1160

AIR QUALITY REPORT FOR M 275 IN OAKLAND COUNTY

TESTING AND RESEARCH DIVISION
RESEARCH LABORATORY SECTION

AIR QUALITY REPORT FOR M 275 IN OAKLAND COUNTY

Research Laboratory Section
Testing and Research Division
Research Project 80 AP-31A
Research Report No. R-1166

Michigan Transportation Commission
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John P. Woodford, Director
Lansing, April 1981

Relationship Between This Project and the State Implementation Plan for Meeting Federal Air Quality Standards

The current State air quality implementation plan (SIP) was approved by the Environmental Protection Agency on December 31, 1979. The transportation plan was reviewed by the Federal Highway Administration on February 12, 1980 and the plan was determined to conform to the SIP. The transportation improvement program (TIP) was determined to conform to the SIP on March 17, 1980. This project was included in the plan and the TIP, each conforming to the SIP. Therefore, pursuant to 23 CFR 770, this project conforms to the SIP.

This report presents air quality information for a proposed section of M 275 in southeastern Oakland County. Meteorological data and estimates of pollution that might occur at receptor sites adjacent to four major intersections (Fig. 1) along with the total pollutant burden for the no-build and build cases are included.

Terrain and Demography

The proposed project traverses a lightly developed residential-commercial-rural area. The terrain surrounding the project is generally flat with no tall buildings or structures in the immediate vicinity which might hinder dispersion of pollutants.

Meteorology

Meteorological conditions in Michigan are generally good for dispersion and dilution of air pollutants. According to air pollution publication AP 101, U. S. Environmental Protection Agency, 1972 (p. 96) there are few days with a high meteorological potential for air pollution.

Hourly weather data recorded at Pontiac City Airport (6 a.m. to 11 p.m. only data recorded) were obtained from the National Climatic Center in Asheville, North Carolina for the years 1967 through 1971 and a one day in nine day sampling of the hourly data with a random start each year was used to prepare meteorological data. Figure 2 shows a 36-point bar graph of wind speed and direction occurrences. Figure 3 is a 12-point wind rose obtained by condensing the 36-point wind data.

Figure 4 shows the distribution of wind speeds observed. Wind speeds are greater than 5 mph more than 95 percent of the time at Pontiac City Airport between 6 a.m. and 11 p.m. The most probable daytime wind speeds are in the 8 to 12 mph range.

Existing Ambient Air Quality

The project area is classified as non-attainment for photochemical oxidants (ozone) and attainment for carbon monoxide and oxides of nitrogen in relation to Federal air quality standards. Carbon monoxide levels were measured with the Department's mobile air quality monitoring laboratory near the proposed project during the period of August 27, 1980 to December 4, 1980. Data were recorded every five minutes, 24 hours a day. The laboratory was located about 2,000 ft west of Bogie Lake Rd and about 200

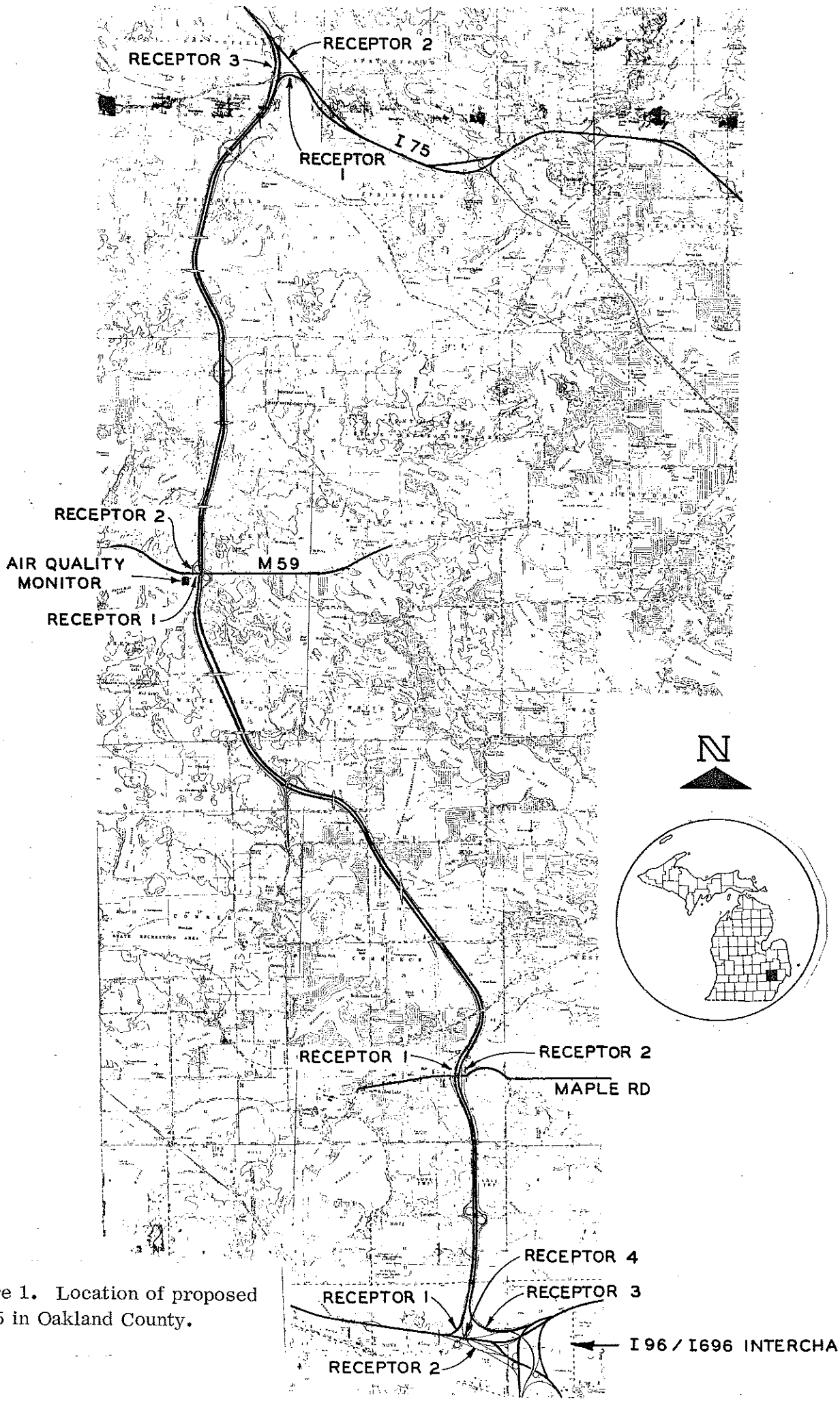

Figure 1. Location of proposed M 275 in Oakland County.

ft south of M 59 (Fig. 1). The 10 highest one-hour and eight-hour averages recorded are presented in Table 1. The data require no seasonal adjustment since the monitoring period included part of the October through February high carbon monoxide season. The highest one-hour and eight-hour concentrations found were 6.9 mg/cu m and 2.7 mg/cu m, respectively. Since the concentrations found are low, the normal correction to represent conditions in 1990 (the estimated time of completion) and the year 2000 was not applied. The normal corrections would include reductions in vehicle emissions due to Federal controls and changes in traffic volumes and speeds resulting in even lower values.

Pollution Estimates

Estimates of carbon monoxide concentrations were made at a receptor height of 5 ft (1.5 m). A mathematical model based on the Gaussian diffusion equation employing a mixing zone concept was used.* Inputs to the model include wind speed and direction, traffic volumes, vehicle emission factors, highway design, and site characteristics.

Carbon monoxide concentrations were estimated at receptor sites adjacent to four major intersections along the proposed route for the years 1990 and 2000 (Fig. 1). The major intersections and receptor sites are identified as follows:

M 275 and I 96/I 696

Receptor 1 - At the edge of the right-of-way of southbound M 275 ramp to westbound I 96.

Receptor 2 - At the edge of the right-of-way of eastbound I 96 connector to southbound I 96 and I 275.

Receptor 3 - At the edge of the right-of-way of northbound M 102 and westbound I 696 connector to northbound M 275.

Receptor 4 - Inside the interchange.

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* Benson, P. E., "CALINE 3 - A Versatile Dispersion Model for Predicting Air Pollutant Levels Near Highways and Arterial Streets," Prepared by California Department of Transportation, Report FHWA/CA/TL-79/23, November 1979.

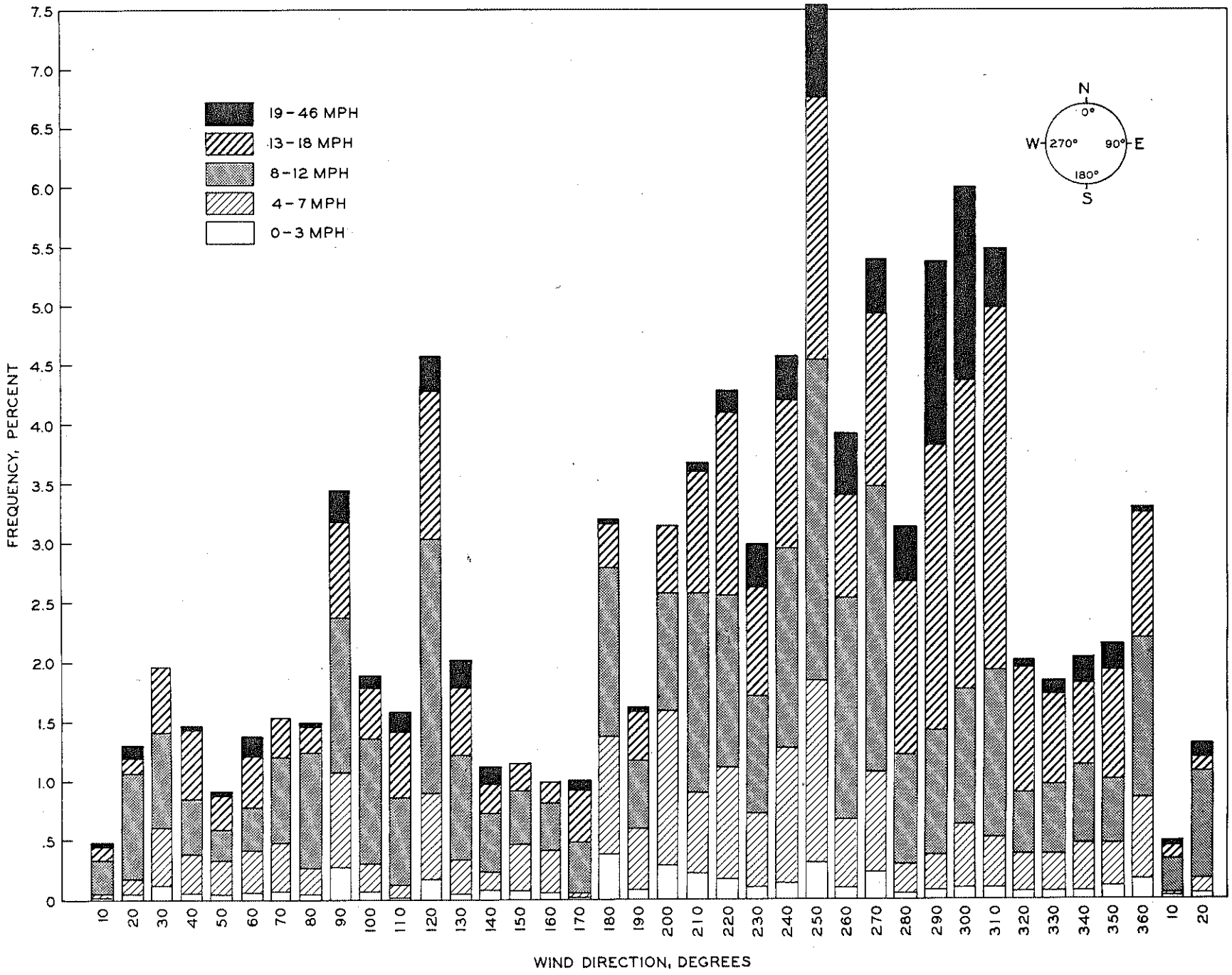

Figure 2. Wind speed and direction occurrences at Pontiac Airport (6 a.m. to 11 p.m.).

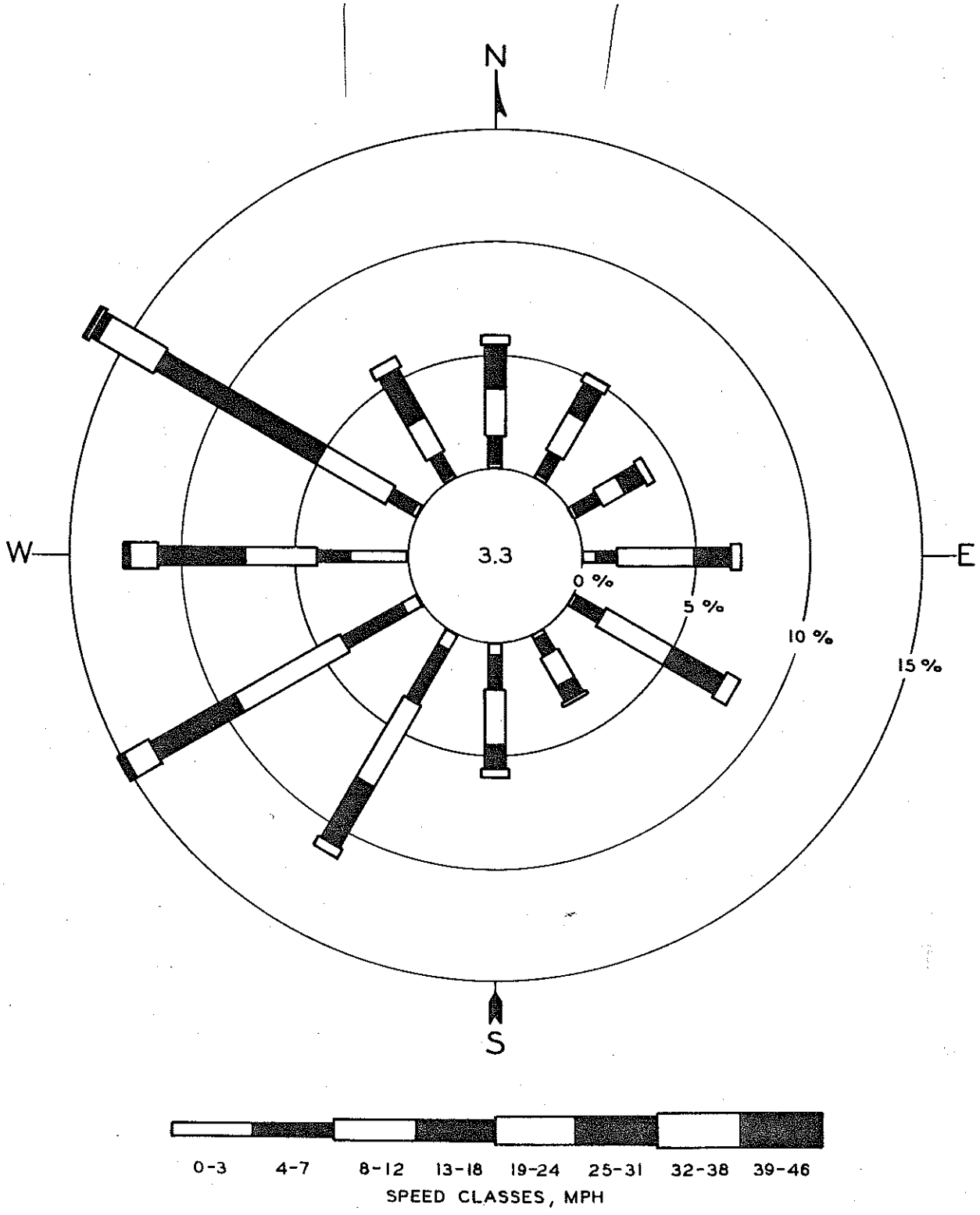

Figure 3. Frequency of wind direction and speed, percent (calms distributed).

M 275 and Maple Rd

Receptor 1 - At the edge of the right-of-way of southbound M 275 ramp to Maple Rd.

Receptor 2 - At the edge of the right-of-way of northbound M 275 ramp to Maple Rd.

M 275 and M 59

Receptor 1 - At the edge of the right-of-way of eastbound M 59 ramp to southbound M 275.

Receptor 2 - At the edge of the right-of-way of southbound M 275 ramp to westbound M 59.

M 275 and I 75

Receptor 1 - At the edge of the right-of-way of northbound M 275 ramp to southbound I 75.

Receptor 2 - Near the rest area adjacent to northbound I 75.

Receptor 3 - At the edge of the right-of-way of southbound I 75 ramp to M 275.

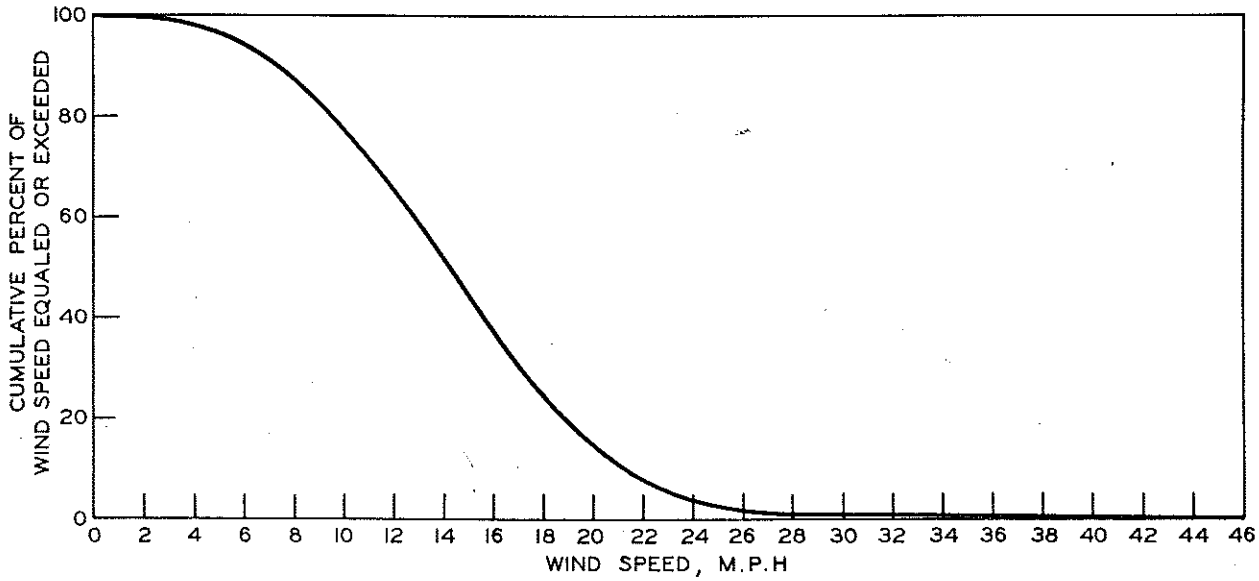

Figure 4. Wind speed distribution at Pontiac Airport (6 a.m. to 11 p.m.).

Information used as input to the model consisted of:

1) Vehicle emission factors, shown in the following table, calculated using "Mobile Source Emission Factors," March 1978, U. S. Environmental Protection Agency. Emission factors were calculated at temperatures of 30 F with 20 percent of the vehicles in a cold start condition, 27 percent of the vehicles in a hot start condition, and the remainder of the vehicles in a hot operation mode. Vehicle age mix data used were for Michigan registrations, and average annual miles driven for various age vehicles were national estimates from "Mobile Source Emission Factors."

EMISSION FACTORS FOR
CARBON MONOXIDE, g/mi, 30 F

Year	Average Vehicle Speeds, mph						
	30(2)	40(2)	50(3)	55(3)	55(5)	55(6)	55(9)
1990* and 2000	15.50	12.19	11.80	11.23	12.16	12.62	14.02

(0) - percent commercial traffic.
* Emission factors are the same for both years.

TABLE 1
BACKGROUND CARBON MONOXIDE MEASURED NEAR
M 59 AND BOGIE LAKE ROAD INTERSECTION IN 1980

1-hr Average, mg/cu m	Date	8-hr Average, mg/cu m	Date
6.9	October 7	2.7	November 27
5.5	October 7	2.6	November 26
5.2	September 30	2.5	November 27
5.0	October 10	2.4	November 26
4.8	October 22	2.4	October 7
4.3	October 10	2.4	October 7
4.1	November 12	2.4	October 7
3.8	September 10	2.4	October 7
3.8	October 30	2.3	October 7
3.7	November 26	2.2	October 7

TABLE 2
TRAFFIC ESTIMATES FOR PROPOSED M 275
AND MAJOR CROSSROADS
(Total Both Directions)

Proposed Roadway and Major Interchanges	Alternate			
	Build		No-Build	
	1990	2000	1990	2000
M 275	7,820	10,500	---	---
	(55)	(55)	---	---
and				
I 96/I 696	11,230	12,200	7,400	8,700
	(55)	(55)	(55)	(55)
M 275	6,200	8,050	---	---
	(55)	(55)	---	---
and				
West Maple Rd	2,670	3,840	2,000	2,500
	(30)	(30)	(30)	(30)
M 275	4,660	6,200	---	---
	(55)	(55)	---	---
and				
M 59	4,200	5,600	3,400	4,400
	(55)	(55)	(55)	(55)
M 275	4,080	5,400	---	---
	(55)	(55)	---	---
and				
I 75	4,300	6,200	3,800	5,200
	(55)	(55)	(55)	(55)

00 = design hour volume (DHV), vehicles per hour
(00) = vehicle speeds, mph

2) Design hour traffic volume (DHV). Traffic estimates and peak traffic speeds for the major roadways are shown in Table 2.

3) Meteorological Conditions. The CALINE 3 model was run at several wind angles to the roadways to determine the angle which produced the highest carbon monoxide levels (worst case) at each of the sites for both the no-build and build alternates. A wind speed of 2.2 mph (1 m/sec) under atmospheric stability class D was used with all wind angles. Table 3 shows the frequency distribution of atmospheric stability classes for the meteorological data used.

4) Road Profile. Since final design plans are not completed, all roadways are assumed to be at grade. At-grade roadways represent a worse condition than elevated roadways.

5) Roadway Widths.

6) Surface Roughness. A value of 74 cm was used. This is a typical value for rural land use.

7) Mixing Height - 100 m.

All estimates of carbon monoxide levels represent maximum worst case one-hour concentrations and are in addition to existing background levels. Worst case conditions are peak traffic, stability D, and a 2.2 mph (1 m/sec) wind. Table 4 presents the calculated estimates, the background and the total carbon monoxide concentration at the receptor sites for both the no-build and build alternates.

Comparison of Estimates with Air Quality Standards

a) One-hour carbon monoxide standard - 40 mg/cu m (35 ppm)

The maximum estimated one-hour concentrations of carbon monoxide at each of the receptor sites in 1990 and 2000 for both the no-build and build alternates are shown in Table 4. The carbon monoxide levels at all receptor sites for both alternates are below the standard.

b) Eight-hour carbon monoxide standard - 10 mg/cu m (9 ppm)

The Federal Highway Administration's report "Project Level Considerations to Assure Adequate Air Quality Analyses," June 1977, suggests

TABLE 3
STABILITY CLASS FREQUENCY DISTRIBUTION BY HOUR
(Percent)

Hour	Stability Class					
	A	B	C	D	E	F
6	11.6	14.0	7.0	48.8	7.0	11.6
7	11.8	6.2	13.7	54.0	10.6	3.7
8	9.3	9.3	18.5	55.6	3.7	3.7
9	7.4	9.9	21.6	61.1	0.0	0.0
10	6.2	6.8	17.9	69.1	0.0	0.0
11	4.3	6.8	16.7	72.2	0.0	0.0
12	3.7	4.3	17.3	74.7	0.0	0.0
13	3.7	4.9	17.9	73.5	0.0	0.0
14	3.1	6.2	17.3	73.5	0.0	0.0
15	3.7	5.6	15.4	75.3	0.0	0.0
16	3.7	4.9	13.6	76.5	0.6	0.6
17	3.1	4.9	19.1	65.4	4.9	2.5
18	2.5	5.6	11.7	63.0	11.7	5.6
19	0.0	0.0	0.0	67.3	21.6	11.1
20	0.0	0.0	0.0	64.2	23.5	12.3
21	0.0	0.0	0.0	57.4	24.1	18.5
22	0.0	0.0	0.0	57.4	19.1	23.5
23	0.0	0.0	0.0	61.3	16.0	22.7
Overall percent	3.9	4.6	11.9	65.8	7.8	6.0

using the following technique for determining the eight-hour carbon monoxide concentration from the one-hour concentration.

$$\frac{V_8}{V_1} \times (\text{1-hr CO concentration}) \times P = \text{8-hr CO concentration}$$

where: V_8 = average hourly traffic volume in both directions during the eight-hour period of interest

V_1 = peak hour traffic volume in both directions

P = one to eight-hour meteorological persistence factor for the eight-hour period.

A value of P = 0.6 is suggested unless data are available to calculate a persistence factor for the proposed project. This technique was used to calculate the eight-hour carbon monoxide level for both alternates. The highest eight-hour concentrations at the receptor sites in the years 1990 and 2000 including background are presented in Table 4. A typical calculation for the no-build alternate I 96/I 696 interchange at Receptor 4 in 2000 follows:

Receptor 4

Westbound I 96

$$\frac{\text{1980 vehicles per hour}}{\text{5000 vehicles per hour}} \times 0.8 \text{ mg/cu m} \times 0.6 = 0.19 \text{ mg/cu m}$$

Eastbound I 96

$$\frac{\text{980 vehicles per hour}}{\text{2500 vehicles per hour}} \times 0.2 \text{ mg/cu m} \times 0.6 = 0.05 \text{ mg/cu m}$$

Eastbound I 96 Ramp to Existing Southbound M 275

$$\frac{\text{1460 vehicles per hour}}{\text{3600 vehicles per hour}} \times 0.2 \text{ mg/cu m} \times 0.6 = 0.05 \text{ mg/cu m}$$

TOTAL 0.3 mg/cu m

The no-build alternate produces slightly less carbon monoxide than the build alternate at all receptor sites. Both alternates at all receptor sites are below the standard.

TABLE 4

ESTIMATES OF ONE-HOUR AND EIGHT-HOUR CARBON MONOXIDE CONCENTRATIONS, mg/cu m (INCLUDING BACKGROUND)

Receptor Site		Interchange															
		I 96				Maple Rd				M 59				I 75			
		1990		2000		1990		2000		1990		2000		1990		2000	
		B	NB	B	NB	B	NB	B	NB	B	NB	B	NB	B	NB	B	NB
1	Max. 1-hr	0.9	0.5	0.9	0.5	2.9	1.8	4.2	2.4	0.6	0.3	1.1	0.3	0.3	0.5	0.6	0.5
	Background	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
	Total	7.8	7.4	7.8	7.4	9.8	8.7	11.1	9.3	7.5	7.2	8.0	7.2	7.2	7.4	7.5	7.4
2	Max. 1-hr	1.0	0.8	1.3	0.8	2.6	1.9	3.8	2.4	0.9	0.3	1.1	0.4	1.1	0.8	1.6	1.1
	Background	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
	Total	7.9	7.7	8.2	7.7	9.5	8.8	10.7	9.3	7.8	7.2	8.0	7.3	8.0	7.7	8.5	8.0
3	Max. 1-hr	1.9	0.6	2.5	0.6	---	---	---	---	---	---	---	---	2.3	0.3	3.2	0.3
	Background	6.9	6.9	6.9	6.9	---	---	---	---	---	---	---	---	6.9	6.9	6.9	6.9
	Total	8.8	7.5	9.4	7.5	---	---	---	---	---	---	---	---	9.2	7.2	10.1	7.2
4	Max. 1-hr	1.8	1.3	1.9	1.3	---	---	---	---	---	---	---	---	---	---	---	---
	Background	6.9	6.9	6.9	6.9	---	---	---	---	---	---	---	---	---	---	---	---
	Total	8.7	8.2	8.8	8.2	---	---	---	---	---	---	---	---	---	---	---	---
1	Max. 8-hr	0.3	0.1	0.2	0.1	0.7	0.5	0.9	0.6	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.1
	Background	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	Total	3.0	2.8	2.9	2.8	3.4	3.2	3.6	3.3	2.8	2.8	3.0	2.8	2.8	2.8	2.8	2.8
2	Max. 8-hr	0.2	0.2	0.3	0.2	0.6	0.5	0.8	0.6	0.2	0.1	0.3	0.1	0.3	0.2	0.5	0.3
	Background	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
	Total	2.9	2.9	3.0	2.9	3.3	3.2	3.5	3.3	2.9	2.8	3.0	2.8	3.0	2.9	3.2	3.0
3	Max. 8-hr	0.4	0.2	0.6	0.2	---	---	---	---	---	---	---	---	0.7	0.1	0.8	0.1
	Background	2.7	2.7	2.7	2.7	---	---	---	---	---	---	---	---	2.7	2.7	2.7	2.7
	Total	3.1	2.9	3.3	2.9	---	---	---	---	---	---	---	---	3.4	2.8	3.5	2.8
4	Max. 8-hr	0.4	0.3	0.5	0.3	---	---	---	---	---	---	---	---	---	---	---	---
	Background	2.7	2.7	2.7	2.7	---	---	---	---	---	---	---	---	---	---	---	---
	Total	3.1	3.0	3.2	3.0	---	---	---	---	---	---	---	---	---	---	---	---

Conclusions

The estimated concentrations of carbon monoxide, including existing background at all of the receptor sites for both alternates of the proposed project are within Federal air quality standards.

Total Pollutant Burden Analysis

A total pollutant burden analysis for carbon monoxide, hydrocarbons, and oxides of nitrogen is included for both the no-build and build alternates for the years 1990 and 2000 at ambient temperatures of 30 and 60 F. The vehicle emission factors calculated as described above under Item 1, "Information used as input to the model' were used to calculate vehicle emissions. Table 5 shows traffic data for the significant roadways in the study area used to calculate total emissions. Table 6 presents the total pollutant burden estimates for both alternates.

TABLE 5
TRAFFIC ESTIMATES FOR TOTAL POLLUTANT
BURDEN (MESOSCALE) ANALYSIS

Location	1990		2000	
	No-Build	Build	No-Build	Build
Haggerty Rd				
I 96 to 12 Mile Rd				
VMT	12,500	7,400	14,400	10,300
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
12 Mile Rd to 14 Mile Rd				
VMT	30,800	18,700	40,200	26,000
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
14 Mile Rd to West Maple Rd				
VMT	24,600	14,800	32,100	20,500
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
West Maple Rd to Pontiac Trail				
VMT	30,100	20,000	39,200	24,700
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Pontiac Trail to Richardson Rd				
VMT	25,300	16,800	33,100	20,900
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Union Lake Rd				
Richardson Rd to Commerce Rd				
VMT	22,000	14,600	28,700	18,100
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Commerce Rd to Wise Rd				
VMT	17,000	11,300	22,200	14,000
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2

TABLE 5 (Cont.)
TRAFFIC ESTIMATES FOR TOTAL POLLUTANT
BURDEN (MESOSCALE) ANALYSIS

Location	1990		2000	
	No-Build	Build	No-Build	Build
Novi Rd				
I 96 to 12 Mile Rd				
VMT	20,700	18,700	25,700	22,600
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
12 Mile Rd to 13 Mile Rd				
VMT	15,900	11,800	21,000	14,700
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
13 Mile Rd to 14 Mile Rd				
VMT	13,800	10,600	18,000	13,100
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
14 Mile Rd to Pontiac Trail				
VMT	25,600	19,600	33,400	24,400
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Pontiac Trail				
Novi Rd to West Maple Rd				
VMT	19,200	14,700	25,100	18,300
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
West Maple Rd to Haggerty Rd				
VMT	73,600	51,900	97,000	64,700
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Haggerty Rd to Green Lake Rd				
VMT	13,700	15,800	17,600	20,100
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2

TABLE 5 (Cont.)
TRAFFIC ESTIMATES FOR TOTAL POLLUTANT
BURDEN (MESOSCALE) ANALYSIS

Location	1990		2000	
	No-Build	Build	No-Build	Build
M 102				
VMT	77,000	77,000	95,000	95,000
Average Speed	55	55	55	55
Percent Commercial	5	5	5	5
13 Mile Rd				
VMT	32,700	72,000	50,000	128,800
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
West Maple Rd				
VMT	74,600	96,300	98,000	141,400
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Commerce Rd				
VMT	26,900	21,200	29,900	22,700
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
M 59				
VMT	62,000	71,100	80,000	97,600
Average Speed	55	55	55	55
Percent Commercial	8	8	8	8
White Lake Rd				
VMT	18,600	17,200	26,000	23,200
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Andersonville Rd				
VMT	15,400	14,400	26,000	24,000
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Davisburg Rd				
VMT	9,200	10,200	12,000	13,000
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2

TABLE 5 (Cont.)
TRAFFIC ESTIMATES FOR TOTAL POLLUTANT
BURDEN (MESOSCALE) ANALYSIS

Location	1990		2000	
	No-Build	Build	No-Build	Build
I 75				
VMT	73,600	118,500	100,000	190,000
Average Speed	55	55	55	55
Percent Commercial	15	15	15	15
M 275				
I 96/I 696 to 13 Mile Rd				
VMT	--	135,000	--	177,400
Average Speed	--	55	--	55
Percent Commercial	--	5	--	5
13 Mile Rd to West Maple Rd				
VMT	--	147,200	--	192,300
Average Speed	--	55	--	55
Percent Commercial	--	5	--	5
West Maple Rd to Benstein Rd				
VMT	--	347,600	--	454,400
Average Speed	--	55	--	55
Percent Commercial	--	5	--	5
Benstein Rd to M 59				
VMT	--	180,000	--	232,300
Average Speed	--	55	--	55
Percent Commercial	--	5	--	5
M 59 to White Lake Rd				
VMT	--	143,000	--	186,800
Average Speed	--	55	--	55
Percent Commercial	--	5	--	5
White Lake Rd to Anderson-ville Rd				
VMT	--	145,400	--	190,100
Average Speed	--	55	--	55
Percent Commercial	--	5	--	5
Andersonville Rd to I 75				
VMT	--	77,300	--	101,100
Average Speed	--	55	--	55
Percent Commercial	--	5	--	5

TABLE 5 (Cont.)
TRAFFIC ESTIMATES FOR TOTAL POLLUTANT
BURLEN (MESOSCALE) ANALYSIS

Location	1990		2000	
	No-Build	Build	No-Build	Build
Decker Rd				
VMT	29,300	22,400	38,300	27,900
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
South Decker Rd				
VMT	17,200	13,100	22,400	16,300
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
South Commerce Lake Rd				
South Decker Rd to Oakley Park Rd				
VMT	11,200	8,600	14,700	10,700
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Oakley Park Rd to Commerce Rd				
VMT	21,500	16,400	28,100	20,500
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Bogie Lake Rd				
Sleeth Rd to Commerce Rd				
VMT	4,200	3,200	5,400	4,000
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Commerce Rd to Cooley Lake Rd				
VMT	9,600	7,300	12,500	9,100
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Cooley Lake Rd to Cedar Island Rd				
VMT	16,000	12,000	20,700	15,100
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2

TABLE 5 (Cont.)
TRAFFIC ESTIMATES FOR TOTAL POLLUTANT
BURDEN (MESOSCALE) ANALYSIS

Location	1990		2000	
	No-Build	Build	No-Build	Build
Cedar Island Rd to M 59				
VMT	19,500	14,800	25,500	18,500
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Ormond Rd				
M 59 to White Lake Rd				
VMT	18,900	15,000	24,700	18,600
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
White Lake Rd to Davisburg Rd				
VMT	38,400	12,300	49,700	15,300
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Benstein Rd				
West Maple Rd to Ladd Rd				
VMT	11,500	9,900	15,900	13,100
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Ladd Rd to Oakley Park Rd				
VMT	12,200	10,500	16,000	13,900
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
Oakley Park Rd to Sleeth Rd				
VMT	13,100	11,100	17,000	14,800
Average Speed	45	45	45	45
Percent Commercial	2	2	2	2
I 96				
VMT	138,500	138,500	173,200	173,200
Average Speed	55	55	55	55
Percent Commercial	6	5	6	5
I 696				
VMT	122,000	122,000	151,600	151,600
Average Speed	55	55	55	55
Percent Commercial	3	5	3	5

TABLE 6
ESTIMATES OF TOTAL POLLUTANT BURDEN

Traffic Projection Year	Alternate	Pollutant, tons per day					
		Carbon Monoxide		Hydrocarbons		Oxides of Nitrogen	
		30 F	60 F	30 F	60 F	30 F	60 F
1990	No-Build	16.25	13.89	1.70	1.44	3.21	3.21
	Build	31.61	27.24	3.18	2.70	6.65	6.65
2000	No-Build	21.09	18.02	2.20	1.86	4.16	4.16
	Build	42.15	36.34	4.23	3.58	8.85	8.85