

NOISE STUDY AND ANALYSIS
CITY OF ROCKWOOD - WAYNE COUNTY
RECONSTRUCTION OF THE I 75 AND
NORTH HURON RIVER DRIVE INTERCHANGE



MICHIGAN DEPARTMENT OF STATE HIGHWAYS

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NORTH HURON RIVER DRIVE INTERCHANGE

M. E. Scarlata

Research Laboratory Section
Testing and Research Division
Research Project 73 TI-176
Research Report No. R-941

Michigan State Highway Commission
E. V. Erickson, Chairman; Charles H. Hewitt,
Vice-Chairman, Carl V. Pellonpaa, Peter B. Fletcher
John P. Woodford, Director
Lansing, October 1974

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Introduction

This noise study and analysis covers the reconstruction of the I 75 and North Huron River Dr Interchange, and the widening of I 75 in the City of Rockwood, Wayne County, in southeastern Michigan. It was initiated as a direct result of a "Resolution of the City of Rockwood" (Appendix) forwarded to the Department by State Representative Alfred A. Sheridan. This resolution petitions for noise barriers along that portion of I 75 located within the city in order to reduce the noise pollution emanating from the I 75 freeway. The main areas of concern are the residential properties along Hazel Ave, Lafler Dr, and Mary Court.

This noise analysis was conducted by the Michigan Department of State Highways and Transportation under the guidelines set forth in the "Bureau of Highways Guidelines for Noise Barriers on Completed Freeways."

The applicable Federal Highway Noise Standards were first promulgated as Federal Highway Administration Policy and Procedure Memorandum 90-2 on February 8, 1973, and more recently in an expanded draft revision as FHPM 7-7-3 on August 1, 1974. Since this project was in process prior to the existence of these noise standards, the first public hearing was on November 4, 1965 and construction commenced on December 13, 1972; it is, therefore, not mandatory that noise abatement measures be brought into the design at this time.

However, the Michigan Department of State Highways and Transportation believes the potential impact of I 75 traffic noise to be of sufficient magnitude as to require every reasonable effort to reduce that impact. It is on this basis that a voluntary application of the noise standards is being conducted and FHWA approval and financial participation are requested.

Traffic Data

The traffic data for the previous alignment (1973) and for the new alignment, opening year (1975) and design year (1990), were supplied by the Surveys and Analysis Division of the Bureau of Transportation Planning (Table 1). As prescribed by Draft FHPM 7-7-3, the lesser of the design hourly volume (DHV), or the maximum volume which can be handled under traffic level of service C conditions, is to be used in the FHPM 7-7-3 noise predictions, level of service C traffic data were therefore used for the I 75 mainline roadway element and DHV traffic data on the remaining roadway elements. Traffic data for the period of 9 p.m. to 12 midnight were also supplied for the sound sensitive hours (SSH) noise predictions required by the "Guidelines for Noise Barriers on Completed Freeways."

TABLE 1
TRAFFIC DATA
Reconstruction of the I 75 and North Huron River Drive Interchange in the City of Rockwood

Item	Roadway Element														
	I 75		Ramp A Southbound Off-Ramp		Ramp B Southbound On-Ramp		Ramp C Northbound On-Ramp		Ramp D Northbound Off-Ramp						
	Existing 1973	Opening Year 1975	Design Year 1990	Existing 1973	Opening Year 1975	Design Year 1990	Existing 1973	Opening Year 1975	Design Year 1990	Existing 1973	Opening Year 1975	Design Year 1990			
Directional DHV	10	10	10	250	350	570	70	120	210	250	350	570	70	120	210
DHV Percent Commercial	45	45	30	5	5	5	5	5	5	5	5	5	5	5	5
DHV Auto Speed	45	45	30	30	30	30	30	30	30	30	30	30	30	30	30
DHV Truck Speed	45	45	30	30	30	30	30	30	30	30	30	30	30	30	30
Service C Hourly Volume	2,180	3,270	3,270												
Service C Auto Speed	45	45	45												
SSH Total Volume	1,314	1,703	2,254	26	128	200	10	19	32	68	96	150	66	95	160
SSH Percent Commercial	40	40	40	5	5	5	5	5	5	5	5	5	5	5	5
SSH Auto Speed	55	55	55	35	35	35	35	35	35	35	35	35	35	35	35
SSH Truck Speed	55	55	55	35	35	35	35	35	35	35	35	35	35	35	35

Geometric Data

The physical dimensions for the project were selected from the construction plans (Control Section 82191, Job No. 028002A, Sheets 2, 5, 7, 8, 12, and 19, for I 75 Stations 1315+00 to 1360+00).

Facility Location

The I 75 and North Huron River Dr Interchange reconstruction will occupy the existing interchange location with additional right-of-way being required in each half of the interchange to allow for re-alignment of the ramps. Figure 1 shows the previous and new alignments.

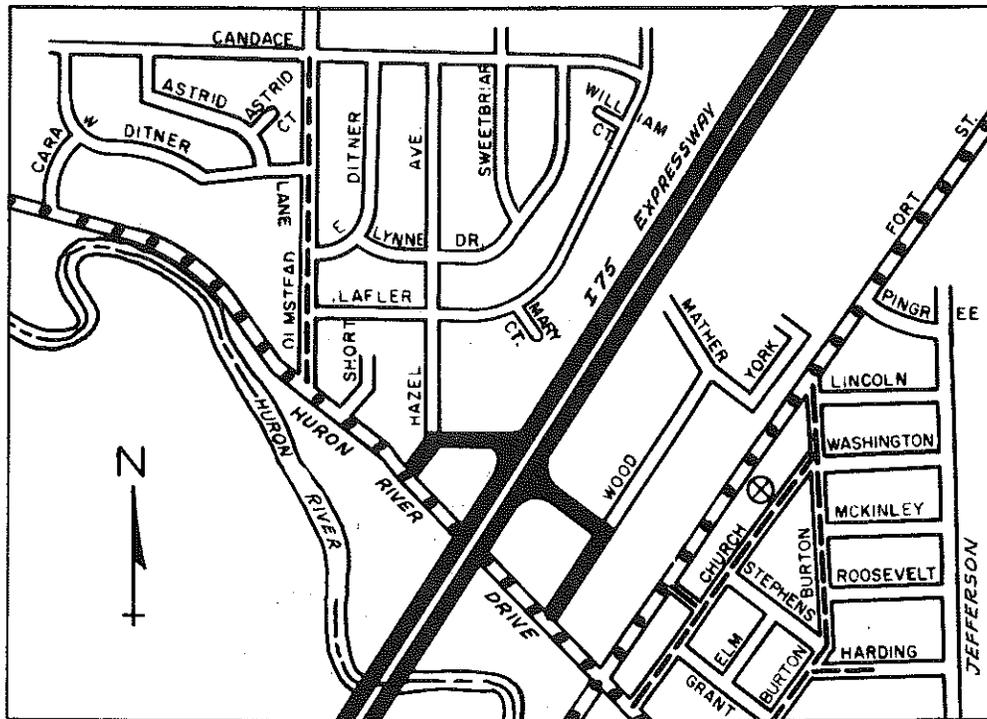
Discussion and Conclusions

Land use categories in accordance with those of Draft FHPM 7-7-3 were determined for the areas along the proposed facility location (Fig. 2). The attached photographs of the facility location indicate the general appearance of the area.

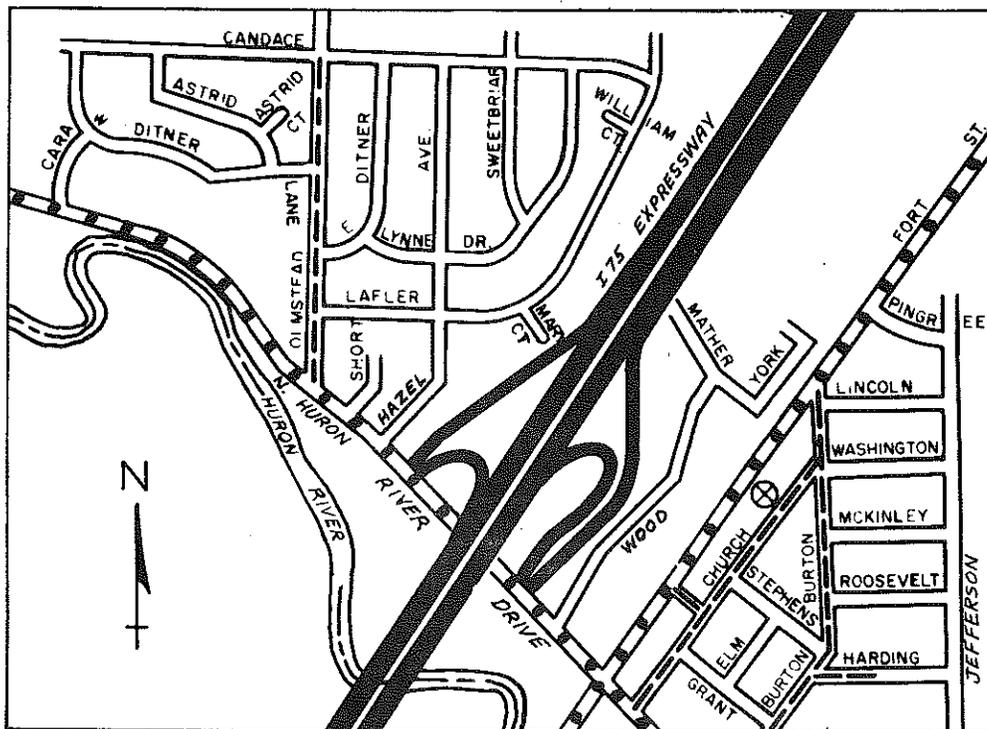
Because construction of the project was well advanced at the time this voluntary application of the noise standards was initiated, it was not possible to measure the pre-reconstruction ambient noise levels. Also, since construction has not been completed at this time, post construction measurements were not possible either.

The result of this situation is that all noise levels (existing, opening year, and design year) reported and discussed in this report are computer predictions utilizing the method of MDSHT Research Report No. R-890, "Traffic Noise Level Predictor Computer Program," (Version No. 7, August 1, 1974). Table 2 is a tabulation of the existing, opening year, and design year predicted L₁₀ noise levels.

Examination of the existing, opening year, and design year L₁₀ predicted noise levels in the residential areas along Lafler Dr (Stations 1333+00 to 1346+00, I 75) and Mary Court (Stations 9+00 to 11+00, Ramp A) indicate this area will be subjected to noise levels of 75 to 77 dbA in the opening and design years. This noise level is significantly higher than the FHPM 7-7-3 Federal Noise Standard sets as the limit for residential land use (Category B, 70 dbA). During the sound sensitive hours, the predicted L₁₀ noise level will be 72 to 75 dbA in the opening and design years.

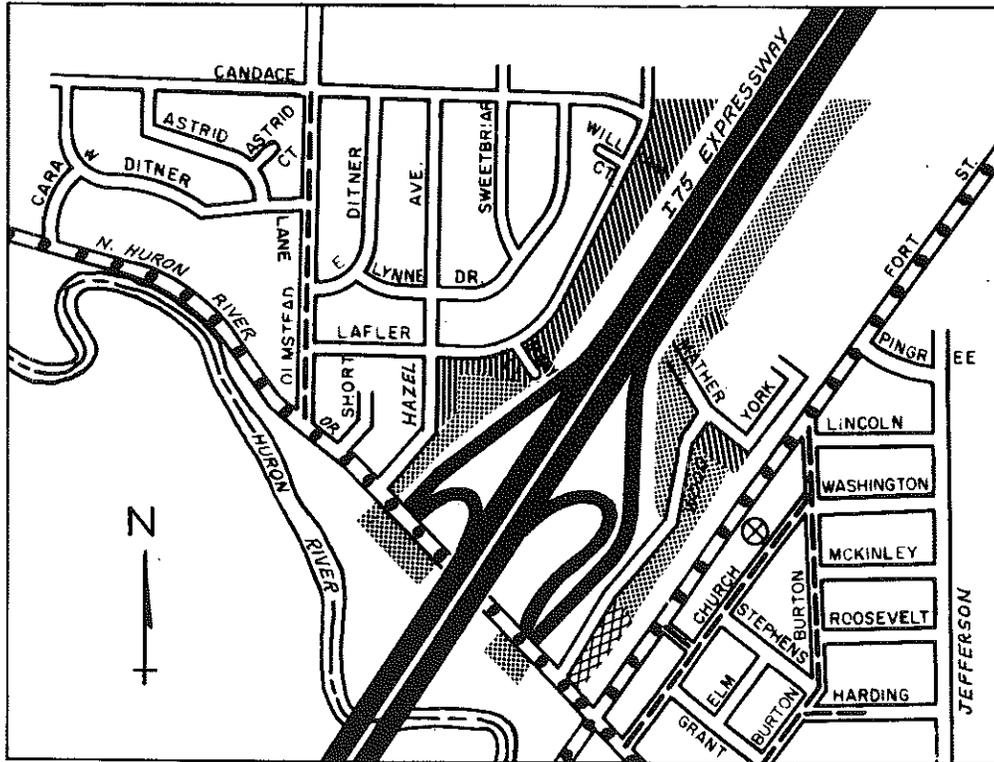


Previous Alignment



New Alignment

Figure 1. Alignment of I 75 and North Huron River Dr, City of Rockwood, Wayne County.



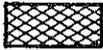
-  Category B - Residential
-  Category C - Commercial
-  Category D - Undeveloped Land

Figure 2. Area land use map.

TABLE 2
 NOISE LEVEL IDENTIFICATION AND COMPARISON OF THE
 RE CONSTRUCTED I 75 AND NORTH HURON RIVER DRIVE INTERCHANGE
 Predicted L₁₀ dbA Noise Levels for Existing (1973), Opening Year (1975), and Design Year (1990)
 (Predictions From Use of MDSHT Research Report No. R-890)

Area Location	FHPM 7-7-3 Design Level Category and Value	Predicted L ₁₀ dbA Noise Level									
		Existing (1973)		Opening Year (1975)			Design Year (1990)				
		FHPM 7-7-3	SSH	No Barrier	12-ft Barrier		No Barrier	12-ft Barrier			
					FHPM 7-7-3	SSH		FHPM 7-7-3	SSH	FHPM 7-7-3	SSH
Hazel Ave - lot 37 (at house)	B(70)	68	67	70	67	71	69	70	69	69	66
Hazel Ave - lot 36 (at house)	B(70)	67	67	70	67	70	69	70	69	68	66
Hazel Ave - lot 35 (at house)	B(70)	67	67	69	67	70	68	70	68	67	66
Lot 225 - Laffer Drive (at house)	B(70)	68	67	70	67	67	66	70	69	67	66
(Station 6+50, Ramp A)											
31789 and 31793 Mary Court (athouse)	B(70)	75	74	76	74	66	64	77	75	66	65
(Stations 10+00 and 11+00, Ramp A)											
Lot 233 - Laffer Drive	B(70)	73	72	75	73	67	64	75	74	67	66
(Station 1333+00, I 75)											
Lot 256 - Laffer Drive	B(70)	73	72	75	73	67	64	75	74	67	66
(Station 1346+00, I 75)											
Commercial along Wood	C(75)	68		70		70		70			
Undeveloped land northeast of	D(--)	73		75		75		75			
Mather along I 75											
Undeveloped land along Wood	D(--)	68		70		70		70			
Undeveloped land along Hazel	D(--)	69		71		73		73			
Undeveloped land along North Huron											
River Drive											
adjacent to I 75	D(--)	77		79		79		79			
opposite Hazel	D(--)	66		68		68		68			

To alleviate this problem the construction of a 2,355 ft long 12-ft high noise barrier wall, from Station 7+00 Ramp A to Station 1351+00 I 75, along the right-of-way line is proposed (Fig. 3). This would reduce the L_{10} noise level in the subject area 8 to 10 db and this noise level of 66 to 67 dbA would then meet the FHPM 7-7-3 requirements for residential land uses. During the sound sensitive hours the predicted L_{10} noise level will be 64 to 66 dbA.

The estimated cost of this 2,355 ft long noise barrier is \$212,000. The relationship between this barrier cost and the \$1,100,000 estimated value of the protected property (lots 226 - 261 Lafler Dr and Mary Court) indicates this project would receive a Priority No. 2 programming in accordance with the standards set by the "Guidelines for Noise Barriers on Completed Freeways." Figure 4 depicts the priority levels for the construction of noise barriers and the priority level of this barrier.

The residential area on Hazel Ave, near the I 75 ramps, will have an increased L_{10} noise level of 2 to 3 db for the opening and design years. This increase in noise level will be imperceptible to the human ear, however the design year noise level of 71 dbA will exceed the FHPM 7-7-3 design noise levels by 1 db. During the sound sensitive hours the design year noise level of 69 dbA would meet the FHPM 7-7-3 design noise level.

To protect these three properties, lots 35 - 37, on Hazel Ave would require an additional 450 ft of 12-ft high noise barrier at an estimated cost of \$40,500. The relationship between this barrier cost and the \$77,000 estimated value of the property protected indicates a noise barrier is not justified (Fig. 4).

The commercial area along Wood St, near North Huron River Dr, will have a 2 db increase for the opening and design years. Since the L_{10} noise levels will not exceed the FHPM 7-7-3 design noise levels and the increase in noise level will be barely perceptible even in the design year, no noise attenuation for this area is deemed necessary.

The L_{10} noise levels for the undeveloped land use areas (Category D) within the project limits are also listed in Table 2. There is no design noise level for this land use category; however, local government units should be made aware of these noise levels with regard to future land use plans.

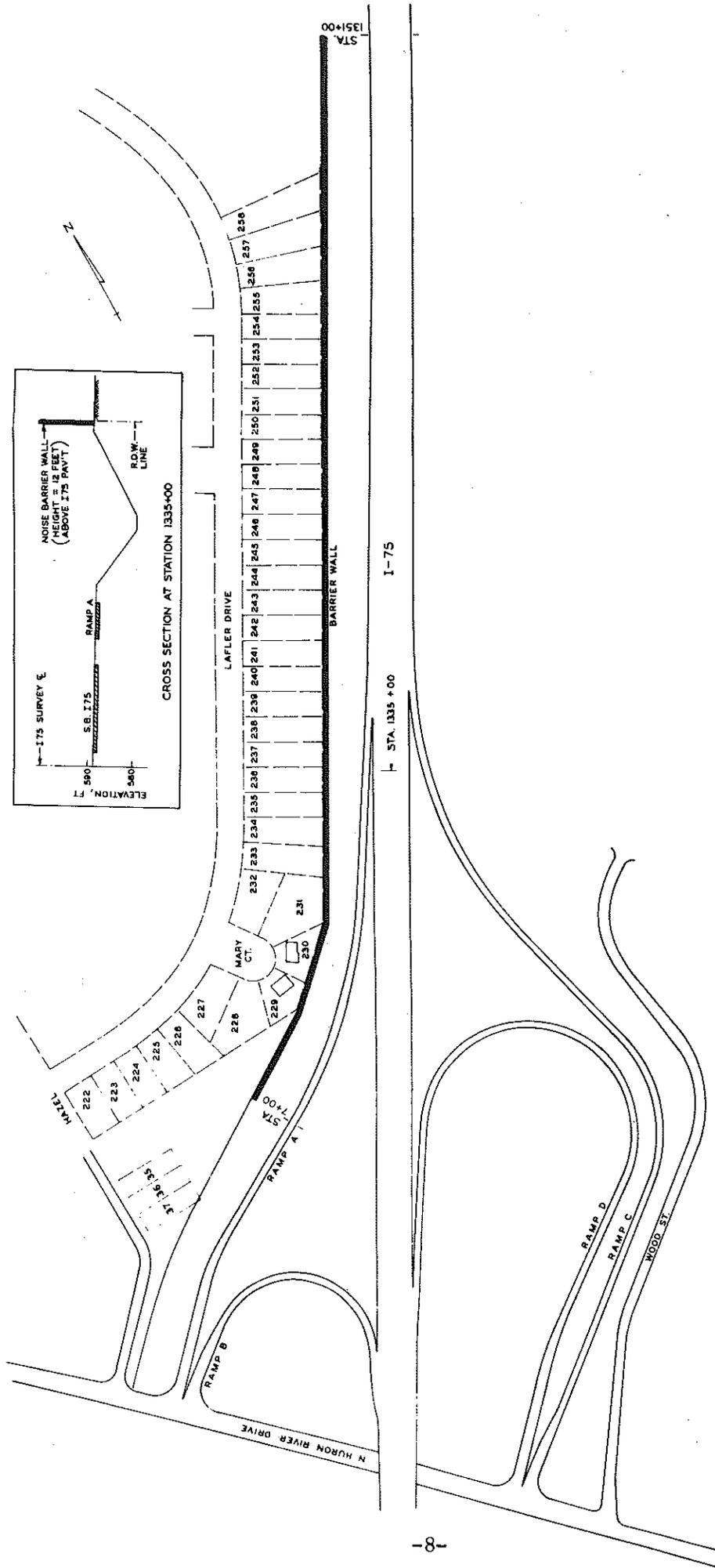


Figure 3. Proposed barrier location and cross section at I 75 and North Huron River Dr Interchange.

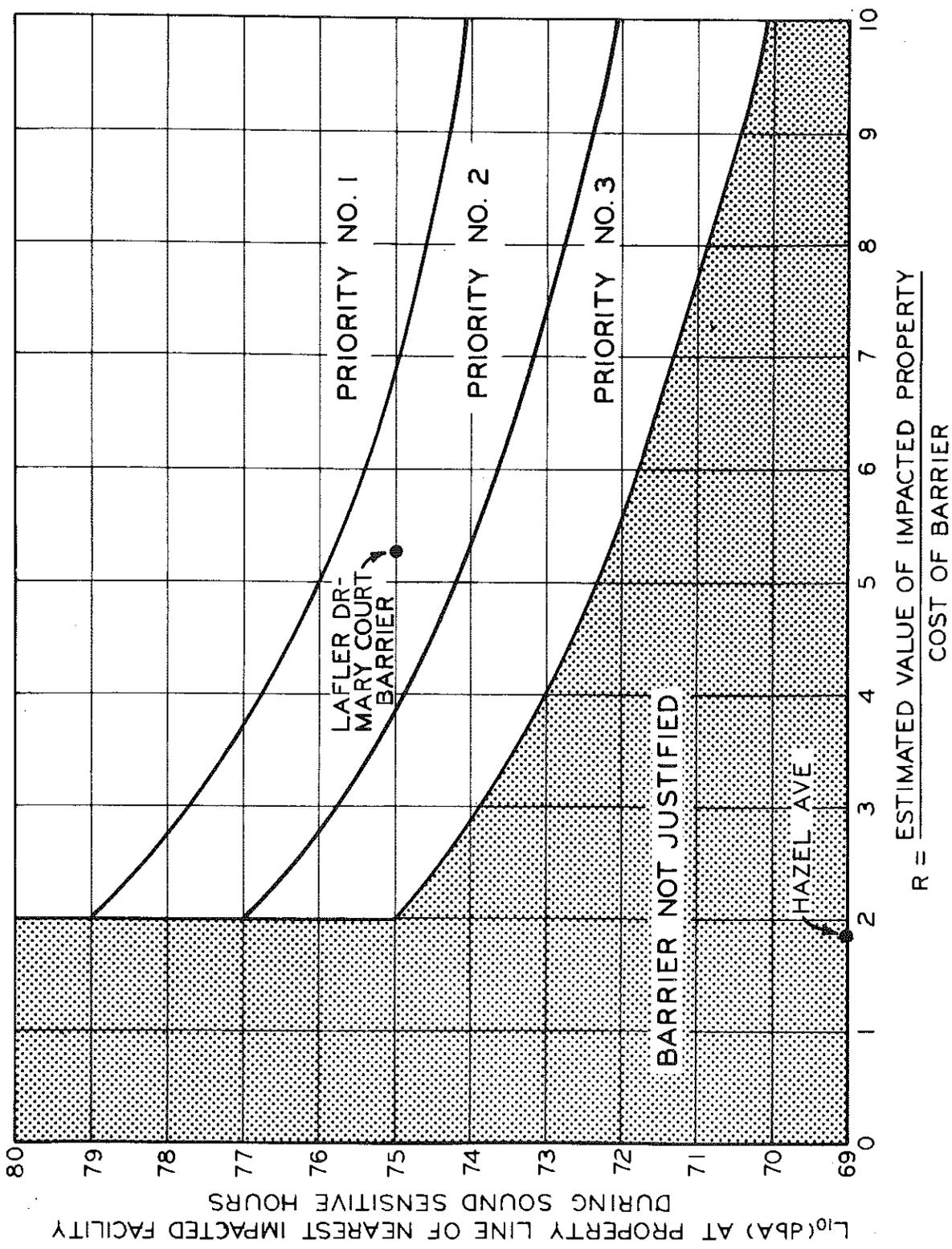
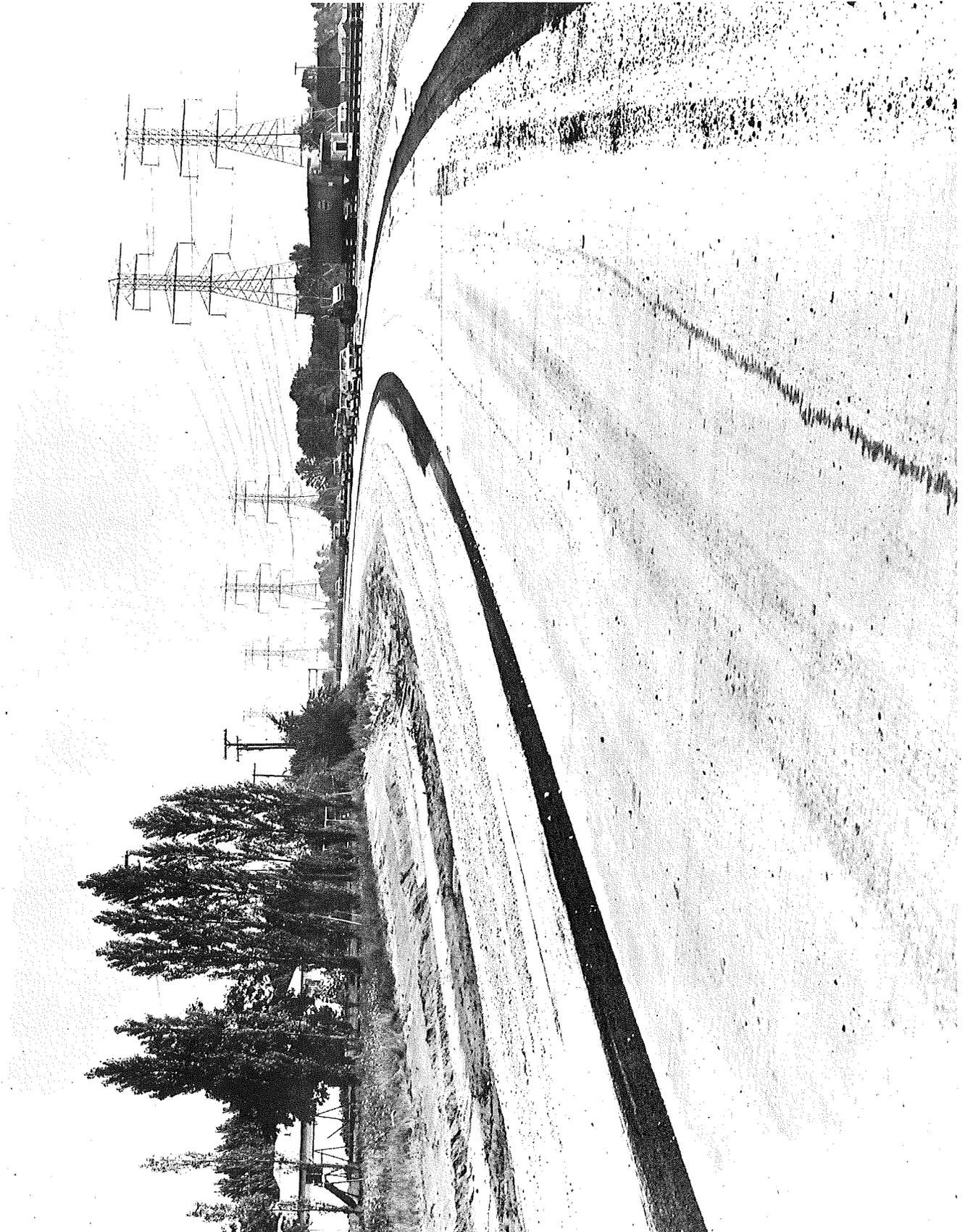


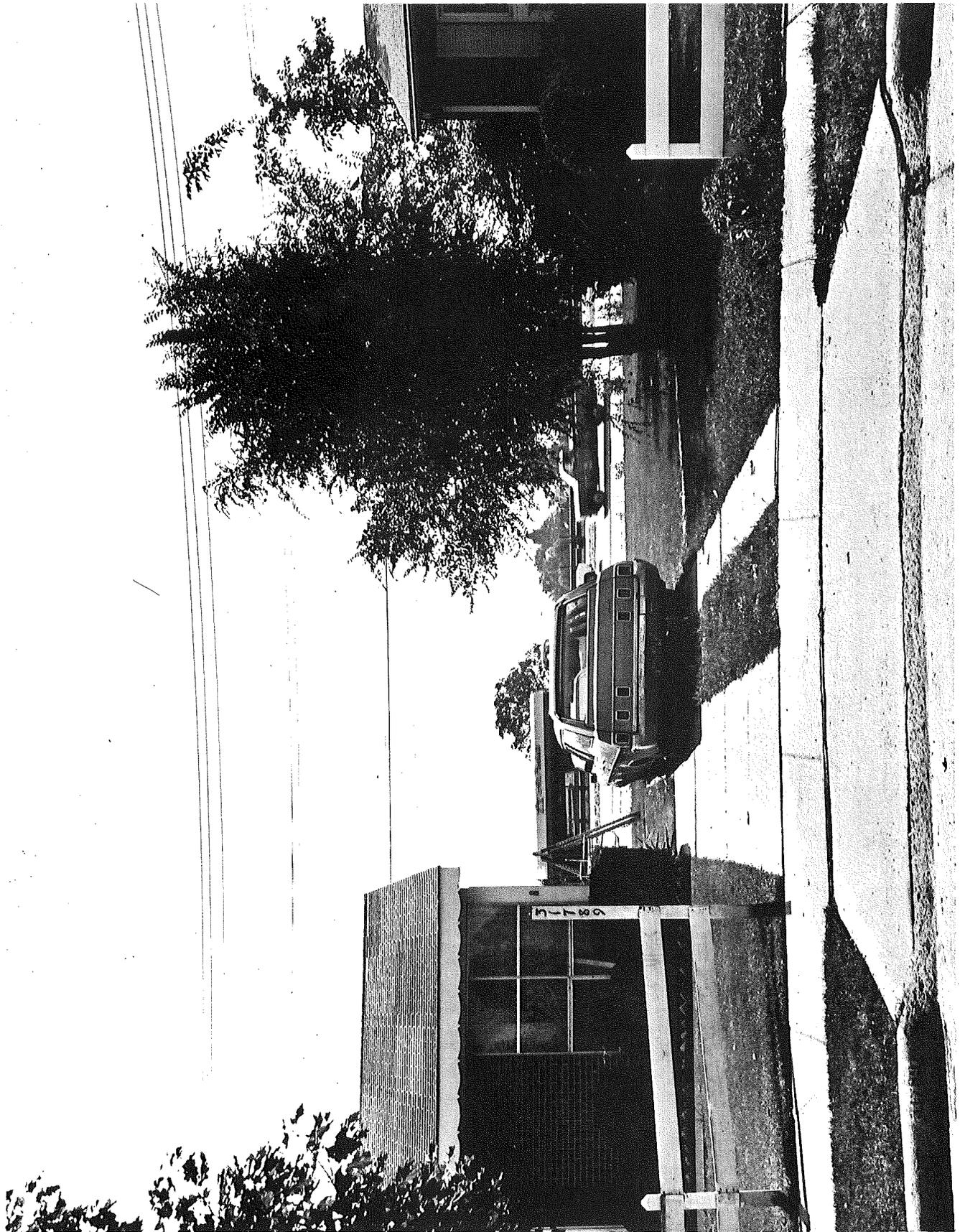
Figure 4. Priority levels for noise barrier construction.



Looking along Ramp A at the residence on Mary Court whose property extends to the right-of-way for I 75.



Residence at 31789 Mary Court viewed from the southbound off-ramp of I 75 (Ramp A).



Looking between the residences at 31789 and 31793 Mary Court at I 75.



Residence at 31793 Mary Court viewed from the southbound off-ramp of I 75 (Ramp A).

APPENDIX

Resolution of City of Rockwood

HOUSE OF REPRESENTATIVES
LANSING, MICHIGAN



TWENTY-NINTH DISTRICT
ALFRED A. SHERIDAN
8272 WEDDEL
TAYLOR, MICHIGAN 48180

MEMBER OF COMMITTEES ON
ELECTIONS-CHAIRMAN
PUBLIC UTILITIES-VICE CHAIRMAN
CORPORATIONS AND FINANCE
LIQUOR CONTROL

August 20, 1974

Mr. Paul Milliman,
Supervising Engineer-Physical Research Unit
Research Laboratory Section
Michigan State Highway Department
Lansing, Michigan 48906

Dear Mr. Milliman

Enclosed is a copy of a Resolution which was adopted and passed by the City Council for the City of Rockwood. The Resolution is self explanatory.

I would appreciate having you make the necessary investigation and expediting the construction of a noise barrier along that portion of I-75 located in the City of Rockwood in order to eliminate or reduce substantially the noise pollution emanating from traffic utilizing said highway within the City of Rockwood.

Best regards.

Respectfully,

A handwritten signature in cursive script, appearing to read "Alfred A. Sheridan".

ALFRED A. SHERIDAN
State Representative
29th District

AAS/ir

Enclosure

RESOLUTION OF
CITY OF ROCKWOOD

WHEREAS, the City Council of the City of Rockwood has continuously received numerous complaints from its citizens who reside within the City of Rockwood adjacent to and in the area of I-75 which passes through the approximate center of the City in a northerly and southerly direction with respect to the intense and continuous noise levels emanating from traffic utilizing that highway through the City of Rockwood; and

WHEREAS, the City Council has received numerous formal petitions from its citizens who reside in the areas surrounding and adjacent to that portion of I-75 located in the City of Rockwood imploring and requesting the City Council to take active steps to eliminate or reduce the noise levels emanating from the traffic using I-75 within the City alleging that the continuous and intense present noise levels emanating from traffic using I-75 within the City of Rockwood violates the health, safety and general welfare of a substantial portion of the citizens of the City of Rockwood; and

WHEREAS, the City Council of the City of Rockwood is of the opinion that the continuous and intense noise levels emanating from traffic using that portion of I-75 located in the City of Rockwood constitutes pollution of the air and the general environment of a substantial portion of the City of Rockwood in violation of the principles and protection of the environment contemplated by the Thomas J. Anderson, Gordon Rockwell Environmental Protection Act of 1970 of the State of Michigan (127 PA 1970); and

WHEREAS, the City Council of the City of Rockwood is of the opinion that the Department of State Highways and Transportation of the State of Michigan is directly responsible for the present noise pollution condition existing in the City of Rockwood in that said department initially constructed

that portion of I-75 located in the City of Rockwood and recently has made substantial additions to that highway with full knowledge and awareness of the fact that there was existing at the time of such construction substantial amounts of residential structures located adjacent to and in the area of said highway; and in the fact that during such recent construction of additions to that portion of I-75 within the City of Rockwood, the legislative concerns with respect to protection of the environment had been formally established and set forth in the foregoing environmental protection act adopted by the Michigan Legislature in 1970; and in the fact that only a minimum amount of right of way was taken within the City of Rockwood for construction of the additions to that highway in spite of the fact that the Department of State Highways and Transportation was well aware of, or should have been aware of, the fact that construction of major interstate highways close to residential developments produced substantial noise problems and complaints; and

WHEREAS, the City Council of the City of Rockwood has attempted for a substantial period of time to get the Department of State Highways and Transportation to provide some type of barrier to eliminate noise pollution to the areas adjacent and surrounding I-75 within the City of Rockwood, such efforts being unsuccessful with the result that at the present time, in the City Council's opinion, the residents of the community in the area adjacent and surrounding I-75 within the City of Rockwood are being subjected to continuous and intense noise pollution emanating from heavy amounts of traffic utilizing that portion of I-75 located within the City of Rockwood;

NOW, THEREFORE, BE IT HEREBY RESOLVED, that the City of Rockwood petitions the Department of State Highways and Transportation to immediately construct sound barriers along that portion of I-75 located in the City of Rockwood in order to eliminate or reduce substantially

the noise pollution emanating from traffic utilizing said highway within the City of Rockwood;

BE IT HEREBY FURTHER RESOLVED, that the City of Rockwood hereby petitions its Federal Representatives to intercede on its behalf with the Federal Environmental Protection Agency to request that Agency to take affirmative steps individually or in conjunction with the Department of State Highways and Transportation of the State of Michigan to construct barriers along I-75 located in the City of Rockwood to eliminate or substantially reduce the present continuous and high level of noise pollution emanating from traffic using I-75 within the City of Rockwood;

BE IT HEREBY FURTHER RESOLVED, that the City of Rockwood further petitions its State Representatives to intercede on its behalf with the Department of State Highways and Transportation of the State of Michigan to get that agency to construct noise barriers along I-75 in the City of Rockwood for the reasons set forth in this resolution;

BE IT HEREBY FURTHER RESOLVED, that a copy of this Resolution be forwarded to the City's State and Federal Representatives and to all other interested parties.

ADOPTED, APPROVED AND PASSED this 19 day of June, 1974, by the City Council of the City of Rockwood.

CITY OF ROCKWOOD

By: Howard J. Dittner
HOWARD J. DITNER, MAYOR

By: Bonnie J. Highley
BONNIE J. HIGHLEY, CLERK