

## BUILDING PLANNING — GENERAL CONSIDERATIONS

### 1. GENERAL

- 1.01 This section outlines important general considerations and basic principles which are recommended in connection with the planning of buildings.
- 1.02 The establishment of new central offices and the making of substantial extensions to existing buildings, as well as the provision of other spaces, are a most important part of the equipment and building work. Also of basic importance in carrying out a program of planning, design, and construction of buildings is an over-all plan of procedure - a long range fundamental plan.
- 1.03 Fundamental plans properly developed should be sound not only for the immediate years ahead but also for each ensuing major step taken over a long term, in line with orderly and predetermined future expansion without reaction on efficient and economical operations. This involves early coordination of the data necessary for establishing the general program of procedure and developing the plans through close contact with the various departments providing the data on which space requirements are estimated.
- 1.04 Considerations in connection with Central Office Planning and Fundamental Plan Work as related to Building and Equipment Matters are discussed in detail in the Notes of the Building and Equipment Conference - December 1925, and Conference of Building Engineers - April 1946, which aside from detail changes in the telephone art, still have general application at the present time.
- 1.05 The fundamental plan, with its various indications and quantitative data, is based upon the forecasts of a commercial survey of the geographical area of the exchange under study which provides the information and estimates required as to the character, amount and distribution of population, telephone development, etc, which are to be expected, not only at the ultimate date but also for periods intermediate between the present and the ultimate date. These are developed in considerable detail for the so-called five-year view and on a somewhat broader basis for the ten-year, fifteen-year, and twenty-year periods leading up to the ultimate date.
- 1.06 As to the so-called ultimate period, facilities for eighteen to twenty years is the generally accepted practice, this being the period beyond which it is not practical at any one time to attempt to make forecasts of the telephone development. In the basic design of the building, consideration should be given to provision of space for a replacing unit. Obviously it will be necessary to care for growth beyond the period for which the current Commercial forecasts are available and the buildings, as the fundamental plan cycle of estimates progresses ahead always eighteen to twenty years, will have to take up the continuing growth either by additions to existing structures or by the establishment of new centers.
- 1.07 The fundamental plan furnishes broad indications in regard to the most desirable arrangement of the ultimate plant and is used either as a basis for, or as a guide, in the advance planning involved in plant extension work.
- 1.08 In many cases more efficient use of existing space can be made if the fundamental plans for an area are known. As an example, it may be possible to limit equipment and personnel to minimum space requirements for a short period if it is known that relief will be available within a reasonable time. Also there may be cases where existing space is not being used in the most efficient manner; rearrangement and perhaps closer spacing of desks may provide the necessary margin for postponement of a building addition, or for permitting the assignment of additional personnel to the area.
- 1.09 The importance of long range planning, of looking ahead for a number of years, in the design of buildings and layout of equipment can not be overemphasized, and it is equally important that the needs of all organizations are anticipated before definitely deciding on a plan or arrangement.
- 1.10 Care and imagination in planning are essential in avoiding unsatisfactory conditions which might lead to expensive rearrangements later. It is also desirable that planning arrangements in general be made flexible to meet unforeseen requirements and contingencies in so far as is practicable.

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1.11 When planning is initiated, the various departments should be consulted to fully determine their respective needs. Consideration of the data so collected will determine the general objectives such as size and shape of the building, allocation of the various spaces and arrangements for future additions or extensions. Close cooperation and coordination among the various people involved such as Commercial, Traffic, Plant, Accounting, Personnel and Engineering is vital to successful planning of buildings. Most of the Companies have a Building Planning Engineer who is responsible for this coordination and for review on a continuing basis of the space requirements in all Company buildings, owned and leased, and for initiating consideration of any new construction early enough to meet the relief requirements.

1.12 Equipment developments, such as toll dispersion, switchboard centralization and customer dialing arrangements, influence central office planning, while many changing factors enter into the determination of the proper procedure for planning office and other spaces not involving equipment.

1.13 In connection with the over-all planning of buildings it is believed to be essential that defense measures be given consideration - especially for buildings located in critical target areas and for those buildings which serve atomic energy and key military installations. Some of the factors which are given consideration in this connection are:

- (1) Provision of a personnel shelter area within the building. This is usually dual purpose space rather than being reserved solely for emergency use as a shelter area.
- (2) Protection of certain regular or emergency switchboard positions and toll testboard which it may be necessary to man at times of disaster.
- (3) Provision of protective location for emergency power equipment.
- (4) In connection with laying out equipment floor plans, the locating of common equipment towards the core of the building or in other comparable areas away from the exterior walls to provide a measure of protection from blast pressures and debris. In the event of a major disaster, if the common equipment and a part of the other equipment in the over-all train remains intact it is expected that the capabilities of furnishing service will be greatly improved.

(5) Elimination of building features that may become hazardous in a disaster such as the use of solid panels in lieu of glass in doors, the elimination of transoms and borrowed lights in partitions, etc.

(6) Recommendations as regards defense considerations in connection with the selection of sites for central offices are outlined in Paragraph 2.03(g) of this section.

1.14 The primary considerations with respect to building construction are (1) the lowest possible cost, consistent with actual needs of equipment and personnel and (2) the most efficient use of available space.

## 2. EQUIPMENT SPACES

### 2.01 Schedule

(a) A coordination schedule is developed on the basis of Commercial surveys and fundamental plan studies. The schedule as set up in detail includes dates for starting and completing the various important steps which will be involved in the project from the time it is first considered until the office is placed in service.

(b) The program of coordinating the various actions in connection with the establishment of a central office includes the following general procedures:

- (1) Determination of type of equipment to be used and the date when it is required for service. Unless other factors are overruling, normally, the completion of the building is timed to coordinate with the equipment shipping schedules to avoid carrying unused space in a new building for any appreciable length of time.
- (2) Recommendation for and purchase of lot.
- (3) Information from the Commercial people on line and station estimates and classification on which the traffic study is based.
- (4) Data from Traffic people on the traffic study.
- (5) Determination of equipment requirements.
- (6) Office space requirements from departments other than equipment needs.
- (7) Preparation of study floor plan sketches.
- (8) Review of layouts with the departments involved.
- (9) Development of final plans after general approval of management.

## 2.02 Planning

(a) The necessity for doing something is established first, then the need is shown for doing the particular thing proposed rather than any one of several alternatives. The fundamental plan will generally indicate the alternatives, however, these should be sought out and developed for consideration.

(b) A case is developed for showing the need for a new building or addition at the time proposed. Under conditions of high building costs it is desirable to recover existing building space instead of replacing it. Utilization of older buildings for office space, public offices, operating quarters, etc, should be considered.

(c) Careful planning is important to make most effective use of space in the initial building without affecting flexibility for future expansion. In the average case, shortening of the initial building period to four or five years and adding space later as required involves no important economic penalty. Advantages of deferred capital requirements and benefit of more frequent review of growth estimates generally outweighs disadvantages of more frequent engineering and disturbance caused by more frequent building additions. It is recognized that certain projects do not lend themselves to shorter building periods. However, it is evident that the greatest opportunity for reducing capital requirements is to build less, and sound judgment should be depended upon in deciding the proper building interval in a given case. When high building costs prevail it is generally the case that a saving can be effected at least in building costs by erecting a building which would be extended within a relatively short period.

(d) Consideration should be given to the fact that future space requirements frequently have a bearing on the economies which may be developed in the initial building. For instance, where the space requirements for the ultimate period are only a fraction more than for the initial period, as in the case of some Community Dial Offices, it would doubtless prove economical in most cases to provide ultimate space requirements in the initial building.

(e) For equipment spaces, data should be available indicating how the estimated space requirements were determined. In the case of space to be provided for the accommodation of

the equipment, both local and toll, the data in general should include information on which the estimates are based. The locations for traffic operating centers and associated dining and rest facilities, and spaces required therefor are included in the study.

(f) For spaces other than equipment, it is necessary to develop whether or not it is proper, all things considered, to provide for these requirements in the proposed equipment building rather than elsewhere in buildings owned or in leased quarters.

(g) Section 760-220-151 of Bell System Practices, Checking Routine - Building Project Planning and Design provides a general outline of suggested principles to be considered in the planning and design of telephone buildings.

## 2.03 Selection of Site

(a) The economical location of the central office site is determined from the indications of the fundamental plan.

(b) Where new central offices are contemplated, early consideration should be given to the location of the wire center. This will greatly facilitate the search for real estate, particularly in those cases where there is little vacant property available or where modification of zoning regulations may be necessary. For a number of reasons it may not be practicable to secure a suitable site at the theoretical wire center, in which case a selection is usually made by weighing the outside plant considerations for each available lot against the advantages the proposed lot may offer as a site for the new building.

(c) The proper size of a lot is of equal importance to the matter of its location. In addition to being properly located, the lot should be of liberal size to provide for orderly expansion to the ultimate building and for unforeseen contingencies. The area of the site required to accommodate a given central office building is determined largely by consideration of the equipment space required in the new building ultimately. The space required for other than equipment purposes and the indications of the fundamental plan as to possible changes in the exchange boundaries are also important factors to be considered. In determining the suitability of available sites it is highly desirable to have in hand a well considered tentative floor plan layout for the ultimate building. This layout would embody an estimate of the space

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units which must be housed, the relationship these bear to each other and the extent to which each one must be enlarged eventually.

(d) In purchasing new lots consideration is given to the marked tendency on the part of many municipalities and other governing authorities, such as County Planning Commissions, to restrict the use to which property within certain boundaries may be put, the heights of buildings, the proportion of the total lot area which may be occupied by the completed building including requirements for certain minimum setback distances from the property lines to the building, and to require, in certain instances, the provision of off-the-street parking facilities in connection with the building.

(e) The time factor inherent in acquiring land, with the attendant processes of negotiation, title search, survey, zoning and subsoil tests, should be recognized.

(f) Factors to be considered in the selection of a site are outlined in Section 760-230-150 of Bell System Practices, Selection of Building Sites for Central Offices.

(g) The current and apparent future international situation emphasizes the need for consideration of the following additional factors which would appear to be of particular significance in the cities which have been designated as critical target areas and in other cities which serve important military or atomic energy installations.

(1) Consideration of dispersed locations to the extent practicable with sufficient separation so that the chance of severe damage to more than one building is greatly lessened in the event of an enemy air attack, sabotage or other disasters. Separation of five miles or more is desirable, however, separation to a lesser degree is better than none at all.

(2) Consideration of locations away from defense plants, air bases, oil refineries, etc, which constitute likely targets or which are hazards from the standpoint of explosions and fires.

(3) Consideration of locations away from highly congested areas where most of the buildings are not of fire-resistant construction. Such areas may burn in a fire storm or conflagration as a result of an enemy attack through the initiation and spread of fires from an atomic, high explosive or incendiary attack.

### 2.04 Requirements

(a) Major functions and services to be considered are as follows:

Local dial.

Intertoll dialing.

Toll terminal.

Local and toll switchboards. Switchboard requirements reduced as extended area service or nationwide customer toll dialing is introduced, either by means of CAMA or FACD equipment. Plans should provide for the re-use of such space.

Local and toll test centers.

Cable entrances, in accordance with Bell System Practices AG40.60, AG40.61, and AG40.62.

Centralized AMA. Centralized AMA requires about 10 to 15 per cent more frame space at the tandem office, in addition to switchboard positions required in the operating room when the operating is done at the tandem location.

Traffic and Plant Quarters.

Dining service.

Coin Counting center.

Commercial - Public and Record.

Other nonequipment offices.

Garage service.

Plant, Maintenance space.

Western Electric installation space.

Accounting Center and Quarters. Accounting Center provides space for the machines for processing messages completed by CAMA as well as local AMA equipment in other offices.

Construction to minimize building maintenance and house service costs.

### 2.05 Size of Building

(a) The proper size of the initial building and the capacity of the ultimate to which it must be capable of being extended are determined in the study of the floor plans with the consideration of the fundamental data and the availability and cost of land.

(b) Recommendations regarding the limiting of the initial building period are contained in Paragraph 2.02(c) of this section.

(c) The proper size of the initial building is more readily apparent than looking into the future to judge the ultimate. The problem in the initial is generally to avoid overbuilding, while in the ultimate is to insure flexibility to continue expanding until the pattern of the fundamental plan takes up the growth in newly opened centers.

(d) It is the objective to obtain a layout which is good initially and over a long term from the standpoint of economical equipment, installation and maintenance. A good plan is economical of floor space and permits spare initial space to be adapted to other uses until needed for equipment without jeopardizing its usefulness for equipment. The objective of flexibility should also be kept in mind to meet unexpected conditions.

### 3. OTHER SPACES

#### 3.01 Planning

(a) For the sound consideration of space requirements other than for telephone equipment it is equally important to develop a Long Range Plan in order to formulate positive plans for making office, garage or storeroom space available at the time needed. Such a plan would comprise a current and long range view study of existing space both owned and leased, tending toward more efficient and economical utilization.

(b) The recommendations contained in Paragraphs 2.02(a), (b), and (c) of this section are generally applicable to the planning of nonequipment spaces as well as to equipment spaces.

(c) A general outline of suggested principles to be considered in the planning and design of garages and garage work centers is contained in Section 760-220-160, Checking Routine, Garages and Garage Work Centers, Project Planning and Design, of Bell System Practices.

(d) Section 760-220-151 of Bell System Practices, Checking Routine, Building Project Planning and Design provides a general outline of suggested principles to be considered in the planning and design of telephone buildings.

(e) Close cooperation among the various people involved, such as Commercial, Traffic, Plant, Accounting, Personnel and Engineering, is also vital to nonequipment space planning as well as to central office planning and the recommendations in this respect which are contained in Paragraph 1.10 of this section apply equally to all types of spaces.

(f) Consideration is given to the provision of space normally used for other purposes which is suitable as a general shelter area for personnel during an emergency, particularly for buildings situated in designated critical target areas and in buildings serving areas that contain likely targets such as atomic energy and key military installations.

(g) Notes entitled "Accounting Space and Building Requirements" are currently under preparation which will be of assistance in connection with the planning and design of buildings for Accounting offices.

#### 3.02 Selection of Site

(a) Factors to be considered in the selection of a site are outlined in Section 760-230-150 of Bell System Practices, Selection of Building Sites for Central Offices.

(b) Certain special considerations in connection with the location of and the selection of sites for garages and garage work centers are contained in Section 760-220-160 of Bell System Practices, Checking Routine, Garages and Garage Work Centers, Project Planning and Design.

(c) Recommendations regarding the selection of an Accounting office location and site are contained in section one, "Selection of an Accounting Office Location and Site" of the notes entitled "Accounting Space and Building Requirements" mentioned in Paragraph 3.01(f). This section of the notes was issued to all Chief Engineers and Controllers by letter of July 30, 1953.

(d) The defense considerations recommended in Paragraph 2.03(g) are equally important and applicable to the location of nonequipment space as well as equipment space. The locations of storeroom and garages are important in planning for disaster operations. It is to be expected that all available Company vehicles and supplies will be needed in the event of a disaster whether natural (such as

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storms, earthquakes or floods) or otherwise (such as enemy air attacks, sabotage, conflagrations or explosions). Storerooms or garages in target area cities are included in defense planning as possible locations of emergency switchboard positions, rendezvous points for off-duty Company employees returning to work after a disaster, Company operating centers for directing restoration work, etc.

### 3.03 Requirements

- (a) Major functions and services to be considered are as follows:

Headquarters, Division, District, Local Accounting centers.

Space for Accounting Personnel.

Coin Counting centers.

Commercial - Public, Record and others.

Plant work - Lounge and supervisory space.

Medical.

Garages and storerooms.