AIR QUALITY SECTION FOR THE FINAL ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED I 475

MICHIGAN DEPARTMENT OF STATE HIGHWAYS

AIR QUALITY SECTION FOR THE FINAL ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED I 475

Research Laboratory Section
Testing and Research Division
Research Project 72 TI-100
Research Report No. R-849
(EV-21)

Michigan State Highway Commission
E. V. Erickson, Chairman; Charles H. Hewitt,
Vice-Chairman, Claude J. Tobin, Peter B. Fletcher
Lansing, February 1973

This report presents air quality information for the environmental impact statement concerning proposed I475. Included are meteorological data, a limited quantity of ambient air quality data, and estimates of pollution levels that might occur adjacent to the freeway if it is constructed.

General Description of the Project Area

The project is in an urban area, located in the city of Flint, Genesee County, surrounded by flat to gently rolling terrain, which facilitates dispersal of air pollutants.

Meteorology

Hourly weather data were obtained from Flint's Bishop Airport for the years 1967 through 1971. A one day in nine day sampling of the hourly observations was used to prepare meteorological data. Figure 1 shows the frequency of wind direction and wind speed on a 36-point bar graph. Figure 2 shows a 12-point wind rose for the same data. Since Michigan lies in the normal track of migrating high and low pressure centers at all times of the year, there is great variation in day to day weather. Thus, while the "prevailing" wind direction is from westerly directions, the wind actually comes from any given direction only about 6 percent of the time. Even on occassions when atmospheric inversions restrict vertical dispersion of pollutants, horizontal ventilation continues freely. Figure 3 shows that about 97 percent of the time wind speeds exceed 4 mph.

The most probable wind speeds are 12 mph for off-peak traffic and 11 mph for peak p.m. traffic (3:30 to 4:30).

There is insufficient time for photochemical reaction between air pollutants to take place before dispersion and dilutions occur. As a result, photochemical smog of the Los Angeles type is not thought to occur in Michigan[1].

The potential for air pollution episodes is related to the incidence of stagnating anticyclones (high pressure areas) with associated inversions that linger a few days. A study covering the 30 year period, 1936 through 1965[2] found that stagnating anticyclones lasting 4 days or more occurred

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[1] Implementation Plan for the Control of Suspended Particulates, Sulfur Oxides, Carbon Monoxide, Hydrocarbons, Nitrogen Oxides, and Photochemical Oxidants in the State of Michigan, January 1972, p. 1-1.

[2] Ibid p. 1-2

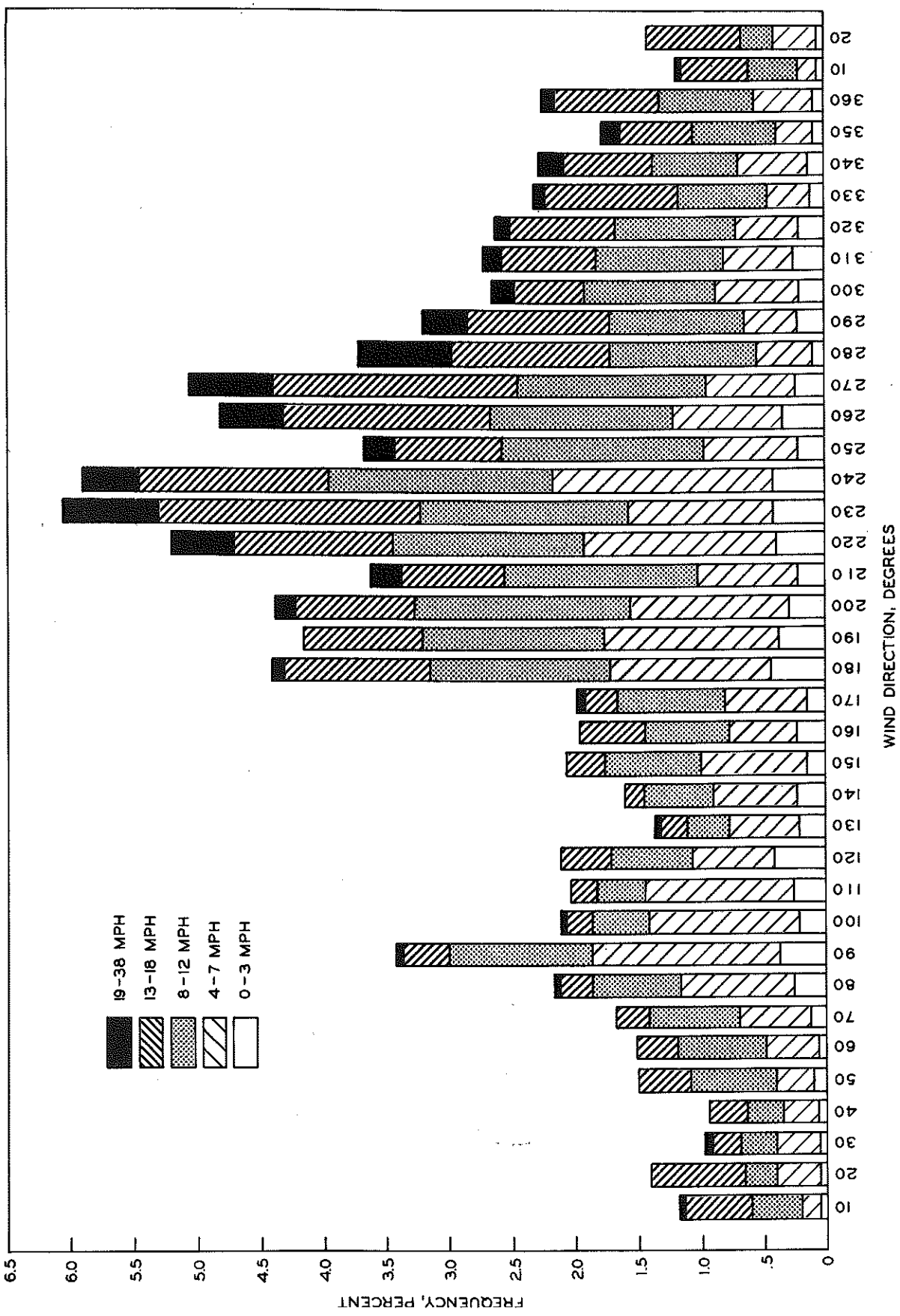

Figure 1. Wind speed and direction occurrences at Bishop Airport.

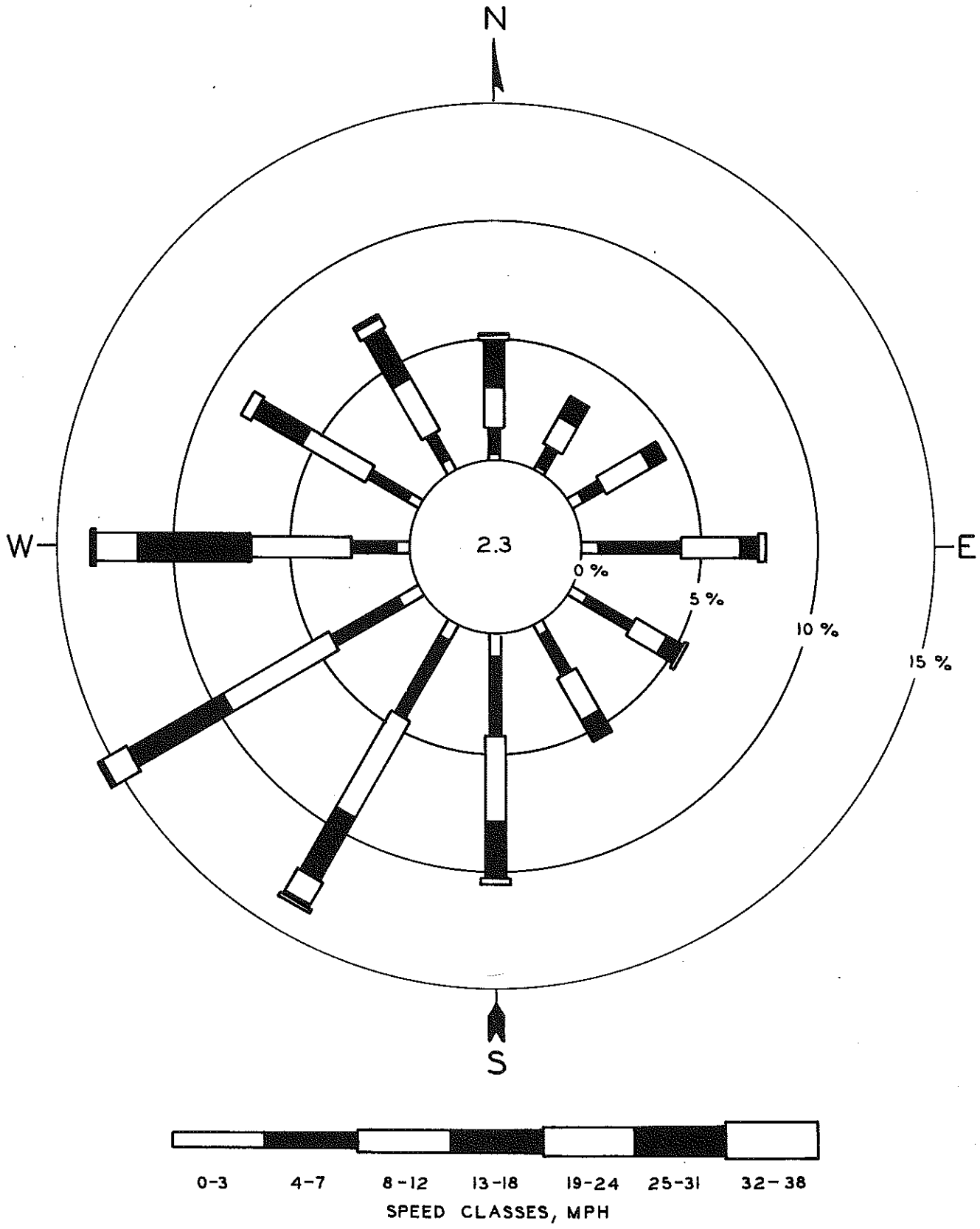

Figure 2. Frequency of wind direction and speed, percent (calms distributed).

TABLE 1
AMBIENT AIR DATA ALONG PROPOSED I 475 CORRIDOR

Sample Site No.	Location	Sample Date	Time	CO, mg/cu m	Wind	
					Direction[1]	Speed, mph
1	Saginaw St. at M 78	9-14-72	2:10 p.m.	1	01	18
2	Park St. at M 78	9-11-72	12:35 p.m.	2	22	8
3	Court St. SW corner	9-14-72	5:15 p.m.	1	35	4
4	Court St. NE corner	9-11-72	11:45 a.m.	2	22	8
5	First St. at East St.	9-27-72	8:30 a.m.	1	03	14
6	Kearsley St. at Lewis Blvd	9-11-72	11:20 a.m.	3	25	8
7	Avon St. at Lewis Blvd	9-14-72	3:00 p.m.	2	02	7
	Avon St. at Lewis Blvd	9-14-72	4:45 p.m.	2	35	4
	Avon St. at Lewis Blvd	9-27-72	10:00 a.m.	1	04	10
8	Broadway Ave	9-11-72	10:40 a.m.	1	25	8
9	Leith St. at Boulevard Dr	9-14-72	3:45 p.m.	1	02	7
	Leith St. at Boulevard Dr	9-27-72	9:30 a.m.	1	04	10
10	Stewart Ave	9-27-72	7:30 a.m.	2	05	12
	Stewart Ave	9-27-72	10:30 a.m.	1	04	8
11	Thetford at Keenly Ave	9-27-72	8:00 a.m.	2	05	12
				avg.<2		

[1] wind direction is reported on a 36 position scale representing 360°.
N = 0, E = 09, S = 18, W = 27

TABLE 2
WEATHERED DATA FOR DAYS WHEN AIR ANALYSES WERE MADE

Date	Hour	Sky Cover, tenths	Ceiling, hunds. of ft	Visibility, miles	Temp, F	Wind	
						Direction	Speed, mph
9/11/72	9 am	10	200	12	63	22	6
	10 am	10	200	12	65	25	8
	11 am	10	200	12	67	25	8
	12 am	10	200	12	68	22	8
9/14/72	2 pm	1	200	14	67	01	18
	3 pm	3	200	14	67	02	7
	4 pm	2	200	14	67	02	7
	5 pm	0	200	14	67	35	4
9/27/72	7 am	9	200	14	49	04	10
	8 am	7	200	14	49	05	12
	9 am	7	200	14	50	03	14
	10 am	5	200	14	52	04	10
	11 am	7	200	14	55	04	8

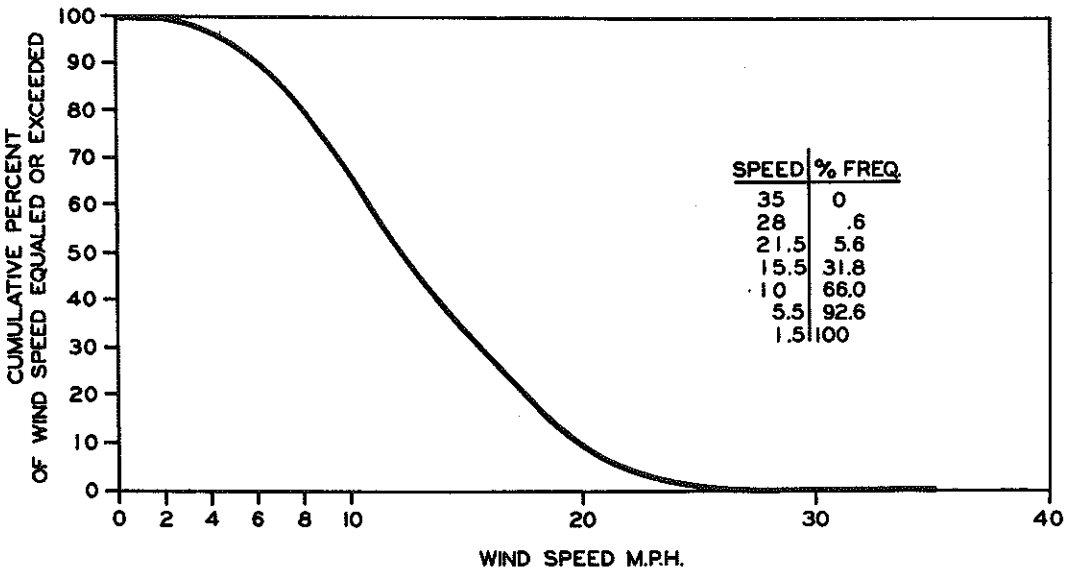

Figure 3. Wind speed distribution.

in the Michigan vicinity on the average about once every two years. Thus, the potential for air pollution episodes in the area of this project is quite low.

Existing Ambient Air Quality

No data for carbon monoxide levels in the proposed construction area were available from any source. The only information available on nitrogen dioxide levels was from a National Air Sampling Network station at the Flint City Hall, near the proposed project. Those data are strongly disputed by the State of Michigan[3], which contends that the nitrogen dioxide levels reported are considerably higher than they should be. For the present we conclude that no useable data on nitrogen dioxide levels are available.

A limited number of carbon monoxide determinations were made along the proposed construction corridor by the Department's Research Laboratory during September 1972, using the NBS indicator tube method. Table 1 presents the results obtained at locations indicated by numbers on the map in Figure 4. Table 2 shows the meteorological conditions that prevailed during the sampling periods.

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[3] Implementation Plan for the Control of Suspended Particulates, Sulfur Oxides, Carbon Monoxide, Hydrocarbons, Nitrogen Oxides, and Photochemical Oxidants in the State of Michigan, January 1972, pp. 5-9 to 5-11.

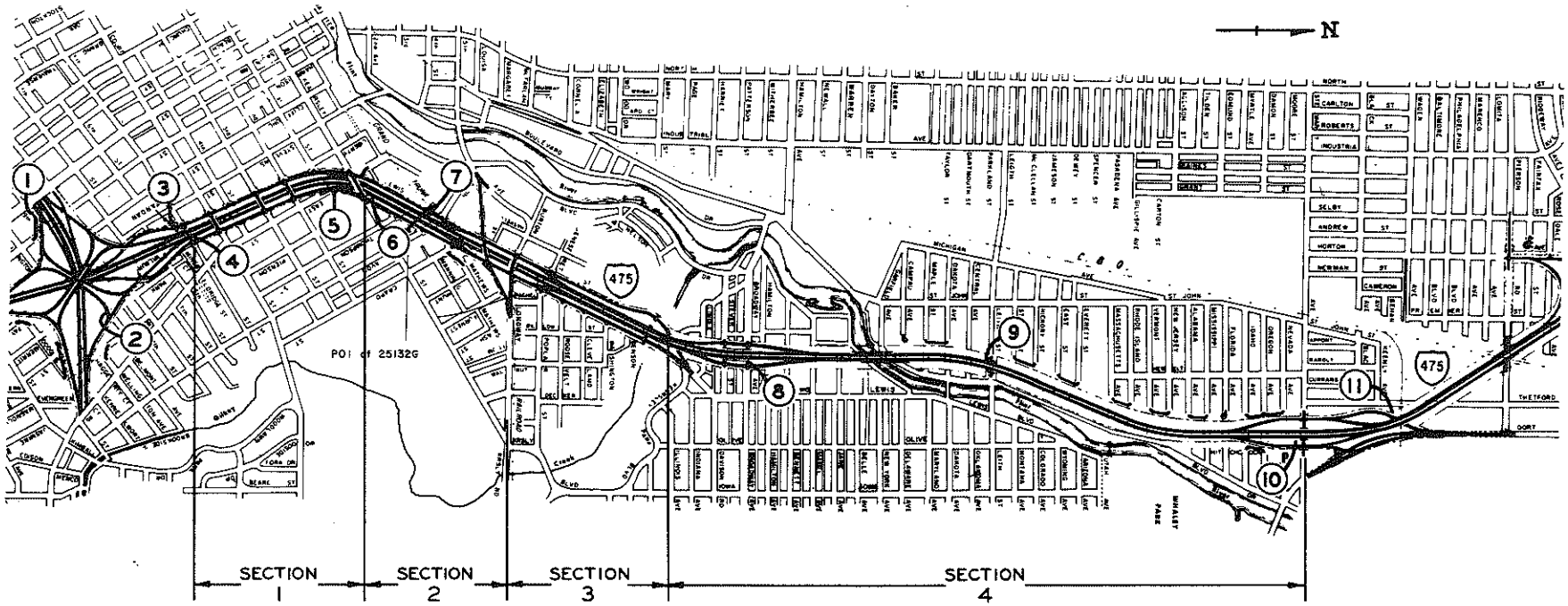

Figure 4. Location of sampling sites and sections used for pollution estimates.

Pollution Estimates

Estimates of ground level concentrations of carbon monoxide and nitrogen oxides (as nitrogen dioxide) were made for different weather conditions at several distances from and normal to the shoulder of the freeway. California's generally unvalidated highway line source dispersion model was used. This model was recommended at a workshop given by the Environmental Protection Agency at Durham, North Carolina, during May 1972. It includes meteorological conditions, traffic volumes, vehicle emission factors and highway design as variables.

Meteorological data (hourly observations) recorded at Bishop Airport near Flint were summarized over a five year period from 1967 through 1971 using a one day in nine day statistical sampling with a random start each year. The data were obtained from the National Weather Records Center at Asheville, North Carolina.

Vehicle emission factors were obtained from the U. S. Environmental Protection Agency, Office of Air Programs Publication, " Compilation of Air Pollution Emission Factors, " No. AP 42, Table 3-1. The 1975 emission factors were adjusted for vehicle speed according to Figures 3-1 and 3-2 of the same publication to fit estimated average speeds of traffic for this project. These speed adjusted emissions were further adjusted for future years according to projected national urban emissions from motor vehicles as shown in the August 14, 1971 Federal Register. Due to the effect of post-1975 model cars in the 1985 vehicle mix, only half the indicated speed correction for speeds above 25 mph was applied in generating 1985 emission factors. After 1985 no speed correction was applied to the 25 mph emission factors, since emission factors for post 1975 vehicles will not be speed-dependent. The emission factors so derived and used here are:

EMISSION FACTORS g/mi

Year	Carbon Monoxide							Nitrogen Dioxide
	Speed mph,							All Speeds
	15	20	30	35	40	45	50	
1980	---	31.0	---	18.8	17.3	14.7	14.7	2.6
1985	---	11.9	9.7	9.3	----	8.8	8.5	1.1
1990	6.6	----	6.6	----	----	6.6	----	0.6
1995	6.0	----	6.0	----	6.0	6.0	----	0.6
2000	6.0	----	6.0	----	6.0	6.0	----	0.6

No variation in NO_x emissions with speed appear since AP 42 states that, "Nitrogen oxides are independent of speed," and no speed adjustment graph was provided.

Pollution concentrations were estimated for:

1. Four representative sections, which covered the entire length of the project. See Figure 4 for identification of the sections.
2. Carbon monoxide and nitrogen oxides (as NO_2)
3. The years 1980, 1985, 1990, 1995 and 2000
4. Distances of 40, 60 and 100 meters from the edge of the freeway shoulder.

Information used as input to the model consisted of:

1. Peak p.m. (3:30 to 4:30) and off-peak traffic volumes. Traffic estimates are shown in the Appendix. Since hourly percentages for traffic flow were available, it was possible to approximate the off-peak traffic as 4 percent of ADT.

2. Worst meteorological conditions and most probable meteorological conditions. Worst meteorological conditions were taken as a 3 mph wind parallel to the roadway, under atmospheric stability class D. Calculated pollution levels under parallel wind conditions were found to be higher for stability class D than for class F. Most probable meteorological conditions (shown in data tables) were chosen for the time of day involved, and the overall most likely stability class (D) was used. Table 6 in the Appendix shows the frequency distribution of atmospheric stability classes for the meteorological data used.

3. The average depth of depression (Section 1, 19 ft; Sections 2 and 3, 10 ft) was used for the depressed sections. An average elevation of 17 ft was used for the elevated section.

4. The width of the freeway sections was calculated as follows:

Sections 1 and 4, six 12-ft lanes	72 ft
two 11-ft shoulders	22 ft
one median	26 ft
	120 ft
Sections 2 and 3, eight 12-ft lanes include two weaving lanes	96 ft
two 11-ft shoulders	22 ft
one median	26 ft
	144 ft

Service roads adjacent to Sections 1 and 2 were 55 ft from the freeway shoulder and were 36 ft in width. Pollutant levels from the service roads and the freeway were calculated separately at appropriate distances and summed to obtain pollution levels for those tables which include both the freeway and the service roads.

Pollution estimates for the a.m. peak traffic are not included because the predicted traffic volume was only 5 percent of ADT, not sufficiently different than off-peak traffic to cause a problem.

All estimates are intended to provide maximum one hour concentration and are in addition to the ambient levels. Traffic estimates for the condition of not building the freeway were not available, so future air quality for the no-build condition could not be estimated. Deterioration of air quality as traffic increases on existing roadways is to be expected.

The proposed freeway changes from depressed to elevated near Station 431+60 after a relatively straight depressed section that is 4,300 ft long. It was considered that a parallel wind near 3 mph would tend to build up pollutants in the depressed section and spill them downwind in the direction of the roadway from the point where the roadway rises to existing grade. Further analysis indicated that at least half of the pollution would continue up the slope of the rising roadway and become dispersed well above ground level. An approximation of this case was made by calculating the carbon monoxide concentration at roadway level for peak traffic conditions, using stability class D, then dispersing half that concentration downwind from a line source 44 meters in length (equal to the width of the freeway). The results obtained for parallel winds at 3 mph and 10 mph are presented below:

CO mg/cu m

	40m downwind		60m downwind	
Year	3 mph wind	10 mph wind	3 mph wind	10 mph wind
1980	22	7	15	4
1985	13	4	9	3
1990	9	3	6	2
1995	8	2	5	2
2000	8	2	5	2

Analysis of meteorological data indicates that the higher concentrations of carbon monoxide shown will very seldom occur, due to frequent variations in wind speed and wind direction.

Tables 3, 4, and 5 present the pollution estimates. Nitrogen oxides, as nitrogen dioxide, are included for information only. There is no emission factor for nitrogen dioxide as such, so no comparison of the estimates with the air quality standard is possible.

Federal air quality standards for carbon monoxide and nitrogen dioxide are:

CO: (a) 10 mg/cu m maximum 8 hr concentration not to be exceeded more than once per year.

(b) 40 mg/cu m maximum 1 hr concentration not to be exceeded more than once per year.

NO_2: 100 μg/cu m annual arithmetic mean.

The data are organized as follows:

Tables 3 and 4 - Pollution estimates for peak and off-peak traffic under worst and most probable meteorological conditions for the freeway without consideration of pollution generated by associated service roads located only along Sections 1 and 2.

Table 5 - Pollution estimates for Sections 1 and 2, including pollutants generated on the service roads.

The peak traffic data for carbon monoxide should be compared with the 40 mg/cu m maximum in the Federal standard. The data for off-peak traffic should be compared with the standard's 10 mg/cu m requirement.

TABLE 3
POLLUTION ESTIMATES FOR OFF PEAK TRAFFIC[1]
(Freeway Only)

Location	Traffic Projection Year	40 Meter Distance From Edge of Freeway Shoulder				60 Meter Distance From Edge of Freeway Shoulder				100 Meter Distance From Edge of Freeway Shoulder			
		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 12 mph wind[2]		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 12 mph wind[2]		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 12 mph wind[2]	
		CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m
Section 1	1980	3.3	479	0.2	27	2.4	343	0.1	26	0.3	47	0.1	22
	1985	2.3	298	0.1	14	1.7	213	0.1	13	0.2	29	0.1	11
	1990	1.9	168	0.1	8	1.3	120	0.1	7	0.2	17	0.1	6
	1995	2.1	207	0.1	10	1.5	148	0.1	9	0.2	20	0.1	8
	2000	2.2	221	0.1	10	1.6	159	0.1	10	0.2	22	0.1	8
Section 2	1980	2.5	431	0.3	52	1.2	219	0.3	48	0.2	44	0.3	43
	1985	1.7	221	0.2	27	0.9	112	0.2	25	0.2	23	0.2	22
	1990	1.4	125	0.2	15	0.7	63	0.2	14	0.1	13	0.1	13
	1995	1.5	154	0.2	19	0.8	78	0.2	17	0.2	16	0.2	16
	2000	1.6	164	0.2	20	0.8	84	0.2	18	0.2	17	0.2	17
Section 3	1980	3.5	602	0.4	74	1.8	306	0.4	69	0.4	62	0.4	62
	1985	2.3	294	0.3	36	1.2	149	0.3	34	0.2	30	0.2	30
	1990	1.9	175	0.2	21	1.0	89	0.2	20	0.2	18	0.2	18
	1995	1.9	193	0.2	24	1.0	98	0.2	22	0.2	20	0.2	20
	2000	2.0	203	0.2	25	1.0	103	0.2	23	0.2	21	0.2	21
Section 4	1980	2.4	421	0.2	32	1.3	222	0.2	31	0.3	47	0.2	28
	1985	1.7	208	0.1	16	0.9	109	0.1	15	0.2	23	0.1	14
	1990	1.4	126	0.1	10	0.7	66	0.1	9	0.2	14	0.1	8
	1995	1.4	136	0.1	10	0.7	72	0.1	10	0.2	15	0.1	9
	2000	1.5	146	0.1	11	0.8	77	0.1	11	0.2	16	0.1	10

[1] average vehicle speeds are reported in the appended traffic tables.
[2] angle between wind direction and roadway direction - section 1, 75°; sections 2 and 3, 27°; section 4, 50°

TABLE 4
POLLUTION ESTIMATES FOR PEAK TRAFFIC[1]
(Freeway Only)

Location	Traffic Projection Year	40 Meter Distance From Edge of Freeway Shoulder				60 Meter Distance From Edge of Freeway Shoulder				100 Meter Distance From Edge of Freeway Shoulder			
		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 11 mph wind[2]		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 11 mph wind[2]		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 11 mph wind[2]	
		CO, mg/cu m	NO_2, µg/cu m	CO, mg/cu m	NO_2, µg/cu m	CO, mg/cu m	NO_2, µg/cu m	CO, mg/cu m	NO_2, µg/cu m	CO, mg/cu m	NO_2, µg/cu m	CO, mg/cu m	NO_2, µg/cu m
Section 1	1980	9.1	1351	0.4	67	6.5	967	0.4	63	0.9	133	0.4	55
	1985	5.9	694	0.3	34	4.2	496	0.3	32	0.6	68	0.2	28
	1990	4.8	437	0.2	22	3.4	312	0.2	20	0.5	43	0.2	18
	1995	4.6	454	0.2	23	3.2	325	0.2	21	0.4	45	0.2	18
	2000	4.6	454	0.2	23	3.2	325	0.2	21	0.4	45	0.2	18
Section 2	1980	6.8	1001	0.6	92	3.4	509	0.6	85	0.7	103	0.5	76
	1985	4.4	514	0.4	47	2.2	261	0.4	44	0.4	53	0.3	39
	1990	3.6	324	0.3	30	1.8	164	0.3	28	0.4	33	0.3	25
	1995	3.4	336	0.3	31	1.7	171	0.3	29	0.3	35	0.3	26
	2000	3.4	336	0.3	31	1.7	171	0.3	29	0.3	38	0.3	26
Section 3	1980	10.3	1400	1.0	130	5.2	712	0.9	121	1.1	145	0.8	108
	1985	5.8	657	0.5	61	3.0	334	0.5	57	0.6	68	0.5	51
	1990	4.0	358	0.4	33	2.0	182	0.3	31	0.4	37	0.3	28
	1995	3.6	358	0.3	33	1.8	182	0.3	31	0.4	37	0.3	28
	2000	3.6	358	0.3	33	1.8	182	0.3	31	0.4	37	0.3	28
Section 4	1980	7.2	980	0.6	76	3.8	515	0.5	72	0.8	108	0.5	66
	1985	4.3	482	0.3	37	2.2	254	0.3	36	0.5	53	0.3	33
	1990	3.2	287	0.2	22	1.7	151	0.2	21	0.4	32	0.2	19
	1995	2.8	281	0.2	22	1.5	148	0.2	21	0.3	31	0.2	19
	2000	2.8	281	0.2	22	1.5	148	0.2	21	0.3	31	0.2	19

[1] average vehicle speeds are reported in the appended traffic tables.
[2] angle between wind direction and roadway direction - section 1, 89° ; sections 2 and 3, 41° ; section 4, 64°.

TABLE 5
POLLUTION ESTIMATES FOR OFF PEAK AND PEAK PM TRAFFIC[1]
(Service Roads Included)

OFF-PEAK TRAFFIC

Location	Traffic Projection Year	40 Meter Distance From Edge of Freeway Shoulder				60 Meter Distance From Edge of Freeway Shoulder				100 Meter Distance From Edge of Freeway Shoulder			
		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 12 mph wind[2]		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 12 mph wind[2]		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 12 mph wind[2]	
		CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m
Section 1	1980	7.4	978	0.3	43	4.5	608	0.2	39	0.8	108	0.2	34
	1985	4.3	520	0.2	21	2.7	328	0.2	19	0.5	56	0.1	17
	1990	3.3	295	0.1	12	2.1	188	0.1	11	0.4	32	0.1	10
	1995	3.4	342	0.1	14	2.2	220	0.1	13	0.4	37	0.1	11
	2000	3.7	366	0.2	15	2.4	235	0.1	14	0.4	39	0.1	12
Section 2	1980	5.2	764	0.5	81	2.8	411	0.5	75	0.6	91	0.4	67
	1985	3.0	369	0.3	40	1.6	198	0.3	37	0.4	43	0.3	33
	1990	2.3	209	0.2	22	1.2	112	0.2	21	0.3	25	0.2	18
	1995	2.4	244	0.3	26	1.3	130	0.2	25	0.3	28	0.2	22
	2000	2.6	261	0.3	28	1.4	140	0.3	26	0.3	30	0.2	23

PEAK p.m. TRAFFIC

Location	Traffic Projection Year	40 Meter Distance From Edge of Freeway Shoulder				60 Meter Distance From Edge of Freeway Shoulder				100 Meter Distance From Edge of Freeway Shoulder			
		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 11 mph wind[2]		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 11 mph wind[2]		Worst Condition Parallel Wind, 3 mph		Most Probable Condition, 11 mph wind[2]	
		CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m	CO, mg/cu m	NO_2, μg/cu m
Section 1	1980	23.1	2510	0.9	105	14.0	1582	0.8	96	2.6	274	0.7	85
	1985	11.5	1209	0.5	51	7.2	770	0.4	48	1.3	131	0.4	42
	1990	8.1	731	0.3	31	5.2	468	0.3	29	0.9	79	0.3	25
	1995	7.5	749	0.3	32	4.8	481	0.3	30	0.8	81	0.3	26
	2000	7.5	749	0.3	32	4.8	481	0.3	30	0.8	81	0.3	26
Section 2	1980	16.1	1776	1.2	274	8.8	956	1.1	138	2.0	211	1.0	126
	1985	8.1	858	0.6	70	4.4	460	0.6	65	1.0	101	0.5	58
	1990	5.7	520	0.5	42	3.1	278	0.4	39	0.7	61	0.4	35
	1995	5.4	534	0.4	44	2.9	285	0.4	41	0.6	62	0.4	36
	2000	5.4	534	0.4	44	2.9	285	0.4	41	0.6	62	0.4	36

[1] average vehicle speeds are reported in the appended traffic tables.
[2] angle between wind direction and roadway direction - section 1, 75° off peak, 89° peak p.m.; section 2, 27° off peak, 41° peak p.m.

APPENDIX

TRAFFIC ESTIMATES FOR PROPOSED I 475
(Total Traffic in Both Directions)

Year	Section 1	Section 2	Section 3	Section 4
1980	70,215 ⟨6,530(40)⟩ [2,809(50)]	70,215 ⟨6,530(40)⟩ [2,809(50)]	99,463 ⟨9,250(35)⟩ [3,978(45)]	95,469 ⟨8,878(35)⟩ [3,819(50)]
1985	84,229 ⟨7,833(35)⟩ [3,369(50)]	84,229 ⟨7,833(35)⟩ [3,369(50)]	113,457 ⟨10,137(30)⟩ [4,538(45)]	109,822 ⟨10,213(30)⟩ [4,393(45)]
1990	87,176 ⟨9,037(30)⟩ [3,487(45)]	87,176 ⟨9,037(30)⟩ [3,487(45)]	123,446 ⟨10,137(30)⟩ [4,938(45)]	121,793 ⟨11,127(30)⟩ [4,872(45)]
1995	107,288 ⟨9,391(30)⟩ [4,292(45)]	107,288 ⟨9,391(30)⟩ [4,292(45)]	136,195 ⟨10,137(30)⟩ [5,448(40)]	132,353 ⟨10,918(30)⟩ [5,294(45)]
2000	114,706 ⟨9,391(30)⟩ [4,588(45)]	114,706 ⟨9,391(30)⟩ [4,588(45)]	143,426 ⟨10,137(30)⟩ [5,737(40)]	141,505 ⟨10,918(30)⟩ [5,660(45)]

Peak Duration - Variable, around 2 hours

Commercial Vehicles
5 percent of Peak
5 percent of Off-Peak

000 = Avg. Daily Traffic
⟨000⟩ = p.m. Peak Traffic
[000] = Off-Peak Traffic (4 percent ADT)
(00) = Avg. Speed

TRAFFIC ESTIMATES FOR SECTION 1 AND 2
SERVICE ROADS

Year	Southbound	Northbound
1980	14,444 〈1,343(20)〉 [578(30)]	23,058 〈2,144(20)〉 [922(30)]
1985	15,083 〈1,403(20)〉 [603(30)]	23,929 〈2,225(20)〉 [957(30)]
1990	16,683 〈1,552(15)〉 [667(30)]	25,029 〈2,328(15)〉 [1,001(30)]
1995	17,881 〈1,565(15)〉 [715(25)]	26,709 〈2,338(15)〉 [1,068(25)]
2000	19,118 〈1,565(15)〉 [764(25)]	28,556 〈2,338(15)〉 [1,142(25)]

000 = Avg. Daily Traffic
〈000〉 = p.m. Peak Traffic
[000] = Off-Peak Traffic (4 percent ADT)
(00) = Avg. Speed

TABLE 6
STABILITY CLASS FREQUENCY DISTRIBUTION BY HOUR
(Percent)

Hour	Stability Class					
	A	B	C	D	E	F
1	0.0	0.0	0.0	55.2	16.3	28.6
2	0.0	0.0	0.0	53.7	16.7	29.6
3	0.0	0.0	0.0	50.2	20.2	29.6
4	0.0	0.0	0.0	49.8	17.7	32.5
5	0.0	0.0	0.0	52.2	17.7	30.0
6	9.9	4.4	2.5	52.7	11.3	19.2
7	9.4	12.3	13.3	48.3	9.4	7.4
8	6.9	13.8	17.2	56.2	2.0	3.9
9	5.4	13.8	18.2	62.6	0.0	0.0
10	3.0	16.7	14.3	66.0	0.0	0.0
11	3.4	17.2	17.7	61.6	0.0	0.0
12	3.0	14.3	16.3	66.5	0.0	0.0
13	2.0	12.8	20.7	64.5	0.0	0.0
14	1.0	13.8	22.2	63.1	0.0	0.0
15	3.0	10.8	20.7	65.5	0.0	0.0
16	1.5	13.3	20.2	62.6	1.5	1.0
17	3.4	9.9	18.7	62.6	3.9	1.5
18	3.0	7.4	10.3	60.1	12.8	6.4
19	0.0	0.0	0.0	62.1	22.7	15.3
20	0.0	0.0	0.0	57.1	24.1	18.7
21	0.0	0.0	0.0	54.7	25.1	20.2
22	0.0	0.0	0.0	51.7	26.6	21.7
23	0.0	0.0	0.0	51.2	25.6	23.2
24	0.0	0.0	0.0	52.2	19.7	28.1
Overall percent	2.3	6.7	8.8	57.6	11.4	13.2