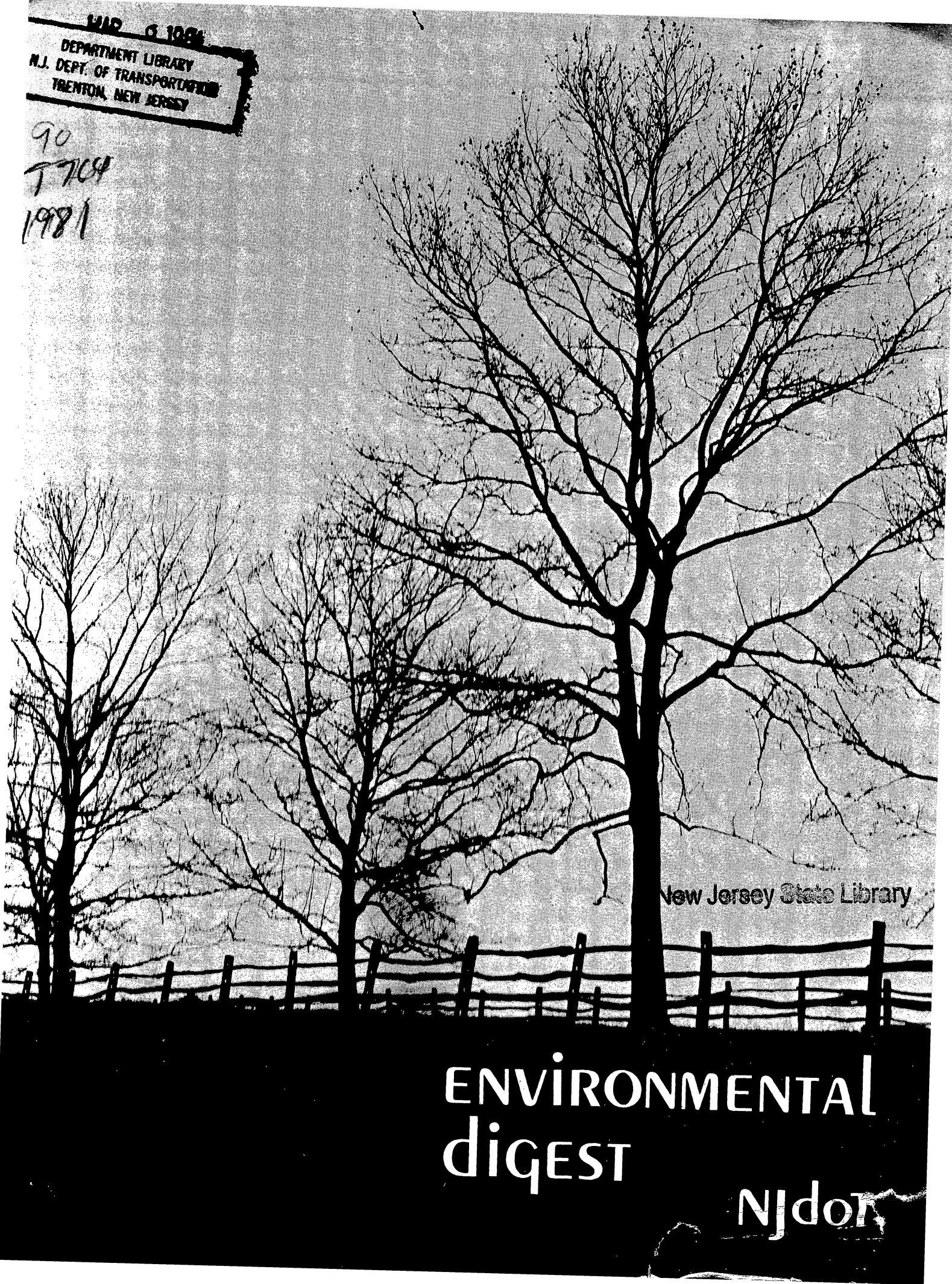


MAR 6 1981
DEPARTMENT LIBRARY
N.J. DEPT. OF TRANSPORTATION
TRENTON, NEW JERSEY

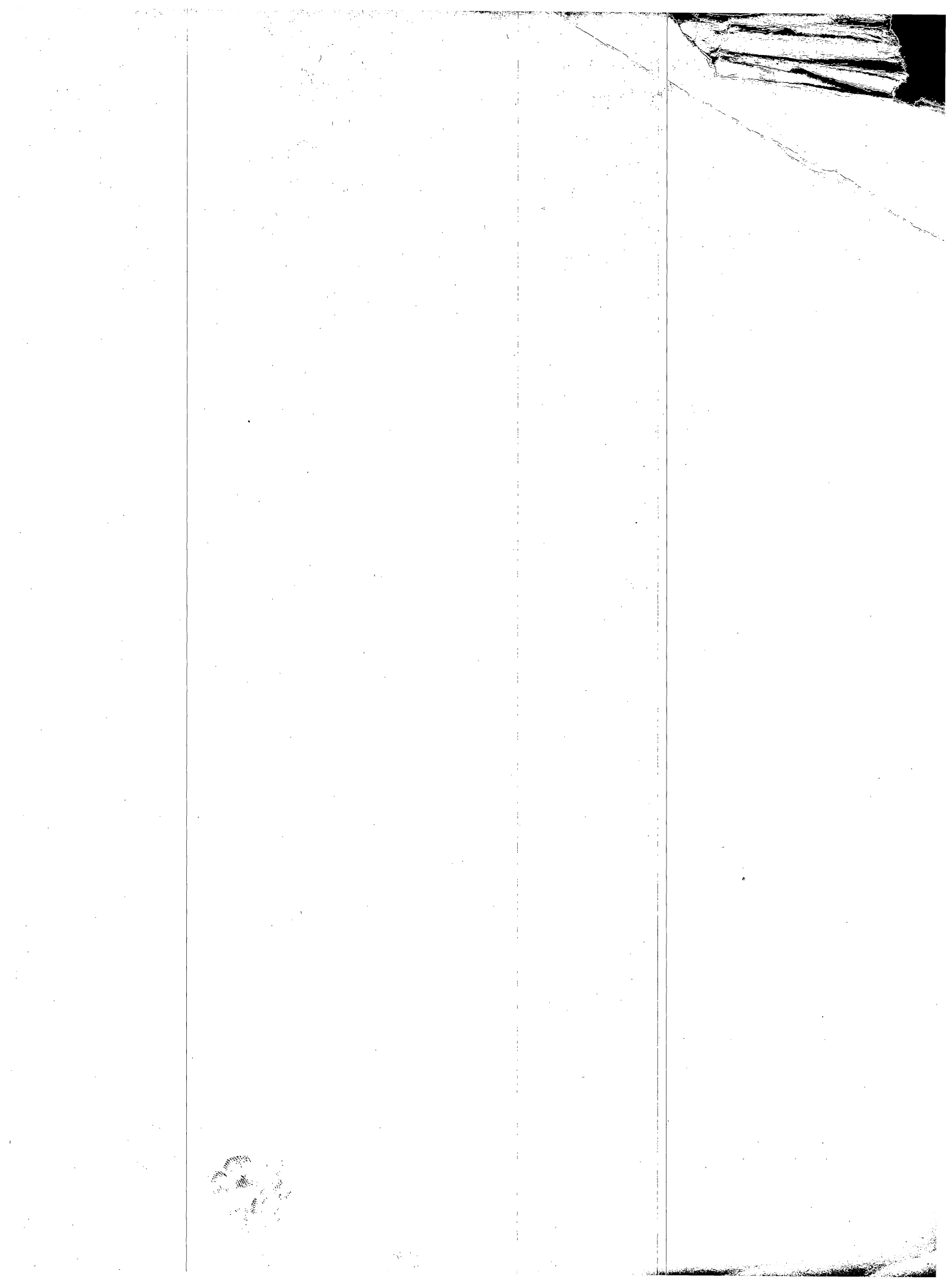
90
T709
1981



New Jersey State Library

ENVIRONMENTAL digest

NJdot





LOUIS J. GAMBACCINI
COMMISSIONER

STATE OF NEW JERSEY
DEPARTMENT OF TRANSPORTATION
1035 PARKWAY AVENUE
TRENTON, N. J. 08625

February 20, 1981

To County and Municipal Officials:

I am pleased to introduce Environmental Digest, a new publication prepared by NJDOT staff to inform local officials of the social, economic and environmental requirements for federal aid transportation projects.

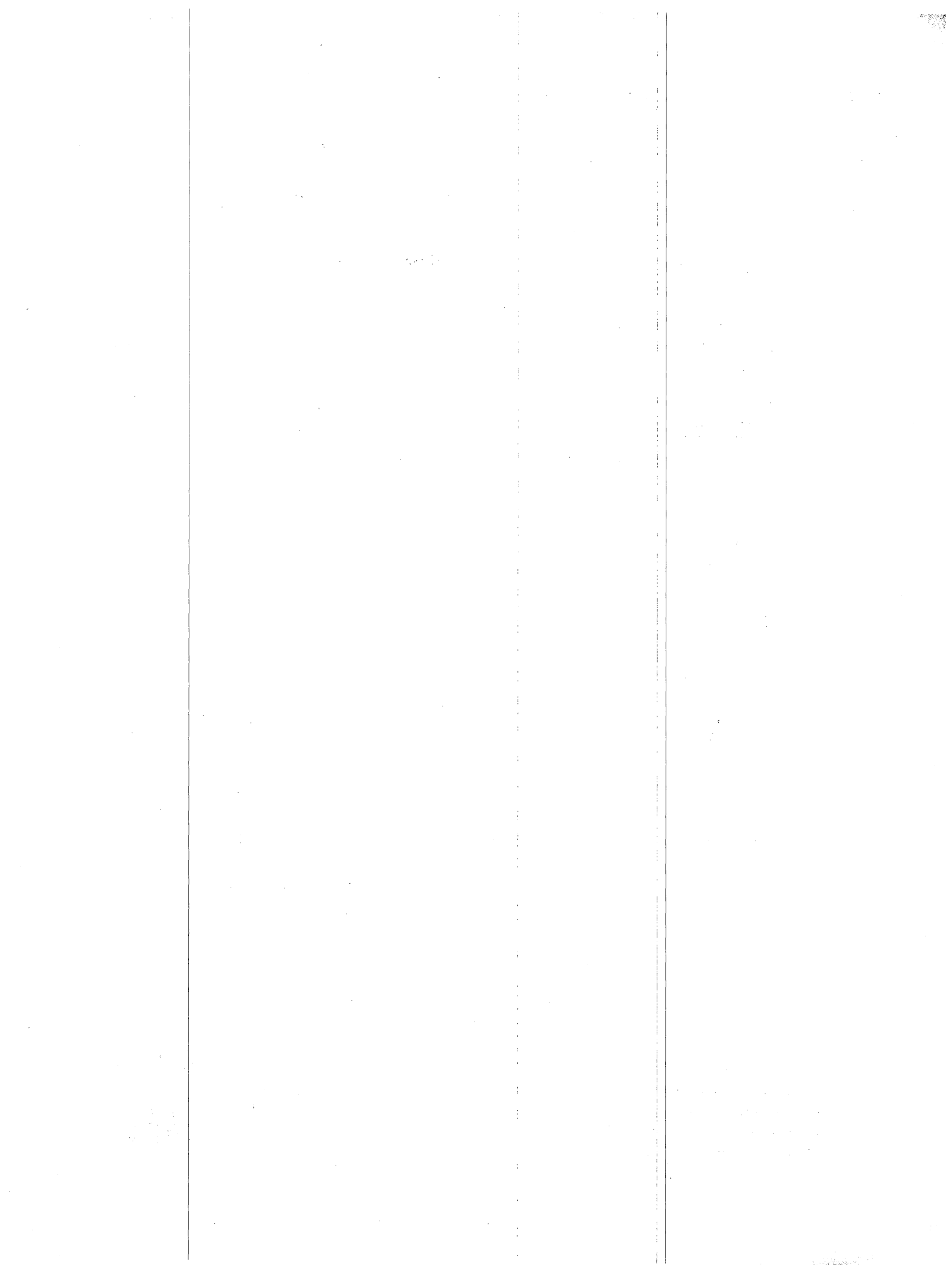
I hope that its use by local sponsors will assist in the development of county and municipal local aid projects and increase coordination with NJDOT.

The Digest, although developed independently, is consistent with the recommendations of the June 1980 report, "Communications with County Governments," prepared for the Federal Highway Administration in conjunction with the National Association of County Engineers.

Up to this time, county and local officials often have not received NJDOT's technical assistance for compliance with federal regulations at a time when it is most useful, at the inception of a project. From now on, the Department will make its environmental expertise available to local officials from the beginning of a project. For your convenience, Section V of this Digest lists the names and telephone numbers of NJDOT's environmental personnel.

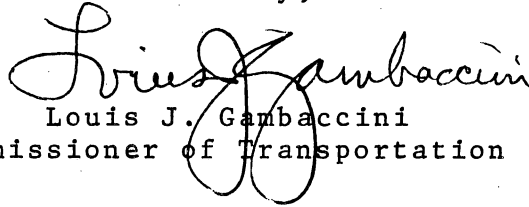
Although the Environmental Digest will be useful to you in expediting federal aid projects, it is not meant to be a final authority or a substitute for regulations. Transportation projects still must be independently reviewed by other state and federal agencies as specified. While NJDOT cannot guarantee approvals by these agencies, it will give its full support in coordinating a project developed in accordance with Digest guidelines with the review agencies and work for its acceptance.

New Jersey State Library

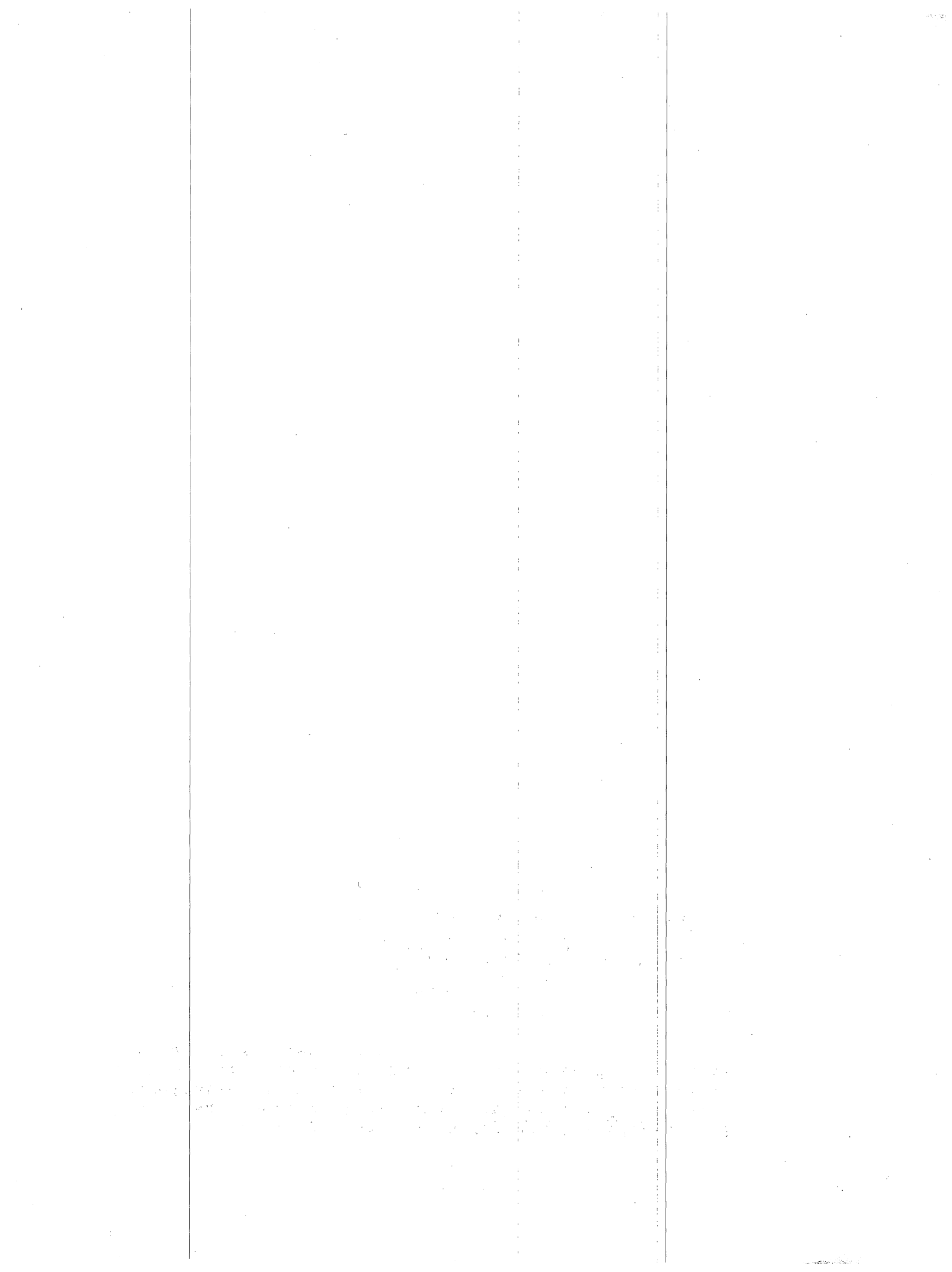


In my opinion, the Environmental Digest will become an important tool with which to build greater coordination between NJDOT and local agencies. This, in turn, will result in better transportation services for New Jersey residents.

Sincerely,

A handwritten signature in cursive script that reads "Louis J. Gambaccini". The signature is written in black ink and is positioned above the printed name and title.

Louis J. Gambaccini
Commissioner of Transportation



Environmental Digest

**THIS DOCUMENT HAS BEEN DEVELOPED AS AN AID
TO MUNICIPAL AND COUNTY ENGINEERS AND PLAN-
NERS FOR THE IDENTIFICATION OF ENVIRONMENTAL
PROBLEMS, WITH SUGGESTED METHODS OF AVOIDING
OR MITIGATING THEM.**

PREPARED BY

New Jersey Department of Transportation

Division of Project Development

Bureau of Environmental Analysis

February 1981

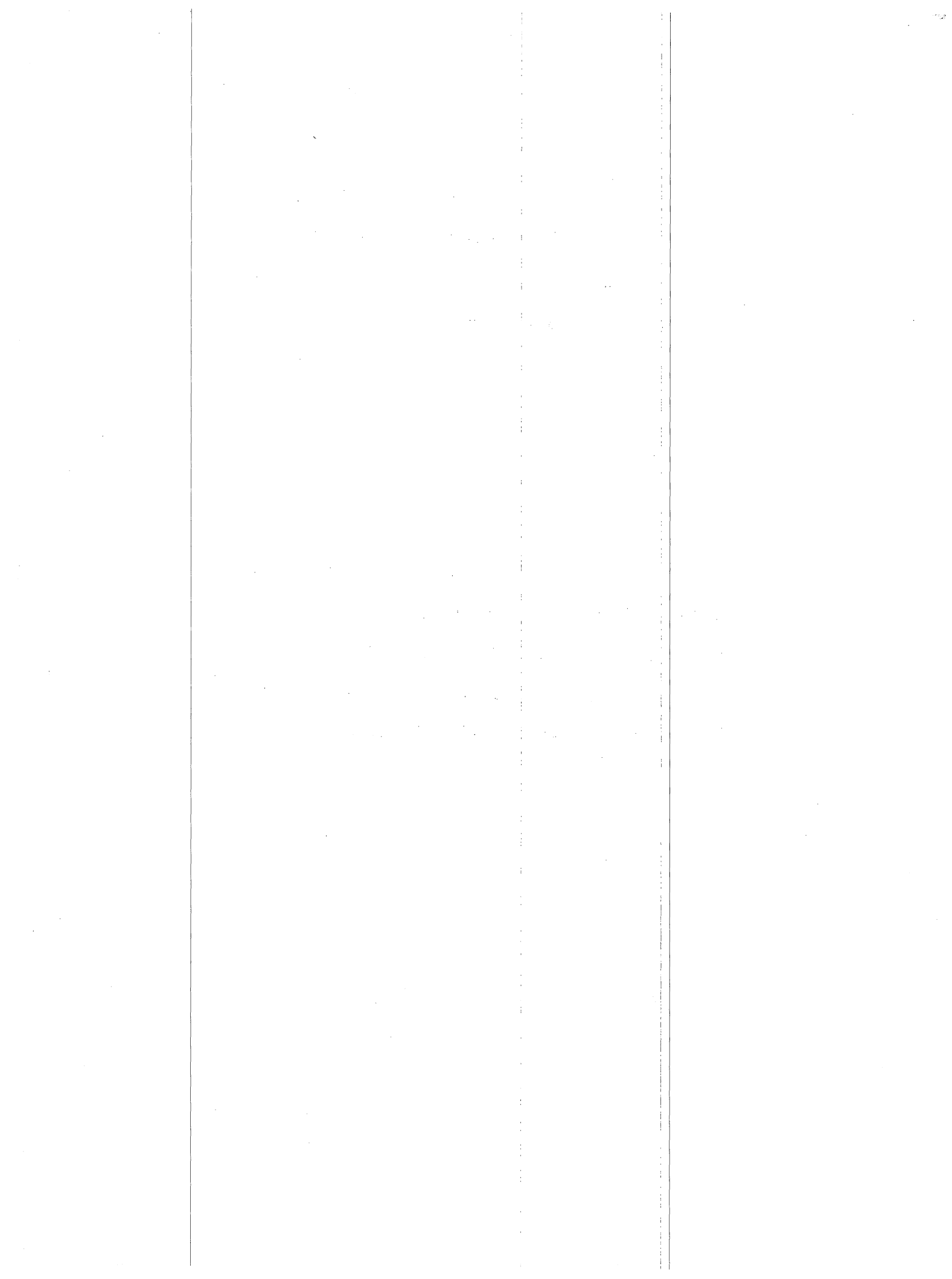


TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>
I	INTRODUCTION	
	A. Purpose	1
	B. Use of the Digest	1
	C. Organization of the Environmental Digest	2
II	LEVELS OF ACTION ASSESSMENT PROCESS	2
III	TECHNICAL DISCUSSIONS	
	A. Air Quality	7
	B. Noise	8
	C. Ecology	11
	D. Archaeological & Architectural Cultural Resources	20
	E. Socioeconomics Land Use Planning Aesthetics	23
	F. Parkland Section 4(f) Requirements	27
IV	PRACTICAL APPLICATION	30
V.	LISTING OF BEA PERSONNEL	39
Appendix A	Conservation Districts in New Jersey	40
B	Permits & Approvals that may be required for Transportation projects	41
C	Wetlands Photographs	44
D	Methodology for conducting a visual survey of Section 106 resources	56

PLEASE NOTE
ON PAGE NUMBERS 45 TO 52
ADD TWO TO THE PAGE
NUMBERS REFERRED TO
UNDER THE PHOTOS.

Faint, illegible text or markings, possibly bleed-through from the reverse side of the page.

I. INTRODUCTION

A. Purpose

This Environmental Digest has been prepared by the New Jersey Department of Transportation (NJDOT) as part of its overall program to minimize delays in the processing of Local Aid transportation projects.

The purpose of the digest is to incorporate into a document available to applicants for Federal Transportation Funds, the benefit of years of experience which the NJDOT has had in dealing with environmental regulations as they apply to transportation projects. Its intent is to identify sources of frequent conflicts which lead to extreme delays and to sensitize project sponsors to critical environmental constraints.

The NJDOT hopes to accomplish this by:

- outlining and describing the requirements of State & Federal Regulations which must be complied with by an applicant for Federal Funds.
- providing a starting point for the establishment of a closer working relationship between the NJDOT staff and the staff of municipalities and counties which intend to apply for Federal Funding.

The availability of such information and DOT staff expertise should allow environmental concepts to be considered by the municipalities and counties during the early conceptual development of a project. Projects could be designed from the outset to comply with environmental regulations and thus avoid unnecessary conflicts with the regulatory process. In addition, early information could allow the counties to establish work programs with a proper balance of the projects with little or no regulatory complications and projects with little hope of receiving environmental clearance without lengthy studies.

B. Use of the Digest

The Digest has been prepared for those who wish to plan, locate, and design their projects around environmental constraints which could seriously delay or even force reconsideration of the practicality of their project. It contains a discussion of the applicable environmental requirements including identification of the design features and types of projects which could trigger the need for detailed, lengthy studies and which could pose constraints to Local Aid projects. It also includes guidance on how to avoid or minimize the impact of these constraints.

C. Organization of the Environmental Digest

Section I - Introduction

Section II - Levels of Action Assessment Process - briefly describes the procedure used by the NJDOT to determine the level of study needed on a particular project to comply with environmental regulations.

Section III - Technical Discussion - is organized by environmental discipline, starting with Air Quality and ending with Parkland - Section 4(f) involvement. It describes the regulatory and physical environmental constraints, and discusses ways of avoiding those constraints.

Section IV - Practical Applications - will combine the individual theories of Section III into one approach, and present a case example.

Section V - Listing of NJDOT Staff - will list DOT staff members who will be available to project sponsors, at any stage of a project, to help implement the principles of the Digest.

II. LEVELS OF ACTION ASSESSMENT PROCESS

Before Federal funds can be committed for engineering, environmental study, and analysis of a Federal-aid Highway Project, the project must be reviewed and then classified by its scope and anticipated impacts by an interdisciplinary team within the NJDOT. The Department's Bureau of Environmental Analysis has the primary responsibility for conducting this review and classification. At this early stage of the project's development, this Level of Action Assessment is generally the principal record to document that the environmental implications of a Federally funded project have been considered.

After review, a project will generally be placed into one of three categories:

- Class 1 - Environmental Impact Statement
- Class 2 - Categorical Exclusion
- Class 3 - Environmental Assessment

The preparation of an Environmental Impact Statement (EIS) is a lengthy process, which takes at least 2-2½ years from the date of its classification, but frequently extends to five years or more.

The process of conducting detailed studies for those Environmental Assessments which need them can also be a lengthy one, and requiring all the necessary approvals can add up to 18 months to the processing of a project. Detailed design of a project generally does not commence until after the EIS or EA process ends. Since engineering design can generally commence soon after the FHWA concurs with a Class 2 determination by the

NJDOT, the advantages to a sponsor of keeping projects within the Class 2 scope should be clear.

The sub-sections of Section III will highlight many of the factors which will require the classification of a project as an EIS or EA.

Occasionally, there will be instances when a project will not immediately be classified due to insufficient information concerning potential environmental impacts; when environmental impacts will jeopardize or seriously delay project development; where project objectives are not clearly defined; or where project feasibility is questionable. If a project cannot readily be classified the following course of action will be followed:

- Additional studies will be done to identify potential environmental impacts.
- The project sponsor will be requested to modify the design in order to lessen or eliminate environmental impacts.
- A recommendation for an Environmental Sensitivity Report and Engineering Feasibility Studies will be made. This recommendation would normally be made for projects which would involve substantial planning, time, resources, or expenditures.

The following is a description of the three Levels to which a project can be assigned:

A. Class 1 - Environmental Impact Statement (EIS)

An Environmental Impact Statement will be prepared for projects that clearly involve significant impacts on the human environment when the environmental studies and early coordination indicate significant impacts, or when review of the Environmental Assessment in light of comments received so indicates that an EIS is necessary.

The following are examples of projects which ordinarily will require the preparation of an EIS:

1. Any new controlled access freeway.
2. Any highway project of four or more lanes on a new location.
3. New construction or extension of fixed guideway systems (e.g., rapid rail, light rail, commuter rail, automated guideway transit and exclusive busway). These projects would be expected to cause major shifts in travel patterns and land use.
4. Major transportation related development whose construction involves a large amount of demolition, displacement of a large number of individuals or businesses or substantial

disruption to local traffic patterns. This classification will take account of the condition of the buildings and availability of comparable replacement facilities for displaced residences or businesses.

B. Class 2 - Categorical Exclusions (CE)

Categorical exclusions are categories of actions which do not involve significant environmental impacts or substantial planning, time or resources. These actions will not induce significant foreseeable alterations in land use, planned growth, development patterns, or natural or cultural resources. Projects meeting the criteria for categorical exclusions will not require additional environmental documentation.

The following is a list of those categories of actions which have been classified as categorical exclusions.

1. Planning and technical studies which do not fund the construction of facilities or acquisition of capital equipment.
2. Grants for training and research programs which do not involve construction.
3. Approval of a unified planning work program and certification of a State or local planning process 23 CFR Part 450.
4. Approval of Transportation Improvement Programs under 23 CFR Part 450, Subpart C and statewide programs under 23 CFR Part 630, Subpart A.
5. Approval of project concepts under 23 CFR Part 476.
6. Engineering when undertaken to define the elements of a proposal or alternatives sufficiently so that environmental effects can be assessed.
7. Federal-aid highways system revisions under 23 U.S.C.103, which establishes classes of highways on the Federal-aid highway system.
8. Approval of utility installations along or across a transportation facility.
9. Reconstruction or modification of an existing bridge structure on essentially the same alignment or location (e.g., widening less than a single travel lane, adding shoulders or safety lanes, walkways, bikeways, or pipelines) except bridges on or eligible for inclusion on the National Register or bridges providing access to barrier islands. Reconstruction or modification of an existing one lane bridge structure, presently serviced by a two lane road and used for two lane traffic, to a two lane bridge on essentially the same alignment or location, except

bridges on or eligible for inclusion on the National Register or bridges providing access to barrier islands.

10. Construction of bicycle and pedestrian lanes, paths, and facilities.

11. Activity included in the State's "highway safety plan" under 23 U.S.C. 402.

12. Transfer of Federal lands pursuant to 23 U.S.C.317 when the subsequent action is not an FHWA action.

13. Modernization of an existing highway by resurfacing, restoration, rehabilitation, widening less than a single lane width, adding shoulders, adding auxiliary lanes for localized purposes (e.g., weaving, turning, climbing) and correcting substandard curves and intersections. This classification is not applicable when the proposed project requires acquisition of more than minor amounts of right-of-way or substantial changes in access control.

14. Highway safety or traffic operations improvement projects including the correction or improvement of high hazard locations; elimination of roadside obstacles; highway signing; pavement markings; traffic control devices; railroad warning devices; and lighting. This classification is not applicable when the proposed action requires acquisition of more than minor amounts of right-of-way or substantial changes in access control.

15. Alterations to existing building to provide for noise reduction and the installation of noise barriers.

16. Ridesharing activities and transportation corridor fringe parking facilities.

17. Landscaping.

18. Program administration and technical assistance activities by the applicant to administer Section 18 funds. (Rural public transportation program.)

19. Project administration and operating assistance to transit authorities to continue existing service or increase service to meet demand.

20. Purchase of vehicles of the same type (same mode) either as replacements or to increase the size of the fleet where such increase can be accommodated by existing facilities or by new facilities which themselves are within a categorical exclusion.

21. Track and rail bed maintenance and improvements when carried out within the existing right-of-way.

22. Rehabilitation or reconstruction of existing rail and bus buildings and ancillary facilities where no additional land is required and there is no substantial increase in the number of users.

23. Purchase and installation of operating or maintenance equipment to be located within the transit facility and with no significant physical impacts off the site.

24. Installation of signs, small passenger and bus shelters, and traffic signs where no substantial land acquisition or traffic disruption will occur.

25. Construction of new bus storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and located on or near a street with adequate capacity to handle anticipated bus and support vehicle traffic.

26. Acquisition of land in which the property will not be modified, the land use will not be changed, and displacements will not occur. For projects other than UMTA advance land loans, this categorical exclusion is limited to the acquisition of minor amounts of land. This is undertaken for the purpose of maintaining the current land use and preserving alternatives to be considered in the environmental process. Advance land acquisition shall not limit the evaluation of alternatives, including shifts in alignment for a construction project which may be required in the NEPA process.

27. Promulgation of rules, regulations, and directives for which a regulatory analysis is not required by Section 3 of Executive Order 12044.

28. Research activities as defined in 23 U.S.C. 307.

29. Emergency repairs under 23 U.S.C. 125 which do not substantially change the design and are commenced during or immediately after the occurrence of a natural disaster or catastrophic failure.

The FHWA Division Administrator may determine that any proposed action on this list may, because of "extraordinary circumstances," require appropriate environmental studies to determine the need for an EIS. "Extraordinary circumstances" include situations that are likely to involve: 1) significant impacts on the environment; 2) substantial controversy; 3) significant impacts on properties protected by Section 4(f) and Section 106 of the National Historic Preservation Act; or 4) inconsistencies with any Federal, State, or local law or administrative determination relating to the environment.

C. Class 3 - Environmental Assessment (EA)

An Environmental Assessment will be prepared for each action that is not a categorical exclusion (Class 2) and does not clearly require the preparation of an EIS (Class 1) or where the EA would assist in determining the need for an EIS.

III. TECHNICAL DISCUSSIONS

A. Air Quality

The Clean Air Act with its various amendments provides the basis for a series of air quality regulations established by the United States Environmental Protection Agency (USEPA), the New Jersey Department of Environmental Protection (NJDEP), and the Federal Highway Administration (FHWA). These regulations are many and voluminous, but for review of individual highway projects they can be boiled down to:

- The project must not cause a new violation or make worse an existing violation of the carbon monoxide National Ambient Air Quality Standards (NAAQS) (35 parts per million, one hour averaging time, and 9 parts per million, eight hour averaging time).
- The project must not generate an increase in the total hydrocarbon emissions in the study area.

Since the above two stipulations are also major goals of the New Jersey State Implementation Plan to Achieve & Maintain the National Ambient Air Quality Standards (NJSIP), a project which complies with these stipulations is generally found to be "consistent with the NJSIP" by the NJDOT. The NJDEP usually concurs with this finding, although in some cases they request additional mitigation measures.

Air Quality Considerations During Early Project Development

Many projects, because of their limited scope, can be determined to comply with the NJSIP stipulations without any air quality study. They include all projects which will not significantly increase traffic volumes and/or truck percents, or significantly decrease average route speeds at any location (the USEPA & FHWA define a 5% change as "significant"). Traffic data need not be available to determine that projects which:

- do not add new lanes; and
- do not remove significant capacity restraints; and
- do not create additional at-grade intersections; and
- do not add additional roadway links to the traffic network,

will not necessitate additional study.

Projects of larger scope will necessitate detailed traffic data and air quality studies to determine the project's consistency with the

NJSIP. These studies generally take anywhere from three to fifteen months to complete. Additionally if these studies which culminate in the preparation of an Air Quality Report (AQR) indicate that the project will not be consistent with the NJSIP, the project must be classified as a Class 1, and an Environmental Impact Statement must be prepared, adding as much as two more years onto the processing of a project.

In light of this, project sponsors should seriously review projects during their early development to determine whether their scope can be maintained at levels which do not trigger the need for detailed studies (e.g. are the additional lanes really necessary in light of the additional delays caused by the need to study them?). Also, they should determine whether they wish to substitute other priority projects which can avoid the AQR process for those which cannot.

If it is decided to proceed with a project which cannot be excluded from AQR preparation, several factors which minimize air quality impacts must be investigated during the planning process. These factors include:

1. Improving vehicular flow at signalized and unsignalized intersections by adding turning lanes or additional through lanes.
2. Sequence timing of traffic signals to avoid queuing.
3. Decreasing vehicle miles traveled (VMT) by providing a more direct travel route without increasing traffic volumes substantially or adding additional network links.
4. Reducing traffic volumes within the project area by incorporating carpool lanes, exclusive bus lanes, bicycle lanes & storage facilities, park & ride lots, on street parking controls, improved public transit, and long range transit improvements.
5. Avoiding receptors which would be sensitive to the adverse impacts of air quality. Such receptors would include schools, hospitals, nursing homes, etc.

These factors must be incorporated into the project if feasible and where they are not feasible, information must be presented to document why they can not be implemented. Incorporation of these factors into a project at an early stage maximizes its chances of complying with the NJSIP stipulations by reducing air pollution generated by the facility. This would reduce the time needed to negotiate air quality clearances and could avoid the lengthy EIS process.

B. Noise

The noise standards with which highway projects must comply were established in the FHWA's Federal Aid Highway Program Manual, Volume 7, Chapter 7, Section 3 (FHPM 7-7-3) Procedures for Abatement of Highway Traffic Noise and Construction Noise. Before FHWA funds can be released

for highway projects, the NJDOT and project sponsor must evaluate the noise levels predicted for the project against the following standards:

- the project should not create noise levels in excess of the Design Noise Levels established for each of five different Land Use Categories (see Table 1); and
- the project should not increase noise levels by 10 decibels or more above those currently experienced in the project area.

Noise Consideration During Early Project Development

The types of projects which can be determined to comply with the FHPM 7-7-3 noise standards without detailed studies are the same as delineated in the air quality discussion. Since noise studies are also time consuming, and since adverse noise impacts can cause a project to be classified a Class 1, with an EIS, project sponsors have multiple reasons for scrutinizing projects of larger scope.

For projects of larger scope which cannot demonstrate compliance with the standards of FHPM 7-7-3, noise mitigation measures must be considered.

State-of-the-art techniques for mitigating noise impacts are at present limited to noise barriers and earth berms. To be effective, a barrier or a berm has to be high enough and long enough to break the line of sight between traffic vehicles and the affected persons or activities.

The noise barrier approach tends to be a costly means of dealing with traffic noise problems. At \$120 per linear foot, a 12-foot high barrier costs over one-half million dollars per mile. Earth berms can be cheaper if made from excess site fill, but slope requirements dictate a base that is four times the height. Frequently, limited right-of-way does not allow their creation. Noise barrier construction on projects of smaller scope are often not possible because of the need to provide access to adjacent land uses.

Therefore, the best method of noise abatement is the one which avoids the problem at the outset. When feasible, careful location and design of the project can help insure that highway noise levels will be compatible with sensitive land uses. The following steps may be taken--individually or in tandem--to minimize noise impacts from the proposed improvement:

1. Locate the road away from groups or clusters of sensitive receptors, especially residential areas, parkland, schools, hospitals, and places of worship. The noise impact zone (the area where the standards are exceeded) usually extends 50-100 feet from each edge of a two lane roadway and from 200-300 feet for a four lane roadway, depending on the truck percentage. When possible, highways should be placed so as to minimize the number of sensitive receptors inside this noise "envelope". Commercial/

DESIGN NOISE LEVEL/ACTIVITY RELATIONSHIPS

Activity Category	Design Noise Levels - dBA ₁ /		Description of Activity Category
	L _{eq} (h) _{3/}	L ₁₀ (h) _{4/}	
A <u>2/</u>	57 (Exterior)	60 (Exterior)	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, open spaces, or historic districts which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B <u>2/</u>	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, and parks which are not included in Category A and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	--	--	For requirements on undeveloped lands see paragraphs 11a and c.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, & auditoriums.

1/ Either L₁₀ or L_{eq} (but not both) design noise levels may be used on a project.

2/ Parks in Categories A and B include all such lands (public or private) which are actually used as parks as well as those public lands officially set aside or designated by a governmental agency as parks on the date of public knowledge of the proposed highway project.

3/ L_{eq} a constant noise level which contains the same amount of acoustic energy as the real, time varying noise level during the same period.

4/ L₁₀ that noise level which is exceeded for 10% of a given time interval.

industrial areas are less sensitive to noise and therefore more suitable for highway placement.

2. Make use of any natural landforms (e.g. hills, cuts) that may block or buffer highway noise. Densely wooded areas greater than 100 feet in thickness may reduce noise levels as much as 10 dB, a halving of the perceived noise level.
3. Where appropriate, depress the vertical alignment. Noise levels may be lowered by depressing a road if the lip of the shoulder can break the line of sight between some of the vehicles and the noise-sensitive receptors.
4. Reduce grades on proposed roads through sensitive areas whenever possible. Gradients of over 2% can increase truck noise levels by several decibels, thereby adding to the noise impact.

C. Ecology

1. Soils; Farmland

The Federal Aid Highway Program Manual, Volume 7, Chapter 7, Section 2 -- Environmental Impact and Related Statements -- is the principal Federal or State regulation which governs Soils and Geology. This regulation requires that these areas be considered during the environmental process, but sets no specific standards.

Although these areas do not generally pose severe regulatory constraints to Local Aid projects, involvement with them can generally be avoided altogether if areas of steep slopes or rock outcrops are avoided and if extensive earthwork is avoided in aquifer recharge zones and in areas of high acid soils.

The President's Council on Environmental Quality (CEQ) has taken steps to protect farmlands over and above the protection offered by FHPM 7-7-2. The CEQ classified farmlands into four categories and discouraged Federal Agencies from participating in the conversion of these lands to non-farming uses.

Although the CEQ regulations do not create a veto over use of farmlands for transportation projects, they can present problems if the project sponsor cannot justify their use. This is especially true for the highest class of farmland -- Prime Farmland. Therefore, although use of farmland is not precluded by any means, it should be avoided if reasonably possible. If not possible, then attempts should be made to minimize such use.

To determine whether Prime Farmland is located in a particular area, the USDA Soil Conservation Service Soil Survey Reports should be reviewed. These reports are located, as a minimum, at each Conservation District Office (see Appendix A) and contain maps which describe the soils in each portion of each county. Any land area

which is currently undeveloped and designated in the Survey Report as Land Capability Class I or II will be considered as prime farmland. Land Capability Class III can also be classified as prime farmland by the SCS, depending on its specific soil characteristics.

2. Surface Water Resources

One of the major causes of conflict in processing a transportation project involves the acquisition of water related construction permits. Several governmental agencies have the authority to control the type of projects and alterations that may be constructed in and over streams, rivers, and lakes. The most frequently encountered permits for a transportation project include the N.J. Department of Environmental Protection's Stream Encroachment, Wetlands, Riparian & Coastal Area Facility Review Act (CAFRA) permits, and Water Quality certificate; the U.S. Army Corps of Engineers Section 404; and the U.S. Coast Guard bridge permit. A listing of the various permits, and a brief description of when they apply, is presented in Appendix 3. If, as a result of the project, significant environmental impacts on these water bodies are anticipated, to obtain these permits detailed studies over several sampling seasons will have to be made to determine both the physical, chemical, and biological properties of the water bodies, as well as the impacts caused by the project.

In addition to satisfying the criteria for the various permits, any project utilizing Federal Funds or requiring a Federal permit must comply with the provisions of Executive Order 11988 on Floodplain Management. Basically, this order requires that construction in the floodplain be avoided unless there is no other practicable alternative. If construction in the floodplain cannot be avoided, the project must then be designed to reduce flood hazards, and to minimize impacts to natural floodplain values.

Surface Water Considerations During Early Project Development

The best way to minimize problems created by involvement with surface water resources is to avoid them altogether. However, some transportation projects such as bridge replacements, usually do not have alternatives to locating in the floodplain. In these cases, the following options should be considered and carefully documented in designing the project:

- a. Replacement of the facility on the existing location. If this cannot be done, the justification, such as high traffic volumes, no suitable detours, or poor roadway alignment, must be presented.
- b. Locate the new facility as close as possible to the existing facility to minimize disturbance of natural areas.

Several other principles should be incorporated into the design of any transportation project located in a floodplain, including:

- a. Minimize the placement of fill and embankments in floodplains. The use of structures, rather than fill should be considered.
- b. Provide adequate water circulation and high stream flow passage.
- c. Preserve natural drainage patterns when possible. Channelization should be avoided or minimized.
- d. Use minimum grading and slope requirements to preserve as much of the site as possible.
- e. Reestablish damaged floodplain areas and return the site to the natural contours.
- f. Minimize vegetation removal.

Projects not designed in accordance with these principles will experience substantial delays (up to several years) in obtaining the required permits. In fact, the permit may even be denied, or the Federal Highway Administration may not participate in the project funding.

The factor which most frequently creates problems in obtaining construction permits is extensive channelization. Channelization is usually developed by project sponsors to satisfy the hydraulic criteria for a NJDEP Stream Encroachment permit (a stream crossing must be designed so that the increase in backwater elevation from a 100-year frequency flood is less than 0.2 of a foot). Usually, the most economical means of satisfying this criteria is to channelize the stream rather than construct a larger structure. In the past, the NJDEP Stream Encroachment permit was based solely on hydraulics, and the environmental impacts of stream modifications were not evaluated. However, the NJDEP is now discouraging extensive channel modifications and is encouraging the use of larger structures to pass the floodwaters from a 100-year storm.

Many projects that require an NJDEP Stream Encroachment permit also require a Section 404 permit from the U.S. Army Corps of Engineers. This permit may be required even if Federal Highway Administration funds are not used. In the processing of the permit, the Corps requests comments on the project's environmental impacts from the U.S. Fish & Wildlife Service, Environmental Protection Agency, and the National Marine Fisheries Service. A memorandum of agreement between the Corps and these Federal agencies precludes issuance of a 404 Permit at the district level over the objections of one of these agencies and these agencies almost always are opposed to any plan that involves a substantial modification of a stream. When this occurs, the District Office of the Corps of Engineers will attempt, in a process that can last two years, to negotiate an agreement between the applicant and the review agencies. If that

fails, the permit application proceeds to the Regional Corps of Engineers office, and eventually to their National office, for a decision. This process will cause additional delays of up to two or three years. Even if a permit is received after this lengthy process, which is unlikely, the Environmental Protection Agency has the authority to veto the Corps decision, if they determine that there will be an unacceptable adverse effect on municipal water supplies, shellfish beds, fishery (including spawning and breeding grounds), wildlife or recreational areas. It should be clear then that it is usually best to avoid, by careful design, any objections to a permit before they occur.

It is recognized that channelization may be necessary for some projects, particularly in the approach and exit sections near a proposed structure. In these cases, there are several techniques that should be included in the project to improve the ecological characteristics of the channelized section.

- if a stream must be widened, the construction should be limited to one channel bank with the other one left natural. This would be more desirable than disturbing the entire stream, and could preserve some of the aquatic habitat and stream bank vegetation.
- Channel alterations should be scheduled to avoid important life cycle stages of aquatic organisms such as migration, spawning, or nursery periods when possible.
- Stream improvement devices such as various types of deflectors, check dams, rock structures, and cover structures, should be installed. These devices are effective in creating holes and riffles that improve fish habitat and in maintaining dissolved oxygen levels and in providing the diversity of stream flow conditions needed by aquatic species.
- Culverts should be located in the original stream channel, and at the existing channel bottom elevation. Large drops in elevation at the end of the culvert can prevent the upstream movement of fish and other aquatic life. If a concrete floor is proposed for the culvert, a "v" or dish-shaped depression should be included to allow for fish passage during low flow periods. High velocities through culverts can also effectively prevent the upstream movement of fish. Baffles or deflectors can be placed along the bottom of the culvert to reduce water velocities.

Construction of a wider channel means that the depth of water will be reduced in that section. The loss of trees along the banks will cause an increase in water temperatures, and dissolved oxygen levels will decrease. This could prevent fish movement and also eliminate many aquatic species from the area. A low flow provision in

the channelized section would be desirable to provide fish passage through the disturbed section, and typical designs for a low flow channel are illustrated in Figures 1-3. Revegetation along the stream banks using suitable shade trees would eventually help to reduce water temperatures.

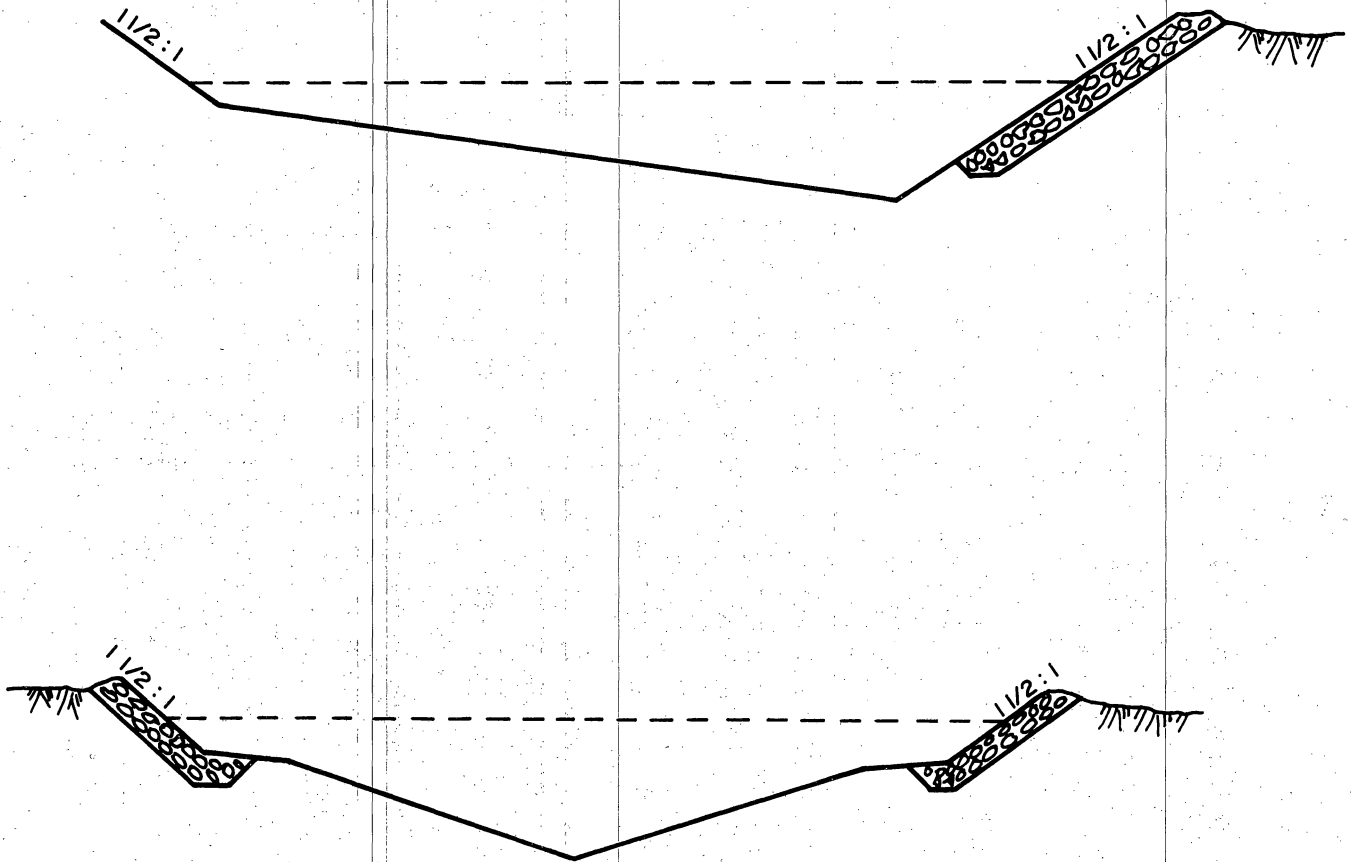
Prior to including any of the habitat improvement techniques on the plans for a modified channel, an investigation of the physical, chemical, and biological characteristics of the stream should be conducted. Avoiding substantial channel work should be a principle objective during project design. However, if avoidance is not feasible, the incorporation of these mitigation measures usually receives a favorable response from resource agencies and generally expedites the acquisition of necessary permits.

3. Wetlands

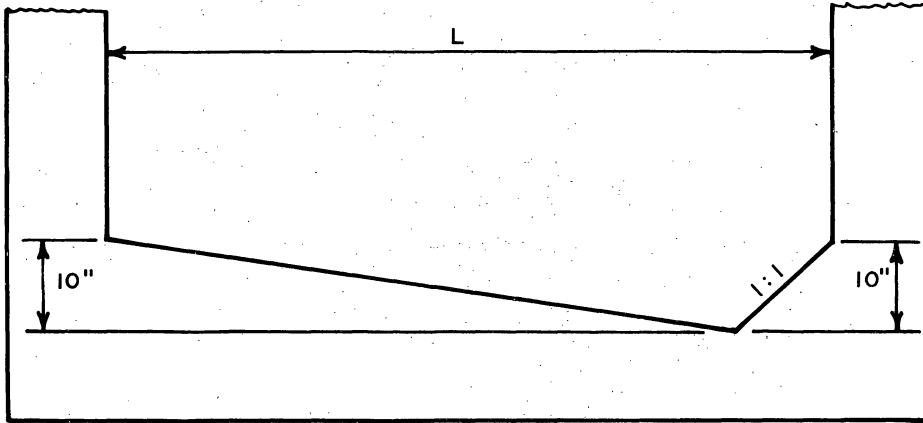
The President issued Executive Order 11990 (EO11990) on May 24, 1977, which established a National policy on wetlands protection. The U.S. Department of Transportation implemented EO 11990 by requiring the protection, preservation, and enhancement of wetlands to the fullest extent practicable during the planning, construction or operation of a transportation facility. New construction in wetlands is to be avoided unless there is no other practicable alternative. In addition,, the proposed project must include all practicable measures to minimize harm to wetlands that may result from construction. These principles must be followed for any transportation project that utilizes Federal Funds or requires a Federal permit, such as the U.S. Army Corps of Engineers Section 404 Permit.

In general terms, wetlands are lands where water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface. It spans a range of environments where terrestrial and aquatic systems meet. The single feature that most wetlands share is soil that at least periodically is saturated with water. This creates severe physiological problems for all plants except for special classes which are adapted for life in water or in soil that is at least periodically saturated.*

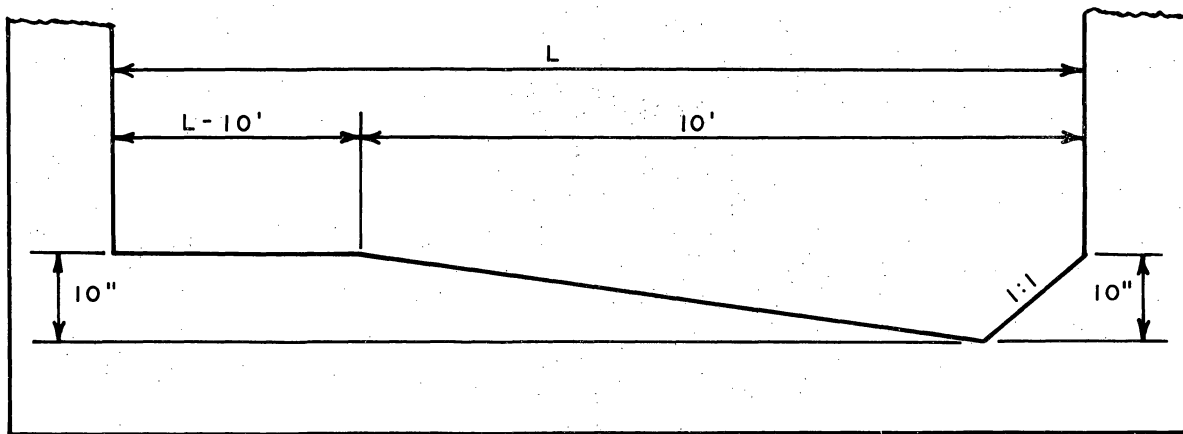
* Cowardin, L.M. Classification of Wetlands and Deep-Water Habitats of the United States, U.S. Fish & Wildlife Service, 1977.



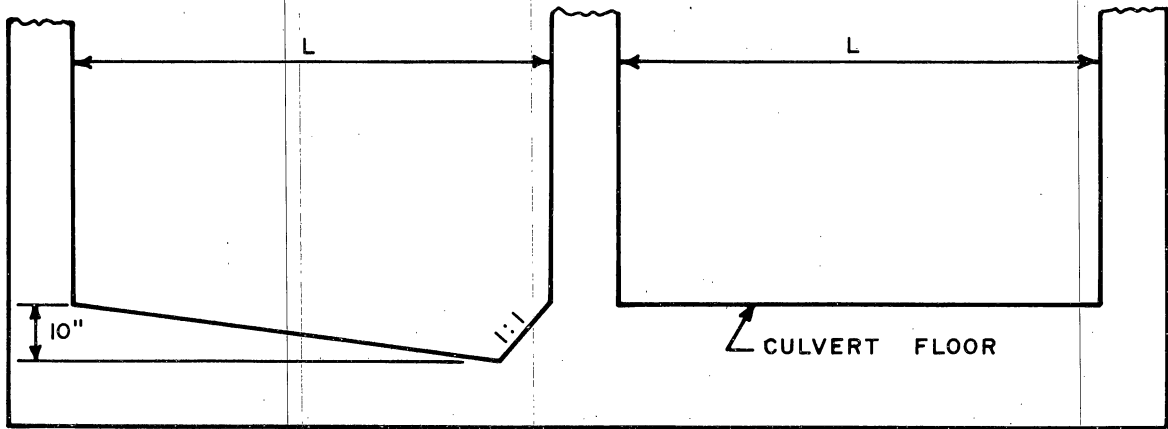
**TYPICAL LOW FLOW
CHANNEL SECTIONS**



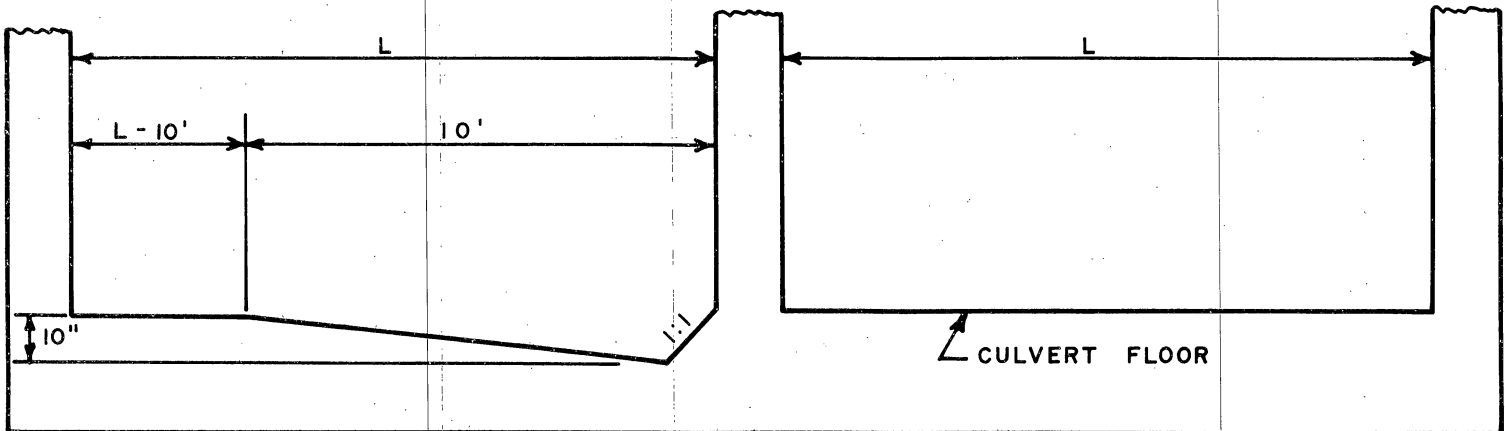
LOW FLOW TREATMENT — SINGLE CELLED R.C. BOX
 CULVERT OR TIE OF TIE ARCHES — $L = 10'$ OR LESS



LOW FLOW TREATMENT — SINGLE CELLED R.C. BOX
 CULVERT OR TIE OF TIE ARCHES — $L = 10'$ OR MORE



LOW FLOW TREATMENT — TWIN CELLED R.C. BOX
 CULVERT — $L = 10'$ OR LESS



LOW FLOW TREATMENT — TWIN CELLED R.C. BOX
 CULVERT — $L = 10'$ OR MORE

Wetlands Considerations During Early Project Development

To determine whether wetlands exist in a particular area, the project sponsor can review the USDA Soil Conservation Service-Soil Survey Reports and can then conduct a field trip to the site. These reports are located at each Conservation District Office (see listing in Appendix A), and contain maps which describe the soils in each portion of each county. Any area that is classified as muck or alluvial soils on the maps, will generally be considered wetlands by one or more State and Federal agencies. The same applies to areas where field reviews identify the presence of the following typical wetlands species: cattails, white cedars, cordgrass (several species of spartina), water lillies or skunk cabbage (in wooded areas). Some less obvious wetlands include lowland red maple forests, stands of phragmites (common weed) and sites characterized by rushes and sedges. To assist project sponsors in the identification of these species, a series of photos of some of this vegetation is included in Appendix C.

If any of the above conditions exist, the NJDOT's Bureau of Environmental Analysis (see phone numbers in Section V) should be contacted if final confirmation is desired.

If areas considered to be wetlands will be affected by a proposed project, alternatives which would avoid new construction in wetlands must be studied. Any Federally Funded project which will have a significant impact on wetlands must be classified as a Level 1 or 2 and therefore will also require the preparation of an Environmental Impact Statement or Environmental Assessment. For any action which entails new construction in the wetlands the Federal Highway Administration must determine and document that; 1) there is no practicable alternative to construction in the wetland, and 2) that all practicable measures to minimize harm to the wetlands have been included.

The best approach to dealing with wetlands is to avoid them unless there is no choice. It is only after all practicable alternatives to construction in wetlands have been considered and documented, that the project sponsor should continue to process projects which use wetlands. And even then, all possible planning to minimize wetlands impacts will have to be incorporated in the project.

Some of the mitigation measures that have been employed on previous transportation projects include crossing wetlands on structure rather than fill, and constructing new wetlands to compensate for the wetlands taken by the project. If a Section 404 Permit is needed (and it generally is), the Corps will probably include various mitigation measures as a condition of the permit.

4. Vegetation & Wildlife

FHPM 7-7-2 and the State and Federal Endangered Species Acts govern the vegetation and wildlife impact areas. FHPM 7-7-2 affords general protection in that it requires that vegetation and wildlife resource areas be identified and impacts to such resources be minimized in the processing of a Federal Aid Project.

Involvement with the Endangered Species Legislation will pose a more serious constraint to a project than FHPM 7-7-2. Construction within the habitat of a species protected by the Federal Legislation is precluded if the U.S. Fish & Wildlife Service (USFWS) determines that the project will have an adverse effect on the survival of the species. Currently, the USFWS considers an encroachment that is not minimal to have an adverse effect on such species.

The State Legislation has no specific provision precluding use of habitat of a species on the New Jersey list. However, the New Jersey Department of Environmental Protection considers protection of such areas of prime importance, and implements such protection for any project that fails under other areas of their jurisdiction (N.J. Executive Order 53, NEPA review, permits, etc.).

Therefore, any area inhabited by species on the State list should be avoided unless no practical alternative exists, and if inhabited by a species on the Federal list, it must be avoided.

The NJDEP - Division of Fish,, Game & Shellfisheries should be contacted for the current listing of endangered and threatened species, and also for the identification of known habitat of such species (phone 609-292-9400).

The New Jersey Legislature has recently passed two natural resource laws that will affect transportation projects in certain areas. The Pinelands Protection Act of 1979 established protection and preservation areas in order to manage and control development in the pinelands of southeast New Jersey. Generally, projects that maintain existing facilities would be compatible with the intent of this Act, while new facilities or major improvements will be extremely difficult to implement.

The New Jersey Natural Areas System Act of 1976 also established a Register of Natural Areas to protect and preserve ecological resources for present and future generations. Approximately 40 acres representing various regions of the State and different types of ecological communities have been designated as Natural Areas under the provisions of the Act. Virtually all construction in these areas will require the approval of the New Jersey Legislature. The N.J. Department of Environmental Protection or the N. J. Department of Transportation's Bureau of Environmental Analysis should be contacted for the locations of these protected sites.

D. Archaeological, Architectural, & Cultural Resources

A series of laws, executive orders, and regulations have been passed within the last 20 years to extend protection to archaeological, architectural, and cultural resources. The legislative action which most directly affects transportation programs is the National Historic Preservation Act of 1966, which:

1. established a National Register of Historic Places for sites of National, State, or Local significance;
2. established a National Advisory Council on Historic Preservation (ACHP);
3. directed the ACHP to develop procedures to review and comment on all Federally funded, licensed or assisted undertakings which potentially affect resources on or eligible for inclusion on the National Register.

The last clause, which is contained in Section 106 of the Act, led the ACHP to establish a series of procedures which must be followed by Federal Aid projects. These procedures, known as the Section 106 procedures, require the Federal Aid applicant to:

- survey a project area for sites on or eligible for inclusion on the National Register,
- prepare a report which analyzes the impacts which the project would have on any (if any) such sites,
- investigate options which avoid or minimize impacts,
- coordinate the above studies and determinations with the State Historic Preservation Officer, the Keeper of the National Register, and the ACHP.

The official procedures are graphically presented in Exhibit 5.

Section 106 Considerations During Early Project Development

Once it has been determined that a Federal Aid project may affect archaeological, historical, and cultural sites of National Register quality, the time consuming Section 106 procedures must be followed. Project sponsors should strive to locate projects in areas where the potential for presence of Section 106 resources is minimal. Even though a survey of a project area by a professional archaeologist and historian might ultimately be necessary to guarantee that no resources are present, the project sponsor can greatly increase his chances of expediting his project by segregating the project area into locales of negligible, moderate, and high "106 potential."

Locales of negligible potential include those where no obviously older* structures are located, and where the soil structure has previously been disturbed. Archaeologists generally write-off the following areas as having been previously disturbed without further survey: 1) where previous road construction has cut and filled to such an extent that no original soils remain, 2) where sewer and other utilities have been placed along side the road in the area of proposed construction, and 3) where an area has been built up recently or over time in such a way that no undisturbed resources remain. If the project sponsor feels that he has steered his project to an area of negligible potential, he should document his findings and submit them to the NJDOT with or before his application for Federal Aid. His documentation should include a liberal amount of photos, information which dates structures and other development as less than 50 years old, and evidence (approximate) of how and when soils in the area have been previously disturbed.

It is obvious that it would not be practical to locate all local projects in such areas. Local planners are often restricted to existing project locations or often have specific areas which they want to service. When, because of the above or other considerations, projects cannot be located in areas which are clearly devoid of resources, the project sponsor should initiate the following preliminary research:

1. Contact the NJDOT's Bureau of Environmental Analysis, who will provide the sponsor with a list of sites in the project area already on the National Register, and with the location of areas of high potential which have been identified in previous NJDOT surveys.
2. Review municipal and county historical records. Most county and municipal libraries contain county and town histories and historical maps which can be used to identify potential resources.
3. Contact local historical societies for information regarding resources.
4. If historic structures are identified, review of documents such as deeds, wills, and mortgages will help date the construction and identify previous owners.
5. If a bridge(s) is involved, the project sponsor should attempt to identify through archival review, the type of the bridge; the age of the bridge; the builder; the construction company; repairs and modifications; the number of other bridges of the same style in the county or State.

* The ACHP Criteria for National Register eligibility indicates that properties which have achieved historical significance within the last 50 years will be considered eligible for the National Register only if they are of "exceptional importance."

6. Conduct a visual survey of the project area. Appendix D presents a methodology for conducting such a survey.

This analysis should supply the project sponsor with substantial information regarding the location of 106 resources, enabling him to segregate his project area into locales of low, moderate, or high potential. He should use the information during the planning and location of his project and record the information in a report which should be submitted to the NJDOT before or with the application for Federal funds. Although such a survey will not guarantee that unexpected 106 sites will not turn up later in the process (especially archaeological sites which because of their presence underground are harder to identify), it will reduce the possibility. In addition, the documentation of the research by the project sponsor minimizes the need for DOT staff to perform it. This will enable a more timely review (and field survey, if necessary) by the NJDOT Cultural Resources Staff, of Local Aid projects.

E. Socioeconomics, Land Use Planning & Aesthetics

The primary regulatory action which governs these disciplines is FHPM 7-7-2. Although FHPM 7-7-2 sets no particular standards for these disciplines, it highlights them as major criteria in determining whether a project should be classified as a Class 1, 2, or 3.

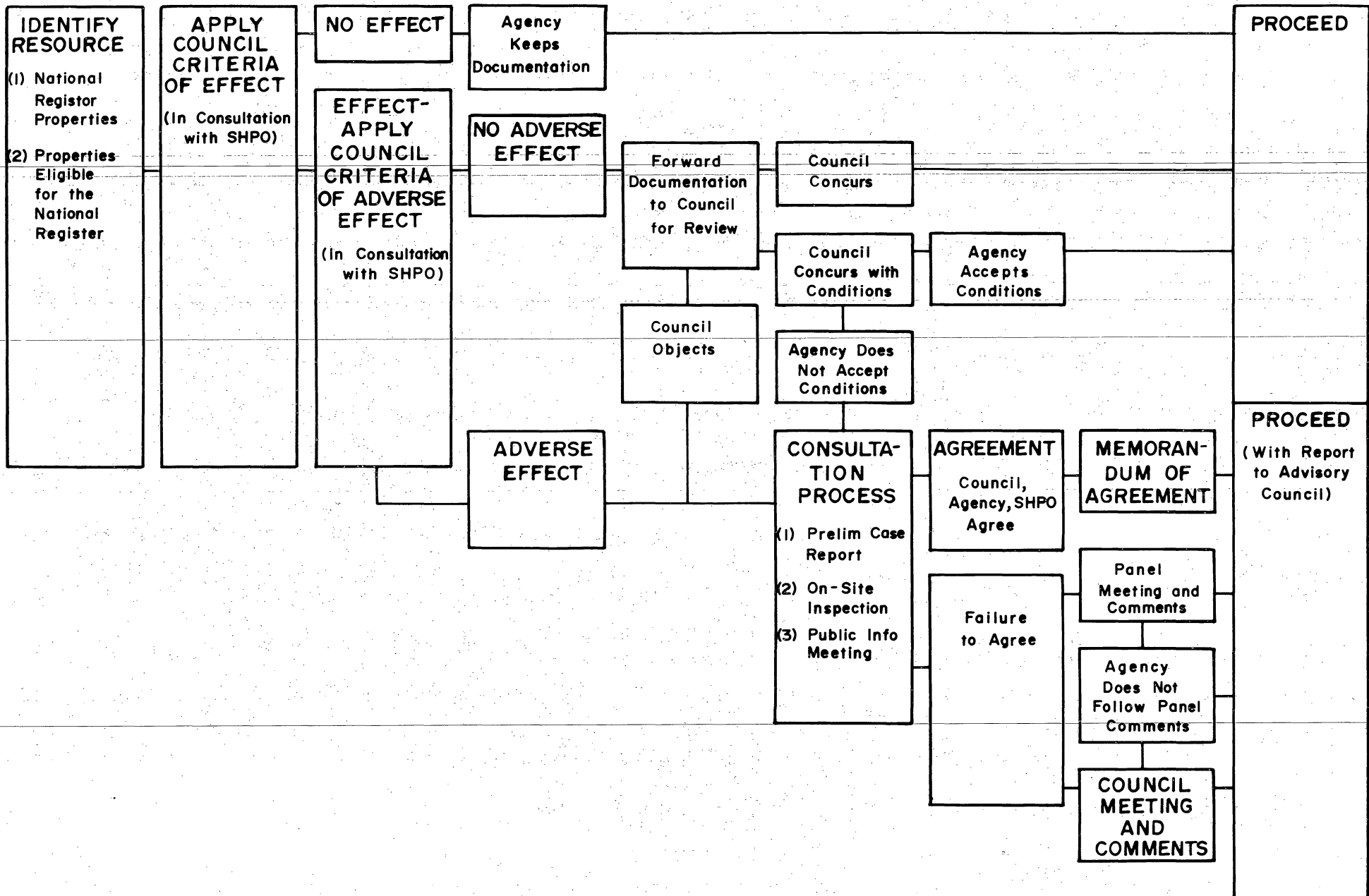
Socioeconomics, land use planning and aesthetics pose constraints to local projects in two ways. First, if significant impacts are not avoided with careful design, the project will have to be classified as a Class 1 or 3 action and lengthy study and coordination efforts will have to be undertaken. In addition, significant impacts in these areas will (more so than in any of the other environmental disciplines) most likely engender organized community opposition, and such opposition is generally more damaging to a project's viability than regulatory constraints.

Socioeconomic, Land Use Planning & Aesthetics Considerations During Early Project Development

The project sponsor should:

- estimate the number of displacements caused by his project (if any),
- determine whether the displaced residences and businesses can be relocated without undue hardship to either the relocatees or the remaining community,
- try to eliminate or minimize the troublesome relocations, and
- consider that displacements can, in certain instances, be preferable to other environmental impacts.

ADVISORY COUNCIL REGULATIONS FOR THE PROTECTION OF HISTORIC AND CULTURAL PROPERTIES



Community Cohesion

The project sponsor should:

- identify the distinct communities and neighborhoods (if any) in the project area (note: if such locales are not immediately apparent to the project sponsor, interviews with key local residents can help identify neighborhood boundaries),
- attempt to avoid severance of any neighborhoods identified,
- consider that widening or dualization projects can in certain cases be as disruptive to neighborhood cohesion as new facilities.

Accessibility to Community Facilities and Services

- locate the community facilities which are in or service the project area,
- identify and locate the users of these facilities,
- determine the means of access to these facilities (i.e. via walking, automobile, public transit, etc.),
- attempt to avoid relocation of facilities outside their service area and attempt to locate and design the project so that severance or hinderance of access to community facilities is minimized.

Employment & Business Activity

The project sponsor should:

- attempt to avoid unnecessary displacement of business activities,
- consider that partial displacements, such as those which cause loss of parking or loss of some plant facilities can destroy the economic viability of a business and force its ultimate abandonment. Such occurrences are more damaging than direct displacements because the business owner is not compensated for the loss of his business by the governmental agencies. If it is determined that the partial displacement does threaten the viability of a business, the project sponsor should seriously consider complete avoidance of the displacement or complete acquisition,
- consider that a project can adversely affect an existing business by altering traffic patterns or creating growth in new areas.

Land Use Planning

This area draws together the direct and indirect project implications to social and economic systems and the relationship of the project to

local and regional land use planning efforts. The main questions to be asked by a project sponsor are:

- Will the project generate or encourage any changes in the local and regional land use patterns,
- Is the project itself and its associated land use changes resulting from its social and economic significance compatible with local and regional plans and zoning?

Of note here is that local plans and zoning may be reevaluated and altered to better accommodate the projects' land use effects. Particularly, where a project may render undesirable the continued use of adjacent properties as residences, the local zoning could be modified to encourage the conversion of such lands to higher uses and, at the same time, benefit present owners through increases in property value prior to sale for redevelopment or conversion. Otherwise, the negative effects restricting the continuation of the existing use could be multiplied by a decrease in property values incurred by the present owners.

Tax Ratables

If the project is sponsored by a county, coordination with the municipality involved should be undertaken to determine whether right-of-way acquisition for the project significantly reduces the tax ratables available to the community.

Aesthetics Considerations

Aesthetic considerations should be an integral part of a project from its initial conception until the final design process. However, only the early considerations will be discussed in this Digest.

During early project development, project sponsors should strive to minimize alteration of the visual environment of those residents who must accommodate the project. This can be most frequently accomplished by minimizing removal of vegetation, especially that which could provide a visual buffer between the project and the receptors. Project should also be located to take advantage of terrain buffers, such as berms or ridges and to avoid visual cutoffs of desirable visual features, such as lakes and rivers.

Removal of trees by minor widening projects in urban areas merits special attention. Project sponsors are prone to overlook such removals, because the impacts appear minor and the trees are generally replaced. However, local residents do not overlook such tree removals and their opposition often results in delays and occasionally forces project abandonment.

F. Parkland/Section 4(f) Requirements

Section 4(f) of the 1966 U.S. Department of Transportation Act states that:

"...the Secretary (of Transportation) shall not approve any program or project which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of National, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or of any land from an historic site of National, State, or local significance as so determined by such officials unless: (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife, and waterfowl refuge, or historic site resulting from such use."

This action was implemented by the Federal Highway Administration in regulations contained in FHPM 7-7-2. These regulations require that a Section 4(f) Evaluation be prepared for any project that involves an outright fee acquisition or temporary or permanent easement from any of the types of properties outlined in the 1966 Act or which seriously impairs the use of the property even though no acquisitions are to be made. If the project is determined to have more than a minimal effect on the property, the project will require preparation of an EIS .

The key phrases in the Act and the implementing regulations are "... feasible and prudent alternatives..." and "all possible planning to minimize harm...."

In the past, the Federal Courts have rendered decisions which allowed little latitude in the interpretation of these phrases.

Feasible means "capable of being constructed in accordance with sound engineering principles", it does not mean "capable of being constructed as easily or as economically or with as few complications as the preferred alternative."

Prudent means "capable of being constructed without extraordinary community impacts and/or disruption and without involving extraordinary costs." It does not mean "capable of being constructed with as few community impacts or at the same cost as the preferred alternative."

The phrase "all possible planning" combines the meaning of feasible and prudent.

FHPM 7-7-2 indicates that the Section 4(f) Evaluation must:

- document that detailed considerations, consultations, and alternative studies were made before it was concluded that there was no feasible and prudent alternative to the Section 4(f) acquisition,

- document that all possible planning has been undertaken to minimize harm to the Section 4(f) lands acquisition,
- document that the required consultation with State, Federal, and local agencies regarding the Section 4(f) property has been accomplished.

Section 4(f) Considerations During Early Project Development

Because of the required consultation and documentation which must be developed to support a Section 4(f) Evaluation, preparation and processing of even the simplest Section 4(f) Evaluation adds at least one year to a project. If the conclusions of the Section 4(f) Evaluation are that the project will have more than a minimal effect on the Section 4(f) property, an EIS will have to be processed, even if the project has no other impacts, adding at least two years to the project. Because of this, it is best for a project sponsor to design projects so that all acquisition of Section 4(f) properties can be avoided.

The desirability of avoiding Section 4(f) impacts provides extra incentive for the project sponsor to complete a preliminary review of the project area for Section 106 properties — acquisition of land from any historic or archaeological site on or eligible for inclusion in the National Register is also protected by the Section 4(f) regulations.

If the project sponsor cannot design his project to avoid Section 4(f) involvement he should send a preliminary Section 4(f) report to the NJDOT with his application for Federal Funds. This report should:

1. describe the Section 4(f) property
 - a) type (recreation, historic, etc.)
 - b) size (acres or square feet & location)
 - c) usage
 - d) ownership & title restrictions (includes Green Acres & Bureau of Outdoor Recreation restrictions, & deed restrictions on conversion of land to a "non-park" use)
 - e) relationships to similarly used lands nearby, if any (e.g. is it part of a county park system, etc.)
 - f) include photos
 - g) include a copy of the official municipal map with the Section 4(f) property located on it.
2. explain why the Section 4(f) acquisition cannot be avoided (include sketches) using other alternatives.
3. include a letter from the agency having jurisdiction over the 4(f) property indicating their support for the proposed project and their finding that it is consistent with local plans for the purchase and maintenance of parkland and open space.
4. indicate whether any Green Acres and/or Bureau of Outdoor Recreation (Heritage Conservation and Recreation Service, U.S.

Dept. of Interior) funds were received for the property in question, or for any other park in the municipality. If funds were received, include the map used in the application for funds.

The above information and documentation is required to comply with the regulation and its availability at the application stage will speed up both the Level of Action Assessment and classification and Section 4(f) Evaluation preparation processes.

IV. PRACTICAL APPLICATION

The previous sections have had as a central theme the principle that consideration of environmental concepts during the initial development of a project will greatly expedite the processing of Federal Aid projects. Special emphasis was placed on review of alternatives which; 1) avoided all environmental constraints or 2) minimized involvement with them to the fullest extent possible. Emphasis was also placed on use of various mitigation measures to reduce the environmental impacts of alternatives which cannot avoid sensitive areas.

In this section, a system for putting all the concepts discussed in Section II together is presented. The key elements of this system which should be implemented by the project sponsor are:

- an inventory of the project area for environmental constraints.
- an investigation of alternatives which avoid or minimize involvement with environmental constraints.
- a review of mitigation measures which could be incorporated into the project.
- a review of alternatives which do not fully meet the objectives of the original proposal but which may be acceptable in light of delays and complications associated with alternatives of the desired scope.

In order to provide maximum benefits, the above analyses should be documented in writing. The availability of such written documentation will speed up later processing of the project through the NJDOT, FHWA, and other State and Federal review agencies.

The next portion of this section includes a suggested format for the necessary documentation. This format has been designed in a checklist format so that it can also serve as a "bookkeeping" record for the environmental inventory.

PROJECT:

LOCATION:

SPONSOR &
CONTACT:

DESCRIPTION: This project consists of the replacement of the Central Road Bridge over the unnamed river, and the realignment of Central Road. Sketch #1 presents the existing situation and Sketch #3 demonstrates the proposal.

- OBJECTIVES:
1. To replace the existing bridge which is in an advanced stage of deterioration.
 2. To eliminate a safety hazard caused by excessive curve and poor sight distance.
 3. To increase hydraulic capacity of bridge to eliminate flooding.
-
-

II ENVIRONMENTAL INVENTORY

1. AIR No significant impact as per Section III of Environmental Digest.
 2. NOISE No significant impact as per Section III of Environmental Digest.
 3. SOILS & FARMLAND Review of Soil Survey indicates Class III farmland at NW corner of Intersecting Road and Central Road.
 4. SURFACE WATER Unnamed River: Channelization 100' E & W of new bridge; no fill or footings in the 40' channel of the river.
 5. WETLANDS Review of soil survey indicates alluvial soils in location of shaded areas on Sketch #2; field review indicated presence of cattails, skunk cabbage, phragmites and sedges; existence of wetlands confirmed by NJDOT-BEA on 8/16/79.
 6. VEGETATION & WILDLIFE No sites on state list, no sites known to NJDOT-BEA or NJDEP FG&S.
 7. SECTION 106 RESOURCES
 1. House located to south of river is of early 19th century construction; review of county archives indicates ownership and construction by town founder.
 2. County records indicate several other structures once on historic house property -- high potential that ruins remain -- See Sketch #2 -- Summary of research attached.
-

8. SOCIO-ECONOMICS,
LAND USE PLANNING,
& AESTHETICS

Farm is already bisected by Central Road - once realignment is accomplished, existing Central Road will be returned to natural state; there are no other considerations - therefore, no impacts.

9. SECTION 4(f)

Since historic house and property likely to be eligible for National Register, it will be protected by Section 4(f).

Discussion

1. The originally proposed project is shown in Sketch 3. This is the most desirable from an engineering viewpoint. The curve is completely eliminated, flooding problem is eliminated via channelization rather than costly bridge design, less new construction is involved and no detour would be necessary during construction.

However, the environmental inventory and assessment indicated that:

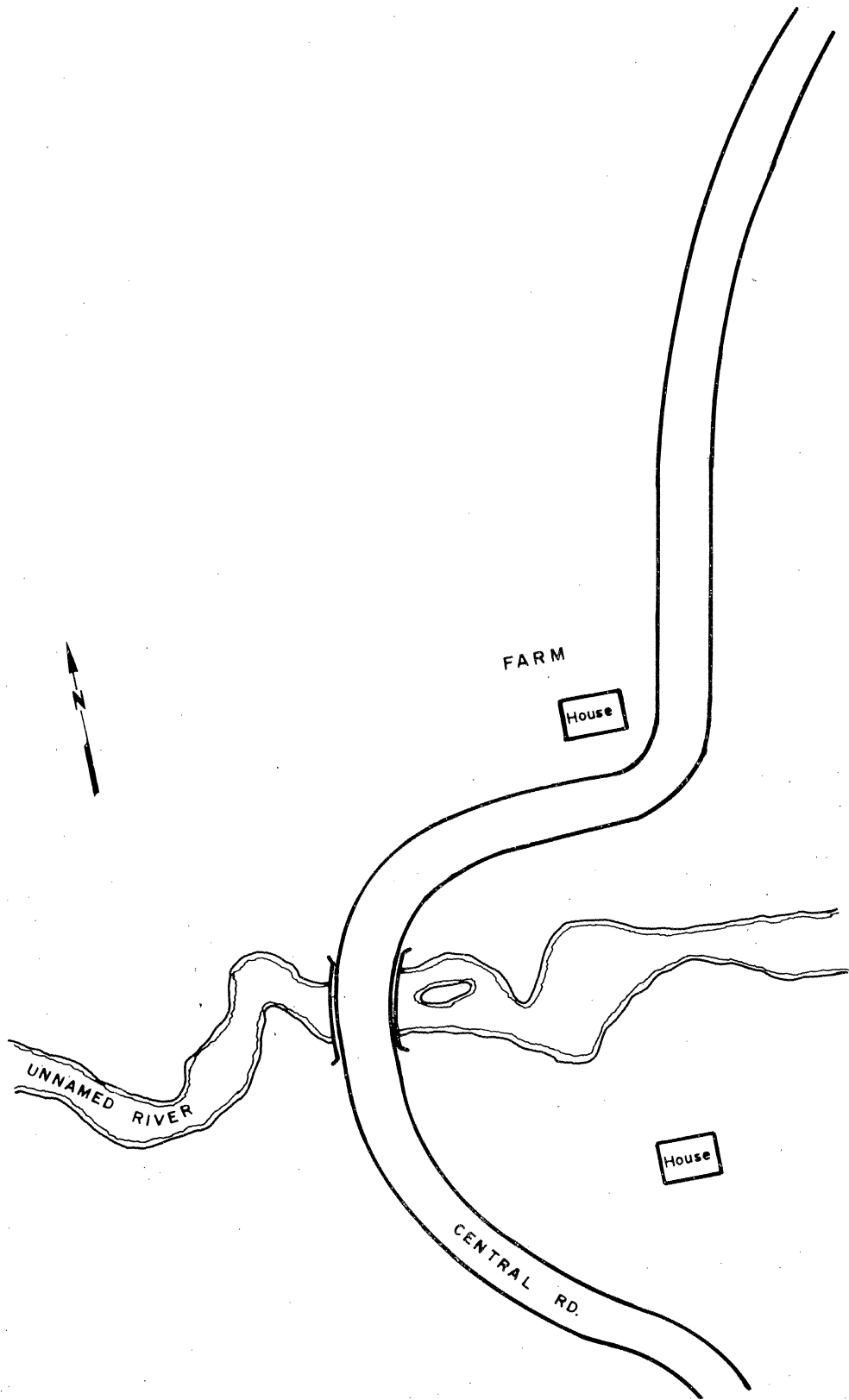
- a. This alternative would probably be classified as a Class 1 or Class 3 action because of wetlands, river and Section 106 impacts.
- b. Compliance with E.O. 11988 and E.O. 11990 could not be accomplished unless project were placed on structure across wetlands and river.
- c. The alternative would have an adverse effect on the historic house and archaeological property.
- d. This alternative would be, at best, forced to the National level of Army Corps for the issuance of a Section 404 permit.

Estimated total time for environmental processing: 5 years

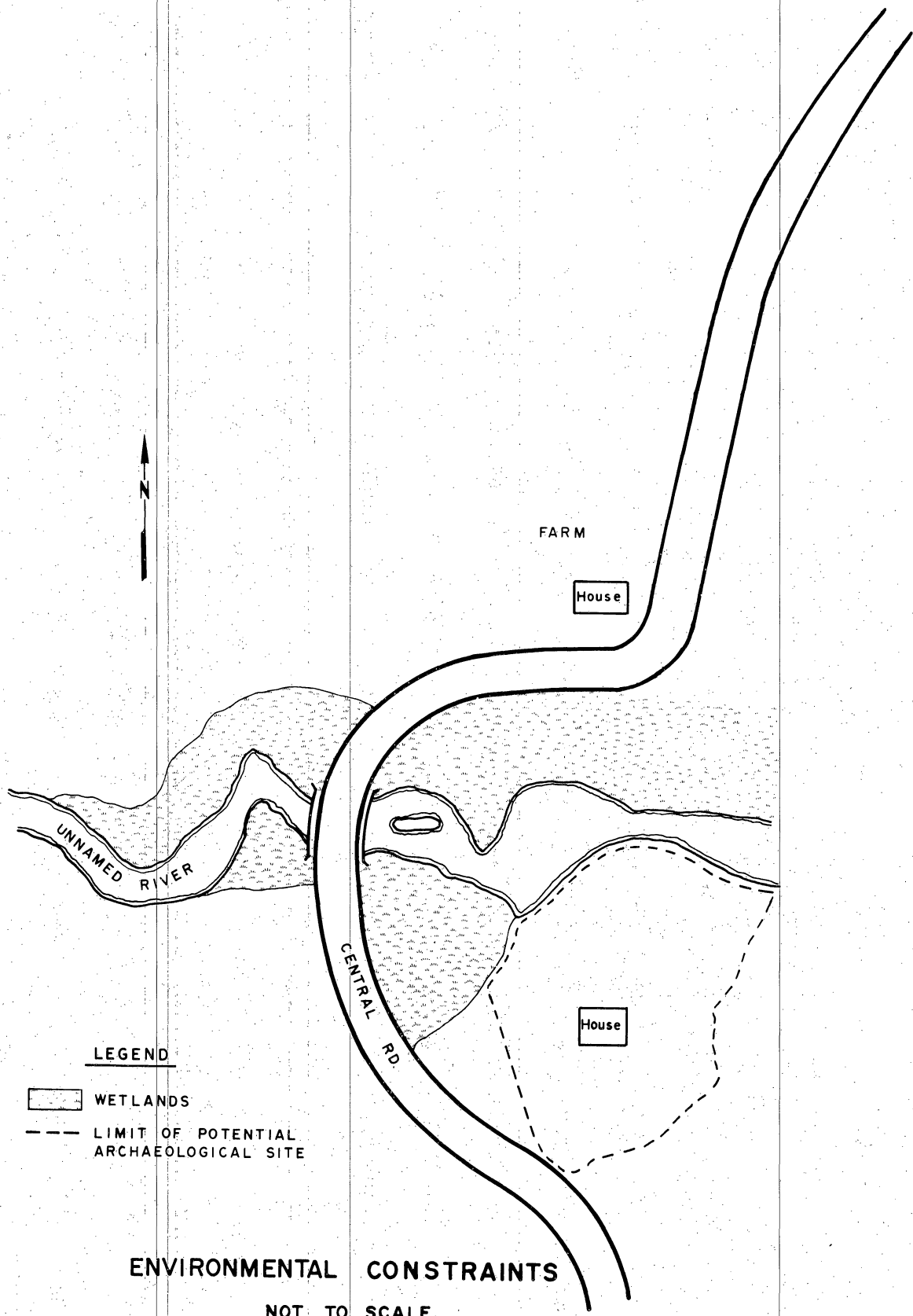
2. Project as now proposed (Sketch #4) eliminates all of the above. Although its design is inferior to original design, it still satisfies project objectives and will comply with State and Federal Design Standards.
3. Consideration was given to shifting original alignment to east to avoid acquisition of historic and archaeological property. Additionally, channelization would have been minimized with superior bridge design. However, this alternative was abandoned because:
 - a. Wetlands, E.O. 11990 and permit problems would remain.
 - b. This alternative would still be involved with Section 106 problems because of its associated aesthetic and noise impacts to the historic property.

III. COMPLIANCE WITH PERMITS & OTHER ENVIRONMENTAL STANDARDS:

	Not Applicable	Project Complies	Proj. Modifications necessary for compliance	Proj. Compliance Doubtful under any circumstance
A) Section 404 Permit (Army Corps of Engineers)		✓		
B) Executive Order 11988 (Floodplain Management)		✓		
C) Executive Order 11990 (Protection of Wetlands)		✓		
D) Stream Encroachment		✓		
E) Water Quality Certification		✓		
F) Riparian Grant; Riparian Permit	✓			
G) Section 106, Historic Preservation Act		✓		
H) Section 4(f), 1966 DOT Act		✓		
I) U.S. Coast Guard Permit	✓			



EXISTING CONDITIONS
NOT TO SCALE
SKETCH * 1



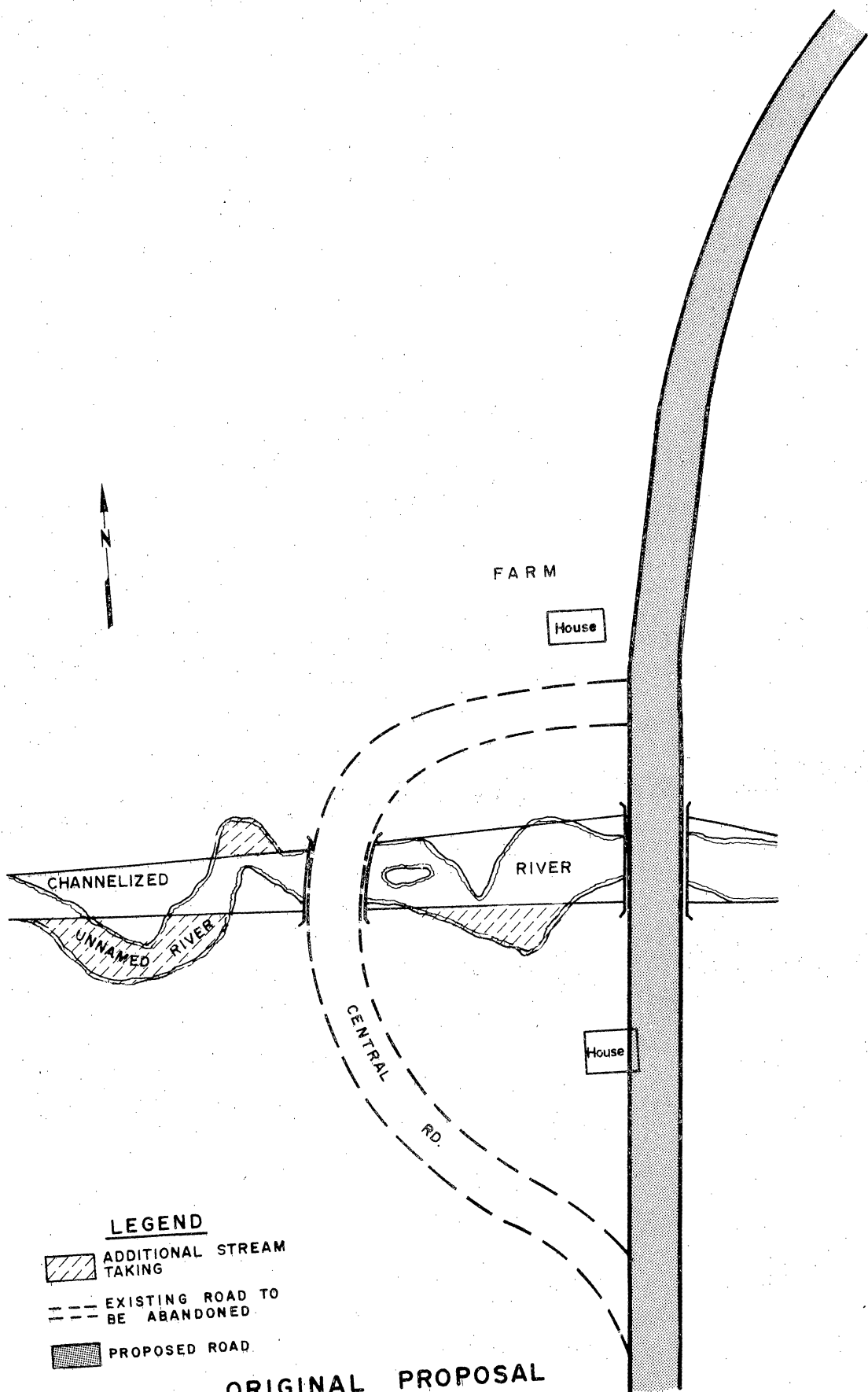
LEGEND

- WETLANDS
- LIMIT OF POTENTIAL ARCHAEOLOGICAL SITE




ENVIRONMENTAL CONSTRAINTS

NOT TO SCALE

SKETCH #2



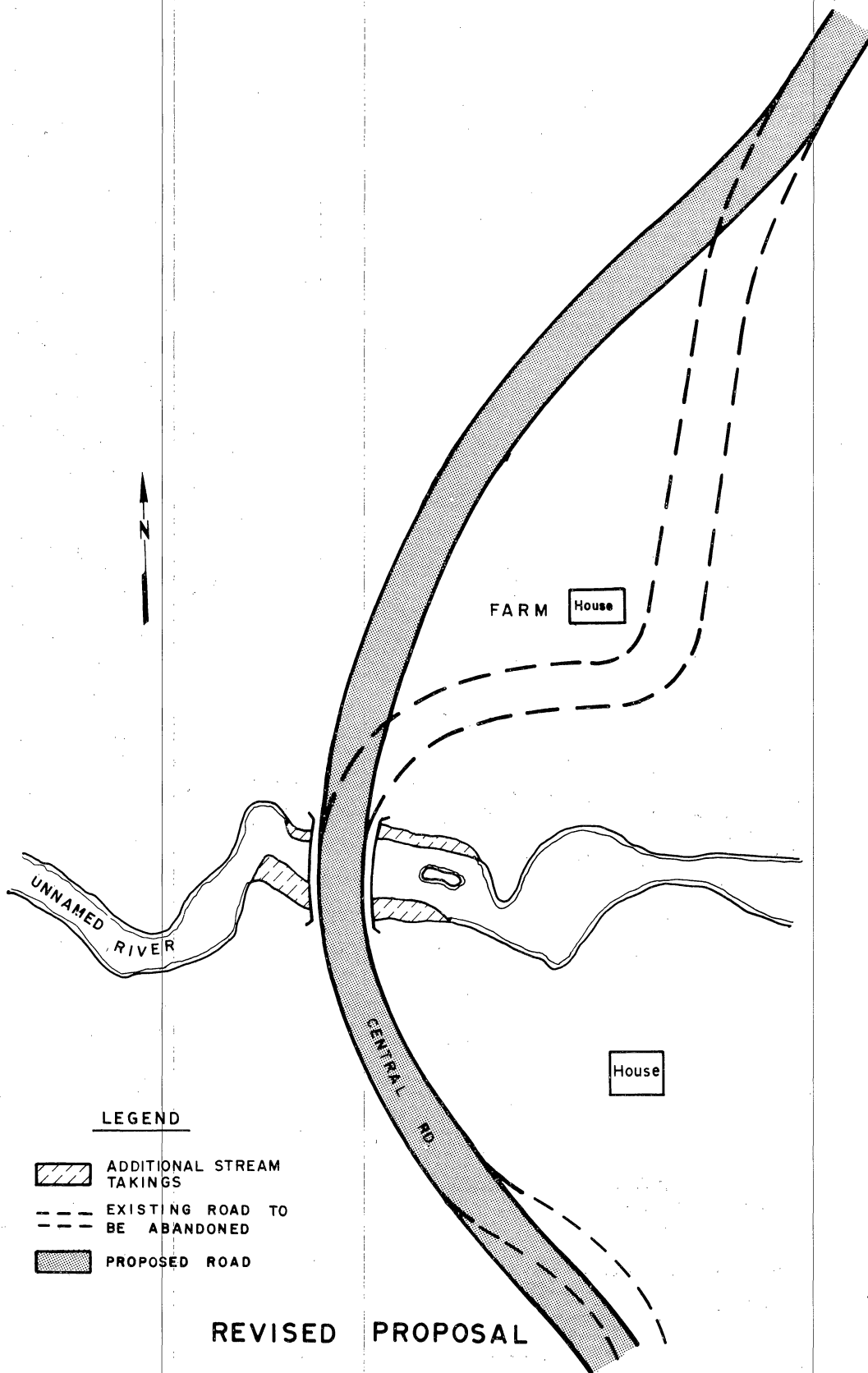
LEGEND

-  ADDITIONAL STREAM TAKING
-  EXISTING ROAD TO BE ABANDONED
-  PROPOSED ROAD




ORIGINAL PROPOSAL

NOT TO SCALE

SKETCH #3



LEGEND

-  ADDITIONAL STREAM TAKINGS
-  EXISTING ROAD TO BE ABANDONED
-  PROPOSED ROAD

REVISED PROPOSAL

NOT TO SCALE

SKETCH # 4

V. LISTING OF BUREAU OF ENVIRONMENTAL ANALYSIS PERSONNEL

F. Howard Zahn 609-292-6543
Chief, Bureau of Environmental Analysis

Frank Winters 609-292-5414
Assistant Bureau Chief

Gary Toth Section Leader for 609-984-2835
Local Aid Projects

For Sussex, Passaic, Warren, Morris, Hunterdon, & Somerset Counties
contact:

Raymond Barnard Area Coordinator 609-984-2838

Evelyn Yborra Ass't. Area Coordinator 609-292-0461

For Bergen, Essex, & Hudson Counties contact:

Jules Oroszvary Area Coordinator 609-984-2837

Elkins Green Ass't. Area Coordinator 609-984-2841

For Union, Middlesex, Mercer, Monmouth, Ocean & Burlington Counties
contact:

Tony Sabidussi Area Coordinator 609-292-0031

Patty Genovario Ass't. Area Coordinator 609-292-9717

For Camden, Gloucester, Atlantic, Salem, Cumberland, & Cape May
Counties contact:

Jack Gartland Area Coordinator 609-984-2836

APPENDIX A

CONSERVATION DISTRICTS IN NEW JERSEY

Name	Address	Telephone No.
Burlington SCD	Cramer Building Rt. 38, Mt. Holly 08060	609-267-0811
Camden SCD	152 Ohio Avenue Clementon 08021	609-767-3977 or 784-1001
Cape-Atlantic SCD	Atlantic Co. Office Bldg. 1200 W. Harding Highway Mays Landing 08330	609-625-2203 or 465-5115
Cumberland SCD	Seabrook 08302	609-451-2144
Freehold SCD (Mon. & Middlesex Co.)	20 Court St. Freehold 07728	201-462-1079
Gloucester SCD	Gloucester Co. Office Bldg. Clayton 08312	609-881-0240
Hunterdon SCD	Route 6, Box 49 Flemington 08822	201-782-3915
Mercer SCD	930 Spruce St. Trenton 08638	609-695-5415 or 396-4593
Morris SCD	Court House Morristown 07960	201-538-1552
Northeast SCD (Bergen, Essex, Hudson & Passaic Counties)	County Service Bldg. 317 Pennsylvania Ave. Paterson 07503	201-525-5000 X 401 or 538-1552
Ocean SCD	Ocean County Agric. Center Whitesville Road Toms River 08753	201-349-1245
Salem SCD	43 S. Main St. Woodstown 08098	609-769-1125
Somerset-Union SCD	1151 U.S. Route 202 Somerville 08876	201-725-3848
Sussex SCD	R.D. 1, Box 13 Newton 07860	201-383-3800 or 852-5450
Warren SCD	Stiger St. Hackettstown 07840	201-852-5450

STATE SOIL CONSERVATION COMMITTEE
P. O. Box 1888, Trenton, New Jersey
Tel: 609-292-5540

Appendix B

TABLE I--Permits and approvals that may be required for a transportation project.

<u>Permit</u>	<u>Agency</u>	<u>Remarks</u>
Coastal Area Facility Review Act (CAFRA) Permit	CAFRA Permit Section Office of Coastal Zone Management Division of Marine Services N.J. Dept. of Environmental Protection, Labor and Industry Building Box 1889 Trenton, New Jersey 08625 609-292-0060	Permit required for major transportation facilities within designated "Coastal Zone."
Riparian Permit	Office of Riparian Lands Management Division of Marine Services N.J. Dept. of Environmental Protection, Labor and Industry Building Box 1889 Trenton, New Jersey 08625 609-292-2613	Permit required for projects constructed within any tidal or navigable waterway. Applicant must have legal document establishing right to use or occupy riparian land (grant or license). Project will also require approval by Army Corps of Engineers.
Wetlands Permit	Office of Wetlands Management Division of Marine Services N.J. Dept. of Environmental Protection, Labor and Industry Building Box 1889 Trenton, New Jersey 08625 609-292-8202	Permit required to excavate, dredge fill, or erect structures on designated coastal (tidal) wetlands. Type A permit for minor projects. Type B permit for major projects. EIS required for Type B projects. Riparian and Corps of Engineers permits will be required.
Stream Encroachment Permit	Bureau of Floodplain Management Division of Water Resources N.J. Dept. of Environmental Protection 1474 Prospect Street Box 2809 Trenton, New Jersey 08625 609-292-2402	Requires permit for the construction, installation or alteration of any structure or permanent fill along, in, or across the channel or floodway of stream. Also required for any alteration of the stream itself within the high-water mark of 100-year flood as determined by the State. Channel relocation and major fill projects require EIS.

PERMITAGENCYREMARKS

Water Lowering Permit

Division of Fish, Game, and
Shellfisheries
N. J. Dept. of Environmental
Protection
363 Pennington Avenue
Box CN003
Trenton, New Jersey 08625
609-292-2402

Requires permit to shut off or draw off waters
of any pond, stream, or lake.

National Pollution
Discharge Elimination
System (NPDES) Permit

Pollution Control Monitoring,
Surveillance and Enforcement
Element
N. J. Dept. of Environmental
Protection
1474 Prospect Street
Box 2809
Trenton, New Jersey 08625
609-292-0580

Requires permit to discharge pollutants from
such facilities as sewage treatment plants at
rest areas and oil-water separators at rail yards.
Although highways are sources of pollutants,
jurisdiction has not been asserted.

42

Water Quality Certi-
fication

Division of Water Resources
N. J. Dept. of Environmental
Protection
1474 Prospect Street
Box 2809
Trenton, New Jersey 08625
609-292-1637

Required for the construction of any facility
which results in a discharge into a water body.
A prerequisite for U. S. Army Corps of Engineers
permit.

U. S. Army Corps of
Engineers
Section 10 and 404
Permits

Dept. of the Army
Philadelphia District, Corps of
Engineers Custom House - 2D and
Chestnut Streets
Philadelphia, Pennsylvania 19106
215-597-2812

Requires permit for structures in navigable water
and water body alterations such as dredging,
channelization and filling (Section 10). Section
404 permit required for placement of dredged or
fill material into all water bodies and/or adja-
cent wetlands. Federal Funds do not have to be
involved for this permit to be necessary.

or
Dept. of the Army
New York District, Corps of
Engineers
26 Federal Plaza
New York, New York 10007
212-264-0183

Permit

Agency

Remarks

U.S. Coast Guard Bridge
Permit

U.S. Coast Guard
Third Coast Guard District
Governor's Island
New York, New York 10004

Requires permit for construction, modification,
or removal of a bridge or causeway in navigable
waters.

Hackensack Meadowlands
Development Commission

Hackensack Meadowlands Develop-
ment Commission
1099 Wall Street
Lyndhurst, New Jersey 07071
201-935-3250

Multitude of permits required for any construc-
tion within Meadowland boundaries. Appropriate
Federal and State construction permits are
also required within boundaries.

Delaware River Basin
Commission

Delaware River Basin Commission
25 State Police Drive
Box 7360
West Trenton, New Jersey 08628
609-883-9500

Requires approval for all projects affecting
water resources in the Delaware River Basin.

Delaware and Raritan Canal
Commission

Delaware and Raritan Canal
Commission
25 Calhoun Street
Box 1390
Trenton, New Jersey 08625
609-396-3063

Requires approval for projects affecting the
Delaware and Raritan Canal State Park.

APPENDIX C



Sedge - (Carex spp.) - Sedges are a tufted emergent with sharply triangular shaped stems. It grows in clumps in shallow fresh waters and borders ponds, meadows and marshes throughout N.J. (Note: It is a preferred habitat of the bog turtle which is on the N.J. Endangered Species List).



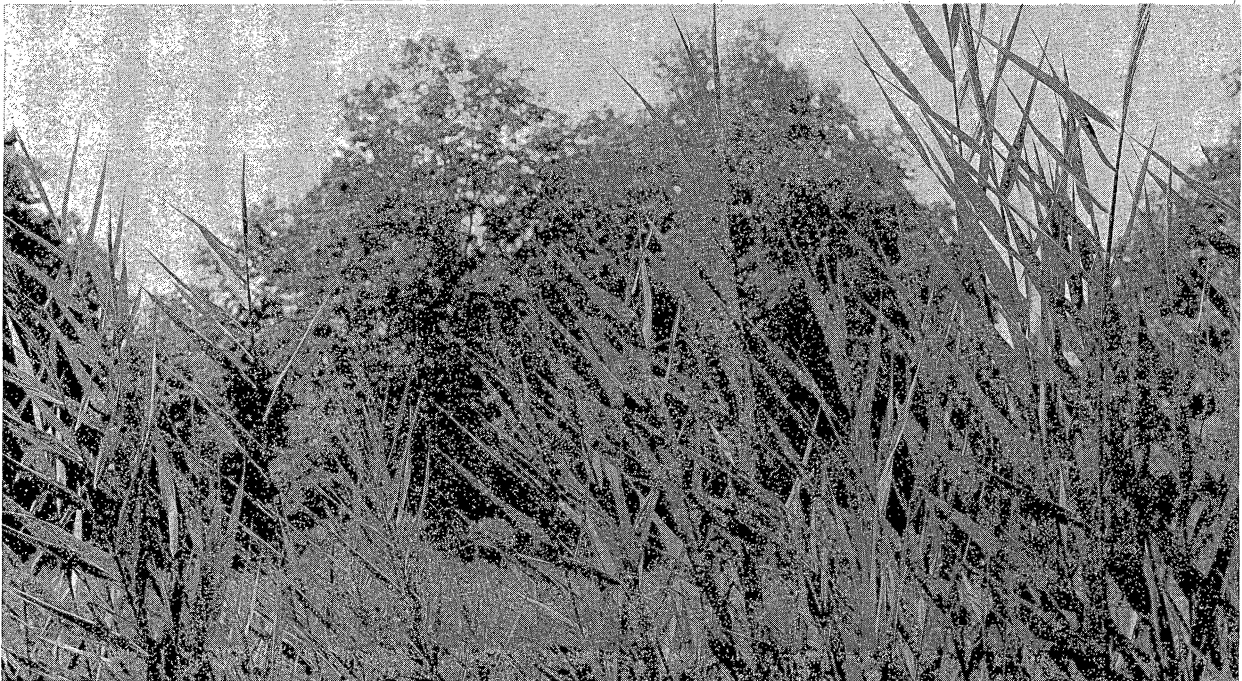
Rush - (Elocharis spp.) - Rushes are an emergent fibrous-rooted annual growing in slender erect clumps 4-20 inches tall. It is mostly found in fresh water marshes and shallow waters throughout New Jersey.



Cattail (Typha latifolia)

Cattail is found throughout New Jersey commonly growing in pure stands in fresh water shallow bays, marshes, sloughs, and pond edges. It is a stout, coarse perennial having erect stems growing 3-7 feet tall.

PLEASE NOTE
ON PAGE NUMBERS 45 TO 52
ADD TWO TO THE PAGE
NUMBERS REFERRED TO
UNDER THE PHOTOS.



Reedgrass (Phragmites communis) - see page 44.



Reedgrass (Phragmites communis) background -

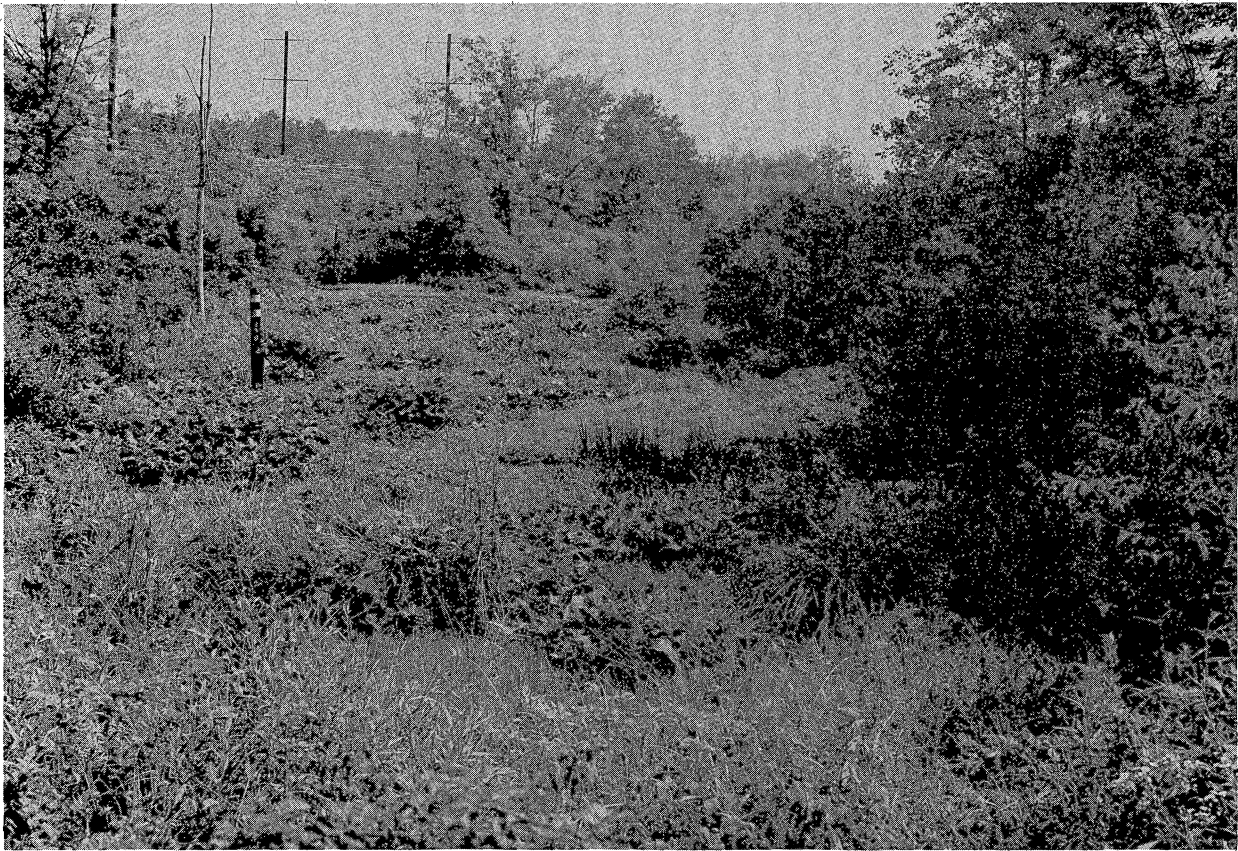
Phragmites grow in stalks that may reach 13 feet in height. It often forms large colonies growing in fresh and salt water marshes and on the banks of lakes, streams, and ditches.

(Note: Phragmites should be used as an indicator that there may be wetlands present since it is also found in filled and disturbed lands and as a soil binder in highways and conservation projects).

Swamp Milkweed (Asclepias incarnata) middle right - see page 51.

Sedge (Carex spp.) in clumps - right side - see page 42.

Sweet Flag (Acorus calamus) - left foreground - see page 50.



Sweet Flag (Acorus calamus) erect in stands - see page 50.

Sedge (Carex spp.) in clumps - see page 42.

Yellow Pond Lily (Nuphar advena) middle - see page 51.

(Note: This picture depicts a wetland area that is not typically thought of as wetlands since standing water is not present. This "finger" of wetlands lies in a depression between two stands of woods).



Yellow Pond Lily (Nuphar advena) middle - see page 51.

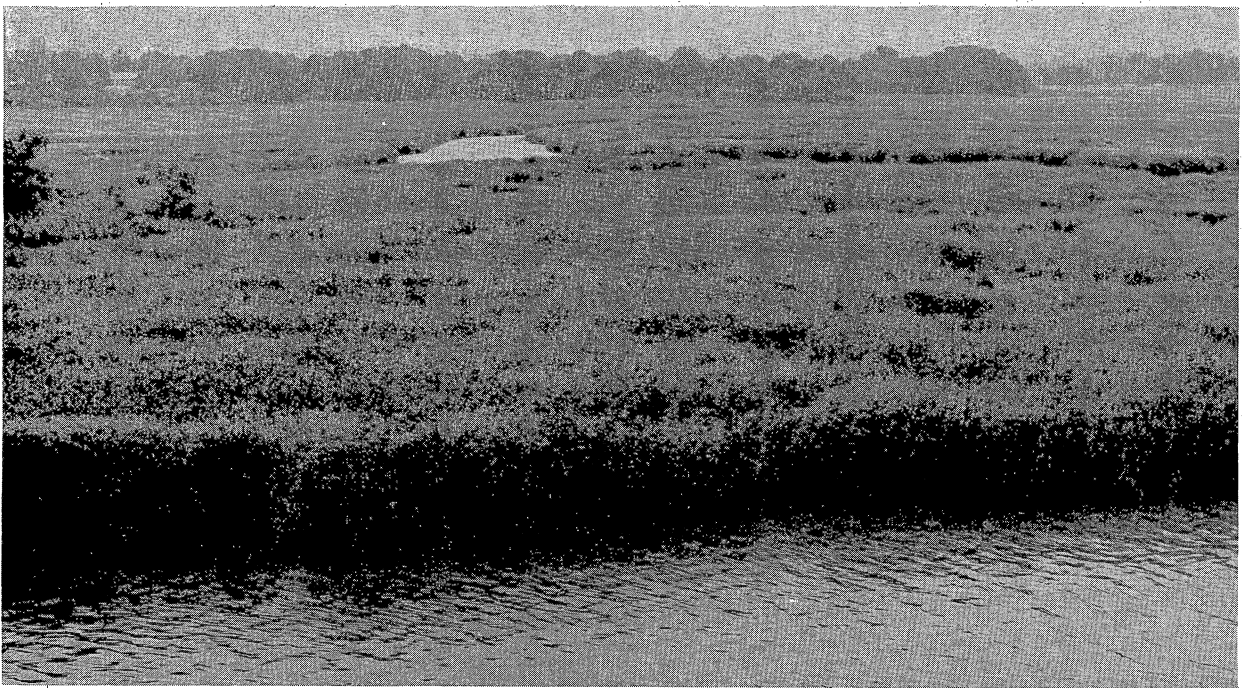
Sweet Pepperbush (Clethra alnifolia) shrubs -
Sweet Pepperbush is a shrub commonly found throughout New Jersey growing in damp woods and on coastal plains. It ranges from 3' to 9' in height.

Alder (Alnus spp.) tree on right foreground -
Alder is a small tree growing on low grounds and wet sites throughout New Jersey. It ranges from 6' to 24' in height.

(Note: This picture depicts a wetland area which is not commonly thought of as wetlands. Technically it is known as Palustrine scrub-shrub wetland).



Cordgrass - (Spartina alterniflora, background, and S.patens, foreground).
Spartina grows in the salt water marshes of southern New Jersey usually in pure stands. It is the most common grass of a bay area and is very important as wildlife food.
S.alterniflora is taller, coarser and found closer to the water than S.patens.



S. alterniflora - foreground
S. patens - background



(Spartina alterniflora) See page 47.



(Spartina alterniflora) See page 47.

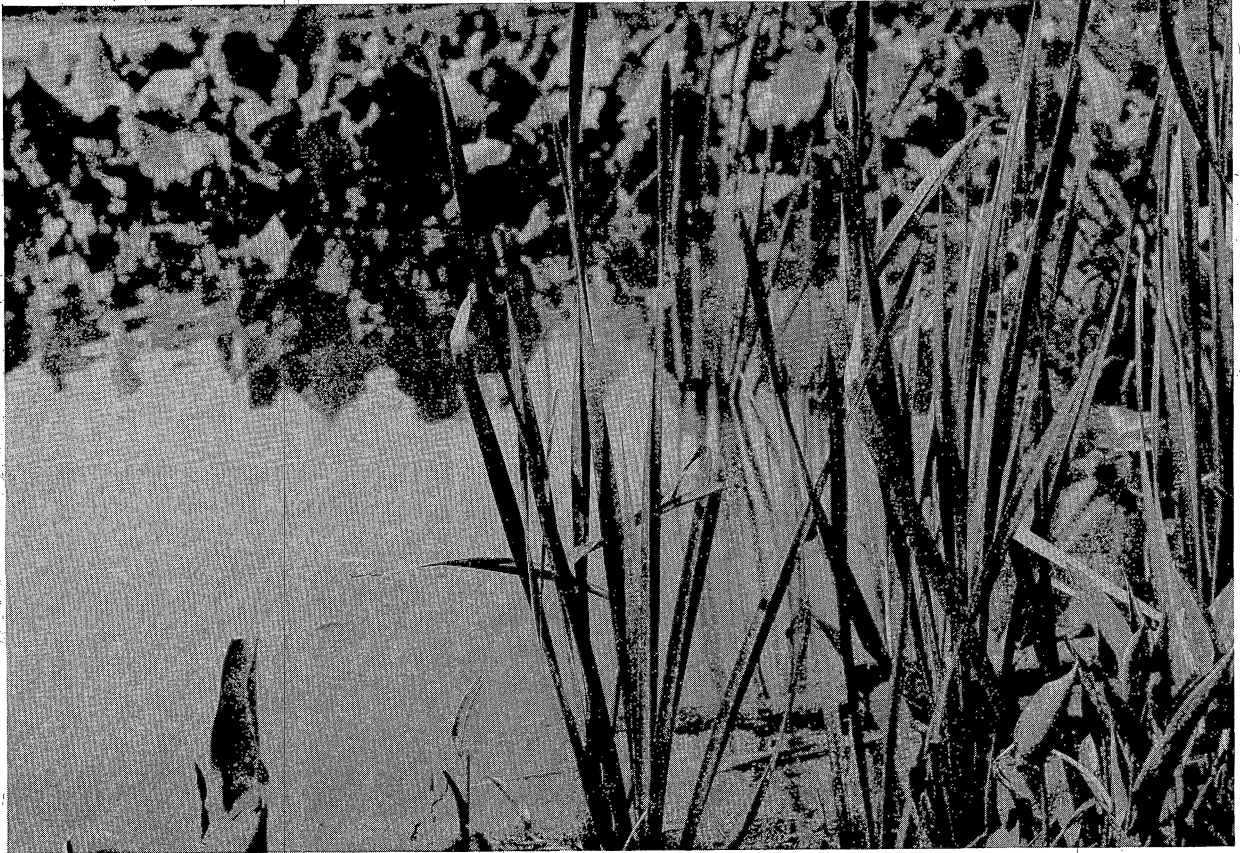


Yellow Pond Lily (Nuphar advena) background, on bank, see page 51.

Sweet Flag (Acorus Calamus) standing erect emergent, see page 50.

Pondweed (Potamogeton spp.) foreground, floating leaf emergent -
Pondweed is found throughout New Jersey commonly growing in lakes, ponds, and slow moving streams mostly in shallow water. It is a delicate perennial with both floating and submersed leaves. The plant and its fruits are eaten by waterfowl and other birds.

Water Milfoil (Myriophyllum spp.) left foreground submersed -
Milfoil is found throughout New Jersey growing in ponds, lakes, and sluggish streams. It is a submersed stout-stemmed perennial used as low-grade duck food.



Yellow/Pond Lily (Nuphar advena) background - see page 51.

Sweet Flag (Acorus calamus) foreground erect emergent
Sweet Flag is found growing along margins of ponds, streams, spring fed marshes, and areas partially drained which are dry in summer. It is an emersed, stout, erect perennial with leaves ranging from 20" to 60" in length.

Pickereelweed (Pontederia cordata) foreground.
Pickereelweed is found throughout New Jersey commonly growing in shallow water or along mucky margins of ponds and slow streams. It is an emersed perennial having heart-shaped leaves.



Swamp Milkweed - (Asclepias incarnata) upper right - Swamp Milkweed is found growing in fresh water swamps and on lake shores and stream banks throughout N.J. It has a milky-juiced stem and stands 14-60 inches tall. (Note: there are 12 other species of milkweed in New Jersey. Only two (2) grow in wet areas: *A. rubra*, *A. lanceolata*).

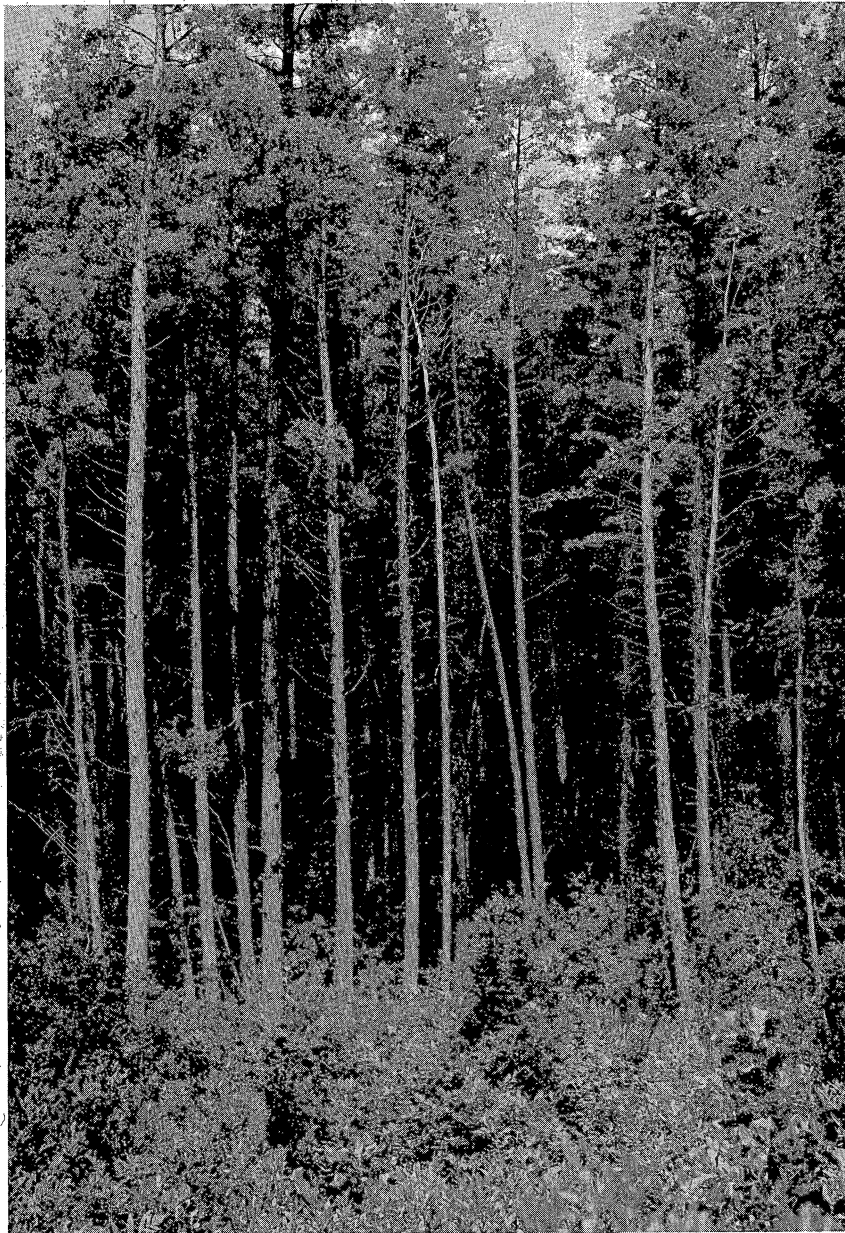
Smartweed (Polygonum spp.) background - Smartweed is found throughout New Jersey growing in swamps, shallow water and shores. It is a very variable species with erect terrestrial forms, aquatic forms with floating leaves, and intermediate forms that reflect the water level.

Water Lillies - (White-Nymphaea odorata) not featured,
Yellow-Nuphar advena) foreground -

Water Lillies are located in shallow waters of freshwater ponds, lakes, and swamps.

Because they are rooted to the soil with leaves emerging to float on the surface of the water, their presence is an indicator that the waters in which they are located will be considered wetlands (for the most part, portions of ponds and lakes which don't support emergent vegetation are not legally defined wetlands).

Of the two types found in New Jersey (white-Nymphaea odorata and yellow-Nuphar advena), the white is more valuable as a wildlife food source.



White Cedar - (Chamaecyparis thyoides)

White Cedar is an evergreen tree growing up to 85 feet tall and is found in the southern coastal plains of New Jersey often in pure stands of fresh water swampy areas.

(Note: The White Cedar should not be confused with the Eastern Red Cedar commonly found throughout New Jersey. The Eastern Red Cedar has two types of leaves, the first -- scale-like and, the second -- pointed growing on the younger twigs. It is most commonly found on drier upland sites, abandoned fields, and disturbed areas).

The White Cedar has scale-like leaves with glandular dots on the back of the leaves. It is only found in areas where water is present at, or close to the surface.



Cinnamon-Fern (Osmunda cinnamomea)

Cinnamon-Fern is commonly found throughout New Jersey growing in swamps, wet woods, and low ground.

Appendix D

Methodology for conducting a visual survey of archaeological, architectural, and cultural resources.

A. Archaeology

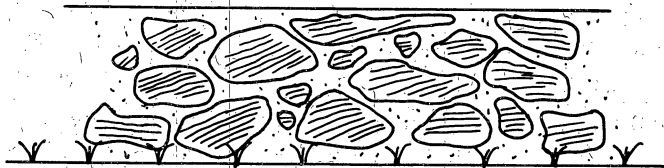
Look for visual clues -- in addition to the areas of previous disturbance identified in Section IIID, the surveyor should take note of:

- Are there any historic plaques?
- Are there any buildings which look old? Buildings of a certain age are likely to have historic and archaeological remains nearby.
- Are there any ruins? Walls of foundations frequently remain, obscured by vegetation, or abutting the roadway and bridges.
- Are there earthworks or mounds which do not appear natural? These earthworks may be part of an early mill, a military battle, or may cover the remains of an historic feature.
- Are there any areas which were favored for settlement by Indians? Such areas include well drained areas near streams, rivers, and other bodies of water; areas near the confluence of two or more water bodies; lands bordering areas of extensive marsh; etc.

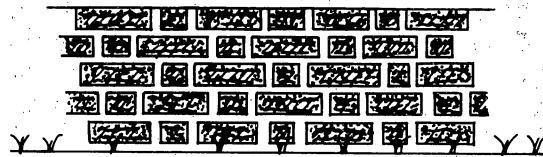
B. Architectural Resources

Identifying an older house can be frustrating and confusing to the lay-person because of numerous remodelings which may have taken place over the years. As tastes changed with time, owners would try to reflect the current vogue in architectural practice, and what may have been a Federal-era house was suddenly transformed into a Second Empire mansion. The lay-person need not be an expert in architectural history, however, to recognize certain features of a house and be able to date it accordingly.

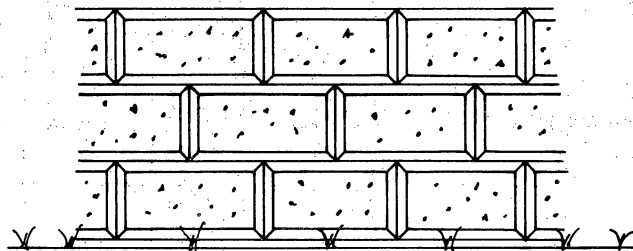
The foundation of a domestic dwelling can usually give us a clue as to its construction date -- in the earliest homes, local rubble stone was used because of its availability and proximity to the site. Early settlers cleared the lands and used these stones as foundations, frequently set without mortar. This was common until around 1800.



With the advent of an increasing population and subsequent manufacturing capabilities, kiln-fired brick began to supplant the earlier random stone construction of foundations. Throughout the nineteenth century we see brick widely used as a foundation material only to be replaced after the turn of the century by concrete block. This was cheaper to manufacture than brick because of its large size and ready handling, but it, too, went the way of its predecessors as cement foundations worked their way into the vernacular building trade with the advent of World War II.



Brick foundation appeared more frequently in 19th century.

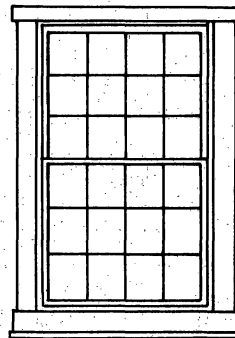


Concrete blocks indicate early to mid-20th century construction.

The type of window found in older homes also gives us a clue as to the age of a structure. The leaded casement window which opened out was the first type of fenestration used by the newly-arrived Europeans. Although common until shortly after 1700, very few examples survive today to the fragility of its construction and materials.

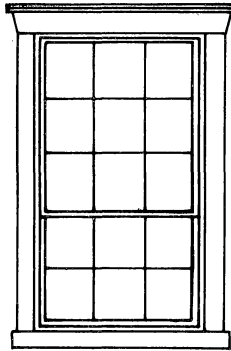
More influential on the American scene is the double-hung window which is still the characteristic window-type today. First developed in Holland around 1710, the double-hung window features two sashes, the upper one fixed and the lower one movable in a vertical manner.

Generally, speaking, the smaller the pane, the older the window (and hence, the house). As glass had to be blown by hand in the 1700's it was nearly impossible to manufacture large window panes. Twelve-over-twelve windows refer to the earliest type of double-hung construction in which twelve panes (three horizontal rows of four panes each) comprised a sash. These were quite common until the Revolution when window panes started to get larger.



Twelve over twelve window, an 18th century treatment

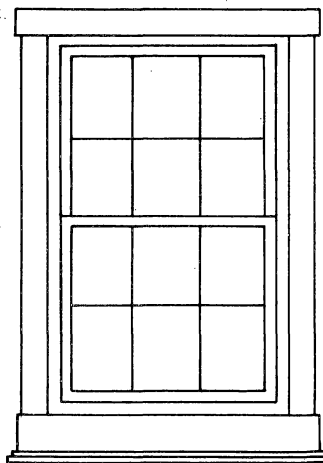
The next division of panes occurred with the nine-over-six arrangement around 1770; the fixed upper sash containing three rows of three panes each and the lower sash two rows.



Nine over six window, common in late 18th century until early 19th century.

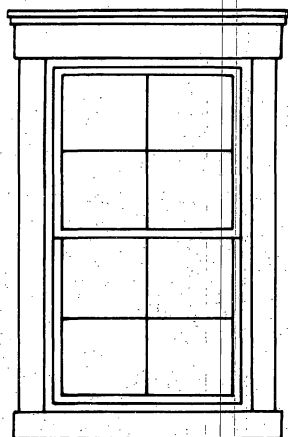
Perhaps the greatest "revolution" in windows took place around 1830 with the mechanization of glass production. It was now possible to manufacture panes of larger dimensions as the machine supplanted the limited capabilities of the glass-blower.

Six-over-six windows were used from approximately 1830 to 1880 and even continues today as an integral part of our domestic architecture.

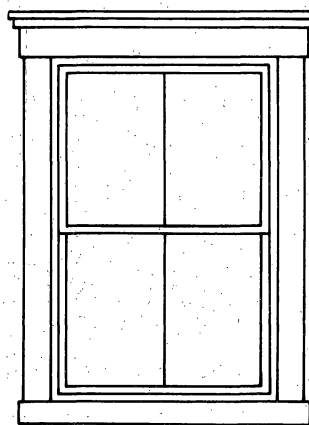


Six over six window, developed c. 1830, is still popular today.

During the Civil War era, another type of window pattern evolved but one which was short-lived: the four-over-four window was a common feature of the Italianate style, but around 1880, the development of the two-over-two rendered nearly all other patterns unfashionable. More light could be admitted into rooms and even the size and shape of windows could be tailored to fit individual needs.



Four over four window was popular during the Civil War era.



Two-over-two window was perhaps the most common style from the late 1800's until after the turn of century.

As mechanical processes become more sophisticated, any variety of fenestration was possible. Popular in the late 1880's and 1890's were stained and colored glass as well as geometric patterns and variegated muntin division: six-over-two, six-over-one, three-over-one, etc., all became stylized representatives of America's architectural scene.

