BUILDING AND EQUIPMENT SPACE PLANNING

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1. GENERAL

1.01 This section outlines the general building planning and provisioning process for new telephone equipment and nonequipment (administrative) buildings and building additions. Much of this process also applies to building rearrangement projects. This section discusses building planning and provisioning only. This separation follows the organizational division of these functions.

1.02 Due to the level and scope of the changes to this section, change arrows have been omitted from this issue. This section is being reissued to:

(a) Remove equipment and space planning procedures

(b) Include nonequipment (administrative) building planning and provisioning in addition to equipment building planning.

1.03 Criteria for planning specific building usage types may be found in the appropriate Sections 760-100-001 through 760-160-100 (Space Planning Bell System Practices).

2. BUILDING PLANNING AND PROVISIONING PROCESS

2.01 The objective of the building planning and provisioning process is to provide adequate building space within the governing guidelines of time, place, and cost. This process requires the timely recognition and knowledgeable interpretation of space needs, as well as the systematic provision of sufficient building space. The building planning and provisioning process is shown in the flowchart in Fig. 1 and discussed in the subsequent paragraphs.

MASTER PLANNING

2.02 Master planning provides for the overall coordination of user space requirements and available space facilities. User space requirements are determined by user space forecasts or user space requests. Available space facilities are identified from the floor space assignment record.

2.03 When discrepancies occur between user space requirements and existing available facilities, a building project is identified. A building project may require the acquisition of new space or rearrangements of existing space.

2.04 When a building project is identified, an analysis of potential locations is performed. Such

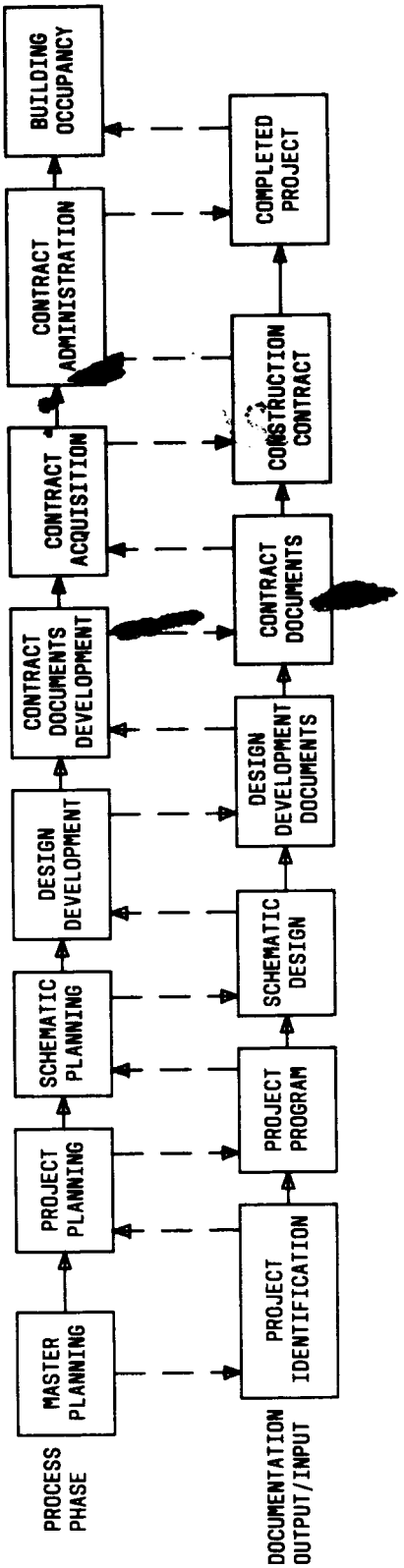

Fig. 1—Flowchart of Building Planning and Provisioning Process

an analysis should include economic studies and time schedules required for each potential location. Many other factors may influence the omission or selection of a location and, therefore, may be required in this analysis. Some of these factors are:

(a) Zoning ordinances

(b) Fire regulations

(c) Hazard exposure

(d) Vehicular access

(e) Parking availability.

The analysis for new buildings should also include:

(a) Availability of utilities (water, sewage, and electricity)

(b) Surface and subsurface conditions

(c) Site capacity for growth.

The analysis for existing buildings should also include:

(a) Building structure

(b) Physical security

(c) Building mechanical/electrical system capacities.

2.05 In order to perform this analysis of potential locations, the master planner must coordinate with the real estate manager, project planner, and the building design and construction group. This is particularly important in developing preliminary cost estimates and in evaluating apparent project requirements as listed above.

2.06 Time schedules associated with the project must allow sufficient intervals for the various phases involved in the building planning and provisioning process. Table A outlines typical time intervals for large, medium, and small building construction projects. Building rearrangement time intervals are also included.

2.07 A recommendation, based on the analysis of potential locations, is prepared by the master planner. An existing or a new location may be advised. The overall project scope should be outlined including estimated budget expenditures and time schedules.

2.08 Upon approval of the building project recommendation, the project is initiated. The master planner coordinates this approval.

PROJECT PLANNING

A. Data Collection

2.09 The project planner requests and receives project requirements from the user groups to quantify space and time parameters. This type of information gathering requires surveying or interviewing the user group(s) to establish specific project requirements.

2.10 Both present and future personnel and/or equipment forecasts should be determined. Future forecasts should be determined at various intervals up to 8 years. These intervals are generally determined by key growth or change events.

2.11 To simplify the information-gathering process, it is recommended that a representative be appointed from each user group to coordinate with the project planner.

2.12 Standardized questionnaires and forms may be helpful in this process to ensure a thorough appraisal.

B. Project Program Development

2.13 The project planner develops a specific project program based on the information obtained from the user groups. A project program organizes user group requirements and other design constraints into a format that is useful for design. Information contained in a project program may include:

(a) Site requirements/conditions

(b) Codes, standards, and regulations pertinent to the facility

(c) User functional and operational organization models

(d) User growth projections

TABLE A

TYPICAL BUILDING SCHEDULE INTERVALS

PROJECT PHASE	LARGE MULTISTORY BUILDINGS	MEDIUM SIZE BUILDINGS (2-10,000 FT^2)	SMALL BUILDINGS (2000 FT^2)	BUILDING REARRANGEMENTS (VARIOUS—TYPICAL)
	BUILDING PROJECT INTERVALS (MONTHS)			
Data Collection	3-4	2	1	1
Project Program	2	2	1	2
Schematic Design (Preliminary Plans) (Estimate Approval)	2	1	1	1
Design Development (Construction Documents)	6-9	3-4	2	2
Bid and Award Period	2	1	1	1
Construction	18-24(+)	6-12	3-6	1-3
Total Months	33-43(+)	15-22	9-12	8-10

(e) User physical needs:

- Floor space
- Furniture/equipment
- Environmental conditioning.

2.14 The size and scope of a project program is generally dependent on the number of variables associated with it; the more variables, the larger the program. Generally, a new building requires a larger program than a building rearrangement project. Information describing project programming tools and methods is available in many industry textbooks.

C. Site Selection and Acquisition

2.15 If a new site must be acquired for the project, the real estate planner should coordinate the following activities:

(a) Perform a real estate market appraisal to identify potential locations.

(b) Prepare a site selection recommendation based on this appraisal.

(c) Prepare and obtain approval of the authorization for the purchase or leasing of the new site.

(d) Finalize negotiations with the site owner or agent.

(e) Prepare and obtain approval of the required legal documents.

DESIGN

A. Schematic Plans

2.16 A schematic design interprets the project program, transforming it into a preliminary building plan. Where appropriate, the schematic design may also include preliminary site plans. The project planner is responsible for the schematic design.

2.17 Schematic plans are generally drawn to scale and indicate the following:

(a) Building dimensions and shape

(b) Building orientation and location on site

(c) Site layout (if appropriate)

(d) Building space allocations

(e) Equipment layouts (for large equipment installations).

2.18 The project planner must coordinate closely with the user groups in the development of schematic plans to ensure an efficient and functional operation layout is achieved.

2.19 However, the project planner must also consider the total project budget and time constraints. A primary responsibility of the project planner is to evaluate alternate schematic solutions to determine both the functional and the economic advantages/disadvantages of design solutions.

2.20 The use of Computer Aided Design Drafting (CADD) systems for building planning should be evaluated by the individual operating company. Many outside vendor systems are available that perform initial block planning through the development of construction documents. These computer systems may facilitate effective design and layout of building planning. The operating company must evaluate and identify projects or locations where high planning activity is evident and determine if it is economically feasible to incorporate a CADD system into the building process. System Letter 82-10-131 should be reviewed in evaluating the need for a CADD system.

2.21 Telephone Office Planning and Engineering System (TOPES) is a computer-aided graphics system that is available from Western Electric as an Engineering, Planning, and Analysis System (EPLANS) product. The TOPES (a time-shared computerized system with software and data bases in a large, centralized host computer) is specifically designed to help operating company engineers prepare preliminary and final study plans for central offices and transmission stations. This system may also be used in developing preliminary plans for administrative office space.

2.22 Cost estimates associated with each alternate plan should be determined and analyzed in the selection of a final proposed schematic plan.

2.23 Capital Utilization Criteria (CUCRIT), developed by AT&T, is offered as a library program on an AT&T-owned IBM time-shared system. This program was developed to assist telephone company planners in determining the financial and economic worth associated with a given set of expenditures to accomplish a specific objective, such as a new building design. This program is available to all Bell Operating Companies. Detailed instructions for acquisition and use of this economic study tool are contained in a memorandum attached to GL 76-07-034 dated July 1, 1976. Section 781-445-150* is the User's Manual for this program.

2.24 The CUCRIT program is a mechanized procedure that enables operating companies to evaluate up to five mutually exclusive alternatives.

(a) The program can be used to consider:

(1) First costs including interest during construction, investment tax credit, depreciation (book, book/tax, and tax), and salvage value

(2) Both one-time and recurring expenses

(3) Division of revenues

(4) Ad valorem, gross receipts, state income, and federal income taxes

(5) Debt interest

(6) Net cash flow

(7) Inflation effects.

(b) The CUCRIT program outputs are:

(1) Net present value

(2) Present worth of expenditures

(3) Discounted payback

(4) Modified rate of return (MROR) which is the measure of long-term economic efficiency recommended for Bell System use in the third edition of the AT&T *Engineering Economy*, McGraw-Hill Book Company, an income statement for analysis of the project's incremental impact on the company's financial report

(5) Return on capital investment

*Check Divisional Index 781 for availability.

(6) Sensitivity analyses of the effects of small changes in inflation rates, operating costs, and revenues.

2.25 The economic study that can be performed using CUCRIT is intended to complement the experience and the intuitition the engineer uses in selecting the best plan. Moreover, in providing a more rational basis for decision making, CUCRIT stimulates the engineer into quantifying characteristics of the alternative plans, which ensures that these characteristics are exposed for consideration.

2.26 Alternate preliminary plans should be reviewed by all interested groups. Such groups may include the following:

(a) ***User Group(s):*** Review by the user groups generally includes the amount of space provided, shape, access, growth potential, and other operations oriented space characteristics.

(b) ***Building Engineering Staff:*** This review is generally focused on the economics and feasibility of the building plans in view of construction practices and requirements.

(c) ***Equipment Engineering Staffs:*** This review is recommended for large installations of equipment (telecommunications or data processing). Such reviews should anticipate both the present and future equipment space requirements.

2.27 A final schematic plan is prepared by the project planner based on the reviews outlined above. This final schematic plan should be reviewed and approved by all interested groups.

2.28 The approved final schematic plan is forwarded to the building engineer. The building engineer is responsible for preparing and coordinating the approval of the building project authorization based on the schematic plan supplied by the project planner.

B. Design Development

2.29 The building engineer coordinates the design development of the schematic design. This phase requires the development of drawings and specifications that define the structural, mechanical, and electrical systems; building layout; and material finishes. The construction drawings present a graphic illustration of the project and the specifications prescribe workmanship and materials. If the content of these two documents is not sufficiently complete, misinterpretations are likely to occur among the bidders. Consequently, high cost proposals are submitted. Drawings and specifications should be concise and clear.

2.30 Ongoing design reviews should be performed throughout this phase to ensure a practical and efficient solution is obtained. These reviews should be performed by the user groups and the building and equipment engineering staffs.

C. Contract Documents

2.31 The building engineer is responsible for the preparation of all contract documents. Contract documents include the following:

(a) ***Construction drawings and specifications***, as prepared in the design development phase, define the scope of work to be performed.

(b) ***The Contract Agreement*** is the principal instrument of the contract documents. Primarily, it incorporates all of the other documents and makes them part of the contract. It also stipulates the contract sum. Execution of the agreement satisfies the establishment of an effective and valid contract.

(c) ***The General Conditions*** is the complementary document to the Contract Agreement. Generally, it sets forth the legal and regulatory requirements of the contract.

(d) ***The Supplementary General Conditions*** document modifies the General Conditions document to meet the requirements of each particular project and owner.

2.32 For further information on contract documents, refer to the "Contract Guidelines for Building Construction in the Bell System" manual.

CONTRACT ACQUISITION

2.33 The building engineer prepares the bid instructions and coordinates the project bidding or negotiating with outside building construction contractors.

2.34 The contract is awarded and signed with the selected contractor. The building engineer is responsible for coordinating this process.

CONTRACT ADMINISTRATION

2.35 The building engineer is responsible for administering the construction contract. This includes monitoring time schedules and budget expenditures.

2.36 The employment of on-site company representatives to observe building construction is recommended where complex, major, or hazard-prone construction is planned.

2.37 Upon construction completion, the building engineer coordinates a construction inspection. This inspection should include representatives from the building operations group, outside design consultants, and field construction observers.

2.38 If such an inspection indicates satisfactory performance by the construction contractor, the building project is accepted by the building engineer.

2.39 The building engineer is responsible for transferring responsibility of the building to the building operations group. This may involve transmitting the following to the building operations personnel:

(a) Operational instructions

(b) Warranties

(c) Door keys/access cards

(d) Stock materials to be used for maintenance and repairs.

BUILDING OCCUPANCY

2.40 Whether the building is to be occupied by people or equipment, close coordination with the user group is important to the move plan. The user group will need to make numerous arrangements prior to the occupancy date. The building engineer should make every effort to ensure the approved building ready date is maintained.

2.41 A user group orientation may be appropriate to instruct new building occupants on the operational features of various building systems (fire safety, mechanical, electrical, etc).