NOISE STUDY AND ANALYSIS
CITIES OF ALLEN PARK, DEARBORN HEIGHTS, AND TAYLOR - WAYNE COUNTY
RECONSTRUCTION OF THE I 94 AND M 39 INTERCHANGE

MICHIGAN DEPARTMENT OF STATE HIGHWAYS

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John P. Woodford, Director
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Introduction

This Noise Study and Analysis covers the proposed reconstruction of the I 94 and M 39 interchange in the cities of Allen Park, Dearborn Heights, and Taylor, which are southeastern suburbs of Detroit. This project was done by the Michigan Department of State Highways and Transportation as part of an Environmental Impact Statement required for the construction or reconstruction of highways, in order to be eligible for Federal-aid participation.

Traffic Data

The traffic data for the present alignment (1973) were selected from a traffic map supplied by the Surveys and Analysis Division of the Bureau of Transportation Planning (Fig. 1).

The traffic data for the proposed alignment during the design year (1995) were taken from a traffic map in Engineering Report No. 1852 (Fig. 2), and the previously mentioned Figure 1.

Since vehicle speeds during the DHV were not available, speed limits were used.

Geometric Data

The physical or geometric dimensions for the interchange reconstruction were selected from Engineering Report No. 1852, associated topographical maps, and related information supplied by the Environmental Liaison Section of the Bureau of Transportation Planning.

Planned Facility Location

The I 94 and M 39 interchange reconstruction will occupy the existing interchange location with additional right-of-way being required in the northeast and northwest quadrants of the facility as shown in Exhibit No. 10, Scheme B, of Engineering Report No. 1852.

No alternate alignments were considered.

Discussion and Conclusions

Land use categories in accordance with those of PPM 90-2 were determined for the areas along the proposed facility location (Fig. 3). Photographs 1 through 5 of the proposed location indicate the general appearance of the existing facility area.

On May 23, 1974 noise measurements were made at typical locations in the residential sections of the areas along the facility. Figure 3 shows the site locations of the noise level measurements and predictions.

The L_{10} noise levels for the present year (1973) and the design year (1995) were predicted by the method of Research Report No. R-890, "Traffic Noise Level Predictor Computer Program." Table 1 is a tabulation of these L_{10} noise levels and the existing L_{10} noise levels.

The typical existing L_{10} noise levels for the residential areas and the John Kennedy Park, at the five measurement sites selected, ranged between 77 and 79 dbA at the nearest point of exposure to the interchange, with the exception of site 4 at Bedford Rd which has an existing L_{10} noise level of 71 dbA, due to the greater distance from the existing facility.

The predicted existing L_{10} noise levels for the facility at these five sites ranged from 76 to 82 dbA, with the exception of site 4 which has a predicted L_{10} of 65 dbA. The predicted existing L_{10} for site 4 was significantly lower than the measured L_{10} noise level due to the difference in traffic volumes on the near ramp; the traffic counts during the field measurement period were nearly three times the DHV traffic count from the traffic map supplied by the Surveys and Analysis Division.

The design year (1995) predicted L_{10} noise levels are slightly lower (1 to 4 dbA) than the predicted existing L_{10} noise levels with the exception of site 4 which is 20 dbA higher than the predicted existing L_{10} noise level. This is due to the closer placement of the Southfield (M 39) to Van Born Rd ramp and the lower traffic counts used in the existing prediction.

The construction of a 12-ft high barrier from Euclid St to 200 ft south of Hanover St, and continuing from there with a 10-ft high barrier through the length of the John Kennedy Park would reduce the predicted design year L_{10} noise level in the northeast residential area and the John Kennedy Park to 70 dbA or less as required by PPM 90-2 for residential and park areas (land use category B).

The construction of a 10-ft high barrier in the northwest residential area from Raymond and Hanover St to Culver St, and from Kolb St to Pelham along the R-O-W would reduce the predicted design year L_{10} noise level to below the 70 dbA required by PPM 90-2 for residential areas.

The land use south of I 94 is primarily commercial and undeveloped land with one park area. The James Cunningham Park is located in the southwest corner of the I 94 and M 39 interchange. The predicted existing L_{10} noise level is 74 dbA at the nearest point of exposure to M 39, which is the main source of noise for this location. The predicted design year

L_{10} noise level is 70 dbA. The PPM 90-2 requirement for park areas is 70 dbA or less. The 4 dbA reduction in noise level from the existing to the design year is due to the greater set-back of I 94 in the new alignment.

Generally, the commercial areas are separated sufficiently from the I 94 traffic by the Wabash Railroad to insure a L_{10} noise level less than the 75 dbA required by PPM 90-2, with the exception of the area along M 39 which has a predicted design year level of 81 dbA and will require an 8-ft high barrier from the Wabash Railroad overpass to the southern terminus of the project near the access road to the complex.

The undeveloped land areas southwest of Pelham along the I 94 R-O-W east of M 39, along the Wabash Railroad at the ramp R-O-W, and along the I 94 R-O-W southwest of Ecorse Creek have predicted existing L_{10} noise levels of 80, 72, and 79 dbA, respectively, and predicted design year levels at the R-O-W of 81, 77, and 80 dbA. There is no design noise level for the undeveloped land use category; however, local government units should be made aware of these noise levels with regard to future land use plans.

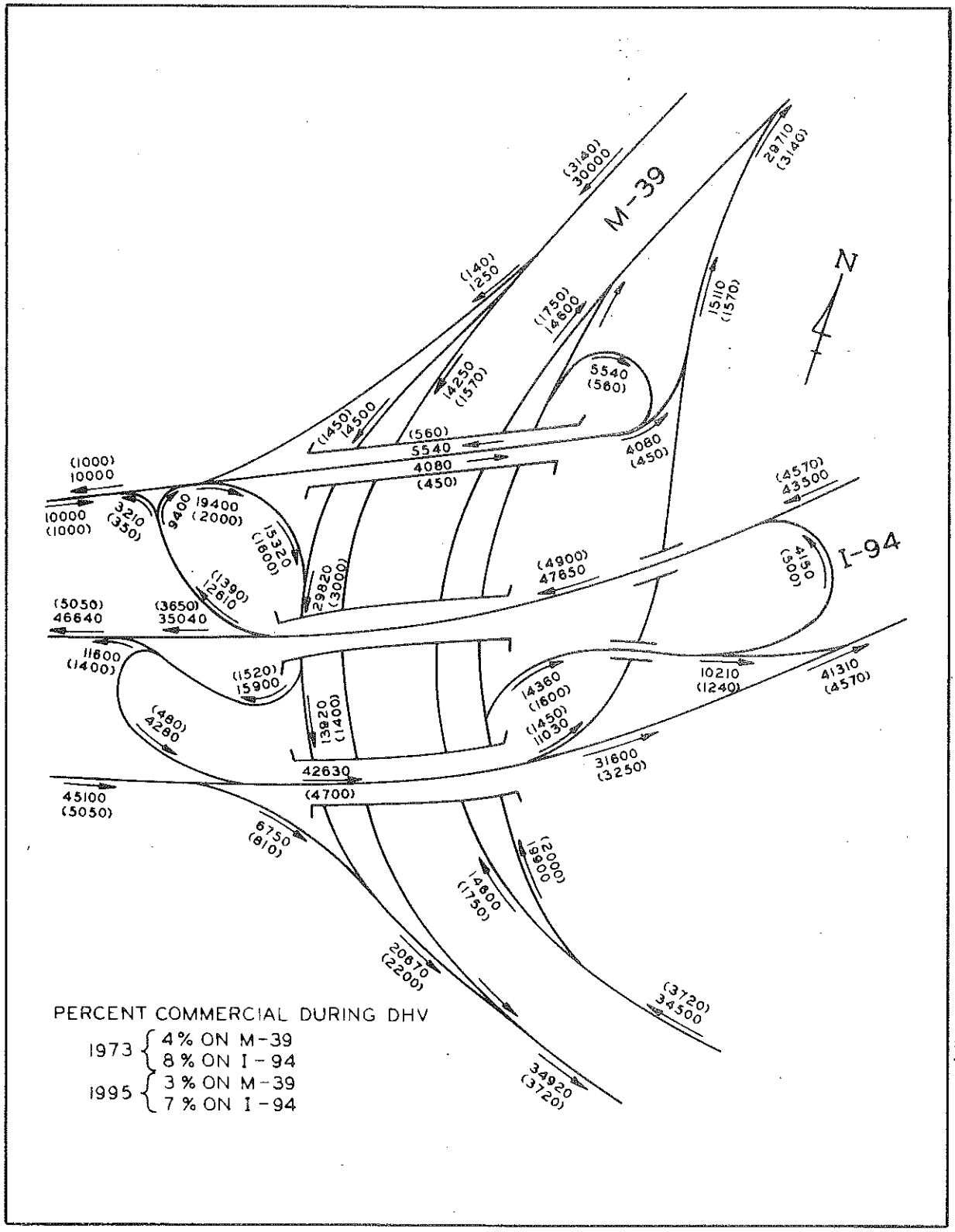


Figure 1. Traffic map, 1973.

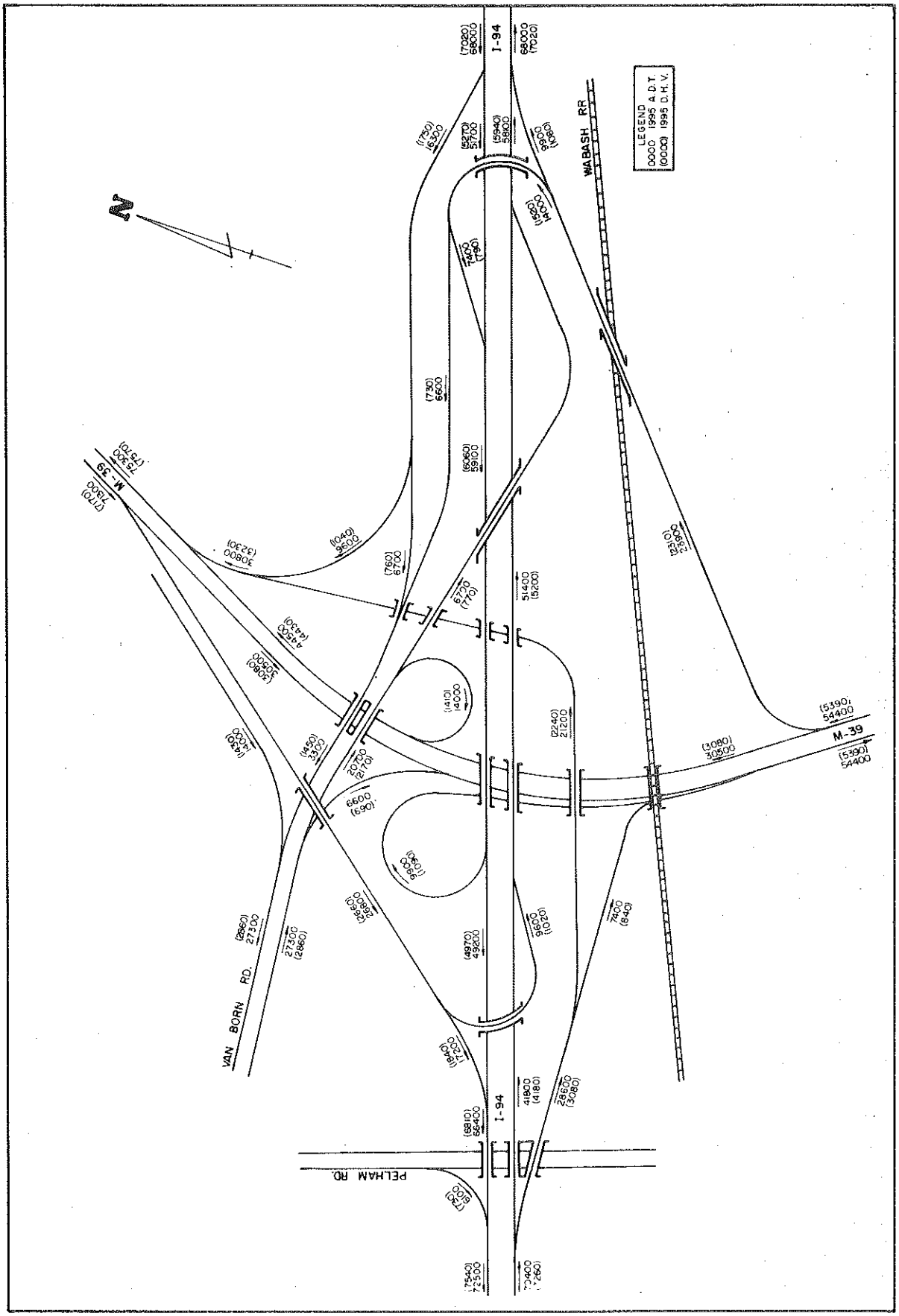
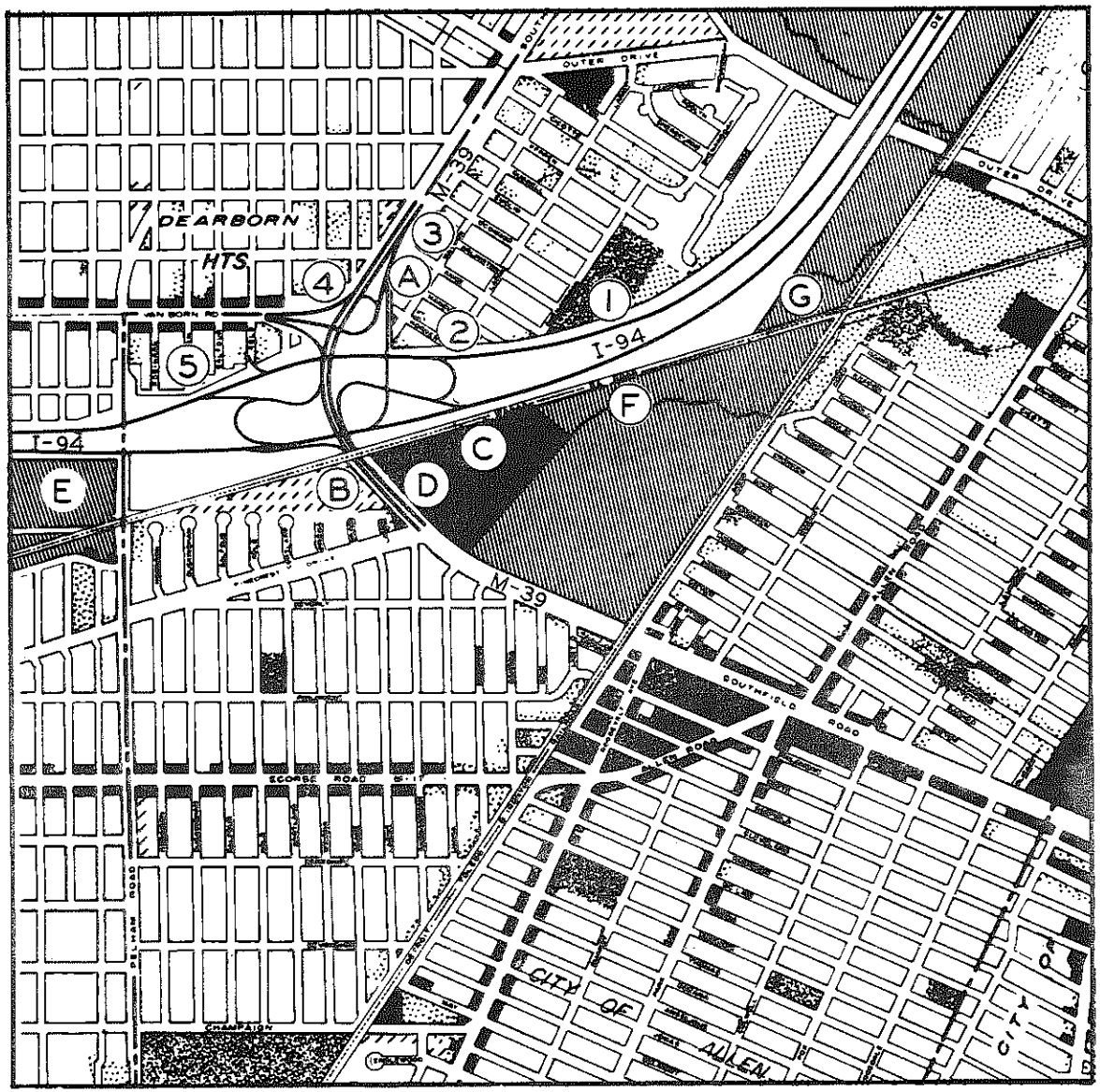


Figure 2. Design year (1995) traffic map.



EXISTING LAND USE

- SINGLE FAMILY RESIDENTIAL
- MULTIPLE FAMILY RESIDENTIAL
- COMMERCIAL & PARKING
- INDUSTRIAL
- PUBLIC
- SEMI-PUBLIC
- VACANT
- CITY LIMITS

(1) Field noise measurement and computer noise prediction site.

(A) Computed noise prediction site.

Figure 3. Existing land use and site locations for noise level predictions and measurements.

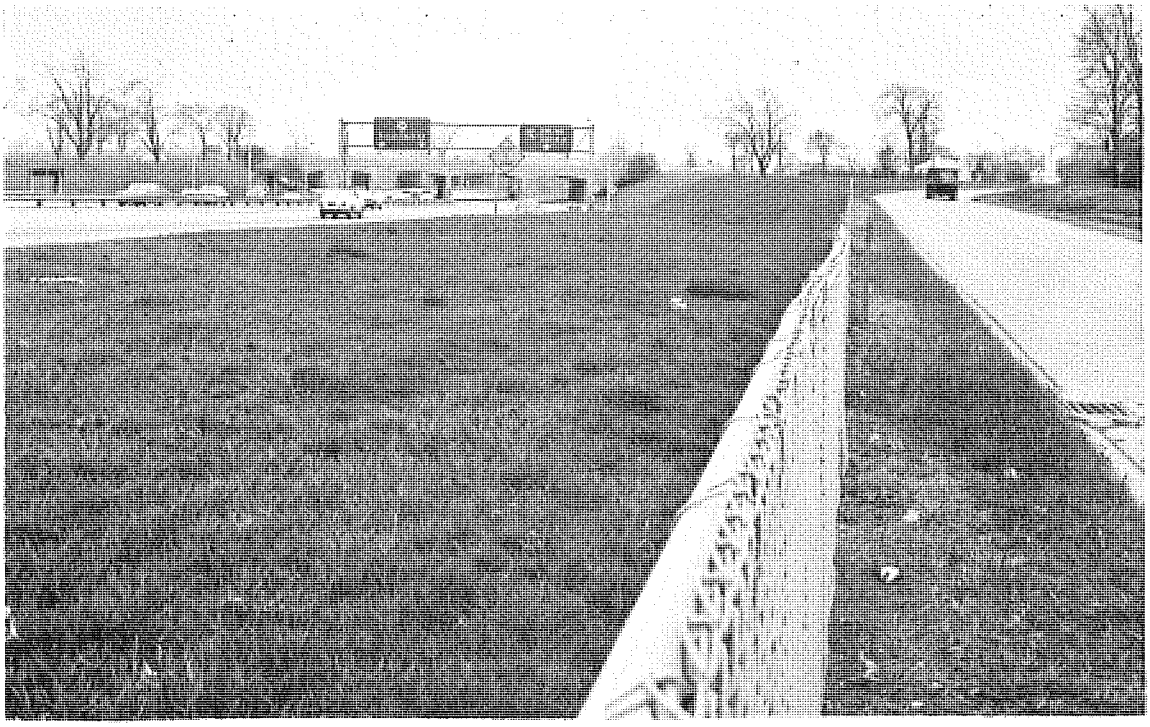
TABLE 1
NOISE LEVEL IDENTIFICATION AND COMPARISON OF PROPOSED I 94 AND M 39 INTERCHANGE
L_{10} (dbA) Noise Levels, Existing and Design Year (1995)
(Predictions from Use of R-890)

Area Number and Location	Design Level Category and Value	Existing L_{10} (dbA)		Design Year Predicted L_{10} (dbA)			
		Measured 5-23-74	Predicted	No Barrier	8-ft Barrier	10-ft Barrier	12-ft Barrier
1 John Kennedy Park at R-O-W	B(70)	77	79	78		65	
2 North corner Horger and Larme	B(70)	78	76	74		66	
3 Anne St and M 39	B(70)	77	82	79		71	70
4 Bedford St at future I 94 R-O-W	B(70)	71	65	85		69	
5 Buckingham St at future I 94 R-O-W	B(70)	79	79	75		65	
A Horger Rd at ramp R-O-W	B(70)		76	80		67	
B James Cunningham Park at M 39 R-O-W	B(70)		74	70			
C Commercial area along Wabash Railroad	C(75)		80	74			
D Commercial area fronting on M 39	C(75)		83	81	71		
E Undeveloped land along I 94 west of Pelham	D(--)		80	81			
F Undeveloped land along Wabash Railroad	D(--)		72	77			
G Undeveloped land along I 94 near Ecorse Creek	D(--)		79	80			

Photograph 1. Noise measurement site 1, John Kennedy Park, viewed from the intersection of Shenandoah and Arlington.

Photograph 2. Noise measurement site 2, Horger and Larme intersection, viewed from westbound I 94.

Photograph 3. Noise measurement site 3, Anne St at M 39 viewed from Southfield and Hanover St.



Photograph 4. M 39 at I 94 overpass, looking south.

Photograph 5. Commercial land use area south of I 94 and the Wabash Railroad, looking southeast across eastbound I 94.