

APPLICATION FOR FEDERAL FINANCIAL
PARTICIPATION IN TRAFFIC NOISE BARRIER
CONSTRUCTION ALONG SELECTED SEGMENTS
OF I 275 IN SOUTHEASTERN MICHIGAN



MICHIGAN DEPARTMENT OF
STATE HIGHWAYS AND TRANSPORTATION

APPLICATION FOR FEDERAL FINANCIAL
PARTICIPATION IN TRAFFIC NOISE BARRIER
CONSTRUCTION ALONG SELECTED SEGMENTS
OF I 275 IN SOUTHEASTERN MICHIGAN

Application is Made to the Federal Highway Administration
Under Section 114 of the Federal-Aid Highway Act of 1973,
Section 109(i), Title 23 U.S.C.
Noise Standards and Procedures for Type II Projects

Research Laboratory Section
Testing and Research Division
Research Project 76 TI-366
Research Report No. R-1052

Michigan State Highway Commission
Peter B. Fletcher, Chairman; Carl V. Pellonpaa,
Vice-Chairman, Hannes Meyers, Jr., Weston E. Vivian
John P. Woodford, Director
Lansing, March 1977

PREFACE

The purpose of this document is to describe and justify a traffic noise abatement project for which Federal financial participation is requested. Specifically, it is proposed to construct approximately 5,400 lin ft of traffic noise barrier along the west side of I 275 in Canton Township between Ford Rd (M 153) and I 94.

The authority for the application herein being made to the Federal Highway Administration derives from Section 114 of the Federal-Aid Highway Act of 1973, Section 109(i), Title 23 U.S.C., Noise Standards and Procedures for Type II projects.

NOISE ABATEMENT APPLICATION

Application

The Michigan Department of State Highways and Transportation is requesting Interstate financial participation by the Federal Highway Administration in the noise abatement measures detailed here for the described segment of I 275.

Authority

The Federal Highway Noise Standards were first promulgated as Federal Highway Administration Policy and Procedure Memorandum 90-2 on January 24, 1973. On February 20, 1974, "Interim Guidelines for Noise Abatement Projects on Previously Constructed Highways," was issued. These existing issuances have been consolidated by the Federal-Aid Highway Program Manual, Volume 7, Chapter 7, Section 3 (FHPM 7-7-3), effective May 24, 1976. Under these guidelines, Regional Federal Highway Administrators or delegated Division Engineers were given authority to approve noise abatement projects for previously constructed highways on any Federal-Aid system, provided:

- 1) A noise analysis has been performed using the general guidelines outlined in FHPM 7-7-3,
- 2) A determination has been made that the noise abatement projects are clearly of high priority,
- 3) The noise abatement project will achieve a significant noise reduction,
- 4) The noise abatement benefits are judged to outweigh the overall economic and environmental cost of the projects,
- 5) The noise abatement measures are for noise-sensitive developed activities which were in existence on May 24, 1976.

Selection of I 275 Segment

The Michigan Department of State Highways and Transportation has selected the herein described segment of I 275 to be the subject of an optional application for Federal-Aid on a traffic noise abatement project. Under the permissive authority granted by the Federal-Aid Highway Act of 1973 the Federal Highway Administration has established regulations for

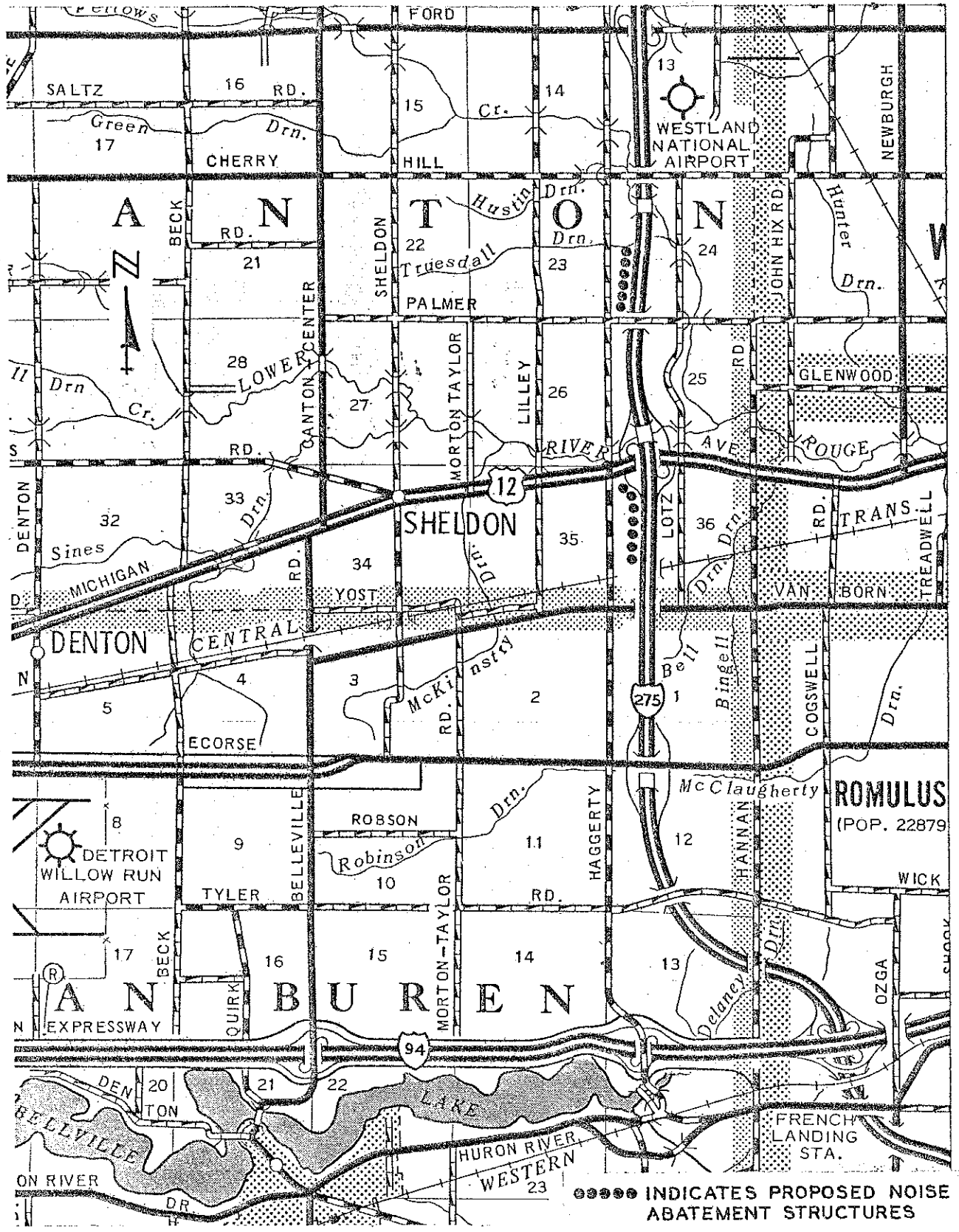


Figure 1. Location of segments of I 275 for which noise abatement structures are being proposed.

dealing with noise on "previously constructed" highways. These are designated as Type II projects (location approval received prior to July 1, 1972 and authorization to advertise for the major grade and drain elements granted prior to July 1, 1976) and are undertaken at the option of the state highway agency.

The subject route segment of I 275 is located along the western edge of the metropolitan Detroit area (Fig. 1). The I 275 north-south freeway traverses an area which is now undergoing the transition from rural-agricultural to suburban-residential use. The areas immediately adjacent to the freeway are developing as a high-density mix of apartment complexes, condominiums, town houses, and single-family residences.

The freeway is composed, generally, of two roadways of three lanes each, separated by a 94-ft median. It is a limited access facility built to Interstate standards. The selected segment studied here is primarily a rural, at-grade facility with some elevated sections located at grade separations.

The decision to apply noise abatement procedures to the subject roadway segment, and as to the type or types of abatement devices to use, are based primarily on its high noise levels. It would probably fall in the 70th to 90th noise level percentile of all Michigan limited access freeway residential frontage where the FHWA L_{10} 70 dbA standard is being exceeded.

Certain preceding decisions and other factors also form part of the basis for this application:

- 1) Noise levels along the route in future years may be lower than those at the time of opening. This could occur because of eventual, enforced statutory limits on the noise of both new and in-service vehicles; technological improvements in the noise abatement aspects of vehicle design and manufacture; and possibly from reduced future traffic volumes and speeds resulting from energy conservation measures. However, because of the uncertainty of the timetable for these future events, and of the magnitude of the reductions that may result, the Department believes it appropriate to treat the problem as it appears to exist at the present--not at some hopefully quieter future time.

- 2) The applicable Federal regulations for Type II projects do not require that the Federal noise standards be met to obtain FHWA financial participation. The Department believes, however, that every effort should be made to achieve those standards. Therefore, they are designed for in this project.

3) Care must be exercised in the selection and design of noise barrier walls to guard against light reflections, sight distance problems, to minimize the hazards of sharp shadows falling across the roadways, and to provide for drainage and snow removal. These factors will be considered during the actual design phase of the project.

Selection of this particular segment of I 275 for noise abatement application is not meant to imply that it is the only noise problem area along I 275, or that it precludes future noise abatement application for other segments of this freeway. This segment was selected because of a potentially serious noise problem in the adjacent residential area brought to the Department's attention by objections and protests from the area residents and supported by requests from local and state officials and legislators. The township has also submitted a formal resolution supporting noise abatement measures (Appendix A).

NOISE ANALYSIS

Definitions

In order to prevent ambiguities, several terms used in the FHPM 7-7-3 Federal Highway Noise Standards are given Michigan definitions as follows:

1) 'Significant Noise Reduction' - An attenuation of at least 6 dbA (preferably over 10 dbA), in the L_{10} noise level at the protected human activity facility nearest the barrier.

2) 'Noise Abatement Benefits' - Any improvement in, or the betterment of, the environmental noise conditions associated with humans.

3) 'Noise Sensitive Developed Activities' - Those portions of land which contain improvements or activities devoted to frequent human use or habitation. For improvements under construction or subsequently added, the date of issue of a building permit establishes the date of existence.

Analysis

Existing noise levels were measured at representative locations in the subject area prior to the opening of the I 275 freeway. These L_{10} levels ranged from 47 to 55 dbA at the freeway right-of-way (R-O-W).

Based upon the traffic data given in Table 1, and the appropriate plan and elevation sheets, L_{10} noise levels were predicted as outlined in FHPM

7-7-3. The resulting L_{10} levels for the design year (1990) ranged from 78 to 82 dbA at the freeway R-O-W. The L_{10} 70 dbA contour was also predicted and is shown in Figure 2.

The residential communities bordering on I 275 and the data of the first building permit for each site are also identified on Figure 2. This information was obtained from the public records of Canton Township.

Normally, the funding for noise abatement projects on previously constructed highways, such as this portion of I 275, will be requested by the Department only for those noise-sensitive developed activity areas which existed prior to the date of construction contract award of the highway. In addition, only those noise-sensitive developed activity areas in which a significant portion of the area has been impacted will be considered for noise abatement in this application.

TABLE 1
INTERSTATE HIGHWAY I 275,
CANTON TOWNSHIP, MICHIGAN
1990 DESIGN YEAR TRAFFIC DATA

Item	Roadway Element		
	I 275		Ramp C
	M 153 to US 12	US 12 to Ecorse Rd	
Directional DHV	4,290	4,140	240
DHV Percent Commercial	7	7	6
DHV Auto Speed	50	50	35
DHV Truck Speed	50	50	35
Service C Volume	4,290	4,290	
Service C Auto Speed	40	40	
Service C Truck Speed	40	40	

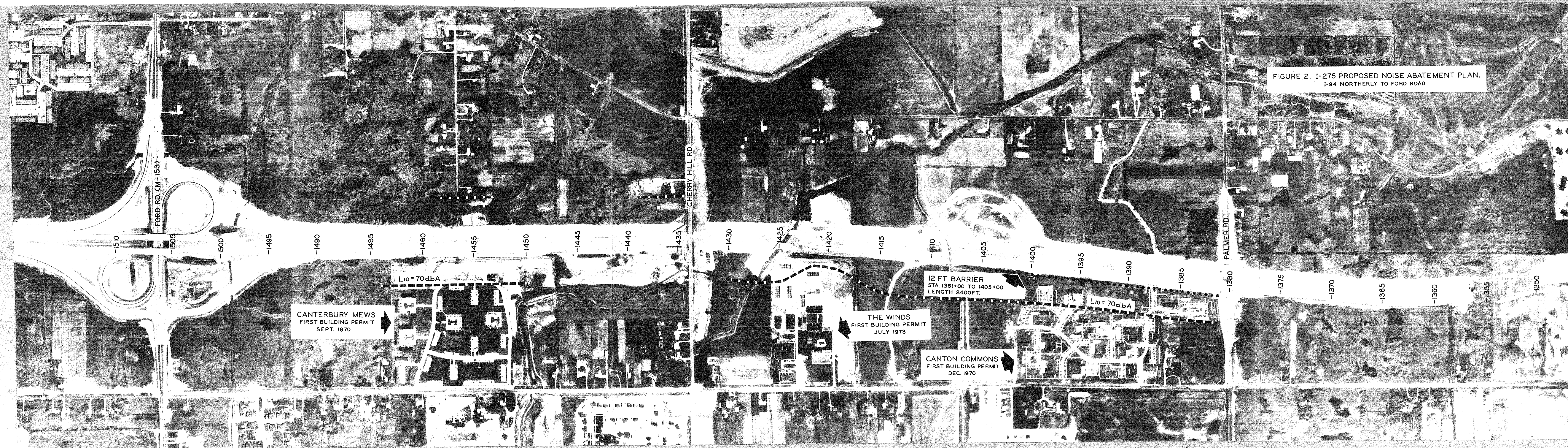


FIGURE 2. I-275 PROPOSED NOISE ABATEMENT PLAN.
I-94 NORTHERLY TO FORD ROAD

CANTERBURY MEWS
FIRST BUILDING PERMIT
SEPT. 1970

THE WINDS
FIRST BUILDING PERMIT
JULY 1973

CANTON COMMONS
FIRST BUILDING PERMIT
DEC. 1970

12 FT BARRIER
STA. 1381+00 TO 1405+00
LENGTH 2400 FT.

L₁₀ = 70 dBA

L₁₀ = 70 dBA

FORD RD. (M-153)

CHERRY HILL RD.

PALMER RD.

-1510

-1505

-1500

-1495

-1490

-1485

-1480

-1475

-1470

-1465

-1460

-1455

-1450

-1445

-1440

-1435

-1430

-1425

-1420

-1415

-1410

-1405

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-1385

-1380

-1375

-1370

-1365

-1360

-1355

-1350

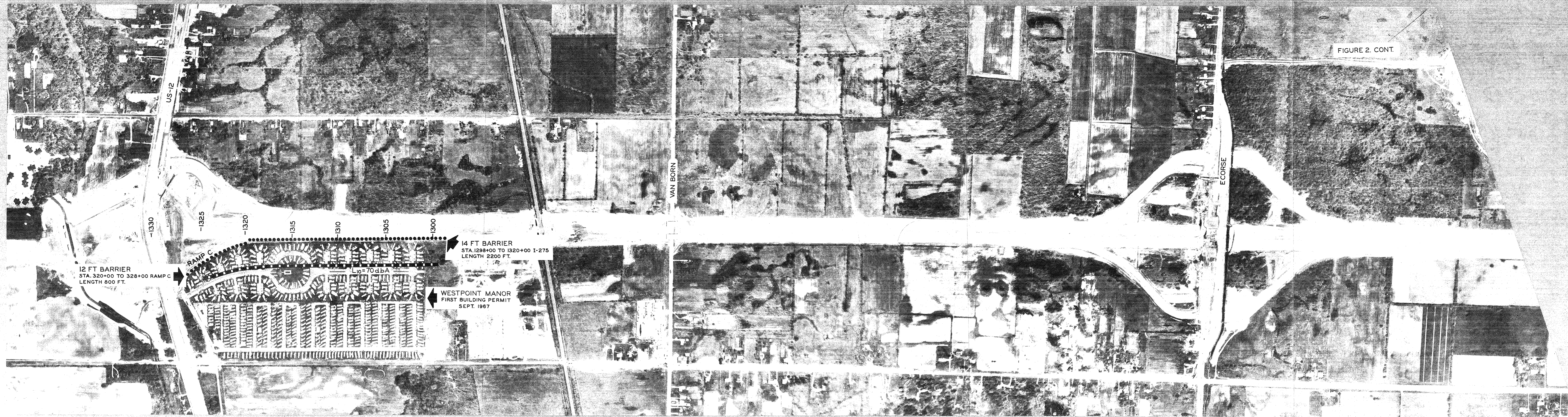


FIGURE 2. CONT.

12 FT BARRIER
STA. 320+00 TO 328+00 RAMP C
LENGTH 800 FT.

RAMP C

-1330

-1325

-1320

-1315

-1310

-1305

-1300

14 FT BARRIER
STA. 1298+00 TO 1320+00 I-275
LENGTH 2200 FT.

WESTPOINT MANOR
FIRST BUILDING PERMIT
SEPT. 1967

$L_{10} = 70 \text{ dBA}$

VAN BORN

E CORSE

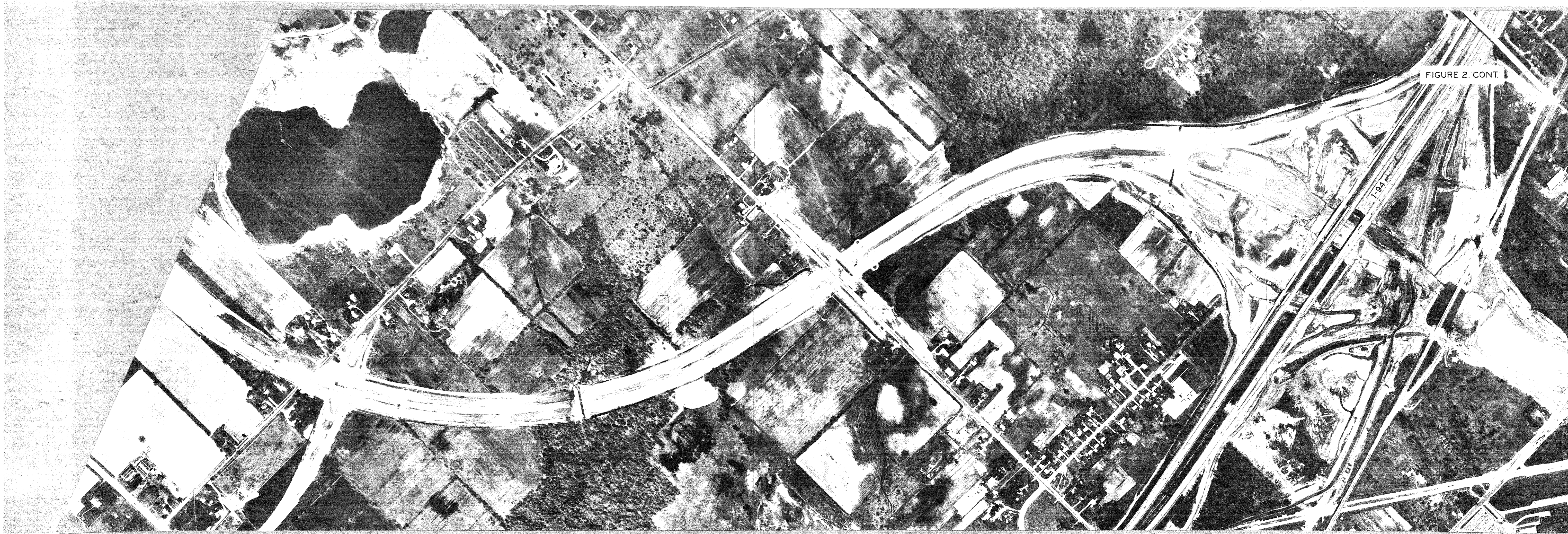


FIGURE 2. CONT.

I-94

NOISE ABATEMENT ALTERNATIVES

Having identified the existing and predicted noise levels, and thereby becoming aware of the potential problem, it is appropriate to consider the available alternatives. It is the Department's opinion that in this case there are essentially only two:

Alternate A - Do Nothing

This alternate calls for no special action for noise abatement. Noise complaints would be rejected because the project predates the Federal Noise Standards.

Alternate B - Build Noise Barriers

Under this alternate the Federal residential noise limit of L_{10} 70 dbA and a significant noise reduction would be achieved at all residences within noise-sensitive developed activity areas where the noise abatement benefits are judged to outweigh the economic cost of the project. The design year (1990) noise level predictions were calculated according to FHPM 7-7-3 and are given in Table 2 and the predicted L_{10} 70 dbA contour is shown in Figure 2. The total length of required barrier is about 5,400 lin ft at an estimated cost of \$90 per lin ft, or an estimated total expenditure of \$486,000. Because of the narrow R-O-W along the subject segments the proposed noise barrier will be of the wall type.

A major portion of this I 275 segment has undeveloped or agricultural land uses adjacent to the R-O-W, thus requiring no abatement measures. However, there are four residential complexes along this segment which have been studied to determine the necessity of noise abatement measures. Of these four complexes it was determined that 'Canterbury Mews' and 'The Winds' did not justify the undertaking of noise abatement projects as there were no residential buildings that would experience an L_{10} noise level in excess of the Federal noise standards. The Canterbury Mews complex, located between Ford Rd and Cherry Hill Rd on the west side of I 275, did have one structure which would experience an L_{10} 73 noise level; however, this is the office for the complex and by itself would not justify the high cost of erecting a barrier at the location. The Winds complex, located between Cherry Hill Rd and Palmer Rd on the west side of I 275, also has no residential buildings in existence which will experience noise levels in excess of the Federal standards. Moreover, The Winds complex has an existing earth berm outside of the freeway R-O-W which effectively shields all but one of the existing foundations, the value of this one foundation would not

TABLE 2
1990 DESIGN YEAR NOISE LEVELS AND BARRIER HEIGHTS

Noise Sensitive Site and Roadway Stationing	Observer to Center of Near Lane, ft	Roadway Elevation, ft	No Barrier		With Barrier	
			L10 dbA Noise Level*	Distance From Right-of-Way to L10 ≤ 70 dbA, ft	Height, ft	L10 dbA Noise Level*
Westpoint Manor						
1300+00	73	14	81	238	12	68
1305+00	73	6	82	281	12	70
1315+00	83	5	81	269	12	69
1320+00	113	8	78	237	10	68
Canton Commons						
1385+00	145	4	77	288	10	70
1398+00	165	4	76	288	10	70
The Winds						
1420+00	225	3	66	---	--	--
1424+00	150	4	72	238	--	--
Canterbury Mews						
1453+00	250	2	73	275	--	--
1460+00	400	4	69	275	--	--

* At nearest Category B land use.

justify the expense of noise abatement measures. It would be more appropriate at this site for the developer to extend the existing earth berm along the creek to shield the remaining foundation when the need arises.

The remaining two complexes 'Canton Commons,' located between Cherry Hill Rd and Palmer Rd, and the 'Westpoint Manor Mobile Home Park,' located between US 12 and Van Born Rd, both have residential structures and playground areas which will experience severe environmental noise impacts as demonstrated when comparing the L_{10} levels of 47 to 55 dbA, which existed prior to the freeway opening, to the predicted design year L_{10} levels of 76 to 82 dbA. Moreover, treatment of an area of such high noise levels and population density must be considered a high priority project. Since I 275 at the Westpoint Manor location is an elevated facility, the noise barrier would have to be constructed at the edge of the shoulder, at an approximate distance of 20 ft from the center of the near lane. The necessary safety considerations, such as protecting guardrail where appropriate, will be part of the design. At the Canton Commons location the noise barrier would be constructed along the freeway R-O-W.

The barriers of the lengths, heights, and locations shown in Figure 2 are designed to ensure that all design year noise levels in the residential areas are L_{10} 70 dbA or less. When the large number of potentially impacted residences (134 homes and the ground floor residents of 21 apartment buildings), residential yard areas, and residents are compared to the moderate cost of the project, the trade-off between noise abatement benefits and economic cost is, in the Department's opinion, justified.

The barrier walls proposed may be of the concrete slab-panel type as used and proven on I 35W near the University of Minnesota in Minneapolis or of a similar design using H-beam supports. These units have reasonable esthetics, practically no maintenance, are relatively easy to erect and meet all physical requirements for sound barriers.

End-sections of barriers, whenever possible, will have 100 to 200 ft step-taper sections to reduce the annoying 'startle' effects of sharp end-sections, i. e., where a very noisy vehicle moving at high speed suddenly breaks out from behind the barrier wall. (These step-taper sections are additional lengths not shown on Figure 2 or included in the 5,400-ft length.)

Assumptions necessary for the approved noise predictor computer programs in use today, coupled with the great difficulty in accurately predicting future traffic parameters, results in at least a 2 dbA uncertainty band around noise predictions. In an effort to compensate for this uncertainty,

2 ft have been added to the calculated height of each barrier in Figure 2. This precaution, as appropriate in all human environmental considerations is designed to favor the potentially impacted citizen, and will be achieved, at a nominal \$6,000 to \$12,000 additional cost--2 to 3 percent of the total cost.

Recommended Alternate

It is the considered recommendation of the Michigan Department of State Highways and Transportation that the Federal Highway Administration approve Interstate participation for implementation of Alternate B as described above and in Figure 2.

MICHIGAN TRAFFIC NOISE ABATEMENT

To support and supplement this application a brief review of the Department's noise abatement related activities has been included below.

Noise Committee

In the spring of 1974 the Department established an ad hoc Noise Committee to formulate guidelines for the construction of noise barriers. In September of 1974 this committee was redesignated as standing, and given the assignment of advising the Department on all noise problems.

Noise Barrier Guidelines

The Department's Bureau of Highways Guidelines for Noise Barriers (Appendix B) was established to ensure that consistent appropriate and safe measures are taken with regard to noise barriers on existing highways; and that these measures are in the best public interest to achieve noise levels compatible with different land uses, with due consideration to social, economic, and environmental effects. Specifically, the guidelines provide the decision maker with answers as to whether a noise barrier should be built, or permitted; if it is to be built by the Department, what its priority should be; who should pay for it; and its design and construction specifications.

Vehicle Noise Control Legislation

A bill establishing noise emission limits for all new and existing cars, trucks, and motorcycles using Michigan roadways has been drafted for sub-

mission to the Michigan House of Representatives. It was prepared by the Michigan Motor Vehicle Noise Control Committee, chaired by a member of the Department of Highways and Transportation, with representatives of State Police, Commerce, and Natural Resources plus support personnel from the Governor's Office, Attorney General, and the House of Representatives. This group, and their respective departments, are actively supporting vehicle noise control legislation to supplement that already implemented by the Federal Government for vehicles in Interstate Commerce.

Noise Level Inventory

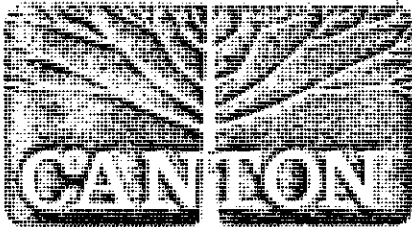
In a further attempt to ensure equitable distribution of Michigan noise abatement funds, a Statewide freeway noise level inventory has been conducted. This recently completed inventory will enable the State to better determine where its noise abatement funds should be utilized to achieve maximum citizen benefit.

Earlier Michigan Noise Barriers

To date, several experimental barriers have been constructed in the state, notably a wooden wall along I 75 in Allen Park, a steel wall along I 75 in Southgate, and an earth mound along I 94 near Kalamazoo. Also, letting is imminent on 1,800 ft of concrete wall on I 75 in Lincoln Park and on several sections of concrete wall totaling 21,000 ft along I 275 between M 153 and Five Mile Rd. A questionnaire was sent to each of the residents shielded by the Allen Park wooden wall resulting in over a 50 percent response to the subjective questions. These responses and other results are being correlated with attenuation measures to help the Department select the most visually acceptable and effective noise barriers.

APPENDIX A

SUPPORTING LOCAL GOVERNMENT RESOLUTION



CHARTER TOWNSHIP OF CANTON

44508 GEDDES ROAD • CANTON, MICHIGAN 48188

GENERAL OFFICES 313 / 397-1000

BUILDING DEPARTMENT 313 / 397-1005

SUPERVISOR
HAROLD STEIN

CLERK
JOHN W. FLODIN

TREASURER
ANNE BRADLEY

TRUSTEES: Eugene Daley Robert Myers Lynne Goldsmith E. Brian Schwall

Nice
McCarthy PWS
Attorney

January 31, 1977

Department of State Highways & Transportation
State Highway Building,
425 West Ottawa
Box 30050
Lansing, Mi. 48909

RECEIVED			
BUREAU OF HIGHWAYS			
FEB 3 1977			
<input type="checkbox"/>	McCarthy	<input type="checkbox"/>	KARDER
<input checked="" type="checkbox"/>	WEINMAN	<input type="checkbox"/>	

Att: John P. Woodford, Director

Gentlemen:

Canton Township has received a copy of your letter of September 13, 1976, to Stephen B. Foley, 41021 Michigan Avenue, Lot 125, Canton, Mi., relative to construction of a highway noise barrier adjacent to I-275 and U.S. 12, West Point Mobile Home Park.

At a regular meeting of the Township Board of the Charter Township of Canton held on January 25, 1977 a resolution was passed requesting the State Highway Department to make application to the Federal Highway Administration for the construction of the barrier.

Very truly yours,

John W. Flodin
Township Clerk

JWF/dk

LTO	RECEIVED RESEARCH LABORATORY FEB - 3 1977 M.D.S.H. TESTING AND RESEARCH DIVISION	MGB
GRC		FJB
AJP		CJA
PM		LFH
RCM		JBA
MHJ		ELS

Director	M. D. S. H. & T.	Director
Church		County
Street	FEB - 7 1977	Michigan
Location		
Date		
Signature	TESTING & RESEARCH	
Division	Division	

cc Action
McCarthy
Flodin
for
2/3/77
59

APPENDIX B
BUREAU OF HIGHWAYS GUIDELINES
FOR
NOISE BARRIERS

MICHIGAN DEPARTMENT OF STATE HIGHWAYS
AND TRANSPORTATION

BUREAU OF HIGHWAYS
GUIDELINES FOR HIGHWAY NOISE BARRIERS

I PURPOSE:

To establish guidelines for use by the Bureau of Highways in the planning, design and construction of earth mound or wall type barriers to abate noise radiating from Michigan highways. Also, for guiding the procedures for review and issuance of construction permits for barriers within the highway right of way, to be financed and built by private interests; further to provide guidance with respect to the matter of barrier funding — public, private or shared.

The guidelines have been established to insure that consistent, appropriate and safe measures are taken with regard to noise barriers on existing highways; and that these measures are in the best public interest to achieve noise levels compatible with different land uses, with due consideration to social, economic and environmental effects. Specifically, they provide the decision maker with answers as to whether a noise barrier should be built, or permitted; if it is to be built by the Bureau what its priority should be; who should pay for it; and its design and construction details.

II APPLICABILITY

These guidelines may be applied, as appropriate, to those urban, suburban and rural FAI, FAP and FAS Michigan State trunkline projects covered by Federal Highway Administration Draft FHPM 7-7-3 (update of FHWA PPM 90-2 to include the congressional directive, with respect to noise, contained in the Federal-Aid Highway Act of 1973).

III EXCEPTIONS:

The conditions set forth here in answering the above questions will be complied with by Bureau personnel unless an exception has been authorized, in writing, by the Deputy Director, Bureau of Highways.

4-23-74
12-4-74
12-19-74
2-4-75
4-10-75
9-11-75

IV CRITERIA FOR DECISION AS TO WHETHER OR NOT A PROPOSED BARRIER SHOULD BE BUILT, OR A PERMIT ISSUED:

A. DEVELOPED LANDS:

The first decision with respect to any noise problem at a developed site will be whether or not construction of a noise barrier in the highway right of way is justified. An affirmative decision requires that all of the following conditions be met.

1. For a residential area the noise problem must be brought to the Bureau's attention by the citizens affected or by an agency or organization representing their interests.
2. The request for noise abatement must be supported by a formal, local government resolution.
3. The local government must furnish the Department with documentation of its existing future land use controls, or which demonstrates or supports that government's intention to control future land development within its boundaries, so as to reasonably preclude the necessity for noise barriers in highway rights of way adjacent to such future developments.
4. A noise analysis performed in accordance with the general guidelines outlined in FHPM 7-7-3 must confirm that the noise level for the appropriate land use category is being exceeded.
5. In any FHPM 7-7-3 Category B area the 70 dbA L₁₀ limit must be exceeded during that area's sound sensitive hours (usually 9:00 p. m. to 12:00 midnight).

6. Highway traffic noise must be the principal constituent of the area noise.

7. The relationship between barrier cost and estimated value of area to be protected, must be in accordance with Figure 1 to qualify for affirmative consideration of a noise barrier. (In general a barrier which costs more than 50 percent of the value of the area being protected, shall be deemed unjustified.)

8. In general, noise abatement projects will be programmed in accordance with the priorities of Figure 1.

9. The noise abatement benefits must be judged by the Bureau to outweigh the overall social, economic and environmental costs of the project.

10. There must be no foreseeable, future public need for the highway right of way on which the noise barrier is to be erected.

11. It must be reasonably proven that the subject noise barrier should be built on highway right of way rather than on adjacent non-highway property.

12. The standards and specifications of Section VI of this Guideline must be fully complied with.

13. The plans must be reviewed and approved by the Bureau.

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12-4-74

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2-4-75

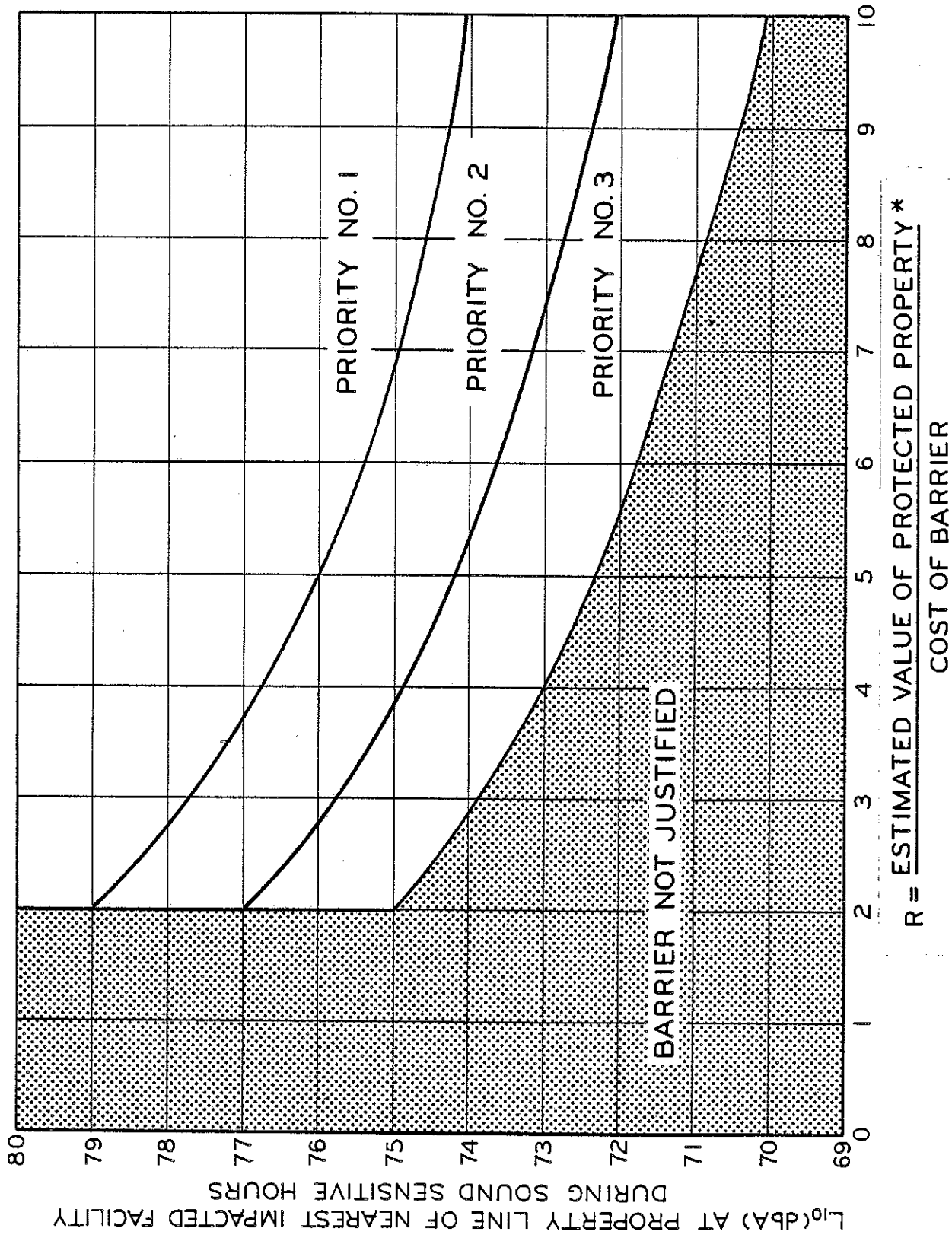
4-10-75

9-11-75

B. UNDEVELOPED LANDS:

To justify, approve or permit erection of a noise barrier in the highway right of way adjacent to undeveloped lands shall require that the following conditions be met.

1. No prudent or feasible alternatives to such erection exist.
2. The local government unit must approve placement of the barrier in the highway right of way.
3. The barrier will be non-Departmentally funded.
4. Items 3, 4, 5, 6, 7, 9, 10, 12, and 13 of Section IV also apply.
5. The barrier must be maintenance free (vegetation covered earth mound would qualify), and wall-types will not be permitted.



*Property enclosed by contour of appropriate FHPM 7-7-3 Design Noise Level.

Figure 1

- 4-23-74
- 12-4-74
- 12-19-74
- 2-4-75
- 4-10-75
- 9-11-75

V FUNDING NOISE BARRIERS

Funding for noise barriers will be arranged by the Department, or will be the responsibility of the affected property owners. When arranged by the Department it will include: (1) city participation as indicated by resolution and as required by state statute, (2) Federal Highway Administration participation as applicable and (3) Department participation as applicable. The source of funds will be determined as follows:

- A. The Department will arrange barrier fundings when the potentially impacted facility (usually a residence or group of residences) was in existence on the date of construction contract award. "In existence" for a potentially impacted facility will be defined as beginning on the date of building permit issuance.
- B. If the facility proposed for noise barrier protection was developed after the roadway, but it can be demonstrated that highway noise has increased by 10 dbA, or more, since the facility's construction then the Department will arrange funding. (This assumes that at the time of impacted facility construction the subject highway was completely open and had been open sufficiently long for traffic to stabilize.)
- C. If neither A nor B above apply, funding will be a responsibility of the property owners.

4-23-74
12-4-74
12-19-74
2-4-75
4-10-75
9-11-75

VI BARRIER CONSTRUCTION AND PERFORMANCE SPECIFICATIONS.

For purposes of safety, economy, esthetics and effective noise abatement any noise barrier constructed by the Bureau or permitted by the Department to be constructed by others, within the right-of-way or on excess property, will meet the following requirements:

- A. A minimum decrease in the L_{10} noise level of 6 dbA must be achieved at the protected human activity facility nearest the barrier.
- B. An earth mound, if constructed, shall blend with existing slopes and shall provide for continued proper drainage. A sound barrier wall, whether constructed on top of an earth mound, or in lieu of an earth mound, may be no closer than 30 ft from the edge of pavement. Also, the toe of any earth mound may not be closer than 30 ft from the edge of pavement.
- C. The front slope of an earth mound having its toe 50 ft or less from the edge of pavement, may be no steeper than 1 on 3. This slope may be increased to 1 on 2 if the beginning of the mound is 50 ft or more from the edge of pavement. The back slope of the mound may be 1 on 2 or any slope that will stand if it is outside the right-of-way.
- D. Slopes steeper than 1 on 2 must be sodded.
- E. Erosion control and turf establishment shall be in accordance with the Standard Specifications and current special provisions.
- F. If the right-of-way fence must be removed and replaced, it shall be replaced in a condition equal to the existing fence; and shall be installed at the right-of-way line. If excess property owned by the Department is involved, the fence shall be installed at either the foot of the slope on the property owner side or, at the far side of the excess property line, whichever is closest to the roadway. (There could be cases where adjacent excess property, by itself, is sufficient to accommodate the earth fill.)
- G. Construction of any earth mound within the right-of-way must be completed within six (6) months after start of construction.
- H. Construction of any barrier shall not obstruct existing drainage, unless alternate drainage is provided. Adequate precaution shall be taken to prevent sediment from entering adjacent watercourses. Sediment must be removed from the road ditch at the conclusion of construction of the barrier.
- I. Any slopes damaged during the course of barrier construction shall be smoothed and restored and the entire highway facility shall be restored to pre-barrier construction condition.
- J. Where existing utilities must be adjusted or relocated due to noise barrier construction the work shall be coordinated with the affected utilities.