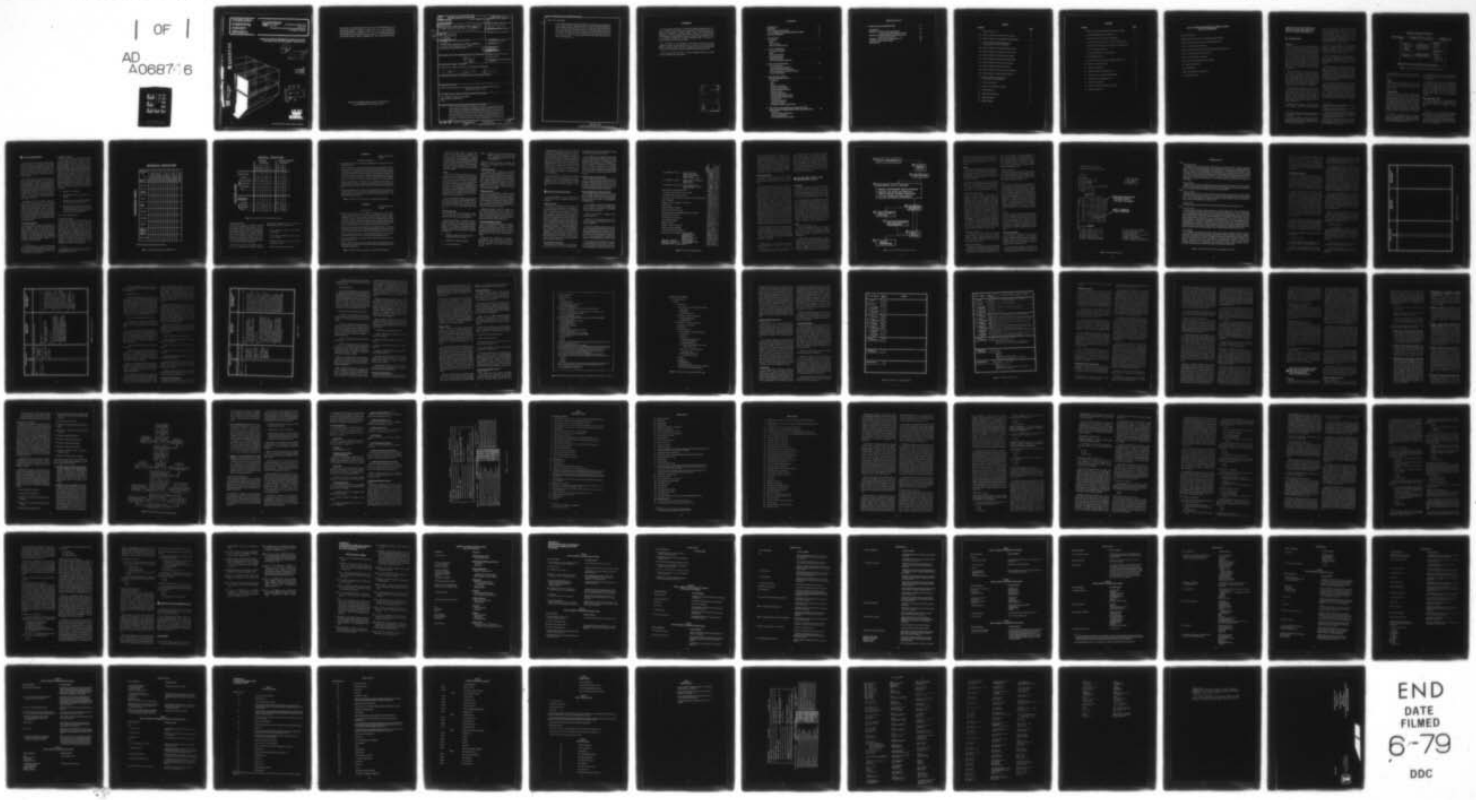
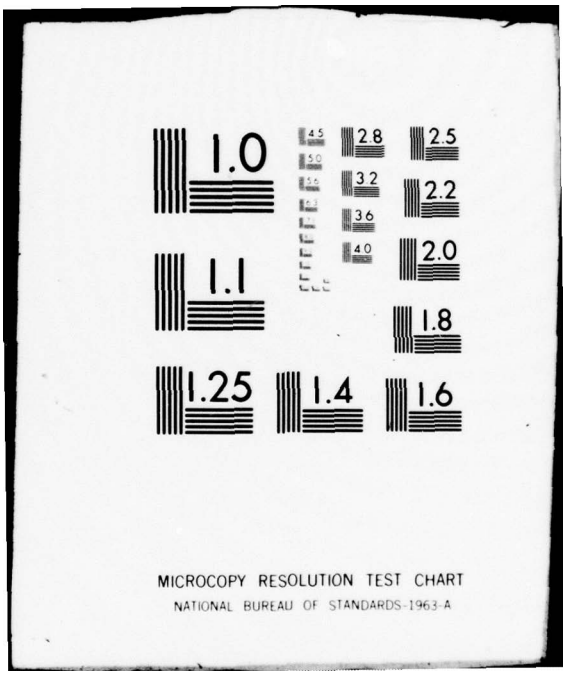
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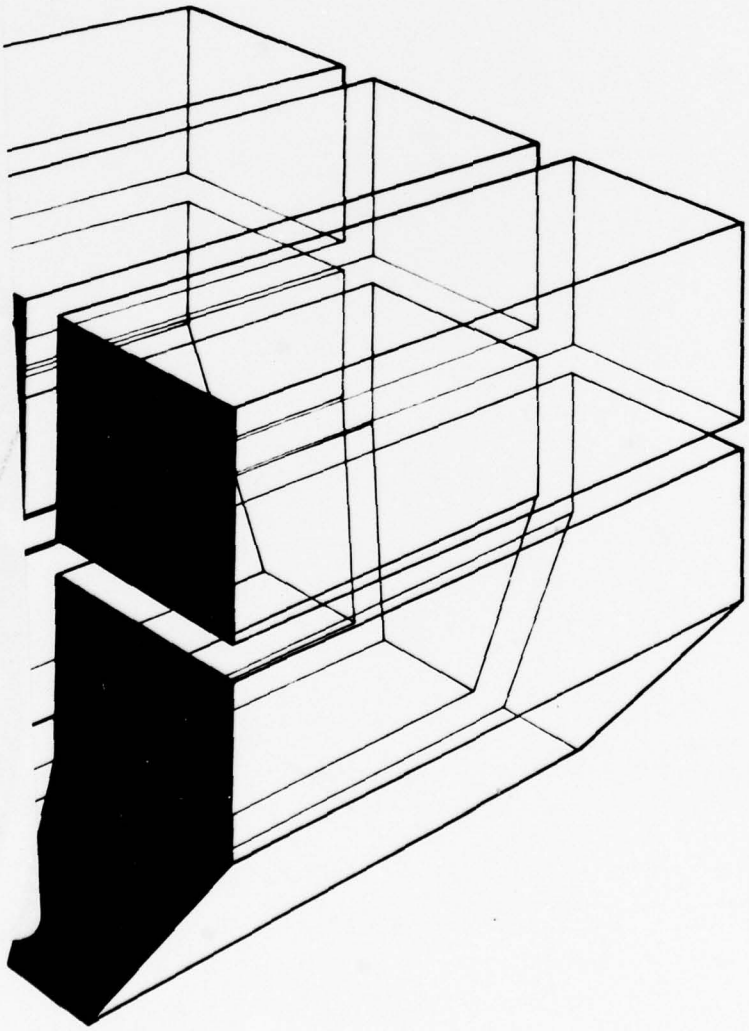
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April 1979
Procedures for Evaluating Environmental Impacts of All Military Programs

COMPUTER-AIDED ENVIRONMENTAL IMPACT ANALYSIS FOR ARMY REAL ESTATE ACTIONS: USER MANUAL

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by
J. J. Fittipaldi
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The Federal government has mandated that its agencies incorporate environmental considerations into the planning of new projects, activities, and decisions. Environmental Impact Assessments and Statements (EIAs/EISs) provide a basis for review and analysis of any proposed action's environmental consequences. The Environmental Impact Computer System (EICS), developed by the U.S. Army Construction Engineering Research Laboratory, helps planners and decision-makers efficiently identify primary and secondary impacts of their proposed projects or activities and suggests ways to mitigate these impacts.

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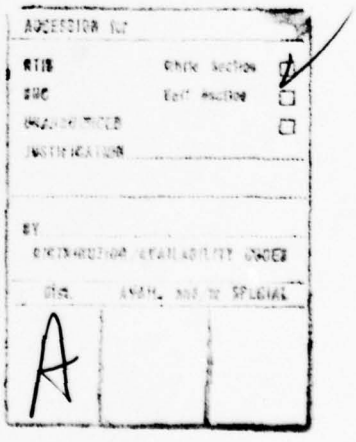
This report discusses the philosophy behind the environmental impact assessment process; defines the EICS components; discusses the criteria and general approach for using the EICS; provides detailed instructions for assessing the Real Estate Functional Area; and provides detailed procedures necessary to use the EICS output in the environmental impact assessment process and in preparing a formal EIA/EIS. The EICS will save its users time and money by eliminating unnecessary library and field research. It is recommended that EICS be used in conjunction with DA Pamphlet 200-1 and other Army command guidance.

FOREWORD

This user manual was prepared for the Directorate of Military Programs, Office of the Chief of Engineers (OCE), under project 4A1621A896, "Environmental Quality for Construction and Operation of Military Facilities", Task 01, "Environmental Quality Management for Military Facilities"; Work Unit 001, "Procedures for Evaluating Environmental Impacts of All Army Military Programs." The OCE Technical Monitor was Mr. V. J. Gottschalk, DAEN-MPE. Mr. E. W. Merli, DAEN-REP, and Mr. L. L. Pitchford, Jr., Chief, DAEN-REP, provided additional guidance.

The work which led to the development of this manual was the result of interdisciplinary cooperation between personnel of the U.S. Army Construction Engineering Research Laboratory (CERL), other Army personnel, and a team of scientists assembled for this study. The manual was written by the CERL Environmental Division (EN).

Dr. R. K. Jain is Chief of EN. COL J. E. Hays is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.



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LIST OF COMMON ACRONYMS AND ABBREVIATIONS USED IN THIS MANUAL

AR: Army Regulations

BAAP: Basic Activities Associated with Implementing Army Programs

CELDS: Computer-Aided *Environmental* Legislative Data System

CEQ: Council on Environmental Quality

EIA/EIS: Environmental Impact Assessment/Environmental Impact Statement

EICS: Environmental Impact Computer System

EIFS: Economic Impact Forecast System

ETIS: Environmental Technical Information System

DA: Department of the Army

FA: Functional Area

NEPA: National Environmental Policy Act

TS: Technical Specialties

COMPUTER-AIDED ENVIRONMENTAL IMPACT ANALYSIS FOR ARMY REAL ESTATE ACTIONS: USER MANUAL

1 INTRODUCTION

Background

The U.S. Army Construction Engineering Research Laboratory's (CERL) work in research and development of environmental assessment methods has been structured around a concept called the Environmental Technical Information System (ETIS). The ETIS is composed of three primary computer systems which have been developed to support the preparation of Environmental Impact Assessments and Environmental Impact Statements (EIAs/EISs): (1) the Economic Impact Forecast System (EIFS), (2) the Computer-Aided Environmental Legislative Data System (CELDS), and (3) the Environmental Impact Computer System (EICS).

These three subsystems are meant to be used together to provide a comprehensive approach to environmental impact analysis. However, they can and have been used separately. Figure 1 shows the relationship of the three ETIS subsystems described above and other subsystems and models (currently under development) which will be available as a total Department of the Army environmental assessment capability.

EIFS estimates the quantitative effect on the local economy produced by a change in Army operations in the economic region of influence. Census data for the counties surrounding the project study area are used in conjunction with location quotient techniques to calculate a number of parameters (such as change in total business volume, change in property values, and change in employment).[1]

CELDS provides summaries of pertinent environmental legislation. Federal and state environmental laws may be retrieved by specifying environmental attributes (characteristics), keywords, states, or any combination of these terms.[2] Most of the keywords used in CELDS are similar or identical to the environmental attributes used in EICS. Therefore, a user can easily investigate the legal ramifications of an environmental attribute which EICS indicates will be heavily impacted by the proposed activity.

The basic system of ETIS is EICS; its primary purpose is to qualitatively identify potential environmental impacts by relating Army activities to environmental elements which encompass the entire biophysical and socioeconomic environment.

EICS was developed to meet the requirements of the National Environmental Policy Act (NEPA), subsequent guidelines published by the Council as Environmental Quality (CEQ), and guidelines set forth in AR 200-1.[3]

EICS should be used in conjunction with DA Pamphlet 200-1.[4] *Handbook for Environmental Impact Analysis.* This pamphlet is suited primarily for preparing assessments of minor or short-duration projects, and addresses the major topics required in an EIS as outlined by CEQ. In contrast, EICS is primarily useful for preparing major EIAs or large EISs involving many environmental considerations.

This user manual is the fourth of a series on EICS designed to assist Army personnel with preparation and review of EIAs and EISs: the first presents instructions for using EICS for assessing the environmental impacts of construction activities;[5] the second presents instructions for using EICS to assess the environmental impacts resulting from Army mission change, operations and maintenance, and training activities;[6] and the third provides instructions for assessing environmental

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[1] *The Economic Impact Forecast System: Description and User Instructions,* DA PAM 200-2 (Department of the Army, December 1976).

[2] R. L. Welsh, *User Manual for the Computer-Aided Environmental Legislative Data System,* Technical Report E-78/ADA019018 (U.S. Army Construction Engineering Research Laboratory [CERL], November 1975).

[3] *Environmental Protection and Enhancement,* AR 200-1 (Department of the Army, 7 December 1973).

[4] *Handbook for Environmental Impact Analysis,* DA PAM 200-1 (Department of the Army, April 1975).

[5] L. V. Urban, H. E. Balbach, R. K. Jain, E. W. Novak, and R. E. Riggins, *Computer-Aided Environmental Impact Analysis for Construction Activities: User Manual,* Technical Report E-50/ADA008988 (CERL, March 1975).

[6] R. Riggins and E. Novak, *Computer-Aided Environmental Impact Analysis for Mission Change, Operations and Maintenance, and Training Activities: User Manual,* Technical Report E-85/ADA022698 (Cerl, February 1976).

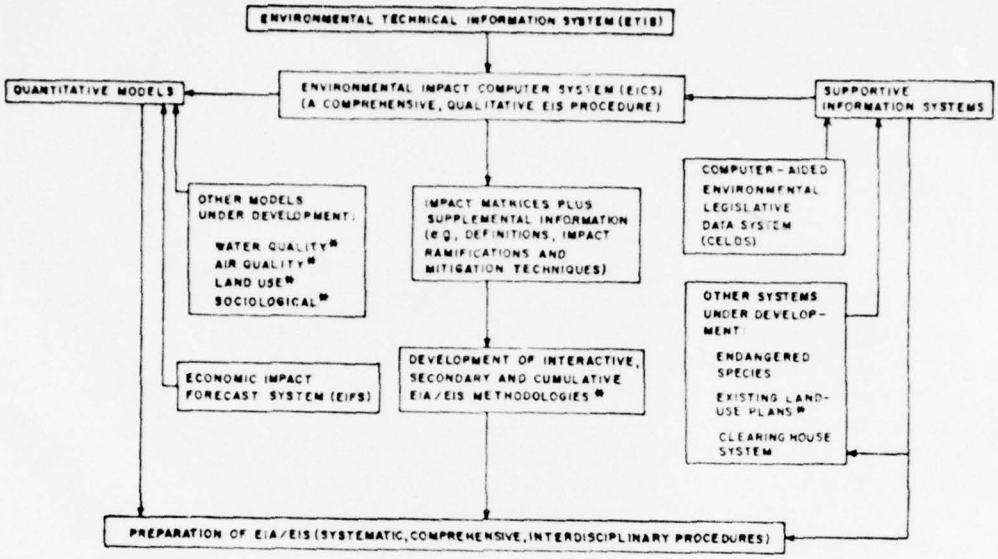


Figure 1. CERL's Environmental Technical Information System (ETIS).

impacts resulting from Army industrial, procurement, and research, development, test, and evaluation activities.[7]

Purpose

This report provides detailed instructions for using EICS to assess the environmental impacts resulting from Army real estate acquisition, excessing, and granting activities.

Outline of Report

Chapter 2 describes and defines specific EICS elements. (The user should become thoroughly familiar with the available program elements, as well as with newly defined terms.) Chapter 2 also provides guidance on environmental categories and data sources necessary for adequate impact assessment. Chapter 3 discusses the criteria and general approach for using EICS. Chapter 4 discusses the procedures for using the EICS output to assess environmental impacts. These refined procedures replace those provided in the first user manual in this series.[8] In addition, Chapter 4 discusses how the EICS output relates to specific EIA/EIS format requirements.

In the EICS, military activities are classified and categorized into nine Functional Areas (FAs).* Chapter 5 contains detailed instructions for accessing the Real Estate FA. Chapter 5 also contains an input form which can be completed and mailed or phoned into CERL for processing. (This form is an option to retrieving EICS output from a remote computer terminal.)

Mode of Technology Transfer

No specific existing Corps or Army guidance documents will be imparted by the results of this study. This report will become a DA pamphlet in the 200 series.

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[7] S. E. Thomas, R. A. Mitchell, R. E. Riggins, J. J. Fittipaldi, and E. W. Novak, *Computer-Aided Environmental Impact Analysis for Industrial, Procurement, and Research, Development, Test, and Evaluation Activities: User Manual*, Technical Report N-43/ADA055520 (CERL, June 1978).

[8] L. V. Urban, et al., *Computer-Aided Environmental Impact Analysis for Construction Activities: User Manual*, Technical Report E-50/ADA008988 (CERL, March 1975).

*FAs are (1) Construction, (2) Operation and Maintenance, (3) Training, (4) Mission Change, (5) Real Estate, (6) Procurement, (7) Industrial, (8) Research, Development, Testing, and Evaluation, and (9) Administration.

2 THE EICS COMPONENTS

A matrix is used to describe the complex relationships between the two basic elements of the EICS: (1) major environmental categories, referred to in the matrix as *environmental Technical Specialties,** and (2) human actions which impact on those activities, referred to in the matrix as *Functional Areas.* Figure 2 illustrates the general format of the EICS environmental impact matrix.

For each intersection within this general form, the EICS computer output expands to a more detailed matrix (see Figure 3) which compares specific *environmental attributes* of a particular Technical Specialty with specific Army activities, or *BAAPs* (Basic Activities Associated with implementing Army Programs) of a particular Functional Area. These matrix interactions of BAAPs with attributes are scored on a *"need to consider" scale.* Also associated with each BAAP, by means of a code number, are *Ramification Remarks* and *Mitigation Statements.*

The specific items of the computer output mentioned above are discussed further in the following sections of this chapter. The final two sections of the chapter review the information contained in Chapter 5, Real Estate Functional Area. The user manual information and the computer output are both integral parts of the functioning EICS, and both should be used for maximum effectiveness in an environmental assessment procedure. Chapter 4 contains detailed discussion of how these materials can be used during an environmental assessment.

Environmental Attributes

To relate activities to impacts, environmental elements (attributes) are defined and categorized under broad categories called environmental *Technical Specialties* (horizontal axis of matrix as illustrated in Figures 2 and 3). Three types of attributes have been developed for each Technical Specialty: detailed-level attributes, review-level attributes, and controversial attributes. Controversial attributes supplement both detailed- and review-level output.

Detailed-Level Attributes

Detailed-level attributes are defined as parameters or factors which can be used to describe the environmental condition. This level of attribute and its associated detailed matrix (see Figure 3) are to be used in evaluating the one or two best alternatives in a major EIA/EIS. For example, in the Ecology Technical Specialty, detailed attributes include Rare/Endangered Animals, Food Webs, Warm-Water Fishing, and Noxious Weeds; in Surface Water: Turbidity, Biochemical Oxygen Demand, Phosphorus, and Mercury; and in Sociology: Population Composition, Sex Categories, Religious Organizations, and Educational Organizations. A standard format for descriptions of detailed environmental attributes is presented in the *Attribute Descriptor Package.*[9] Each description consists of sections A through D, which contain the following information:

A — Definition of the Attributes

B — Information about the source of the effect or pollutant

C — Information on how the attributes might be affected or influenced by Army actions

D — Information on how the effect on an environmental attribute might affect other biophysical and socioeconomic attributes (interaction with other environmental attributes).

For examples, see Figures 4 and 5.

Review-Level Attributes

Review-level attributes present an overview of the nature of potential impacts without the specificity provided by the detailed-level attributes; thus, they provide a useful summary of potential impacts for reviewing EISs or for evaluating a number of alternatives to a project to determine the two or three best from an environmental viewpoint. Examples of review-level attributes are Community Profile, Pathogenic Organisms, and Increase in Undesirable Species from the areas of Sociology, Surface Water, and Ecology, respectively. A brief, general description of each review-level attribute has been developed and is also available in the *Attribute Descriptor Package.*

*Technical Specialties are (1) Ecology, (2) Health and Safety, (3) Air Quality, (4) Surface Water, (5) Ground Water, (6) Sociology, (7) Economics, (8) Earth Science, (9) Land Use, (10) Noise, (11) Transportation, (12) Aesthetics, and (13) Energy and Resources Conservation.

[9] *Environmental Impact Computer System Attribute Descriptor Package Reference Document,* Technical Report E-86/ADA024303 (CERL, June 1976).

TECHNICAL SPECIALTIES

FUNCTIONAL AREAS

Environmental Attributes / Basic Army Activities	Ecology	Health & Safety	Air Quality	Surface Water*	Ground Water*	Sociology	Economics	Earth Science	Land Use	Noise	Transportation	Aesthetics	Energy-Resource Conservation
Construction													
Operation Maintenance													
Training													
Mission Change													
Real Estate													
Procurement													
Industrial													
Research, Development, Test & Evaluation													
Administration													

*Will be combined as Water Quality in the future.

Figure 2. Environmental impact matrix—general form.

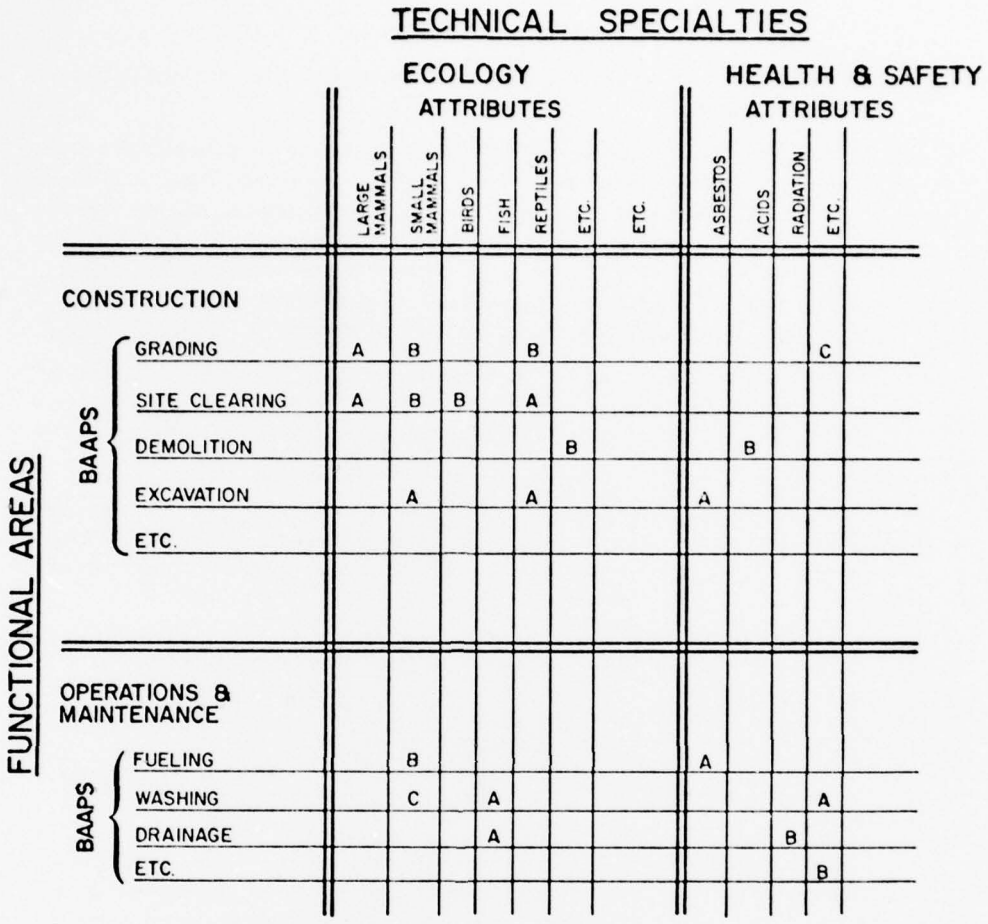


Figure 3. Partial breakdown of environmental impact matrix.

Controversial Attributes

Many factors contribute to controversy regarding Army activities, including intense public concern for environmental quality, confusion about potential environmental impacts, and the need to establish trade-offs between economic gains or missions accomplishments and environmental damage. NEPA specifically requires that potentially controversial effects be considered in assessing environmental impact. Therefore, environmental attributes considered particularly prone to such reaction have been identified.

Controversy may arise out of the public's fear of a project. For example, many attributes of physical environmental pollutants may not be controversial themselves, but controversy may arise from:

1. Effects attributed to them at normal ambient concentrations.
2. Cost of abating the pollutant, given the uncertain degree of its effect.
3. Indecision concerning what constitutes available technology for control.
4. The time necessary for legal compliance.

EXAMPLE 1

Detailed Attribute No. 9
Ecology

Endangered Animal Species

A. Endangered species are those animals whose populations are so small that they are in danger of extinction.

B. The reason behind the decreasing population is usually the encroachment of a man's activities and resource needs on the home ranges of the animal. The grizzly bear is an example of an endangered species. Some species, such as certain hawks and eagles, can be accidentally killed following predator and insect poisoning programs. Still other species have been destroyed by commercial hunting interests. The American bison and the alligator are classic examples of this exploitation. The California condor is in danger of extinction due to drastic reduction of its breeding habitat.

C. Land-clearing operations are probably the most common activities affecting endangered species, especially in otherwise remote areas. Insect and rodent control programs often have unwanted side effects when nontarget species consume poisoned bait.

D. Threats to endangered species are certainly among the most likely to engender controversy. Many scientific and conservation organizations keep a close watch on rare and declining species. These groups are certain to create public discussion of any *potential danger to such species.*

Figure 4. Example of attribute descriptor for Ecology Technical Specialty.

EXAMPLE 2

Detailed Attribute No. 2
Land Use

Access to Minerals

A. Access to mineral resources is the capability of exploration of valuable mineral resources. Mineral resources include iron and ferro-alloy metals (iron, boron, copper, *molybdenum, silicon, titanium, varadium, chromium,* cobalt, manganese, tungsten, zirconium); nonferrous metals (lead, copper, and zinc); light metals (bauxite, magnesium, and titanium); nonmetallic minerals (stone, limestone, sandstone, slate, granite, marble, sand, gravel, clay, lime, gypsum, salt, sulfur, phosphate, and potash); fossil fuel (coal, petroleum, and natural gas); and other fuel sources (uranium).

B. Access to mineral resources can be denied by the presence of structures, parks and recreational areas, and by other features associated with the presence of human activity, or an adjacent land use to which extraction operations may be in conflict.

Army activities can deny access to mineral resources. Activities or the results of activities can commit an area to a use which prevents extraction of minerals.

C. Use of the land adjacent to overlying mineral resources can deny access for an indefinite period of time.

D. Denial for access to mineral resources is largely a matter of incompatibility. If giving access to minerals would lead to health or safety threats, the existing land use is incompatible with extraction.

Figure 5. Example of attribute descriptor for Land Use Technical Specialty.

When Army activities, plans, or policies affect attributes of the socioeconomic environment, controversy is likely to develop. Examples of economic attributes which could be identified as potentially controversial are those involving either basic philosophic questions dealing with political expediency, or those related to questions of economic efficiency and equity. Thus, controversy arises whenever there are responsible differences of opinion concerning the solution of environmental problems.

BAAPs

Army activities within Functional Areas which actually may impact environmental attributes are called BAAPs. The scope of a BAAP may vary considerably from one FA to another. For instance, the Construction BAAP "Grading" is much more specific than the Real Estate BAAP "Acquire Lands for Military Construction." To complicate matters, BAAPs *within* FAs may differ in scope. These apparent inconsistencies are partially due to various limitations of an information system such as EICS. Equally important, however, is the varied nature of the Army's activities in accomplishing its missions and functions.

In fact, most BAAPs are general in scope *because of* the Army's wide range of activities; however, some are more general than others. Even "Grading" can be performed several different ways, and some ways may be more likely to cause environmental impacts than others.

Need-to-Consider Scale

Intersections within the detailed matrix are identified with indicators of "need-to-consider" for the potential impact of the activity on the attribute.

Any activity may impact on virtually all the environmental attributes, but a person who is assessing environmental impact must identify the relative importance of the attributes in describing an impact. Therefore, the following "need-to-consider" scale was developed to indicate which attributes are most likely to be impacted:

A = Definitely consider this factor as being potentially impacted by the activity.

B = Possible effect, requires consideration.

C = Consider in special cases.

Blank = As far as we know, without knowing all the details of your project, you need not consider this intersection; please check the Ramifications/Mitigations.

Intersections within the matrix are identified with indicators of the appropriate rating on the need-to-consider scale.

Ramification Remarks

The complex nature of impacts and interactions associated with Army programs makes it necessary to qualify matrix scores (attribute/activity impact interactions) with Ramification (impact result) Remarks. These remarks, which typically address differing degrees of impact, depending on time of year, site condition, climate, and magnitude of activity, are linked to impacting activities by the "Ram-Mit Codes" (see Figure 8) and are presented by the EICS computer output following each matrix.

Mitigation Statements

Along with an evaluation of activities' potential effects on environmental attributes, EICS indicates measures that could minimize or eliminate significant impacts and, where possible, indicates the effectiveness of these measures. Choosing proper mitigation (abatement or moderation) procedures greatly depends on local conditions, and further critical evaluation of the problem by an expert may be necessary.

Mitigation Statements, which are supplied with EICS output following each Technical Specialty matrix, indicate the general nature of the controls which might be exercised. These statements may illustrate the nature of the potential impact and demonstrate why a particular activity is an environmental concern.

Environmental Baseline Information

Basic data and background information specifically related to a particular site are required to properly prepare EIAs and EISs. This information constitutes the environmental baseline and is useful not only in describing the existing environment, but also in relating project activities to the various environmental attributes.

Baseline data can be divided into two categories: data associated with environmental considerations available from "outside" sources, and available installation data applicable to the various environmental categories.

Figure 6 gives a summary for the first category of data. Because actual agency titles may vary from state to state, sources are listed in general terms; they are scored according to their relationship to attributes in the various environmental categories. Appendix B provides further sources of environmental data for these various categories. Initiative is required at the installation level to obtain more specific information regarding sources and the types and detail of data locally available. A directory of Federal, state, and local information sources keyed to attribute numbers can be developed by installation or command planners for each installation.

The second category of information is available from data, records, and reports generated on the installation. Some of the installation and regional information sources are listed in Chapter 5. Other EICS manuals provide information sources for other FAs.

3 EICS UTILIZATION CRITERIA

The potential EICS user must consider several criteria before he/she can use EICS practically and cost effectively.

Project Size and Cost

The EICS is a comprehensive environmental tool for (1) assessing very large projects with many environmental implications in numerous environmental areas, (2) assessing a number of alternatives to a large project (using the review level of the system), and (3) reviewing large environmental impact assessments or statements. DA Pamphlet 200-1 provides enough background for assessing many of the small projects common to all installations. Examples of minor assessments would include the site selection of an artillery firing point, the construction of a small PX building on an installation cantonment, or an installation assessment for a small depot. Examples of major EIAs/EISs in which the EICS can be used are a major installation realignment, a major military land acquisition, or any large installation-wide assessment. A typical set of detailed-level output from the EICS for such a project may be an inch thick and may contain several thousand potential impact considerations.

Time and Manpower Availability

Personnel tasked with assessing very large projects such as those listed above must have sufficient time and manpower to perform the environmental analysis and prepare several drafts of the EIA/EIS.

Even if EICS is used in preparing a large impact statement, CERL field test experience has shown that such assessments require 1 to 9 months to prepare, depending on the percentage of time available to the project coordinator and members of the assessment team, the amount of cooperation the coordinator obtains from other installation offices and personnel, and the priority that the installation and MACOM HQ gives to producing a quality environmental impact statement.

Number of Alternatives to Be Assessed

If the assessor must consider several prime alternatives for a given large project, he/she should enter the EICS at the *review* level and obtain output for each alternative to quickly determine the one or two best environmental alternatives. Then a detailed assessment can be prepared using the *detailed* EICS output.

Resources Available to the Project Coordinator

The following questions and many more like them must be critically evaluated by the project coordinator before he/she can use the EICS most advantageously and before he/she can prepare an interdisciplinary, comprehensive EIS.

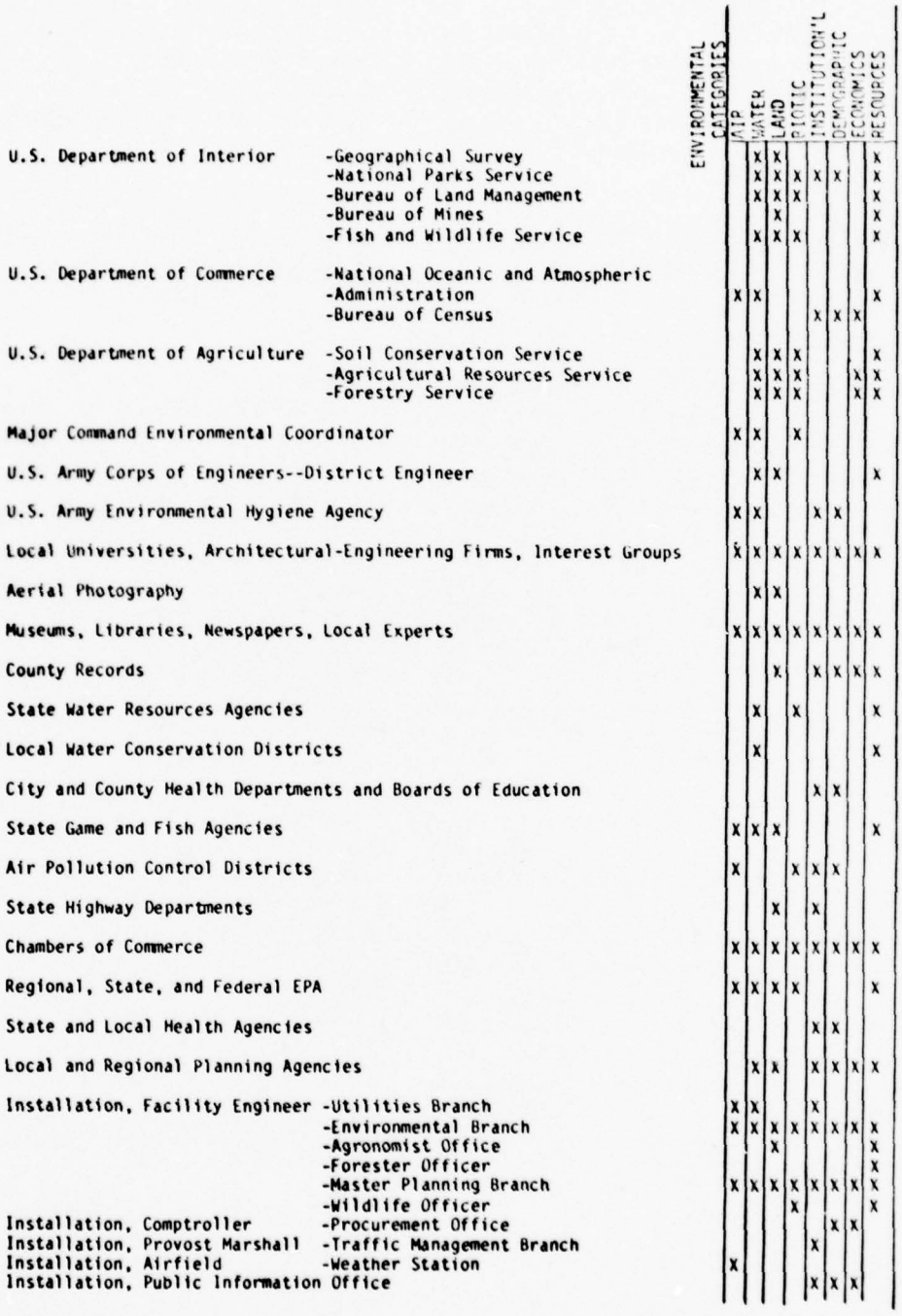
- Is the project coordinator thoroughly familiar with the action(s) to be assessed, the EIS process, and the general environmental interrelationships which exist in the project area?

- How many personnel are available to help prepare a major EIS?

- What are the preparing personnel's educational backgrounds and familiarity with the environment in question?

- How many installation experts, such as those found in the preventive medicine office, the forestry office, the grounds maintenance division or branch, and the public affairs and/or information office can be counted on to provide timely and reliable assistance in answering questions, providing factual information, and helping analyze the EICS output?

- How many dollars are available to hire experts or A/E consultants to gather baseline information and perform analyses for which no expertise exists on the installation or within the Army? For exam-



		ENVIRONMENTAL CATEGORIES	AIR	WATER	LAND	BIOTIC	INSTITUTIONAL	DEMOGRAPHIC	ECONOMICS	RESOURCES
U.S. Department of Interior	-Geographical Survey			X	X					X
	-National Parks Service			X	X	X	X	X		X
	-Bureau of Land Management			X	X	X				X
	-Bureau of Mines				X					X
	-Fish and Wildlife Service			X	X	X				X
U.S. Department of Commerce	-National Oceanic and Atmospheric Administration		X	X						X
	-Bureau of Census						X	X	X	
U.S. Department of Agriculture	-Soil Conservation Service			X	X	X				X
	-Agricultural Resources Service			X	X	X			X	X
	-Forestry Service			X	X	X			X	X
Major Command Environmental Coordinator			X	X		X				
U.S. Army Corps of Engineers--District Engineer				X	X					X
U.S. Army Environmental Hygiene Agency			X	X			X	X		
Local Universities, Architectural-Engineering Firms, Interest Groups			X	X	X	X	X	X	X	X
Aerial Photography				X	X					
Museums, Libraries, Newspapers, Local Experts			X	X	X	X	X	X	X	X
County Records					X		X	X	X	X
State Water Resources Agencies				X		X				X
Local Water Conservation Districts				X						X
City and County Health Departments and Boards of Education							X	X		
State Game and Fish Agencies			X	X	X					X
Air Pollution Control Districts			X			X	X	X		
State Highway Departments					X		X			
Chambers of Commerce			X	X	X	X	X	X	X	X
Regional, State, and Federal EPA			X	X	X	X				X
State and Local Health Agencies							X	X		
Local and Regional Planning Agencies				X	X		X	X	X	X
Installation, Facility Engineer	-Utilities Branch		X	X			X			
	-Environmental Branch		X	X	X	X	X	X	X	X
	-Agronomist Office				X					X
	-Forester Officer									X
	-Master Planning Branch		X	X	X	X	X	X	X	X
	-Wildlife Officer					X				X
Installation, Comptroller	-Procurement Office							X	X	
Installation, Provost Marshall	-Traffic Management Branch						X			
Installation, Airfield	-Weather Station		X							
Installation, Public Information Office							X	X	X	

Figure 6. Sources of baseline information.

ple, are any archaeological and historic sites or objects going to be affected?[10, 11] Will there be an irreversible commitment of prime and unique farmlands? Detailed investigations must be performed by experts in these fields before such issues can be effectively addressed in an EIA/EIS. Even if all the best systems available are used, CERL experience has shown that the project coordinator will need thousands of dollars to accomplish these supplemental analyses for major or extensive projects.

Overall EICS Utilization

The nine FAs correspond nearly one-to-one with the major program activities *listed in Chapter 2 of* AR 200-1. All FAs except Administration are now operational.

Since FAs are interdependent, the user must determine which one(s) is needed for his/her projects; most programs will involve two or more FAs. As an example, an EICS system user may approach the system with only an assessment of construction activities in mind. However, in trying to perform a comprehensive and total assessment, the user may find that this basic construction project is linked to a major mission change which, in addition to construction, involves major additions to training activities and new real estate acquisitions. At this point, the user should consider how the task of assessing the construction project will blend into the rest of the assessment process, and should identify whether these associated assessments or an overall comprehensive assessment are actually being completed. As a minimum, the user should definitely consider the associated operation and maintenance of the facility being constructed and its eventual disposal. Therefore, on a major construction project, both the Construction and Operations and Maintenance (O&M) FAs of EICS should be accessed.

Most personnel starting out in the assessment process find themselves focusing too narrowly in their assessment. Hopefully, the requirement to complete a yearly installation-wide assessment will help the assessor take a broader approach, and thereby produce a more comprehensive, integrated environmental assessment or statement.

Each FA is described by a detailed list of BAAPs which identify specific actions associated with the project and those likely to cause environmental impacts. A list of the specific activities along with their associated definitions can be found in the manual(s) which specifically address particular FAs. If a user does not know whether a given FA is applicable to an assessment, he/she should review the list of activities within that FA to better determine if those activities will be performed in the project.

4 EICS USE: INPUT, OUTPUT, AND PREPARATION OF AN EIS

Introduction

The EICS can assist in tasks other than EIA/EIS preparation. Used early in projects and program development, the system can help planners assess project alternatives. Management can use the system to assist in its review of an EIA/EIS. The review-level output from the system is specially designed for these tasks.

This manual, however, is designed for use of EICS for preparing EIAs and EISs. This chapter defines the logic of overall EICS utilization, from system access to use of the output for environmental impact analysis. It also discusses how the EICS output can be applied to various sections of an EIA or EIS and how supplemental information can be used in total environmental impact analysis. The material is oriented toward use of detailed-level output, but a similar procedure can be followed when using the EICS to review documents or evaluate alternatives. Where appropriate, special reference to the use of review-level output is made.

Input

Specifying Project Requirements

Output received depends on what the user requested on the input form. Separate EICS requests should be made for each major project alternative, including alternative sites. Figure 7 outlines the steps for using EICS material.

Generally, input procedures (Figure 7, item 1) require the user to request EICS output by filling out an input form for each FA requested and mailing it to CERL. Input requests may also be made over an interactive computer terminal, thus eliminating the need for completing an input form. Output can still be mailed to the user or received directly through the

[10] *Master Planning for Army Installations Emergency Expansion Capability*, AR 210-23 (Department of the Army, 15 March 1976), p 3-5.

[11] *Historic Preservation Administrative Procedures*, TM 5-801-1 (Department of the Army, 1 November 1975).

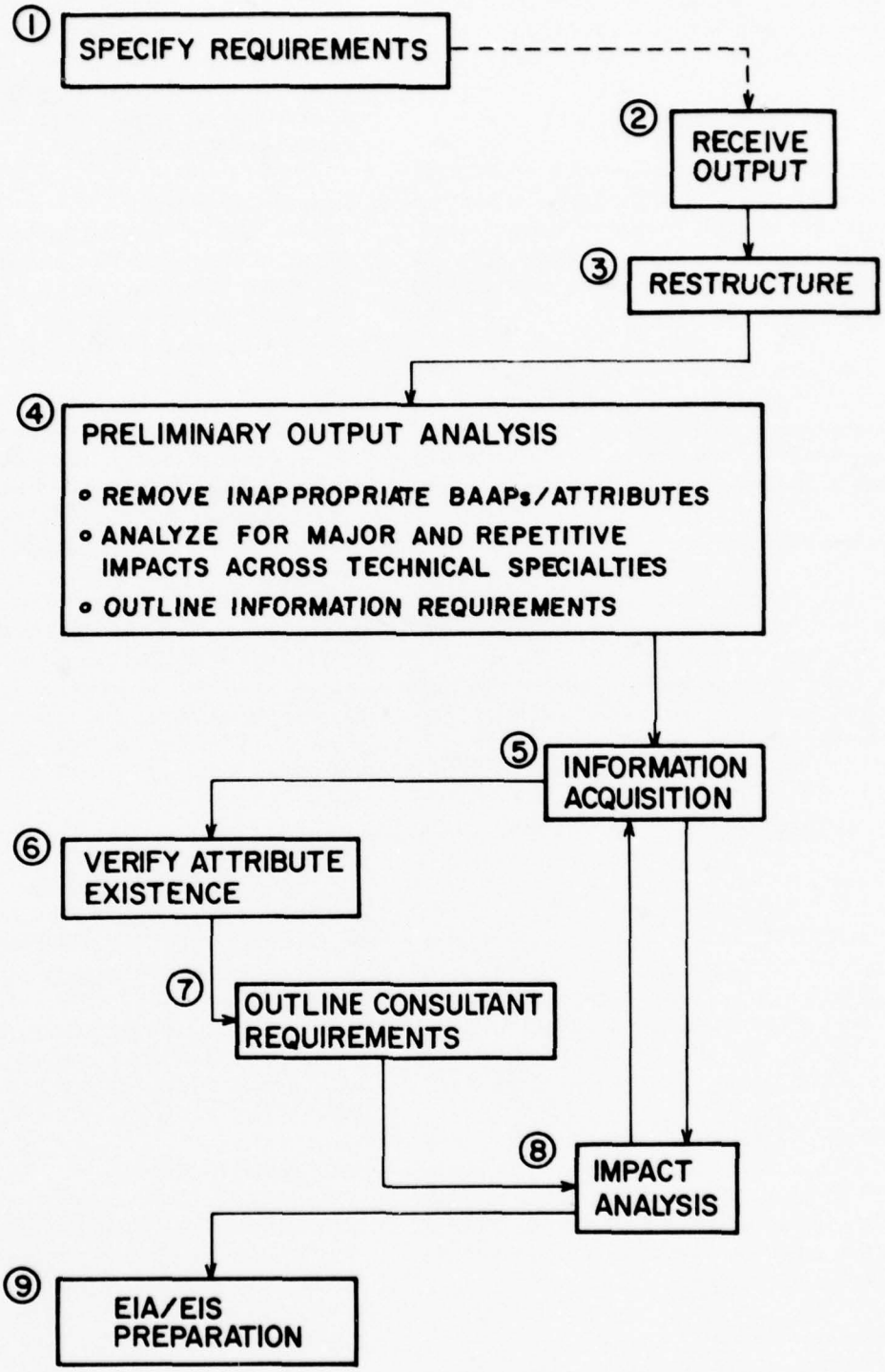


Figure 7. Steps in the EICS impact analysis procedure.

computer terminal. Separate inputs are required for each major project alternative and alternative location. The user must submit separate requests for each site of a project which will be conducted at two or more locations.

Output

Environmental information provided by ETIS for the user consists of EICS, EIFS, and CELDS output and supportive materials (*Attribute Descriptor Package*, CERL TR-E-50). The user must study, verify, and manipulate this information (items 4, 5 of Figure 7) to prepare an EIA/EIS.

EICS output is furnished to the user by mail, along with a copy of the original input form(s) to show what output was requested. EICS computer output consists of a complete list of all BAAPs for the FA, plus sets of information for each Technical Specialty requested.

The Technical Specialty Matrix

Impact predictions appear in matrix form. Attributes are coded by numbers which appear horizontally as the first line of data (Figure 8). The left column of numbers, entitled "BAAPs," refers to the potentially impacting activities being performed during the project for a particular subprogram. A possible impact is shown by the letter A, B, or C at the intersection of the horizontal and vertical axes, which corresponds to a given activity and attribute. (For an explanation of these letters, see the "Need-to-Consider Scale" section of Chapter 2.) Absence of a letter at an intersection means that no impact is predicted. A column at the right side of the matrix headed with "RAM-MITS," with four-digit numbers arranged below it, corresponds to Ramification Remarks and Mitigation Statements. Ramification Remarks explain why the activity, or some test listed for that BAAP, will cause a problem; Mitigation Statements give possible means to reduce the problem or level of impact.

Activities and Attributes

Also printed on the matrix (Figure 8) are lists of impacted attributes coded to the matrix attribute numbers, and lists of impacting BAAPs, also coded to the matrix BAAP numbers. Controversial attributes are identified with an asterisk.

Ramifications Mitigations

Decoded sets of Ramification Remarks and Mitigation Statements are provided with the output. Each set contains one or more Ramification Remark and one or more Mitigation Statement and is identified by a code number corresponding to a code number in the right-hand column of Figure 8, labeled "RAM-MITS." A specific Ramification Remark or Mitigation Statement may be used more than once or in different combinations with other Remarks or Statements if it applies to more than one activity. Figure 9 illustrates typical Ramification-Mitigation output.

Supportive Documents

Other than the computer printouts, materials available to the user include the *Attribute Descriptor Package*, BAAP definitions, alternative BAAP methods/tests, and Technical Specialty introductions and information source lists (see Chapter 5).

EIFS

EIFS addresses impacts related to expenditures of military dollars in local communities. This system is an export-based location-quotient technique that uses an export multiplier to measure local economic vitality. Data were obtained from the Bureau of the Census and similar organizations. EIFS uses these baseline data, along with data supplied by the user, to estimate the magnitude of related economic changes in the following areas: 1. total business volume; 2. total personal income; 3. total employment; 4. property values; 5. housing expenditures, investments; 6. non-housing expenditures, investments; 7. tax revenues; 8. schools—costs, government aid; 9. local government operating costs.

CELDS

CELDS is an up-to-date summary of all Federal and state laws, regulations, and standards related to the environment. It was developed in response to an Army need for rapid and easy access to relevant environmental standards. CELDS has been developed for non-lawyers to use in determining standards which might be important in regulating ongoing Army activity or which should be considered in planning some future action.

Restructuring the Output

It would be most convenient for the user if the activities, attributes, ramifications, and mitigations could be printed on the matrix without code numbers. Computer printout limitations presently make this possible. The user can "cut and paste" the output to arrange it in a more convenient form.

First, the activity list is placed at the left side of the matrix so that the code numbers are covered by the corresponding activity and the activities align with the

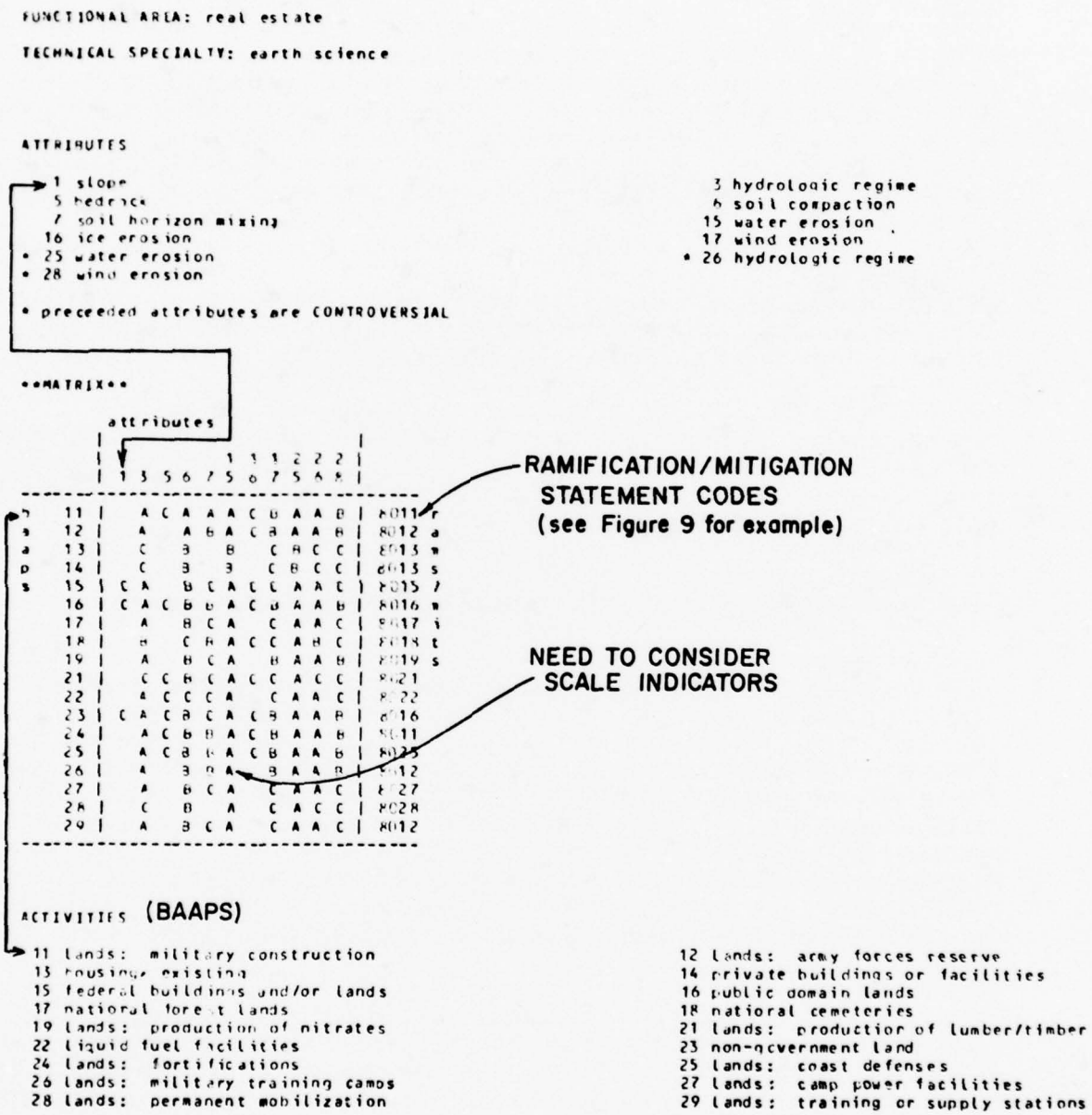


Figure 8. The EICS matrix printout.

TRANSPORTATION

5010

/RAMIFICATIONS/

STANDARDS AND SPECIFICATIONS FOR PACKING. AS SPELLED OUT BY FEDERAL CODE OF REGULATIONS. THE DEFENSE SUPPLY AGENCY MANUALS. AR 700-15. AND CUSTOMER REQUIREMENTS IN SPECIFIED PROCUREMENT INSTRUCTIONS ALL DETERMINE REQUIREMENTS FOR PACKING CERTAIN ITEMS AND MODES OF TRANSPORT TO BE USED. FURTHER REGULATIONS DETERMINE THE SUPPORT SERVICES REQUIRED OF TRANSPORT COMPANIES (SUCH AS STORAGE FACILITIES. CARGO HANDLING EQUIPMENT). FAILURE TO MEET STANDARDS COULD VOID A CONTRACT AND MAY EVEN RESULT IN LITIGATION. CARELESS PACKING COULD RESULT IN ACCIDENTS.

/MITIGATIONS/

COMPLY WITH EXISTING STANDARDS AND REGULATIONS FOR PACKING. PROTECT AGAINST LOOSE PACKING MATERIALS WHERE THEY MAY ESCAPE FROM THE CARRIER. BECOMING A DRIVING HAZARD AND LITTERING PUBLIC OR PRIVATE PROPERTY.

5020

/RAMIFICATIONS/

SHIPPING CONTAINERS THAT ARE EITHER REUSED OR RECYCLED REQUIRE RETURN TRANSPORT (EMPTY RAIL CARS. TANK CARS.. FLAT BED TRUCKS. CONTAINERIZED CARGO. SHIPPING CRATES. OIL DRUMS AND SO ON). WASTE MATERIAL FROM PACKING. SUCH AS EXCESS DUNNAGE. REQUIRES TRANSPORT TO DISPOSAL SITE.

/MITIGATIONS/

SCHEDULE REGULAR PICK-UP AND RETURN OF CONTAINERS AS WELL AS DELIVERY.

5030

/RAMIFICATIONS/

LOADING AND UNLOADING OPERATIONS COULD CREATE TEMPORARY TRAFFIC DISRUPTIONS IF AN OVERSIZED CARRIER (TANK TRUCK OR VAN) PROTRUDES ONTO A PUBLIC ROADWAY AND BLOCKS TRAFFIC FLOW. SIMILARLY. RAIL SWITCHING TO ACCESS INDUSTRIAL RAIL SPURS COULD TEMPORARILY RESTRICT TRAFFIC MOVEMENT AT CROSSINGS, THOUGH MOST LOADING OPERATIONS ARE SELF-CONTAINED ON THE INDUSTRIAL SITE. THE USE OF FORK LIFTS OR OTHER SUPPORT SYSTEMS COULD IMPEDE TRAFFIC MOVEMENT IN THE AREAS IMMEDIATELY SURROUNDING THE FACILITY. DISRUPTION TO TRAFFIC FLOW THAT CAUSES POTENTIAL HAZARDS WOULD NECESSITATE SPECIAL SIGNAGE OR TRAFFIC CONTROLS (WARNING LIGHTS. CROSSING GATES. AND SO ON). LOADING AND UNLOADING HAZARDOUS SUBSTANCES COULD PROVIDE OPPORTUNITIES FOR ACCIDENTS SUCH AS EXPLOSIONS. CHEMICAL SPILLS. ETC.

/MITIGATIONS/

SITE LOADING AND UNLOADING AREA AWAY FROM PUBLIC ROADWAYS WHERE TRAFFIC FLOW MIGHT BE BLOCKED BY OVERSIZED TRANSPORT CARRIERS. CONSULT LOCAL HIGHWAY OFFICIALS TO INSURE THAT LOCAL PAVEMENT WIDTHS AND STRENGTHS ARE ADEQUATE FOR HEAVY VEHICLES. ROUTE TRAFFIC TO MINIMIZE TRUCK-RAILWAY CROSSINGS. AVOID USING SUPPORT EQUIPMENT SUCH AS FORKLIFTS OR CRANES WHERE TRAFFIC FLOW MAY BE IMPEDED. UNLESS USE IS TEMPORARY AND DURING OFF-PEAK HOURS. OBSERVE SAFETY PRECAUTIONS WHEN LOADING AND UNLOADING HAZARDOUS SUBSTANCES.

Figure 9. Example of Ramification Remarks and Mitigation Statements.

proper row of scores. Next, the attributes list is cut into sections of approximately five attributes. These sections are placed above, but not covering, the attribute codes at the top of the matrix. Ramification remarks and mitigation statements can be aligned to the right of the ramification-mitigation codes, although reference to them in their present arrangement should not be difficult.

Preliminary Output Analysis

Since EICS is designed for general use, it does not provide all the information required to perform the analysis. The user must provide or acquire additional environmental baseline information (item 5 of Figure 7). Some information requirements are initially used to answer filter questions. The user should refer to the baseline information section in Chapter 2 and to the information source lists in Chapter 5 for assistance.

As data are gathered, they must be analyzed further to determine their usefulness to the goal of producing an EIA/EIS. This data analysis will include a final evaluation of probable impact magnitude and importance, as well as a detailed description of the project and its environmental setting. All major alternatives are examined carefully during the analysis phase, with the most viable one chosen as the document organization continues. The draft EIA/EIS document is produced at the end of this process. Note that items 1, 2, and 3 occur at the beginning of the assessment process and item 7 at the end, but that all the other steps will be occurring and interacting throughout the entire assessment of the project.

The person in charge of producing an environmental assessment document should plan work assignments before doing the preliminary EICS output analysis, especially for a large project. The work of environmental assessment and document preparation can be divided among available personnel in several ways:

1. By Technical Specialty area (or groups of Technical Specialties)

2. By activity locations

3. By activity types, such as (for RDT&E, for example) aeronautics, weaponry, medical research, etc.

4. By section of the EIA/EIS, such as project description, environmental setting, or land use relationships.

For a large assessment, the project leader should try to seek workers who represent various disciplines. Such a multidisciplinary approach will produce a document superior to one written from a single viewpoint.

The EICS user should perform preliminary analysis of the output (Figure 7, item 4) to further tailor it to the site, become familiar with the impacts associated with the project, and organize an approach to the assessment process. He/she should first remove obviously inappropriate BAAPs and attributes. *If an activity will not be performed, it can be deleted; if it is certain that an attribute does not exist at the site, it can be deleted.* To make these deletions accurately, the user may need to become familiar with the attributes on the matrix by examining pertinent descriptors in the *Attribute Descriptor Package*, and with the BAAPs by reviewing their definitions and the alternate methods of accomplishing them (Table 1, Chapter 5).

After reviewing the Ramifications and Mitigations for each BAAP (in a Technical Specialty), the user can study the matrix output to identify major impacts in each Technical Specialty and repetitive and associated impacts among several Technical Specialties. To assist the user in this procedure, a simple worksheet has been developed for use during the impact analysis process. (It is a *suggested* worksheet; others may be developed by the individual user.)

Figure 10 is a sample worksheet which may be used to organize the information obtained during output analysis of a Technical Specialty matrix. (Several sheets may be required for each Technical Specialty.) Working from left to right, the three main sections of the worksheet can be used as listed below:

1. Matrix Factors Section

a. Each BAAP may be examined individually across a horizontal matrix row by listing it in the left-hand portion of the section, and then placing pertinent attributes or groups of attributes in the right-hand column. Individual scores may be noted, if necessary, in the center. (The examples in Figure 11 follow this procedure.)

b. A similar procedure may be followed for the vertical matrix columns of individual attributes.

c. Several BAAPs performed by a particular organization or at a particular location may be examined as a group.

MATRIX FACTORS	SCORE		IMPLICATIONS (RAMS-MITS)	INFO/CONSULTANT REQUIREMENTS

Figure 10. Worksheet #1: Output Analysis.

MATRIX FACTORS	SCORE		IMPLICATIONS (RAMS-MITS)	INFO/CONSULTANT REQUIREMENTS
Example of Output Analysis: 2 BAAPs from the Construction Functional Area.				
BAAP		Ecology Technical Specialty attributes		
65 Solid Waste	A	Disease vectors Other undesirable species	User's Notes: Debris on site: rats, bugs, etc. Control problem by weekly disposal (landfill, incinerator)	See contracting officer (Procurement Office) on past construction. How was debris and other solid waste disposed of, by whom, and how often? Is contractor's landfill "sanitary"? See pest control records for rat, bug problems on past construction sites, overall base pest problems. Site visit--find best spot for temporary dump. Can we get separate contract for waste disposal on this project, or will current disposal contractors be able to handle it? Looks like a controllable problem--probably not significant problem if controlled. Require fencing to conceal debris?
	B	Small mammals	(Original Ram-Mit: "*Ramification: Temporary* on-site disposal of packing materials and other organic debris may lead to increased populations of rats, mice, roaches, termites, and other undesirable animals." "Mitigation: Require, by contract provision or by providing service, that all organic solid waste be disposed of in an approved landfill or incinerator no less frequently than once a week.")	

Figure 11. Example for Worksheet #1.

(13) Energy and Resources Conservation.

ADA024303 (CERL, June 1976).

Figure 2. Environmental impact matrix—general form.

d. Particular attention may be given to horizontal rows and vertical columns which have large numbers of impacts scored.

2. Implications Section

This column provides space to note (a) the essential implications of the Ramification Statements, (b) the suggested mitigations, and (c) which impacts may be unavoidable, short-term, or long-term. Although the Ramifications/Mitigations should be fairly easy to use as provided with the computer output, the individual "Rams" and "Mits" could also be attached in this column in particular cases where note-taking proves overly repetitious since a single Ram/Mit statement will often apply to more than one matrix intersection.

3. Information/Consultant Requirements Section

a. Questions raised about specific impacts, mitigations currently in use, and their success in reducing impacts, etc., may be listed in this section of the worksheet.

b. Persons or organizations which should be consulted to provide the answers to these questions may be listed here. Such names may be obtained from the user's own knowledge, from the information sources listed for each Technical Specialty in Chapter 5, or from suggestions in the Ramification Remarks or Mitigation Statements.

c. Known documentation of relevant information may be noted.

d. When information needed to determine extent of impact is not available, field work requirements should also be noted; include whether the work can be provided in-house or through some government or educational institution, or whether it will require contracting to an outside consultant.

Figure 11, an example analysis from the Construction Functional Area, shows how the Output Analysis Worksheet can be used to summarize the possible impacts of an activity and the steps to verify the activity's presence and significance.

EICS is designed for general use. As can be seen from the discussion on the Information Requirement section of the Output Worksheet, the EICS matrix does not provide *all* the information required to perform the analysis. The user must provide or acquire additional (environmental baseline and other information) in order to answer the questions raised by the matrix analysis. Some information requirements are used initially to answer filter questions. The user should refer to the baseline information section in Chapter 2 and to the information source lists in Appendix B for assistance. (See p. 28 for further details on information acquisition for an environmental assessment.)

Because the user may not be able to understand the implications of some environmental attributes at his/her particular location, he/she should consult with experts as the need arises even while performing preliminary output analysis. The text in the *Attribute Descriptor Package* is designed to reduce this need; if necessary, it will also help the user communicate with experts in the Technical Specialty areas. As mentioned above, information sources (experts) are listed in the source tables in Appendix B.

Finally, regardless of whether the Output Analysis Worksheet or some other method of output analysis is chosen, the user should arrange the potential impacts developed from matrix analysis into categories such as the following:

1. Impacts which the preparer(s) can address.

2. Impacts which will occur simply because of the presence of an attribute.

3. Impacts requiring scientific consultation for analysis.

4. Impacts about which information is readily available.

5. Impacts for which field work will be required to obtain adequate information.

6. Impacts associated with more than one Technical Specialty which might require analysis in the primary specialty before analysis of secondary or cumulative impacts in other specialties.

7. Impacts associated with more than one Technical Specialty which can be adequately analyzed in any of the Technical Specialties (duplication).

Preparing an EIA/EIS Document

During the environmental impact analysis procedure, the EICS user should have two primary goals: (1) to

MATRIX FACTORS	SCORE		IMPLICATIONS (RAMS-MITS)	INFO/CONSULTANT REQUIREMENTS
Construction Output Analysis Example, continued:				
BAAP		Ecology attributes		
73 Clearing site	A	trees, shrubs, fish, amphibians, food webs, encroachment on natural habitat	User Notes: Removes animal habitat, animal food sources, stresses small plants, can lead to pests increase, increased runoff, and thus siltation. Unavoidable in area cleared. Specify clearing limits carefully, or choose alternate sites. (Original Ram-Mit: "Ramification: Removal of trees drastically alters the ecological balance and aesthetic interest of any area where it is done. It removes habitat for many animals, removes food sources for still others, stresses remaining smaller plant associations, and often leads to increases in plant and animal pests. It can also allow increased runoff after rains, impacting downstream aquatic organisms. "Mitigation: Removal of trees is an unavoidable impact if the site is to be used. But contracts should clearly specify limits of clearing. Alternate sites might be used if forested areas are locally scarce.")	See base forester, resource manager, facilities engineer, or environmental engineer. Reference the base master plan section on forests. What percent of proposed site is currently forested? Same question for entire base. May need field survey of timber, other plants, animals -- how much baseline information already in current master plan? How much contractable? Call university forestry and biology departments. Can we shift construction site so less forest is cut? Is current site of any particular importance? Any nearby streams or ponds (see base maps)? What is planned to control erosion? Any pests or weeds of particular importance around (so increases would be a problem)? Any threatened species known to site, to base, to the region?
	B	herbs, birds, endangered plants, impacts on game animals		
	C	small mammals, reptiles, productivity, seasonal aspect, small game hunting, threatened species		

Figure 11. (cont'd)

Figure 5. Example of attribute descriptor for Land Use Technical Specialty.

d. Particular attention may be given to horizontal rows and vertical columns which have large numbers of impacts scored.

2. Implications Section

This column provides space to note (a) the essential implications of the Ramification Statements, (b) the suggested mitigations, and (c) which impacts may be unavoidable, short-term, or long-term. Although the Ramifications/Mitigations should be fairly easy to use as provided with the computer output, the individual "Rams" and "Mits" could also be attached in this column in particular cases where note-taking proves overly repetitious since a single Ram/Mit statement will often apply to more than one matrix intersection.

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c. Known documentation of relevant information may be noted.

d. When information needed to determine extent of impact is not available, field work requirements should also be noted; include whether the work can be provided in-house or through some government or educational institution, or whether it will require contracting to an outside consultant.

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3. Impacts requiring scientific consultation for analysis.

4. Impacts about which information is readily available

5. Impacts for which field work will be required to obtain adequate information

6. Impacts associated with more than one Technical Specialty which might require analysis in the primary specialty before analysis of secondary or cumulative impacts in other specialties

7. Impacts associated with more than one Technical Specialty which can be adequately analyzed in any of the Technical Specialties (duplication).

Preparing an EIA/EIS Document

During the environmental impact analysis procedure, the EICS user should have two primary goals: (1) to

determine the probable environmental impacts of the project and ways to mitigate them; and (2) to document such information so that the decision-maker can intelligently decide about whether to go ahead with the project as is, modify it, choose an alternate site, or cancel it entirely.

EICS can greatly facilitate meeting the first goal, since the system was developed as a *tool* to help the user consider all environmental factors and the ways they may be affected by an Army action. Meeting the second goal of adequate and useful impact documentation requires more than just the computer output, attribute descriptors, and BAAP definitions, however. It is not intended, for instance, that the Ramification Remarks be inserted word-for-word into Point 3 of the CEQ guidelines for an EIA/EIS. Instead, after completing the preliminary output analysis of EICS output, the project team should be ready to begin planning the remainder of the work in information acquisition, impact analysis, and document preparation.

Making an Outline

Figure 12 gives the basic outline for the EIA/EIS. At the outset of the project, the environmental assessor should prepare a working outline which expands the basic one by listing items requiring specific discussion for that particular project. The working outline could include specific functions, organizations, facilities, test ranges, environmental (attribute) categories, etc., that are pertinent to the site(s) being considered for the project.

For example, after the preliminary analysis, the user might make extensive notes about what should be covered under just one item, "Water," for the Environmental Setting section of the document (see Figure 13). The user can develop the information in such an outline by consulting the *Attribute Descriptor Package*, EICS user manuals, mission and function statements, base maps, and other installation information available from the Facilities Engineer. The questions raised in the preliminary analysis will help indicate what areas should be emphasized in the project description and environmental setting sections and what kinds of impacts should be listed on the outline for later discussion.

The entire analysis procedure which follows, including evaluation of impact presence, degree, and significance, can be conducted with this working outline in mind. Then as specific information is obtained during analysis, it can be labeled according to its location in the outline and future location in an EIA or EIS.

Information Acquisition

Information acquisition (Figure 7, item 5) for impact analysis has two general forms: reviewing existing sources and collection in the field. Existing sources, which include reports, studies, personal interviews, etc., should always be searched first.

Information requirements can vary considerably. It might be enough just to establish an attribute's presence; on the other hand, detailed information about its location and condition might be required. Requirements can be determined (as suggested for section 3 of Worksheet #1) before acquisition begins.

Another factor to consider during information acquisition is the completeness of the description of any current, ongoing activities. The user needs to obtain baseline information which answers such questions as:

- What activities (BAAPs) are actually being performed by the facilities, organizations, or test groups being considered in this environmental assessment?
- How is the activity being performed?
- How often is it performed?
- If any waste is being produced, what is it and what quantities are produced?
- Are any mitigation procedures already being performed? If so, what are they?

All but the last question must be answered somewhere in either Part 1 or Part 2 of the environmental assessment in the descriptions of the existing activities and environments (before the project). This considerably simplifies the later sections of the document involving the actual impacts. The answers to the last question would be used in part 5-B of the EIA, "How Avoidable Adverse Impacts Will Be [or Are] Avoided."

Verifying Attribute/BAAP Existence

(Figure 7, Item 6)

When known nonexistent attributes and BAAPs have been filtered out, a preliminary site visit and/or discussion with *knowledgeable* base personnel (those who have themselves recently been at the site in

1. PROJECT DESCRIPTION
   a. Purpose of action
   b. Description of action
      (1) Name
      (2) Summary of activities
   c. Environmental setting
      (1) Environment prior to proposed action
      (2) Other related Federal activities
2. LAND-USE RELATIONSHIPS
   a. Conformity or conflict with other land-use plans, policies and controls
      (1) Federal, state, and local
      (2) Clean Air Act and Federal Water Pollution Control Act Amendments of 1972
   b. Conflicts and/or inconsistent land-use plans
      (1) Extent of reconciliation
      (2) Reasons for proceeding with action
3. PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT
   a. Positive and negative effects
      (1) National and international environment
      (2) Environmental factors
      (3) Impact of proposed action
   b. Direct and indirect consequences
      (1) Primary effects
      (2) Secondary effects
4. ALTERNATIVES TO THE PROPOSED ACTION
   a. Reasonable alternative actions
      (1) Those that might enhance environmental quality
      (2) Those that might avoid some or all adverse effects
   b. Analysis of alternatives
      (1) Benefits
      (2) Costs
      (3) Risks
5. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED
   a. Adverse and unavoidable impacts
   b. How avoidable adverse impacts will be mitigated
6. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY
   a. Trade-off between short-term environmental gains at expense of long-term losses
   b. Trade-off between long-term environmental gains at expense of short-term losses
   c. Extent to which proposed action forecloses future options
7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES
   a. Unavoidable impacts irreversibly curtailing the range of potential uses of the environment
      (1) Labor
      (2) Materials
      (3) Natural
      (4) Cultural
8. OTHER INTERESTS AND CONSIDERATIONS OF FEDERAL POLICY THAT OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION
   a. Countervailing benefits of proposed action
   b. Countervailing benefits of alternatives

Figure 12. Outline for CEQ-prescribed EIS content. (From AR 200-1, 14 November 1975, Figure 2-4.)

2. EXISTING ENVIRONMENT

A. Natural Environment

(2) Water

a. Surface Water

1. Natural waters—Locations (maps), descriptions

a. Streams (list)
b. Rivers (list)
c. Lakes and ponds (list)

2. Man-made—Locations, descriptions

a. Holding ponds (maps)
b. Drainage systems

b. Groundwater—Locations, descriptions

1. Aquifers—on- and off-base
2. Wells (map)

c. Current Water Quality

1. Treatment Systems—Locations, descriptions

a. Drinking water

b. Wastewater

1. Sewage treatment plans (list)
2. Vehicle washracks (list)
3. Aircraft cleaning (list)
4. Laboratory chemical waste (list sources, types, amounts, etc.)

c. Petroleum, oil, and lubricants waste

1. Contingency plans
2. Recent spills of stored fuel
3. Fuel dumping by aircraft

2. Standards

a. EPA region
b. NPDES permits
c. Compliance record
d. Recent water quality tests (data in an appendix)
e. Planned treatment system upgrading

Figure 13. Example section of expanded EIA/EIS outline.

question) can be made to verify the existence of each remaining attribute or BAAP. Impacts resulting because an attribute is present can then be analyzed, as can all impacts which may result automatically because a BAAP is performed. The presence, location, and condition of attributes will determine the extent of further analysis. Preliminary determination of the presence of impacts on attributes can be started during the site visit; determination of degree and significance of the impacts may require consultation with various in-house and out-of-house experts. In some cases, it may be desirable to obtain field surveys or investigations of certain attributes. Such investigations may be obtained at little or no cost from government agencies, at minimal cost from professors or graduate students at local colleges or universities, and from professional consultants.

Outlining Consultant Requirements

(Figure 7, Item 7)

Because the user may not understand all environmental attributes and/or have the expertise to perform all impact analyses, he/she should consult with experts as the need arises (Figure 7). The output and supportive materials will provide background information that will help the user prepare scopes of work (item 4c) and communicate with experts in each Technical Specialty area.

The user should compile a list of information which must be obtained by consultants. The key to obtaining professional (or amateur) consultant services, at a cost which can reasonably be borne by the sponsoring organization, is to use the previously performed output analysis, plus the in-house and out-of-house expertise available, to narrow down the scope of work for the paid consultant. The consultant should obtain *only* that *specific* information which is not otherwise available. In some cases, after reading the Ramifications, Mitigations, and attribute descriptors, the user may be able to perform adequate impact analysis by asking questions of his/her various information sources and consultants rather than by assigning work to them.

Impact Analysis

Impact analysis (Figure 7, Item 8) includes determining the nature, scope, and significance of environmental impacts resulting from a program or project. Ramification Remarks and attribute descriptors can provide information helpful in the analysis. After completing a matrix analysis by some systematic means, such as using Worksheet #1, the information acquired from existing sources (documents and records of personal interviews), as well as that acquired in any field investigations (conducted by Army personnel or by informal or contracted consultants), should be cataloged according to the categories listed for potential impacts. Each occurring impact should also be categorized according to its degree and significance. Suggestions in Ramification Remarks, observable problems in the field, results of field studies, and contacts with experts knowledgeable about particular environmental areas (such as those listed in Chapter 5, contracted consultants, etc.) can all be used to help determine the degree and significance of impacts.

Mitigation techniques should be categorized according to whether they are being used, may be used, or are unlikely to be used. The latter can be considered for possible inclusion as management alternatives in Point 4 of the EIA/EIS.

Information Organization

During the preliminary EICS output analysis, the user will have developed several types of information which he/she originally noted on Worksheet #1 or on some similar summary sheet. As mentioned previously, this information can be inserted into the expanded outline as it becomes available. However, since details regarding impacts must be placed in so many different portions of the EIA/EIS document, a second worksheet (Figure 14) was developed to aid in organizing the results of the impact analysis investigation according to the points of the basic EIA/EIS outline. As before, the worksheet could be used to organize information in several ways:

1. One sheet could be used to summarize impacts for each area or project being assessed.

2. One sheet could be used for each problem discovered during the analysis process. This is the method used in the example (Figure 15) in which the impacts of operating an unlined landfill were summarized. Items followed by a question mark were those the user was still unsure of at the time the sheet was filled out. As field studies were completed, and personal conversations with nearby residents, city officials, and civil engineers were conducted, these items could be crossed off or expanded, whichever was appropriate.

3. One sheet could be used to summarize impacts on a particular attribute, such as "Rare and Endangered Species," or even for a single species.

TYPE OF IMPACTS		CEQ POINTS		REMARKS
POSITIVE	DIRECT	3b		
	INDIRECT	3b		
	LONG TERM BENEFITS	6		
	SHORT TERM BENEFITS	6		
NEGATIVE	DIRECT, AVOIDABLE	3b 5b		
	DIRECT, UNAVOIDABLE	3b 5a		
	INDIRECT, AVOIDABLE	3b 5b		
	INDIRECT, UNAVOIDABLE	3b 5a		
	SHORT TERM LOSSES	6		
	LONG TERM LOSSES	6		
LAND USE RELATIONSHIPS		2,3		
COMMITMENT OF RESOURCES		7		
CONTROVERSIAL				

Figure 14. Worksheet #2: Impact organization.

TYPE OF IMPACTS		CEQ POINTS		PROBLEM: SOLID WASTE DISPOSAL -- Unlined landfill, possible groundwater contamination suspected REMARKS
POSITIVE	DIRECT	3b		Generally - sanitary and safe disposal of waste reclaim waste land?
	INDIRECT	3b		Jobs; salvage; mosquito control
	LONG TERM BENEFITS	6		Land reclamation resulting in recreation?
	SHORT TERM BENEFITS	6		Waste disposal
NEGATIVE	DIRECT, AVOIDABLE	3b 5b		Erosion due to equipment (reduce by seeding ASAP); Noise. Odor. Fire hazard.
	DIRECT, UNAVOIDABLE	3b 5a		Loose trash (visual impact). Leaching into groundwater? Energy use (refuse transport). Reduction in land value. Commitment of land.
	INDIRECT, AVOIDABLE	3b 5b		Health hazard to nearby wells, streams, until lined? Safety of workers.
	INDIRECT, UNAVOIDABLE	3b 5a		Weeds encouraged, undesirable birds and mammals attracted. Loss of recyclable materials. Loss of real property value. Decreased land values nearby?
	SHORT TERM LOSSES	6		Vegetation and wildlife, land, labor, recreation, nearby land values.
	LONG TERM LOSSES	6		Soil loss, soil productivity. Land use. Energy and equipment. Loss of recyclable materials.
LAND USE RELATIONSHIPS		2,3		Decreased land values nearby? Limits land usage Utilities must be diverted Zoning effects? (burning) other related ordinances Decrease in site stability (affects future uses)
COMMITMENT OF RESOURCES		7		Energy Labor Land Use Equipment Money Recyclable materials not used Water use (if leachate causes contamination or contains toxic materials)?
CONTROVERSIAL				Aesthetics -- loose trash Noise Archaeological sites? Non-recycling Health hazards related to water (wells, stream)? Nearby land relationships?

Figure 15. Example for Worksheet #2.

4. One sheet could be used for each Technical Specialty.

Completing the Report

After the impact analysis is complete and impacts have been summarized in some way convenient to the writer(s), all that remains is for the actual text to be written (Figure 7, item 9). If sufficient planning has gone into the analysis and summary work, each writer will be able to produce his/her portion of the report by inserting the appropriate information (already collected) while proceeding through the expanded outline. A few points follow which may be helpful to remember.

1. Large quantities of data, for baseline information or for impact evaluation, should be placed in appendices whenever possible. This reduces the need for decision-makers and other readers of the document to constantly skip pages to follow the text.

2. Except when discussing land-use plans, Point 3 discussion of negative impacts should minimize mention of impact avoidance or mitigation methods that are in use or will be used, except by referencing the portions of Point 5-B, "How Adverse Impacts Will Be Mitigated," in which they are thoroughly discussed.

3. Often, specific details of a project are not known at the time an environmental assessment is begun; this makes impact evaluation rather difficult. Nonetheless, the EIA/EIS writer should make every effort to discuss those impacts that may occur. In fact, the Army is obligated to do so. If project information is at a very general stage, then the discussion of impacts will have to be general as well.

4. Due to organization and availability of information, it is often more expedient to compile sections as the information becomes available regardless of its numerical sequence. In addition, some sections such as the description of the existing environment must be assembled in the earliest stages in order to be useful as base data for comparison.

Relationship of EICS to the CEQ Points

The EIA/EIS format used here is that given in DA PAM 200-1[12] (see Figure 12); when preparing an EIS, it is mandatory. Various Army commands may provide more detailed variations of this outline. Using a format for an EIA similar to that used for an EIS can save time and trouble if an EIS is necessary later.

The latest guidance[13] emphasize that environmental considerations should be taken into account from the *beginning of the decision making process.* Initial environmental studies should be conducted along with initial technical and economic studies. Too often, assessments and statements are written to justify decisions long since made. If environmental assessments were made when a project began, environmental information could be integrated into, rather than tacked onto, the decision-making process and, in many cases, delays could be avoided. Present guidelines require that draft impact statements (and thus the required prior assessments) be prepared and circulated during the earliest possible stage of the decision-making process.

It is impossible to determine appropriate responses for the 8 points without information about the nature of the project. This section describes how EICS output can assist the preparer in responding to certain points. Each user must tailor his/her responses to each case, and the detail necessary depends on the particular circumstances. It is conceivable that, in some cases, the anticipated environmental impact of an Army program or project would be negligible in many of the Technical Specialty areas. In other cases, considering these same Technical Specialty areas would be the most significant part of evaluating a potential environmental impact.

The EICS has been developed to assist the user in responding to Points 3, 4, 5, 6, and 7. It can also assist in indicating items which should be included under Points 1 and 2. For example, past users of EICS have found the Functional Area concept useful in helping organize the project description portion of Point 1, and the same has been true with the Technical Specialties for the environmental setting. In addition, specific BAAPs which cause significant impacts, or attributes which are impacted often or significantly, can be elaborated on in Points 1-B and 1-C, respectively. In this way the impacts sections (3 through 7) can be reserved for discussing impacts specifically, rather than padded with extraneous baseline information.

This area is one which often receives negative comments from persons or organizations reviewing EIAs or

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[12] *Handbook for Environmental Impact Analysis,* DA PAM 200-1 (Department of the Army, April 1975), p 20.

[13] Council on Environmental Quality, "Proposed Regulations Under National Environmental Policy Act," *Federal Register,* Vol 43, No. 25230 (June 9, 1978).

EISs. They may complain that the impacts sections were hard to read and the real project impacts obscured because excessive baseline information was inappropriately included there. Similarly, they may complain that project description or environmental setting portions of the document did not really contain enough information to allow evaluation of the thoroughness with which the proponent agency or office considered project impacts on that environment. Of course, in all sections of the EIA/EIS document, the preparer should refrain from including large amounts of numerical data. Such information can be placed in appendices.

The following paragraphs explain how to relate the information in EICS output to the requirements of the impacts sections of an EIA or EIS (Points 3 through 7).

Probable Environmental Impact (Point 3)

Potential impacts are identified in the matrices (Figure 8). Although both positive and negative impacts will be described in an EIA/EIS, the matrices usually identify only potential detrimental impacts. Ramification Remarks describe the nature and scale of potential negative impacts. The *actual* negative impacts are determined during impact analysis.

It is probable that many positive aspects of a proposed action will have been firmly established during its conception. Within EICS, the Mitigation Statements may indicate some positive impacts. The environment may benefit during mitigation of a particular impact if it or a similar impact was present before the project began. Specifically, activities performed for the new project that are *less environmentally damaging than the methods formerly used* could be said to be beneficial when the new project occurs in an area where military activities have occurred previously. The "Purpose of the Proposed Action" from Point 1 of the EIA/EIS can also indicate positive impacts, usually socioeconomic ones, which can be referenced in this section.

Both direct and indirect impacts will be considered. Direct impacts are shown in the matrices and discussed in the Ramification Remarks; indirect impacts are also considered but may not be specifically indicated. An impact described with one Technical Specialty may actually be a secondary effect of an impact on another Technical Specialty. For example, erosion can affect water quality, and poor water quality can affect floral and faunal communities, human health, and economics. Possible secondary effects of impacts are described for each attribute in the *Attribute Descriptor Package*.

Note that the project activities listed as impactors on the natural and human environment in Point 3 should already have been thoroughly described in the "Summary of Activities" of Point 1-B. Similarly, the "normal" state (before the project) of the various natural and human factors, including ongoing installation operations if applicable, should have been detailed in Point 1-C. (Large amounts of environmental baseline data or lengthy activity descriptions can be placed in supporting appendices.)

The purpose of Point 3 (plus Points 5 through 7) is to describe specific *changes* in the environment (impacts) resulting from the proposed action. These changes may be new, or they may be ongoing impacts which have a relationship to the project (or to current military activities at the site) and which the project will allow to continue.

The attributes of each Technical Specialty include those parameters considered particularly prone to intense public concern. These "Controversial Attributes" can be identified in the *Attribute Descriptor Package* or by the asterisks in the Technical Specialty attribute lists of the computer output (Figure 8). The attribute descriptors and identified impacts for these attributes, plus the related Ramification/Mitigation Statements, will assist the user in identifying and resolving controversial issues.

Although the Land Use Technical Specialty of EICS was designed to address Point 3 impacts, it may also be used for Point 2, "Land Use Relationships."

Alternatives to the Proposed Action (Point 4)

The EICS is an excellent tool for evaluating alternatives and can be used most effectively during the project's early planning. Several acceptable courses of action can be evaluated to determine which alternative will have the least environmental impact. As shown in Figure 7, final selection of the preferred site(s) or alternative for a particular project should be postponed until after impact analysis.

Alternatives discussed in this section may be alternative *projects*, alternative *sites* for the project, or alternative *methods* by which a particular project may be accomplished. To evaluate alternatives involving different *projects* or *sites*, the preparer should obtain review-level EICS output for each alternative and examine the matrices to identify the environmental costs of each. Information about advantages and disadvantages of each alternative can be used in this procedure. Analysis of benefits, costs, and risks will indicate the best choice.

Evaluation of alternative *methods* of accomplishing a project will involve reviewing suitable methods of mitigating the project's impacts. These management alternatives may be alternatives which would require changes in Army policy at the installation level or higher. Mitigation procedures which can (and will) be used during the life of the project without affecting policy would be discussed under Point 5-B.

Probable Adverse Environmental Effects Which Cannot Be Avoided (Point 5)

The EICS Mitigation Statements help identify ways to avoid, eliminate, or reduce adverse impacts. Those mitigation procedures which can and will be implemented during the life of the project (or which are already in effect) can be discussed in part B of this section, leaving unavoidable adverse impacts to be discussed in part A.

Relationship Between Short-Term Uses and Long-Term Productivity (Point 6)

Ramification Remarks and attribute descriptors can help the writer of an environmental assessment distinguish short- and long-term benefits (of the project) from short- and long-term impacts on the environment. Short-term impacts should be well-established in Point 3, "Probable Environmental Impacts"; some of these may be repeated over the long term (as long as the project continues). Other long-term impacts can arise from cumulative effects caused by continuous or repeated activities. The significance of long-term effects can be evaluated by the extent to which future options are foreclosed.

Irreversible and Irretrievable Commitment of Resources (Point 7)

The Energy and Resource Conservation Technical Specialty was developed to assist in addressing this point. Resources such as labor, materials, and fuels are described by attribute descriptors. The Technical Specialty matrix identifies impacts, and Ramification Remarks describe the effects on resources.

5 REAL ESTATE FUNCTIONAL AREA—BASIC ACTIVITIES ASSOCIATED WITH IMPLEMENTING ARMY PROGRAMS (BAAPs)

Introduction

The Real Estate Functional Area encompasses Army activities which deal with the various forms of real estate—land, buildings, and facilities. BAAPs associated with the Real Estate Functional Area are primarily *policy* BAAPs, as opposed to *activity* BAAPs. Specifically, policy BAAPs would include such actions as management decisions to buy land or to realign base operations, while activity BAAPs would include clearing brush or excavating a site. In some instances, policy BAAPs can result in substantially more widespread environmental impacts than activity BAAPs. For example, a policy BAAP to reduce Army expenditures by 30 percent would result in substantial nationwide economic disruption. Conversely, brush clearing from a construction site might have only local watershed implications. In spite of their possible widespread effects, impacts associated with management decisions are often not directly linked to environmentally damaging activities. Consequently, the impacts of policy BAAPs are difficult both to determine and to assess. For this reason, the following pages will discuss potential impacts of activities associated with this FA.

In the Real Estate FA, policy actions tend to invite controversy. It has been established, however, that policy actions on real estate *within* an installation tend to create less controversy than those actions which impact on adjacent public or private lands. Although controversy often develops as a function of community perception of issues, serious impacts may arise without public awareness of all pertinent facts. For example, declaring on-post family housing excess may overload the existing civilian housing stock, community facilities, etc., by forcing military dependents to find shelter in the private sector.

Serious thought should be given to each alternative method (regarding its unique impacts) within the Real Estate FA. Certainly, greater adverse impact (controversy) may arise through acquiring land by condemnation proceedings than through outright purchase. When the Army grants land out for use there are more rigid controls (which limit use intensity/activity through license) than if there is a lease.

The Real Estate FA is divided into three activity types: (1) real estate acquisition, (2) real estate excess, and (3) real estate grant. Each of these three activity types will be addressed individually in the following pages, with examples provided where appropriate.

Discussion of Major Sub-Activities

Real Estate Acquisition

Real estate acquisition is a policy action regulated through statute. The Federal Government has the

inherent power to acquire land for constitutional purposes, though this power can only be exercised at the discretion of Congress and legislative authorization. Authorized Army acquisition of real property and interest therein are shown in the BAAP list (See Table 1, pp 43-45). Real property may be acquired by transfer, donation, purchase, lease, or condemnation if it is established that:

1. The activity to be satisfied is essential to an assigned mission

2. Real property under the control of the Army is inadequate to satisfy the requirement

3. No real property under the control of the Navy, Air Force, or other Federal agency is suitable for use by the Army on a permit or joint use basis.

Several potential impacts are associated with real estate acquisition, including those listed below.

- **Public rights versus private rights (ownership).** Army acquisition of privately owned land and/or facilities for public purposes will virtually always create controversy. Included in this controversy may also be the conflict concerning using of land to its maximum permissible development, one that will bring maximum profit to the owner.

- **Changes in private ownership boundaries.** Whenever possible, land acquisition proceedings should be planned to affect the least number of owners possible. Therefore, the number of private citizens impacted by the transaction is lessened, which in turn reduces the chance of controversy.

- **Encroachment on critical areas within or adjacent to the lands to be acquired.** A number of states have designated various land types within their boundaries as critical areas. The specific definition of critical areas will vary from state to state. However, the acquisition of lands that contain or are adjacent to such critical areas will have greater potential for public concern. In addition to designated critical areas, certain types of lands, such as wetlands, are generally recognized as important from an ecological perspective. The existence of such lands within the borders of an area to be acquired should be carefully considered prior to acquisition.

- **Encroachment on or acquisition of existing public lands within or adjacent to the lands to be acquired.** Army acquisition of land within or adjacent to publicly owned lands may present problems of accessibility and/or use conflicts. For this reason, acquisition of lands that encompass or are adjacent to such areas also requires careful consideration.

- **Reduction of lands on the tax rolls.** Increasing the acres of land under Army ownership could create controversy over taking these lands off the public tax rolls. Historically, public opinion in the United States has been opposed to public ownership of lands due to the subsequent increased tax burden placed on privately owned lands.

- **Changes in existing and/or protected land use patterns in growth.** Army acquisition and use of lands has the potential of either encouraging or discouraging certain types of land uses adjacent to the Army-owned lands. For example, Army acquisition and development of land will often create the need for services that will locate adjacent to the Army-owned property, thereby creating an Army-influenced land use pattern. In some instances, Army activity will discourage certain types of land use, such as residential areas adjacent to firing ranges.

- **Changes in existing and future land values.** For the very reason that Army activities have the potential of changing land use patterns and growth, these same activities can influence existing and/or future land values. For example, land adjacent to the main entrance of an Army installation may be very much in demand for commercial development due to its accessibility to Army personnel. In other instances, Army activity may take land with high land values (such as commercial use), and in turn may render this land most useful for such activities as agriculture and forestry, which traditionally have lower land values.

- **Alteration of existing demographic characteristics.** Demographic characteristics are closely associated with land use activities. For this reason, Army influence over land use activities will influence both existing and/or projected age, sex,

and family formation trends within or adjacent to the acquired land. Such changes in demographic characteristics can either be beneficial or negative, depending on the specific circumstances.

Real Estate Excess (Disposal)

Excess lands or facilities are those items which have no foreseeable requirement to satisfy the Army installation's mission. Army and DOD regulations provide that when the Army determines that real property is excess to its needs (has no foreseeable requirement), a memorandum is sent to the other military departments (Air Force, Navy), to each defense agency, and to the U.S. Coast Guard. The memo advises these agencies of the excess property's availability and describes the property in sufficient detail to permit a reasonable evaluation of need. After a period of 30 days has elapsed without receiving a written notice of a tentative requirement, the holding military department (Army) may proceed with disposal action. Furthermore, if the notice of a tentative requirement is not confirmed within an additional 30 days, disposal action may proceed. Figure 16 outlines the process of real property disposal.

Any land under Army control could be a candidate for classification as excess. With this fact in mind, a comprehensive list of lands and facilities was used as a basis for developing the "Excess" section in the BAAP list (Table 1).

Excessing Army property may simply include removal of some previously used land and/or facilities attached to an existing base. In contrast, it may also include a complete realignment of bases, which could result in a base closure and excessing of all property associated with that base. Impacts associated with each of these actions could be significantly different. For example, a base closure and excessing of all property associated with that base could include the following impacts:

- Losses in direct labor work force
- Losses in local total population
- Changes in the ethnic/racial composition of the community
- Losses in off- and on-base employment within the region
- Losses in the gross regional output
- Losses in direct sales such as retail sales, base procurement awards, and PX/Commissary-bought purchases
- Decreases in local tax revenues
- Disruptions in existing capital improvement programs
- Reductions in contributions to charities within the region
- Decreases in regional bank deposits
- Increases in local housing vacancy rates
- Decreases in public school enrollment
- Decreases in private school enrollment
- Decreases in vocational school and college enrollments in region
- Reduction in medical services to the region

In addition to these impacts associated with base closure, the following potential impacts may result from excessing land and/or facilities:

- **Changes in supply and demand of available housing stock, warehousing, office stocks, and land.** Excessing of either land or facilities has the potential of creating within the community a surplus of that particular item. This surplus, in turn, could result in lowering the price of that particular item within the community or even driving private holders of that item out of business.
- **Conflicts over future ownership.** When land or facilities are declared excess, there are standard procedures which determine who has priority over acquiring the piece of land and/or the facilities in question. Although the primary responsibility for determining what agency will acquire the Army excess land and/or facilities rests with the General Services Administration (GSA), the Army could, by default, be involved in such a controversy. For example, the local community surrounding the base may want a piece of property to be excessed by the Army; however, the local communities do not have the option of acquiring that piece of land until the Department

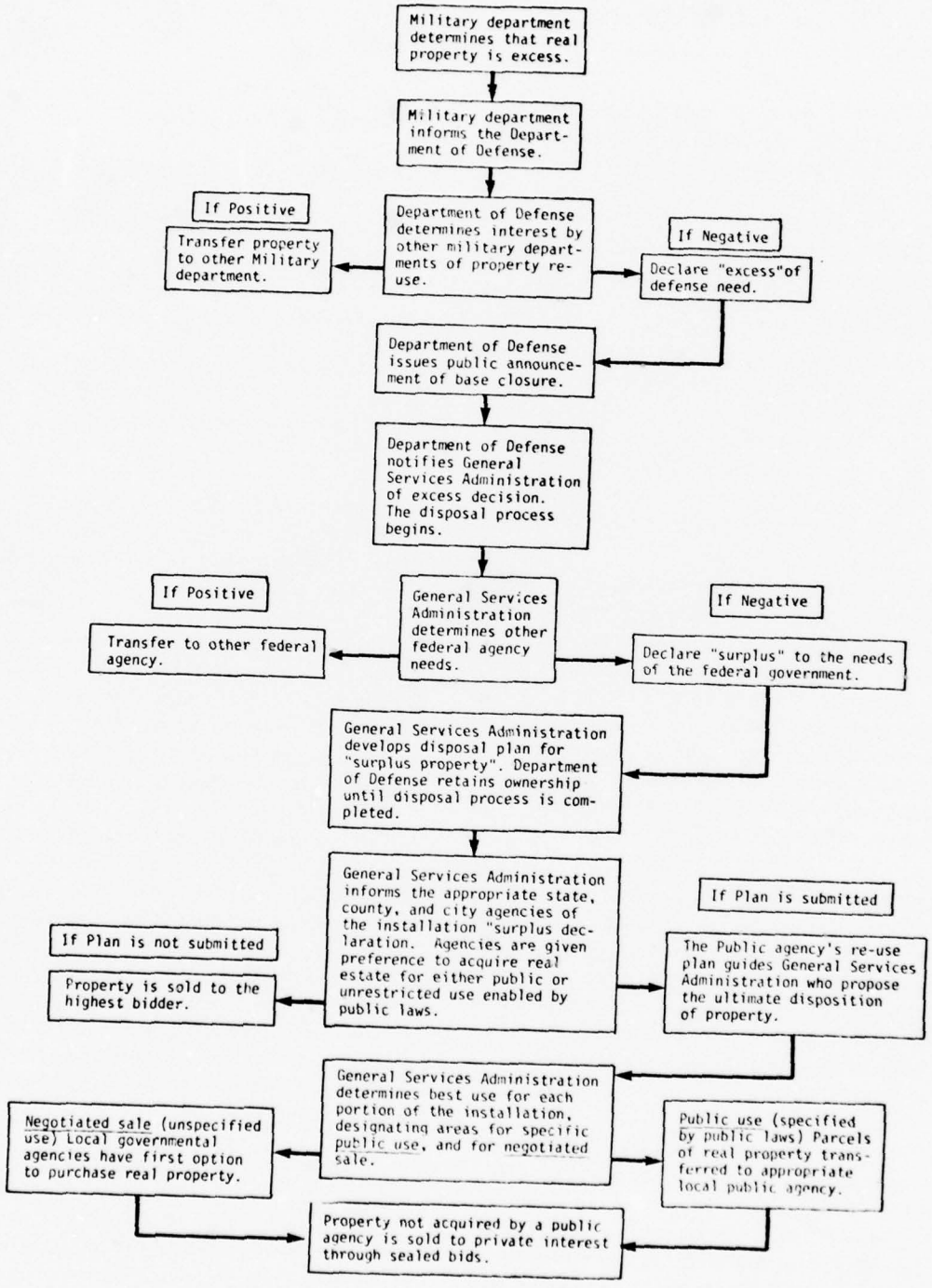


Figure 16. The process of military real property disposal.

of Defense agencies and other Federal agencies have an opportunity to acquire it. It is possible that the Army could find itself indirectly involved in a fight between another Federal agency and the community where the Army facility is located.

- **Cost of preparing land for excess.** Costs are associated with the preparation of virtually any land declared excess for turnover to GSA. The costs could either be economic, environmental, or both. For example, if the property in excess requires demilitarization (for example, a chemical disposal area), the costs involved could be extensive, both economically and environmentally. Specifically the demilitarization of a piece of property such as a chemical disposal area might require destruction of the existing ground cover and a complete treatment of the soil. This action would involve several costs, including the cost of destroying the existing environment as well as the cost of vegetation removal and the cost of treating chemically contaminated soil.

- **Changes in the finance/operations of public facilities.** Excessing of Army land and/or facilities is likely to reduce the need for water, sewage treatment, and electric power. This could result in an improvement in an overburdened subsystem providing these services. Alternatively, such action could leave the community with an overcapacity of these services which would place an additional burden on the community to help finance or operate them efficiently.

Real Estate Grants (Management)

Real Estate grants occur when the use of some form of real estate which is under control of an Army agency is granted to another agency or private party. In this situation, ultimate control is still maintained by the original agency in charge. Real estate grants occur when Army real property is not currently needed but is retained for future use.

Real property for which the Army has no foreseeable requirement is disposed of in accordance with AR 405-90. Real property which the Army does not currently need but which is retained for future use will be made available to others for use either exclusively or concurrently with the Army in accordance with AR 405-80.

The use of Army real estate is granted after efforts have been made to obtain competition for its use through advertising (i.e., public announcements, circulating and posting notices, advertisement in newspapers, and trade journals), as set forth in Army regulations. Notable exceptions to the above procedure are:

1. Granting easements, leases, or licenses to public agencies and public utilities.

2. Granting permits to other Federal agencies.

3. Granting leases or licenses to utility companies having an exclusive franchise in the area for space to attach their electric transmission or communication lines on Government-owned poles.

Responsibility for determining real estate available for non-Army use is the function of the Army Commander, head of a special staff agency, or the Major Command.

Property is made available (grant rights or privileges) to others for use either solely or concurrently with the Army. Grant-use property types and methods are listed under "Grants."

The U.S. Army may want a real estate grant either to obtain land needed for some Army activity, or to allow another Federal agency and/or private party to use Army land for an activity. Under either case (acquiring or giving of land/facilities), both legal and environmental accountability are necessary.

Legal accountability rests chiefly in the use proposed for the land or facilities in question. For example, if the Army leased a land parcel to test explosive devices and later returned this land to the original owner, and an undetected military device later exploded and injured someone, the Army would probably be involved in a liability suit. Similarly, if the Army granted another agency or individual use of some of its land and someone was hurt by a military device, it is quite likely that the Army would become involved in any ensuing litigation.

Environmental accountability, either for giving or for acquiring land, might include the obligation for responsibility for using this land by the individuals to whom the Army has leased it. Alternatively, the Army could find itself responsible for the environmental damage that it does to leased land.

It is suggested that if the Army leases a piece of land for a given activity, the appropriate BAAP for that activity (in the appropriate FA) be referenced to determine the potential environmental damage created by that activity. This should offer some guidance to the potential for environmental damage on leased land.

User Input Requirements

To obtain EICS output for the Real Estate FA, the user must complete Input Form #8 (See Figure 17) and send it to CERL. The following instructions are numbered to correspond with the items to be completed on the input form.

1. **Project Name**

Designate any name or description that does not exceed 75 characters. (Each letter, space, number, or punctuation mark is one character.)

2. **Installation**

Write your installation's name.

3. **Respondent's Name, Address, and Telephone Number**

Supply your *complete* military mailing address, including office or organization symbols. State your commercial telephone number, and add the Autovon or FTS telephone number (indicate which by circling).

4. **Site Number**

One input form should be completed for each site being used for Real Estate activities. Site designation should include consideration of topography, vegetation, usage of the area, and geopolitical features.

In the blank provided, list an arbitrary one-digit number (for your information only) to label the site.

5. **BAAP Subprogram code**

In the blank provided, list the letter corresponding to *one* of the following responses describing the Real Estate activities to be assessed.

a. Activities restricted to the acquisition of land and/or facilities thereupon.

b. Activities involving the excessing of real property.

c. Activities involving the grants to use or to constrict varied land use.

6. **Specific Applicable BAAPS** (See Table 1)

Reference the specific activities to be conducted under the proposed Real Estate action.

7. **Ramifications-Mitigations Texts**

Check (✓) if you wish to receive texts of Ramification Remarks and Mitigation Statements.

8. **Detailed or Review Level**

These terms refer to the depth of information desired. Check (✓) the level you are requesting.

9. ***Date of Request***

Indicate the date that the input was mailed to CERL.

10. **Technical Specialties Requested**

Check (✓) the Technical Specialties for which you wish output.

11. **Answers to Real Estate Filter Questions**

Fill in this matrix with the numbers corresponding to your responses to the Real Estate Filler Questions (See pp 41 through 53). Appendix B provides data which may assist in answering these questions.

12. **(Optional) Cross-Functional Area Selector**

Check the following functional area(s) which you anticipate as a result of the proposed real estate activity. For those area(s) checked, please select the appropriate activity category(ies) listed in Appendix C.

NOTE: If you have questions, call Dr. E. W. Novak or Mr. J. J. Fittipaldi at (Commercial) 217/352-6511, or (FTS) 958-7286.

Technical Specialties/Filter Questions

General

Real Estate is a difficult Functional Area for which to forecast environmental impacts, especially for acquisition and excess actions. Previous use of the land or facilities, proposed use, possible future use, and the relative change in use must all be considered when assessing the impacts of a real estate action. A problem with acquisition actions is that although the future use may be known, specific details may not yet have been developed at the time of environmental impact assessment. These details are important in estimating degree and significance of impact, and sometimes in determining whether there will be any impact at all.

INPUT FORM NO. 8 REAL ESTATE FUNCTIONAL AREA

1. PROJECT NAME: _____
2. INSTALLATION: _____
3. RESPONDENT'S NAME: _____
COMPLETE MILITARY ADDRESS:
_____
_____
_____
_____
COMMERCIAL TEL. NO: _____
FTS OR AUTOVON TEL. NO: _____

4. SITE NO: _____
5. BAAP SUBPROGRAM CODE: _____
6. SPECIFIC APPLICABLE BAAP'S
_____ # _____ # _____ # _____ # _____
7. PRINT RAMIFICATION-MITIGATION TEXT?
YES _____ NO _____
8. DETAILED OR REVIEW LEVEL?
DETAILED _____ REVIEW _____ BOTH _____
9. DATE OF REQUEST _____

10. TECHNICAL SPECIALTIES REQUESTED

ECOLOGY _____
HEALTH & SAFETY _____
AIR QUALITY _____
SURFACE WATER _____
GROUND WATER _____
SOCIOLOGY _____
ECONOMICS _____
EARTH SCIENCE _____
LAND USE _____
NOISE _____
TRANSPORTATION _____
AESTHETICS _____
ENERGY/RES. CONS. _____

11. ANSWERS TO FILTER QUESTION

	Q-1	Q-2	Q-3	Q-4	Q-5
ECOLOGY					
HEALTH & SAFETY					
AIR QUALITY					
SURFACE WATER					
GROUND WATER		0			0
SOCIOLOGY					
ECONOMICS					
EARTH SCIENCE					
LAND USE					
NOISE					
TRANSPORTATION					
AESTHETICS					
ENERGY/RES. CONS.					

12. (OPTIONAL) CROSS FUNCTIONAL AREA SELECTOR

☐ CONSTRUCTION _____
☐ MISSION CHANGE _____
☐ OPERATIONS & MAINTENANCE _____
☐ TRAINING _____
☐ INDUSTRIAL _____
☐ RDTE _____

Figure 17. Real estate input form.

Table 1
Real Estate Activities

10 Real Estate Acquisition

11 Lands: Military Construction (donation, purchase, exchange of Government-owned lands)*

12 Lands: Armed Forces Reserve Facilities (purchase, lease, or transfer)

13 Housing, existing (purchase, donation, condemnation, or transfer)

14 Private buildings or facilities: School, hospital, library, museum, cemetary, other (gift, devise)

15 Federal buildings and/or lands (transfer from DOD agencies, transfer from General Services Administration)

16 Public Domain Lands (permit, lease, fee transfer, or purchase)

17 National Forest Lands (exchange without reimbursement)

18 National Cemeteries (purchase)

19 Lands: Production of Nitrates/Munitions (lease, purchase, condemnation, or gift)

21 Lands: Production of Lumber/Timber Products (condemnation, purchase, donation)

22 Liquid Fuel Facilities (purchase)

23 Non-government Land (easement, license, lease, donation, purchase, condemnation)

24 Lands: fortifications (donation)

25 Lands: coast defenses (donation)

26 Lands: military training camps (donation)

27 Lands: camp power facilities (donation)

28 Lands: permanent mobilization (donation)

29 Lands: training or supply stations (donation)

100 Real Estate Excess

110 Operational Facilities

111 Airfield Pavements

112 Liquid Fuel Dispensing Facilities [(limited storage)] **

113 Liquid Fuel and Nonpropellant Storage [(fuel, oil, lubricants, etc.)]

114 Communications, Navigational Aids, and Airfield Lighting [(communications center, transmitter building, antenna pole and wire, flight tower, instrument landing system, airfield lighting)]

115 Land Operational Facilities [(airfield operational buildings, missile launching and storage shelters, PX and craft shop, battalion headquarters building, aircraft revetment, blast deflector facility, radar tower)]

116 Waterfront Operations Facilities [(piers, wharfs, sea walls, gun emplacements, moorings, breakwaters, dredging)]

117 Harbor and Coastal Facilities

118 Maintenance [(aircraft maintenance hangars, missile assembly and test building, motor repair shops, tank repair shops, weapons maintenance shops)]

119 Production [(aircraft, vehicle, and ship plants, weapons and ammunitions plant, electronics and communication plants)]

121 Research, Development, and Test Facilities [(buildings, test tracks, etc.)]

122 Research, Development, and Test—Other

130 Training Facilities

131 Classrooms

---

*( ) denote alternative methods of accomplishment.

**[( )] denotes alternate items.

Table 1 (cont'd)

132	Range or Target House
133	Gas Chamber
134	Weapons Ranges
140	Supply Facilities
141	Ammunition Storage [(open, covered, cold)]
142	Cold Storage [(perishables)]
143	Storage–Covered [(warehouses, bunkers)]
144	Storage–Open [(pavement, gravel, unpaved)]
150	Hospital and Medical Facilities
151	Hospital Buildings
152	Dispensaries (includes pharmacy)
153	Dispensaries With Beds
154	Laboratories and Clinics
160	Administrative Facilities
161	Administrative Buildings [(post headquarters buildings, division headquarters buildings, engineer, ordnance, signal, supply service, administration buildings)]
162	Administrative Structure Underground
163	Administrative Structure–Other Than Buildings, Flagpole, Facility Signs, Monument
170	Housing and Community Facilities
171	Family Housing
172	Bachelor Housing
173	Community Facilities–Personnel
174	Recreational–Interior, Community Facilities–Morale, Welfare [(bank, bowling center, post chapel, commissary, automotive self-help garage, library, open mess-NCO and officer, post office, indoor swimming pool, theater, etc.)]
175	Recreational–Exterior, Community Facilities–Morale, and Welfare [(multi-purpose courts, baseball and football fields, outdoor swimming pool, golf course)]
180	Utilities and Ground Improvements
181	Electric Power Facilities
182	Heat and Refrigeration [(air conditioning)]
183	Sewage and Waste Treatment Facilities
184	Water Supply Facilities
185	Roads and Streets
186	Railroad Tracks
187	Ground Improvements, Fencing
188	Fire and Other Alarm Systems
191	Land, Unimproved
192	Other Rights, Easements, Army Use, and Leases (air navigational rights, joint use)
200	**Real Estate Grant*** **
201	Use Power Lines and Com Fac [(easement or right-of-way)]
202	Construct Power Lines and Com Fac [(easement or right-of-way)]

***First in series refers to grant right to use the existing facility.
Second in series refers to grant right to develop for future use.

Table 1 (cont'd)

203 Use Elec/Com Substations [(electric power lines, telephone, telegraph lines) (easement or right-of-way)]

204 Construct Elec/Com Substations [(electric power lines, telephone, telegraph lines)] (easement or right-of-way)]

205 Use Pipelines [(gas, water, sewer)] (easement or right-of-way)

206 Lay Pipelines [(gas, water, sewer)] (easement or right-of-way)

207 Use Pumping Station [(gas, water, sewer, and oil pipelines)] (easement or right-of-way)

208 Construct Pumping Stations [(gas, water, sewer, and oil pipelines)] (easement or right-of-way)

209 Use Canals (easement or right-of-way)

211 Build Canals (easement or right-of-way)

212 Use Ditches (easement or right-of-way)

213 Dig Ditches (easement or right-of-way)

214 Use Flumes (easement or right-of-way)

215 Develop Flumes (easement or right-of-way)

216 Use Dams and Reservoirs (easement or right-of-way)

217 Construct Dams and Reservoirs (easement or right-of-way)

218 Use Roads and Streets (easement or right-of-way)

219 Construct Roads and Streets (easement or right-of-way)

221 Use Railroad Tracks (easement or right-of-way)

222 Construct Railroad Tracks (easement or right-of-way)

223 Use Tunnels (easement or right-of-way)

224 Construct Tunnels (easement or right-of-way)

225 Use Ferries (easement or right-of-way)

226 Develop Ferries and Facilities (easement or right-of-way)

227 Use Bridges (easement or right-of-way)

228 Construct Bridges (easement or right-of-way)

229 Livestock Passage (easement or right-of-way)

231 Crops (lease)

232 Grazing (lease)

233 Mineral Extraction (lease)

234 Mineral Exploration (license)

235 Gravel/Borrow Material Removal (license)

236 Fill Material Deposit on Marsh (license)

237 Archaeological Excavations (license)

238 Treasure Search (license)

239 ROTC Use of Army Reserve Centers (license)

241 Civic Use of Army Reserve Centers (license)

242 Red Cross Use (license)

243 State Use, Land/Fac for National Guard (license)

244 Trailer Sites (lease)

245 Post Office, Banking, Credit Union Sites (lease)

246 Timber Harvest (sale)

Possible types of impacts for acquisitions as listed in the Ramification Remarks result from construction of new facilities, from future uses of such facilities (particularly when the future uses might involve release of air or water pollutants), and from the use of land acquired for field activities. Two significant factors determine the presence of impacts when land is being acquired: (1) previous use and condition of the land (industrial, commercial, residential, and other development; agricultural; underdeveloped; wilderness), and (2) the degree to which the Army will intensify use of the land (percent increase in foot or vehicle traffic, noise, pollution, etc.). Further information on future impacts should be obtained by accessing the other EICS FAs.

Forecasting the impacts resulting from excessing actions is even more difficult than for acquisition actions, especially when the action is an excess of developed lands or buildings. The assessor should consider possible future uses, but only very generally since future use is likely to be totally unknown. Furthermore, actions of future owners, rather than the Army action in itself, will cause direct impacts; therefore, the Army contributes only indirectly to those possible impacts. Suggested impacts in the Ramification Remarks for this section are therefore *strictly* suggestions regarding these possible indirect impacts, and scores for these BAAPs (110-192) are for the indirect effects and based on "worst case" assumptions. (In fact, future uses may be less environmentally significant than Army use.) Appendix A characterizes the typical re-uses of surplus military property.

Since the Army has no control over future uses of the land or the facilities being excessed, the only way it could mitigate possible future impacts would be by retaining the land. And even this might not be a mitigation if the new land use contributed more pollution than the previous one. From a public relations standpoint, of course, the Army may well have an interest in future uses or misuses of former Army facilities or land.

Estimating impacts of excessing actions may be relatively easy when land, rather than (or in addition to) facilities, is being excessed. This is discussed for BAAPs 122 (R&D—field test ranges), 134 (Training—weapons ranges), and 191 ("Unimproved Land"). Relatively unimproved Army lands may often receive intensified use if they reach the public sector. Particularly when the land is located in a corridor between or adjacent to developed areas, industrial, commercial, or residential development may be encouraged because of the land's relatively low cost. Impacts caused by construction and development can be discussed in such cases by the assessor of the excess action.

An exception to this intensive use generation would be in the case of demilitarized impact zones or chemical test areas. Conversion of such land will probably not be to any use more intense than livestock grazing. In this case, impacts compared to past use would not be more intense, just different, and could be estimated by means of some of the BAAPs in the Grants section of the Functional Area, such as 229—Livestock Passage and 232—Grazing. "Use" BAAPs, such as 218—Use Roads and Streets might also be applicable.

One mitigation suggestion given in the Excess section would be a matter for policy decision at some level higher than that of the assessment preparer. It would be used in cases where a facility was being excessed in which pollution control measures (such as fume hoods in chemical labs) were currently inadequate, and in which such controls should be improved by any new owner. In this kind of situation, the Army could prepare a document which would be attached to any other documents pertaining to the facility for forwarded to GSA prior to its ultimate disposal, and which would be available to any potential new owner. The document would discuss the particular pollution controls (or lack of them), the reasons for their inadequacy, and the means by which such inadequacy could be corrected should the new owner use the facility in ways which could produce similar kinds of pollution.

Assessing impacts of real estate grants will be much simpler than for the others, since the future use will be known. Also, since the property will not be changing hands, the Army can legally enforce impact mitigation measures through grant contract provisions or by denying grants in certain sections of the installation.

Real Estate/Ecology—Introduction

In both the Acquisition and the Grants sections of the Real Estate FA, field surveys or other means of determining "relative ecological importance" or "areas of high ecological importance" are mentioned in both the Ramification Remarks and the Mitigation Statements. What is required is a subjective rating which compares various habitat types on the installation and in surrounding counties and which is based on observation by a qualified expert. The installation wildlife officer, forester, or environmental officer may have received formal training in the biological sciences and

may be qualified to conduct such a survey. Local university biology departments may be sources of available specialists. State and Federal agencies which administer environmental or related programs will often supply biologists, ecologists, soils experts, or wildlife experts for a day or two for no charge as a public service. Detailed studies requiring longer periods of field work as well as specific funding are desirable, and they may be required for preparation for a formal EIS. But for preparation of an EIA and for environmental decision-making at any time, a subjective ranking by survey (2- to 3-day), if performed by a *qualified, disinterested* party, will be sufficient for determining areas which should receive greater protection from pollution, construction, field activities, etc. An exception is the presence of threatened or endangered species, which may not be discovered in some cases without a much more thorough field investigation.

Another useful (and related) type of information to have available during impact assessment and environmental planning is the extent of "natural areas" within and near the installation. "Natural area" can be defined as any area covered with natural, though not necessarily native plants, and which serves as wildlife habitat. This would include forests, nonagricultural prairie or plains areas, tundras, abandoned fields which were last plowed or mowed 2 or more years ago, unoccupied deserts, and areas maintained in a relatively natural state for recreational, training, or testing purposes. Installation sites or other types of little-used buildings might also be classified as "natural areas." In general, the more restricted such an area is in terms of human activity, the more "natural" it is. A visit to the site will determine the presence of such areas, and installation maps can help determine their extent. Guidance can be obtained from the base wildlife officer, forester, agronomist, entomologist, and/or environmental officer, or from environmental scientists employed by some of the agencies listed as references helpful in the assessment process.

Filter Questions–Ecology

ANSWER QUESTIONS 1 AND 2 IF ANY ACQUISITION IS BEING CONSIDERED AS PART OF THIS ENVIRONMENTAL ASSESSMENT.

1. Does any land being acquired contain any "natural" areas (forest, grassland, marsh, etc.)?

(1) Yes
(2) No
(3) Don't know

2. Will any buildings, roads, or other structures be constructed on the acquired land?

(1) Yes
(2) No
(3) Don't know

ANSWER QUESTION 3 IF ANY EXCESSING IS BEING CONSIDERED AS PART OF THIS ENVIRONMENTAL ASSESSMENT.

3. Are any buildings, roads, or other structural facilities (as opposed to lands) being excessed?

(1) Yes
(2) No

ANSWER QUESTIONS 4 AND 5 IF ANY GRANT ACTION IS BEING CONSIDERED AS PART OF THIS ENVIRONMENTAL ASSESSMENT.

4. Will any construction occur or be authorized as a result of the grant?

(1) Yes
(2) No

5. Will any excavation occur or be authorized as a result of the grant?

(1) Yes
(2) No

Real Estate/Health and Safety—Introduction

Real estate acquisition, excess, grants, and leases, generally have no health impact in and of themselves. The potential impact of the overall decision, however, must be considered before the time the real estate action is decided.

In acquisition, taking land or facilities out of their current use may cause a health impact. The Army's planned use of the land or facilities may also involve a health impact. The latter can be estimated best by examining the appropriate FAs (Construction, O&M, Training, etc.) at the review level. Separate impact statements may be required for construction, operation, and later uses, but these must all be considered to at least a limited extent. In real estate excess, some potential health effects may be associated with removal of the military facility (e.g., a military hospital may have provided some medical services to the local community), but the major consideration will be the potential impact of the expected future use. This, of course, may not even be known at the time of excess, and in any event, sufficient detail for a thorough impact analysis will not be available. Nonetheless, the

potential health and safety problems of the general expected use and of the suitability of the site for that use can be estimated.

In the case of grants, licenses, etc., the main consideration is that the Army may be taking on the responsibility (or at least a share of it) for the environmental health consequences of the actions of others. Extra care must be taken when granting such rights, since the Army will not usually directly control the facility's operation.

Filter Questions—Health and Safety

ANSWER QUESTION 1 ONLY IF YOUR REAL ESTATE ACTION IS TO EXCESS.

1. For real estate excess, is the anticipated use of the facility similar to the current or intended Army use?

(1) Yes
(2) No
(3) Don't know

Real Estate/Air Quality—Introduction

The impacts on air quality associated with real estate transactions are rarely direct. Rather, the impacts result from the use of the property after the transaction has been completed.

When trying to identify impacts that might occur because of a real estate action, one must begin by trying to speculate on how the real estate might be used after the transaction has been completed. In many cases, the primary activities that might impact air quality are the construction or demolition of structures on the real estate property. If buildings which currently occupy the land are demolished, then the method of demolition and the disposal of waste products can present problems. For example, if a building is razed by burning, or if the waste material is incinerated, then the air quality may be negatively impacted. Therefore, incineration of any kind should be avoided.

Temporary unpaved construction roads can also cause problems. The fugitive dust which is emitted when trucks traverse these roads can be excessive. If this is the case, one can expect nuisance complaints from local authorities. The method for dealing with this problem is to regularly apply water on a case-by-case basis to the temporary roads. Fugitive dust can also become a problem if large buildings are razed in an urban setting. These problems can be dealt with by enclosing the structure (where practical) during demolition.

For a setting such as the construction of a large metropolitan-type complex in a previously sparsely populated area, the number of cars and power-producing facilities will probably increase substantially. If this is the case, the level of particulates, sulfur oxides, oxides of nitrogen, carbon monoxide, photochemical oxidants, and hydrocarbons can be expected to increase. Conversely, if the number of people inhabiting a particular piece of real estate is reduced drastically, the level of these pollutants will be lowered dramatically. This, of course, would have a positive effect on the air quality.

For those activities which are very likely to cause air pollution, such as the construction or demolition of buildings, the user is referred to the appropriate sections of the impact assessment associated with construction. If the property use is not known, the user should investigate if the Army has any similar existing land use. If so, there will be impact assessment procedures for that activity. For those land uses which are foreign to the Army, the user should seek additional aid (e.g., from CERL).

As noted above, the assessment of the impact of a real estate action on air quality is dependent on how the property will be used *after* the transaction. Therefore, it is imperative that the user obtain as much information as possible on how it is expected to be used. Information on real estate action can be obtained by contacting the installation master planner, who can discuss the expected use of the property.

Filter Question—Air Quality

1. Is there going to be any incineration associated with the use of the real estate either for demolition of existing buildings, waste products and the like, or as a part of the proposed use of the real estate?

(1) Yes
(2) No

Real Estate/Water Quality—Introduction

The actual act of acquiring, excessing, or granting real estate and rights-of-way has no immediate impact on surface and ground water. However, the secondary effects of these acts have significant potential for impact. Thus, careful consideration of possible effects on ground and surface water must be included in the real estate decision-making procedure, and should be reflected in real estate contracts.

The need for considering the potential impacts may be briefly illustrated for the three major real estate procedures. When acquiring land for certain uses, there may be particular land characteristics that are desirable for avoiding or minimizing impacts on ground and/or surface water. For example, purchase of property adjacent to a stream having a limited capacity for receiving wastewater could result in more stringent and expensive wastewater treatment requirements. Other, less obvious characteristics such as the position of the ground water table could render particular real estate quite unsuitable for certain military activities. If precautionary measures are necessary to avoid or minimize impacts of military activities at a particular site, then the costs of those measures should be a consideration in site selection.

To avoid or minimize impacts on surface and ground water in excessing or granting real estate, either the future use of the property may need to be restricted, or certain precautionary measures may be necessary. In such cases, the sales, lease, or grant contract should include provisions to require the new users to exercise their rights in a manner compatible with good water quality control practices. Examples of such prohibitions or restrictions include limitations on ground water extraction rates, controls on clearing of vegetation, and banning of landfilling or certain types of industrial activities.

A scenario may be conceived by which almost any Real Estate BAAP could lead to an impact on almost any attribute of the water environment. Thus, in evaluating the possible effects of real estate activities, emphasis was placed on guiding policy decisions rather than on attempting to contemplate the various conceivable secondary effects in extreme detail. Information on possible secondary effects of activities associated with specific real estate transactions must be sought by referring to appropriate BAAPs in other FAs and/or by consulting with appropriate authorities. Water Quality Filter questions will be broken down into two areas—surface water and ground water.

Filter Questions—Surface Water

1. For grants, which of the following uses will not be made of any dam and reservoir?

   (1) Recreation (swimming, boating, etc.)
   (2) Water supply (domestic or industrial) or irrigation
   (3) Power generation
   (4) No dam or reservoir grants are being considered

2. Will the granting of this right result in an actual increase in loading on the facilities (as opposed to conversion of all or part of existing loading from military to nonmilitary status)?

   (1) Yes
   (2) No, or no grants are involved in this action.

3. Will the cropland be irrigated?

   (1) Yes, with surface water
   (2) Yes, with groundwater
   (3) No, or no crop grants are involved in this project.

4. Does any proposed real estate grant for gravel or borrow material involve a comparatively minor (less than 10 percent) enlargement of an existing gravel or borrow pit?

   (1) Yes
   (2) No
   (3) No grants or borrow pits are involved.

5. Is the slope of all land involved in the activity less than 2 percent, and is the site located more than 1 kilometer from a flowing stream?

   (1) Yes
   (2) No

Filter Questions—Groundwater

1. For grants, which of the following uses will not be made of any dam and reservoir?

   (1) Recreation (swimming, boating, etc.)
   (2) Water supply (domestic or industrial) or irrigation
   (3) Power generation
   (4) No dam or reservoir grants are being considered

3. Will the cropland be irrigated?

   (1) Yes, with surface water
   (2) Yes, with groundwater
   (3) No, or no crop grants are involved in this project.

4. Does any proposed real estate grant for gravel or borrow material involve a comparatively minor (less than 10 percent) enlargement of an existing gravel or borrow pit?

   (1) Yes
   (2) No

Real Estate/Sociology Introduction

Army real estate actions may create controversy in a

local community. For this reason, it is important that Army real estate decisions consider the possible effects of said decisions on local community members. Coordination of installation operations with civilian activities is extremely important for maintaining a cooperative relationship with neighboring communities. Effective preparation for avoiding environmental impact requires some coordinated plans that will anticipate emergent situations and allocate resources effectively with minimal disruption to established relationships between the installation and host communities.

There are no Real Estate filter questions for the Sociology Technical Specialty.

Real Estate/Economics–Introduction

The EICS approach to the economic aspects of real estate actions is general. It is difficult, and at times impossible, to evaluate the economic effects of a real estate activity on a region until its details are known. Generally, the acquisition of real estate has the potential to cause more economic problems than the release of real estate for use by the local private and public sectors.

The items most likely to be impacted by real estate activities are property values and tax revenues. However, the user must be aware that real estate activities are often undertaken in conjunction with some other level of activity, such as a mission change. The impacts of these actions must be addressed simultaneously.

There are no Real Estate filter questions for the Economics Technical Specialty.

Real Estate/Earth Science–Introduction

In the Real Estate FA, each action can be considered a policy BAAP rather than an activity BAAP. While a policy decision will not impact Earth Science attributes directly, it may cause considerable secondary and tertiary impacts. (These impacts are not secondary or tertiary in respect to their importance, however.) Therefore, the Real Estate–Earth Science matrix was scored considering future use of the lands or facilities which would generate the greatest impacts.

Real estate acquisition may require construction of some structure or facility once the land has been acquired. Real estate excess may require demolition, remodeling, or additional construction before or after the land and/or facilities have been disposed. Many real estate grants will involve construction or increased use of a facility. These were the activities considered when scoring the matrix.

It should be understood that the above activities will create the greatest impacts on Earth Science attributes. Therefore, most of these BAAPs were scored relatively high. Careful and thoughtful consideration should be given to each of the filter questions in order to obtain the appropriate and most accurate examination of impacts involved in real estate actions.

Construction or demolition will generally require vehicular movement over unpaved ground. It may also require excavation or removal of top soil. These activities compact soil and disturb soil horizons. Along with the removal of vegetation and ground cover, this will increase the amount of water runoff from precipitation. All of these factors will increase the potential for additional water and wind erosion. If there is substantial runoff and erosion over a large area for a considerable length of time, there may be an impact both on the local relief and the hydrologic regime. This occurs when local stream velocities and sediment loads are increased. These factors increase bank erosion and siltation rates.

Blasting, pile driving, or tunneling during construction or demolition will create subsurface vibrations. These vibrations may fracture bedrock or be transmitted through bedrock and damage adjacent man-made structures. In areas of considerable slope and where soil or rock strata are unstable, these vibrations may set in motion gravity mass wasting in the forms of landslides or avalanches. In conjunction with saturated soil when ground cover is removed, slower forms of mass wasting, such as soil creep or slump, may also be set in motion by these vibrations.

Site-specific investigations would provide the most valuable information to assess impacts and develop mitigation procedures relating to earth science processes. Many installations have local bore data from past projects. The Soil Conservation Service (SCS) and the U.S. Geological Survey (USGS) have conducted many surveys and can usually provide invaluable information for site-specific investigations. State and local SCS offices and state geological surveys can provide this information in much greater detail. University earth science, geology, and geography departments or their equivalent may also be able to provide useful information.

Consultation with these sources can also be valuable in developing mitigation procedures. The impacts of ground cover removal and erosion can be mitigated by following procedures in accordance with TM-5-630, *Repairs and Utilities: Ground Maintenance and Land Management*. The impacts of mineral extraction and processing can be mitigated by consulting with the U.S. Bureau of Mines and by adhering to the many Federal and state reclamation laws. Consult the Computer-Aided Environmental Legislative Data System (CELDS) for information concerning pertinent legislation.[14] In addition, many mitigation procedures can be written into the terms of the contract for a grant, lease, or license.

Filter Questions—Earth Science

1. If any of the following activities are to be undertaken before or following the proposed action, answer "Yes" to this question. If none of the activities are to be undertaken, answer "No."

   a. Use of explosives for any proposed excavation on the site
   b. Pile driving activities during any proposed construction on the site
   c. Tunneling or excavation through bedrock on the site
   d. Use of explosives or demolition of any structure on the site.

   (1) Yes
   (2) No
   (3) Do not know

2. If the lands/facilities involved in the action are located in any of the following areas, answer this question "Yes."

   a. An area with a slope greater than 11 percent.
   b. An area where U.S. Soil Conservation Service has made a soil survey and has determined that the soils are unstable.
   c. An area where the U.S. Geological Survey has made a survey and has determined that the area is geologically unstable.

   (1) Yes
   (2) No
   (3) Do not know

3. Will excess of land/facilities require demolition of existing man-made structures before or after the proposed action?

   (1) Yes
   (2) No, or the action does not involve excessing
   (3) Do not know

4. If the proposed or future use of the lands/facilities to be acquired, excessed, leased, etc., is known and any of the following statements are true, answer "Yes" to this question. If the proposed or future use of the lands/facilities is not known, answer "Do not know" to this question.

   a. The lands'/facilities' proposed use will increase vehicular or pedestrian movement on unpaved ground.
   b. The lands'/facilities' proposed use will require additional construction or demolition.

   (1) Yes
   (2) No
   (3) Do not know

Real Estate/Land Use—Introduction

Decisions to acquire, excess, or grant real estate have direct land use impacts. Sound, well-planned decisions which generate specific, detailed activities or development can avoid or greatly reduce adverse impacts. The most typical impacts which real estate activities induce are:

1. Incompatibility on post
2. Induced land use change
3. Consumption of fragile land

There are no filter questions for the Land Use technical specialties.

Real Estate/Noise—Introduction

By virtue of its comprehensiveness, the Real Estate FA includes all other FAs. Therefore, the evaluation of real estate entails the examination of all other FAs.

Noise is an integral part of all three activity types: real estate acquisition, real estate excessing, and real estate granting. Although the Army plays different roles in each of these three activity types, they either impact or are potentially impacted by environmental noise.

It is imperative to thoroughly understand real estate activities and the legal responsibilities when nonmili-

[14] R. L. Welsh, *User Manual for the Computer-Aided Environmental Legislative Data System*, Technical Report E-78/ADA019018 (CERL, November 1975).

tary parties are involved. The Army is subject to environmental regulations promulgated by municipal and state government, including noise provisions. Such provisions can be advantageous to the Army by restricting incompatible non-military land use development that could encroach on the Army installation, thereby adversely affecting the Army mission.

The Army has an obligation to integrate real estate actions into its planning process, and this includes examining a property's future use. This long-range plan must also be cognizant of long-term potential for noise and its need for control. A comprehensive listing of ramifications and mitigations must be thoroughly evaluated at a policy level before solutions are determined.

There are no filter questions for the Noise Technical Specialty.

Real Estate/Transportation–Introduction

Transportation impacts resulting from real estate actions fall into two main categories: (1) impacts on the use or performance of an existing transportation system, and (2) the addition or deletion of elements of a transportation system such as a section of roadway, an airfield, or maintenance and support facilities. In either case, public transportation authorities (such as local traffic engineers and transportation agencies, the airport authority, and the harbor authority) should be contacted so that mitigation actions can be implemented so as to avoid serious disruption to existing public systems. In particular, traffic volume changes anticipated from any Army real estate action should be identified and disseminated to local transportation authorities.

Filter Questions–Transportation

1. Which of the transportation systems listed below might be directly affected by the real estate action?

(1) Roadways and roadway traffic
(2) Railways and railway traffic
(3) Airfields and air traffic
(4) Waterways and water transport
(5) Offroad traffic (trailbikes and landrovers)
(6) None of the above

2. Will access to or through the property be desirable for recreation or sightseeing purposes?

(1) Yes
(2) No

3. Traffic volume on roadways leading to the facility is currently:

(1) At capacity
(2) Under capacity
(3) Neither of the above

Real Estate/Aesthetics–Introduction

Most aesthetic impacts resulting from actions to acquire, excess, or grant real estate are contingent on what ultimately happens to the property after the action has occurred. For example, the action of purchasing land for building family housing would have fewer aesthetic ramifications than the actual siting, design, construction, and operation of the housing units. Instead, the aesthetic issues of concern to the act of acquiring the land would be where or what land is acquired. If, for example, the parcel of property or structure being considered is not adjacent to an existing Army development, or in some way introduces a new land use activity to the area, the overall design character and environmental amenities of the area may be affected. Likewise, granting the use of Army property that is not compatible with existing land uses in the area could result in aesthetic impacts (e.g., the addition of utility lines in an unmarked natural area).

In addition to compatibility, another criterion for determining the aesthetic impacts of real estate policy action would be whether or not the action might serve to induce other development actions that may have more profound impacts than the original action. An example would be granting the right to build a roadway through Army property where access to property on the other side may have been difficult or prohibitive before. Without stringent land use controls, the aesthetic characteristics of the property along the right-ofway could be altered considerably by inducing development such as a commercial strip.

In summary, the issue of most concern in Real Estate FA is not so much the policy action itself, but rather what that policy action facilitates in terms of specific activities or developments. The two primary criteria for evaluating real estate actions would then be: (1) whether or not the use of the real estate being acquired, excessed, or granted would be *compatible* with the aesthetic character of the existing area surrounding the parcel in question, and (2) whether or not other developments likely to be *induced* by the action would be compatible. Since there is no way to predict what might ultimately happen to land excessed by the

Army, it is recommended that local city and county (perhaps regional) planning agencies in the area be contacted prior to excessing action to insure the development of land use controls for future land use compatibility and protection of aesthetic resources.

Filter Questions—Aesthetics

1. Is the land or facility being acquired, excessed, or granted easily visible from one of the following:

   (1) A public roadway,
   A park or recreation area,
   A residential development.
   (2) None of the above, it is not visible by the public.

2. Are there other similar land uses or facilities in the area surrounding the parcel being acquired, excessed, or granted?

   (1) Yes
   (2) No

Real Estate/Energy and Resource Conservation—Introduction

Real estate activities may have many impacts on Energy and Resource conservation attributes, depending on the type and magnitude of the transaction involved. Effects on renewable resources (air, water, animal life, etc.) would accompany most actions as the land is modified or used in some manner. The severity of these impacts would depend on the type and extent of the resources existing on the property and the extent to which modifications are made. New construction would be a prime example of a significant change.

When facilities are excessed, consideration should be given to the potential future use of the property. Continued use of buildings or other structures may consume significant amounts of energy for heating and cooling. Often the structures in question may be lacking in insulation, resulting in excessive energy loss for future applications. Demolition of structures may be desirable; however, the structures should be analyzed for material content that could warrant recycle or reuse.

More specific information on impacts on energy and resource conservation may be best obtained by referring to specific activities in other FAs which more accurately describe the details of the activities involved in the real estate transaction and subsequent actions.

Filter Questions—Energy and Resource Conservation

Answer the following questions for real estate excess or grants:

1. Which response best describes the general vicinity of the real estate in question?

   (1) Built-up area (buildings and grounds that are maintained on a continuing basis)
   (2) Forest or grasslands (supporting natural vegetation and wildlife)
   (3) Cropland
   (4) Any combination of the above

2. Does runoff from the property enter any ocean, estuary, salt marsh, or tidal flat within 8000 meters (about 5 miles) of the site?

   (1) Yes
   (2) No

Answer the following question for real estate excess:

3. Are recyclable materials (metals, building material, etc.) to be reclaimed or reused from the structures to be demolished?

   (1) Yes
   (2) No
   (3) No structures are to be demolished.

6 SUMMARY AND RECOMMENDATIONS

This manual has provided guidance for using the Real Estate Functional Area of the Environmental Impact Computer System (EICS).

It is recommended that the EICS be used in conjunction with DA Pamphlet 200-1, *Handbook for Environmental Impact Analysis*, and other Army command guidance. For minor projects, DA Pamphlet 200-1 may be all that is needed. For major Army projects or actions, the EICS should provide a comprehensive and cost-effective technique for addressing the NEPA and CEQ requirements.

REFERENCES

Council on Environmental Quality, "Proposed Regulations Under National Environmental Policy Act,"

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The Economic Impact Forecast System: Description and User Instructions, DA PAM 200-2 (Department of the Army, December 1976).

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Historic Preservation: Administrative Procedures, TM 5-801-1 (Department of the Army, 1 November 1975).

Lacey, R. M., H. E. Balbach, and J. J. Fittipaldi, *Compendium of Administrators of Land Use and Related Programs*, Technical Report N-40/ADA057226 (CERL, July 1978).

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Riggins, R., and E. Novak, *Computer-Aided Environmental Impact Analysis for Mission Change, Operations and Maintenance, and Training Activities: User Manual*, Technical Report E-85/ADA022698 (CERL, February 1976).

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Welsh, R. L., *User Manual for the Computer-Aided Environmental Legislative Data System*, Technical Report E-78/ADA019018 (CERL, November 1975).

APPENDIX A: DEFINITION OF TERMS AND SUMMARY OF ADAPTED USES OF SURPLUS MILITARY FACILITIES

DEFINITIONS OF TERMS

acquisition – The act of obtaining real property by any method.

condemnation – The process by which property of a private owner is taken for public use, without his consent, but upon the award and payment of just compensation.

contract – A promissary agreement between two or more persons that creates, modifies, or destroys a legal relation.

devise – A gift of real property by the last will and testament of the donor.

donation – A transfer of property without consideration–sometimes subject to revocation if not used for the purpose it was donated.

disposal – Any authorized method of permanently divesting the Federal government of control of real estate.

easement – An acquired right of use, interest, or privilege (short of ownership) in lands owned by another, such as a utility easement or right-of-way. Easements are often used by highway departments because they entail smaller payments than would be required for outright purchase. They may be permanent or limited in time, depending on the agreement.

excess property – Any property under the control of any Federal agency (Army) which the head of the agency determines is not required for the needs and the discharge of the responsibilities of the agency.

exchange – Exchange is a contract by which the parties mutually agree to exchange real property usually based on fair market value.

gift – A voluntary conveyance of land without consideration.

real property – Includes land and interests therein, leaseholds, standing timber, building, and improvements owned by the United States and under control of the Department of the Army. It also includes piers, docks, warehouses, rights-of-way, and easements, whether temporary or permanent, plus improvements permanently attached to these items and ordinarily considered real estate.

right-of-way – The right of passage by any means through land of another.

transfer – An act by which the title to property is conveyed from one person to another.

timber harvest – Removal of timber from Federal lands by private parties.

timber reforestation – A method of replacing harvested trees so that usable forest continues to be produced.

lease – An agreement which grants exclusive use of real property, generally for a term of years and for a fixed rent.

license – Bare authority to do a specified act or acts upon the land of the licensor without possessing or acquiring any real estate interest therein.

outgrant – The act of making Army-controlled real property available to private parties for known Army use.

permit – The act of granting temporary authority to another government agency for the use of property under Army contract.

public domain land – Land acquired by Federal government by treaty, cession by states, or annexation in which title to third parties has not vested since the United States acquired ownership.

purchase – The act of acquiring real property on a mutual basis based on an agreed price.

SUMMARY OF ADAPTED USES OF SURPLUS MILITARY FACILITIES

Former Use	Present Use
Cantonment Area	**Historic Monument or Site** National Historic Site
Administration Buildings Recreation Facilities Unimproved Grounds	**Public Parks and Public Recreational Area** Youth Center State Park
Maintenance Buildings Administration Buildings Administration Buildings Housing Administration Buildings	**Health and Education** Regional Vocational School Training School for Navajo Indians Branch Campus, University of Maine
Airfield and Flight Line Facilities	**Public Airport** Military and Civilian Aircraft Aircraft Modification Business
Airfield, Tower, and Navigation Aids Airfield, Tower, and Navigation Aids	County Airport Municipal Airport
Family Housing Units	**Residential** Public Housing Dwelling Units Private Single Family Dwelling Units
Training Area (Unimproved Grounds)	**Wildlife Conservation** Wildlife Conservation Area Hunting Preserve
PX Commissary Barracks	**Commercial** Army Surplus Store Restaurant
Officer Barracks Ammunition Igloos Administration	**Industrial** Light Industrial Use Dead Storage Air-Industrial Parks
Cantonment Area	**Mixed Land Use** Diverse Mix of Any of the Above Uses; Residential Commercial Health/Educational

APPENDIX B: REFERENCES HELPFUL IN ASSESSING IMPACTS AND ANSWERING FILTER QUESTIONS

Table B1
References Helpful in Assessing Impacts for Ecology

Source of Information	Information Provided
Site visits, installation and U.S. Geological Survey (USGS) maps of counties surrounding the installation	Extent of natural areas which may be impacted.
DFE, plant engineers	Pollution control measures in effect at currently used facilities.
DFE, Building and Grounds Division	Possible presence (and relevant training) of wildlife officer, agronomist, forester.
Washington, D.C., and Regional Directors of the U.S. Department of Interior, Fish and Wildlife Service	Lists of animals and plants classified as threatened or endangered. Possible presence of such species on the installation or on land being acquired.
Chief, Environmental Simulation Branch Mobility & Environmental Systems Division Waterways Experiment Station (WES) Vicksburg, Mississippi	Computer-aided retrieval of data about possible presence of threatened animal species.
State departments of conservation, fish and game, environmental protection, or other similar agencies	Information about local and regional hunting and fishing resources; information about local occurrence of threatened species, as well as species protected by the particular state.
U.S. Forest Service particularly, their regional experiment stations	Information on forest management practices suitable for timber sale requirements in particular areas for particular tree species.
Local colleges and universities, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Corps of Engineers District Offices, etc.	Biologists, botanists, zoologists, ecologists, and other experts qualified to give expert opinion on the susceptibility of specific sites to environmental impact.

Table B2
References Helpful in Assessing Health and Safety Impacts

Source of Information	Information Supplied
Environmental Health Engineering Section, Office of the Surgeon General	General information on health factors, mitigating procedures.
Army Environmental Hygiene Agency	
Installation Preventive Medicine Officer	Specific information about local conditions, such as transport mechanisms for disease, population susceptibility to health effects, etc.
Local and state health departments	
L. V. Cralley and P. R. Atkins, eds., *Industrial Environmental Health*, (Academic Press, 1975)	
V. M. Ehlers and E. W. Steel, *Municipal and Rural Sanitation* (McGraw-Hill, 1965)	

Table B2 (cont'd)

Source of Information	Information Supplied
S. L. Kark, *Epidemiology and Community Medicine* (Appleton-Century-Crofts, 1974)	
Health Hazards of the Human Environment (World Health Organization, 1972)	
P. W. Purdom, *Environmental Health* (Academic Press, 1971)	
P. E. Sartwell, ed., *Preventive Medicine and Public Health* (Appleton-Century-Crofts, 1965)	
A. C. Stern, ed., *Air Pollution* 3rd ed. (Academic Press, 1976)	
G. L. Waldbott, *Health Effects of Environmental Pollutants* (C. V. Mosby Co., 1973)	
J. S. Williams, et al., *Environmental Pollution and Mental Health* (Information Resources Press, 1973)	

Table B3
References Helpful in Assessing Impacts and Answering Filter Questions for Air Quality

Sources of Information	Information Supplied
Principal Investigators	Information on how dangerous agents are stored, transported and disposed of.
Preventive Medicine Officer	Information on incineration practices on the installation.
Safety Officer	Safety record of installation.
Test directors	General information on vehicle/weapon emissions, smoke generation, dust clouds, etc.
U.S. Weather Bureau	Climatological conditions which might be expected during RDT&E activities.
U.S. Soil Conservation Service	Susceptibility to dust generation of soil types in areas of outdoor RDT&E activities.

Table B4
References Helpful in Assessing Water Quality Impacts

Source of Information	Information Supplied
DFE, Buildings and Grounds	Nature of constructing or demolition (if any) planned on the real estate to be acquired.
Installation HQ, General Staff	Identity of military groups carrying out environmental impact assessments for specific activities related to the real estate transaction.
	The intended future use of the real estate to be acquired for military use.

Table B4 (cont'd)

Source of Information	Information Supplied
DFE	Water supply requirements and wastewater quality and quantity associated with the activities involved in the real estate transaction.
	Nature of materials in landfills, lagoons, or similar waste storage facilities on the real estate being considered.
	Capacity of, and current loading on, military facilities (such as reservoirs, pipelines, pumping stations, etc.) to which rights might be granted.
U.S. Weather Bureau	Climatological conditions which might be expected to have an effect on the future activity to be carried out on the land involved in the real estate action.
U.S. Geological Survey	Topographical maps for the land involved in the real estate activity and for adjacent land. Records on ground and surface water quality.
U.S. Soil Conservation Service	Soil types in area involved in the real estate activity.
Appropriate civic service groups	Local attitudes concerning the real estate activity involved.
Local planning agency	Land use plans, regional solid waste management plans, regional water supply plans, regional plans developed under Section 208 of PL 92 500 (the Water Pollution Control Act Amendments of 1972).
CERL computer-aided environmental impact analyses	Potential impact on water of the activities to be associated with the real estate involved.
	Current impact on water of activities to be discontinued on the real estate involved.
Military or municipal water supply engineer	The demand for water by the present and/or future activities involved in the transaction.
	The capacity of water supply, treatment, and distribution facilities involved in—or impacted by—the real estate transaction.
Military or municipal wastewater treatment facility engineer	Present loading on the wastewater treatment facility from the area involved in this activity.
	The capacity of the treatment plant and collection system involved in or impacted by the real estate transaction.
Appropriate state water pollution control authority	Applicable water quality standards.
	Historical and current quality of surface and ground water.
	Compliance of activities involved in this real estate transaction with National Pollution Discharge Elimination System Permit program.
U.S. Environmental Protection Agency	Effluent guidelines for industries involved with this real estate activity.

Table B4 (cont'd)

Source of Information	Information Supplied
	Pretreatment guidelines for the industries involved in this real estate activity.
	Relationship of the real estate to a regional planning activity under Section 208 of PL 92 500.
Water quality control expert	Potential surface and ground water quality effects of the particular future activity associated with this real estate transaction.
	Possible impacts of waste flow from activities associated with the real estate transaction on wastewater collection and treatment facilities.
	Influence of future activities on the real estate on the quality and quantity of residues (sludges) produced in the course of wastewater treatment.
	Possible effects of discontinuing current activities associated with the real estate on wastewater collection and treatment facilities and on sludge.
	Means for minimizing potential impacts on surface and ground water hydrology by provisions in real estate contracts.
	Effects of present or past military usage of the real estate on ground and surface waters.
	Potential future water quality impacts for materials in landfills, lagoons, and similar waste storage facilities on the real estate being considered.
Ground water hydrologist	Potential effects of future activities on ground water quality and quantity.
	Potential effects of discontinuing current activities on ground water quality and quantity.
	Means for minimizing potential impacts on ground water quality by provisions in real estate contracts.
Prospective leasees or grantees	Details concerning future activities on the real estate – especially as they relate to water use, wastewater production and treatment, and "non-point" sources of discharges to surface waters.
	Anticipated construction requirements and techniques.
	Anticipated demolition requirements and techniques.
Military legal counsel or legal consultant	Current Federal, state, and local regulations concerning water supply, wastewater management, and refuse management pertinent to the real estate transaction.
Installation facility engineer Installation master planner Installation agronomist Installation forester	Characteristics of land being considered such as vegetative cover, slope, proximity to surface waters, and other major topographical features.
	Current activity associated with the real estate to be acquired.

Table B5
References Helpful in Assessing Impacts for Sociology

Source of Information	Information Supplied
Installation	
Public Information Officer	Analysis of "clipping file" for reports of community reactions to prior events.
Staff Judge Advocate	Information on community complaints.
Community	
Media representatives Educational officials Clergymen Other organizational leaders	Informal expressions of concern for activities and implications for the community opinion process.

Table B6
References Helpful in Assessing Economics Impacts

Source of Information	Information Supplied
Economic Impact Forecast System USA CERL P.O. Box 4005 Champaign, IL 61820	Population data Business trend data Tax information Real estate value data Employment data
U.S. Bureau of the Census Census Reports Department of Commerce Washington, DC	*Population data* Housing data Employment data Migration information
Local planning agencies	Population data, including recent trends Employment data Business trend data Tax data
State planning agencies	Same as local agencies but for larger geographic areas.
Local realty boards	Data on the local housing markets.

Table B7
References Helpful in Assessing Earth Science Impacts

Source of Information	Information Supplied
U.S. Department of Agriculture Soil Conservation Service (SCS)	The SCS can provide extensive information from published soil surveys. These surveys provide information on soil classification; soil texture, structure, profiles, permeabilities, and erosion potential; soil agricultural, plant, and other use limitations and capabilities; and management criteria. If published data are not available, information can usually be supplied from field survey data.

Table B7 (cont'd)

Source of Information	Information Supplied
U.S. Geological Survey (USGS)	The USGS can provide information on geological stability, including topographic information, stream delineation, and subsurface geology.
State Geological Survey	The Survey can provide information similar to that of the USGS, but more detailed.
Military engineers	Command facility engineers can provide information on the use and adequacy of design for the future use of a facility. The Corps of Engineers district military construction branch can provide information on both the actual design of facilities and certain types of construction activities such as excavation or blasting, required for certain construction. The master planner in the installation's engineers office can provide information on the adequacy of the existing transportation network, supporting service facilities, etc.

Table B8
References Helpful in Assessing Land Use Impacts

Source of Information	Information Supplied
City planning department	City land use plan Zoning map Capital improvement plan Transportation plan Demographic information Tax information Housing Recreation and open space plan
Public utility company	Easements Rights-of-way Underground utility information Population growth studies
Regional planning commission	Regional land use plan Transportation plan Water and sewer plan Capital improvement plan A-95 review process* Demographic information Federal and state laws Housing information 208 plan** Recreation and open space plan
City/county tax assessor's office	Tax information

*U.S. Office of Management and Budget Circular A-95 delineates procedures for implementing Federal laws concerning projects using Federal funds. A review process must occur by which affected Federal, state, and local agencies determine the consistency of the proposed project or policy with relevant land use and land use related plans, policies, and programs.

**Federal Water Pollution Control Act of 1972 (Public Law 92-300), Section 208, enables drainage basin studies.

Table B8 (cont'd)

Source of Information	Information Supplied
State agencies, e.g., natural resources, planning, water pollution control, environmental protection, highway commission, historical society, etc.	State transportation plan State land use plan A-95 review Highway maps Recreation and open space plan Highway capacity statistics Demographic information State and Federal laws Housing information Ecology: Wildlife information Vegetation information Critical areas information Air quality information Geologic information Water and oil well boring logs Capital improvement plan
U.S. Department of Agriculture, Soil Conservation Service	Soil information, e.g., productivity and erodibility Land use plans (watershed development plans) Aerial photos
U.S. Geological Survey	USGS maps (maps identifying topographic, vegetation, and physical features) Geological information, e.g., water availability and mineral deposits Aerial photos Seismic areas Aquifer recharge areas
U.S. Army Corps of Engineers	Water quality Discharge limitations Flooding information Flood plain information Transportation (water) Ecology: Wildlife information Vegetation information Federal water laws Maps A-95 review Recreation and open space plan Demographic information Urban studies (land use and wastewater treatment data) Point and non-point water pollution
U.S. Forest Service	Recreation and open space Vegetation information Fish and wildlife information Land use plan Aerial photos
U.S. Department of the Interior, e.g., Bureau of Outdoor Recreation, Fish and Wildlife Service, etc.	Recreation and open space Vegetation information Fish and wildlife information Land uses Mineral deposits Federal laws and regulations A-95 review

Table B8 (cont'd)

Source of Information	Information Supplied
HUD, HEW	Housing information Capital improvements Health information Education information Demographic information A-95 review
Office of Management and Budget	A-95 review

Table B9
References Helpful in Assessing Noise Impacts

Source of Information	Information Supplied
Preventive Medicine Office Preventive Medicine Officer (PMO) Post sanitation engineer	Acoustical survey of primary noise sources on post; hearing conservation areas; classification of personnel exposed to noise by occupational specialty; hearing and protective devices (aural and circumaural); audiometric testing; educational materials on noise and related health effects.
Facilities Engineer Post engineer Planning – real estate Environmental officer	Master or comprehensive planning for the post; responsibility for capital improvements, including roadway, utility, and buildings; site development, including environmental impact; aerial and topographic inventory of installation and associated areas; land use and structural inventory for installations; possible complaints from community.
Training officer	Information about scheduling, program of instruction, location of personnel in training, and associated equipment required; safety and environmental requirements associated with training.
Testing officer	Information about scheduling source(s) to be tested, method of test, and location; performance requirements and characteristics of equipment under test.
Public information/civil affairs officer	Coordinator of military activities with civilian counterpart; provide interface for official responses and positions for Army installation to the governmental jurisdictions; familiarity with local environmental requirements and structure for enforcement; repository of public responses to noise-related problems.
Judge Advocate Officer	Knowledge of environmental laws, regulations, and policies that may apply to the Army installation; legal negotiations, adjudication with civilian community.
U.S. Army Environmental Hygiene Agency Bio-Acoustics Division Aberdeen Proving Ground, MD	Technical assistance to installation; hearing conservation survey; community noise impact survey; noise repository of military-related sources, including weapons, aircraft, mechanical equipment, construction equipment.
Construction Engineering Research Laboratory Corps of Engineers Champaign, Illinois	Technical assistance to installation; environmental noise studies; acoustical assessment of primary noise sources; specialized engineering-related controls.

Table B9 (cont'd)

Source of Information	Information Suplied
Municipal executive office/city clerk (Office of the Mayor, City Manager)	Noise legislation information, including existing or proposed ordinances; repository for enacted legislation.
Municipal planning department	Land use, social, and geographic information for subject area; may include aerial data.
	Environmental impact review procedures; A-95 review, environmental requirements.
Local environmental agency	Noise legislation requirements general resource information; code of recommended practice; status on enforcement.
Local public safety office	Enforcement procedures and requirements; code of recommended practice; fines, appeals, violators by noise source.
City attorney	Legal opinion as to applicability to U.S. Army; adjudication–legal decisions.
County executive office	Noise legislation information, including existing or proposed ordinances; repository for enacted legislation.
County planning department	A-95 clearinghouse for EIS: environmental impact requirements; land use, social, and geographic information; land use management controls.
County environmental agency	Noise legislation requirements general resource information; code of recommended practice; status on enforcement.
County public safety office	Enforcement procedures and requirements; code of recommended practice; fines, appeals, violators by noise source.
County attorney	Legal opinion as to applicability to U.S. Army; adjudication–legal decisions.
Office of the Governor	Noise legislation, including existing (enacted) and proposed legislation; organizational structure (administration) for noise control.
State environmental agency	Generally the lead agency for noise control; noise level requirements; code of recommended practice.
Office of the Attorney General	Legal opinion as to applicability to the U.S. Army; adjudication–legal decisions.
U.S. Environmental Protection Agency Office of of Noise Abatement and Control Washington, DC	Federal noise legislation and guidelines; educational materials; instrumentation; technical assistance.
REGIONAL OFFICES: EPA	
I Boston	
II New York	
III Philadelphia	
IV Atlanta	
V Chicago	
VI Kansas City	
VII Dallas	
VIII Denver	
IX Seattle	
X San Francisco	

Table B10
References Helpful in Assessing Transportation Impacts

Source of Information	Information Supplied
Installation Master Planning Office	In the vicinity of the installation; location of military and civil airfields and heliports; low altitude airways, airport control zones, and restricted airspace; location of highways and harbor facilities. Airspace utilization map, flight hazard strip map, and airfield map for installations having airfields.
City, county, regional, state or Federal Department of Transportation, transportation engineer	Existing and projected traffic flow around the RDT&E site; highway and pavement design criteria. Planned highway extensions and construction schedules. Carpooling programs (funds available to initiate carpool matching program). Office contacted depends on classification of roadway (state or U.S. highway, for example).
City, county, or regional planning department	Availability of public transportation services (commuter trains, buses, etc.).
Military Traffic Management Command (MTMC), Eastern Command: Bayonne, NJ; Western Command: Oakland, CA.	Information on management of DoD freight traffic, CONUS ocean terminals, and nontemporary storage.
Military Traffic Management Command (MTMC), Transportation Engineering Agency (TEA), Newport News, VA.	Traffic and safety engineering studies, transportability studies, transportability guidance.
Airport Authority	Flight schedules and traffic patterns, carrying capacity of runways, planned extensions and construction schedules. Location and use of private airfields.
Port Authority	Number and size of berthing areas, type of cargo handling equipment and cargo handling capacity, schedule of operation of passenger and cargo freighters, depth of channel or dock area.
City, county or state Department of Recreation, or Army Corps of Engineers or National Park Service if national waterway is involved.	Maps of waterway or body of water, designated recreational use of water (power boats, canoeing, sailing, or swimming), restricted areas. Size, location, and managing authority of parks and picnic areas. Maps of access roads to recreation areas, docking and fueling areas, traffic loads, and seasonal information (if road or docking area is not open all year).

Table B11
Resources Helpful in Assessing Aesthetics Impacts

Source of Information	Information Supplied
CERL Architectural Branch P.O. Box 4005 Champaign, IL 61820	Human Habitability criteria.
General Services Administration Interior Design Staff Special Projects Division 19th and F Streets Washington, DC 20405	Professional interior design services.

Table B11 (cont'd)

Source of Information	Information Supplied
National Furniture Center, GSA Crystal Square, Building 5 Washington, DC 20405 ATTN: Mr. Robert Hughes, Director	Industrial design services and schedules
National Endowment for the Arts Federal Design Improvement Program 2401 E. Street Columbia Plaza Washington, DC 20506 ATTN: Ms. Lani Lattin, Director for Federal Activities	General Federal government design information. This is a relatively new agency, and responsibilities are still being defined. Publications and research reports will change over time.
Marilyn D. Bagley, *Aesthetics and Environmental Planning*, EPA 600/5 73-009 (Nov., 1973) (Available through Government Printing Office).	Methodologies for assessing aesthetics for environmental impact assessment. Discussion of criteria, definitions in environmental terminology.
Marilyn D. Bagley, "Aesthetic Assessment Methodology," in L. Edwin Coate and Patricia Bonner, *Regional and Environmental Management* (J. Wiley & Sons, 1975)	Evaluation criteria for aesthetic attributes.

Table B12
References Helpful in Assessing Energy and Resource Conservation Impacts

Source of Information	Information Supplied
On-Post	
Procurement officer	Material quantities and requirements, records, sources of supplies.
Operational officers	Details of material requirements, environmental safeguards, contingency plans.
Utilities engineer	Waste disposal programs, recycling efforts, energy needs.
Off-Post	
U.S. Environmental Protection Agency	Recycle/reuse potential, and waste production. Discharge/emission requirements.
Colleges and universities	Critical materials availability, recycle/reuse potential, future projections. Records, data, and assistance on specific problems concerning waste production and pollution control.
U.S. Department of Energy	Research development of topics relating to energy production and use. Records, data, and assistance on energy-related topics.
State energy and conservation office	Not available for every state. This type of agency generally acts as an advisory board to the state's executive department and can provide information on regulatory requirements of that state.
Local utilities engineers (water, sewer, electric, gas)	The effects of the proposed action on local utilities, efficiencies, capacities, equipment, etc.

APPENDIX C:
OTHER FUNCTIONAL AREA CATEGORY LISTS

Table C1
Construction Categories

Facility Class Codes*	
100	Operational and Training Facilities
110	Airfield Pavements
120	Liquid Fuel and Dispensing Facilities
130	Communications, Navigational Aids and Airfield Lighting (Communications Center, Transmitter Building, Antenna Pole and Wire, Flight Tower, Instrument Landing System, Airfield Lighting)
140	Land Operational Facilities (Airfield Operational Buildings, Missile Launching and Storage Shelters, BX and Craft Shop, Battalion Headquarters Building, Aircraft Revetment, Blast Deflector Facility, Radar Tower)
150	Waterfront Operations Facilities (Piers, Wharfs, Sea Walls, Gun Emplacements, Moorings, Breakwaters, Dredging)
160	Harbor and Coastal Facilities
170	Training Facilities (Classrooms, Range or Target House, Gas Chamber, Weapons Ranges)
200	Maintenance
210	Maintenance (Aircraft Maintenance Hangers, Missile Assembly and Test Building, Motor Repair Shops, Tank Repair Shops, Weapons Maintenance Shops)
220	Production (Aircraft, Vehicle and Ship Plants, Weapons and Ammunitions Plants, Electronics and Communication Plants)
300	Research, Development and Test Facilities
310	Research, Development and Test Facilities
390	Research, Development and Test—Other than Buildings, Test Tracks, etc.
400	Supply Facilities
410	Liquid Storage and Nonpropellants (Fuel, Oil Lubricants, etc.)
420	Ammunition Storage
430	Cold Storage
440	Storage—Covered
450	Storage—Open
500	Hospital and Medical Facilities
510	Hospital Buildings

*These codes have been taken from AR 415-28 and modified for EICS purposes. For further information on facility class listings, see the AR.

Table C1 (cont'd)

Facility Class Codes*	
520	Dispensary with Beds
530	Laboratories and Clinics
540	Dental Clinics
550	Dispensaries
600	Administrative Facilities
610	Administrative Buildings (Post Headquarters Buildings, Division Headquarters Buildings, Engineer, Ordinance, Signal, Supply Service, Administration Buildings)
620	Administrative Structure Underground
690	Administrative Structure–Other than Buildings, Flagpole, Facility Signs (Monuments)
700	Housing and Community Facilities
710	Family Housing
720	Bachelor Housing (Officer, Noncommissioned Officer, and Enlisted Quarters)
730	Community Facilities–Personnel (Fire Station, Confinement Facility, Schools, Fixed Laundry)
740	Community Facilities–Morale, Welfare and Recreational–Interior (Bank, Bowling Center, Post Chapel, Commissary, Automotive Self-Help Garage, Library, Open Mess–NCO and Officer, Post Office, Indoor Swimming Pool, Theater, etc.)
750	Community Facilities–Morale, Welfare and Recreational–Exterior (Multi-Purpose Courts, Baseball and Football Fields, Outdoor Swimming Pool, Golf Course)
800	Utilities and Ground Improvements
810	Electric Power
820	Heat and Refrigeration (Air Conditioning)
830	Sewage and Waste
840	Water
850	Roads and Streets
860	Railroad Tracks
870	Ground Improvements, Fencing
880	Fire and Other Alarm Systems
890	Miscellaneous
900	Real Estate
910	Land
920	Other Rights–Easements and Leases
930	Improvements–Landscaping, Demolition, etc.

Table C2
Operations and Maintenance Categories

		Category Description
B0000		Supply operations
C0000		Maintenance and repair of material
	G0000	Personnel support operations
G1000		Chaplain activities
G2000		Information services
G3000		Special service activities
G6000		Preservation of order
G7000		Bachelor housing, furnishings, support
G8000		Medical facilities
	H0000	Installation services
H1000		Communication services
H2000		Audio-visual services
H3000		Transportation services
J0000		Operation of utilities
	K0000	Maintenance and repair of real property
K1000		Utilities systems
K2000		Buildings
K3000		Grounds
K4000		Railroads
K5000		Surface areas
K6000		Special and miscellaneous equipment
	M0000	Other engineering support
M1000		Fire prevention and protection
M2000		Refuse handling
M3000		Pest control services
M4000		Lands management

Table C3
Training Categories

1	Basic combat training
2	Advanced individual training–tactical
3	Advanced individual training–nontactical
4	Unit or operational training (RA, NG, or AR).

Table C4
Mission Change Categories

1. Type of mission change

   Realignment of military forces

   Change in support function

2. Realignment

   (a) Increase strength and/or require more intensive training, such as extension into new training areas, increased frequency or duration of training activities, and use of more destructive weapons or vehicles.

   (b) Decrease strength and/or require less intensive training, such as elimination of training in current training areas, decreased frequency or duration of training activities, and use of less destructive weapons or vehicles.

   (c) Generate both increases and decreases in strength and/or training activity.

3. Mission change requires:

   (a) More support in the form of civilian employees, housing, schools, services, facilities usage, etc.

   (b) Less support in the form of civilian employees, housing, schools, services, facilities usage, etc.

   (c) More support in some missions and less support in others.

Table C5
Industrial Categories

100	Depot supply operations
110	Depot repair operations
120	Arsenal activities
130	Mfg. non-initiating high explosives
140	Mfg. priming compositions
150	Mfg. initial detonating agents
160	Mfg. propellents
170	Mfg. shell casings and projectiles
180	Mfg. chemical agents
190	Mfg. chemicals for explosives manufacture

Table C6
RDT&E Categories

1	Activities restricted to "planning and design"—research involving no physical laboratory or field work.
2	Research involving physical laboratory (indoor) work as well as planning and project design.
3	Activities involving physical field (outdoor) research, tests, etc., as well as planning and project design.
4	Research involving planning and design, laboratory work, and field work.

INPUT FORM NO. 8 REAL ESTATE FUNCTIONAL AREA

1. PROJECT NAME: _____
2. INSTALLATION: _____
3. RESPONDENT'S NAME: _____
   COMPLETE MILITARY ADDRESS:
   _____
   _____
   _____
   _____
   COMMERCIAL TEL. NO: _____
   FTS OR AUTOVON TEL. NO: _____
4. SITE NO: _____
5. BAAP SUBPROGRAM CODE: _____
6. SPECIFIC APPLICABLE BAAP'S
   # _____ # _____ # _____ # _____ # _____
7. PRINT RAMIFICATION-MITIGATION TEXT?
   YES _____ NO _____
8. DETAILED OR REVIEW LEVEL?
   DETAILED _____ REVIEW _____ BOTH _____
9. DATE OF REQUEST _____

10. TECHNICAL SPECIALTIES REQUESTED:

ECOLOGY _____
HEALTH & SAFETY _____
AIR QUALITY _____
SURFACE WATER _____
GROUND WATER _____
SOCIOLOGY _____
ECONOMICS _____
EARTH SCIENCE _____
LAND USE _____
NOISE _____
TRANSPORTATION _____
AESTHETICS _____
ENERGY / RES. CONS. _____

11. ANSWERS TO FILTER QUESTION

	Q-1	Q-2	Q-3	Q-4	Q-5
ECOLOGY					
HEALTH & SAFETY					
AIR QUALITY					
SURFACE WATER					
GROUND WATER		0			0
SOCIOLOGY					
ECONOMICS					
EARTH SCIENCE					
LAND USE					
NOISE					
TRANSPORTATION					
AESTHETICS					
ENERGY/ RES. CONS.					

12. (OPTIONAL) CROSS FUNCTIONAL AREA SELECTOR

☐ CONSTRUCTION _____
☐ MISSION CHANGE _____
☐ OPERATIONS & MAINTENANCE _____
☐ TRAINING _____
☐ INDUSTRIAL _____
☐ RDTE _____

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Fittipaldi, John J
Computer-aided environmental impact analysis for Army real estate actions : user manual / by J. J. Fittipaldi, S. E. Thomas, E. W. Novak. -- Champaign, IL : Construction Engineering Research Laboratory ; Springfield, VA : available from NTIS, 1979.
73 p. ; 27 cm. (Technical report ; N-70)

1. Environmental impact analysis. 2. Real estate management-environmental aspects. I. Thomas, Susan E. II. Novak, Edward W. III. Title. IV. Series: U.S. Construction Engineering Research Laboratory. Technical report ; N-70.

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