DOCUMENT RESUME

ED 219 036 HE 015 308

AUTHOR Kaiser, Harvey H.
TITLE Facilities Audit Workbook: A Self-Evaluation for Higher Education.
INSTITUTION Association of Governing Boards of Universities and Colleges, Washington, D.C.; Association of Physical Plant Administrators of Universities and Colleges, Washington, D.C.; National Association of Coll. and Univ. Business Officers, Washington, D.C.
SPONS AGENCY American Telephone and Telegraph Co., New York, N.Y.; International Business Machines Corp., Armonk, N.Y.
PUB DATE Jul 82
NOTE 62p.
AVAILABLE FROM Association of Physical Plant Administrators, Eleven Dupont Circle, Suite 250, Washington, DC 20036 (Nonmembers, $20.00).

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *College Buildings; Cost Effectiveness; *Costs; Data Analysis; Data Collection; *Educational Facilities Planning; *Facility Case Studies; Facility Improvement; *Facility Inventory; Facility Utilization Research; Higher Education; Repair; Research Design; *Self Evaluation (Groups); Space Classification

ABSTRACT

The purpose and scope of a facilities audit and steps in conducting an audit are outlined, and facility ratings forms that can be used in the process are included. The audit is presented as a part of the comprehensive facilities management approach, and the users and different audit uses are also addressed. The audit design phase includes deciding who should be on the audit team, what facilities they should cover, the time frame involved, and the use of consultants. The next phase includes designing the plan, data collection, and data analysis. The third phase of a facilities audit is the presentation of findings. Attention is directed to: how audit findings should be summarized, priorities for repair and renovation projects, planning of the final presentation, and gaining support for the recommendations. Additional considerations are as follows: using outside consultants, rating the facilities, a comprehensive versus a condensed audit, and cost analyses or proposed projects. The proposed procedures outlined in the workbook: can be used in the field without extensive training, can be used without consultant assistance, can be used by any institution, and is based on a manual tabulation of data that can readily be adapted to automated data processing. The proposed system provides a functional analysis of facilities and data that can be used for setting and justifying priorities. It also inspects buildings by components on the basis of a physical analysis and indicates conditions that can serve as a base for future surveys. Appendices include a list of room use categories and building type characteristics, information alternative methodologies, and a bibliography. (SW)

AGB
APPA
NACUBO

FACILITIES AUDIT WORKBOOK

A SELF-EVALUATION PROCESS FOR HIGHER EDUCATION

SPONSORED BY

THE ASSOCIATION OF GOVERNING BOARDS OF UNIVERSITIES AND COLLEGES (AGB)

ASSOCIATION OF PHYSICAL PLANT ADMINISTRATORS OF UNIVERSITIES AND COLLEGES (APPA)

NATIONAL ASSOCIATION OF COLLEGE AND UNIVERSITY BUSINESS OFFICERS (NACUBO)

SUPPORTED BY AT&T AND IBM

PREPARED BY HARVEY H. KAISER

ACKNOWLEDGEMENTS

The preparation of this workbook has been supported by the Association of Governing Boards of Universities and Colleges, the Association of Physical Plant Administrators and the National Association of College and University Business Officers. Robert Gale, President, and Nancy Axelrod, Vice President, Programs and Public Policy of AGB, recognized the need for a facilities audit workbook, obtained the financial assistance for its preparation and publication, and secured necessary critical reviews. AT&T and IBM provided the grants to AGB which made this resource possible.

This workbook serves as an example of interassociation cooperation among AGB, the Association of Physical Plant Administrators (APPA), and the National Association of College and University Business Officers (NACUBO). These three associations brought the critical issue of deferred maintenance to the attention of higher education. Paul Knapp, APPA's Executive Director, instituted a seminar series on deferred maintenance. Much of the material prepared for the seminar workbook provides the core research for this manual.

The following association representatives formed a deferred maintenance committee to support the preparation and publication of the *Facilities Audit Workbook:* Robert Gale and Nancy Axelrod of AGB; Steven Hychka of NACUBO; and Paul Knapp of APPA. Members of APPA's Deferred Maintenance Committee who helped develop the concept of the workbook are—Lawrence O'Neill, Washington University; Elmo Morgan, consultant; Edward Bogard, Albion College; and Charles Diehl, George Washington University. APPA staff members Sherry Reynolds, Director of Continuing Education, and Barbara Fatkin, Director of Publications, also assisted in the workbook preparation.

Particularly valuable in the development of the manual was the material provided by Brenda Albright, Associate Director for Fiscal Affairs and Data Systems of the Tennessee Higher Education Commission; Thomas Smith, Associate Vice President for Physical Facilities, and William Griffith, Assistant Vice President, both of Ohio State University; Edward Meagher, Maintenance Department, Villanova University; William Erickson, Vice President Business and Financial Affairs, San Diego State University; Dober and Associates, Inc., Belmont, Massachusetts; and L. Terry Suber, Colorado State University. Recognition to those institutions that have permitted their material to be included in whole or part does not imply approval of the final product.

Contributors to the APPA Deferred Maintenance Seminars are to be recognized for their assistance, including some previously mentioned above: William Baker, Assistant Vice President, Budget Analysis and Planning, University of California Statewide System; Robert Burch, Physical Plant Administrator, George Washington University; Gerald Beavers, Legislative Budget Committee, California State Legislature; Sy Zachar, Educational Facilities Laboratories Division, Academy for Educational Development; Anthony Lazzaro, Vice President Business Affairs, University of Southern California; and Harlan Bareither, Associate Vice President for Planning, University of Illinois.

Valuable comments on earlier drafts of the workbook that were helpful in preparing the final version were contributed by Edward Bogard, Lawrence O'Neill, William Griffith and William Pocock, Chairman of the Board of Trustees of the College of Wooster and member of AGB's Board of Directors, and Donald Simek, Director of Real Estate and Construction at IBM.

Dr. Geraldine McArdle of McArdle Associates, Reston, Virginia, assisted in the preparation of the workbook's concept and outline. Kathy Hom, Washington, D.C., researched and developed the first draft. Dr. Robert Diamond of Syracuse University helped refine the workbook. I also want to thank those staff members of Syracuse University whose efforts in carrying out deferred maintenance programs provide much of the author's experience with the subject. I wish to thank Mrs. Pauline Stukus for typing assistance.

Although AGB financially supported the preparation of this workbook through grants from AT&T and IBM, the author is fully responsible for its contents.

CONTENTS

PREFACE

Faced with increased fiscal constraints, the majority of higher education institutions in the United States have lagged behind in funding the maintenance of their buildings, grounds, and utilities as a greater proportion of their available dollars have supported the academic portion of their programs.

In their studies of public and independent higher education, John Minter and Howard Bowen point out:

> "American higher education has been through nearly a decade of financial stringency and the maintenance of physical assets has without doubt lagged. Buildings and equipment have been allowed to deteriorate, replacement of worn-out and obsolete capital has been postponed . . . with few exceptions, no one knows the amount of the deferrals, not even the leaders of the institution."

Institutions, if they wish to survive, must address the problems associated with the deterioration of their physical capital and establish a set of priorities to overcome these needs. This workbook, sponsored by the Association of Governing Boards, will help you; first, in assessing the quality of your physical plant; and, second, in establishing maintenance priorities that can be used in developing programs and requesting and justifying funds from governing boards and external sources.

We hope you will find this workbook comprehensive and easy-to-use. The proposed procedures:

- can be used in the field without extensive training,
- can be used without consultant assistance,
- can be used by any institution, regardless of size and location, and
- uses a manual tabulation of data that can readily be adapted to automated data processing.

In the development of this workbook, various procedures used by statewide systems and individual institutions were examined along with the techniques used by private consultants in preparing institutions for audits. The workbook also builds in the widely applied standards of the Higher Education Facilities Inventory and Classification System, the procedures used by the Tennessee Higher Education Commission, and audit procedures and forms used by Ohio State University, the University of Nebraska, Purdue University, Villanova University, and Syracuse University.

The proposed system:

- inspects buildings by components on the basis of a physical analysis,
- provides a functional analysis of the facilities,
- weighs different components of the analysis to produce a final assessment,
- provides a final determination of conditions which is usable as a base for future surveys, and
- provides data that can be used for setting and justifying priorities.

It is important to note that the audit of facility conditions is one of a series of steps in facility improvements. The audit must be followed by setting priorities and presenting the findings. Inherent in the selection of priorities are the costs of correcting observed conditions through renovations and repairs by major capital outlays. Although not included in this workbook, the process of estimating costs for improvement can be readily completed. It is suggested that specific projects be estimated for observed condition either by an institution's staff, retained architects, engineers, or contractors. With the prior selection of priorities, tentative timetables can incorporate projections of inflationary increases and a more accurate total of necessary funding can be achieved.

This workbook has been organized with an introduction and specific instructions on procedures and a sample set of facility rating forms which can be reproduced for each facility to be inspected. For use on your campus, you may wish to modify or consolidate forms. It is urged, however, that the weighting system be retained. Appendix D describes alternative methodologies and references.

This workbook was designed to be used—but to be fully utilized, it must be adapted for use on your campus. Not every component, form, or procedure must be part of the facilities audit. This manual was created to be a sample only; there should be no hesitation by any institution to add to, amend or delete from the materials presented.

ABOUT THE AUTHOR

Dr. Harvey H. Kaiser is Vice President for Facilities Administration and Associate Professor of Urban Planning at Syracuse University. By education and experience he is an architect, urban planner, and social scientist. He has written and spoken extensively on the subject of facilities management in education and private industry and has been a consultant to government, colleges, and universities. He is a registered architect and holds an undergraduate degree from Rensselaer Polytechnic Institute and graduate degrees from Syracuse University.

CHAPTER 1

INTRODUCTION

THE PURPOSE OF A FACILITIES AUDIT

The purpose of a facilities audit is to evaluate the functional and physical adequacy of a campus' facilities. Furthermore, an audit is designed to assist the institution's decision-makers evaluate the future needs for maintaining the physical plant.

Circumstances may differ between institutions that undertake a comprehensive survey of all facilities for the first time, or those that have a specific set of goals for determining existing conditions. Designing the format of this workbook to the needs of all levels of institutions suggested that a comprehensive approach be taken to include a description of a building's characteristics, existing conditions of building components, and an overall facility rating for physical and functional conditions.

The methodology and forms used in this manual can be adapted for different scopes of investigation and provide the base for future surveys using only a condition analysis. Maintenance aspects can be noted on the facility rating forms and summarized separately. For those institutions with comprehensive descriptions of building components and conditions on hand, a condensed facilities audit of condition analysis and survey summary is included in Appendix A. This condensed form can also be used for future facility audit updates.

The comprehensive audit approach serves three purposes: (1) a description of building components; (2) an analysis of building conditions; and (3) an overall rating of a building's condition. A facilities audit using this workbook provides a record of building conditions for a base year, notations on maintenance needs, and a basis for selecting priorities for major repair and renovation projects.

Typical criteria for undertaking a facilities audit are:

1. Defining major repair and renovation priorities to eliminate deferred maintenance.
2. Restoring functionally obsolete facilities to a usable condition.
3. Eliminating conditions potentially damaging to property or presenting safety hazards.
4. Identifying energy conservation measures.
5. Providing accessibility for the handicapped.

THE COMPREHENSIVE APPROACH TO FACILITIES MANAGEMENT

For an institution to effectively and efficiently serve present and future students and staff, it must have a comprehensive facilities management program. The facility audit is only a part of the comprehensive facilities management program. The audit provides a space inventory, and a survey of physical and functional conditions and opportunities to note maintenance needs. A comprehensive program includes—

". . . an inventory of existing and proposed policies, an overview of existing conditions, and a projection of future requirements. Included are the buildings, land, grounds, and utilities of an institution, its financial and human resources, and its policies and procedures. The ultimate goals are to bring existing facilities into a sound condition, to utilize those facilities efficiently, and to organize operations under good management techniques.

A comprehensive program for facilities management illustrated below consists of ten points grouped in four areas. This format is suitable for institutions of different sizes but should be kept somewhat flexible. A four-year planning period with biannual updating cycles is appropriate to be sensitive to conditions which can rapidly outdate a planning tool. All of the items in the ten-point program are dynamic and as such require assignment of administrative responsibilities to manage change and retain accountability"

Planning Policy	ONE	GOALS AND PRIORITIES • Land Use • Enrollments • Facilities
Audit and Analysis	TWO	FACILITIES • Inventory • Conditions
	THREE	MANAGEMENT PRACTICES AND PROCEDURES
	FOUR	SPACE UTILIZATION
Facility Requirements	FIVE	CAPITAL PROGRAMS
	SIX	DEFERRED MAINTENANCE
	SEVEN	CONTROLLED MAINTENANCE
Regulatory Measures	EIGHT	ENERGY CONSERVATION
	NINE	ENVIRONMENTAL QUALITY, HEALTH, AND SAFETY
	TEN	ACCESSIBILITY FOR THE HANDICAPPED

Taken from: *New Directions for Higher Education*, Edited by H. H. Kaiser, Jossey-Bass, Inc., 1980

USE OF THE DATA

The information gathered in the facilities audit will have several intended users and serve many different purposes.

Senior Campus Administrators. The audit can provide a consistent presentation of the entire range of problems in the physical plant leading to better priority setting when funding is limited. Results can also provide documentation for capital budget requests and help establish a facilities problem data base.

Trustees. The facilities audit can provide information to the Trustees who are concerned with long-range budgeting and planning. As with the administrator, the audit will serve as a priority-setting tool.

Physical Plant Managers. The audit will provide data for coordinating day-to-day maintenance as well as for major project planning. The facilities audit will also help the physical plant staff communicate with administration, physical plant problems which were avoided in the past could be objectively presented to senior campus administrators in the Audit.

Team Specialists. The audit will enable engineers, architects, and plant specialists to gather data about their particular areas. The needs of the entire team can be identified and worked with more objectivity with the audit data, it should make it easier for the overall needs of the institution to be studied.

SELF-EVALUATION PROCESS

The self-evaluation process evaluates the physical condition and functional adequacy of campus facilities, producing a record of a building's characteristics and use, condition of buildings, an overall facility rating, and comments on maintenance requirements and repair and renovation needs. The process is logically divided into three phases which, in turn, subdivide into a series of steps. The basic phases and steps are illustrated in Figure 1.1. There can be many variations on a central framework, depending on an institution's size, existing data, and institutional resources.

FIGURE 1.1 THE SELF-EVALUATION PROCESS

PHASE ONE—DESIGNING THE AUDIT

- A. What to include
  - 1. Buildings
  - 2. Grounds
  - 3. Utilities
- B. Depth of Audit
  - 1. Need
  - 2. Cost
  - 3. Time
- C. Phases
  - 1. Comprehensive audit
  - 2. Condensed audit

- A. Prime Responsibility
- B. Members
  - 1. Institution
  - 2. Consultants

PHASE TWO—COLLECTING THE DATA

- A. What information to collect
- B. Who will collect information
- C. Schedule

- A. Buildings
  - 1. Physical Data
    - a. Primary systems
    - b. Secondary systems
    - c. Service systems
    - d. Safety standards
  - 2. Functional Data
- B. Grounds
- C. Utilities

- A. Physical Evaluation
- B. Functional Evaluation
- C. Priority repairs and renovations
- D. Maintenance needs
- E. Cost Estimates

PHASE THREE—PRESENTING THE FINDINGS

- A. Building characteristics
- B. Building evaluation summary

- A. Repair and renovation projects
- B. Five-year program

- A. Define audience
- B. Identify data required
- C. Design presentation

TERMINOLOGY

FACILITIES AUDIT: An evaluation of the physical and functional adequacy of campus facilities, including buildings, grounds and utilities.

FACILITIES RENEWAL PROGRAM: A program which integrates a regular maintenance program funded by current operating funds, with deferred maintenance, facilities remodeling and renovations, retrofit for energy conservation, elimination of health and life safety problems, and provisions for access to the handicapped which would prove most cost-effective.

MAJOR MAINTENANCE PROGRAM: Includes additions, repairs or remodeling and renovation, defined by scope of work and source of funding. The work is typically too complex and costly to be included in a maintenance program, requiring funds outside of a current operating budget.

Addition—New construction attached to existing structure as an extension. Generally involves alterations within the existing building.

Alterations—Change of use involving modifications to interior space. Less extensive than remodeling or renovation. Includes relocation of interior space divisions; modifications to existing mechanical/electrical systems; and exterior cladding.

Repairs of Remodeling—Rebuilding or replacement in areas larger than individual spaces of walls, ceilings or floors; replacement of mechanical, ventilation, cooling or electrical systems, structural components or roofs. Replacement of doors, windows, ceiling and floor finishes throughout a building or complete level of a building.

Renovation or Reconstruction—Conversion to new use of interior spaces requiring major demolition and rebuilding of major structural elements, new mechanical/electrical systems, architectural exterior and interior treatments, internal circulation and safety features.

MAINTENANCE: Facilities maintenance in the college and university setting is the upkeep of buildings, equipment, grounds, and utilities to meet the institutional goals of teaching, research and community service. Categories of maintenance are defined for management and budgeting purposes based on cycle of activity, scope of work, and funding allocation and sources. Four commonly used categories are:

Emergency Maintenance—Involves the repair or replacement of institutional property requiring immediate attention because the functioning of a critical system is impaired or because health, safety, security of life or property is endangered. Emergency work supersedes all other categories of maintenance.

Preventive Maintenance—Involves the planned inspection of buildings, equipment, grounds and utilities for conditions which will lead to harmful depreciation, and the appropriate actions to assure continuous operation or maintenance at acceptable levels.

Planned, Controlled or Regular Maintenance—Routine repairs and replacements of buildings, equipment, grounds or utilities which are normally recurring on a more or less predictable basis. It does not involve major structural or space alterations, or major repairs.

Deferred Maintenance—Maintenance, repair and renewal work deferred from normal operating budget cycle due to lack of funds.

HOW TO USE THIS FACILITIES AUDIT WORKBOOK

This workbook is divided into a *Manual* and a set of *Facility Rating Forms* The manual can be used with the facility rating forms as an audit instrument, or standing alone as a discussion of the facilities audit

The manual portion is comprised of four chapters:

CHAPTER 1—INTRODUCTION. The introduction discusses the purpose and scope of a facilities audit. It explains the different phases and steps included in the self-evaluation process. The audit is presented as a part of the comprehensive facilities management approach, the users and different audit uses are also discussed.

CHAPTER 2—PREPARING FOR A FACILITIES AUDIT. This chapter presents "Phase One of a Facilities Audit—Designing the Audit." It discusses who should be on the audit team, what facilities they should cover, the time-frame involved, and the use of consultants.

CHAPTER 3—CONDUCTING A FACILITIES AUDIT. Chapter 3 presents "Phase Two of a Facilities Audit—Collecting the Data," and describes the steps for designing the plan of attack, data collection, and data analysis for conducting a facilities audit. Sample facility rating forms are presented, divided into two parts which are side-by-side on each page. The right side has a sample of each one of the forms to be used; the left side has the narrative which includes background as well as procedural information.

CHAPTER 4—SUMMARIZING AND PRESENTING AUDIT FINDINGS. This last chapter describes "Phase Three of a Facilities Audit—Presentation of Findings," and discusses how to summarize the audit findings and prioritize repair and renovation projects. It also suggests how to plan the final presentation and building support for the recommendations and conclusions.

The workbook includes a set of facility rating forms used in the facilities audit. The facility rating forms are samples only; each institution is encouraged to create its own forms or amend these to fit its needs. Anyone desiring to use the forms as they are will find that they can be easily reproduced.

LIMITATIONS AND PROBLEMS WITH THIS APPROACH

The major limitation with this audit approach is that it only describes and examines present physical conditions. It does not consider qualitative factors, such as historical value or future possibilities which are based on institutional policies The rating system does not in itself set priorities. Cost estimates are necessary to complete the process. Facilities which rank an 84 do not automatically rate funds or projects over facilities which receive an 85. As a matter of fact, evaluation of the summary scores will probably show a good number of facilities in any one institution to be numerically so similar as to deny differentiation.

A problem that may have to be settled by the individual audit teams is what to do with mixed-use buildings, or those facilities which have more recent additions to the original construction.

NEED FOR UPDATING

The data gathered in a facilities audit must be gathered consistently and updated regularly. One university felt that a computer was absolutely necessary for the evaluation and updating of audit information. For institutions that may not have computer capabilities, this audit is still usable, but a simplified method of storing and updating the data must be developed.

Each institution must decide how often to conduct this audit A five-year schedule of comprehensive audits is reasonable with annual inspections on a condensed basis The schedule should depend on how the audit findings will be used and what the individual institution needs.

CHAPTER

PREPARING FOR A FACILITIES AUDIT

DESIGNING THE AUDIT

The first phase of the self-evaluation process is the design of the facilities audit. Included are two steps:
Step I. Determine the scope of the audit.
Step II. Select team.

PHASE ONE—DESIGNING THE AUDIT

STEP I— Determine the Scope of the Audit	STEP II—Select Team
A. What to include 1. Buildings 2. Grounds 3. Utilities B. Depth of Audit 1. Need 2. Cost 3. Time C. Phases 1. Comprehensive audit 2. Condensed audit	A. Prime Responsibility B. Members 1. Institution 2. Consultants

Step I involves determining what buildings, grounds, and utilities should be covered by the audit. A decision is made on whether a comprehensive survey of all buildings is to be completed or whether a limited scope is to be developed. This decision can be based on institutional purposes, available resources, and the time required to produce survey results.

The selection of the team is conducted in Step II. A determination is made here for primary responsibility for the audit, institutional staff to be assigned to the survey, and the use of consultants or other non-institutional staff.

DETERMINING THE AUDIT SCOPE

All institutionally-owned buildings, grounds, and utilities should be reported in the facilities audit. You may prefer to list separately those facilities which are under construction, being leased, or not available for future educational purposes. Likewise, those facilities which are to be demolished, renovated or whose use will be substantially changed in the next five years may be listed separately. Analysis of buildings and summary of conditions are described by the facility rating forms. Separate surveys of grounds and utilities describing conditions and a summary narrative should also be included in the audit.

Consider the institution's overall priorities and future planning efforts in preparing for a facilities audit. The audit should thoroughly evaluate the physical and functional problems of the individual facility. This evaluation will enable the administration to compare the needs and problems of each facility with all the others and provide assistance in establishing priorities and allocating improvement funds.

An audit scope may be limited to a portion of campus facilities, such as a survey of housing, classroom space, or auxiliary activities. However, the partial survey should be integrated into a complete one. If the entire campus is not to be audited at one time, try to select those facilities which have a higher priority to the institution. Priorities can be determined by needs, age of facilities, academic program innovations, or, possibly, categorical funding such as mandated programs for energy conservation or handicapped accessibility.

SELECTING THE AUDIT TEAM

Audits can be done most successfully by "in-house" personnel, using outside expertise in any area where the campus lacks staff. If consultants or members of other institutions conduct the audit, it is very important to include a representative from the institution on the team who will actually implement the recommendations in the audit findings. To ensure consistent results, the audit team must visit all facilities to be evaluated as a group, even though this may prove difficult when the staff has other day-to-day responsibilities. It is also important to involve staff who have been working with the facilities, thus providing access to invaluable "institutional memory" resources.

Depending on the size of the institution, the audit team should include the following:

1. An audit manager and/or institutional representative, who is responsible for the coordination of the audit;
2. Staff representatives from physical plant maintenance, facilities planning, campus safety, and the business officer;

3. Representatives of building occupants; and
4. Professional consultants as necessary for technical assistance.

If at all possible, use available institutional staff; they know the facilities and may already know what the problems and needs are. Once again, it is important to involve existing staff in the audit. If any special programs or efforts will result from this exercise, involve implementing staff as soon as possible.

USING OUTSIDE CONSULTANTS

If the institution cannot use its own staff for the audit due to time constraints, or because unavailable personnel or special expertise is required, it may be necessary to consider using outside consultants. If a consultant is to be used, the audit's format must be set up in advance by in-house staff. Procedures must be clearly defined for what is to be evaluated, how observations are to be recorded, how the data is to be processed, and in what form the results are to be reported.

The real advantage of outside professional help is that the audit can be done in a concentrated time period, by people who will not be interrupted by the day-to-day requirements of plant operations. In areas where technical expertise is necessary, the outside consultant can bring in experts who can supplement the knowledge and experience of the institution's permanent staff.

ORIENTING THE AUDIT TEAM

The members of the audit team should have a general understanding of the facilities audit, as well as a thorough understanding of its purpose and usefulness. Team members must be familiar with the forms and basic data about each building to be audited. Data should include:

1. Small-scale floor plans of each building;
2. Construction and maintenance history;
3. Current use of the space;
4. A list of known problems.

This should be collected by the institutional facilities audit manager from institutional staff and compiled in a format usable to the team. Team members should be encouraged to contribute information or tions which would make the forms more ap- to the individual institution.

SCHEDULING THE AUDIT

The four major phases in conducting a facilities audit are:

PHASE ONE, STEPS I & II

- Designing the audit. This includes determining what facilities are to be included, what aspects are to be covered, designating personnel, contracting outside consultants, assigning responsibility, and contacting staff from the facilities to be audited. (2-3 months)

PHASE TWO, STEPS III & IV

- Collecting the data. Designing the mechanics of data collection. Recording, evaluation and summarizing data collection using facility rating forms. (2-4 months)

PHASE THREE, STEP V

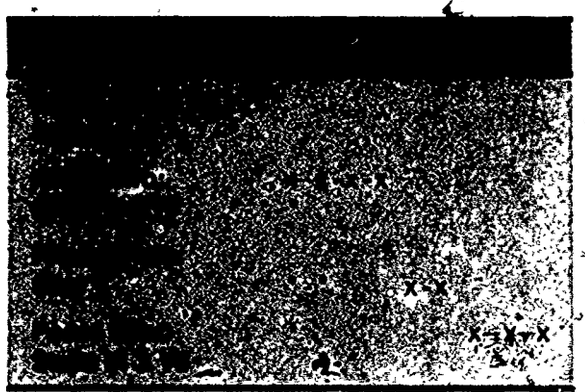
- Evaluating, processing and summarizing the physical and functional adequacy of facilities, selection of priority repairs and renovations, preparation of cost estimates, and noting of maintenance needs. (1 month)

PHASE FOUR, STEPS VI & VII

- Preparation of the final report and its presentation. (1-3 months)

The time involved in a facilities audit can range from six months to a year, depending on the number of buildings, availability of staff for the audit team, and the resources available for evaluating the data.

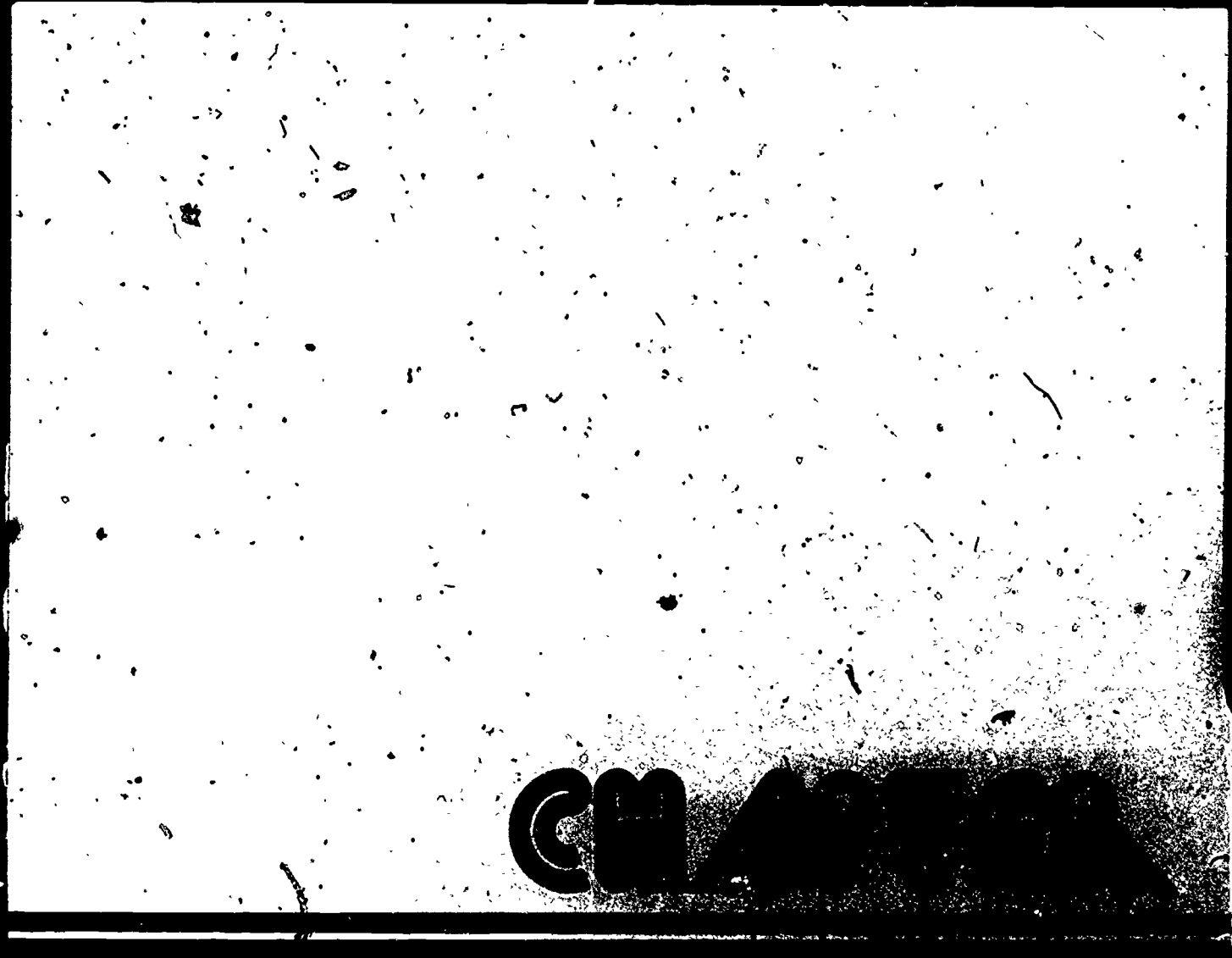
The time-frame or schedule might look like this:



---- Shortest amount of time necessary
x----x Longest amount of time necessary

In scheduling the audit consider if the institution has special needs, or if it is undergoing this process for a special reason. If this is the case, identify the special data needed and make any necessary changes in audit procedures. Read Chapter 4 on presentation before starting data collection; it is easier to adapt the manual and forms before beginning the actual audit, and certainly easier to modify beforehand than during the evaluation period.

Know what the presentation is going to look like. If you plan to use slides or illustrations—prepare them while conducting the actual inspection. Be sure to take copious notes of anything unusual.



COLLECTING THE DATA

The second phase of the facilities audit is data collection. Collection of data by a detailed building survey is the focus of three steps:

Step III. Design a Plan of Attack.
Step IV. Collect the Data.
Step V. Evaluate and Analyze the Data.

In Step III the total campus inventory of buildings is divided into three groupings: institutionally-owned facilities not to be reported; facilities to be demolished or renovated in the next five years; and facilities to be audited. After the buildings to be audited are identified, the audit team members are assigned responsibilities. Procedures are reviewed and a schedule for surveying buildings is prepared. Finally, the facility rating forms are prepared and distributed to audit team members.

In Step IV the audit team fills out facility rating forms at the end of each day's inspection. The entire audit team reviews each building and establishes a rating summary.

In Step V comments from the physical and functional analysis are summarized for priority repairs and renovations and maintenance needs.

DESIGNING THE PLAN OF ATTACK

All institutionally-owned facilities should be reported in the survey. However, detailed evaluations are not required for the following:

1. Residential facilities that the institution is leasing or not using and that the institution does not plan to use for future educational purposes;
2. Hospitals;
3. Facilities currently under construction; and
4. Facilities planned for immediate demolition.

Facilities that are institutionally-owned but not requiring a detailed evaluation should be listed on Form A-1. If an institution plans to renovate any buildings for programmatic purposes within the next five years, then its facilities should be listed on Form A-2. The current use (e.g., dormitory) and proposed use (e.g. office building) should also be listed on Form A-2.

The evaluation of existing buildings deals with the physical and functional adequacy of a structure. In making a functional analysis of a facility, evaluation is limited to the individual structure in its present programmatic usage.

Physical analysis. The facilities audit begins with a physical analysis of each building. The physical analysis can be done by separating the building into five components. In this methodology we have used the following physical analysis categories:

1. Primary Structure—Includes the structural load-bearing elements of a building as well as foundation drainage, the roofing system, and the flooring.
2. Secondary Structure—Includes architectural elements and items normally appearing in room and door schedules, interior walls, and ceilings.
3. Service Systems—Includes all mechanical and electrical components, cooling, heating, plumbing, and conveying.
4. Safety Standards—Includes those systems which are necessary to achieve compliance with applicable building codes, National Fire Protection Association standards, recognized life safety practices, and Section 504 regulations.
5. Energy use efficiency—Covers both the active and passive energy use systems of the facility.*

CONDUCTING A FACILITIES AUDIT

- A. What information to be collected
- B. Who will collect information
- C. Schedule

- A. Buildings
  - 1. Physical Data
    - a. Primary systems
    - b. Secondary systems
    - c. Service systems
    - d. Safety standards
  - 2. Functional Data
- B. Grounds
- C. Utilities

- A. Physical Evaluation
- B. Functional Evaluation
- C. Priority repairs and renovations
- D. Maintenance needs
- E. Cost Estimates

NOTE: Facilities acquired by the institution for land use purposestion for land use purposes require detailed evaluation if these facilities are used for educational purposes.

*This facilities audit workbook does not cover the energy audit procedures. Institutions interested in an energy audit should refer to "Energy Alert 79-1 Energy Audit Procedures," February 16, 1979 from *Energy Audit Procedures* Ohio Board of Regents Energy Conservation Program, published in June 1978.

17-N

Functional Analysis. The functional analysis of a building should be performed by someone who has knowledge of its possible uses and the total university physical requirements. Functional analysis examines a building's suitability of use for its present occupancy as well as for other programs, its location, and other provisions. It can be used to study assignable space and adaptability or suitability for present as well as future use.

RATING THE FACILITIES

Detailed facility evaluations are recorded on Forms labeled B. Conditions are recorded by grouping each building into five components: (1) Primary Structure; (2) Secondary Structure; (3) Service Systems; (4) Safety Standards; and (5) Functional Standards. Each component is evaluated following the classification system (below) developed by the National Center for Education Statistics used for the Higher Education Facilities Inventory and Classification Survey.

CLASSIFICATION SYSTEM

(S) Satisfactory—Suitable for continued use with normal maintenance. No capital outlay funds needed during the next five years.

(2) Remodeling A—Building is currently adequate. Requiring restoration to present acceptable standards without major room use changes, alterations, or modernizations. The approximate cost of "Remodeling A" is not greater than 25 percent of the estimated replacement cost of the building.

(3) Remodeling B—Requiring major updating and/or modernization. The approximate cost of "Remodeling B" is greater than 25 percent, but not greater than 50 percent of the building's replacement cost.

(4) Remodeling C—Requiring major remodeling of the building. The approximate cost of "Remodeling C" is greater than 50 percent of the building's replacement cost.

(U) Unsatisfactory—Structure should be demolished or abandoned because the building is unsafe or structurally unsound, irrespective of the need for the space or the availability of funds for a replacement facility.

The set of Forms labeled B has been organized so that specific maximum points have been assigned to various building components with a rating in relation to its contribution to the category. Auditors rate each component in one of five conditions, then compute the value of the component rating summarized on Form B.

The five components and their maximum point value have been assigned to the various building components as follows:

		Points
B.1.	Primary Structure—Foundation System	13
2	Primary Structure—Column & Exterior Wall System	13
3.	Primary Structure—Floor System	7
4.	Primary Structure—Roof System	7
	Primary Structure Total	40
5.	Secondary Structure—Ceiling System	3
6.	Secondary Structure—Interior Walls and Partitions	3
7.	Secondary Structure—Window System	2
8.	Secondary Structure—Door System	1
	Secondary Structure Total	9
9.	Service Systems—Cooling	10
10.	Service Systems—Heating	10
11.	Service Systems—Plumbing	5
12.	Service Systems—Electrical	8
13.	Service Systems—Conveying	1
	Service Systems Total	34
14.	Safety Standards	5
	Safety Standards Total	5
15	Functional Standards—Assignable Space	4
16	Functional Standards—Adaptability	4
17.	Functional Standards—Suitability	4
	Functional Standards Total	12
	Maximum Total Points for each facility	100

Form B is a summary form for the components. Forms B.1 through 17 are used to arrive at a point rating for each component. Each form consists of five parts:

1. **Descriptive information for each component.** *Please note. If this information is not available, the institutional representative should leave it blank.*
2. **System Evaluation.** The institutional representative should check the appropriate category.
3. **Comments.** Space is provided for comments on the nature of the problems, how they might be corrected, and costs.
4. **Numerical Evaluation.** The appropriate category for all systems with the component should be circled to determine Condition Value Multiplier.
5. **Component Rating.** The point value of the component is multiplied by the Condition Value Multiplier to determine component rating which is then transferred to Form B.

Example: If the Primary Structure Foundation of a facility is in the (2) Remodeling A category, then the point value of the component (13) would be multiplied by the Condition Value Multiplier (0.8) to obtain the component rating (13 x 0.8 = 10.4).

Please note that the multiplier is based on a constant scale of 0.0. to 1.0 points based upon the ease or difficulty and cost of correcting the component factor.

Prior to obtaining a final building rating, consideration will be given to the functional analysis of the facility. For example, in the physical evaluation, a building may be classified in the (U) Demolition category, however, for historical or aesthetic reasons or other policies, the institution may want to remodel the facility. On the other hand, a facility may fall in a remodel category, but the institution may want to demolish the facility because the building conflicts with the campus plan for land use.

Form B.17A (Functional Analysis) is used when these considerations are appropriate.

Form B.18 is a summary of the Physical Evaluation (from Form B.1-14) and the Functional Analysis (from B.17A).

RATING FORMS

FACILITY RATING FORMS

PROCEDURES

After completing the facilities audit preparation procedures, the audit team is ready to begin the actual audit.

FORM A.1

STEP 1—The facilities audit manager will schedule the campus tour(s) and arrange for suitable meeting places.

STEP 2—The audit manager will be responsible for the duplication, distribution and completeness of the forms. He/she should accompany the audit team throughout their tour and make arrangements for any necessary meetings with plant staff.

STEP 3—All facilities that are institutionally-owned should be listed on Form A.1 *if they are not* to receive a detailed evaluation.

Some facilities which may be omitted from the audit are:

1. Residential facilities that the institution is leasing or not using and that the institution does not plan to use for future educational purposes;
2. Health Services Centers;
3. Facilities *currently* under construction or being demolished; and
4. Facilities under a minimum size of 5,000 square feet.

A.1. INSTITUTIONALLY-OWNED FACILITIES NOT REQUIRING DETAILED EVALUATION

Building Name	CHECK ONE: Residential*	Hospital	Under Construction	To be Demolished Prior to
(1)				
(2)				
(3)				
(4)				
(5)				
(6)				
(7)				
(8)				
(9)				
(10)				
(11)				
(12)				
(13)				
(14)				
(15)				
(16)				
(17)				
(18)				
(19)				
(20)				

Comments: _____

*Institution is leasing or not using and does not plan to use for future educational purposes.

A.2

A.2. INSTITUTIONALLY-OWNED FACILITIES DEMOLISHED OR RENOVATED WITHIN THE NEXT 5 YEARS

If you plan to demolish, renovate or change the purpose of a facility within the next five years, then these facilities should be listed on Form A.2. The current use (e.g. dormitory) and proposed usage (e.g., office building) should also be listed on Form A.2.

	Building Name	Current Use	Proposed Usage
(1)			
(2)			
(3)			
(4)			
(5)			
(6)			

Comments:

PROCEDURES

STEP 1—All institutionally-owned facilities, demolished or renovated within the next five years, should be listed on Form A.2.

PROCEDURES

FORM B

STEP 1—All facilities to be audited should be listed on individual Forms B.1-17. Only the identification portion of Form B should be filled out at this time.

NOTE: The set of detailed Form B's, B.1-17, has been organized so that specific points may be given to the conditions of the various building components as follows:

Sec. 1-4	Primary Structures	40 Points Max.
Sec. 5-8	Secondary Structures	9 Points Max.
Sec. 9-13	Service Systems	34 Points Max.
Sec. 14	Safety Standards	5 Points Max.
Sec. 15-17	Functional Standards	12 Points Max.
	TOTAL POSSIBLE POINTS =	100

STEP 2—Completing the Facilities Evaluation Form B. Form B.1 through B.17 will be used to derive point ratings for each of the facility components to be evaluated. Each section consists of five parts, each part will describe, comment on, evaluate, or rate that particular section. Instructions for transferring recorded building conditions to Form B are described in each of the illustrated Forms B.1-17.

STEP 3—Please read and understand how each part is to be completed.

A. System Type—This part is to be completed with descriptive information for each of the components and/or subcomponents. Note: If this information is not available, the part should be left blank and a note made in "Comments."

(continued Page 17)

(continued from Page 16)

B. System Evaluation—Check the appropriate category under S, 2, 3, 4 or U; evaluate each subcomponent by the standards stated in "D Numerical Evaluation."

C. Comments—Space is provided for comments on the nature of the problems, how they might be corrected, and costs. Any extensive comments from "B", relevant observations or evaluation problems should also be written here.

D. Numerical Evaluation—The appropriate category for the overall system should be selected here. The correct multiplier should be circled.

E. Numerical Rating—The point value of the whole section, that is the maximum allowable number of points is multiplied by the multiplier. The result is the numerical score for the section and should be transferred to "Form B—Physical Facilities Evaluation Summary."

STEP 4—Select an audit recorder. It is generally more effective if one of the institutional representatives or the audit manager records all group and individual observations. Any member of the audit team can fulfill this function; it is very important that only one person records information on the summary sections. This helps keep the results and evaluation notes consistent.

STEP 5—Make sure that each facility to be audited has a complete set of Form B's.

STEP 6—The name of the audited facility should be written in the bottom right-hand corner of each section. This is important because of the number of papers each facility will have and the number of facilities which the audit will cover.

NOTE: The audit team may prefer to summarize each facility as they visit it or wait until they have evaluated three or four before making any entries on the Form B summary. Observations and notes, however, should be made at each facility as each component or subcomponent is evaluated.

It has been estimated that the average facility will take about an hour to visit and evaluate; the schedule then should be broken up so that the team members can be fresh, alert, and objective when evaluating each facility.

B. PHYSICAL FACILITIES EVALUATION SUMMARY

Building Number & Name _____

Location _____

Survey Date _____

Survey Team _____ _____

_____ _____

_____ _____

	Ratings	
	Possible	Actual
Primary Structure	(40)	( )
1. Foundation System	13	____
2. Column & Exterior Wall System	13	____
3. Floor System	7	____
4. Roof System	7	____
Secondary Structure	(9)	( )
5. Ceiling System	3	____
6. Interior Walls & Partitions	3	____
7. Window System	2	____
8. Door System	1	____
Service Systems	(34)	( )
9. Cooling	10	____
10. Heating	10	____
11. Plumbing	5	____
12. Electrical	8	____
13. Conveying	1	____
Safety Standards	(5)	( )
14. Safety Standards		____
Functional Standards	(12)	( )
15. Assignable Space	4	____
16. Adaptability	4	____
17. Suitability	4	____
TOTAL	100	

BUILDING RATING*		
S. Satisfactory	95-100	____
2. Remodeling—A	75- 94	____
3. Remodeling—B	55- 74	____
4. Remodeling—C	35- 54	____
U. Demolition	0- 34	____

*Transfer rating to Form B.18 _____ Building

3.1

B.1. PRIMARY STRUCTURE—FOUNDATION SYSTEM

A. System type

(1) Exterior columns: individual ftgs. & piers _____ predrilled piling _____ driven piling _____ continuous ftgs. _____ caissons _____ mats _____
(2) Foundation materials: steel _____ concrete _____ wood _____ other _____ combination _____
(3) Interior footings: individual ftgs. & piers _____ piling, pile caps & piers _____
(4) Foundation walls: continuous ftgs. _____ grade beams _____

B. System Evaluation

	S	2	3	4	U	Comments
(1) Cracked walls						
(2) Foundation settlement						
(3) Foundation deterioration						
(4) Design load						

C. Comments:

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8±.1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5±.1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2±.1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 13 x (D) (Condition Value Multiplier) = _____

B.1. Primary Structure—Foundation _____ Building

PROCEDURES

PRIMARY STRUCTURE

The Primary Structure includes all structural load-bearing elements of a building: columns, exterior wall, floor, and roof systems.

FORM B.1

STEP 1—Indicate the appropriate subcomponents of the system in Part A. If more than one type of structure or material is present, indicate the major one.

STEP 2—Evaluate the condition of the foundation system in Part B. (Refer to "B. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Suggestions for correcting problems and cost estimates should also be noted here.

STEP 4—Select the overall rating of this system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked D in Part E.

STEP 6—Multiply the multiplier by 13 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on the foundation system.

PROCEDURES

FORM B.2

STEP 1—Indicate the appropriate subcomponents of the system in Part A. If more than one type of structure or material is apparent, indicate the major one.

STEP 2—Evaluate the condition of the wall system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Suggestions for correcting problems and cost estimates should also be made here.

STEP 4—Select an overall rating of this system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 13 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on column and exterior wall systems.

B.2. PRIMARY STRUCTURE—COLUMN & EXTERIOR WALL SYSTEM

A. System type

(1) Structural—Reinforced concrete columns ____ Structural steel ____
Reinforced concrete walls ____ Structural wood ____
Load bearing masonry ____ Light steel frame ____

(2) Non-Structural Walls:
Masonry: brick ____ concrete block ____ limestone ____
marble ____ granite ____ other ____
Curtain or panel: metal ____ glass ____ asbestos cement ____ laminated ____
other ____

(3) Insulation: fiberglass bats ____ other ____ . thickness: ____

B. System Evaluation

	S	2	3	4	U	Comments
(1) Physical condition						
(2) Waterproofing						
(3) Caulking						
(4) Cleaning, pointing						
(5) Code compliance						
(6) Insulation						
(7) Maintainability						
(8) Painting						

C. Comments: ____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8 ± .1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5 ± .1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2 ± .1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 13 x (D) (Condition Value Multiplier) = ____

B.2. Primary Structure—Column & Exterior Wall System ____ Building

B.3

B.3. PRIMARY STRUCTURE—FLOOR SYSTEM

A. System type

Classification: 1 hr. _____ 2 hr. _____ 4 hr. _____ other _____.

Structure:

(1) Reinforced concrete: slab & beam _____ pan joist _____ two-way slab _____ waffle slab _____ flat slab _____
Precast concrete: double tee _____ span deck _____ single tee _____
Structural steel: bar joist _____ metal deck _____ steel frame _____ wood frame _____

(2) Floor finish: VAT _____ concrete _____ wood _____ carpet _____ terrazzo _____ brick _____ quarry tile _____ ceramic tile _____ epoxy _____ other _____

B. System Evaluation

	S	2	3	4	U	Comments
(1) Structural condition						
(2) Maintainability						
(3) Floor finish						
(4) Vibration						
(5) Fire rating						
(6) Design load						

C. Comments: _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8 ± .1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5 ± .1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2 ± .1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 7 x (D) (Condition Value Multiplier) = _____

B.3. Primary Structure—Floor System _____ Building

PROCEDURES

FORM B.3

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of construction or materiai is apparent, indicate the major one.

STEP 2—Evaluate the condition of the floor system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Suggestions for correcting problems and cost estimates should also be noted here.

STEP 4—Select an overall rating for the floor system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 7 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section of floor systems.

PROCEDURES

FORM B.4

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of construction or material is apparent, indicate the major one.

STEP 2—Evaluate the condition of the roof system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Suggestions for correcting problems and cost estimates should also be noted here.

STEP 4—Select an overall rating for the roof system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 7 (Max. Points) and write the answer after "Numerical Score" in Part E. This completes the section on roof systems.

B.4. PRIMARY STRUCTURE—ROOF SYSTEM

A. System types

(1) Flat
- (a) Concrete: slab & beam _____ flat slab _____ joist & slab _____ waffle slab _____ two-way slab _____ other _____
- (b) Precast concrete: double tee _____ single tee _____ span deck _____
- (c) Steel: metal deck & beam _____ metal deck & joists _____ tectum & joist _____

(2) Pitched
- (a) Steel: truss & wood deck _____ truss & nailable concrete _____ other _____
- (b) Wood rafters & sheathing _____ wood truss & sheathing _____ other _____

(3) Insulation: light weight concrete _____ rigid fiberglass _____ vermiculite w/asphalt binder _____ urethane _____ polystyrene _____ fesco board _____ foam glass _____ fiberglass (bats) _____ other _____

(4) Roof material: built up asphalt _____ built up coal tar pitch _____ asphalt shingles _____ clay tile _____ asbestos shingles _____ slate _____ copper _____ steel _____ aluminum _____ other _____

(5) Parapets: concrete _____ brick _____ block _____ precast concrete _____ other _____

B. System Evaluation

	S	2	3	4	U	Comments
(1) Physical condition						
(2) Leaks						
(3) Drainage						
(4) Insulation						
(5) Dissimilar types						
(6) Fire rating						
(7) Design Load						

C. Comments: _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8 ± .1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5 ± .1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2 ± .1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 7 x (D) (Condition Value Multiplier) = _____

B.4. Primary Structure—Roof System _____ Building

3.5

B.5. SECONDARY STRUCTURE—CEILING SYSTEM

A. System type

(1) Integral systems: exposed structure _____ attached to structure _____

(2) Suspended system: lay-in metal grid _____ concealed spline metal grid _____ gypsum board _____ plaster _____ other _____

(3) Materials: mineral _____ wood fiber _____ fiberglass _____ metal _____ wood _____ other _____

(4) Finishes: integral _____ paint _____ fabric _____ other _____

B. System Evaluation

	S	2	3	4	U	Comments
(1) Physical condition						
(2) Suitability						
(3) Accessibility						
(4) Appearance						
(5) Code compliance						

C. Comments: _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8±.1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5±.1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2±.1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 3 x (D) (Condition Value Multiplier) = _____

B.5. Secondary Structure—Ceiling System _____ Building

PROCEDURES

SECONDARY STRUCTURE

The secondary structure includes all the architectural elements usually appearing in room and door schedules.

FORM B.5

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of construction or material is apparent, indicate the major one.

STEP 2—Evaluate the condition of the ceiling system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observations, or evaluation problem should be written in "C. Comments." Suggestions for correcting problems and cost estimates should also be noted here.

STEP 4—Select an overall rating for the ceiling system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 3 (Max. Points) and write the answer after "Numerical Score" in Part E. This completes the section on ceiling systems.

PROCEDURES

FORM B.6

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of construction or material is apparent, indicate the major one.

STEP 2—Evaluate the condition of the interior walls and partitions in Part B. (Refer to "D. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Suggestions for correcting problems and cost estimates should also be noted here.

STEP 4—Select an overall rating for the interior walls and partitions in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 3 (Max. Points) and write the answer after "Numerical Score" in Part E. This completes the section on interior walls and partitions.

B.6. SECONDARY STRUCTURE—INTERIOR WALLS & PARTITIONS

A. System type

(1) Classification: Movable _____ rigid _____ load bearing _____
(2) Framing: metal stud _____ wood stud _____ masonry _____ other _____
(3) Material: plaster _____ drywall _____ wood paneling _____ exposed masonry _____ ceramic tile _____ concrete _____ structural glazed tile _____ other _____
(4) Finish: integral _____ painted _____ vinyl wall covering _____ other _____

B. System Evaluation

	S	2	3	4	U	Comments
(1) Strength & stability						
(2) Appearance						
(3) Physical condition						
(4) Acoustical quality						
(5) Adaptability						
(6) Maintainability						
(7) Code compliance						

C. Comments: _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8 ± .1
(3) Remodeling B—Requires major modernization; cost between 25 and 50% of total replacement	0.5 ± .1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2 ± .1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 3 x (D) (Condition Value Multiplier) = _____

B.6. Secondary Structure—Interior Walls & Partitions _____ Building

B.7

B.7. SECONDARY STRUCTURE—WINDOW SYSTEM

A. System type

(1) wood _____ steel _____ aluminum _____

(2) double hinge _____ fixed glass _____ casement _____ projected _____
awning _____ reversible _____

(3) single glazing _____ double glazing _____ clear glass _____
heat absorbing glass _____ tinted glass _____ other _____

(4) Shading devices: interior blinds _____ exterior blinds _____ solar screens _____
awning _____ shades _____ drapes _____ architectural devices _____ other _____

B. System Evaluation

	S	2	3	4	U	Comments
(1) Functional ability						
(2) Physical ability						
(3) Appearance						
(4) Infiltration						
(5) Maintainability						

C. Comments: _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8±.1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5±.1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2±.1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 2 x (D) (Condition Value Multiplier) = _____

B.7. Secondary Structure—Window System _____ Building

PROCEDURES

FORM B.7

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of construction or material is apparent, indicate the major one.

STEP 2—Evaluate the condition of the window system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Suggestions for correcting problems and cost estimates should also be noted.

STEP 4—Select an overall rating for the window system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 2 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on window systems.

PROCEDURES

FORM B.8

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of construction or material is apparent, indicate the major one.

STEP 2—Evaluate the condition of the door system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observations or evaluation problems should be written in "C. Comments." Suggestions for correcting problems and cost estimates should also be noted.

STEP 4—Select an overall rating for the window system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 1 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on the door system.

B.8. SECONDARY STRUCTURE—DOOR SYSTEM

A. System types:

aluminum _____ steel _____ wood _____ all glass _____ sliding _____ hinged _____ folding _____

B. System Evaluation S 2 3 4 U Comments

(1) Door leaf _____

(2) Frame _____

(3) Hardware _____

(4) Closers _____

(5) Security _____

(6) Panic devices _____

(7) Fire rating _____

(8) Keying _____

C. Comments: _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8±.1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5±.1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2±.1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 1 x (D) (Condition Value Multiplier) = _____

B.8. Secondary Structure—Door System _____ Building

B.9

B.9. SERVICE SYSTEMS—COOLING/VENTILATING SYSTEM

A. System types

(1) Space Equipment:

Direct Expansion— Window units _____ Thru-the-wall, _____ Single zone _____
All-air multizone _____ Single zone con. vol. _____ Double duct _____
Air-Water 2-pipe fan coil _____ Unit ventilators _____ Induction _____
4-pipe fan coil _____ Terminal reheat _____
Variable volume _____ Var. vol. reheat _____

(2) Refrigeration type & quality—recip. dx _____ water chiller—recip. _____
cent. _____ abs. _____

(3) Energy source—central plant _____ electricity _____ steam _____ gas/oil _____

(4) Heat rejection device—air condenser _____ wood tower _____ metal tower _____

(5) System capacity—Total _____ tons

(6) Control type—elect. _____ pneu. _____

B. System Evaluation

	S	2	3	4	U	Comments
(1) Cooling capacity						
(2) Temperature controls						
(3) Cooling all season						
(4) Noise level						
(5) Energy consumption reasonable*						
(6) Air circulation & ventilation						
(7) Reliability						
(8) Economizer cycle installed						
(9) Filtration						
(10) Humidity						

C. Comments: *Refer to energy audit. _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8 ± .1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5 ± .1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2 ± .1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 10 x (D) (Condition Value Multiplier) = _____

B.9. Service System—Cooling/Ventilating System _____ Building

PROCEDURES

SERVICE SYSTEMS

The service system includes all mechanical and electrical components, such as cooling, heating, electricity and conveying.

FORM B.9

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of component is apparent, indicate the major one.

STEP 2—Evaluate the condition of the cooling/ventilating system in Part B. Omit items (1) through (3) for facilities with cooling capacity. (Refer to "D. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Refer to an energy audit here. Suggestions for correcting problems and cost estimates should also be noted.

STEP 4—Select an overall rating for the cooling/ventilating system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 10 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on the cooling/ventilating system.

31-A

PROCEDURES

FORM B.10

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of component is apparent, indicate the major one.

STEP 2—Evaluate the condition of the heating system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate values.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Refer to an energy audit here. Suggestions for correcting problems and cost estimates should also be noted here.

STEP 4—Select an overall rating for the heating system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 10 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on the heating system.

B.10. SERVICE SYSTEMS—HEATING SYSTEM

A. System types

(1) Transfer medium—steam _____ hot water _____ air _____ elect. _____

(2) Space equipment

Radiators	_____	2-pipe fan coil	_____	Multizone	_____
Convectors	_____	4-pipe fan coil	_____	Double duct	_____
Finned		Unit ventilators	_____	Terminal reheat	_____
Tube	_____	Radiant	_____	Con. vol. single zone	_____
Baseboard	_____				

(3) Energy Source: central plant _____ coal _____ gas _____ oil _____ elect. _____

(4) System Capacity—Total _____ BTUH Control Type—pneu. _____ elect. _____

B. System Evaluation

	S	2	3	4	U	Comments
(1) Heating capacity						
(2) Temperature control						
(3) Heating all seasons						
(4) Noise level						
(5) Energy consumption*						
(6) Air circulation & ventilation						
(7) Filtration						
(8) Humidity control						

C. Comments: *Refer to energy audit _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8 ± .1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5 ± .1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2 ± .1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 10 x (D) (Condition Value Multiplier) = _____

B.10. Service Systems—Heating System _____ Building

B.11

B.11. SERVICE SYSTEMS—PLUMBING SYSTEM

A. System types

(1) Services available:

cold water	____	acid waste	____	nitrogen	____
hot water	____	natural gas	____	deionized water	____
sanitary		vacuum	____	distilled water	____
drain	____	compressed air	____	sprinkler	____
storm drains	____	oxygen	____	standpipe	____

(2) Water heating system:

(a) Energy source _____ (c) Recovery capacity _____ gph

(b) Storage capacity _____ gal

B. System Evaluation

	S	2	3	4	U	Comments
(1) Supply quantities						
(2) Drain & waste function						
(3) Sanitation hazards or cross-connections						
(4) Fixture quantities						
(5) Fixture types & conditions						
(6) Wheelchair fixtures						
(7) Female facilities						
(8) Roof drainage						
(9) Site drainage						

C. Comments: _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8 ± .1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5 ± .1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2 ± .1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 5 x (D) (Condition Value Multiplier) = _____

B.11. Service Systems—Plumbing System _____ Building

PROCEDURES

FORM B.11

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of component is apparent, indicate the major one.

STEP 2—Evaluate the condition of the plumbing system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate values.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Refer to an energy audit here. Suggestions for correcting problems and cost estimates should also be noted here.

STEP 4—Select an overall rating for the plumbing system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 5 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on the plumbing system.

PROCEDURES

FORM B.12

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of component is apparent, indicate the major one.

STEP 2—Evaluate the condition of the electrical system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate values.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Refer to an energy audit here. Suggestions for correcting problems and cost estimates should also be noted here.

STEP 4—Select an overall rating for the electrical system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 8 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on the electrical system.

B.12. SERVICE SYSTEMS—ELECTRICAL SYSTEM

A. System types

(1) Power System

Service voltage _____ Amperage _____

Dist voltage _____ Watts/sq. ft. _____

(2) Lighting System

Basic lamp type—incand ____ fluor. ____ HID ____ other ____

Basic fixture type—_____

B. System Evaluation*

(1) Power System	S	2	3	4	U	Comments
(a) Safety conditions						
(b) Service capacity						
(c) Switchgear capacity						
(d) Feeder capacity						
(e) Panel capacity						
(f) Convenience outlets						
(2) Lighting System						
(a) Light levels						
(b) Fixtures						
(c) Emergency lighting						
(d) Exit lighting						

C. Comments: *Refer to energy audit _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8 ± .1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5 ± .1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2 ± .1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 8 x (D) (Condition Value Multiplier) = _____

B.12. Service Systems—Electrical System _____ Building

B.13

B.13. SERVICE SYSTEMS—CONVEYING SYSTEMS

A. System types

(1) Conveying Systems and quantity of each:

(a) Elevators: electric gearless _____ electric gear _____ hydraulic _____

(b) Dumbwaiters _____ lifts _____ escalators _____ pneu. tube _____

(2) Elevator speed: electric 1 _____ fpm hydraulic 2 _____ fpm

(3) Elevator capacity: electric 1 _____ lb. hydraulic 2 _____ lb.

(4) Elevator control type: manual _____ selective _____ selective collective _____ group supervisory _____

B. System Evaluation:

Elevators & Escalators	S	2	3	4	U	Comments
(1) Speed						
(2) Size						
(3) Condition						
(4) Appearance						
(5) Maintainability						
(6) Noise						
(7) Code compliance						
(8) Pneumatic tubes						
(9) Dumbwaiter						

C. Comments: _____

_____

_____

_____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8±.1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5±.1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2±.1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 1 x (D) (Condition Value Multiplier) = _____

B.13. Service Systems—Conveying _____ Building

PROCEDURES

FORM B.13

STEP 1—Indicate the appropriate components of the system in Part A. If more than one type of component is apparent, indicate the major one.

STEP 2—Evaluate the condition of the conveying system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observations, or evaluation problems should be written in "C. Comments." Suggestions for correcting problems and cost estimates should also be noted here.

STEP 4—Select an overall rating for the conveying system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 1 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on the conveying system.

PROCEDURES

FORM B.14

STEP 1—Identify the system components in A. This consists primarily of recording information from observation and information from facility staff.

NOTE: Much of the information in this section should be requested from institutional staff before the audit begins. It may be useful to distribute copies of this form and request that the information be part of the basic orientation data. This may in turn require study of and reference to other institutional studies.

STEP 2—Evaluate the system in Part B. (Refer to "D. Numerical Evaluation" for the appropriate value.)

STEP 3—Any extensive comments, observation or evaluation problems should be written in; if it is necessary to make any extensive comments or observations, use the back of the form.

STEP 4—Select the overall rating of this system in Part D. Circle it.

STEP 5—Take the corresponding multiplier and put it in the blank marked (D) in Part E.

STEP 6—Multiply the multiplier by 5 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on safety standards.

B.14. SAFETY STANDARDS—OVERALL SAFETY STANDARDS

A. System types

(1) Exits:
- (a) Stair construction: concrete _____ steel _____ wood _____
- (b) Stair enclosures: none _____ 1 hour _____ 2 hours _____
- (c) Travel distance _____ ft.
- (d) Number of exits _____

(2) Fire ratings (see Appendix)
- (a) Construction type: I _____ II _____ III _____ IV _____ V _____ VI _____
- (b) Building height _____ ft., _____ stories
- (c) Building occupancy group: A—Residential _____ B—Business _____ C—School _____ D—Institutional _____ E—Assembly _____ F—Storage _____ G—Industrial _____ H—Hazardous _____

(3) Extinguishing systems: portable extinguishers _____ standpipe _____ hose cabinets _____ sprinklers _____ other _____

(4) Detection and alarm systems: manual alarm _____ w/annunciator _____ smoke detectors _____ fire detectors _____ visual _____ audible _____

(5) Lighting systems: exit signs _____ exit lighting _____ emergency power batteries _____ emergency generator _____ other power _____

B. System Evaluation

	S	2	3	4	U	Comments
(1) Means of egress						
(2) Fire ratings						
(3) Extinguishing systems						
(4) Detection & alarm system						
(5) Lighting system						
(6) Handicap accessibility*						

C. Comments: *Refer to accessibility audit _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8 ± .1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5 ± .1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2 ± .1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

E. Numerical Rating: 5 x (D) (Condition Value Multiplier) = _____

B.14. Safety Standards _____ Building

PROCEDURES

FUNCTIONAL ANALYSIS

Functional analysis examines a building's suitability of use for its present occupancy as well as for other programs. It studies location, availability of space and various qualitative considerations such as traditional, historical, aesthetic, community, and other intangible values.

Functional analysis is also useful in examining some of the negative aspects of building suitability, such as conflicting land use, visual and physical arrangement problems, and conflicts and attitudes detrimental to the community and the campus.

The evaluation should be performed by someone who has knowledge of the possible uses of the facility and the total university physical plant requirements. This person may be a permanent member of the audit team or may be a representative for the specific facility. They are responsible for taking the lead in this particular section.

The functional standards section is actually four forms: B.15. Functional Standards—Assignable Space; B.16. Functional Standards—Adaptability; B.17. Functional Standards—Suitability; and B.17.A. Functional Analysis.

B.15

PROCEDURES

FORM B.15

STEP 1—Estimate, measure if possible, the total floor space within the facility (gross area). Put this in A. (1).

STEP 2—Estimate, measure if possible, net assignable floor space within the facility (net area). Put it in A. (2).

STEP 3—Divide the net area by the gross area (2). This should give the percentage of assignable space. Put this data in A. (3).

STEP 4—Evaluate the space ratio by the suggested standards of net and gross portions of total building area. Residential facilities have a recommended standard of 240 gross square feet per resident.

STEP 5—Note any problems, concerns, etc., under "C. Comments."

STEP 6—Select an overall rating for assignable space in Part D. Circle it.

STEP 7—Take the corresponding multiplier and put it in the blank marked in Part E.

NOTE: Suggested standards are provided for comparison.

STEP 8—Multiply the multiplier by 4 (Max. Points) and write the answer after "Numerical Rating" in Part E. This completes the section on assignable space.

B.15. FUNCTIONAL STANDARDS—ASSIGNABLE SPACE

A. Space Inventory

(1) Total floor space (gross area) = _____ sq. ft.
(2) Assignable space (net area) = _____ sq. ft.
(3) Assignable space ratio (2) = _____ %

B. Evaluation

	S	2	3	4	U	Comments
Assignable space ratio is						

C. Comments: _____

D. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Optimum for facility of this type	1.0
(2) Adequate for facility of this type	0.8 ± .1
(3) Fair for facility of this type	0.5 ± .1
(4) Poor for facility of this type	0.2 ± .1
(5) Bad for facility of this type	0.0

Suggested Standards	Net %	Gross %
Physical Education Facilities	70	30
Libraries	80	20
General Academic Buildings	60	40
Administration Buildings	65	35

E. Numerical Rating: 4 x (D) (Condition Value Multiplier) = _____

B.15. Functional Standards—Assignable Space _____ Building

B.16

B.16. FUNCTIONAL STANDARDS—ADAPTABILITY

A. System Evaluation

	S	2	3	4	U	Comments
(1) Flexible design concept						
(2) Partitions (movable or rigid)						
(3) Specialized building type						
(4) Flexible service systems						
(5) Stationary equipment						

B. Comments:

C. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8±.1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5±.1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2±.1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

D. Numerical Rating: 4 x (C) (Condition Value Multiplier) = _____

B.16. Functional Standards—Adaptability _____ Building

PROCEDURES

FORM B.16

STEP 1—Evaluate the facility in its adaptability to current and future use. Study each of the subcomponents of the system, A. (1)-(5) and evaluate them according to the standards in "C. Numerical Evaluation."

STEP 2—Any extensive comments, observations of evaluation problems should be written in "B. Comments." Suggestions for correcting problems and cost estimates should also be noted here.

STEP 3—Select an overall rating for adaptability in Part C, circle it and place the corresponding multiplier in the blank marked (C) in Part D.

STEP 4—Multiply the multiplier by 4 (Max. Points) and write the answer after "Numerical Rating" in Part D. This completes the section on adaptability.

PROCEDURES

FORM B.17

STEP 1—Evaluate the facility in its suitability for current use. Study each of the subcomponents of the system, A. (1)-(5) and evaluate them according to "C. Numerical Evaluation."

STEP 2—Any extensive comments, observations or evaluation problems should be written in "B. Comments." Suggestions for correcting problems and cost estimates should also be noted here.

STEP 3—Select an overall rating for suitability in Part C, circle it and place the corresponding multiplier in the blank marked (C) in Part D.

STEP 4—Multiply the multiplier by 4 (Max. Points) and write the answer after "Numerical Rating" in Part D. This completes the section on suitability.

B.17. FUNCTIONAL STANDARDS—SUITABILITY

A. System Evaluation

	S	2	3	4	U	Comments
(1) Educational spaces						
(2) Working environment						
(3) Circulation & functional relationships						
(4) Conflicting uses						
(5) Other						

B. Comments: _____

C. Numerical Evaluation (circle one)

	Condition Value Multiplier
(S) Satisfactory	1.0
(2) Remodeling A—Requires restoration, cost not more than 25% of total replacement	0.8 ± .1
(3) Remodeling B—Requires major modernization, cost between 25 and 50% of total replacement	0.5 ± .1
(4) Remodeling C—Requires major remodeling, cost greater than 50% of total replacement	0.2 ± .1
(U) Demolition—System is totally unsatisfactory and cannot be remodeled—replace	0.0

D. Numerical Rating: 4 x (C) (Condition Value Multiplier) = _____

B.17. Functional Standards—Suitability _____ Building

B.17A

B.17A. FUNCTIONAL STANDARDS—FUNCTIONAL ANALYSIS

A. Considerations:

(1) Traditional value: significant role or meaning relative to institutional customs, habits, or traditional practices or values.
(2) Historical value: significant role or meaning relative to the history of the institution.
(3) Aesthetic value: visual qualities and physical arrangement with other buildings.
(4) Social and community values: Benefits or detriments to campus and community.
(5) Interim use values: facility could be used temporarily for other functions or activities.
(6) Future land use: conflicting land use with campus plan.
(7) Suitability: spatial characteristics relative to specific use or is suitable for highly specialized usage that is difficult to replace.
(8) Intangible values: orientation, psychological environment, noise, odors, etc.

B. Comments: _____

***C. Rating (check one)**

(S) Satisfactory ____
(2) Remodel A ____
(3) Remodel B ____
(4) Remodel C ____
(U) Unsatisfactory ____

*transfer rating to Form B.18

B.17A. Functional Analysis _____ Building

PROCEDURES

FORM B.17A

STEP 1—Study the considerations under A.

STEP 2—Record any significant observations in "B. Comments."

STEP 3—Evaluate the overall rating for the facility in Part C.

Note: This is a qualitative assessment.

STEP 4—Transfer the rating from C. to Form B-18. "Rating Summary." This completes the functional analysis section.

PROCEDURES

RECORDING INFORMATION FROM THE COMPLETED FORMS—B.1-B.17 ON FORM B.

STEP 1—Transfer the numerical ratings from Forms B.1-B.17 to *FORM B, PHYSICAL FACILITIES EVALUATION SUMMARY.* Record each score in the appropriate blank.

STEP 2—Add up each of the component totals and put the total into the parenthesis in the "actual" column.

STEP 3—Add up all of the component totals and put the total in the "actual" column.

STEP 4—Match the Building Rating in the last portion of the summary form to the actual total of the components (e.g., for a component total of 87, the blank beside 75-94 would be checked).

STEP 5—Circle the appropriate condition under building rating. This is the final physical facilities evaluation rating for this facility.

PROCEDURES

FORM B.18

STEP 1—Fill in "A. General Information." The date should be the date the evaluation portion of the facilities audit was completed.

STEP 2—"B. Numerical Rating" is the overall numerical rating that the campus audit team assigns to the facility components.

STEP 3—Record any significant, overall comments, observations, or evaluation problems in "C. Comments." Suggestions for setting priorities, correcting problems, and cost estimates should be noted here.

STEP 4—Campus Rating. Record the rating of the physical analysis, transferred from Form B, Physical Facilities Evaluation Summary, the rating of the functional analysis, transferred from Form B.17-A, Functional Analysis, and enter the final recommended rating.

STEP 5—Where a campus is part of a multi-campus system, a separate audit team rating may be entered in E. This completes the rating summary section.

B.18. RATING SUMMARY

A. General Information

Date _____

(1) Building No. _____ (4) Year Occupied _____

(2) Building Use _____ (5) Gross Square Feet _____

(3) Building Name _____ (6) Assignable Square Feet _____

B. Numerical Rating

	S	2	3	4	U	Comments
(1) Physical analysis						
(2) Functional analysis						
(3) Final recommended rating						

C. Comments: _____

D. Campus Rating

Date _____

Rating _____

E. Audit Team Rating

Date _____

Rating _____

B.18. Rating Summary _____ Building

PROJECT ANALYSIS

A thoroughly prepared facilities survey will determine the physical condition and functional adequacy of each building. An analysis of observed conditions provides the basis for estimating costs of deferred maintenance and requirements to restore the building to its original maintainability. Besides the deferred maintenance costs, two critical questions should be addressed: Is the building suitable for its function and current use, or will it require remodeling? What is the total cost compared with a new building cost, and is a relocation of a program to another building possible?

Each identified priority should be separately estimated and as detailed and specific as possible, using actual quantities for breakdowns of labor and material, and including fees and other appropriate owner costs. General estimates from similar projects or square foot costs are not specific enough to determine priorities. Reliable sources should be used; where institutional staff is available, their experience with campus conditions and similar projects is vital for estimating project costs. Where necessary, architects, engineers, contractors, and special consultants should be retained for assistance in preparing estimates.

Cost analysis can be augmented when there is a computer available to handle the data from a facilities audit. If data is stored in machine-processible form, and renovation and deferred maintenance cost calculations are programmed, costs can be updated easily for inflation or for any changes in building conditions.

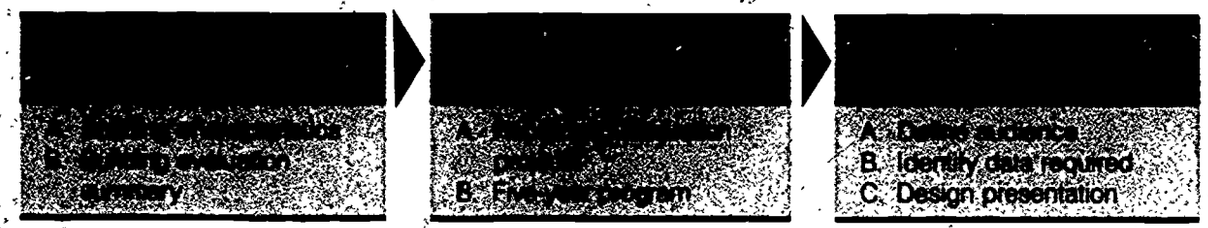
CHAPTER 4

SUMMARIZING AND PRESENTING AUDIT FINDINGS

SUMMARIZING THE FINDINGS

The third phase of the facilities audit is the presentation of findings. The three steps in this phase are:

Step VI. Summarizing the Facilities Audit
Step VII. Prioritizing
Step VIII. Reporting/Presenting



The audit summary can be organized in several ways: by building, by building subcomponents and systems, by repair and renovation, or by priorities. For example, emergency projects, handicapped accessibility, or projects by building types or cost centers can be organized separately; if an energy audit is also conducted, the summary could be by energy conservation factors. The summary should be more than just facts and figures; narrative should also be used to show overall facility conditions, functional appropriateness, and to express other qualitative findings.

Consider the proposed uses for the audit information in developing summaries. Several summaries may be appropriate; information may be organized in a broad overview presentation for the Trustees, or in specific sequences and portions for the physical plant operations staff. Determine if the audience who receives this summary is more interested in physical, functional, or cost analysis before submitting the summary.

FORM I—FACILITIES AUDIT SUMMARY
BUILDING CHARACTERISTICS AND USE

Institution Name—Date of Facilities Audit

1. BUILDING CHARACTERISTICS	BUILDING A	BUILDING B	BUILDING C
Construction Date			
Additions			
Gross Area (Sq. Ft.)			
Net Assignable Area (Sq. Ft.)			
Construction Type*			
Floor Levels			
Building Assignment			

2. BUILDING USE						
HEGIS CODE*	NASF	%	NASF	%	NASF	%
100 Classroom						
200 Laboratory						
300 Office						
400 Study						
500 Special Use						
600 General Use						
700 Supporting						
800 Health Care						
900 Residential						
000 Other						
TOTAL		100		100		100
Resident Capacity						

3. COMMENTS			

*See Appendix

A suggested format for a facilities audit summary is shown on the following forms:

FORM I. Building Characteristics and Use

1. Building Characteristics. A basic description of each building being audited.
2. Building Use. The net assignable square feet (NASF) organized by HEGIS Code classification.
3. Comments. Notation of special characteristics, (e.g. multi-use).

FORM II. Condition Analysis and Proposed Actions

1: Building Condition Analysis. Physical and functional analysis from facilities audit, entered on Form B, Physical Facilities Evaluation Summary. Priorities for each component grouping are entered in appropriate column.

2. Proposed Actions. Maintenance needs and repair and renovation proposals.

FORM II—FACILITIES AUDIT SUMMARY CONDITION ANALYSIS AND PROPOSED ACTIONS

Institution Name—Date of Facilities Audit

	BUILDING A		BUILDING B
1. BUILDING CONDITION ANALYSIS	Form B—Condition Rating	Priorities 0-5 years	
A. PHYSICAL ANALYSIS			
I. Primary Structure			
Foundation System			
Column & Exterior Wall Syst.			
Floor System			
Roof System			
II. Secondary Structure			
Ceiling System			
Interior Walls & Partitions			
Window System			
Door System			
III. Service Systems			
Cooling			
Heating			
Plumbing			
Electrical			
Conveying			
IV. Safety Standards			
V. Functional Standards			
Assignable Space			
Adaptability			
Suitability			
B FUNCTIONAL ANALYSIS			
C. FINAL RECOMMENDED RATING			
2. PROPOSED ACTIONS			
Continued Maintenance			
Minor Repair/Renovation			
Preplanning			
Major Repair/Renovation			
Reconstruction			
Demolition			

FORM III—FACILITIES AUDIT SUMMARY
PROJECT REQUEST FOR REPAIR AND RENOVATION

_____ _____FY
Institution Name

_____
Building

1. **PROJECT TITLE** _____

2. **PRIORITY NUMBER** _____

3. **PROJECT DESCRIPTION AND JUSTIFICATION:** _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

4. **PROJECT COST ESTIMATE:**

Labor	$_____
Materials	$_____
A/E Fees	$_____
Other	$_____
Contingency	$_____
TOTAL COST ESTIMATE	$_____

5. **ESTIMATE PREPARED BY:** _____

6. **REQUEST DATE FOR PROJECT START:** _____

FORM III. Project Request for Repair and Renovation.
Description of project and cost estimate prepared in detail using labor and material breakdowns specifically for the project

FORM IV. Five-Year Repair and Renovation Program.
Priority ranking of repair and renovation requests for a five-year period.

An example of presenting the case for funding support is the five-phase budget request process developed by the State of Colorado.

1. Determine the specific problem. A detailed condition analysis is completed for each facility. Building components are evaluated and major repair or renovation items are identified.

2. Verify the problem and determine the best solution. Problem items identified in the condition analysis are summarized. Technical staff verify each item and propose a solution.

3. Prepare a cost estimate for each problem/solution. Plant operations staff prepare cost estimates for each specific problem and proposed action.

4. Administratively review and prioritize each problem/solution/cost. A committee of senior plant operations staff review, prioritize, and approve each project. A summary list is prepared and distributed to plant operations management for comments.

5. Prepare the budget process document. After all projects have been administratively reviewed and approved, the budget request document is prepared. State of Colorado guidelines are followed and, wherever possible, appropriate detail is added.

The thoroughness of the Colorado approach has aided in regularly securing requested funds. The plant operation management comments, "We have no problems in getting what we need."

FORM IV—FACILITIES AUDIT SUMMARY
FIVE-YEAR REPAIR AND RENOVATION PROGRAM

_____ _____ FY

Institution Name

PRIORITY NUMBER	PROJECT DESCRIPTION	ESTIMATED COST
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

SETTING PRIORITIES FROM THE AUDIT

The facility audit will furnish two types of data to the administration and other decisionmakers who need to set priorities. First, those buildings that have the greatest need based on the severity of their physical and functional problems will be recognized. Second, the audit results will help forecast major renovation and repair projects for the next five years.

The rating system will not automatically show what items must be attended to in 1-2-3 order. For example, a facility that rates a 74 is not automatically worse than one that rates a 75. However, it is probably valid to conclude that those facilities in the 50-74 range will need more immediate attention than those in the 75-100 range. Also, each institution has its own priorities; the audit results may not show some qualitative element that would affect funding priorities.

Probably as many different reasons for justifying funding requests exist as there are requests for funds. Pragmatic reasons will dictate grouping physical plant improvements into broad descriptive categories to assist in determining priorities. The broad categories are:

1. Program and operational purposes. Actions necessary to support institutional missions, because they produce space, furnishings, equipment, utilities, and other physical items the campus must have to conduct its activities.

2. Economy and efficiency measures. Physical plant actions which also support program and operational objectives, but deserve special attention because they will also result in immediate or eventual cost savings.

3. Institutional liability proposals. Special matters requiring early attention because, if the problems are not remedied, people may be injured, property damaged, and the institution's physical ability to fulfill its missions placed in jeopardy, possibly through legal suits, injunctions, and court-ordered actions.

The general guidelines for priority selection of capital needs used by Syracuse University are:

1. Elimination of health and safety hazards.
2. Major renovations and remodelings designed to upgrade existing facilities and protect the investment in an institution's plant assets.
3. Self-amortizing projects.
4. Improvements to physical plants aimed at reducing institutional operating costs such as energy conservation, building maintenance, and utility systems.
5. Elimination of architectural barriers to provide access and opportunity for the handicapped and elderly.
6. Renovations of existing facilities for revised academic programs or to overcome obsolescence.
7. Replacement of existing facilities in cases where renovation or remodeling is impractical.
8. Capital improvement projects that are essential to accommodate new programs or to consolidate several programs from existing obsolete facilities.

Categorization of priorities requires consistent treatment of requests to arrive at funding decisions. Typically, categorizing involves separating building requests from site requests, differentiating repairs and renovations from new building projects, estimating project costs, and then summarizing project requests for a five-year period.

Selection of funding priorities is based on a systematic categorization to arrive at funding decisions including identifying all needs, differentiating repairs and renovations from new building projects, tabulating costs of physical plant improvements, determining priorities, and requesting funds. During this cycle of (a) articulated need, (b) reviews and revisions, (c) recommended funding, and (d) funding decision, all parties may or may not concur on priorities. Occasionally, first priorities on available funds have not been met and lower priorities advanced. This seems to be particularly true in selecting new building projects over repair and renovation projects. For these reasons, it is essential that an institution use the facilities audit as the basis for developing a facilities improvement policy to meet the needs of observed conditions.

Other factors are not easily categorized but should be considered in funding decisions. Faculty and staff morale make a positive contribution to institutional productivity and can be influenced by sufficient space and properly functioning, well-furnished and equipped, attractive and well-maintained facilities. Student recruitment is influenced by the physical appearance of a campus and the architectural qualities of its buildings and site aesthetics. Once enrolled, the quality of the physical environment can be a factor in student retention. Another factor is the relationship of a campus to its community; one of close interdependence enriches the students' and faculty's experience with the support of the community and vice-versa. An institution may represent the largest economic activity in a region and act as a strong contributor to the cultural and educational life of a community. Well-functioning and attractive facilities are economic assets to a community and may require community support to offset the effects of deterioration. A final factor is historic preservation. Facilities which may be in marginal condition and otherwise considered for replacement, can be justified as a priority for improvement because of their importance to institutional continuity and because they are a focal point for the non-academic community.

Final decisions on funding requests should be based on a careful examination of physical plant issues to be faced in the coming decade, given the age and condition of campus buildings, enrollment, projections, and expected severe constraints on funding. The examination should include: (1) a detailed review of recent requests for physical plant improvements, (2) a site evaluation of requests, (3) a review of the priority designation for projects, and, (4) an objective assessment of each request in relation to the three broad categories of program and operational purposes, economy and efficiency measures and institutional liability proposals.

Two concepts influencing final decisions are *need* and *risk*. For example, does one defer action on academic or research program advancement in favor of remedying life-safety problems or achieving operational economies? In the final analysis, institutional policy must be made concerning protection of campus physical assets, fiscal instability by postponing deferred maintenance or avoiding energy conservation measures, and the risk of erosion in program quality and campus life—matters less tangible, but as debilitating as the more obvious physical consequences of deferring high priority building and site repairs.

DESIGNING THE AUDIT PRESENTATION

Before beginning the audit procedures, think about what the presentation will look like If the audit summary is to be submitted in report form only, consider what charts, graphs, and illustrations would be helpful The report itself can be presented as a list of facts and figures in an abbreviated outline or in an extensive narrative which includes subjective observations and commentary.

If the audit presentation is to be a verbal one, consider the use of visual aids. Large charts, slides, and models or samples make much more of an impact than three hours of droning prose. Develop a theme for the presentation; organize it so the train of thought can be followed. Above all—keep the presentation simple. Any technical or detailed questions can be handled later or may be taken out of the written audit summary by those who are interested.

The facilities audit can be one of the most valuable tools the administration and staff have in facilities management if it is developed and presented well. The best-conducted audit is useless unless the information can be communicated to the intended audience in a usable format. Conclusions and recommendations should be able to stand on their own.

For presentation purposes, several universities found it easier to classify their facilities into three major categories:

1. **Academic/Administrative.** This category includes facilities which are instructional and non-instructional in nature: Classrooms, offices, research areas, libraries, and administrative facilities.
2. **Physical Plant/Farms.** This includes all maintenance facilities and yards, storage and loading areas, and farm or agricultural facilities.
3. **Auxiliary Services.** This category includes student and faculty housing, student centers, athletic centers, and other self-supporting activities.

This classification system makes it easier to organize a presentation which can be translated into a budgetary framework The larger institution with auxiliary services in separate facilities can identify projects financed on a self-amortizing basis and other categories that require full appropriation for funding repair and renovation projects. Smaller institutions with limited resources for comprehensive audits and presentation techniques will find forms I-IV found earlier in this chapter useful as a format for presentation of audit findings.

GAINING SUPPORT FOR THE FACILITIES AUDIT CONCLUSIONS AND RECOMMENDATIONS

Once the facilities audit is complete, how does one gain support for a program to correct deficiencies uncovered by the audit? Essentially, by developing an effective presentation—one that can sell the conclusions and recommendations. Consider the following items when presenting a program:

Overview. Does the audit show a broad understanding of the institution's budgetary mechanism and present position? Do the conclusions and recommendations fit into long-term institutional policies and overall goals?

Credibility. The credibility of the audit and facilities staff is very important. It must be able to show that previously allocated funds were well used and take the initiative on the best use of new resources from new programs.

Competency. The audit team and the implementing staff must be able to show their competency in the audit process as well as in the eventual follow-up in program activities.

Thoroughness of Preparation. The facilities audit must be thoroughly researched, analyzed, and presented. The form of the presentation as well as the substance must be impeccable, data must be noncontradictory and capable of withstanding thorough scrutiny.

Sympathetic Senior Administrator. An institution's budget represents components in competition for limited financial resources. Without the assistance of a strong advocate, the facilities audit may not be done or may be just put on the shelf after completion. A senior administrator who understands the audit process and its conclusions and recommendations is invaluable in the implementation stage.

Preparation for Implementation. The conclusions and recommendations of the facilities audit must be in an immediately usable format. The administrators who will be involved in the implementation should be included in the formulation of the conclusions. Operational staff should also be involved when possible; the end product is better for their contributions and it also ensures that there are no misconceptions about the purpose of the audit.

CONCLUSIONS

Following the three phases of the self-evaluation process will produce a successful facilities audit. Thus, it is essential that their nature, purpose, and intended use be understood. Flexibility in using the procedures is necessary, depending on an institution's size, existing data, and available institutional resources. The process described in this workbook represents the methods of many statewide public systems and private and public colleges and universities. Each method was evolved over a period of time and met the purposes of campus administrators, plant operations staff, and governing boards in different regions of the country. Application of the self-evaluation process to your institution will benefit present as well as future members of the campus community.

APPENDICES A

APPENDIX A
CONDENSED FACILITIES AUDIT

A condensed facilities audit may be appropriate for institutions that have already conducted a comprehensive audit and wish to use an abbreviated format for updating purposes. The same phases and steps used for a comprehensive audit are used in the condensed approach. It should be noted that the condensed audit shifts the survey emphasis from determining an overall facility evaluation to an analysis of conditions of components. In some cases, the evaluation of component parts of a structure and an overall building summary may require time and resources which are inappropriate to an institution. However, the background material and content of the manual portion of this workbook should be carefully reviewed before selecting the condensed audit approach.

There are four suggested forms for the condensed audit, representing a minimum level of information about a facility and its repair and renovation needs

FORM I—CONDENSED FACILITY DESCRIPTION

1. BUILDING CHARACTERISTICS	BUILDING A	BUILDING B	BUILDING C
Construction Date			
Additions			
Gross Area (Sq. Ft.)			
Net Assignable Area (Sq. Ft.)			
Construction Type*			
Floor Levels			
Building Assignment			

2. BUILDING USE HEGIS CODE*	NASF	%	NASF	%	NASF	%
100 Classroom						
200 Laboratory						
300 Office						
400 Study						
500 Special Use						
600 General Use						
700 Supporting						
800 Health Care						
900 Residential						
000 Other						
TOTAL		100		100		100
Residential Capacity						

3. COMMENTS

*See Appendix

FORM I. FACILITY DESCRIPTION

1. Building Characteristics. A basic description of each building being audited.
2. Building Use. The Net Assignable Square Feet (NASF) organized by HEGIS Code classification.
3. Comments. Notation of special characteristics (e.g., multi-use).

FORM II. CONDITION ANALYSIS

1. Building Condition Analysis. Physical and functional analysis from facilities audit entered on Form B, Physical Facilities Evaluation Summary. Priorities for each component grouping are entered in appropriate column.
2. Proposed Actions. Maintenance needs and repair and renovation proposals.

FORM II—CONDENSED FACILITIES AUDIT BUILDING CONDITION ANALYSIS

BUILDING COMPONENT	BUILDING CONDITION	REPAIR/RENOVATION RECOMMENDATION
A. Primary Structure		
1. Foundations		
2. Column and Exterior Framing		
3. Floor System		
4. Roof System		
B. Secondary Structure		
1. Ceiling System		
2. Interior Walk & Partitions		
3. Windows		
4. Doors		
C. Service Systems		
1. Ventilating/Air Conditioning		
2. Heating		
3. Plumbing		
4. Electrical		
5. Conveying		
D. Safety Standards		
1. Egress		
2. Fire ratings		
3. Extinguishing Systems		
4. Detection & alarms		
5. Emergency power		
E. Energy Conservation		
1. Source of energy		
2. HVAC		
3. Lighting		
4. Insulation		
F. Handicapped Access		
1. Circulation		
2. Services		
G. Functional Standards		
1. Assignable space		
2. Adaptability		
3. Suitability		

Condition Index: (A) *Good*—requires no major repairs or renovations;
(B) *Fair*—Repairs and renovations required in next 6-10 years;
(C) *Poor*—Repairs and Renovations required in next 2-5 years;
(D) *Unsatisfactory*—Repairs and renovations required immediately to prevent severe building damage, eliminate safety hazards or comply with codes and ordinances;
(E) *Terminate*—Demolish or dispose of facility.

FORM III—CONDENSED FACILITIES AUDIT
PROJECT REQUEST FOR REPAIR AND RENOVATION

_____ _____ FY

Campus

_____

Building

1. PROJECT TITLE _____

2. PRIORITY NUMBER _____

3. PROJECT DESCRIPTION AND JUSTIFICATION: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

4. PROJECT COST ESTIMATE:

Labor	$_____
Materials	$_____
A/E Fees	$_____
Other	$_____
Contingency	$_____
TOTAL COST ESTIMATE	$_____

5. ESTIMATE PREPARED BY: _____

6. REQUEST DATE FOR PROJECT START: _____

FORM III. PROJECT REQUEST FOR REPAIR AND RENOVATION

Description of project and cost estimate prepared in detail using labor and material breakdowns specifically for the project.

FORM IV. FIVE-YEAR REPAIR AND RENOVATION PROGRAM

Priority ranking of repair and renovation requests for a five-year period.

FORM IV—CONDENSED FACILITIES AUDIT
FIVE-YEAR REPAIR AND RENOVATION PROGRAM

_____ _____ FY

Institution Name

PRIORITY NUMBER	PROJECT DESCRIPTION	ESTIMATED COST
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

HEGIS ROOM USE CATEGORIES

100 Classroom Facilities
110 Classroom
115 Classroom Service

200 Laboratory Facilities
210 Class Laboratory
215 Class—Laboratory Service
220 Special—Class Laboratory
225 Special—Class Laboratory Service
230 Individual—Study Laboratory
235 Individual—Study Laboratory Service
250 Nonclass Laboratory
255 Nonclass—Laboratory Service

300 Office Facilities
310 Office
315 Office Service
350 Conference Room (Office Related)
355 Conference—Room Service (Office Related)

400 Study Facilities
410 Reading/Study Room
420 Stack
430 Open—Stack Reading Room
440 Processing Room
455 Study Service

500 Special-Use Facilities
510 Armory
515 Armory Service
520 Athletic/Physical Education
523 Athletic Facilities Spectator Seating
525 Athletic/Physical Education Service
530 Audiovisual, Radio, TV
535 Audiovisual, Radio, TV Service
540 Clinic (Nonhealth Professions)
550 Demonstration
555 Demonstration Service
560 Field Building
570 Animal Quarters
575 Animal—Quarters Service
580 Greenhouse
585 Greenhouse Service
590 Other

600 General-Use Facilities
610 Assembly
615 Assembly Service
620 Exhibition
625 Exhibition Service
[illegible]ood Facilities
635 Food—Facilities Service
650 Lounge
655 Lounge Service
660 Merchandising Facilities
665 Merchandising—Facilities Service
670 Recreation
675 Recreation Service
680 Meeting Room
685 Meeting—Room Service
690 Locker Room

700 Supporting Facilities
710 Data Processing/Computer
715 Data Processing/Computer Service
720 Shop
725 Shop Service
730 Storage
735 Storage Service
740 Vehicle—Storage Facility
745 Vehicle—Storage Facility Service
750 Central Food Stores
760 Central Laundry

800 Health-Care Facilities
810 Patient Bedroom
820 Patient Bath
830 Nurse Station
840 Surgery
850 Treatment
860 Service Laboratory
870 Supplies
880 Public Waiting
895 Health-Care Service

900 Residential Facilities
910 Sleep/Study Without Toilet/Bath
919 Toilet/Bath
920 Sleep/Study with Toilet/Bath
935 Sleep/Study Service
950 Apartment
955 Apartment Service
970 House

000 Unclassified Facilities
050 Inactive Area
060 Alteration or Conversion Area
070 Unfinished Area

Nonassignable Area
WWW Circulation Area
XXX Custodial Area
YYY Mechanical Area
ZZZ Structural Area

APPENDIX B HIGHER EDUCATION GENERAL INFORMATION SURVEY (HEGIS) ROOM USE CATEGORIES

APPENDIX C
BUILDING TYPE CHARACTERISTICS

BUILDING TYPE CHARACTERISTICS

TYPE	I	II	III	IV	V	VI
Class-Fire Rating	Fire-Proof 3-4 hour	Fire-Resistive 2 hr. or better	Protected 1-2 hour	Slow Burning 1 hr. or better	Combustible Less than 1 hr.	Unprotected No Rating
Exterior Walls	Stone, Heavy Masonry	Brick/Stone Veneer Heavy Masonry Back-up	Insul. Met. Panel Light Masonry Back-up Maybe Bearing Wall	Masonry or Mas. Veneer Maybe Bearing Wall	Wood, Cem. Asb or Window Wall Panels Lt. Met./Wood Frmg.	Plywd./Sh. Met. Panels. Lt. Met. Girts/Wd. Frmg
Structural Framing (Beams & Columns)	Reinforced Concrete or Heavy Structural Steel W/Conc., Plas. or F.R. GWB. Fire Protection		Light Structural Steel, St Joi , GWB F. Protection	Heavy Timber (Mill Constr.) St./Wood Cols.	Wood/Light Steel Frmg. Wood Framed Bearing Walls	Pre-Fab. Lt. Steel Wood Trusses or Built up Rafters, Box Shell
Floor	Reinforced Concrete	R.C., Mas. Arch w/Conc. Fill, Heavy Battle Dk.	Cellular Steel or Precast Concrete Slab deck, Conc. Fill	Heavy Timber Planking	Frmg.: Wood, Lt. Met. or Steel Joist.	Sheet metal or Plywood on Light Steel or Wood Framing
Roof	Reinforced Concrete	R.C. or PreCast Conc.		Wood Planking; steel or Precast Conc. w/Conc. Fill	Deck: Plywood, Wood, Sheathing or protected Sh. Met.	

Notes: Any type may have an element from adjacent types, but should not have a preponderance of elements from a type of higher number (poorer class of construction).

Explanation of Abbreviations:

C.B.	= Conc. or Masonry Block	F.R.	= Fire Resistive	Mas.	= Masonry (includes brick, stone, structural tile, gypsum block and unit masonry)
Cem. Asb.	= Cement Asbestos	Frmg.	= Framing		
Con.	= Concrete	GWB.	= Gypsum Wall Board	Min.	= Minimum or Minimal
Compo.	= Composition	Ins.	= Insulation	Plas.	= Plaster
F.P.	= Fire Proofing	Lt. Metal	= Light Metal	Plwd.	= Plywood
				R.C.	= Reinforced Concrete
				Str. St.	= Structural Steel

REFERENCES

1. Altobello, Daniel J. "The Effects of Deferred Maintenance on Financial Planning", *NACUBO Business Officer* (March 1979), 21-22.
2. Association of Physical Plant Administrators. *Remodeling, Renovation, and Conversion of Educational Facilities*. Washington: APPA, 1975.
3. ASHRAE Handbook. *Fundamentals Volume (1977)*
   Systems Volume (1976)
   Equipment Volume (1975)
   Applications Volume (1978)
   New York: American Society of Heating, Refrigeration and Air Conditioning Engineers, (1975-78).
4. Bareither, Harlan D. "Deferred Maintenance Technical Bulletin #2: Space Realignment, Renewal, and Replacement (SR^3)". *APPA Newsletter* (February 1979), 27:2.
5. *1981 Berger Building and Design Cost File*. New York: Van Nostrand Reinhold Company, 1981.
6. *Boeckh Building Valuation Manual, 2nd Edition*. Milwaukee: Boeckl. Publications 1979.
7. Bowen, Howard R. *The Costs of Higher Education* San Francisco: Jossey-Bass, 1980.
8. Callender, John Hancock. *Time Saver Standards* New York: McGraw-Hill Book Company, 1966
9. Carnegie Commission on Higher Education. *The More Effective Use of Resources: An Imperative for Higher Education*. Hightstown, N.J.: McGraw-Hill Book Company, 1977.
10. Castaldi, Basil. *Educational Facilities: Planning, Remodeling, and Management*. Boston: Allyn & Bacon, Inc., 1977.
11. Class, Robert Allan and Koehler, Robert E. *Current Techniques in Architectural Practice*. Washington: The American Institute of Architects, 1976.
12. *Comprehensive Maintenance and Repair Pro-n*. Annapolis, Md.: State of Maryland Dement of General Services, 1978.
13. Conover, H. S. *Grounds Maintenance Handbook*. New York: F. W. Dodge Corporation, 1958.
14. *Dodge Construction Systems, Costs 1981*. New York: McGraw-Hill, Information Systems, 1981.
15. *1981 Dodge Manual for Building Construction Pricing and Scheduling, 16th Edition*. New York: McGraw-Hill Information Systems, 1981.
16. Educational Facilities Laboratories. *Bricks and Mortarboards*, New York: Educational Facilities Laboratories, 1964.
17. _____. *Campus in Transition*. New York: Educational Facilities Laboratories, 1975.
18. *Engineering News Record*. Cost Analyses, published quarterly.
19. Griffin, Gerald and Burks, David R. *Appraising Administrative Operations*. Berkeley, CA.: University of California Systemswide Administration, 1976.
20. _____. "Deferred Maintenance III: Management Appraisal Guidelines Physical Plant Department" *APPA Newsletter*. (March 1979), 27:3.
21. Griffith, William J. *Using Facilities Audit for Deferred Maintenance*. Columbus, OH.: Ohio State University, unpublished paper, 1981.
22. Halstead, D. Kent. *Higher Education Prices and Price Indexes*. Washington: U.S. Department of Health, Education and Welfare, 1975 (with Supplements).
23. Heintzleman, John E. *The Complete Handbook of Maintenance Management*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1976.
24. Hornbostel, Caleb. *Construction Materials: Types, Uses and Applications*. New York: John Wiley and Sons, 1978.
25. Hunt, Jr., William Dudley. *Creative Control of Building Costs*. Washington: The American Institute of Architects, 1967.
26. Jacobsen, Robert L. "Colleges May Pay Dearly for Delaying Maintenance". *Chronicle of Higher Education* (November 17, 1977).
27. Johnson, Eugene W. "Physical Plant Financial Administration for Small Schools". *APPA Newsletter* ((March 1978), 26:3.

APPENDIX D
REFERENCES
SAMPLE PROCEDURES

61

6.1A

28. Kaiser, Harvey H. *Mortgaging the Future: The Cost of Deferring Maintenance.* Washington: Association of Physical Plant Administrators, 1979.

29. _____. *Managing Facilities More Effectively.* San Francisco: Jossey Bass, Number 30, 1980.

30. Knowles, Asa. *Handbook of College and University Administration, General.* New York: McGraw-Hill Book Company, 1970.

31. Loomis, Wayne and Skeen, Duane. "Evaluating the Adequacy of Campus Physical Facilities". *Planning for Higher Education,* Society for College and University Planners (December 1977). 6:3.

32. *Marshall Valuation Service, 1981.* Los Angeles, CA: Marshall and Swift Publication Company, 1981.

33. McClintock, David L. *Formula Budgeting: An Approach to Facilities Funding.* Washington: Association of Physical Plant Administrators, 1979.

34. McGuinness, William J. and Stein, Benjamin. *Building Technology: Mechanical and Electrical Systems.* New York: McGraw-Hill Book Company, 1975.

35. Means, Robert Snow, *Building Construction Cost Data, 1981.* Duxbury, MA: Robert Snow Means Company, 1981.

36. Merritt, Frederick S. *Building Construction Handbook. 3rd Edition.* New York: McGraw-Hill Book Company, 1975.

37. Minter, W. John and Bowen, Howard R. *Independent Higher Education—1980.* Washington's National Institute of Independent Colleges and Universities, 1980.

38. _____. *Preserving America's Investment in Human Capital.* Washington: American Association of State Colleges and Universities, 1980.

39. Morrow, L. C. *Maintenance Engineering Handbook.* New Jersey, McGraw-Hill Book Company, 1960.

40. Pazderka, Robert J. "Deferred Maintenance: A Threat to the Built Environment for Learning". *PA Newsletter* (January, 1979). 27:1.

41. Ramsey/Sleeper. *Architectural Graphic Standards, 7th Edition.* New York: John Wiley and Sons, 1981.

42. Suber, Terry L. *Coping With Deferred Maintenance.* Fort Colling, CO: Colorado State University, unpublished paper, 1981.

43. Tennessee Higher Education Commission. *Facilities Evaluation Study.* Knoxville, TE: Tennessee Higher Education Commission, 1980.

44. Weber, George O. Editor. *A Basic Manual for Physical Plant Administrators.* Washington. The Association of Physical Plant Administrators, 1974.

45. _____. *Formula Budgeting for Physical Plants of University and Colleges.* College Park, MD: University of Maryland, Unpublished paper, May, 1972.

SAMPLE PROCEDURES

Additional references for sample audit procedures were obtained by contacting the following:

1. Colorado State University, L. Terry Suber, Physical Plant Department, Fort Collins, Colorado 80523.
2. Dober and Associates, Inc., 385 Concord Avenue, Belmont, Massachusetts 02178.
3. Nebraska Coordinating Commission for Higher Education, William S. Fuller, Lincoln, Nebraska.
4. Ohio State University, William J. Griffith, Office of Campus Planning and Space Utilization, 8 Administration Building, 190 North Oval Mall, Columbia, Ohio 43210.
5. Purdue University, W. W. Wade, Department of Physical Plant, Administrative Services Building, West Lafayette, Indiana 47907.
6. San Francisco State University, David Taylor, Plant Operations, 1600 Holloway Avenue, San Francisco, California 94132.
7. Tennessee Higher Education Commission, Brenda N. Albright, 501 Union Building, Suite 300, Nashville, Tennesee 37219.
8. Villanova University, Edward Meagher, Maintenance Department, Villanova, Pennsylvania 19085.