

22.8

356

OLD QUEEN ANNE RD

TELE. POLE #9230

YIELD SIGN

BUMPER 5FT Long Approx

ACCIDENT NO. 90-0296

OPERATOR (S)

Diagram By Officer William Quigley #6

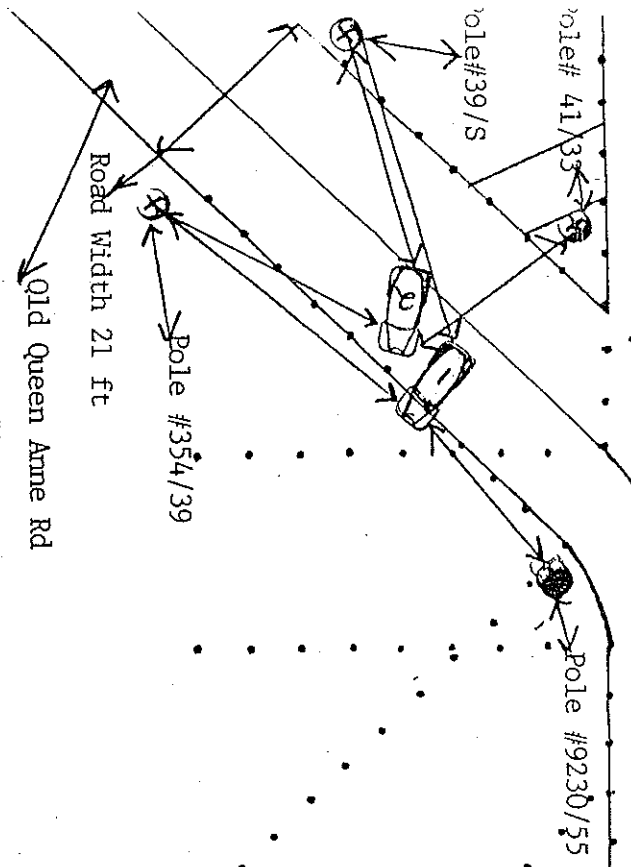
~~1-20-90~~  
1-20-90  
165.7

1/20/90

Trainingfield Rd

Old Queen Anne Rd

Yellow Centerline



\*\*Diagram not to Scale\*\*

Traffic-Light

Roads- Ice/Snow covered-approx 1 inch.

Weather- Snowing

ACCIDENT NO.

90-0004

OPERATOR (S)

[Redacted]

Measurements-Veh#1

Pole#9230/355 to left front= 71 ft

Pole#354/39 to right front=36 ft

Pole#41/35 to right rear=47 ft

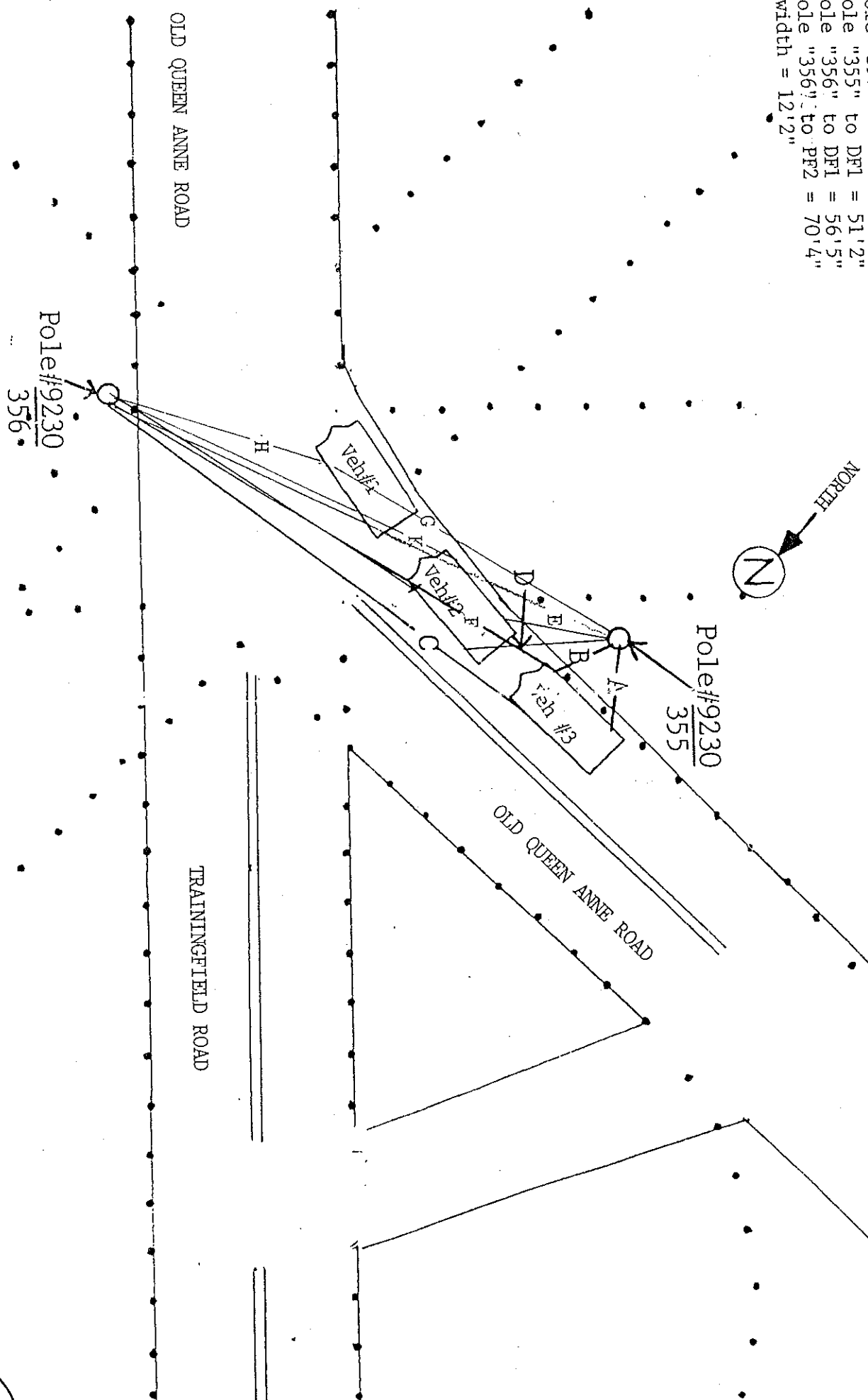
Measurements Veh#2

Pole 354/39 to right front=28 ft

Pole#39/S to left rear=35 ft

B = Pole "355" to PF3 = 13'  
 C = Pole "356" to DF3 = 99'8"  
 D = Pole "356" to PF3 = 101'4"  
 F = Pole "355" to DR1 = 37'2"  
 F = Pole "356" to PF3 = 101'4"  
 G = Pole "355" to DF1 = 51'2"  
 H = Pole "356" to DF1 = 56'5"  
 K = Pole "356" to PF2 = 70'4"  
 Lane width = 12'2"

11-24-90  
 1534  
 C. J. [Signature]



Accident #90-0272