

A MANUAL FOR CONDUCTING ENVIRONMENTAL IMPACT STUDIES

by

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(The opinions, findings, and conclusions expressed in this report are those of the authors and not necessarily those of the sponsoring agencies.)

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SUMMARY

This report suggests methodologies which should enable an interdisciplinary team to assess community values. The methodologies are applicable to the conceptual, location, and design phases of highway planning, respectively. The approach employs a weighted value technique for comparison of the monetary, quantifiable and qualitative factors of alternate locations on the environment. The research team is currently testing this methodology on actual proposed highway projects.

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BACKGROUND

In October 1960, K. M. Wilkinson, the Virginia Department of Highways' metropolitan transportation planning engineer, requested the Virginia Highway Research Council to develop methods of predetermining the environmental impacts of proposed highways. In responding to this request, Jack H. Dillard, state highway research engineer, appointed an environmental task force composed of several members of the Council staff. As the task force grappled with the problem of defining the scope of the proposed study, two major points became readily apparent; first, that to ensure the methodology would not merely justify what departments have been doing for years, it would be advisable to include on the task force persons who were unfamiliar with highway departments and their philosophy; and secondly, that persons trained in disciplines other than those represented on the Council staff would be needed.

To obtain the benefit of a new viewpoint and to supplement the Council staff, the environmental task force was expanded to include three members of the University of Virginia faculty: James E. Lewis, associate director for community health planning; Wallace Reed, associate professor of environmental sciences; and J. Ronald Saroff, associate professor of city planning in the School of Architecture. The task force was also supplemented by several graduate students.

The results of this research effort are being published in three separate reports. The first, "Citizen Participation in Public Hearings in Virginia," by L. Ellis Walton, Jr., and Jerome R. Saroff, gives an analysis of the socioeconomic characteristics of persons attending public hearings, the concerns expressed by those who testified, and the basic format for highway hearings.

The second, "A Review of the Factors Used in Measuring the Environmental Impact of Urban Highways" by James E. Lewis and L. Ellis Walton, Jr., gives a brief summary of selected studies by other states on which the study methodology was based.

The third is the present report.

PURPOSE

The purpose of this manual is to provide a methodology for measuring the environmental impact of a proposed highway. It is intended that this manual be supplemented by the other two reports on this project (see above). In addition, individuals involved in predicting environmental impact should constantly be seeking means of expanding their knowledge in the subject area and improving their approaches.

IMPLEMENTATION

It is hoped that this manual will be of value to organizations such as city and county planning agencies in evaluating their environmental planning. It may also assist citizen groups in reviewing the Highway Department's environmental statements or in conducting their own studies. If a community group were to conduct its own study using this methodology it could gain a sound basis for discussions with the Department to identify real community values. The authors recognize that it will not always be possible for Department employees, regardless of their dedication, to identify specific community values. Therefore, it is hoped that this manual will motivate interested citizen groups to review the proposed highway on the same basis as the Department will. Then both groups could seek the best possible means of meeting communities' transportation needs.

While ideally environmental studies should be conducted at the conceptual stage to enable the selection of the route which will complement the community the most and cause the least damage, this will not always be done, so one must be practical. Therefore, the Research Council developed three different methodologies. The researchers found that no one approach could be effectively used for the three basic stages of highway project developments, i. e., conceptual, location, and design.

DEVELOPMENT OF METHODOLOGIES FOR ASSEMBLING AND PRESENTING IMPACT DATA

The methodology set forth in this manual is the product of many think-tank sessions of the environmental task force. The research team spent several months conducting an extensive literature review, including studies by other agencies and theoretical works.

Frequent meetings of the interdisciplinary team were held to develop a list of factors to be considered in the study. The selection was not made on the basis of whether it could be measured or quantified; the principal criterion was that the variable be one that the team considered necessary to an effective environmental impact study. Therefore, the following discussion of factors includes some that cannot now be quantified.

The third stage in the development of the methodologies was to extract from the literature those factors that could be quantified. In most studies efforts at quantification have been limited to items that could be assessed in dollar values. Some studies have recognized that dollar value has little meaning for parks or historic areas and the like, so they have been assigned arbitrary weights. The methodologies developed by the Council use dollar values for those things having meaningful monetary values and a system of weighted values for those items whose monetary value cannot be determined realistically or has no meaning.

METHODOLOGIES

Each methodology presented has been designed for a specific stage of highway plan development. The first is for the conceptual stage, which may be defined as the stage at which the need for connecting point A to point B has been determined and several alternative routes have been selected. At this stage perhaps the only detailed information that the transportation planner has is engineering cost estimates and the engineering desirability of each route.

The second is the location, or corridor, stage. The highway engineer has selected the location of the proposed route, but detailed plans have not yet been completed.

The third is the design stage, where not only has the specific route been fixed but plans are available in such detail that it is possible to assess specific damages to individual properties. At this stage it is critical that an environmental study examine the specific impacts of the proposed improvement.

Ideally, an environmental study would begin in the conceptual stage and, based on an examination of the projected environmental consequences, the best possible alternative would be recommended. In this stage it would be quite feasible to suggest shifts in the alignment of the facility without sacrificing expensive engineering plans. If an environmental study were conducted in the conceptual stage then it would only be necessary to update the information gathered and supplement it with specific data for the corridor and design stages. However, from a practical standpoint methodologies designed for the Virginia Department of Highways must provide for initiating environmental studies at all three stages — conceptual, location, and design. The necessity for developing three different approaches lies in the fact that Virginia is estimated to have approximately 400 to 500 plans for highway projects in one of the two later stages.

AN ENVIRONMENTAL IMPACT METHODOLOGY FOR THE CONCEPTUAL STAGE

As indicated elsewhere in this report, the conceptual stage of the plan development is considered the ideal time in which to initiate an environmental study. In theory the designer has selected three or four alternative routes that will equally satisfy the transportation objectives of connecting point A with Point B. In addition, this is the stage in which it is possible to select a route that will meet the transportation needs and cause the least damage to the environment. If a change is made at this stage the Department is not forced to weigh the advantages of the proposed shift against a substantial investment already made in engineering and plan development.

In conducting an environmental impact study at the conceptual stage, the following steps should be considered as minimum guidelines.

Review Justification Study

The first step would be to review the justification studies for the proposed highway. In most cases the major justification for a proposed project would be the transportation study for a specific community. The review of this material will serve not only to demonstrate the need for the facility, but also to provide a general overview of the complete transportation system for the community.

In addition to gaining a general overview the environmental team can determine what socioeconomic data were collected by the Metropolitan Transportation Planning Division (MTPD) when the transportation planning study was conducted. Generally, the traffic zone data collected by MTPD includes the names of businesses, tax figures, and the numbers of employees of the businesses. The environmental team should only have to update this information when making the impact study.

Review Newspapers

The Public Information Division maintains a file of newspaper clippings for each county and city in the state. The file contains news items concerning highways appearing in local papers over the past three years. The researchers believe that a review of this file will help the study team develop a feeling for community views on highway projects in general and offer some insight on specific segments of the total system.

Examine Topographic Maps

The request to conduct an environmental study generally will include copies of U. S. Geological Survey topographic maps with the proposed route marked in red. Before conducting the field study, the environmental team should examine the topographic maps to obtain a general picture of the area.

Study Aerial Photographs

The engineering unit requesting the environmental study will generally furnish the most recent available aerial photographs of the area with the proposed routes indicated with color tape. The environmental team should study the aerial photos and compare them with the topographic maps and any plans that are available. Key reference points should be determined from the maps and photos.

Review Previous Hearings

Unless the environmental team members are familiar with the area, an hour or two spent reviewing transcripts of previous hearings in the area could be time well spent. The researchers found in a previous study ^{1/} that the review of previous hearings can assist in predicting issues and reactions to proposed projects. Even if the previous hearings reviewed were not on the project under consideration, the records help establish a feeling for the mood of the community.

^{1/} Walton and Saroff, "Citizen Participation at Public Hearings."

Review Project With Designer

For a project in the conceptual stage, the researchers believe that much can be gained by the environmental team's discussing the project with the designer prior to a field inspection of the proposed project area. However, the team leader should determine if this discussion should be held before or after the field work. The researchers recognize that there is a danger that the environmental team will be influenced by the discussion with the designer, but if the team leader feels that his team will not become biased then the team may save a great deal of time in the field.

Interview District Engineer

Prior to the field inspection, the team leader should obtain an appointment with the district engineer. The discussion with the district engineer can be held prior to the field inspection or later, depending on the specific situation. The researchers found in several case studies that this interview was more meaningful if it was handled in two parts. The first contact was a phone call to the district engineer to explain that the team would be working in his area and to discuss the project briefly. The second was a personal interview after the field work, in which the team discussed its preliminary findings. The researchers found that a very fruitful discussion was possible if the team had sufficient background on the project to review specifics.

Interview Resident Engineer

The resident engineer in the area should be contacted for an appointment to discuss the project. The researchers have found that it is desirable to arrange for the resident engineer to accompany the team on its first inspection of the project. There may be others in the residency who are familiar with the project, but the environmental team needs the advice of someone who is aware of potential trouble spots, such as which civic groups might object, which property owners have expressed concern, or other similar problems.

It is suggested that the environmental team make note of any potential problems that might be solved by minor modifications in the project plans. One of the major functions of the team is to advise the highway administrators of ways in which the social, economic, and environmental considerations can enable the proposed project to complement the environment it will traverse.

Conduct On-Site Inspection

After completing the preliminary interviews, the environmental team should conduct its own on-site inspection. It will be recalled that in the first on-site inspection, the team was accompanied by the resident engineer. The team's on-site inspection should be conducted in two stages. The first should be a windshield survey to obtain an overview of the area. The second should be a walking tour for an in-depth study. While conducting the field inspection, the environmental team should compare the MTPD^{2/} data with existing conditions.

The results of the walking tour should enable the team to complete the environmental field report, the form for which is shown in Figure 1. A separate environmental field report should be completed for each alternate route. For example, if the proposed project has four alternate routes then a field report will be completed after the on-site inspection of each route.

Complete the Environmental Field Report

To complete the environmental field report simply make an inventory of the types of public or private services that will be affected by the proposed route. Of course, it is not always possible to determine the exact amount of impact since the team will not have detail plans at this stage.

The types of data to be included in the field report are discussed below.

1. Church — If there are churches adjacent to the proposed route the team will list them in the space provided. Each church that is listed must be contacted. Contact either the pastor or a key member of his staff and determine an estimate of the number of church members who reside in the immediate area and walk to church and the number of people who might have some social neighborhood interchange with the church. The estimated number of people affected is entered in the appropriate column.

This approach is required regardless of whether or not the church building is actually affected. The reason for obtaining this information, if the church will not be relocated by the project, is that the church may serve individuals in the neighborhood. Similar information must be obtained for each church adjacent to the route.

^{2/} The MTPD unit has completed transportation studies for three different size urban areas. Comprehensive Plans for areas of 50,000 population or more; less detailed plans for areas of 10,000 to 50,000 population; and preliminary transportation plans for areas of 3,500 to 10,000 population.

Figure 1.

ENVIRONMENTAL FIELD REPORT (COMMUNITY SERVICES -- PUBLIC AND PRIVATE)

Project _____	Proposal _____	
Service	Negative Impact on Number of Organizations	People Affected
Church 1.		
2.		
3.		
Civic Center		Population
Civic Organization 1.		
2.		
3.		
City Stadium		
Fire Station		
Golf Course (Public)		
Hospital, Convalescent Home, etc.		Population
Library		
Museum		
Park		
Playground 1.		
2.		
Rescue Squad		Population
Recreation Center		
Private Recreational Club		
School 1.		
2.		
Social Service Organization 1.		
2.		
3.		

2. Civic Center — If a civic center is adjacent to the route, its name will entered on the form. The team should interview the center's manager or another executive, and question him on how he views the impact of the road. If the interview indicates that the proposed route will have a negative impact then show a one in the column headed "negative impact on number of organizations" for each civic center.
3. Civic Organizations — The section for this type of organization should be completed in a similar manner. This category would include community recreation groups, swim clubs, and other civic or neighborhood organizations.

If it appears that the proposed route will have a negative impact on the organization, then a one should be shown in the middle column and the number of members in the third column. If the organization has a membership limit, but has not yet achieved it, the membership limit should be used since the impact will potentially involve the maximum number.

4. City Stadium — Follow the same procedure as for the civic center.
5. Fire Station — Follow the same procedure as for the civic center. However, when the fire department executive officer is interviewed the team member should seek to determine any effects of the proposed road on the fire department's operations. For example, will it increase efficiency and safety in answering calls? If it will have a negative impact then enter this fact on the report. Also the team member conducting the interview should make a separate note for inclusion in the narrative report.
6. Golf Course (Public) — Same procedure as for civic center.
7. Hospital, etc. — Same procedure as for civic center.
8. Library — Same procedure as for civic center.
9. Museum — Same procedure as for civic center.
10. Parks — Same procedure as for civic center.
11. Playground — Same procedure as for a church, except enter the estimated number of people living in the immediate area who could walk to the playground.
12. Rescue Squad — Same procedure as for a fire station.

13. Private Recreational Club (including country clubs, etc.) — Same procedure as for civic organization.
14. School — Same procedure as for a church.
15. Social Service Organization (this would include Salvation Army shelters, church shelters, etc.) — Complete the same as for a church.

It should be noted that for some facilities (i. e. civic centers, stadiums, fire stations, golf courses, hospitals, convalescent homes, libraries, museums, parks, and rescue squads) the number of people affected will be the population of the transportation study area. The rationale is that generally the entire community will pay for such facilities and therefore any negative impact affects all of the population to some degree.

Complete Community Values Worksheet Number 1

The community values worksheet number 1 (Figure 2) should be completed by the environmental team after the on-site inspection of each proposed alternate.

The use of the environmental field report will facilitate the data collection for this form since the team members will be required to consider all potential impacts on the community. While making the field inspection, the team members will check each category and indicate on the worksheet if the variable is applicable or not.

The community values worksheet contains a list of the types of impacts that are possible in most communities. In an attempt to quantify the various impacts the researchers have established a set of factors which are based on how frequently highway departments have displaced various types of community facilities. This evaluation of the difficulty with which highways have been able to build around and through these community activities was supplemented by sociological considerations. For example, the sociologist considers dividing a neighborhood a "no no " and therefore the weight is 10 times the residents affected.

Services

To complete the community values worksheet, enter the number of community facilities to be affected and multiply by the factor beside the specific service to obtain a weighted value. Sum the weighted values and enter in the appropriate space. This total should be transferred to the environmental ratio worksheet (shown later in Figure 4). In addition to the weighted value, the environmental team should show on the ratio sheet the dollar values of such facilities.

Figure 2.

COMMUNITY VALUES WORKSHEET NUMBER 1

Project _____

Proposal Number _____

Type of Impact	Unit of Measure	Factor	No.	Weighted Value
<u>SERVICES</u>				
Church	No. of members who can walk to services	5.0		
Civic Center	Per 1,000 population in city or county	1.0		
Hospital	Per 1,000 population in city or county	10.0		
Library	Per 1,000 population in city or county	1.0		
Museums	Per 1,000 population in city or county	1.0		
Parks	Per 1,000 population in city or county	1.0		
Playgrounds	The no. of residents within walking distance	3.0		
Rescue Squad	Per 1,000 population of the area served	1.0		
School	No. of students that can walk to school	3.0		
Social Service Org.	No. of people served per week, (Salvation Army shelters, etc.)	3.0		
ENTER TOTAL AS IMPACT ON SERVICES				
<u>RELOCATION</u>				
Dividing Neigh.	Residents in immediate area	10.0		
Residents	Use the number to be relocated			
	If replacement housing is available.	2.0		
	If replacement housing is not available.	4.0		
ENTER TOTAL AS IMPACT OF RELOCATION				

Relocation

The relocation section should be completed by entering the number of neighborhoods that are to be divided, if any, and obtaining the weighted value.

The number of residents to be relocated is entered on the appropriate line. It will be noted that the factor for relocating people where replacement housing is not available is twice as great as where housing is available.

The total of the weighted values is transferred to the appropriate line of the environmental ratio worksheet. In addition, the dollar value is to be entered. The dollar value should include all additive payments, moving costs, and actual right-of-way costs.

Community Values Worksheet Number 2

Employment

If the proposed facility will displace businesses then an estimate of the amount of employment that will be lost to the community should be entered on the community values worksheet number 2 (Figure 3). The weighted values are then obtained and the total transferred to the environmental ratio worksheet.

Noise Pollution

Based on the results of the computer projections of noise simulation compared to actual readings in the area, the team should multiply the dBA increase (e.g. for an increase from 50 dBA to 60 dBA use a factor of 10) times the number of people living and/or working in the area. This weighted value is transferred to the environmental ratio worksheet.

If any money is to be spent to reduce the noise, then enter this amount as the dollar value on the appropriate line.

Air Pollution

The impact on air pollution is computed by multiplying the percent increase in air pollution times a factor equal to each 1,000 population in the transportation area. This weighted value is transferred to the environmental ratio worksheet.

Figure 3

COMMUNITY VALUES WORKSHEET NO. 2

Project _____

Proposal No. _____

Type of Impact	Unit of Measure	Factor	No.	Weighted Value
<u>EMPLOYMENT</u>	(Use the amount of employment involved)			
	If firm will relocate in city or county	0		0
	If firm will relocate outside city or county	3.0		
	If business will close or create unemployment	10.0		
	If transportation problems will be created for employees	3.0		
ENTER TOTAL AS IMPACT OF EMPLOYMENT				
<hr/>				
<u>NOISE POLLUTION</u>	The no. of individuals living or working in the area. Use the increase (e.g., an increase from 50 dBA to 60 dBA would mean a factor of 10).			
ENTER TOTAL AS IMPACT OF NOISE				
<hr/>				
<u>AIR POLLUTION</u>	Per 1,000 pop. of city or county by the percent increase			
ENTER TOTAL AS IMPACT OF AIR POLLUTION				
<hr/>				
<u>WATER POLLUTION</u>	Per 1,000 population of city or county by the percent increase			
ENTER TOTAL AS IMPACT OF WATER POLLUTION				
<hr/>				
<u>HISTORICAL SITES</u>	Per 1,000 population in city or county	10.0		
ENTER TOTAL AS IMPACT OF HISTORICAL SITES				

Water Pollution

The number of water sources that might be affected should be multiplied by each 1,000 population in the transportation area. Enter the weighted value and dollar value expended to reduce water pollution on the appropriate lines on the environmental ratio worksheet.

Historical Sites

Compute the impact on historical sites by multiplying a factor of 10 (a "no no") times the number of sites. Transfer the total impact and the dollar value to the appropriate line on the environmental ratio worksheet.

Environmental Ratio Worksheet

The environmental ratio worksheet (Figure 4) is completed for each of the proposed routes. The ratio for each route is computed by dividing the dollar value total into the weighted value total. The lowest ratio will indicate the route which is least harmful to the environment. However, selection of the route on the basis of the lowest ratio may not be as simple as this since the computations are based on the environmental team's values for the community.

The environmental team should review its findings with the following officials and agencies:

- 1 — Regional Planning Director
- 2 — Local Planner (City or County)
- 3 — Local Elected Officials
- 4 — Water Pollution Unit in the Area
- 5 — Historic Landmarks Commission
- 6 — Air Pollution Control Board
- 7 — Resident Engineer
- 8 — District Engineer
- 9 — The Designer

Following the review with the above individuals and agencies the environmental team should decide if the alternate with the lowest environmental ratio still looks to be the best route (that one that will cause the least environmental damage). If they think it does, they should recommend it.

The final step in this stage is to consider discussing the team's report with local citizen groups that can be expected to have a vital interest in the proposed facility. It may be that a trade off now will save problems later.

Figure 4

ENVIRONMENTAL RATIO WORKSHEET

	Proposal No. 1		Proposal No. 2	
	Weighted Value	Dollar Value	Weighted Value	Dollar Value
Change in Tax Base	- 0 -	\$106,443	- 0 -	\$ 83,989
Impact of Relocation	154	33,000	50	19,500
Opportunities For Multiple Use	- 0 -	- 0 -	- 0 -	- 0 -
Impact on Historical Areas	- 0 -	- 0 -	- 0 -	- 0 -
Impact on Business	- 0 -	- 0 -	- 0 -	105,000
Public and Private Services	600	- 0 -	600	- 0 -
Influence Of Air Pollution	N/A	N/A	N/A	N/A
Influence Of Noise Pollution	5,000	- 0 -	5,000	- 0 -
Influence of Water Pollution	N/A	N/A	N/A	N/A
Influence of Traffic on Other Roads	-	-	-	-
Impact On Employment	980	-	980	-
TOTALS	6,734	\$139,443	6,630	\$208,489

THE LOCATION STAGE

The second methodology approach is one for the location stage of highway plan development. At this stage the Department has selected the location or corridor but the plans are not specific enough to permit the assessment of individual damages. While the general location has been selected, some segments may not be firmly fixed. In these cases there will be one or more alternates. Whenever there is one or more alternate routes, the environmental team will have to complete an environmental field report for each alternate.

Documents Required

Before the environmental team begins a study the following data should be on hand.

The material received from the Location and Design Division should include:

1. Plans — The plans should contain as much detail as possible about the proposed highway. Specifically, the plans should indicate the width of the right-of-way required, the locations of any interchanges, the rechanneling of streams, and any other information possible.
2. Aerial Photographs — These should indicate the current proposed route. On one project used as a test case, the aerial photo indicated one location and the plans showed a later revision. This error resulted in lost time and wasted effort.

In addition, the photo should be one taken within the last year. If the aerial photo is several years old, it may not show recent land use developments and would thus be almost worthless.

3. Topographical Maps — Sufficient topographical maps to include the area should be included. These maps should show the proposed route.
4. Justification Studies — The package sent to the Environmental Quality Division should include ALL of the latest justification studies available. These should include traffic studies, cost benefit studies, estimates of construction and engineering costs, and estimates of right-of-way acquisition costs (including relocation costs). These cost estimates should include figures on alternative locations that were considered but not selected.

If this material is not included but is needed, delays are encountered.

5. Previous Environmental Impact Study — If there has been a previous environmental impact study on the project it should be included. The environmental team will want to review it. They should examine previous recommendations to determine which have been followed and if any have been omitted. If some were not followed then the team should determine why, and see if they would be meaningful at this time.
6. Previous Public Hearings — Records from any public hearings which have been held on the proposed project should be reviewed. The environmental team should seek to determine what community attitudes were expressed at the previous hearing; how the community generally views highways; if there were specific comments which would apply to this project; and if any other concerns expressed at the hearing apply to this project.

Reviews Recommended Before Field Inspection

Review Documents Received From Location and Design Division.

The environmental team should carefully review the documents received from the Location and Design Division. The team members should make notes on important items to be checked, such as:

1. Rechanneling of streams
2. The number of houses taken
3. The number of businesses taken
4. Schools adjacent to projects
5. Churches adjacent to projects
6. Parks or other recreational areas

The researchers believe that this review is very important to help orient the environmental team, and that it should save time in the field.

Review Correspondence File

At least one team member should examine the correspondence file for any specific problems. Quite often this file will indicate situations, such as problems related to historic sites, etc. , which should be evaluated at the time of the field inspection. Sometimes this correspondence file will suggest individuals who should be interviewed. Any problems recorded in this file will not disappear just because they are out of sight, but rather they might crop up as major obstacle at the public hearing.

Review Newspaper File

At least one member of the environmental team should examine the newspaper clipping file of the Public Information Division. This review should indicate the general feelings about highways as compared to other improvements. In addition, this file could contain items about the specific project.

If this file does not contain selections from the "Letters to the Editor section", then a note should be made to review the local papers in the library in the area.

Important items should be photostated and be included in the environmental file.

Review Route With the Designer

After the environmental team has examined the plans and other supporting material, it should discuss the plans fully with the designer. If the specific project has been designed in the District drafting room, then this review will have to wait until the environmental team goes to the District.

The purpose of this discussion is to determine what special problems the designer encountered; why various alternates were discarded; and his viewpoint on problem situations that the environmental team has encountered.

Review Route With the Metropolitan Transportation Planning Division

The purpose of this review is to determine the justification for the project, if it was initiated by the MTPD, and if it will achieve the goals that the MTPD had in mind.

In addition the environmental team should obtain any of the basic MTPD file data believed to be helpful.

Review Previous Environmental Studies of the Area

If there have been any previous environmental studies for the specific area, they should be reviewed. This review should help point out some of the key problems in other studies; public reaction; and how correct past assumptions were, if the present conditions are compared to a past forecast. If there have been a number of such studies, then select the ones most relevant to the present project.

Review Project with District Engineer

At this stage the environmental team should be very familiar with most aspects of the project, except for the physical site. Therefore, the discussion with the district engineer can be rather specific.

The team should make note of any special problems pointed out by the district engineer. If the team has encountered any questions, these should be discussed in order to obtain the district engineer's views.

Review the Project with the District Right-of-Way Agent

While the environmental team is in the District Office, an interview should be held with the district right-of-way agent. The team should seek to obtain his views on the estimated right-of-way cost; the availability of replacement housing; the general economic conditions in the area; and suggested means of reducing the amount of damages.

Review Project with the Resident Engineer.

For the most part, the interview with the resident engineer can be held during the tour of the project. As the on-site inspection is conducted, the resident engineer will point out any special problems or items which will be of interest to the environmental team.

If the environmental team has encountered any problems or has any reservations about the project they should be discussed with the resident engineer. Arrangements should be made to tour sites which appear to require in-depth inspection.

Field Inspection

The environmental team should now be ready to begin the in-depth phase of the study. It should now tour the project for an in-depth on-site inspection. When the tour of the project is made the team should complete the environmental field report shown in Figure 5.

Complete The Field Report

The environmental field report is completed in two sections: one for the businesses affected, and the other for residential areas.

Business Section

The business section of the Environmental Field Report is completed as follows:

Identification — Indicate the parcel number shown on the plans or the owner's name as shown on the plans.

Real Estate Assessment — Under this heading should be entered the assessment on land and the assessment on improvements. The reason that these are entered separately is that it will be necessary to estimate the amount of tax loss on land that is taken, where the improvements are not disturbed. Therefore, the entry must be made to reflect the amount for land and the amount for improvements.

Percent Taken — Enter in this column the percentage of the land that will be taken. This percentage is computed by using an overlay matrix of $\frac{1}{4}$ acre, $\frac{1}{2}$ acre and 1 acre squares. The data are then counted and a percentage is developed.

Tax Base Loss — The estimate of the loss in tax base is computed by multiplying the percentage taken by the amount of the assessment times the community tax rate. The result is the estimated tax loss to the municipality.

Employment — The last possible solution would be to interview the employers and obtain the actual amount of employment. However, this could be very sensitive and the team leader will have to make the decision. If the decision is made not to interview the businesses then the environmental team will have to estimate the amount of employment in each firm. This is best done by observations of each business firm.

The necessity for determining the amount of employment is twofold: first, the environmental team will need to know the impact on employment; and secondly, if there is danger of an actual loss of this employment to the community and it is thought by the environmental team to be significant to the community, then the impact on the community should be completed by using the factors developed by the U. S. Chamber of Commerce in their 1962 study. ^{3/}

^{3/} Chamber of Commerce of the United States, "What New Industrial Jobs Mean to a Community," Economic Research Department, Washington, D. C. 1962.

To make this computation multiply the amount of employment expected to be lost by the factors listed below:

Reduced Personal Income	\$7,100
Reduced Bank Deposits	\$2,290
Reduced Retail Sales	\$3,310

Residential Section

A sample of the residential section of the environmental field report is shown in Figure 6. This section should be completed as follows:

Identification — Indicate either the parcel number of the owner's name as shown on the plans.

Real Estate Assessment — Under this heading should be entered the real estate assessment on land and the assessment on improvements. The reason that these are entered separately is that it will be necessary to estimate the amount of tax base loss on land that is taken, where the improvements are not disturbed. Therefore, the entry must be made to reflect the amount for land and improvements separately.

Percent Taken — Enter in this column the percentage of the land that will be taken. The percentages will be obtained from an overlay matrix of $\frac{1}{4}$ acre, $\frac{1}{2}$ acre and 1 acre squares. The data are then counted and the appropriate percentage is developed.

Tax Base Loss — The estimate of loss in tax base is computed by multiplying the percentage taken by the amount of the assessment times the community tax rate. The result is the estimated amount of tax loss to the municipality.

Number of Occupants — The last possible method of completing this portion would be to survey the residents in the path of the highway and obtain an exact count. However, this is a decision that must be made by the team leader. It may be that the climate of the community is such that it would be best not to interview the residents. In the event that the decision is made not to survey the area, then the environmental team should estimate the number of residents by multiplying the number of dwelling units by the census average occupants per household.

When both sections of this form are completed data are available for the final report. Ideally this information would be used to up-date the previous environmental study (i. e. , the one completed at the conceptual stage); however, it will be several years before this will become normal routine because of the substantial number of plans that the Department has in the location or design stages.

When this methodology is used for a study at the location stage and the environmental impact study was not conducted at the conceptual stage, then the community values worksheets number 1 and number 2 should be completed if alternates exist. At the location stage there should be at least one or two alternates. For a detail guide to completing the community values worksheets refer back to the appropriate sections of this manual.

Interview Selected Individuals and Groups

When the environmental team members make the on-site inspection, they will walk any portion that they are unable to see fully from the car. This is necessary since the team must know fully what is in or adjacent to the right-of-way. In making this field inspection the environmental team will make notes of potential problem areas and a list of individuals who should be interviewed. Even if the team does not think it necessary to interview individuals adjacent to the proposed route, there are categories of people that should be consulted in nearly every community. The researchers found that by asking opinions from the types of residents listed below a fairly good insight into specific community values could be gained. The categories the researchers suggest are as follows:

1. Pastors of Churches — If there are any churches near the proposed route which serve the community traversed, the team should arrange to interview the pastors. The researchers found that often the pastor of a local church could help convey the mood of the community to the environmental team. Frequently, individuals seeking advice will discuss their concerns about community problems with their pastor.
2. Principals of Schools — If there are schools adjacent to the area the environmental team should discuss the impact of the proposed highway on the school. Frequently minor changes in entrances can enable the proposed road to enhance the school. In addition the principal will be aware of some of the reactions of the citizens in the area to the proposed highway.

3. Citizens Who Have Written the Department — The environmental team should contact and offer to discuss the proposed facility with any citizen who has written the Department about the project. There will be many occasions when the team members can ease the concerns of the citizens who have expressed their opinions about the project. Frequently a minor modification can solve the problem. The environmental team can achieve a good deal in the way of public relations for the Department in these contacts.

However, the team members interviewing such citizens must be carefully chosen since this sometimes is a very sensitive chore and should be handled with great care.

4. Citizens Who Testified at a Previous Hearing on This Project — The environmental team should contact those individuals who testified at previous hearings and discuss their comments. Even if the Department is unable to comply with the citizens' suggestions the team may be able to demonstrate to the public that the Department does consider all suggestions.
5. Virginia Employment Commission — The environmental team should seek ideas and comments from the Manager or Assistant Manager of the local Virginia Employment Commission Office. The researchers found the VEC office a good source of information for the employment situation, specific employment estimates, and ideas on the general economic conditions of the area. For example, the researchers found the VEC manager to be the only source of information on why a certain city had so many stores vacant in the downtown area. Everyone else the researchers asked sort of passed it off, but the VEC provided a substantial amount of background on the subject.

Interview the City Manager and/or the County Executive

The team should not contact the city manager or county executive until the team members are thoroughly familiar with the project. At the time these executives are interviewed the discussion should be as specific as necessary. The team should not take up the time of these men, who are usually pressed for time, talking about a project the team is not up-to-date on.

In the discussion with the chief executive of the municipality the team member can determine if other officials of the local government should be contacted. The team member should determine who handles civil defense, traffic and safety, etc. In addition it would be well to see if the local government is still in favor of the project or if there have been any changes since previous endorsements.

Review The Executive Director Chamber of Commerce

The Chamber of Commerce will usually favor the proposal, at least the researchers found this to be the case, but the executive director can supply a good deal of background information. This source may prove helpful in determining what groups might object to or favor the proposed project. The team member should ask for suggestions of individuals who should be consulted.

Interview Virginia Historic Landmarks Commission

The Virginia Historic Landmarks Commission should be consulted about locations of historic sites in the area. In some communities there are local representatives that can assist with this problem. Actually the Virginia Historic Landmarks Commission has agreed to notify the Department when any site in Virginia has been classified as of historic value. Therefore, the major part of this situation would, at least in theory, be handled in the Central Office with MTPD.

Interview the Regional Planning District Director

This interview should be among the last conducted since the discussion will deal with regional goals and their relationship to the proposed project. The team member should determine if there have been any changes in the views of the Planning District Commission since it endorsed the project.

Interview Other Groups

The environmental team should interview any group that has been mentioned in previous discussions. In addition, the team should talk with the following:

- a — The Civil Defense Coordinator
- b — Water Resources Agency
- c — Soil Conservation Agency
- d — Division of Game and Inland Fisheries

The above methodology should now enable the team to complete the environmental ratio. While the ratio should not be the only criterion for selecting the route it should be given a great deal of consideration. However, it must be supplemented by the recommended modifications.

An example of a final environmental impact study report is given in the Appendix.

THE DESIGN STAGE

The design stage methodology should follow that for the location stage, except that for the design stage greater in-depth study is required. Therefore, the environmental team should follow the methodology for the location stage plus the additional methodology in this section.

WATER POLLUTION — The team should request that water quality studies be conducted as soon as possible. Usually these studies will be conducted by the Materials Division. They should be requested for before, during and after construction of the project. The purpose of these tests are to provide the Department with factual data of the present and future condition of water in the area and what contribution, if any, the construction makes to the overall water pollution problem.

The final report should include specific suggestions for preventing water pollution during and after construction.

NOISE POLLUTION — The environmental team should arrange for updating the noise simulation report and compare it to the actual readings in the specific area.

For this stage the noise level should be estimated for each building adjacent to the highway. This will enable the Department to answer specific questions of individuals.

WILDLIFE CONSERVATION — Contact the Division of Game and Inland Fisheries' local research biologist and game warden and locate any wildlife migration areas that will require special attention.

LANDSCAPE — The environmental team should seek to find areas along the proposed route where opportunities exist to make the highway aesthetically attractive by suggesting special treatment of the landscaping. For example, along the top of a heavy cut the Department might consider planting white pine trees. This might serve to enhance the aesthetics and as a partial barrier for noise.

APPENDIX

APPENDIX

EXAMPLE OF AN ENVIRONMENTAL IMPACT ENVIRONMENTAL IMPACT CASE STUDY ROUTE 20 — KEENE IMPROVEMENT

by

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BACKGROUND

At the request of the Environmental Quality Division, the Environmental and Economics Section of the Virginia Highway Research Council conducted a study to determine the probable socioeconomic and environmental impact of the proposed improvement of Route 20 at Keene. This evaluation was a part of the Highway Department's effort to ensure in the proposal stage that projects will complement the environments they traverse.

METHODOLOGY

The methodology employed evolved from an eighteen-month study conducted by the Research Council, as modified by experiences in practical field application. The Council approach utilizes an interdisciplinary team (representing the fields of sociology, economics, and ecology) to study the area first hand. In order to measure local values team members interviewed selected inhabitants of the area to be affected. At Keene, the team members conversed with the assistant postmaster and the proprietor of the general store. In addition, the team examined the Albemarle County property tax records to determine the probable impact of the proposed taking on the tax base of the county. A windshield survey supplemented by a walking tour of the project area familiarized the team with its distinctive features.

PROPOSED MODIFICATIONS

Adoption of the following recommendations should result in the least harmful impact of the proposed highway project on the area.

1. A gravel turnout of sufficient depth to accommodate the safe entry and exit of passengers from a parked automobile should be provided between Stations 170 and 185, or in that vicinity. The area is a natural park and could thus be made more available to the traveling public.
2. The rail fence on the Terhune property and the old oak tree on the Thigpen property should be preserved, if possible.
3. Consideration should be given to the recycling of the existing roadway fronting the U. S. Post Office in the Green Mountain Service Center building, to add to the parking space at this public facility.
4. Consideration should be given to the disruption of and danger to the busing of school children. It is possible that construction of the project can be scheduled in the summer months, or that heavy equipment operations can be minimized at normal bus transit times.

ENVIRONMENTAL IMPACT

The potential socioeconomic and environmental effects of the proposed improvement were evaluated in accordance with the Federal Highway Administration guidelines set forth in PPM 20-8. The environmental impact is considered to be as follows:

Fast, Safe, and Efficient Transportation -- The improvement to this stretch of Route 20 should provide faster passage of the area by through traffic and safer entry onto Route 20 from Routes 712, 713, 714, and 715. As Albemarle County Sheriff George Bailey mentioned in an interview with one of the team members, a serious two-car collision occurred just south of the proposed improvement while this impact study was being conducted. The proposed construction should allow a higher speed over a shorter distance, providing for more efficient transportation. Its full impact will not be felt until the entire route from Scottsville to Charlottesville has been improved.

National Defense -- The improvement would facilitate faster and safer movement of defense traffic by reducing potential delays. Parenthetically, the improvement will have a direct, if somewhat minor, impact on the operations of the 80th Regiment of the 80th Division of the 1st Battalion (Reserve) of the U. S. Army, whose first sergeant commutes through the area to his headquarters in time of emergency.

Economic Activity -- The proposed construction will take a portion of the apron fronting the Green Mountain Gulf Service Center on Route 20. Due to the limited congestion at the service station at present, it is doubtful that the taking will result in a loss of business to this operation. The only other business affected, the general store and American gas station, fronts on Route 712 and does not have the potential traffic flow problems of the Gulf station. The proposed construction closely follows the existing route, and will not disrupt the agricultural activity of the area, nor will any timber stands be affected by the improvement.

Employment -- No adverse impact on employment in the area is expected. Commuting to Charlottesville will be easier, but the project is not so extensive that noticeable differences will be felt.

Recreation and Parks -- There are two unofficial turnouts between Stations 170 and 185, both in a heavily wooded area. They are not large enough for safe parking, although they are being used as rest stops. The proposed right-of-way would seem to provide sufficient space for a wider gravel turnout, perhaps with a picnic table and trash can, on the east side of Route 20. Between these stations, nothing man-made can be seen and the loudest non-traffic sound is a birdcall.

Fire Protection -- The Scottsville Volunteer Fire Department serves the numerous family housing units in the Keene area. The upgrading of the road will provide faster and safer passage for the heavy fire-fighting equipment.

Aesthetics -- With the new route so nearly approximating the old, the blending of the road into the topography and vegetative growth of the area is simple to maintain. Replacement of the rail fence on the Terhune property would help maintain the colonial atmosphere of the area.

Public Utilities -- The power poles of the Appalachian Power Company (Lynchburg) and the telephone poles of the Virginia Telephone and Telegraph Company (Charlottesville) are the only utilities affected.

Public Health and Safety -- While Route 20 is not statistically the most dangerous in the county, its upgrade should help Albemarle lower its accident rate per mile. The Rescue Squad unit at Charlottesville serves the Scottsville area, and will be able to transport persons to the hospital facilities in Charlottesville with greater dispatch. The Keene area is replete with waterways that periodically flood the road. The connecting route upgrades should ameliorate this problem.

Residential and Neighborhood Character and Location -- No living areas or work areas are to be taken, and the nature of the upgrade (same number of lanes) is such that the communities on the east and west sides of the present route will be no more distant than at present. The people in this area like its rural quality, and this will not be disturbed. The Department has a service area on Route 713 east, which has acclimatized the area to Highway Department activities.

Religious Institutions and Practices -- The Hermitage Methodist Homes of Virginia property marked on the scroll has been sold to Samantha Mawyer. The two churches in the area will be unaffected by this improvement.

Conduct and Financing of Government -- The tax base data secured at the Albemarle County Courthouse show an estimated (depending on the disposition of the unused portions of the existing right-of-way) tax loss of \$31.00 on a base of \$2.6 million (see attached chart). Experience has shown that when highways are improved, the added useability of the road allows more intensive development of the abutting land. This has, in the past, caused an increase in the county revenues from property taxes. Post Office operations at Keene are made difficult by the lack of parking space in front of the building. It is possible that the existing roadway (scheduled for removal) might be recycled to ease the parking difficulties there.

Conservation -- The proposed channel change at Station 169 alters the present watering place of deer in the area; the stream has other suitable places, so the disruption should be temporary. The Ranlet property has been recently logged over, so that the timber loss due to the road construction will be minimal. The Randolph property includes a stand of oak trees. Those taken will represent a loss to the timber production of 1990.

Natural and Historic Landmarks -- No man-made landmarks will be disturbed. If possible, the grandfather oak south of the Boxon Hill driveway at Station 154 should be preserved.

Noise, Air, and Water Pollution -- The environmental team used the computer program developed by the National Cooperative Highway Research Program to simulate the noise that will result from the proposed improvement. Actual readings taken at five locations were as follows

Station 116	73 dbA
Station 156	72 dbA
Station 170	77 dbA
Station 220	68 dbA
Station 221	57 dbA

Based on a comparison of the computer estimates and the actual readings, it is believed that the noise from the proposed improvement will be no greater than that at present.

Air pollution does not appear to be of any major consequence in this area. The improved route structure should allow more efficient engine operation, with resulting lower emissions per mile traveled.

Water pollution should not be a major problem on this project if the contractor takes preventive measures to minimize sedimentation in fast-running Totier Creek and its tributaries. Rechanneling will follow the natural basin etched into the terrain over the years -- it will alter the timing of the natural stream changes, but not the expected locations. The proposed channel cleanout at Station 108 should actually reduce the downstream sedimentation caused by overflows of Totier Creek. The Scottsville Recreation Center is not served by Totier Creek, so what sedimentation does result from the construction should not have serious consequences.

Property Values -- The improved access should enhance the general property values in the area, particularly on the connecting routes. The Green Mountain Gulf Service Center may suffer a reduction in value, since its potential room for expansion will be limited by the dwelling immediately behind it.

Multiple Use of Space — The rural character of the area does not demand more intensive use of the roadway than presently envisioned.

Replacement of Housing — No housing will be taken. If the road makes present homesites less desirable, Route 713 east and Route 715 are now in a state of development of single-family dwellings.

Education — A telephone conversation with Mr. Ritter, the Director of Transportation for school busing in Albemarle County, disclosed that eight two-way trips are made per school day along this route. Disruptions could be minimized if the construction were begun and completed in the summer months. If this is not possible, coordination of the construction activities with the school bus schedules would be advisable.

Displacement of Families and Businesses — No families or businesses will be displaced.

FINANCING OF GOVERNMENT

PROJECT: 0020-002-106

Parcel Number	Acre		Value (\$)		Total Tax (\$)	Take		Tax Loss (\$)	
	Total	Take	Land	Improvement		Land	Improvement		
1	102.40	1.45	3,150	5,550	513.30	2.63	N	2.63	
2	373.0	0.55	8,800	4,680	795.32	0.76	O	0.76	
3	199.0	4.24	4,650	6,880	680.27	5.85	T	5.85	
4	492.45	0.10	11,880	10,120	1,298.00	0.14		0.14	
5	90.8	1.00	1,520	4,650	362.85	0.98	A	0.98	
6	273.7	7.80	4,880	5,810	630.71	8.86	P	8.86	
7	101.0	0.10	3,050	3,450	383.50	0.18	P	0.18	
8	38.8	1.60	480	150	37.17	1.17	L	1.17	
9	15.75	1.60	230	3,580	244.79	1.37	I	1.37	
10	111.4	1.00	2,430	0	143.37	1.28	C	1.28	
11	239.8	1.25	3,380	12,940	962.88	1.04	A	1.04	
12	30.59	0.60	1,480	2,550	237.77	1.71	B	1.71	
13	4.97	0.10	230	670	53.10	0.27	L	0.27	
14	6.25	0.10	360	720	63.72	0.34	E	0.34	
15	5.00	0.01	230	970	70.80	0.03		0.03	
16	1,407.47	6.00	17,430	5,690	1,364.08	4.39		4.39	
TOTAL		27.51							\$31.00

