

CHECKING ROUTINE

BUILDING PROJECT PLANNING AND DESIGN

1. GENERAL

1.01 This section furnishes a general outline of suggested principles to be considered in the planning and design of telephone buildings. A checking routine is recommended for the analysis of specific building projects to determine the design requirements with consideration of the factors which affect the utility, cost and appearance of the building.

1.02 It is important to the control of building projects that consideration be given to the principles of initial planning in regard to site selection and scope of the project. The review of building projects by application of a checking routine before plans and specifications are submitted for bids, provides an additional control to the project.

1.03 Although many of the items included in this section are covered in detail elsewhere in Bell System Practices, it is thought that a tabulation of the items or questions to be considered will be helpful in the application of a checking routine.

1.04 The size and importance of the office and the character of the community require the individual consideration of each project.

1.05 This section is revised and reissued to include additional recommendations, changes in certain wording and rearrangement of the text. Arrows are used to indicate changes throughout the text.

2. SELECTION OF BUILDING SITE

2.01 Factors to be considered in this section are outlined in more detail in BSP Section H21.111, Selection of Building Sites for Central Offices, and Section H21.215, Survey Information.

2.02 Requirements in regard to type and use of proposed building.

- (a) Liberal size for orderly expansion and unforeseen contingencies.

(b) Location with consideration of theoretical ultimate wire center.

(c) Location in relationship to outside plant.

(d) Zoning and building code restrictions.

(e) Availability of public facilities. (Water, sewer, electricity, etc.)

(f) The general situation with respect to comfort and safety of employees such as availability of parking facilities for employees' automobiles and accessibility to adequate public transportation. This is particularly important in the case of a building which will house an operating center, revenue accounting office or district office.

(g) Consideration given to the character of the neighborhood as regards the safety of employees reporting and leaving at night.

(h) Location of operating centers in areas having favorable employment conditions as regards the availability of prospective employees.

(i) Downtown business locations for operating centers usually less desirable from both the employment and transportation viewpoints.

(j) Consideration of accessibility to the public and the availability of public parking when business offices are involved.

(k) Desirability of location for present or future public office.

(l) Favorable neighborhood reaction to the project.

(m) Influence of surroundings upon the architectural design of the building.

(n) Usefulness for disaster operations in the event of natural disaster or an enemy attack.

2.03 Avoidance of hazardous locations.

(a) Flood hazard of sites near streams.

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(b) Adequacy of storm sewer facilities where available.

(b) Objective of high ratios of productive area to gross area and volume.

(c) Consideration of the type and occupancy of adjacent buildings and surrounding area from fire exposure and fire spread standpoint.

(c) Consideration of initial period of perhaps four to five years where lateral extension can readily be made.

(d) Location as far away from most likely targets for enemy action as practicable.

(d) Advantages of deferred capital requirements and benefit of more frequent review of growth estimates thought to outweigh disadvantages of more frequent engineering and disturbance by earlier building addition.

(e) Hazards of locations near aircraft landing areas.

(e) Temporary use of space not occupied initially.

(f) Possibility of leaks from gas mains entering building through underground cable duct.

(f) Deferring construction of part of cable vault if cable entrance is at one end of building.

(g) Vibration effect on equipment and explosion hazard of locations on heavily traveled streets and railroads.

3.02 Seasonal planning.

(h) Lot selection to permit outside transformer vault for heat dissipation and explosion pressure venting.

(a) Planning for seasonal construction in cold climates to avoid outside work in winter.

2.04 Building design factors - reaction on cost.

(b) Consideration of deferment where possible, consistent with above, especially if costs should indicate downward trend.

(a) Bearing capacity of the soil and type of foundation required.

3.03 Scope of work.

(b) Slope and contour of lot with consideration of drainage problems, retaining walls, etc.

(a) Early consideration of scope of work and design with architect.

(c) Natural and established grades in relation to proposed floor elevations.

(b) Decisions as to type of construction, materials and mechanical and electrical equipment.

2.05 Site conditions affecting building costs.

(a) Rock excavation.

(c) Planning the project development with the architect.

(b) Soft bottoms requiring pile foundations.

(d) Early review of planning with the departments involved.

(c) Sheet piling and pumping in soft or wet excavation.

3.04 Working drawings.

(d) Subsurface water (waterproofing and pumping).

(a) Advantage of complete plans and specifications. Possible reuse on other projects.

(e) Excessive cut or fill excavation.

(b) Use of typical design for smaller buildings. (CDO, repeater stations, radio buildings, etc.)

(f) Excessive landscaping requirements.

(c) Reuse of mechanical and electrical detail sheets, stairway and toilet layouts, etc.

3. PLANNING

3.01 Building period.

3.05 Requirements and considerations.

(a) Avoidance of overbuilding by reduction of area and volume of initial structure to minimum.

(a) General

(1) Importance of making prompt use of new plant and fullest practicable use of existing plant, salvaging existing buildings for reuse where applicable.

(2) Comparative costs of structural steel and reinforced concrete construction.

(3) Advantages in use of standard manufactured products.

(4) Use of portable partitions in consideration of flexibility, salvage and convenience during rearrangements.

(5) Selection of materials and design to reduce number of crafts involved and ease of coordination problems.

(6) Consideration of future growth of building in locating stairways, basement areaways, ventilating and heating equipment, etc.

(7) Importance of spacing columns for maximum efficiency in the utilization of equipment floor space. (BSP Section H22.101, Column Spacing in Equipment Rooms.)

(b) Office space

(1) Recheck of space requirements before contract is let to allow for changes in plan, organization changes, etc.

(c) Ceiling heights

(1) Early check of structural, ventilating and fundamental cabling plans for coordination and to conserve ceiling heights (BSP Section H20.121, Ceiling Heights for Equipment Buildings).

(2) Possible basement floor all on one level unless boiler height requires lower level boiler room floor.

(3) Possible design of permanent office, quarters and nonequipment areas in lighter construction with lower ceiling heights.

(4) Consideration of use of main distributing frame 300 protectors high where appropriate in smaller offices and where balance in layout of floor plan and length of property indicate the soundness.

(5) Ceiling height requirements for new buildings housing toll and central office equipment are outlined in BSP Section

H20.121, Ceiling Heights for Equipment Buildings.

(d) Equipment entrances

(1) Standard 4-ft. by 8-ft. window openings with sash removed provide satisfactory and flexible entrances and are less costly and hazardous than special door openings. Reduction in number and size of windows as a protective measure against fire and blast hazards may require consideration of a separate equipment entrance.

(2) Beam or concrete anchor pads for hoisting arrangements located on roof above general equipment entrances selected as most convenient. Where hoisting beam is provided, retractable type is preferable.

(e) Smaller offices

(1) High cost per line offset by simpler treatment and low cost materials.

(2) Use of local contractors, labor and materials, where available, for lower costs.

(3) Possible use of prefabricated structures either in whole or in part, (asbestos shingles over wood, or metal; or concrete block with cement paint finished surfaces).

(f) Public relations

(1) Public office arranged to provide feeling of quietness, warmth and welcome to the public without the appearance of extravagance in space or decoration. Avoidance of steps where practicable and provision of clear convenient window display space are desirable.

#### 4. DESIGN

##### 4.01 General

(a) Construction and maintenance economies of simplified general design of buildings.

(b) Avoidance of eccentricities of architectural design.

(c) Minimum window requirements and reduced glass areas for increased safety to equipment and reliability of service in times of fire, storm, explosion, earthquake, or sabo-

tage in war; window treatment and maintenance expense reduced and heating and cooling design loads lowered.

(d) Consideration of surrounding structures, with simplified design where exposed to stores, garages, etc., approximate flat roofs (BSP Section H32.405, Flat Roof Grading) and minimum parapet walls (BSP H32.335, Parapet Walls).

(e) Minimum size penthouse to reduce exterior wall treatment cost (BSP H32.334, Exterior Walls of Masonry). Economical treatment of penthouse stairs or consideration of use of outside stairway or fire escape for access to penthouse if appearance not controlling.

(f) Avoidance of heavy or elaborate office and quarters treatment (cornices, paneling, etc.).

(g) Restriction on size of lobbies and corridors requiring treatment for appearance. Cutoff areas requiring special treatment from other areas.

(h) Importance of landscaping design in producing satisfactory appearance of building. Consideration of surrounding area in addition to building in landscape treatment.

(i) Omission of items from general contract involving special design such as built-in clock, furniture, fixtures, etc.

#### 4.02 Excavation and grading

↳ (a) Importance of consideration of need for basement or partial basement. Cost of rock excavation, shoring, pumping, water-proofing, etc., factors to be considered.

↳ (b) Substitution of overhead cabling to C.D.F. to eliminate splicing pit in community dial offices.

(c) Postpone improvement of part of lot where lot is large and area and surroundings permit.

(d) Possibility of grading around building to keep areaway construction to minimum.

#### 4.03 Masonry

(a) Stone use limited to that justified by site conditions and character of surroundings. Costs controlled by amount of stone, depth and overhang of cornice, if any, thickness of cop-

ing or band course, mouldings, panels, balconies, porches, ornamental columns, etc.

(b) Avoidance of brickwork specialties such as Flemish bond, herringbone pattern, quoins, and raked joints.

(c) Concrete (BSP Section H32.378 Interior Finish of Rooms in Central Office Buildings).

(1) Importance of knowledge of soil and bearing conditions in structural design.

(2) Finishing requirements reduced with use of smooth, tight forms.

(3) Omission of fill on concrete floor slab.

(d) Glazed tile (BSP Section H32.378).

(1) Considered for wall surface treatment after initial cost and maintenance comparison with other finishes.

(2) Possible use of salt-glazed or unglazed tile at lower cost.

(e) Concrete blocks (BSP Section H32.378).

(1) Considered for use in partitions and exterior wall back-up.

(2) Quality of block important to avoid later dusting, shrinkage, spalling and rust spots.

(f) Temporary rear walls and areaways to reduce cost and facilitate later removal.

(g) Concrete for curbing rather than stone where acceptable at street or property lines.

4.04 Waterproofing and damp-proofing limited to requirements with consideration of topography of lot and subsoil conditions.

4.05 Marble, tile and terrazzo (BSP Section H32.378).

(a) Avoidance of special treatment, mouldings, panels, curved surfaces, floor patterns, etc.

(b) Requirements of surface finish in determining type of material to be used.

4.06 Lath and plaster (BSP Section H32.378).

(a) Omission on surfaces where character of occupancy permits and appearance not controlling.

(b) Control of costs by reducing ornamental plastering, cornices, pilasters, panels, etc.

(c) Application of acoustical tile to ceiling slab avoiding, where possible, more costly suspended ceiling. Suspended ceiling is sometimes preferable in operating rooms. ←

#### 4.07 Carpentry and millwork.

(a) Omission of trim on door and window openings, etc. ←

(b) Avoidance of special millwork designs and special mouldings.

(c) Elimination or reduction of heavy cornices, wainscots or other trim where possible.

(d) Omission of transoms and borrowed lights where not necessary.

(e) For cost and maintenance considerations avoidance of use of shutters where used only for appearance.

#### 4.08 Roofing and sheet metal.

(a) Consideration of minimum roof fill for slope to run off water (BSP Section H32.405).

(b) Possible use of hanging gutter, if any required, on temporary walls or where appearance is not controlling.

#### 4.09 Structural steel and miscellaneous metal work.

(a) Control of amount of bronze, aluminum or iron grilles, handrails, or ornamental metals.

(b) Limitation of extent of initial ironwork in length or width of cable vault to fit immediate needs (BSP Section H36.163).

(c) Limitation of amount of iron in balustrades to requirements. (BSP Section H32.610.) Use of lightweight design.

(d) Avoidance of heavy moulded handrails and newel posts.

(e) Simple fire escape design to meet local codes.

(f) Minimum height flagpole on roof for saving on costly tilting apparatus and maintenance considerations. Possible installation

of flagpole, where required, in front or side yard.

#### 4.10 Doors and windows.

(a) General use of nonferrous materials for exterior doors or metal work, where possible, to reduce maintenance costs.

(b) Use of unit door frames instead of bucks and trim where possible.

(c) Stock windows and their mouldings more economical and generally more readily available.

(d) Flush doors or with a minimum of mouldings considered more desirable.

(e) Use of wood doors where fire protective requirements are otherwise met; and aluminum or wood doors for special treatment of entrance less costly than bronze doors.

(f) Window shades installed at a lower cost initially and more easily maintained than venetian blinds. For ventilation, double center hung type shade provides light and permits air control. Venetian blinds are sometimes preferable for operating rooms, lounges and quiet rooms. ←

#### 4.11 Glass and glazing.

(a) Consideration of less costly translucent type glass for upper sash of metal and wire glass windows.

(b) Limitation of size and number of mirrors and shelves in toilet rooms.

#### 4.12 Painting.

(a) Hand soil marks less apparent on darker color door finishes.

(b) Consideration of deferment of painting interior basement walls, and other areas where possible, to avoid inclusion in the general contract. Omission of painting in cable vault. ←

(c) Appropriate floor covering as required for business offices. ←

#### 4.13 Floor covering (BSP Section H32.378).

(a) Consideration of omission under general contract except where part of architectural design.

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- (b) Use of standard grade patterned linoleum with burlap back in switchrooms as compared to heavier types.

4.14 Hardware.

- (a) Finish hardware simplified where locks or closing devices are not required.
- (b) Linoleum or rubber kickplates and push-plates less costly than metal types, and  
→ more easily maintained. Consideration of omi-  
→ sion under general contract.

4.15 Plumbing.

- (a) Floor drains kept to minimum for main-  
→ tenance considerations, and in toilet rooms  
→ located inconspicuously out of path of travel.
- (b) Tank type toilets generally more econom-  
ical in use of water than flush valve type  
in small cities and towns.
- (c) Consideration of use of metal toilet stalls,  
and limitation stall height to require-  
ments.
- (d) Individual soap dispensers preferable to  
→ central tank systems except in larger toil-  
→ ets (BSP Section H34.114).
- (e) Initial toilet room fixture installation  
to minimum requirements (BSP Section  
H24.520).
- (f) For equipment installation force, consid-  
eration of provision of temporary fixtures  
to be reused later at other locations.
- (g) Consideration of enameled iron wash basins  
for smaller offices, rather than vitreous  
china (BSP Section H34.150).
- (h) Wall urinals with drainage openings below  
the water level more easily maintained than  
those with opening covered only when the urinal  
is flushed.
- (i) Desirability of arranging toilet rooms  
→ above one another or with minimum offsets  
in multistory buildings.

4.16 Heating, ventilating and air conditioning.

- (a) Review of amount of radiation to avoid pos-  
sible overdesign, and to allow for heat  
emission from central office equipment.

- (b) Use of single boiler in certain buildings  
with additional boilers added later for  
ultimate period.

- (c) Omission of vacuum return pump where pos-  
sible in smaller buildings or avoidance of  
duplicate pumps in larger buildings.

- (d) Use of unit ventilators and packaged air  
conditioning units instead of central sys-  
tems in certain areas.

4.17 Electrical work.

- (a) Check of plans for number and location of  
electrical receptacles and lighting fix-  
tures. Consideration of equipment frame re-  
ceptacles in determining requirements.

- (b) Avoidance of specially designed or elabo-  
rate lighting for entrances, business of-  
fices and display windows.

- (c) Check of size and routing of electrical  
conduit to provide economical runs.

- (d) Normal ceiling lighting generally consid-  
ered adequate for toilets.

- (e) Fluorescent lighting fixtures not gener-  
ally extended to areas where the quality  
and amount of light is not important, or where  
the lighting only occasionally used.

- (f) Location of transformers on poles or on plot  
outside of building where appearance and  
size permit.

- ↗ (g) Consideration of provision of underfloor  
duct for telephone and power distribution  
in spaces with heavy concentration of desks and  
office machines such as in accounting offices,  
plant service centers, etc.

4.18 Fire Protection (BSP Section H41.230).

- (a) Early review of plans with Marsh and  
McLennan for fire protection recommenda-  
tions.

- (b) Consideration of wall, enclosure and parti-  
tion design in accordance with the National  
Building Code, where not in conflict with local  
requirements.

- (c) Limitation in use of rolling steel fire  
shutters to requirements as determined by  
Marsh and McLennan.

- (d) Windows, under present practice, not rec-  
ommended to be automatic self-closing.