

AMBIENT AIR QUALITY ANALYSES FOR THE PROPOSED
I 696 CORRIDOR

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MICHIGAN DEPARTMENT OF STATE HIGHWAYS

AMBIENT AIR QUALITY ANALYSES FOR THE PROPOSED
I 696 CORRIDOR

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Research Laboratory Section
Testing and Research Division
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Michigan State Highway Commission
Charles H. Hewitt, Chairman; Louis A. Fisher, Vice-Chairman
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Lansing, August 1971

INTRODUCTION

This report was prepared to transmit ambient air quality data obtained by the Research Laboratory relative to the Environmental Impact Statement required for construction of the proposed I 696. The data were requested by G. R. Adams in a memorandum to Paul Milliman dated July 21, 1971. Analytical data for the proposed I 696 corridor were not available from the Michigan Department of Public Health or any city or county agency. The Michigan Department of Public Health data were obtained for carbon monoxide and nitrogen dioxide at the Warren City Hall during September and October of 1970. Wayne County Health Department data were obtained for 1970 and 1971 covering carbon monoxide levels in the Detroit area and nitrogen dioxide levels on East Jefferson Ave. at Rivard St. in the City of Detroit. No data were obtained from a City of Detroit agency because Wayne County handles air pollution analysis for Detroit. No hydrocarbon data were available from other sources since little analytical work is currently being done on hydrocarbon levels in Michigan.

The air quality data obtained are shown in three sections of the report. The first section shows values obtained near the proposed I 696 corridor. The second section shows values obtained at other requested locations for comparison purposes, and the third section presents data from the two health departments. No traffic counts were made.

I - DATA OBTAINED NEAR THE PROPOSED I 696 CORRIDOR

The following sampling stations are marked on portions of a strip map for the proposed corridor. Sampling was conducted between 6:00 a. m. and 8:30 p. m.

Station Locations

Station A - Station A is located in a sparsely settled subdivision, as shown in Figure 1. The few houses near the sampling site are indicated by small rectangles. Open land area around the houses is covered by brush and tall weeds. No change in ambient air quality should be expected on moving up to 600 ft across an open field from the proposed right-of-way limits.

Station B - Station B is located within 100 ft of the proposed right-of-way as shown in Figure 2. The area east of Woodward Ave. along Ten Mile Rd. is a general business area that merges into a well maintained residential section. Sampling was done along Main St. which carried a steady flow of traffic that moved well on the occasions it was observed.

Stations C and D - Stations C and D are also shown in Figure 2. Station C is north of Station B, within 200 ft of the proposed right-of-way. Station D is north of Station C, within 600 ft of the proposed right-of-way.

Station E - Station E is located east of Station D as shown in Figure 2. This area was sampled to check a district along the railroad indicated to be "industrial" on the map of existing land use along the proposed corridor. The area actually contained mostly warehouses and shipping docks and appeared to be little used.

Data Obtained from the Sampling Stations

Station	Carbon Monoxide, ppm	Nitrogen Dioxide, ppm	Total Hydrocarbons, ppm
A	less than 1 avg.	0.03*	0.4 avg. 0.1 to 1.1 range
B	4 avg.	0.07 avg.	2.0 avg. 0.5 to 4 range
C	3 avg.	0.07 avg.	0.6 avg. 0.4 to 0.7 range
D	3 avg.	0.10 avg.	0.8 avg. 0.1 to 1.4 range
E	1 avg.	0.06	0.1

*When no average is reported a single measurement is indicated.

II- DATA OBTAINED FROM COMPARISON LOCATIONS

Station Locations

Station F - A residential area near the intersection of Twelve Mile Rd. and Southfield Rd., a Detroit metropolitan area not affected by a freeway.

Station G - A service road shoulder on the east side of the Lodge Freeway near Nine Mile Rd, adjacent to a depressed freeway without heavy surface traffic.

Station H - This station is located on the east service road shoulder of the Lodge Freeway at Seven Mile Rd., adjacent to a depressed freeway with heavy surface traffic.

Stations I and J - Station I is located approximately 200 ft east of the Lodge Freeway on Seven Mile rd., Station J is approximately 600 ft east of the Lodge Freeway on Seven Mile Rd.

Data Obtained from the Sampling Locations

Station	Carbon Monoxide, ppm	Nitrogen Dioxide ppm	Total Hydrocarbons, ppm
F	1 avg.	0.04*	2 avg. 0.1 to 4 range
G	1	0.08	0.3
H	6 avg. 4 to 8 range	0.07 avg. 0.4 to 0.10 range	2.5 avg. 0.9 to 4 range

Station	Carbon Monoxide, ppm	Nitrogen Dioxide ppm	Total Hydrocarbons, ppm
I	6 avg. 5 to 8 range	0.09	0.4
J	4 avg. 3 to 5 range	0.06 avg. 0.05 to 0.06 range	1.7 avg. 0.3 to 2.8 range

* Where no average is recorded a single measurement is indicated.

III - DATA FROM WAYNE COUNTY AND MICHIGAN DEPARTMENTS OF HEALTH

Tables 1 and 2 present data on carbon monoxide levels in the Detroit metropolitan area as obtained by the Wayne County Department of Health and the Michigan Department of Public Health, using continuous automatic analyzers. Tables 3 and 4 present similar data for nitrogen dioxide. Examination of these data in relation to Federal Air Quality Standards, cited below, show that the Federal Standards for these pollutants are being met. This is possible even though some hourly values as shown in the Tables are well above the maximum permissible levels because Federal Standards are based on results which are averaged over an 8-hr period for carbon monoxide and over a one-year period for nitrogen dioxide.

Federal Air Quality Standards

The pertinent standards as published in the Federal Register, April 30, 1971, are:

Carbon Monoxide

- a) 9 ppm maximum 8-hr concentration not to be exceeded more than once per year.
- b) 35 ppm maximum 1-hr concentration not to be exceeded more than once per year.

Nitrogen Dioxide: 0.05 ppm, annual arithmetic mean.

Hydrocarbons: 0.24 ppm (not including methane) maximum 3-hr concentration (6:00 to 9:00 a. m.) not to be exceeded more than once per year.

CONCLUSIONS

The data for carbon monoxide at the Fisher Freeway and 16th St. are particularly significant. This sampling site is on the shoulder of an exit ramp of I 75 between the Freeway and Michigan Ave., a heavily traveled street. This shows that an existing area adjacent to freeway traffic and surface traffic, with combined heavier traffic volume than would be expected anywhere along the proposed I 696, easily meets the Federal requirements for levels of carbon monoxide.

The levels of carbon monoxide and nitrogen dioxide found by Research Laboratory personnel are well within the range of values reported in the Michigan Department of Public Health data for similar times of day, so we conclude that Federal Standards for these pollutants are also being met at the locations reported in Sections I and II, and that the Standards will continue to be met along I 696 if constructed as proposed.

At this time, we do not have the necessary instrumental accessories for determining methane to correct total hydrocarbon results to the form required for comparison with the Federal Standard. One-third of the individual total hydrocarbon levels found meet the Standard without correction. The satisfactory levels of carbon monoxide and nitrogen dioxide reported in Sections I and II indicate, however, that hydrocarbon contamination of the atmosphere from automotive sources is now, and will continue to be, within acceptable limits if the proposed I 696 is constructed.

A report of experimental methods for ambient air analysis is in preparation for separate transmittal.

TABLE 1
 WAYNE COUNTY DEPARTMENT OF HEALTH
 DATA FOR CARBON MONOXIDE
 (Numbers signify parts per million)

Year	Detroit		River Rouge		Highland Park
	Max. hour	Max. 24-hr	Max. hour	8-hr avg.	Max. hr
1965	14.5	5.7	---	---	---
1968	---	---	18.0	---	---
1969	18.0	---	28.5	---	14.9
1970	---	---	10.8	7.5	---

FISHER FREEWAY - 16th St.

Date	Hours sampled	Max. hour	Avg. all hours	Max 8-hr avg.
Sept. 1970	384	11.0	4.2	---
Oct. 1970	360	11.0	3.7	7.5
Nov. 1970	720	8.0	2.9	4.8
Dec. 1970	528	10.5	3.4	6.6
Jan. 1971	744	8.5	2.2	---
Feb. 1971	576	11.0	---	8.1
Mar. 1971	552	6.9	---	5.4

TABLE 2
MICHIGAN DEPARTMENT OF PUBLIC HEALTH
DATA FOR CARBON MONOXIDE

WARREN CITY HALL
CONCENTRATION OF CO IN PPM

SEPTEMBER 1970												OCTOBER 1970																						
WARREN, MICHIGAN												WARREN, MICHIGAN																						
DAY	HR/	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MAX	HR	MIN	HR	AVG	HRS	NO. OF	DAY	
9	**	**	**	**	**	**	**	**	**	**	**	**	5	4	4	7	**	**	**	**	**	**	**	**	**	**	7	14	4	12	5	4	9	
10	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	1	3	2	3	3	2	7	44	**	**	3	44	1	14	9	10	10		
11	**	7	6	3	2	2	6	6	7	10	3	**	**	2	1	3	8	10	14	8	8	9	7	8	5	6	14	17	0	11	6	23	11	
12	**	8	9	15	10	9	10	13	12	7	8	2	0	0	2	5	6	9	5	2	2	5	4	9	9	7	15	2	0	11	7	24	12	
13	**	9	2	3	6	4	2	5	4	5	6	2	5	5	4	8	5	4	4	7	4	5	5	3	5	3	7	0	2	1	5	24	13	
14	**	3	1	4	4	1	2	3	3	3	1	2	2	3	5	7	4	6	5	6	6	7	4	3	3	7	14	1	1	4	5	24	14	
15	**	2	2	5	3	6	2	6	8	3	7	6	8	6	0	2	2	5	9	8	7	4	0	3	3	9	9	0	2	1	4	5	24	15
16	**	1	3	1	3	4	2	5	4	1	5	0	**	2	1	**	0	1	1	1	9	4	3	5	2	5	6	0	4	2	22	16	16	
17	**	5	3	4	2	4	3	5	5	4	3	2	3	5	2	3	4	3	3	9	11	15	16	11	12	16	21	0	3	6	24	17		
18	**	7	**	**	5	5	4	**	**	**	**	3	4	4	1	1	**	**	**	**	**	**	**	**	**	**	7	0	1	13	4	15	18	
19	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	0	19	19
20	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	0	20	20
21	**	**	**	**	**	**	**	**	**	**	**	**	**	**	16	22	15	23	21	16	10	9	9	2	1	0	23	16	0	23	13	21	21	
22	**	1	0	**	0	0	1	2	5	2	0	**	**	1	1	**	0	3	3	1	1	1	5	2	3	5	7	0	1	2	20	22	22	
23	**	2	0	4	2	7	6	0	4	4	1	7	2	4	4	4	7	4	6	4	5	4	6	6	6	8	13	0	0	4	4	24	23	
24	**	7	7	4	4	4	3	4	3	1	3	4	4	9	8	12	13	10	6	6	4	4	4	4	2	6	15	1	1	8	6	24	24	
25	**	8	3	4	4	5	3	9	10	7	6	4	4	2	4	0	1	2	1	1	2	0	1	1	4	10	7	0	8	4	24	25		
26	**	2	2	1	1	0	0	3	2	0	1	**	**	0	0	0	0	**	0	0	3	3	0	1	1	3	6	0	4	1	20	26		
27	**	3	1	1	2	3	4	2	1	2	2	0	8	0	2	2	4	5	4	2	3	4	5	2	0	4	5	0	0	10	2	27		
28	**	1	2	3	2	4	1	2	3	0	3	3	3	0	4	4	4	1	4	4	3	4	3	0	0	0	8	11	0	12	3	24	28	
29	**	0	**	**	**	**	**	**	**	0	0	2	3	4	4	2	4	1	6	5	4	4	4	3	3	7	7	0	0	0	3	17	29	
30	**	3	7	5	2	3	3	1	4	1	3	2	0	4	4	3	2	4	0	5	6	6	5	6	6	7	1	0	0	11	3	24	30	
AVG		4	4	5	4	4	4	5	5	3	4	3	3	3	3	5	5	6	6	5	5	7	6	4	4	4	7	1	3	4	4	4	4	4

DAY	HR/	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MAX	HR	MIN	HR	AVG	HRS	NO. OF	DAY
1	5	7	4	3	2	2	1	1	1	2	3	2	1	1	1	0	0	2	2	2	5	3	3	3	2	7	1	0	14	3	24	1	
2	3	0	3	3	0	2	5	3	4	0	0	1	0	2	**	**	**	**	0	0	1	1	3	5	4	5	0	0	1	2	20	2	
3	2	1	1	2	0	0	0	1	0	0	0	3	2	2	0	0	3	2	1	2	1	3	3	3	4	4	23	0	4	1	24	3	
4	1	0	1	0	**	**	**	**	**	**	0	1	0	1	1	0	0	1	2	0	2	2	0	2	0	2	17	0	1	1	19	4	
5	2	1	3	3	2	1	1	1	3	3	3	5	1	0	**	**	5	6	5	1	2	4	1	1	1	5	10	0	12	2	23	5	
6	1	1	1	1	3	0	4	2	4	5	1	0	**	0	2	5	7	4	4	1	**	4	2	2	6	16	0	4	3	23	6		
7	3	1	3	3	2	1	1	5	6	5	6	6	8	6	6	7	4	5	4	6	**	10	9	7	9	10	1	4	5	23	7		
8	6	7	9	8	10	6	7	8	15	13	11	7	3	3	1	1	4	5	3	3	5	6	10	7	8	15	7	1	13	7	24	8	
9	8	5	8	5	3	6	3	8	6	8	7	4	5	**	**	**	**	**	**	**	**	**	**	**	**	**	8	0	3	6	6	24	9
AVG	4	3	3	3	3	3	3	4	4	5	4	3	2	3	2	3	3	4	3	2	3	3	4	4	4	4	7	3	3	4	4	4	4

TABLE 4
 WAYNE COUNTY DEPARTMENT OF HEALTH
 DATA FOR NITROGEN DIOXIDE
 (Numbers signify parts per hundred million)

Date	24-hr avg.*
Aug. 31, 1970	2.0
Sept. 8, 1970	2.5
9,	1.5
10,	2.0
15,	2.0
16,	2.0
18,	5.0
19,	3.0
21,	2.5
25,	2.0
Oct. 19, 1970	2.0
20,	2.0
22,	2.0
23,	2.0
26,	2.0
28,	2.5
30,	2.0
Nov. 6, 1970	2.5
9,	2.5

* Measured at 1311 E. Jefferson Ave., Detroit

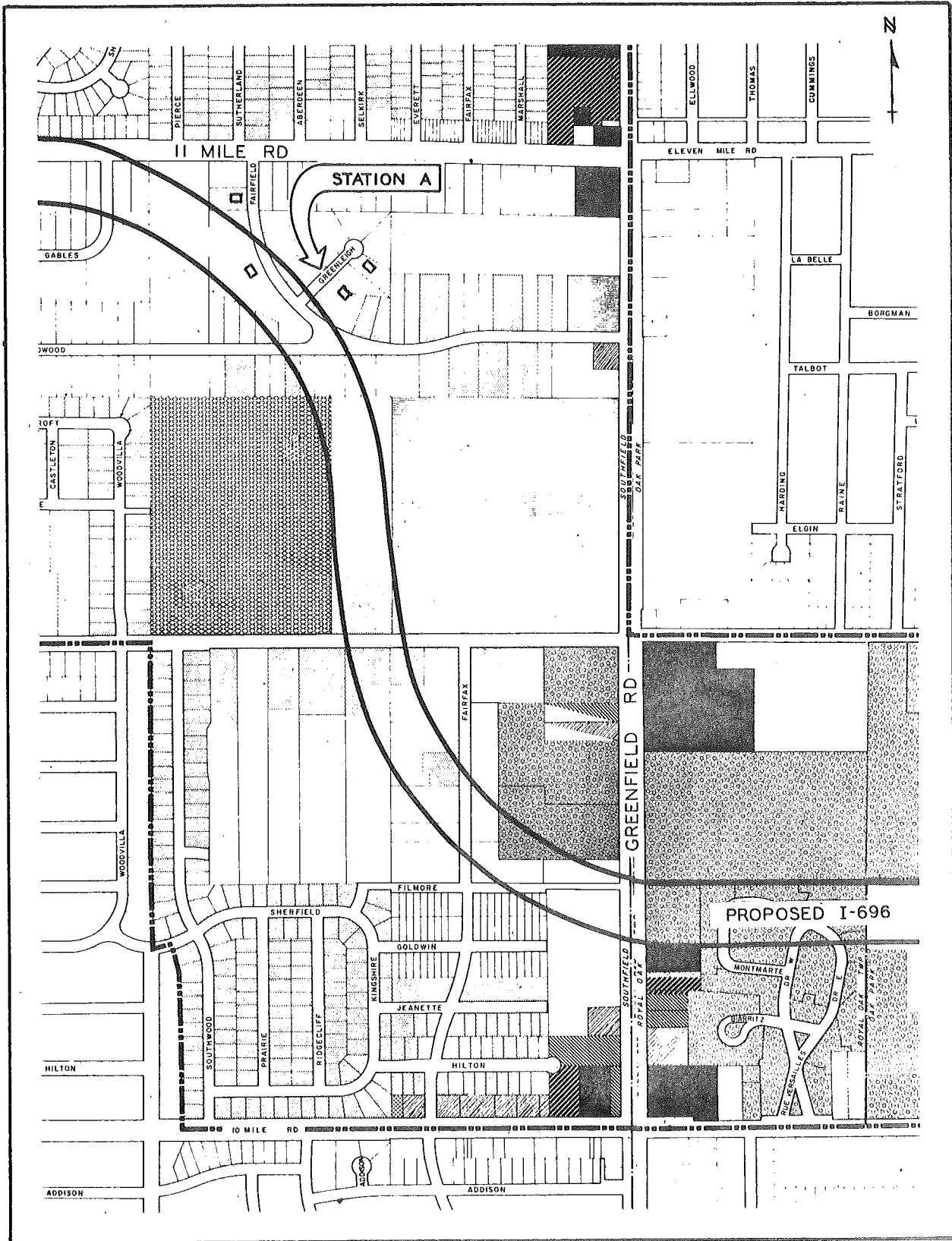


Figure 1. Station A location.

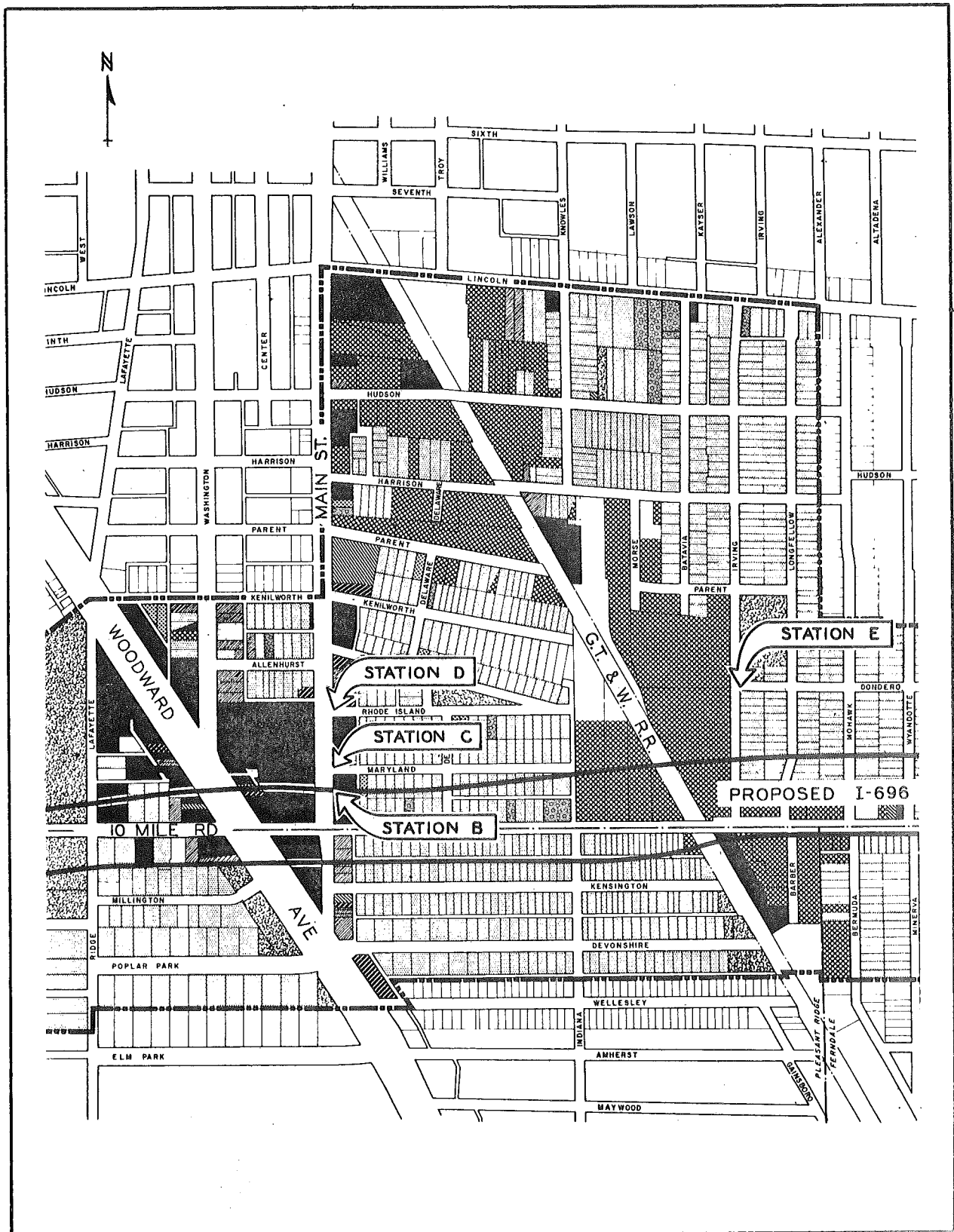


Figure 2. Station B, C, D, and E locations.