Part II

Space Guidelines for Preplanning

Preplanning Guidelines for Space Allocation

The objective of any building project, whether new construction or the renewal of an old facility, is to provide the size, configuration, and relative juxtaposition of spaces needed to properly support an approved program objective. In striving to reach the optimum physical characteristics, the building's design team will be required to make a series of tradeoff decisions in order to fit the building on the owner's preferred site, to keep the overall project contained within its budget allocation, to provide needed or perceived lobby space or formal entryways, to house all of the program requirements, etc. This process can be a long and burdensome one for all parties, or it can be accomplished efficiently and in a timely manner.

The success of any capital project can frequently be linked directly to how well the project was started, and the start is dependent on the "quality" of information initially provided to the design team by the user's representatives. In this regard, the design team will be expected to provide alternative design solutions; these will be discussed and debated among the users and finally result in an approved design concept. In order for the designers to meet this expectation, it is incumbent that the user's representatives provide a comprehensive, well conceived program document that, among other things, identifies the room size parameters and adjacencies that are required to support the program objectives.

There are several ways that the user(s) can establish space need parameters as part of the project's program documentation. One way is to rely on traditional practices and previous experience. The following section of these Guidelines provides examples of this methodology. This is generalized information that can be helpful when considering traditional types of space. More sophistication can be introduced by referencing the *Space Planning Guidelines'* as published by the Council of Education Facility Planners, International. These guidelines project typical space allocations based on weekly student contact hours (WSCH) and station occupancy rate factors and by the higher education general information survey (HEGIS) code factors for each academic discipline. The CEFPI guidelines were used as the basis for the space-needs evaluation for each campus's physical master plan. Either of these two techniques will result in space allocations that reflect historically accurate space assignments but may not account for unique site conditions or may not adequately project the requirements needed to support new technologies.

Another method for determining program-to-space relationships is through benchmarking. This process may be more time consuming than the analytical methodologies incorporated in the CEEPI guidelines. Benchmarking is, however, more likely to result in space allocations that represent current best practices in teaching and learning (and incorporating modern technology into the building program). The benchmarking methodology requires the user to: 1) identify peer institutions; 2) identify the program-to-space standards used at the peer institutions; 3) visit selected peer institutions and assess programs and spaces; 4) question each peer institution regarding their perception of their program to space relationships; and 5) tabulate this information into a space-to-program allocation for the particular project being developed. Care must be taken to assure: 1) that appropriate peer institutions are included in the benchmarking study; and 2) the reasonableness of the final program-to-space relationships that result from this process.

As stated previously, the space guidelines included here are to be considered reasonable estimates of the space needed for selected purposes and not a definitive minimum or maximum that must be adhered to rigidly. In applying the guidelines, consideration must be given to the room shape, equipment requirements, access, utilization, and other functional requirements that may be required by the program or expected by tradition. This becomes especially critical when applying the guidelines within the context of an existing facility. These guidelines are based on current planning standards and functions applicable to the University System of Georgia and they warrant review on a periodic basis to verify their continued validity.

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[1] *The Space Planning Guidelines* are published by the Council of Educational Facility Planners, International, 29 W. Woodruff Ave., Columbus, Ohio, 43210, and are updated annually.

Classrooms
Including Seminar Rooms

It is likely that classrooms, including seminar and conference-type rooms, will rapidly evolve to support a variety of state-of-the-art instructional technologies employing ever-changing electronic characteristics. These "smart" classrooms are likely to include cabling and multiple types of electronic support equipment, particular line-of-sight requirements, audio and video transmission capabilities, and numerous other types of existing and yet-to-be-invented electronic support equipment, some of which are discussed in the *Design Guidelines for Instruction Presentation Systems and Facility Infrastructure* as prepared for the Office of Facilities in January 1998. A copy of these guidelines is fully reproduced as Appendix 2 to this document.

Even with the evolution of modern electronic instructional support capabilities, it is likely that use of, and reliance on, the more traditional form of classroom will be appropriate. This document, thus, includes a variety of information that could be applicable to any type of teaching and learning situation.

Table 1

Intended Use	*Assignable Square Feet*
35-station, tablet arm chair-type seating	600-700
35-station, table-type seating	750-875
50-station, tablet arm chair-type seating	800-900
60-station theatre-type seating	800-900
15-station seminar-type seating	325-375

Suggested Topics For Consideration:

- During the life of any classroom, it is likely that the classroom will be used to support several different academic programs. Accordingly, all classrooms should be designed to accommodate the full range of modern electronic instructional support capabilities.

- Classrooms should be designed to accommodate the teaching methodologies that will support the academic discipline(s) for which the building is being designed. For example, some classrooms might be designed without windows (to support two-way video instruction) while tiered seating may be necessary for other teaching methods. The size of such rooms may vary based on the particular instructional method(s) that will be used.

- The number of each classroom type should be determined by the program requirements of the academic discipline(s) that are scheduled to occupy the building.

- The design of all classrooms should incorporate proportions such that the room has functional length to width and floor to ceiling characteristics. Factors that should be considered include sight lines from all student stations to the instructor's position (and to the viewing screen(s) in the case of two-way interaction classrooms), acoustic characteristics, door placement to minimize class disruption for late arrivals, window placement (if windows are appropriate), and the location and type of lighting.

- Classroom design should avoid unique shape characteristics to ensure the room's future flexibility.

- The type of learning station (tablet armchair, table-type, or fixed seating) should be as required to serve the instructional program(s) that will be offered in the classroom; the type of seating must be clearly identified in the project program because it affects the project's scope.

- Classrooms which incorporate a traditional configuration, tablet arm chair-type seating, should not generally exceed fifty stations.

- An executive conference room should include or otherwise have access to a sink, counter and secure storage areas suitable for the serving of prepared food. Executive conference rooms are limited to the President's suite and the vice president's office suites but should also be made available to other campus users.

- It is important to make certain that each classroom has adequately anticipated the faculty-instruction needs by providing, as required, counter tops, technology requirements, sinks, hot and cold water, video projection capabilities, power and data service needs, and similar features.

Computer Laboratories

Computer laboratories, including computer classrooms, require dedicated support spaces, together with areas reserved for storage and maintenance of computer-related equipment and supplies. It is intended that the following space guidelines include all computer laboratory-related spaces.

Table 2

Type of Computer Laboratory	*Assignable Square Feet/Station*
General Computer Laboratory	45-50 ASF/Station
Advanced (CAD) Computer Laboratory	85-90 ASF/Station

Suggested Topics for Consideration:

- ❖ Space for the following uses/functions is included in the guideline space standard: student workstations (terminals), instructor's station, an office (160 SF) for lab consultant/lab technician, equipment repair area, storage room, network equipment/server room. These functions do not need to be included within the laboratory they serve but may be grouped or otherwise located to allow efficiencies or economies.
- ❖ Careful consideration should be given to the number of stations included within a self-instruction computer laboratory to take advantage of "economies of scale" savings but not to create laboratories that are so large that they become unfriendly factories.
- ❖ Consideration should be given to grouping computer laboratories around, or in the vicinity of, central supporting facilities.
- ❖ The need for security, and the need for 24-hour access, if applicable, be considered.
- ❖ The need for additional power requirements and air-conditioning must be accounted for at significant concentrations of computer-related equipment.
- ❖ The location of the printers that serve the computer laboratories is very important. Are the printers to be networked and located at a single location, randomly placed throughout the labs, or configured in some other fashion? Costs, power, and data cabling factors should be considered.
- ❖ Attention should be given to the type of furniture that will be used to support the laboratories. Will the furniture incorporate power and data cable capabilities or will it be necessary to provide for these services in other ways? Will the furniture be fixed in place or movable?

Libraries

Generally, university and college libraries include three distinct types of space: reading space, stack space, and public and technical service-support spaces. One method for estimating the amount of library space is to calculate space needs as a function of student enrollment, as in Table 3 below. A project program, based on the institution's mission, purpose, accreditation criteria, and site and circumstance, will result in the final determination of the size and types of spaces needed in any library facility.

Reading Space

Reading Space includes General Purpose Reader Stations, Study Carrels, Telecommunications / Computer Workstations and Individual/ Group Study Rooms.

One method for determining the amount and type of reader stations is as a function of enrollment:

Reading Space = (Percent usage student enrollment by division + faculty percent usage) times ASF per reading station.

Table 3

Users (EFT)	*Universities*	
	With Department Libraries	*Without Department Libraries*
Lower division students	10%	15%
Upper division students	5%	15%
Graduate students	5%	20%
Doctoral students	5%	20%
Faculty	5%	10%

For department and specialty libraries the percentages may vary significantly and are generally higher.

The program should confirm and validate the number of each type of reading station. All reading stations should have data and power access. The following types of reading stations may be anticipated:

- ❖ General Purpose Reader Stations: sized at 25-30 ASF per station;

Study Carrels: 35-40 ASF per station;

- ❖ Telecommunications/Computer Workstations: 45-50 ASF/station; and
- ❖ Individual/ Group Study Rooms: Generally 30-35 ASF/student.

Stack Space

Stack space includes "Open stacks" and "Movable Aisle Compact Shelving" (MACS).

Generally, a library will house “non-book materials” at a ratio of 40 percent of the open stack area.

Table 4

EFT Student Enrollment	*Collection Volumes*	*Volumes in Open Stacks*	*Volumes in MACS*	*Assignable Square Feet*
Up to 3,000	300,000	300,000	N/A	20,000
6,000	630,000	630,000	N/A	30,000
8,000	840,000	400,000	440,000	50,000-60,000
10,000	940,000	400,000	540,000	55,000-65,000
12,000	1,060,000	480,000	580,000	65,000-70,000
14,000	1,200,000	600,000	600,000	75,000-80,000
18,000	1,400,000	700,000	700,000	90,000-100,000
20,000	1,500,000	800,000	700,000	95,000-105,000
25,000	1,800,000	100,000	800,000	120,000-130,000

Public / Technical / Service / Support Space

Service / support space can be estimated at 35% to 45% of the reading stack areas and it may include administrative offices, reference areas, cataloging, acquisitions, lounges, circulation space, utility space, and other miscellaneous areas:

Library space (GSF) = reading space + stack space + service/support space

Planning for Modern Library Technologies

The preceding methodology for estimating library space needs is based on the traditional form and function(s) expected from university libraries. Modern technological innovations, coupled with changes in the learning and teaching environment, make it doubtful if traditional libraries will be constructed in the future. However, the basis for estimating the space eligibility for library purposes, no matter how the purposes are provided, remains valid.

It should be expected that space previously devoted to volumes in stack spaces and/or in MACS will be used to accommodate student work stations, group study spaces, electronic library interface stations, and many other types of electronic-support-for-learning opportunities. Library planners must pay careful attention to the manner in which printed material will be acquired and managed versus the manner in which the same information can be accessed electronically. It is also quite likely that libraries will evolve to become integral components of larger "learning centers" that include a variety of teaching and learning spaces. Library planning is evolving and a great effort should be made to evaluate the multitude of available opportunities and to develop a configuration that is best suited to the particular teaching mission, site and circumstance, and need of each campus.

Suggested Topics For Consideration:

- ❖ There are two types of collection space: "open stacks" and "movable aisle compact shelving" (MACS). The amount of each type of collection space will change as a campus’s collection grows.
- ❖ The location of the electronic card catalogues and related support spaces should be carefully considered in order to allow for appropriate pedestrian circulation and for future flexibility.
- ❖ Movable Aisle Compact Shelving (MACS) provides denser storage and a resultant reduction in the amount of space needed to house the collection. MACS or dense storage should be designed at a 25:1 ratio of volumes to square feet. MACS should be carefully monitored so that the least frequently used volumes are housed in this less accessible method. MAC equipment is not generally accessible to library clients.
- ❖ The control of humidity is of particular concern in certain regions.
- ❖ Lighting requirements differ significantly throughout the various parts of the library; close attention should be paid to assure the provision of the appropriate type and levels of light.
- ❖ The site for a new library should take into account the need for access by campus and community users, the need for extended hours of security, after hours access requirements, and the delivery and custodial access requirements.

Office Spaces

Table 5

Use	*Size in Square Ft*
Campus President (private)	225 – 300
Vice President or Dean	200 – 250
Library Director	150 – 200
Department Head	125 – 175
Professional Staff (private office)	110 – 125
Faculty Office (private office)	115 – 130
Professional Staff, 4 stations (open office environment or workroom configuration)	400 – 440 (+ 80 sq. ft. for each add'l staff)
Senior Secretary or Department Receptionist	145 – 160
Clerical or Technical Support Staff (single office)	100 – 120 (+ 60 square feet for each additional staff)
Student Assistant	60 – 80
15-station executive conference room	350 – 400

Suggested Topics for Consideration:

- The campus president's office is the only space on campus that should incorporate a private restroom. The need for a campus president to have ready access to a meeting or conference room is recognized; space for such use is not included in this office space calculation but should be accommodated within the President's suite of spaces.
- It is intended that faculty offices be provided on the basis of one office for each full-time equivalent faculty position. Gang or multiple-station faculty offices are discouraged because they do not allow the confidential counseling necessary between student and faculty and do not provide the security needed to protect testing materials or intellectual property.
- Professional staff may be housed in private offices or in the open office/workroom environment, depending on the type of function to be performed and the organizational framework utilized by the campus. This space includes all circulation, files and equipment requirements.
- The senior secretary or department receptionist's area is sized to include departmental files, electronic support equipment, and/or a waiting area as appropriate to serve the program requirements.
- The arrangement of administrative offices for the president, vice presidents, and their respective staffs should be designed to support the particular administrative organizational style determined to be best suited to the campus and its educational purpose. Thus an administrative facility may be designed to accommodate all central administration, or the central administration may be dispersed throughout the academy.
- Economies are associated with the open office configuration. Careful consideration should be given to using this design when appropriate.
- Whenever possible, offices should be designed to incorporate the use of natural light.
- Office suites should be designed to include waiting or reception areas when the office serves the public or when clients visit the office space on a regular basis.
- Clusters of office spaces should be provided with appropriate service-support facilities, including work rooms incorporating mail and storage service areas, copy rooms, and spaces for electronic support equipment.
- An executive conference room should include or otherwise have access to a sink, counter and secure storage areas suitable for the serving of prepared food. Executive conference rooms are limited to the President's suite and the vice president's office suites but should be made available to serve other campus users.

Indoor Physical Education

The instructional need for physical education space will depend greatly on the campus's academic mission, together with the campus's site and situation within the local and/or regional community. However, the general need for indoor physical education space to support the academic program might be similar to that referenced in the following table.

Table 6

Campus Student (ASF) Enrollment (EFTS)	*Square Feet*
Minimum eligibility	24,000 ASF
2,000 – 4,000	11 ASF/EFTS
4,000 – 8,000	10 ASF/EFTS
8,000 – 15,000	8 ASF/EFTS
15,000 – 25,000	6.5 ASF/EFTS
25,000+	6 ASF/EFTS

Suggested Topics For Consideration:

- The basic gymnasium facility, suitable for campuses with smaller enrollments, should be designed to accommodate multiple activities, i.e., a multipurpose building. Attributes of such facilities should be designed to accommodate instructional programs that are consistent with the campus's academic mission. Thus, while the overall size of the gymnasium may be the same at campuses with similar enrollments, the integral components of the buildings may vary because of the particular programmatic requirements of the institutions.

- Because of the large volume spaces, combined with the potential for large numbers of persons attending spectator sports or other activities, the method(s) by which a gymnasium facility is heated, cooled, and dehumidified should be carefully considered. Operating cost factors should be evaluated at part of a gymnasium's initial design to assure that construction cost savings are considered together with the longer-term operating cost characteristics.

- Normally, a campus gymnasium should be sited so that its various facilities (e.g., locker rooms, showers, etc.) can serve both indoor and outdoor physical education activities.

- Gymnasium facilities should be sited and designed to optimize the use of available parking in order to reduce the need to construct additional parking to serve the occasional event assembly needs of the facility.

- Because it is common for a gymnasium to service multiple assembly events that are attended by persons not particularly acquainted with the campus grounds, special attention should be given to the provision of exterior lighting and signage that is useful during the hours of darkness.

Outdoor Physical Education

Any campus s need for outdoor physical education space is influenced greatly by factors beyond the requirement for instructional space. The following table indicates the amount of outdoor space a campus may require in support of its instructional programs.

Table 7

Campus Student Enrollment (EFTS)	*Acres*	*Teaching Stations*
2,500	18	4
5,000	22	8
7,500	26	9
10,000	29	11
15,000	34	14
20,000	37	17
25,000	39	19

- Examples of outdoor teaching stations include baseball or softball fields, soccer fields, track and field areas, field hockey areas, tennis courts, multi-use outdoor areas, and other similar outdoor athletic areas that support instruction in physical education.
- The type of outdoor physical education areas constructed should be consistent with the needs of the physical education (academic) program.

- Support facilities, such as lockers and showers, are typically provided in the campus gymnasium rather than in free-standing buildings.

Plant Operations

(Physical Plant)

An appropriately sized and configured corporation yard is vital to the operation and maintenance of all campus facilities. Corporation yard space includes shops, drafting room, offices, warehouse areas, storage, groundskeepers workrooms, vehicle storage and maintenance facilities, and may include campus security quarters and shipping and receiving facilities. Corporation yard space eligibility is calculated on the basis of ASF per EFTS and includes both indoor and outdoor areas.

Table 8

EFTS	*ASF Per EFTS*	*ASF*	*Outdoor Paved Area*
Minimum	N/A	7,500	10,000 sq. ft.
2,500	4.8	12,000	20,000 sq. ft.
5,000	4.2	21,000	33,000 sq. ft.
10,000	3.0	30,000	40,000 sq.ft.
15,000	2.4	36,000	45,000 sq. ft.
20,000	2.0	40,000	50,000 sq. ft.
25,000	1.8	45,000	55,000 sq. ft.

Suggested Topics For Consideration:

- The plant operations area should include all facilities necessary to support the physical requirements of the institution and may include offices for the plant director and administrative support staff, shops for the trades, warehousing (and if determined appropriate to the nature and operations of the campus, central receiving), and outdoor paved storage for vehicles and equipment.

- If weather or other site-specific conditions make it practical or necessary, the area established for the outdoor paved parking of vehicles and equipment may include a roof covering. Such roofing installations are not considered as a building within a campus's inventory of facilities.

- The plant operations area should be well fenced and capable of being well secured when not in use.

- If practical, the plant operations area should have direct vehicle access from a suitable public highway, in addition to private egress to the campus. It is preferable to encourage the separation of commercial delivery vehicles from on-campus traffic.

The Efficiency Ratio

(Burden Factor)

The total area of a building is a combination of the assignable and non-assignable areas of the building and is generally known as the "gross area."

For preplanning purposes the gross area may be calculated by multiplying the assignable (net) area by an efficiency factor, or its reciprocal, the burden factor [net area times efficiency ratio (or burden factor) = gross area].

Computing the gross area by use of typical burden factors is one method to estimate the overall size of a building during its initial planning. The burden factor accounts for non-assignable spaces such as lobbies and corridors, toilet rooms, mechanical spaces, custodial closets, and electronic support and telephone rooms. Certain building types are typically more efficient than others; as such, the following table may be helpful in computing the gross size of a building during **preliminary planning**.

Table 9

Building Efficiency Factors
For Use During Preplanning

Building Type	*Burden Factor*	*Efficiency Ratio*	*Target For Construction Efficiency Ratio*
Classroom / Faculty Office Building	1.6 – 1.5	62% - 66%	65%
Administration Building	1.7 – 1.6	59% - 62%	60%
Classroom / Laboratory Building	1.7 – 1.6	59% - 62%	60%
Laboratory or Research Laboratory	1.8 – 1.6	55% - 62%	60%
Large Volume, Large Circulation Buildings	1.5 – 1.3	66% - 77%	70%
Large Volume, Small Circulation Buildings	1.2 – 1.1	83% - 91%	85%

The Building Project Procedure Manual

Capital improvements implemented under the auspices of the Board of Regents will be in accordance with the *Building Project Procedure Manual* as issued by the Office of Facilities, Board of Regents of the University System of Georgia. This manual includes definitive information regarding each stage of a project's development and implementation. Chapters of the manual include topics such as an Introduction to Programming, Schematic Design, Preliminary Design, Construction Documents, Bidding and Award of the Construction Contract, and Construction Administration and Project Close-Out.

A review of the *Building Project Procedure Manual* during the preprogramming stage of a project's development can help focus tasks to assure that the user/owner group develops achievable schedules and expectations. Such a review can also serve to reassure the user group that its involvement and oversight is anticipated through the preliminary Design stage of a project's development.