

**COMMONWEALTH ARMORY
BOSTON UNIVERSITY RESIDENTIAL COLLEGE**



**by
James Flick
January, 1986**

**COMMONWEALTH ARMORY
BOSTON UNIVERSITY RESIDENTIAL COLLEGE**

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by
James Flick
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PREFACE

A student attends an institution of higher learning to develop his mind, learn new skills, and mature. Living on the university campus has many benefits, for it is within on campus housing that close associations with other students can occur. As Chickering points out: "The student's opportunities for contact with different kinds of persons can lead to increased ease and freedom in his relationships with others. Because in his residence hall a student observes the impact of his behavior on others and feels the force of the group's behavioral norms and standards, he can better develop a personal system of values that he can hold with integrity." (Chickering, 1969, p. 221). The impact of the familiar college bull sessions is usually a leading factor in this sort of student development. The placement and design of lounges within a residence hall has been found to be a critical element in the promotion of such discussions. Besides physical space such as the lounges, behavioral elements are also important to the success of such discussions. Restrictive rules and regulations can be hindering to impromptu discussions, and sometimes lead to a sort of guerrilla warfare with students. Therefore it is important to realize that policy as well as physical form plays a vital role in the student lifestyle. If physical planning can provide for many of the concerns that rules and regulations address, such as security and safety for example, then an alleviation of restrictive behavioral standards will provide more freedom for the student. Planning in this regard becomes a crucial part of student living ----- and learning.

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- ... To Grandma who made it all possible...
- ... And lastly to my mother who has been known to proudly proclaim at parties: "Word processing is my life!"...

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INTRODUCTION



INTRODUCTION

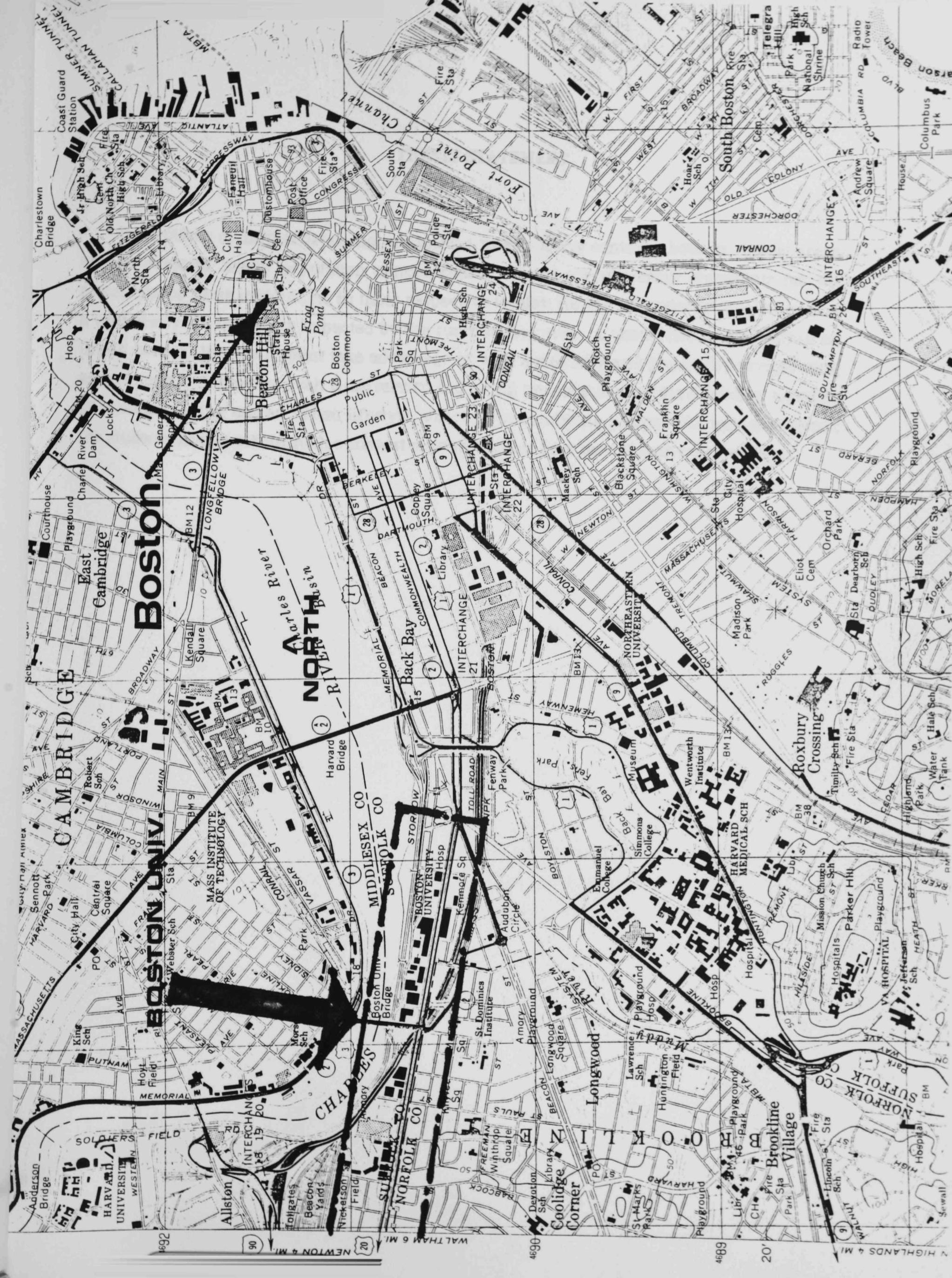
Boston University is located in historic Boston's Back Bay area. The University Campus is located in the midsts of a sprawling urban community. For this reason, attending Boston University is a learning experience in not only academics, but in urbanism as well.

Boston University was originally located in the heart of downtown Boston, but since the 1860's when the institution's doors first opened, there has been tremendous enrollment increases, forcing the university to find space for growth. The Back Bay area of Boston was a newly created infill section and provided the perfect location to expand the university while maintaining close ties with the city of Boston. The university chose to locate on a parcel of land close to the Charles River. (Refer to the area map on the following page).

The firm of Cram and Ferguson was chosen to design a master plan for Boston University's new location. Ralph Adams Cram authored the first master plan to be composed of quiet quadrangles dominated by a chapel. It took two decades before Cram's master plan started to take shape. The Back Bay at the time of Boston University's inception there was planned to be a neighborhood of social prominence, much like the Beacon Hill area. Cram's master plan would have fit into the neighborhood nicely if that were the case. Today, however, with the build-up of the area into a commercial sector, Boston University finds itself once again in the middle of a city.

Within this type of urban environment, Boston University has a tradition of renovating historic structures in the land-scarce area, instead of tearing down and building anew. This has lead to keeping intact the historic context of the area.

Once again, the need for expansion faces Boston University. The need is in the form of student housing. This programs' intent purpose is to provide a foundation for which additional housing can be accomodated without altering the lifestyles of Bostonians residing in - and the historic characteristics of - the surrounding neighborhood.



Boston

CAMBRIDGE

NORTH RIVER

CHARLES RIVER

MIDDLESEX CO

SUFFOLK CO

NORFOLK CO

SUFFOLK CO

Boston Univ.

MASS INSTITUTE OF TECHNOLOGY

BOSTON UNIVERSITY

NORTHEASTERN UNIVERSITY

HARVARD MEDICAL SCH

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THESIS STATEMENT

Institutions of higher learning are located within many contexts; both in remote areas, and in areas of heavy population concentration. There are numerous arguments for the placement of these institutions in their respective locales; for the lifestyles of those attending a university are obviously impacted by the surrounding area. A university located within an urban context lets the student take advantage of both a mentally and physically invigorating environment. Attending such a university and living on campus provides a melding together of academic living and an urban lifestyle, which is a stimulating prospect for a lot of students; for students living within such a context must in essence be a *part* of both environments.

PHILOSOPHICAL/THEORETICAL BASIS

My personal philosophical/theoretical basis changes often. Every new and unique learning experience for me usually results in a reversal of past opinions and ideas that I would have once bet my life on. Some people I'm sure would be lead to believe that this is a particularly unstable attitude. I prefer to call it a "flexible attitude."

Certain key issues ~~do have~~ the staying power to survive my frequent changes of perception and attitudes however. Simply stated, I feel that architecture *should be* an expression of a culture; its' standards, its' expressions, and for heaven's sake - its' humor! Now how in the hell can anyone design all of that into a building, much less have anybody understand it? When I learn the answer to that one, I'll make the cover of *Progressive Architecture* for sure!

Architecture is vernacular. What's suitable is *suitable!* Revival of all sorts of architectural styles is o.k. Take the original Federal Style for instance; I believe it was only an expression in culture. After all, where did the Federal Style architects originally come from? O.k., I can't answer that one, but Federal Style nonetheless did remind the traitorous United States citizen of merry ole' England, their former culture. (Who as we know were inspired by the ancient Greeks and Romans - who undoubtedly forced a culture upon the Brits' whether they wanted it or not).

So that's it in a nutshell. I'd be traitorous myself if I didn't mention that it goes without saying that architecture should be designed for maximum productivity in these very costly of times. Otherwise this program's *intent* would be utterly worthless.

ISSUES

- Maintaining the exterior appearance/character of the Armory building.
- Maintaining positive relations between the younger inhabitants of the Armory and the residents of the Allston/Brighton area, one of a highly elderly population.
- Optimizing the relationship of a residential facility to its location within a highly commercial urban context.
- Creating an environment that will enhance positive interactions between the faculty and student inhabitants.
- Providing security, and health safety measures while retaining high levels of student freedoms.
- Accomodating the different lifestyles of undergraduate students, graduate students, and faculty.

GOALS

- A condition in which a great number of students will be provided with the opportunity for social interaction.
- A condition in which surrounding neighborhood communities will coincide peacefully with the students.
- A condition in which the existing structure of the Armory can provide space for student living.
- A condition in which the Armory's adaptive re-use into a University facility will not hinder the buildings' contribution to the historical character of Boston's Back Bay area.
- A condition in which future enrollment growth of Boston University is provided for.
- A condition in which the Armory will function as a residential college; providing students and faculty with a unique environment in which to exchange thoughts, perceptions, and ideas.
- A condition which allows for ease of operational and maintenance procedures.
- A condition which allows for a variety of student lifestyles and values.

OBJECTIVES

- To provide living space for a minimum of 550 upper-level undergraduate students.
- To provide separate living and research areas for graduate students.
- To implement a variety of living accommodations to suite the varying lifestyles of undergraduate students, graduate students, and faculty
- To provide proper handicapp accessibility to all areas of the facility.
- To update mechanical, environmental, and other components within the Armory to provide for the health, safety and well being of its occupants.
- To encourage private retail trade to open service facilities within the complex.

BACKGROUND



BACKGROUND/ENVIRONMENTAL ANALYSIS SUMMARY

Lee Claflin, Isaac Rich, and Jacob Sleeper were representatives of the new, self-made mercantile generation of mid-nineteenth-century America. It was their intent to give the city of Boston something in return for their good fortunes - hence in 1869 Boston University was established by these three men. The founders were not newcomers to the education field, they had collaborated in the past with the establishments of other institutions of higher learning; but Boston University was by far their biggest venture.

Boston University has had a long history of renovating many buildings for its own usage. In many instances, the revitalized buildings, (and the vibrant activity brought about by the new use for the buildings) added a new splendor to an otherwise run down neighborhood. Sometimes however, the results of the university's expansion into residential neighborhoods leads to conflict with the residents of the neighborhood. Such is the case as Boston University attempts to expand southward and westward. The neighborhood residents of Allston/Brighton are upset with the increased rental rates, noise, and limited parking accessibility the university's expansion into the neighborhood has brought about. The residents do not want the university students in their neighborhoods because of these problems. To settle the conflicts Boston University needed to find an additional facility to house students, and it had to be located someplace - but where?

The Commonwealth Armory built in 1914 has served the National Guard since the same year. The Guards' needs have changed quite a bit over the years, and thus decided to relocate to new facilities - after studying a renovation scheme for the Armory. The Armory has slowly been engulfed by Boston University; being surrounded on three sides by university buildings. The soon to be vacated Armory is suddenly seen as a golden opportunity to solve the student housing shortage.

The case studies in this section deal with the subject of dormitories. Each of the five case studies represents a different problem that was placed before the designers. The intent of the case studies is that they will hopefully provide a bit more insight into the complex subject of suitable living arrangements for the university student.

... The phrase "the university community" has different meanings to different people. It evokes perhaps as many varied images as does the phrase "the urban community". For some, the university is the detached, removed, rational, questioning, non-practical centre of knowledge and research, particularly esoteric, specialized, and theoretical research. For others, the ivory tower is covered with ivory, and the university is both a symbol of and the embodiment of tradition and the stability of values and culture. Still others view the university as a seedbed of revolution, either in politics or behaviour. Some see the university as a ladder to success, the way to status and career satisfaction. In contrast, others see the university as a tool of the military-industrial complex and a supreme manipulator of individuals. For some the university is on the idea-frontier of technological, social, and economic changes, and is indeed the source of vitality in all these arenas; for others, the university is not-too-efficient handmaiden to society. In short, the way the university community is viewed is related to one's philosophical and political outlook and probably to one's personality...¹

No matter what one may think a university truly *is* or what a university *represents* (a haven for learning, research, theorizing, etc), one aspect of a university's physical being is clear: The university is in reality a community. The "university community" is generally thought of in two different ways; that of a physical entity, and also on an intellectual basis. Physically, the university ... is a special and demarked place in which the social and intellectual existence of academic people occurs. In North America, specialized buildings are grouped in proximity on campuses. Most buildings are intended to transmit and create formal knowledge through libraries and laboratories and places in which to talk, as small as a seminar room and as large as a great lecture hall. But there are also facilities for acquiring knowledge - or wisdom - informally through places for eating, sports, films, concerts, exhibits, lounging, displays of art and nature, and many other kinds of activity...² Intellectually, students and faculty are working together in "related work of the mind in a manner not found outside the university".³

The placement of a university as a "physical community" have historical anecdotes that undoubtedly still hold true today. Although there have been many different historical cases for placing a university in its location, only the "two ends of the spectrum" will be presented here to demonstrate a point. There

were those founders of colleges and universities who were afraid that the wrong type of surrounding environment would do harm to students ... behaviour and character development⁴.... It was felt that a remote location would be conducive to learning. Pushing for an institute of higher learning in the American colonies in the early 18th century, George Berkely, the Bishop of Cloyne, for whom Berkely, California, is named, wrote:

... Many things ought to be considered in the choice of a situation. It should be in good air; in a place where provisions are cheap and plenty; where there is no great trade, which might tempt the Readers or Fellows of the college to become merchants, to neglect of their proper business; where there are neither riches nor luxury to divert or lessen their application, or to make them uneasy and dissatisfied with a homely frugal subsistence; lastly, where the inhabitants, if such a place may be found, are noted for innocence and simplicity of manners.⁵

The Bishop of Cloyne did indeed find the perfect place to locate the college; he suggested Bermuda.

On the other hand, some universities were envisioned from the start to be "born within a city". Boston University happens to be a prime example of this thought process.

... On May 26, 1869, three self-made businessmen created the legal entity which was to inherit the fruits of their lifelong labors, an institution of higher learning. Deeply religious and socially conscious Methodist lay leaders, they hoped to "enrich other lives with what had been denied their own." Their newest philanthropy they named Boston University in honor of the opportunities and riches the metropolism had bestowed upon them. Their lives illustrate the forces which fueled the explosive growth of mid-nineteenth-century Boston.⁶

... Since the university's establishment in Boston in 1869, succeeding generations of alumni have returned to a campus that differed radically from the scenes of their student days. Continual change seems to have characterized university policy. In response to its founders hope that Boston University would truly become "Boston's University," the frequent shifts and transformations in the institution's physical setting reflected the dramatic dislocations of nineteenth-century Boston. And in spite--possibly because--of its migrations across the surface of the city, the university implanted deep roots in the cultural and intellectual life of Boston.¹

... The principles of institutional cooperation and economic opportunism allowed the fledgling university to provide its students with facilities of high quality. Boston University students attended science classes in the Back Bay premises of the recently founded Massachusetts Institute of Technology; and the first university-owned buildings on Beacon Hill were renovated private homes and churches. Residents in flight from post-Civil War commercial expansion that had invaded the old South End readily sold their properties to the university and migrated to the tranquil settings recently made available by the Back Bay and new South End landfill operations. This pattern was to repeat itself in the post-World War I flight from the Back Bay to the suburbs, when the university enjoyed an extraordinary opportunity to acquire new properties for its expanding needs. Thus from its beginnings, Boston University played a significant role in the city's urban development, giving new life and purpose to obsolete buildings and, in the process, reversing the decline of certain older neighborhoods.²

Nothing in life is ever simple; however, and although Boston University's expansion into its present home in the Back Bay has done much to improve parts of the surrounding neighborhood, there are some problems brewing that have hindered the university's status as a good neighbor. As Boston University went through a period of expansion in the late sixties and early seventies, the increase in student population required the university to lease entire apartment buildings around the intersection of Commonwealth Avenue and Harvard Avenue. The encroachment of students into the suburbs of Allston and Brighton has caused some resentment within those communities. ...Allston/Brighton city councilor Brian McLaughlin has been a constant critic of the problems caused by Boston University students' migration into the community of 67,000.³ McLaughlin blames the problem on [expensive housing costs in the area, and says that the costs are] ... "directly related to a great amount of real estate speculation by landlords who try to attract undergraduate students especially, who probably don't like either the living situation on campus and have nowhere else to go."

" The blame, I think, is shared by landlords who are less than honest and the administration for not providing what students need on campus. The unscrupulous descriptions for landlords is that they are well aware of what the laws are in terms of the commonwealth of Massachusetts and in the city in

terms of Allston/Brighton. Quite often they are enticing students to live off campus and doing that in an illegal sense, whether it's through over-occupancy or illegal additions to buildings." ⁴ The problem with overcrowding in the nearby Allston area by university students are twofold; one, the additional demand for street parking is at an all time high. This is caused by long time residents and the less permanent, or "transient" residents (students), competing for parking spaces. The increase of cars on Allston's narrow streets is of concern to community leaders who feel the crowding to be a potential hazard that emergency vehicles must weave through. Additionally, permanent residents of Allston continue to complain about the noise from parties and the increase of trash and vandalism in the neighborhood. Ronnie Smith, deputy commissioner for the elderly, adds, "A lot of the kids at BU (Boston University) and Boston College are used to a standard of living greater than many of their neighbors in Allston- Brighton. Many feel no responsibility to maintain it (the neighborhood), and some even feel free to destroy it." ⁵

"Of course, the universities (including BU), are acting as irresponsibly as some of the kids who are driving us crazy," Smith says. ⁶ Not all students are irresponsible, but comparatively few noisy undergrads are enough to provoke the community's ire. ⁷ Another problem that hits the permanent residents of the neighborhood is that of increased rental rates. Whereas not all of the students who chose to live in the Allston area are irresponsible, Any BU student, however, inadvertently drives up Allston rents. Real estate firms and absentee landlords capitalize on students' needs for housing by buying available buildings and boosting rents. The result is living quarters affordable for several students together, but a price too steep for a family with only one, or at most two, breadwinners.

As a result, young families often move out of Allston, leaving behind a permanent elderly population more likely to clash with energetic students who still suffer growing pains. ⁸ The following excerpt by a student journalist attending BU entitled "**The Lure of sunny Allston**" brings a student's point of view into light:

... Like the limits of any state of mind, the official borders of Allston are tenuous at best. Certain outposts, like the Atrium in what used to be called Peckard Square, are more concrete, but where Boston ends and Allston begins is a subject of ambiguous speculation.

It is this uncertainty that has helped promote friction between long-time Allston residents and Boston University: the residents feel the University knows no boundaries when it comes to imposing on their community, and the permanent shortage of on-campus housing at BU has not help allay their fears of greater student influxes.

Of course, many of the students living in Allston do not feel they fit the feeling conjured by residents -- helpless orphans deprived by big BU of their campus living space. They enjoy the independence of living off-campus. They appreciate the funky bohemian flavor afforded by living in a community with its own subtle nuances, rather than in a sterile, uniform unit of university housing. Despite not being as picturesque as a Bay State Road brownstone, living in Allston is a step into the "real world" rather than the cloistered protection of sharing space with, by and large, a homogenized group of upper-middle-class white kids.

In Allston, the thrill of discovering a new treat like Steve's Kitchen, a friendly and hearty eatery recently opened on Harvard Avenue by a family of Greek immigrants, supplants the occasional displeasure of a less than spotless street corner. And despite the picture painted by residents of all students being slobbering selfish drunks, the majority of students living in Allston do so because they *want* to.

Accordingly, these students treat their individual neighborhoods with more respect than many students who live in university housing treat their living environment.

Some BU students, confronted with now unlikely possibility of having to move off-campus, talk of the surrounding "bad neighborhood." Allston may not be as squeaky clean as the institutional surroundings of BU, but I doubt that these same people would express as much concern about kids down the hall selling cocaine or cheating on their midterms. Clearly, the ignorance on the part of both students and residents has not helped alleviate problems. Perhaps the BU administration's new concern for improved relations will lead to greater communication between the involved parties.

Like the city of Boston itself, Allston is crowded. Parking spaces command a premium -- after 10 p.m. motorists looking for spots on the street must display patience and conviction. Trying to find an appealing apartment takes fortitude. The "T" (short for the Massachusetts Bay Transit Authority, ie the subway) resembles a sardine can in the morning rush hour, coming down from the BC (Boston College) to the BU campus, making residents' objections to BU's shuttle bus even more querulous. But for BU students, living in Allston is not always a forced decision made by an administrator's lack of foresight in gobbling up centralized territory. It is often a matter of preference.⁹

After years of apparent indifference to complaints from the community and local politicians, BU has finally begun to address the Allston problems they helped create. In January of 1985 for instance, BU appointed Community Liaison Maureen Hurley to work toward resolving tensions between Allston and the university.

Bu's recent acquisition of the Commonwealth Armory also offers future possibilities of creating more on-campus housing, which would help relieve Allston's over-bearing student presence.

While most Allston residents and politicians were outraged when BU took possession of the Armory in late '83 ("The bill was literally snuck through in the middle of the night," says Gallagher), most will concede the benefits of the site for providing on-campus housing.

Presently, BU is required by law to create at least 550 beds for students at the Armory site. Although new construction cannot begin until 1990, BU will receive funds from the state and city to help finance the project.

Until then, students and the community have numerous options to help alleviate tensions. Possibilities include student action committees that would handle complaints from residents. Student representatives could also sit in at town council meetings. Also, the long-term residents should rely on the more stringent Boston Police, not to BU to provide disciplinary action for noisy students.

None of these suggestions will serve as long-term salvage operations, but they should restore some of the goodwill that has been lacking between students and residents, as well as between BU and Allston.¹⁰

ENDNOTES

¹Lewis B. Mayhew, "Colleges Today and Tomorrow." The City and the University, San Francisco: Jossey Bass, Inc. 1969 p. 18.

²Ibid. p. 18.

³Ibid. p. 20.

⁴Ibid. p. 22.

⁵Ibid. p. 26.

⁶Ibid. p. 31.

¹Nancy Lurie Salzman, Buildings and Builders an Architectural History of Boston University, Boston: Boston University Scholarly Publications, 1985.
p. 4.

²Ibid. p. 5.

³Lisa M. Moore, "Boisterous Students Arouse Resident's Wrath." The Daily Free Press, Thursday, February 28, 1985. p. 5.

⁴Ibid. p. 5.

⁵Ibid. p. 5.

⁶Ibid. p. 5.

⁷Ibid. p. 5.

⁸Ibid. p. 5.

⁹Ibid. p. 5.

¹⁰Ibid. p. 5.

HOUSING BACKGROUND

INTRODUCTION

Residence halls are not just for living in, they are for learning in. The resident gets a chance to interact with many people his own age, with similar problems, fears and goals that he has. Living in a residence hall is learning to live and communicate with other people.

Boston University has a general commitment to provide all students attending the University with a thorough grounding in the liberal arts and sciences to ensure the development of critical thinking and communication skills. As part of this mission, the office of Residence Life and the Office of Housing share responsibility for administering the residence hall system at the university.

The Office of Residence Life, located at 985 Commonwealth Avenue, is responsible for staffing the halls with Hall Directors and Resident Assistants (or RA"s); providing programs and noncurricular learning opportunities; working with student governments and the faculty-in-Residence program; and administering the residence disciplinary system.

The Office of Housing, also at 985 Commonwealth Avenue, is responsible for operations activities in the residential facilities, housing assignments, residence charges and student housing accounts, security, food permits, damage charges, and furnishings.

GOAL

... We at Boston University believe that your educational experience extends beyond the classroom and into the residence halls, where your total education - which includes personal, intellectual, and professional growth - can easily be facilitated. It is the responsibility and goal of the Office of Residence Life and the office of Housing to provide an environment where this growth can flourish. ...

ADMINISTRATION

In addition to its central office staff, Residence Life employs at least one full-time professional staff member to oversee the day-to-day life in each residence hall. The Hall Directors are the managers of the residence halls, and they serve to support the productive living and learning environment for resident students. The Program Directors and Assistant Directors work with

staff and student government leaders on the many hall-sponsored events each year, and they contribute to the smooth management of "move-in," "move-out," and everything in between. Students will likely have considerable contact with the secretarial support staff-staff members, who serve students from the residence hall offices during business hours on weekdays. Their duties include maintaining accurate hall records, distributing room keys, and providing information about hall procedures. They also relay room repair requests and room painting requests to the appropriate University offices.

RA'S

The resident assistant, or "RA," is a part-time Residence Life staff member, and could well be a new student's best source of information on campus. RA's are usually juniors or seniors, and sometimes graduate students. The senior RA, another part-time Residence Life staff member, works with the student government and RA staff in a large residence hall in coordinating educational, cultural, and social events throughout the year. All RA's share "on duty" coverage for the residences when the main hall offices are closed. Each year, hundreds of students apply for a limited number of these RA positions.

FACULTY -IN- RESIDENCE PROGRAM

The faculty-in-Residence Program is in a way, the basis for this program. The housing complex is not meant to be just a dormitory, but a place to truly fulfill the University's intent that campus housing be a place for a student to learn and mature.

Many faculty members and their families reside in various large and small halls. The faculty-in-Residence program has two major goals: 1) to make available to students an educational experience that extends beyond their course and classroom work, and 2) to provide both students and faculty with opportunities to get to know one another in the informal atmosphere of the residence halls.

Faculty members associated with the program will invite students to acquaint themselves with the rich cultural life of the University, the city, and their neighborhoods; faculty members have also been known to have accompanied students to the theater, concerts, athletic events, and other activities. Informal academic counseling and tutoring, film showings, and the discussion meetings in faculty apartments all are ways of enriching the students life.

A new addition to the program is the faculty lecture series. This program gives non-resident faculty members the opportunity to participate in and contribute to the students' residential experience. Students invite faculty members to their halls to speak on current events, issues, and areas of special interest, to join students for special dinners, or to meet in small group discussions.

RESIDENTIAL SAFETY AREA

The Residential Safety Area provides a 24-hour-a-day uniformed security coverage at the main entrance of each large residence hall. Students are advised to keep their Boston University identification cards in their possession at all times, and students who reside in the large halls must display their I.D. cards to the Security Assistants each time they enter their own halls. The need for security of this sort is an unfortunate aspect of living in an urban environment; however, one that must be taken into consideration in the design of a new housing facility within this context.

RESIDENTIAL OPTIONS

Boston University offers a variety of living conditions for students. Housing options range from "international-style" high-rises to nineteenth-century brownstones, from residence complexes for more than fifteen hundred students to halls with only a few rooms, from six-person suites to private singles, from halls with board plans to apartments with kitchens.

The residence halls and apartment buildings vary not only in size and design, but also in atmosphere. Educational, cultural, social, and recreational programs differ according to a residence hall's facilities, its staff, and the needs and interests of its student population.

It is the intent to make the "Armory," a facility that will expand further the varied and educational opportunities of living on the Boston University Campus.

THE COMMONWEALTH ARMORY

BACKGROUND The Armory of the Massachusetts Division of the National Guard was designed by James McLaughlin, built, and finished in 1916. ... The castle-like Tudor Revival style of the exterior of the building is used in a genuinely martial setting. James E. McLaughlin, the architect of the Boston Latin School, faced special requirements in the design for the local cavalry division. The broad set-back and entrance bridge at the third level provide space for a moat-like ramp servicing the two levels below. Wagons would load feed for the horses from railroad cars at the rear of the building and then roll up into the first and second levels along special ramps. The land to the east served as an open drill ground for the cavalry; it was later covered by the present three-story additions.

The theatrical approach is through iron gates hung on open-grille posts attached to great brick-and-limestone piers. A bridge then leads over the moat/driveway to a massive three-story gatehouse. Projecting, the two-story "guardhouses" flank the doorway. McLaughlin lavishly applied a Tudor Revival vocabulary of blind trefoil arches, heraldic shields, powerful buttresses, and alternating bands of red waterstruck brick and white limestone. A crenellated parapet completes the image of a fortified castle.

The Armory was immediately the dominant building on the streetscape. Within a year, the owners of *The Fourth's Companion*, (the first American weekly paper for children) well-known for their architectural sophistication, constructed their new printing plant in stylistic homage to the Armory.¹

The Commonwealth Armory has served for over 65 years as one of the most important and active armories and Massachusetts National Guard facilities in the Commonwealth. During this period, it has been gradually adapted and altered to accommodate the changing equipment, technology, training procedures and administrative requirements of the National Guard. In the past several years, the building's deficiencies have again been brought to the forefront and concern has been shown regarding a direction for the future maintenance and upgrading of the Commonwealth Armory.

A few years ago, the National Guard was considering renovating the Armory once again to fit their needs. Recently, the Guard has been instructed to move to a new site outside of town. During the time of the renovation proposals, a study was commissioned by the Massachusetts Bureau of Building Construction (BBC) to upgrade the Commonwealth Armory for the purpose of

serving the Massachusetts National Guard for a projected 40-year period. Undertaken in close cooperation with the guard's State Quartermaster, Colonel William Quigley, the study involved an in-depth survey of existing conditions and detailed recommendations for repair and rehabilitation. The study was conducted by Anderson Notter Finegold Inc., a Boston firm of architects and preservation planners with extensive experience in the rehabilitation of older buildings. Consulting engineers were called on to provide special expertise in their respective fields.

The renovation proposal included the following:

- the upgrading of space to meet all applicable code requirements (fire, energy, building codes)

- new mechanical, electrical, fire protection and plumbing systems

- additional locker and restroom facilities to accomodate the growing female guard membership

- design of a new mess hall and kitchen near the small drill hall

- replacement of certain equipment (such as lockers, cabinets, counters and bins)

- upgrading of all offices to Class A office space, with new finishes, carpeting, acoustical ceilings and a movable partition system

- replacement of all windows with thermopane glass and new roofing throughout.

Field investigations were conducted by the architect and consultants, and documented with drawings and photographs of existing conditions. Preliminary drawings were prepared to define the scope of renovations and develop accurate cost estimates.

The proposed renovations would have required a substantial estimate of money to the tune of \$11,500,00 (in 1980). The cost would cover complete replacement of all major systems. The proposed renovation would meet the National Guard's projected needs for the next 40 years, by extending the life of

Area B. Drill Hall No. 1 is a clear span structure of 52,500 square feet. The shorter dimension (east-west) is 175 feet and is spanned by double steel trusses at 44-foot intervals, which are supported by steel columns. Egress is provided by double doors exiting directly to Gaffney Street. A row of arched windows above these doors provides a small amount of natural lighting. Balconies overlook the hall from the east and south sides. The north-south span is a full 300 feet in length. Large arched clerestory windows in the gables admit natural light. Clear height from floor level to the underside of the trusses is 24 feet, and to their ridge point, it is 36 feet. The trusses vary in depth from 24 feet at the ridge to ten feet at the eaves and are bent at the midpoint of their span. The trusses support a gambrel-shape roof which is 60 feet above floor level at the eaves.

The roof of Drill Hall No. 1 is an asphalt-impregnated roll roof layered over two-inch nominal wood decking. It is supported on 2 x 12 rafters at four feet on center, which rest on steel purlins above the truss system. The decking and support system appear to be in excellent condition, except where water infiltration has occurred at the eaves and in alternating bays where skylights formerly existed. The original contract documents and early photographs indicate that these were three huge monitor skylights which provided a substantial amount of natural light and ventilation for the hall. The 26-foot by 88-foot skylights were removed, apparently due to leakage. The deterioration of base and cap flashing has produced efflorescence and minor spalling of the north, east and west walls.

Vehicles have continually been stored and paraded inside this space. In the early 1960's, an attempt to create a fire separation between this hall and the rest of the building resulted in asbestos boarding of all windows in the east and south walls. In effect, little or no fire separation was created. All doors are wood, and most are of hollow-core construction. The original earthen floor has two layers of bituminous concrete paving in very good condition. A suspended acoustical ceiling and additional lighting were added for an auto show. The lighting functions well, but the ceiling has deteriorated. It consists of a membrane fabric of salt-peter impregnated canvas attached to bow trusses hung from the roof trusses.

A cantilevered concrete balcony projects from the east wall. It has a wood floor and three tiered benches. The floor is very worn. A low balustrade and handrail frame the balcony edge. The south balconies are of steel and concrete. They appear to be replacements for the original set which matched the east

balcony. While the east balcony functions strictly as a viewing stand, the south balconies serve as corridors as part of the egress system.

Area A The main administrative area is comprised of sub-basement, basement, three main floor levels and a three-story tower. Total floor area is 162, 800 square feet. Floor to floor heights vary from 11'- 0" at the upper floors to 13' - 6" at the ground and first floor levels.

The original 1914 area is of reinforced concrete with a steel beam system supported by masonry walls at the upper stories. All steel has been fireproofed with plaster on lath casings.

The 1953 office addition to the east wing was constructed over a portion of the original structure. It contains a reinforced concrete floor system supported by steel columns and beams. The columns are encased in concrete block to provide fire protection. The steel beams are exposed and are not in compliance with fire codes.

EXISTING CONDITIONS - STRUCTURAL

The Commonwealth Armory building contains the original structure along with a major addition added in the early 1950's. The building is composed of a very large structure of many levels whose framing systems vary. The building will be discussed structurally in three parts: 1) The Drill Halls, 2) the 1914 office and other spaces, and 3) the 1950's additions. In general, the building is in sound condition. The following is a summary of the structural conditions for the Armory buildings based on a visual inspection by a registered engineer:

Both Drill halls are essentially single story structures with small balconies in the larger hall. Both halls have roof framing consisting of wood deck, wood joists and structural steel trusses along with appropriate cross bracing. The larger hall has steel columns supporting the 200 foot span trusses, while the smaller hall has the trusses bearing on masonry piers. The steel structure is in good condition. The consulting engineer who analysed the structure recommended that the steel in the smaller drill hall be cleaned and painted, since there were areas of minor corrosion evident.

The wood is in generally good condition. There may be some small areas near the eave or near the former skylights that the decking may have to be replaced while reroofing is taking place. The engineer estimated (in 1980) that \$2,000 ought to cover that item. The engineer was not able to judge the

condition of the cantilevered balcony, but he saw no visible signs of any distress. There are no signs of settlement in the walls of the drill halls, and the engineer considered them to be structurally sound.

The 1914 multi-level headhouse and office area is framed at the lower levels with a 2-way flat concrete slab supported on concrete columns. The concrete slab upper floors rest on steel beams and the exterior masonry bearing walls. There are minor cracks in concrete floors and walls due to horizontal movements. The structure is in excellent condition.

Parts of the 1953 office wing were constructed over a portion of the original building. It is generally concrete slabs supported on structural steel beams and columns. The structure does not bear on any of the 1914 structure. This addition is the poorest of all areas from a structural standpoint. The masonry non-bearing partitions have numerous cracks, and in some areas have separated from the structure by as much as 1/2 inch. At the southeast corner, there are cracks in a masonry pier. These problems are caused by differential settlements of the footings and/or deflections in the floor support system and are for all practical purposes completed after nearly 30 years. The structure, in general, shows no signs of serious distress.

The exterior bridge is a concrete frame with a structural concrete slab supported on concrete arches on both sides. The underside of the arches show signs of serious spalling of concrete. Some of the reinforcing is exposed and has corroded. The limestone facing of the arches is loose in some areas and should be replaced or reattached.

The exterior walls of the Armory are in good condition, except where repointing is needed in certain areas.

THE ADMINISTRATION BUILDING

This building is less than 30 years old, and is a three story office building. A review of the contract drawings was made the by the structural engineer. The engineer believes the Administration building's structure is properly designed. A field inspection showed no signs of any distress in the any members as far as he could see. There were no signs of settlements of the foundations or any noticeable masonry cracking.

The resulting analysis is that the building is in excellent structural condition, and that it can be used many more years as an office facility with little or no maintenance problems from a structural standpoint.

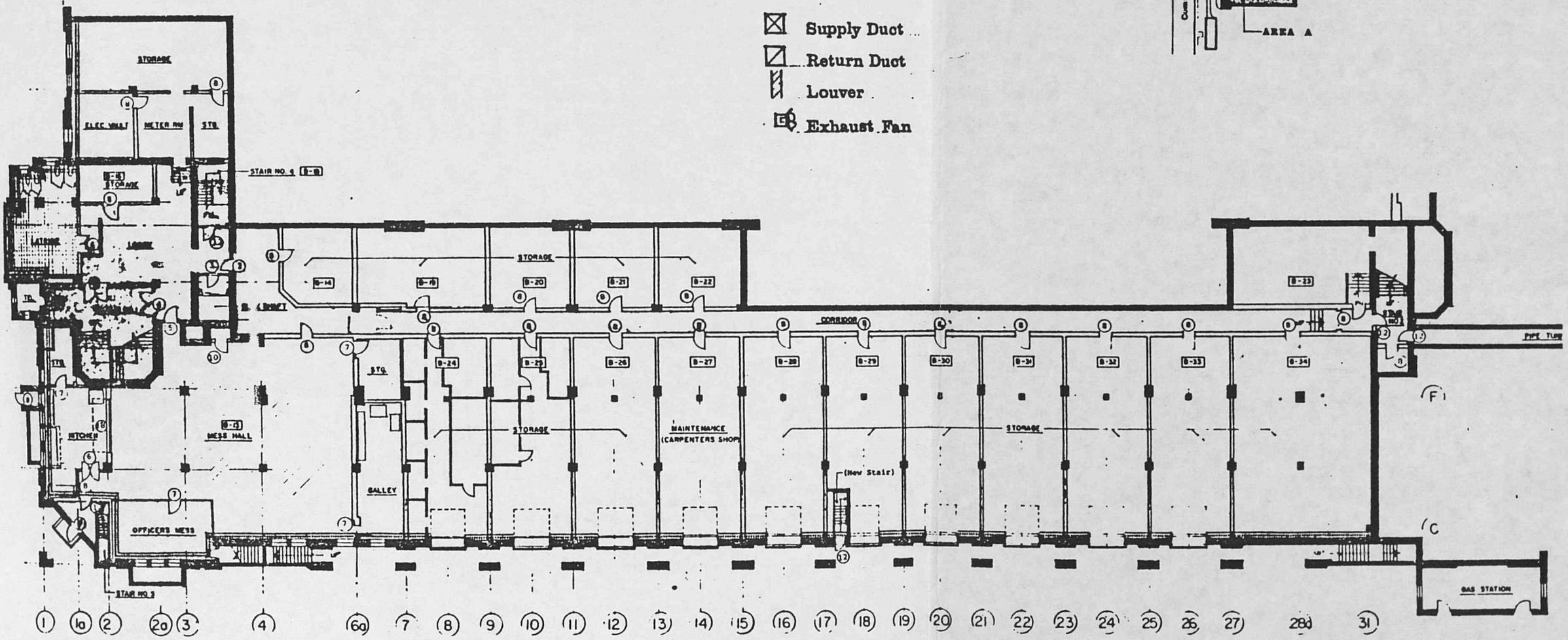
EXISTING CONDITIONS - MECHANICAL

The existing heating system utilizes steam as the heating medium. The three existing boilers are brick base, built-in-place, firing No. 4 fuel oil. The existing condensate system is comprised of one large and two small condensate pumps and the related receivers.

Generally, the present heating system consists of cast iron radiators, baseboard radiation and unit heaters. The system is old and does not function very efficiently.

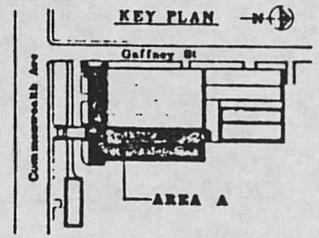
After viewing the basic existing system, the architect recommended that the entire system be replaced. ... This would include the removal of the present boilers, radiators and controls. A new system should be installed which will be more efficient in terms of annual operating costs for the building and in terms of providing adequate heat, ventilation and air-conditioning to all areas of the building.²

Floor plans of the basement and first floors of area A on the following pages reveal the basic structural system used throughout the complex, and the general space available for use in a renovation of the building.



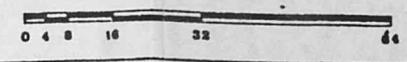
LEGEND

- ☒ Supply Duct
- ☐ Return Duct
- ▨ Louver
- ⊞ Exhaust Fan



ARMORY · Area A · Bsmt. Fl. |

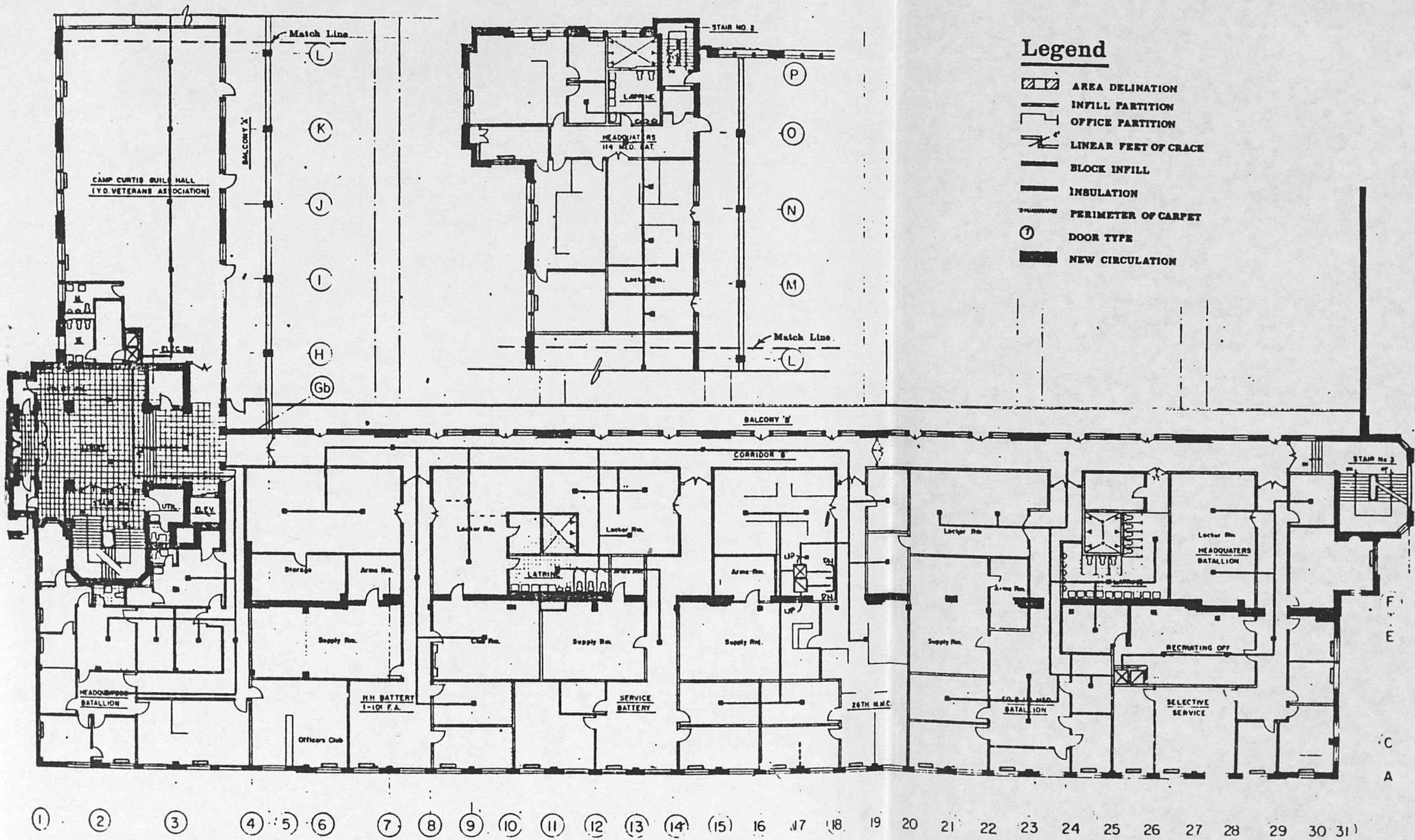
COMMONWEALTH ARMORY STUDY · Commonwealth Ave., Boston, Ma. · R.E.C.
 ANDERSON NOTTER FINEGOLD INC., ARCHITECTS · 77 N. Wash. St. Boston, Ma.



Architectural Repairs

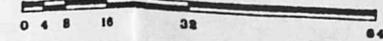


Draw No.
A-2



ARMORY Area A First Fl.

COMMONWEALTH ARMORY STUDY Commonwealth Ave. Boston, Ma. B.B.C.
ANDERSON NOTTER FINEGOLD INC. ARCHITECTS 77 N. Wash. St. Boston, Ma.



HVAC

Repairs



ENDNOTES

¹Nancy Lurie Salzman, Buildings & Builders An Architectural History Of Boston University. Boston University Press, Boston Massachusetts. 1985. p. 111

²James G. Alexander, Commonwealth Armory Renovation Study. Anderson Notter Finegold Inc, Boston, Massachusetts. 1980. p. 9

CASE STUDIES - SUMMARY

The case studies offer various approaches to architectural design and building activities. Some place emphasis with the form of the building and the context in which it resides, some place emphasis on how well the building performs in terms of what it was designed for; while others combine portions of the previous subjects while discussing process, or what the architect worked with. What knowledge did the architect have to work with and what were the concerns of the time? These elements effect the outcome of a building. The cases studies provide an analysis of the subject of student housing and its variations. Insights into the design of dormitories can be gained from the evaluation of the case studies along with material from other sources.

□ Case study number one is the renovation of four existing 19-century dormitories for Yale University. Knowledge of process and space utilization can be gained, as the renovation of the Armory should follow a similiar process.

□ Case study number two actually has two parts: One part deals with dormitories as working designs for a rural Vermont Art school (Bennington College), while the second part is a postoccupancy evaluation for the dormitories. There is also insight into the validity of postoccupancy evaluations.

□ Case study number three deals mainly with environmental contextual issues of the effects a dormitory has on the area around it.

□ Case study number four deals with the placement of dormitories in various inter-mixing contexts (similiar to case study three), but also provides a review of the buildings functioning and the thoughts and process of design by the architect.

□ Case study number five deals with again, envirnmental context, and also design function.

YALE'S OLD CAMPUS REVITALIZED

BACKGROUND

Yale University has long been known as an outstanding institution of higher learning. Located in New Haven, Connecticut, this university is prestigiously known as an ivy league school. Freshman attending Yale are an enviable group to be sure, although by the mid-seventies campus housing was not as well respected as its occupants. Since the 1930's, freshman have lived on the section of Yale known as the "Old Campus". The dormitories that make up part of the old campus are splendid examples of past architectural styles. Farnam (1869-70), Durfee (1871), and Lawrance (1885-86) halls were designed by Russell Sturgis, Jr. and are of the High-Victorian style. Welch (1891), by Bruce Price, and Vanderbilt Halls (1894), by Charles C. Haight, are examples of English Collegiate style (See Figure C-1 for building locations).

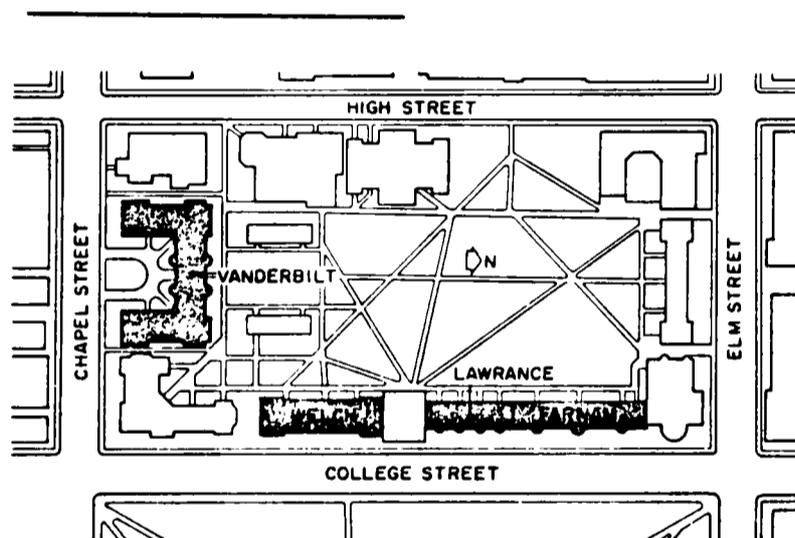


Figure: C-1, Site Plan

Source: ARCHITECTURAL RECORD, p. 93 March 1977

Since the time the dormitories were built, until the mid-seventies, there has been little alteration done to them - save for the switching over from gas to electric lighting, upgrading on the plumbing, and heating facilities, and general maintainance.

Problems began to occur concerning overcrowding within the small bedrooms of the dormitories. First, double-decker bunks were used in bedrooms designed for one individual. Students who did not like the "double-decker" situation began disassembling their beds and placing them in the living rooms of what had once been two-person communal

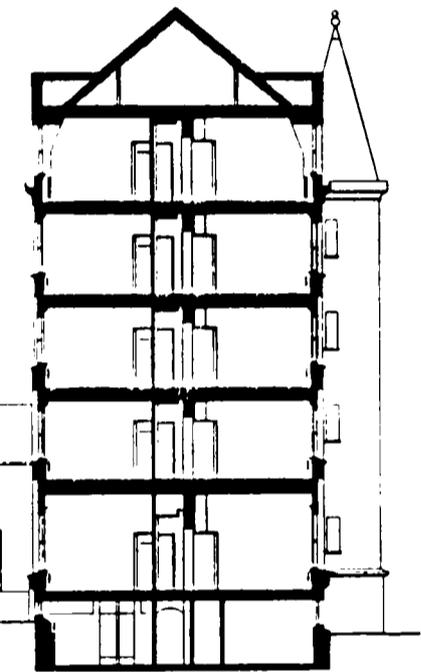
suites. The Yale administration decided something had to be done to remedy the situation. After a proposal to build two new student residential colleges on nearby Whitney Avenue and Grove streets had been thwarted (due to a disagreement on a tax financing plan for the project between the University and the New Haven Board of Aldermen, the Board refused to approve construction for a new project. Building costs had become prohibitive by the time the courts overturned the Boards' ruling) a decision was made to renovate the old campus.

REQUIREMENTS

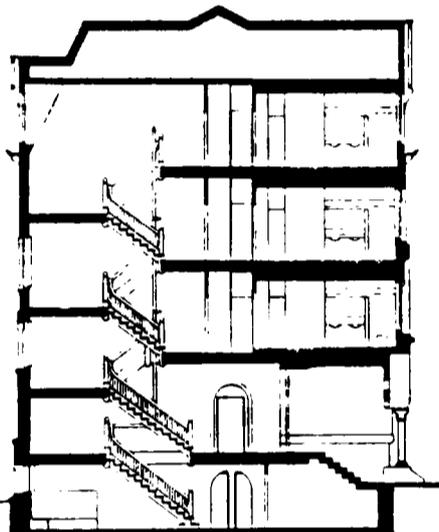
There was a lot of enthusiasm by the students for the renovation plan because they realized how much they loved the character of old buildings and preferred them as places to live. The primary goals for the renovations were to increase capacity by 120 beds to reduce overcrowding; to bring the buildings up to current life safety code; to renovate completely the heating, electric and plumbing systems; and to renovate all the building finishes and the structure for long-term dormitory use. These goals, ... and every aspect of the renovation, from basic suite arrangements to the design of the storage units under each bed was carefully worked out among the Yale Office of Facilities Planning, the architects and the committee.¹ The committee was made up of faculty and students. Associate Provost Jonathan Fanton was chosen to head the committee. The committee worked with the two architectural firms of Edward L. Barnes, Architect, New York City and Herbert S. Newman Associates, New Haven. From the goals set forth, the architects developed common design objectives for all the buildings to be renovated. Four objectives were decided upon: ... 1) The architectural character of each building was to be preserved as much as possible by retaining the original materials, details and external appearance of the buildings - which when taken as a whole represent a unique period in late 19th century American architecture.² 2) A variety of room sizes and types would be constructed. 3) Two means of egress from each suite would be provided (which was accomplished while protecting the privacy of the adjacent suites). 4) The bathrooms would be located ... within the suites rather than at public corridors and stairhalls. This makes the bathrooms secure from intruders, permits bathroom sundries to be left in the bathrooms, and encourages student maintenance of their own bathrooms.³ It appeared this last step could save money in the long run by decreasing janitorial services.

exteriors of these old buildings, the architects were able to create additional architectural character by accenting several details. The original entrances to Farnam hall were accented by pierced-stone transoms set in a gothic arch and supported by four Corinthian order columns. During the renovation, the marble shafts of the columns were polished and the pierced-stonework cleaned. In addition, glass doors replaced worn wood doors. The newly installed glass doors accentuated the silhouettes of the pierced-stone transoms as seen from within while enabling the character of the brick and tile stairwells to be visible from the outside.

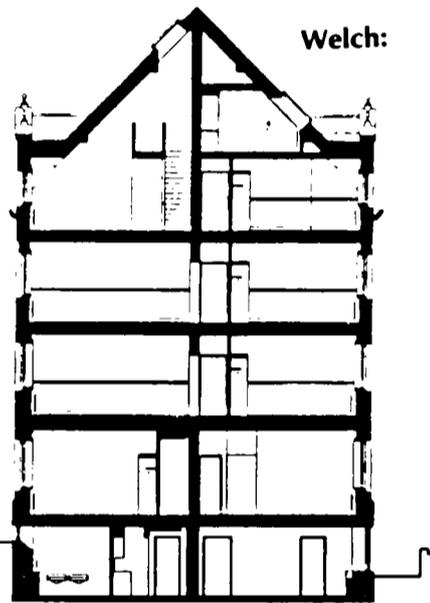
Lawrance:



Farnam:



Welch:



Vanderbilt:

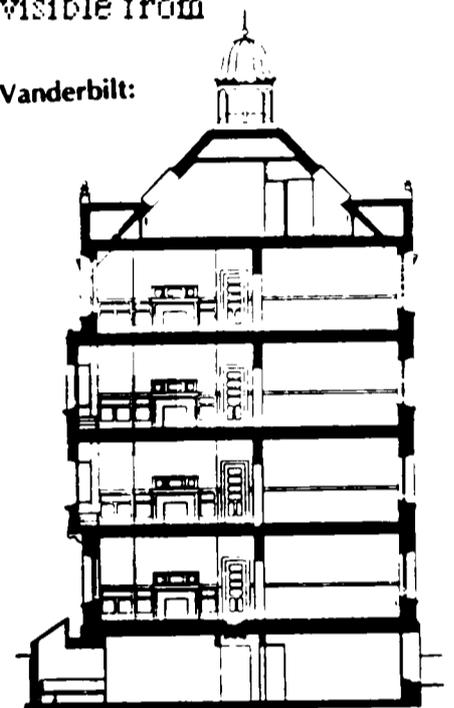


Figure: C-2. Building Sections

Source: ARCHITECTURAL RECORD, p. 94-95, March, 1977

INTERIORS

The interiors of the buildings have plenty of their 19th-century character still intact. Instead of gutting the entire inside of these buildings and starting anew (a method that would have driven up construction costs, as well as devastated the interior character of the buildings), the architects chose to work with as much of the existing interior structure as possible. By working with existing materials, such as brick and wood, the strength of the interior components was maintained - enabling it to stand up to future rough dormitory use. As a result, many of the original brick walls and brick arches still remain intact as demising walls. Also, refinished oak still serves as flooring in the living suites and many of the corridors. A proper maintenance schedule for refinishing the wood will insure many good years of use for the oak as a flooring material.

To create living conditions that met the requirements for the Yale

METHODS

The committee and the architects worked together closely in developing criteria to cover the needs for the various types of living spaces. The optimum arrangement for living spaces called for a six-person suite made up of four singles and one double room. A living room and private bath would be located within the suite to be utilized by all six persons. Of course, this method of spatial arrangement had to be modified in accordance with the varying conditions existing within each of the old buildings. The existing suites originally designed as doubles (but were serving as quadruples up until the time of the renovation) were turned into suites for six by the architects whenever it was possible to do so. The extra space needed was obtained by ... converting alternate living rooms into double bedrooms, thus permitting the crowded small bedrooms to revert to single occupancy⁴

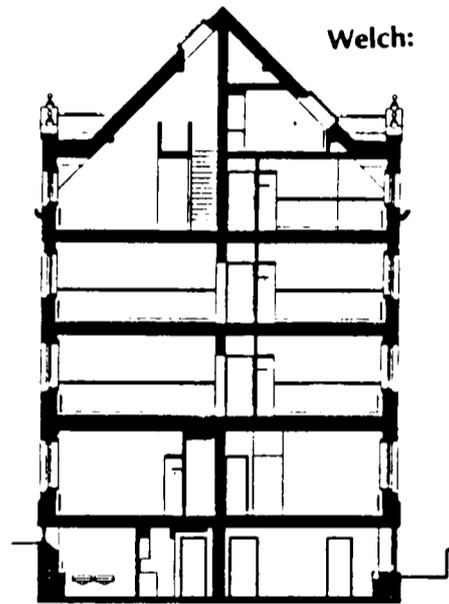
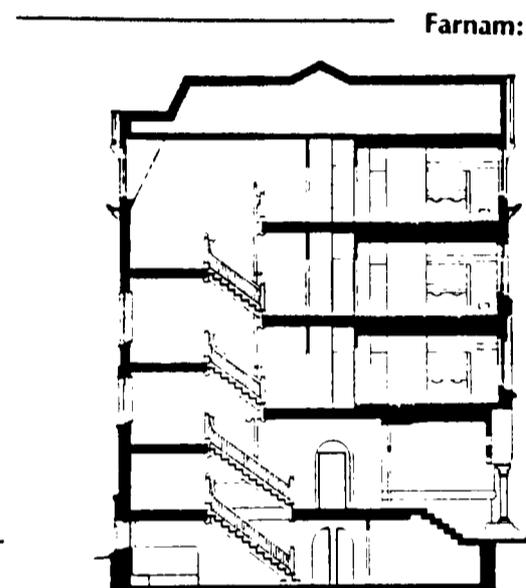
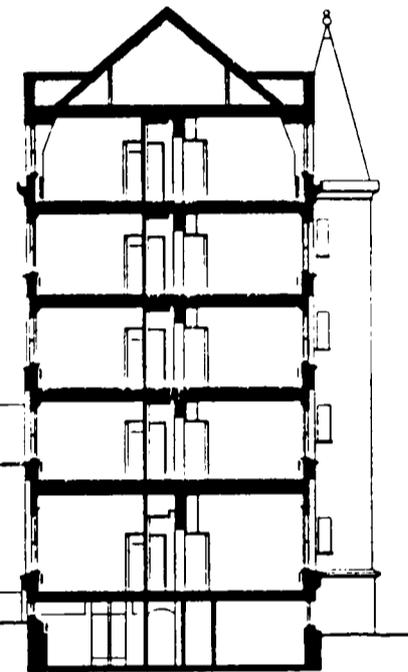
EXTERIORS

On a typical floor, the density was increased only slightly. A significant number of additional beds was gained by converting the attic spaces of Vanderbilt and Welch halls into living space. Similar renovation occurred in the basements of Farnam, Lawrance, as well as Vanderbilt and Welch. Great care was taken in the renovation of the attic and basement areas to create a minimal effect on the exteriors of the buildings. Natural light was obtained within the newly created basement spaces of existing Vanderbilt hall by the addition of top-lighted circular areaways (or light wells, see Figure C-2) These areaways met lighting and ventilation requirements, yet disrupted only a minimal amount of the character and landscaping in the Vanderbilt courtyard. The areaways provided natural light to the common living space of a suite of rooms (ie: the living room), while the window sills on the opposite side of the building (facing toward the campus) were lowered and shallow grassed areaways were created. Natural light for the attic was obtained through the use of a specially designed window constructed of aluminum-clad wood and tempered bronze glass (Figure C-2). They were designed for installation in a sloping roof surface with minimum disruption to the roof plane. In addition, the windows had a reversing mechanism for exterior glass cleaning. To brighten the attic and basement spaces further, existing brick was cleaned of excess mortar and painted white to enhance light reflection throughout the spaces.

In addition to minimizing the effects of modern construction on the

exteriors of these old buildings, the architects were able to create additional architectural character by accenting several details. The original entrances to Farnam hall were accented by pierced-stone transoms set in a gothic arch and supported by four Corinthian order columns. During the renovation, the marble shafts of the columns were polished and the pierced-stonework cleaned. In addition, glass doors replaced worn wood doors. The newly installed glass doors accentuated the silhouettes of the pierced-stone transoms as seen from within while enabling the character of the brick and tile stairwells to be visible from the outside.

Lawrance:



Vanderbilt:

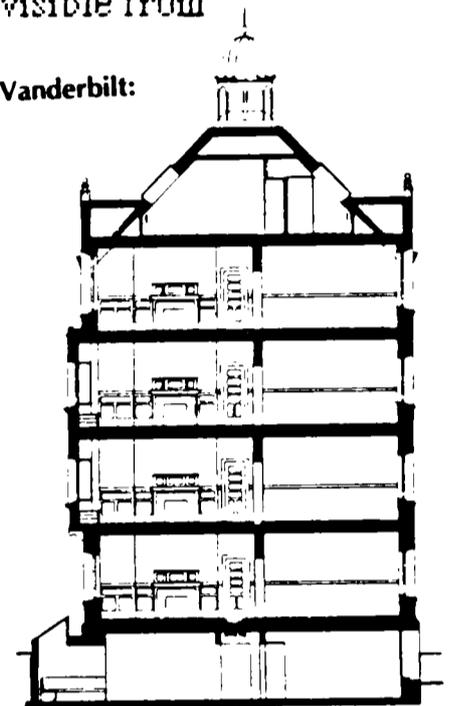


Figure: C-2, Building Sections
Source: ARCHITECTURAL RECORD, p 94-95, March, 1977

INTERIORS

The interiors of the buildings have plenty of their 19th-century character still intact. Instead of gutting the entire inside of these buildings and starting anew (a method that would have driven up construction costs, as well as devastated the interior character of the buildings), the architects chose to work with as much of the existing interior structure as possible. By working with existing materials, such as brick and wood, the strength of the interior components was maintained - enabling it to stand up to future rough dormitory use. As a result, many of the original brick walls and brick arches still remain intact as demising walls. Also, refinished oak still serves as flooring in the living suites and many of the corridors. A proper maintenance schedule for refinishing the wood will insure many good years of use for the oak as a flooring material.

To create living conditions that met the requirements for the Yale

undergraduate while keeping construction costs to a minimum, fully furnished mock-up rooms containing the elements shown in the isometric drawing (Figure C-3) were carefully analyzed by the architects and the committee. The construction of mock-up rooms is recognized in the hotel design field as a way of working detailed problems out before hundreds of similar rooms are actually built - thus saving time and money in the long run.

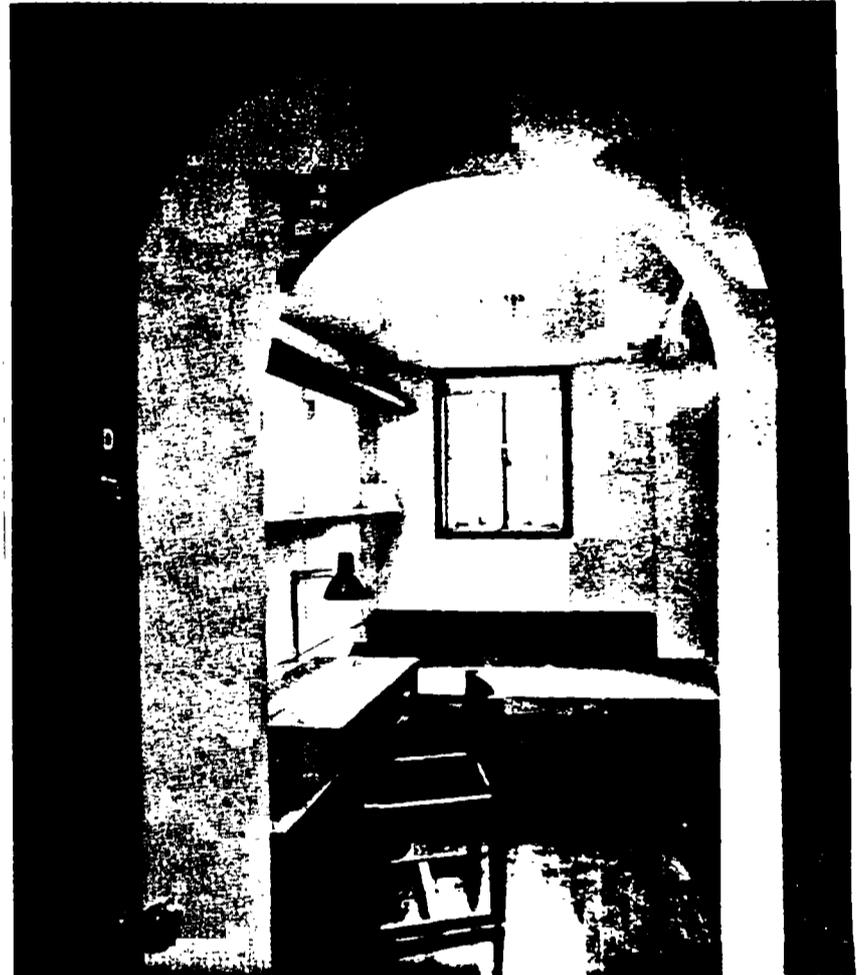
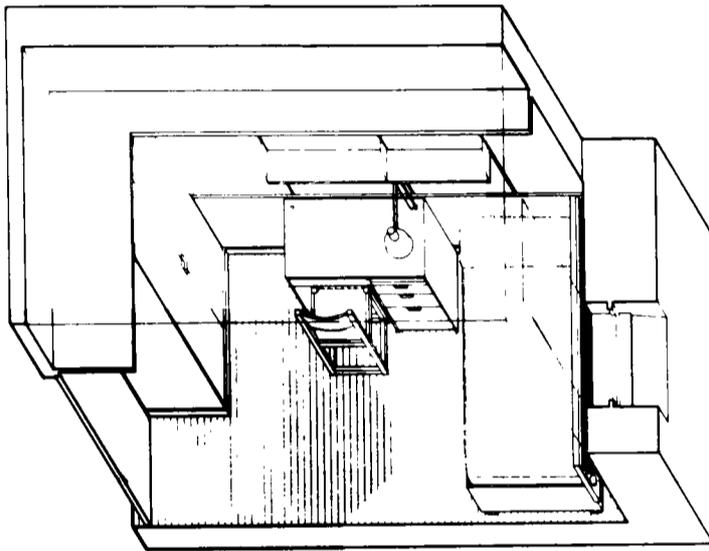


Figure: C-3, Mock Up of Typical Single Room (Isometric)
Source: ARCHITECTURAL RECORD, p. 99, March 1977

A modification to Farnam and Lawrence hall's basements consisted of lowering the slabs to gain legal headroom to make space for additional mechanical equipment and to accommodate new suites. For the Welch hall renovation ... The attic and fourth floor were combined with interior stairs to create large six- and seven-person suites with double height living rooms. On typical floors, four- and five-person suites were created with interior bathrooms by combining two former suites consisting of a living room each and bunk bed double rooms. One living room was converted to a double room, one living room remained, and all former bunk bed doubles were converted to single rooms⁵ Similarly, Vanderbilt hall's attic space was transformed into bedroom and living spaces.

The typical floors in Farnam hall were gutted in order to maintain single bedrooms at a seven foot minimum width, the minimum allowable width in accordance with the building code in use (See Figure C-4). As in the Vanderbilt hall renovation, basement window sills were lowered to allow natural light to enter the space. Grassed areasways were again used to form light wells for the basement windows. The apses in two of the three basement stairwells were used as small living rooms for double suites. The third apse was used as a sitting area for the laundry room.

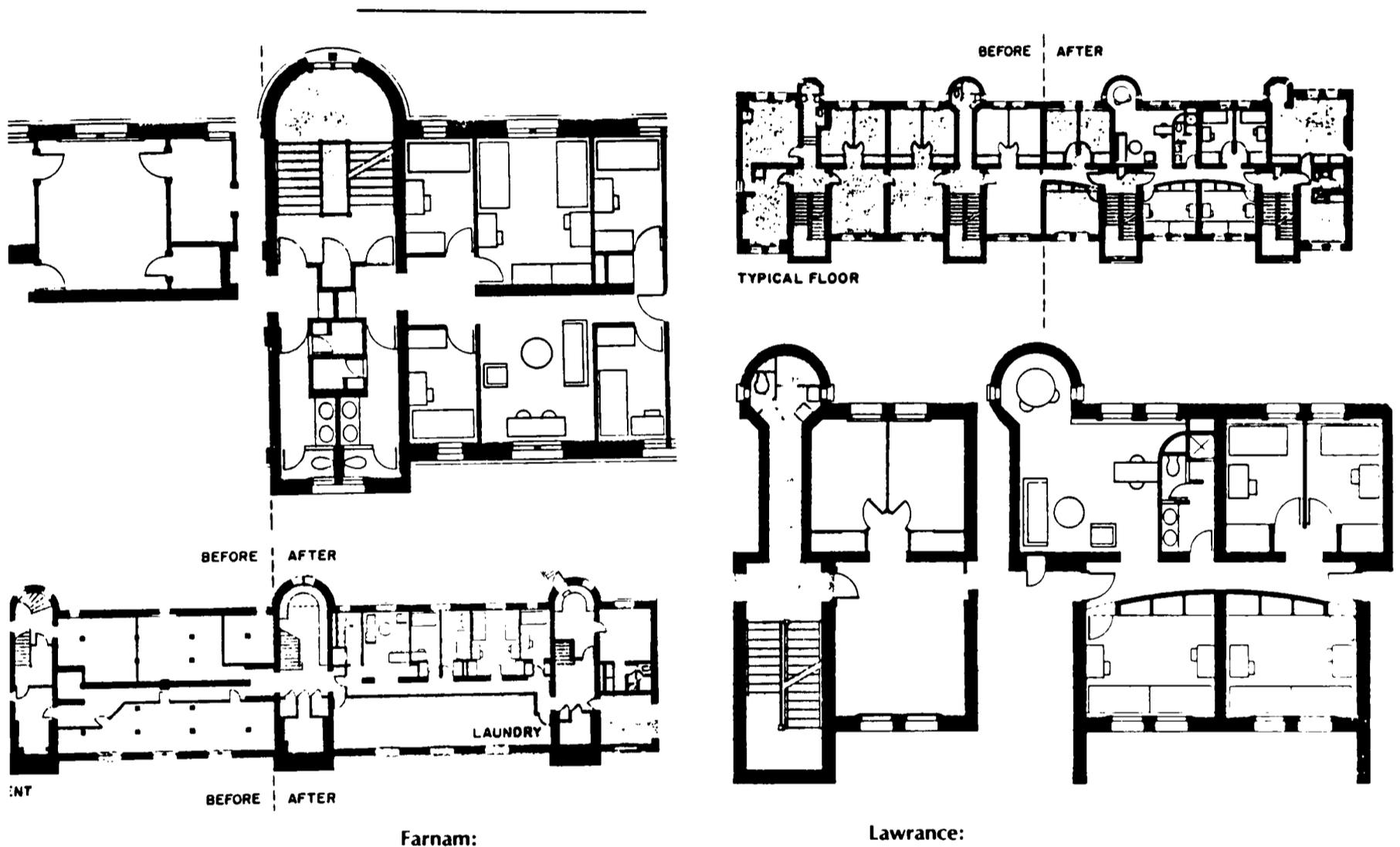
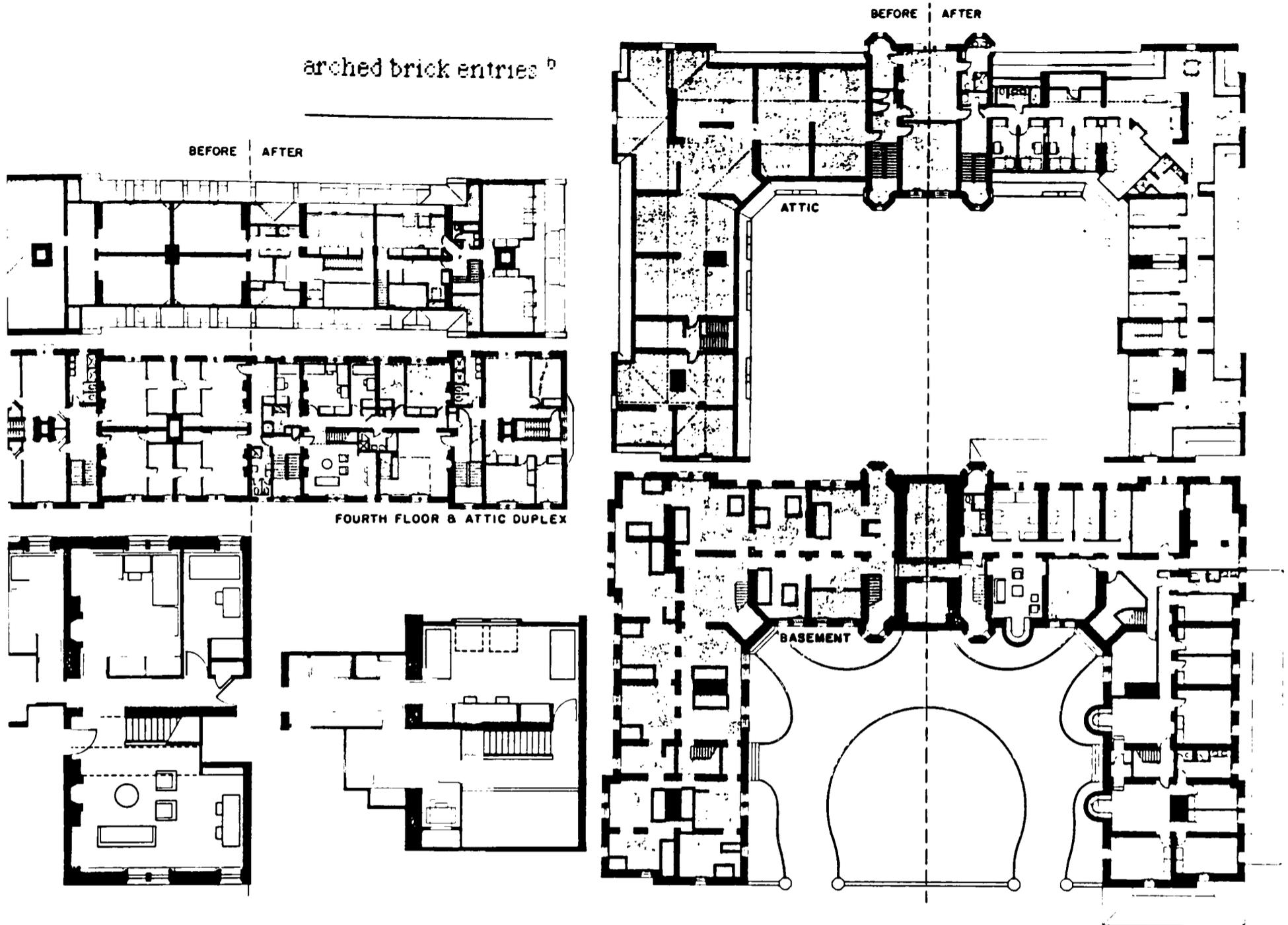


Figure: C-4. Floor Plans
 Source: ARCHITECTURAL RECORD, p. 94-95, March, 1977

As the apses of Farnam hall were revitalized for different use, such was the case for the circular towers of Lawrence hall - which once enclosed bathrooms (See Figure C-5). ... By removal of the bearing wall, these spaces were incorporated into living rooms and made into sitting alcoves and study niches. The curving wall in the corridor gives a special architectural character to Lawrence while maintaining existing



Welch:

Figure: C-5, Floor Plans
 Source: ARCHITECTURAL RECORD, p 94-95, March, 1977

Vanderbilt:

CONCLUSION

The goal for the renovation was to accommodate an extra 120 beds, and to gain additional space for the existing number of occupants. The goal was achieved: renovation for the quarters of all 1,000 students was done at a cost of \$7,000 per bed. (Costs of new construction in New Haven, Connecticut in 1975 were figured to be \$13,000 per bed.) This project proves that maintaining existing traditional campus "landmarks" by renovation can create new accommodations inexpensively

POSTOCCUPANCY EVALUATION FOR STUDENT HOUSING

INTRODUCTION

In order to gain a more complete understanding of student housing (ie. physical spaces; works of architecture) than is represented by case studies of dormitories presently existing; an analysis of *how well* the physical spaces designed by architects, scholastic committees and others perform in regards to student activities is needed. Postoccupancy evaluation is quite a powerful pair of words these days: they represent the means to measure design efficiency. However, they are much easier to talk about than to do, as Ellen Perry Berkeley points out in the following paragraphs:

... Although we hear about it in the schools, and we see versions of it regularly in this journal, (AIA JOURNAL) postoccupancy evaluation is still not widely done. Why not? Is it disdained as disrespectful, washing dirty linen in public? Or is it blue-penciled as tedious, pointless: Why care whether a building's entrances "work" when the site and circumstance for that building will never be duplicated? Or is it avoided as dangerous, wrong-headed: Why talk about architecture with people who wouldn't know a "fitting statement" or an "admirable restraint" if it came up and bit them on the ankle? Or is "evaluation" done mainly as entertainment? The miniscandal. Quotable quotes. Good fun, for those who like to read that sort of thing.

What are the reasons for doing postoccupancy evaluation? What can be learned from it? Is it worth learning? And how do we learn it?...¹

Summarizing what Ms. Berkeley has learned from postoccupancy evaluations is that evaluations are worth doing. However, acquired knowledge from the evaluations can not be expected to *just* come from carefully worded questionnaires given to the building's users, nor *just* from observations of the physical spaces, but also from observations of student activities within the spaces and through informal verbal sessions with the students themselves.

BACKGROUND

Bennington College is located in the low rolling hills of Vermont. Originally an all girls school, Bennington College is now mainly an arts intensive school. Three dormitories were designed in 1968 by Edward Larrabee Barnes FAIA at a time when the school was still inclusively for women. The "new dorms" contained about 15 percent of the student population. Campus architecture is a grab-bag of styles including: renovated old barns, 1930-era colonials, 1950's modern, and 1970's concrete. According to many of the students one of the most compelling aspects of the campus is the surrounding natural scenery.

Choosing an appropriate way of gaining knowledge for the evaluation is of course a critical step unto itself. Communication of ideas to the target groups (ultimate users, owners, or maintenance personnel) from the evaluator(s) and vice-versa must have the same clear meaning to both parties. Some open-ended questions were prepared in advance of the trip to Benington with the intent of interviewing students who might be lounging around in the dormitories living rooms. To the evaluator's surprise the large public living areas were devoid of activity; hence some solid information about student activities as opposed to the building's design was available by mere observation alone.

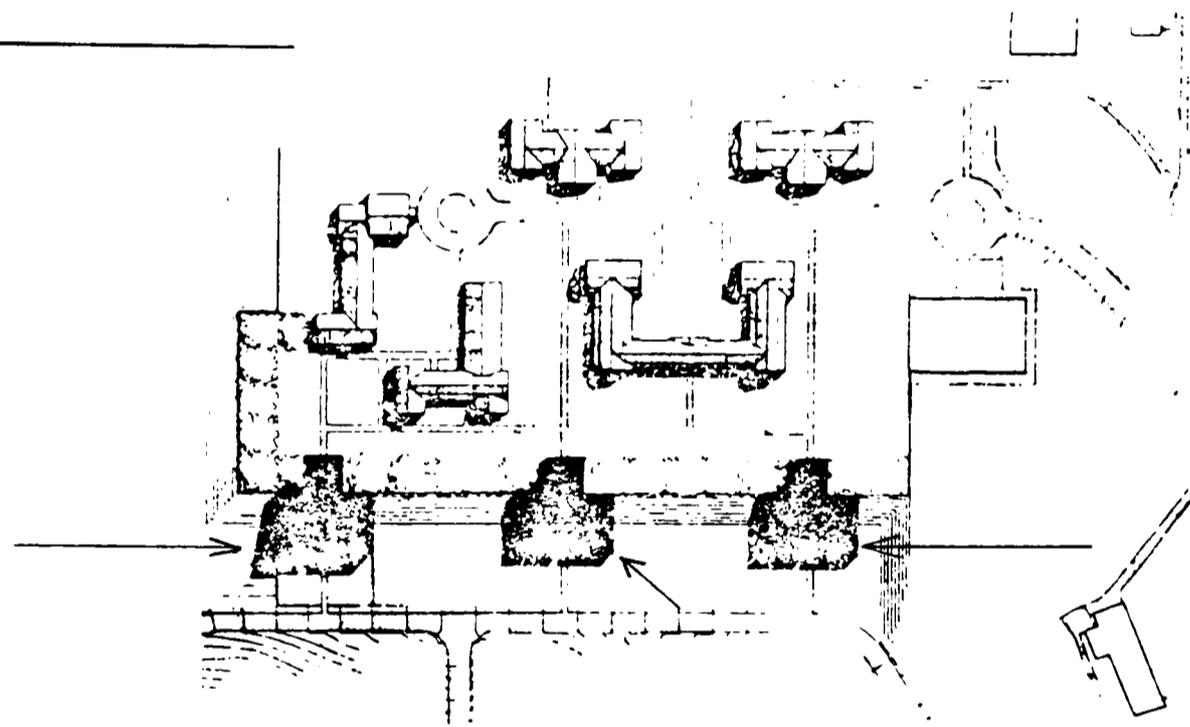


Figure: C.2-1 Site Plan
Source: AIA JOURNAL, p. 59, April, 1979

DATA COLLECTION ... Occasionally, a couple of students would gather at the stairway connecting the two floors of rooms, or a student would go quickly from a bedroom to a bathroom, but the living rooms and other public areas were empty. (Take a moment to look at the plans. The three dorms are identical, with student bedrooms on the two ground floors, and a large living room alone on the third level. The basic suite of three single rooms and a double, with their shared bathroom, is repeated six times in each dorm.)²

Questioning students in the hallways and public areas drew interest from other inhabitants of the dormitory and started some good conversations which usually were finished up in a number of private rooms and suites. The interviews were usually on a one-to-one basis; however, so the students were not responding to one another. It is immediately apparent that one of the

problems in postoccupancy evaluation is deciding whether the replies are representative or not, reasonable or not, relevant or not.

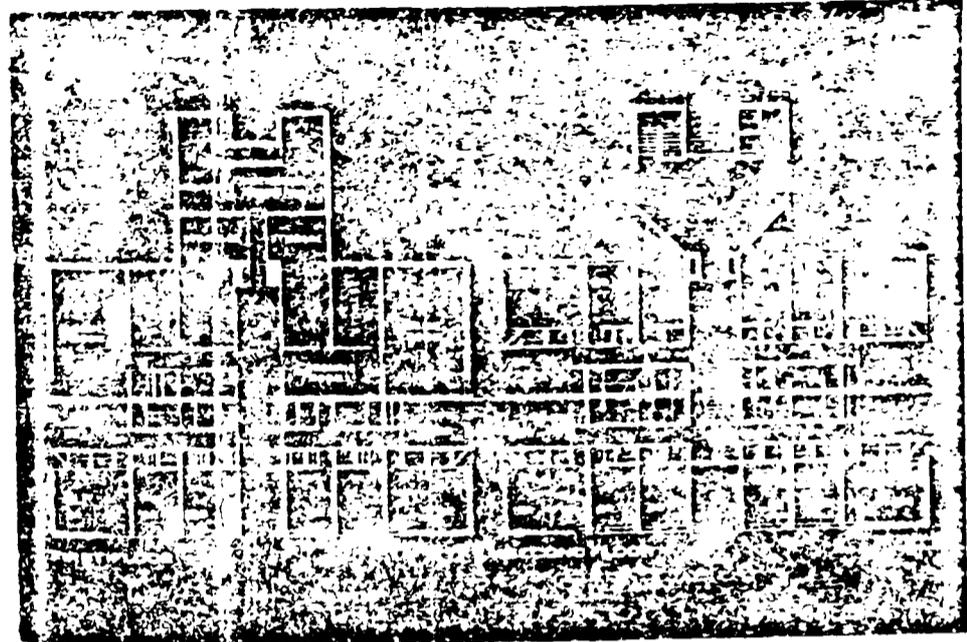


Figure: C.2-2 Floor Plans
Source: AIA JOURNAL, p. 61, April, 1979

INTERVIEWS

The following is a sampling of answers from the interviews with the students of the three new dorms. The information can be scrutinized in reference to the postoccupancy evaluation for the three dormitories as well as an important insight into student activities.

... EFB (Ellen Perry Berkeley): *What was your first reaction to this dorm?*

Vickie: I thought these buildings were very ugly, very cold, but I have a very traditional view of architecture. Then I started to love it. I found that these suites, and the short hallways and small bathroom, were conducive to building relationships. We gather in a lot of places out in the hall. I've loved this dorm; probably it has a lot to do with my friends all being here.

Mike: These buildings had connotations before I even got to them. This was the ghetto, not part of the center, off-track.

Lisa: They don't look as nice as the older ones, maybe because they stand out from the others and there's no landscaping around them.

Denise: I liked the way the rooms were shaped. I'd heard the walls were thin, but it didn't bother me at first.

EFB: *What did the architect want to do here, do you think?*

Mike: Create little boxes without tops. For someone to have a "boat-room" [one of the two odd-shaped rooms flanking the upper entrance] three other rooms have to live in boxes.

Donna: He was trying to get a modern effect in an old setting. But it doesn't

succeed. You lose an old feeling that the school represents.

Keith: The communal living. Only five or six people sharing a suite. At a lot of other schools, it's very hectic because of the long hallways.

Claudia: I think he wanted to make something very modern.

EPB: *Does it suit you living here? In what ways?*

Vicki: Yes, it definitely does, and I'm very picky. I don't mind it at all now. But downstairs it seems like a cellar. And you have to close your shades all the time down there, because people from the parking lot look in. The way the buildings are set up, on the hill, interests me. I like the situation, away from the swing of things.

Denise: Esthetically, I think it works.

Keith: I like this better than I'd like the old dorms. Or a 20-story tower. I like these big windows. He realized we were in a scenic area.

EPB: *In what ways does the building not suit you?*

Lisa: Little things, like no doorknobs. Strange to come to a place with no moldings - my mother does Williamsburg colors.

Vicki: Maybe they didn't heat it enough last winter, but the nature of this building makes it seem colder than it is. It's not as cozy as other buildings, not as much charm.

Donna: You can hear anything in these rooms - breathing, a whisper, anything - unless you have your stereo on very loud. People play their stereos very loud because it gives you privacy.

Joel: The walls are paper-thin. Everything from music to sex can be heard through the walls.

Denise: Even if someone is not making a lot of noise, you hear them.

EPB: *Does this building feel like home to you? In what ways could the building have made you feel more at home?*

Donna: This is a dollhouse. The furniture is perfect. It's kind of cold. You have to work hard to get these rooms to look good.

Mike: My room feels like home, but not the building.

Vicki: It definitely feels like home, but again, because all my friends are here. I feel good coming through the door to this dorm. But it's kind of what I've made it, in my own head. The things I don't like - the architecture - I don't let them get me.

Claudia: It's harder to feel at home in this kind of building than in the older ones, where things go every which way. Everything's very angular here, perfect angles. And everyone's isolated; in other houses you see the living

room right *there*. Also, the furniture here looks like a motel.

Lisa: We've made it home, we all know each other. Still, the white, square, perfect, comes through. You feel you're in a box.

Denise: The walls not white would help. A pastel would have been nice.

Keith: I spend a lot of time here, so it seems like home. It's not Mom's kitchen. But I adapt pretty well.

EPB: *What does this building say to you about the possibilities of architecture, and the limitations?*

Mike: It says more about finances than about architecture. From what I've heard, they were cutting costs.

Vicki: That's something I've never really thought about. You're talking with someone who's so traditional I would love an old house full of antiques.

Claudia: That's hard to say. I don't know anything about architecture.

Denise: If I were the college, I'd build something more solid. Something that could withstand a lot. These have been around since '68, but the old buildings have been here since 1932 and they're nicer. The old houses were originally only "temporary" but they're still here. . . . But I like modern buildings very much. I like the geometry of them. I like A-frames.

Joel: It says something when the thing that people like the most is the furniture.

EPB: *If you were to create an ideal place for students to live in, what would it be like?*

Lisa: Quiet, older, more homey, woodwork, paned windows. When you're a guest in the old dorms, it's like being in someone's house. In the new dorms, it's like an apartment building.

Mike: A two-story cabin, and only maybe five or seven people - 35, or however many in there, is too many. I still don't know everyone.

Denise: I'd want something the same as this, in terms of size. I wouldn't want 300 students, in cinder block. But I'd like these sections to be bigger, eight or nine students, not five. And I'd like a living room for each suit.

Vicki: A living space in the middle, with suites like this jutting out from it. It would be nice to enter and find a living room right there; an emphasis on coming home.

Claudia: I would like it so people can inter-react more.

Donna: I guess you can't go very different from this place or the old dorms: a lot of rooms and a lot of people. I would prefer an old place, they're a whole lot warmer. The people are together, a family group, a community, and this one

lacks it, I think, because of the modern effect.

Joel: Better insulation for sound. More windows in the doubles³

ANALYSIS

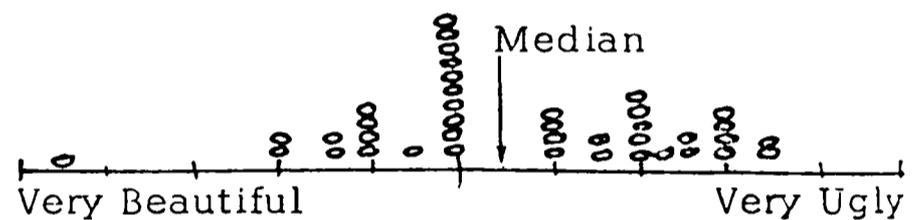
Many of the answers were not very thoughtful; however, this could mean that the the questions asked the students were not very challenging.

... Interviewing takes a lot of time: establishing contact, listening to a lot of extraneous material, deciding when to probe and when to move on. ...⁴

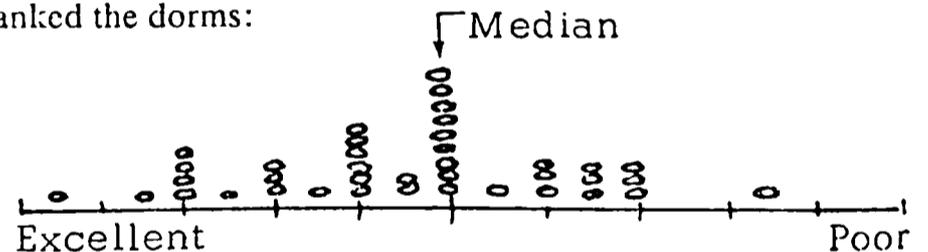
Although this lengthy process provides some useful information (such as the types of activities that students engage in, the types of spaces necessary for stated activities, and the types of spaces the students feel comfortable in, etc.), one cannot begin to learn what it means to actually *live* in the buildings. Another form of information gathering is therefore required.

QUESTIONNAIRES Questionnaires are a form of information gathering which add some additional information to personal interviews. Below are the results of the questionnaires given to the students in the new dorms of Bennington College. Out of 90 delivered, 41 were filled out and returned.

This is how the students ranked the dorms in terms of esthetics:



In terms of overall accommodations, this is how the students ranked the dorms:



This is how students ranked their own rooms:

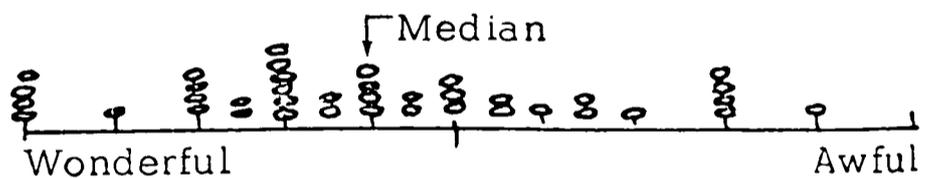


Table: C.2-3 Questionnaire Results
Source: AIA JOURNAL, p. 60, April, 1979

As mentioned previously, questionnaires add to the information gathered from personal interviews. First, there is privacy for the person filling out a questionnaire, for one does not sign one's name, hence increasing (hopefully) honest replies. Second, there is more time to respond with a questionnaire as opposed to a personal interview, thus hopefully a more complete reply will be obtained.

ANALYSIS

Along with the rankings shown in Table C.2-1 on the previous page, the students supplied additional information and comments in the blank spaces provided on the questionnaire.

Function aside, the students commented on visual aspects of the buildings; some complemented the dormitories "space-ship-type appearance", while others disliked what was deemed as the "unlivableness of a hospital look." "The old dorms feel more relaxed said another student." These type of comments reveal that a postoccupancy evaluation requires a priority of facts to be used in determining true evaluation of the design. Large windows in the single suites allow a lot of natural light in the room, along with the scenic beauty of the surrounding Vermont countryside (scenic beauty being measured as a positive factor - see BACKGROUND); however, some students feel that the large windows are a waste of energy which negates any positive physiological aspects the scenic beauty provides. Passive solar concepts would have proved the ideal solution for the architect to use, thus saving energy and providing for views at the same time. Limited knowledge of the use of passive solar concepts in the 1960's may have been the culprit; however There are no easy answers when it comes to efficient, pleasing design.

... Concerning the dorm as a whole, a few students said they liked the living room (an interesting space, well placed, nice fireplace), while others noted its "near nonexistence due to oddly placed staircase" and its "barrenness." One student thought it would be easier to go down to a living room than to go up. The dormitory has poorly arranged kitchens, with counter space inadequate; dark suite halls; no ventilation in bathrooms, towels never dry; a large entrance lobby, a waste of space; a pay phone in poor location, it often goes unanswered. These are a sampling of the complaints voiced by students about their living arrangements. For almost every year there is a nay (one of the problems in postoccupancy evaluation). ...⁵ The list of qualities and features *not liked* was twice the length of the list of qualities and features *liked*!

In the rooms and suites, noise was by far the loudest complaint. While the building's best-loved feature were the windows in the single suites; the small windows in the double suites were universally loathed by the students. Another problem is the closets in the suites. They are praised for their storage capacity, and yet many students have pointed out the poor location of the closet doors; the door to the suite has to be closed before the closet door can be opened.

Although these are only a handful of comments, it is clear that the students have a good bit of feeling about these dorms. "... I wouldn't wish these dorms on

anyone," said one student. Said another: "No one wants to live in the new houses, they are the black sheep of the campus." But of the 41 students returning my questionnaire, 26 were already repeaters in these dorms and most of these had chosen to stay on for another semester. Most said they liked the size of the dorms; only four would have liked a different size (all smaller). Most said they liked the idea of suites, and these suites in particular; only nine would have liked a different kind of suite.⁶ The winner for the favorite type of room to live in was the so-called "boat room": named because of an odd angle of two adjoining walls that resemble the prow of a ship (see floor plan).

PROCESS

It must be understood that the postoccupancy evaluation done at Bennington was rudimentary, and done at an unscholarly level; therefore it would take more investigation than was done to find out why so many people were staying on in dorms they found so unsatisfying. Another problem that comes up doing an evaluation at this level is the correct processing of information. As Ms. Berkeley points out:

... A lot of information turns up, but much of it is hard to add up. Can we conclude that the living rooms are a "failure?" They fail as *living rooms* as casual meeting places. Perhaps, with that failure, these dorms fail. But to some extent (and with some problems), the function of hanging-out is taken over by stairways and hallways. And one student told me: "I always wanted to live in a castle, and the living room is like that. I go there because no one's up there. I play music there. It's got great acoustics. I sleep there sometime." Another student does her twice-a-day meditation in the living room, always undisturbed. Another uses the living room as a study, spreading out a dozen books and notebooks to write a paper at the 11th hour. It's not what the architect or the college had in mind. It's an expensive miscalculation, but I am not willing to call it a disaster. I have long suspected that dormitory residents need a place of retreat: an inaccessible carrel, a soundproofed typing room, an unseen alcove or balcony. Perhaps this is what the living room provides - at grand scale!

To discover such unexpected occurrences as we see in these living rooms may, in fact, be one of the main reasons for doing postoccupancy evaluation. Not just to discover whether something "works" in ways that we have anticipated, but to learn whether anything happens (in attitudes or behavior) that we have *not* anticipated.⁷

ANALYSIS

One may wonder what the architect had in mind for these buildings. It must be noted again that Bennington College was a college for women at the time of the new dormitories inception. "... The most important thing right at the

beginning." Edward Larrabee Barnes, FAIA, told me, "was to agree on the size of the house. This size was what we all wanted: 30 people is absolutely right and human, an organic group, like a family. I think it has a real effect on student life." Beyond that, he continued, "there are only a few basic things: a large percentage of single rooms, and small bathrooms, and soundproofing - if you've got that, it's a good dorm." He called it "a cheap building" in reference to its acoustical problems, "but I understand they're fixing that."⁸

Barnes also mentioned aims that went unnoticed by the students: the placement of the buildings to reinforce the classical symmetry: Jeffersonian - or like the barns in back of houses. He mentioned he wanted to bring the buildings closer together against the climate, "but it wasn't the Bennington style."⁹ (The "Bennington style" in a sense being the multitude of detached structures described in the BACKGROUND). The students questioned did not complain about being assaulted by the weather, so the arrangement of the dormitories on the site was not questioned in this regard. Barnes talked about aims of his that went unnoticed by the students; however, why should they have been? It is true that one large megastructure on the site would not have been in scale with the rest of the college campus; but is using harsh, classical symmetry justifiable because it is a Jeffersonian design technique?

Before the postoccupancy evaluation of the new dormitories of Bennington College, there were only weighty judgements masquerading as pure description given by the architect and critics. Consider the evaluation of these dormitories written for the April 1969 issue of *Progressive Architecture (P/A)* with descriptions of "unassuming forms" and "the repose of order [chosen] over the excitement of showmanship" and "entirely lacking in artifice."¹⁰ These were descriptions for a piece of artwork alone, and not for a physical structure to be utilized by people. Consider also that a postoccupancy evaluation is not meant to evaluate one building; but to advance the state of the art by revealing the quality of design decisions. For example, as ... *P/A* described the living room as "the social center of each dormitory" - and perhaps it was, for those first few months, when the living room led to a roof-deck for sunbathing. But the deck was soon declared off-limits and the living room doors were fastened shut when the roof couldn't take the traffic.¹¹ The evaluation done ten years after the *P/A* review has shown the living rooms to be something different entirely

Another crucial step that must be done to round out the investigation is to get the big picture - after all the students are not the only ones who have to deal with the buildings on a daily basis; maintenance personnel and the owners have

display, to solicit opinions, and this leaves the college sharing some of the responsibility."¹³

There is usually some disgruntlement, some disagreement between the contracting parties - the architect, the client, the contractor, and the consultant, concerning the many problems arising out of single project. How much of this should be explored, exposed? ... I came away with the hunch that perhaps buildings never work out quite as they were planned. The improvisations - and perhaps the complaints, too - are not necessarily the result of miscalculation, although they may be. Or they may be the product of passing time, the passing of certain sensibilities. But how widely shared were those sensibilities in the first place?¹⁴

... Despite all its difficulties, postoccupancy evaluation is probably the only kind of discussion about living and lived-in architecture that makes any sense; ... for any real evaluation of architecture *must* be *postoccupancy*. How is it that this vital trunk is considered only one of the distant outer branches?¹⁵

just as much to do with the buildings as the students. Questioning maintenance personnel is a good way to find out about a buildings long-term cost.

The Director of Physical Plant for the college, in charge of maintenance for the dormitories provided a breakdown of problem areas. In 1979 \$83,000 was spent for repairs on the three new dormitories. Additions include: aluminum siding on the exteriors to reduce heat loss by an estimated 40 to 50 percent and to do away with continual painting (wood siding was originally used); acoustical treatment in the form of an additional layer of half-inch gypboard over the original three-eighths-inch gypboard (on steel studs); acoustical tile on the hallway ceilings (to reduce the "tunnel effect" of sound waves in a hallway); wall-to-wall carpeting in the suites and hallways (also to control noise while providing low maintenance costs).

Common housekeeping problems include: the need for staging and long ladders to clean the high windows; the need to trace a duct to the outside if a bathroom fan doesn't work; getting the porous tile in the bathrooms to look clean; the fact that the flat roof(s) leak. However there is nothing that is major enough to require large expenditures of funds to the maintenance crew on a continuous basis.

Good qualities about the dormitories on this level appear to be the heating system, the room size, the amount of closet space, and the general layout of spaces. The Director of Physical Plant for the college would like to see the addition of loft/balconies for the high ceilinged living rooms with large expanses of glass. He guessed that such an addition would cost around \$2,000 for each dormitory. "... You'd have a fantastic view. You'd double the floor space...."¹²

CONCLUSION

What responsibility did the administration have in the design of the dormitories? The college had an art and architecture committee which served in an advisory capacity. The board was composed of faculty, students and administration, they corresponded to the buildings and ground committee of the board of trustees. Apparently, this committee's main concern was for the exterior of the dormitories with concern for the interiors remaining solely to the architect. As a faculty member who served on the committee points out: "...We got something from Mr Barnes that does enhance the campus. As sculpture it's really quite stunning, especially when approached in snowshoes with a fresh snow on the ground. But we sensed that the interior design was then required to fit the exterior skin. We might have gotten more of his attention to the ways students live. However, models of the dorms were on

display, to solicit opinions, and this leaves the college sharing some of the responsibility."¹³

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PUTTING DORMITORIES IN CONTEXT

INTRODUCTION

As universities grow in size there is most often a need to expand the housing facilities for students as well. Before the dormitories can be designed there is a need for the proper site to be utilized. Whether new buildings are to be constructed or an existing building is to be renovated for adaptive re-use, the existing context of the surrounding campus is of great importance. The adjacent surrounding areas of a prospective site can consist of important university landmarks which carry a lot of weight in their character.

On the Texas Tech campus in Lubbock, the administration building serves as a foundation for the campus architectural style; as well as a nodal point at the end of a long axial vista created from a large expanse of open lawn. The administration building at the University of Texas in Austin serves a similar purpose, but has added height in the form of a tall clock tower arising from the central mass of the building. The U.T. tower is a nodal point seen from most of the campus and surrounding areas. The structures that are built adjacent to these buildings must be sensitive in scale, style and materials, or they may detract importance from a long standing university landmark. Of course a landmark does not necessarily mean a building, or even a structure of any kind. Harvard square is a courtyard that has been in existence since the 17th century; would one erect a dormitory (no matter how sensitive scale, style and materials were utilized in reference to surrounding buildings) in the middle of the square?

The dormitories should ideally be located within the campus proper (or an area in close proximity under university control); so that the university can provide energy (if necessary), security, maintenance, and convenience for students to classes, labs, and other university facilities.

BACKGROUND

... The approach to Northwestern University (in Evanston, Illinois) from the south is a pleasant progress along the shore of Lake Michigan through a settled community of substantial homes set in tree-studded lawns. At the university proper, the transition from town to gown is a gentle one, free of the ticky-tacky college-town development that so often signals arrival at the gates of an institution of higher learning.¹ When Northwestern University faced a perceived shortfall of around 900 places in student housing, a decision was made to locate new student housing on the south end of campus, where scattered dormitories and sorority houses held a basis for forming a student housing precinct. Finding a suitable site within the recommended area was more of a

problem. The architects for the project, Nagle Hartray & Associates in consultation with the university's administration and housing committees decided upon three separate sites within the southern campus context. The three separate sites were in appropriate relation to each other as well as to existing student housing in the area. The sites - ... a parking lot, a street that

could be closed without calamitous effect on campus circulation routes, and a rose garden and lawn overmantling an underground storage building. (in a second phase of expansion a dormitory with dining hall and a residential college replace a huddle of houses at the campus entrance.)²

A clear problem in contexture arose in trying to interweave three housing complexes of varying size into an existing building fabric - complicated by the absence of a consistent context. The dominant motif on campus is Collegiate Gothic, found on the older buildings on campus. However, later campus additions are a mixture of various styles, adding ... up to a fine Collegiate Eclectic stew.³ Each dormitory was to be designed to fit in with its immediate "neighbors", and also to unify the south campus. Particular attention was paid to the site located that would mark the vehicular entrance to the campus. For it is at this point that the building massing would have to

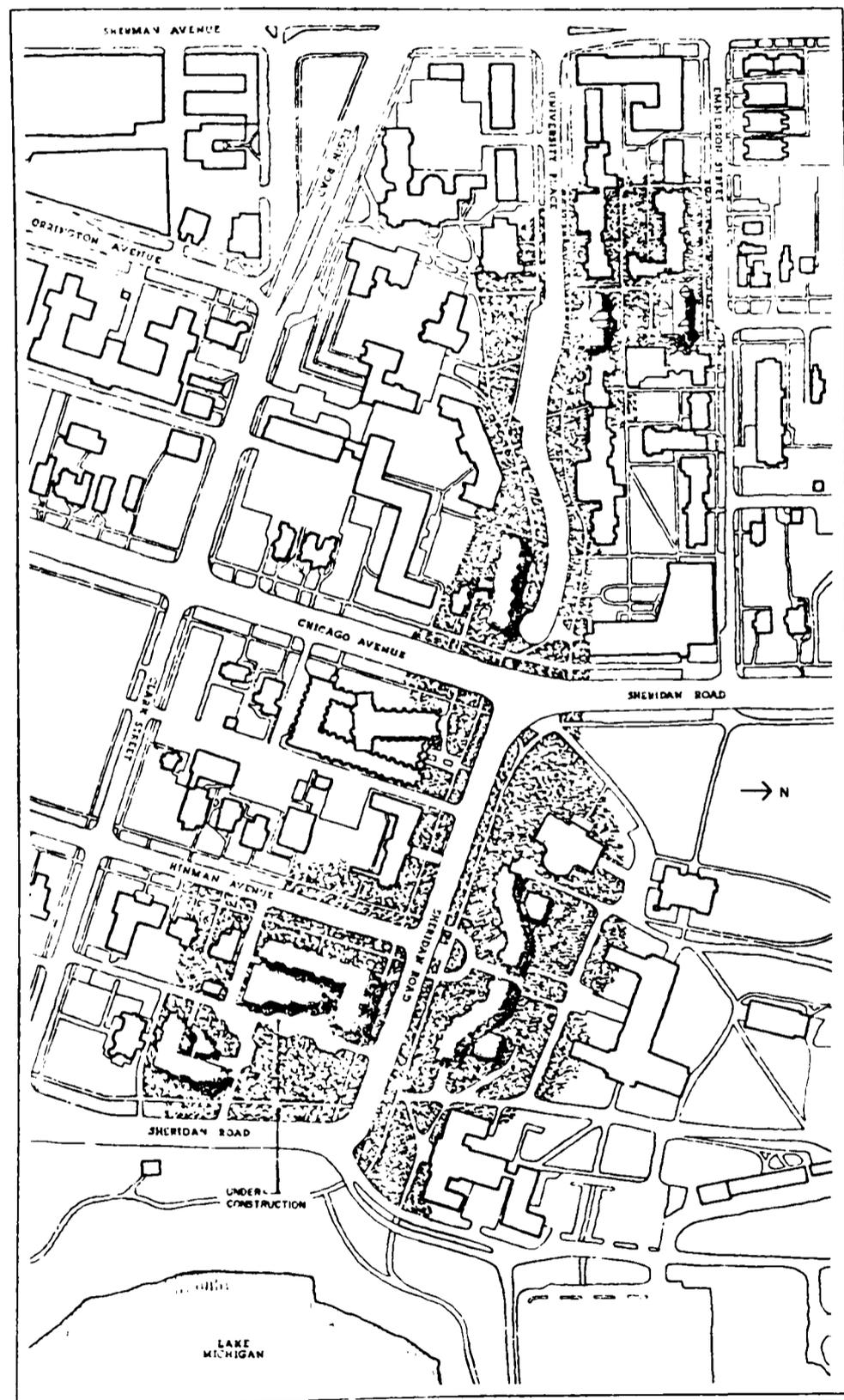


Figure: C.3-1 Site Plan

Source: ARCHITECTURAL RECORD, p. 96, October, 1982

be representative of the university as a whole, while dealing with vehicular and pedestrian circulation and views.

ANALYSIS

The three dormitories share similar design themes, as would be expected, yet each dormitory's expression of a theme is done in a uniquely individual manner. As stated, the dormitories are dispersed in location and divergent in character; however, the three projects have caused a unifying thread to be drawn through the emerging residential sector because of similarities in the way each dormitory relates to the streetscape. Refer to Figure C.3-1 Site Plan to follow the axial spine of the student housing district: note the dissection of Sheridan Road (which acts as a major spine to the area) as a vehicular thoroughfare. University Place (street) functions as a path for vehicles requiring access to the housing area, and not as a thruway for campus traffic. The pedestrian is able to travel from Sheridan Road onto University Place and experience the subtle transition in character; which in each case, the new dormitories try to reflect by their street façade. The private façade of each dormitory turns a bit more into the site to provide for the suggestion of a private courtyard space.

... Of the recently added housing facilities, the Kresge dormitories are the largest in size, the most complex in program, and the most prominent in location, coming immediately to view as the approach swings into the campus. The complex supplants a formal expanse of lawn and walkways - a nonbuilt gateway - that previously marked the entry to the university. Thus to retain a suggestion of the former openness and sense of arrival, the complex is arched back away from the street in a symmetrical serpentine curve and pulled apart at the center to reveal an axial vista across the remaining lawn.⁴ Kresge hall is built over an underground storage building, and so for structural reasons is limited to three stories in height. The architect apparently utilized this height

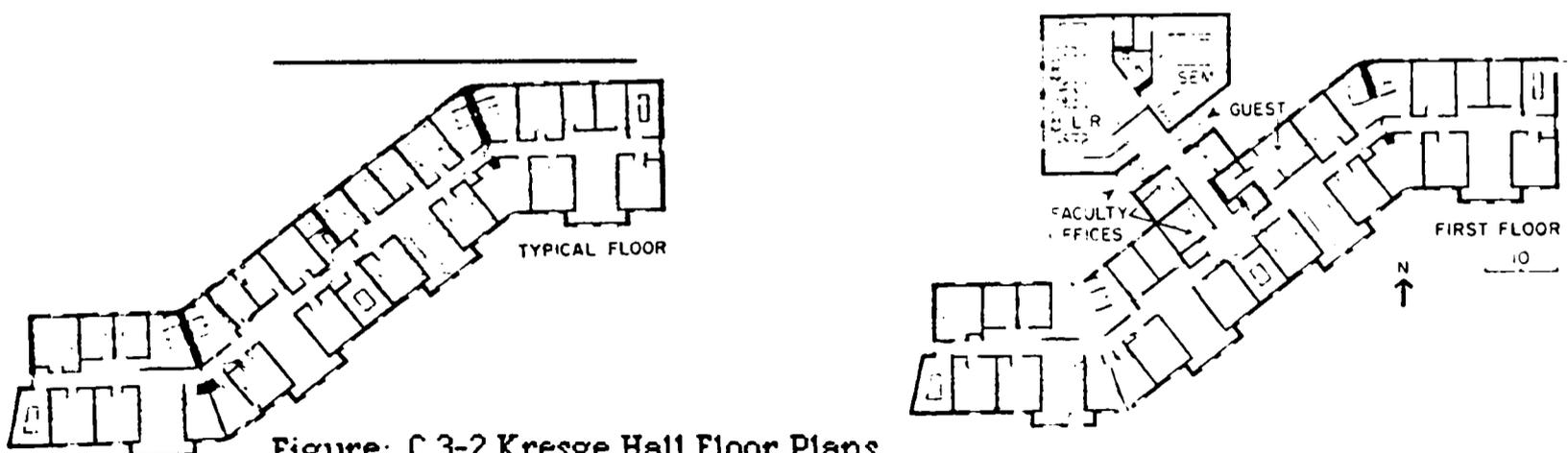


Figure: C.3-2 Kresge Hall Floor Plans
Source: ARCHITECTURAL RECORD, p. 101, October, 1982

limitation to advantage by combining formal massing (suitable to serve as a university gateway) with residential scale and character.

Kresge Hall is composed of two buildings which mirror one another in plan. (See Site Plan and Floor Plans). The dormitory was designed to be utilized as a residential college housing 240 students whose major interest lies in foreign studies or communications. Living arrangements are based on ... eight-person suites with bed-study rooms grouped around shared living rooms that are emphasized by bay windows on the street side of the building.⁵ Recreation, laundry and service spaces, as well as one guest room per floor augment the living spaces. ... In addition, however, the program called for academically oriented common facilities - language labs, seminar rooms, faculty offices, audio and video equipment, computer stations - which are concentrated in low structures linked to the dormitories by their off-street entrances.⁶

The North Allison dormitory is the middle unit of the newly built group of dormitories. North Allison replaces a parking lot with housing for 129 students. The building plays an important role in providing a transition from the bland bulk of the larger modern dormitories to the cozy Cottage Gothic of nearby sorority houses and small residences. In this regard scale is the critical issue, therefore the buildings height was contained within four stories. An interesting method was used to visually contain the length of the buildings. A

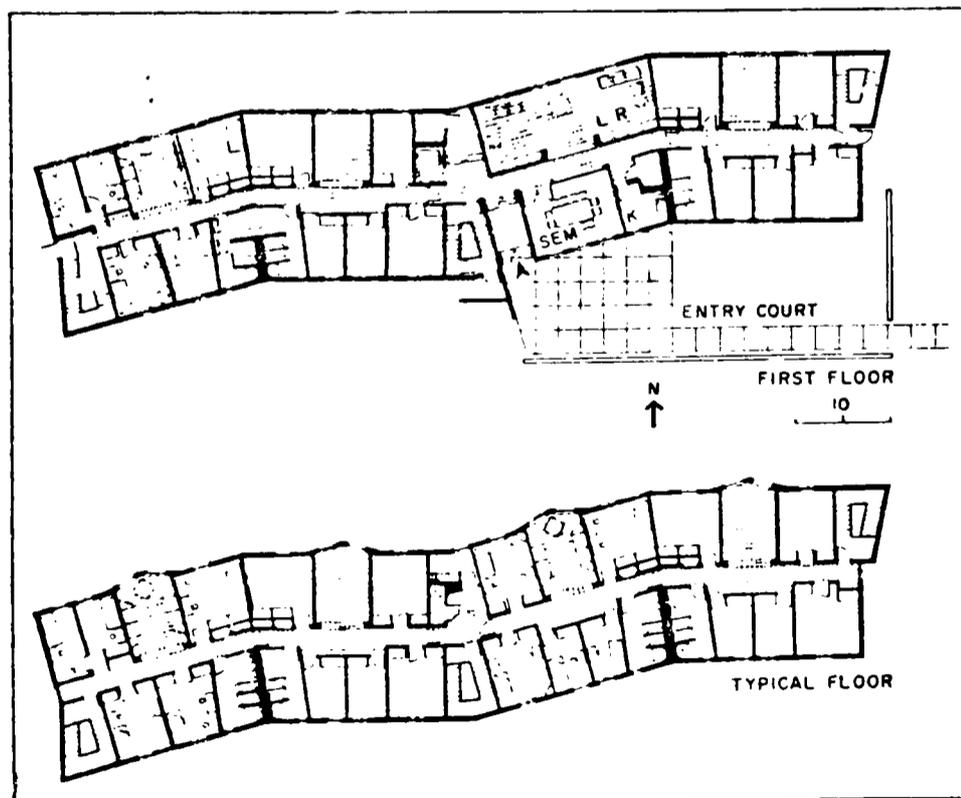


Figure: C.3-3 North Allison Dormitory Floor Plans
Source: ARCHITECTURAL RECORD, p. 97, October, 1982

slight undulation to the façade, further articulated by modified bays marking the suite living rooms (See Figure C.3-3 Floor Plans) tempers the length of the structure. The entry court to the building was placed in the rear of the building in anticipation of the formation of a quadrangle to be created by the expansion of the existing dormitory to the south of North Allison

The interior living spaces are arranged in eight-student "community suites" of single and double rooms clustered around a living room (as was done in Kresge Hall). The eight-student per suite was deemed as the correct amount of people to share a common living room, and to share a common bathroom - the individual rooms do not have sinks and thus must use the sinks in the "suite bathroom".

The Mid-Quad dormitories are the farthest west of the new dormitories. The setting is an almost suburban street made up of a double row of sorority houses: circa 1924, designed by Gamble and Rogers in a free rendition of the style of

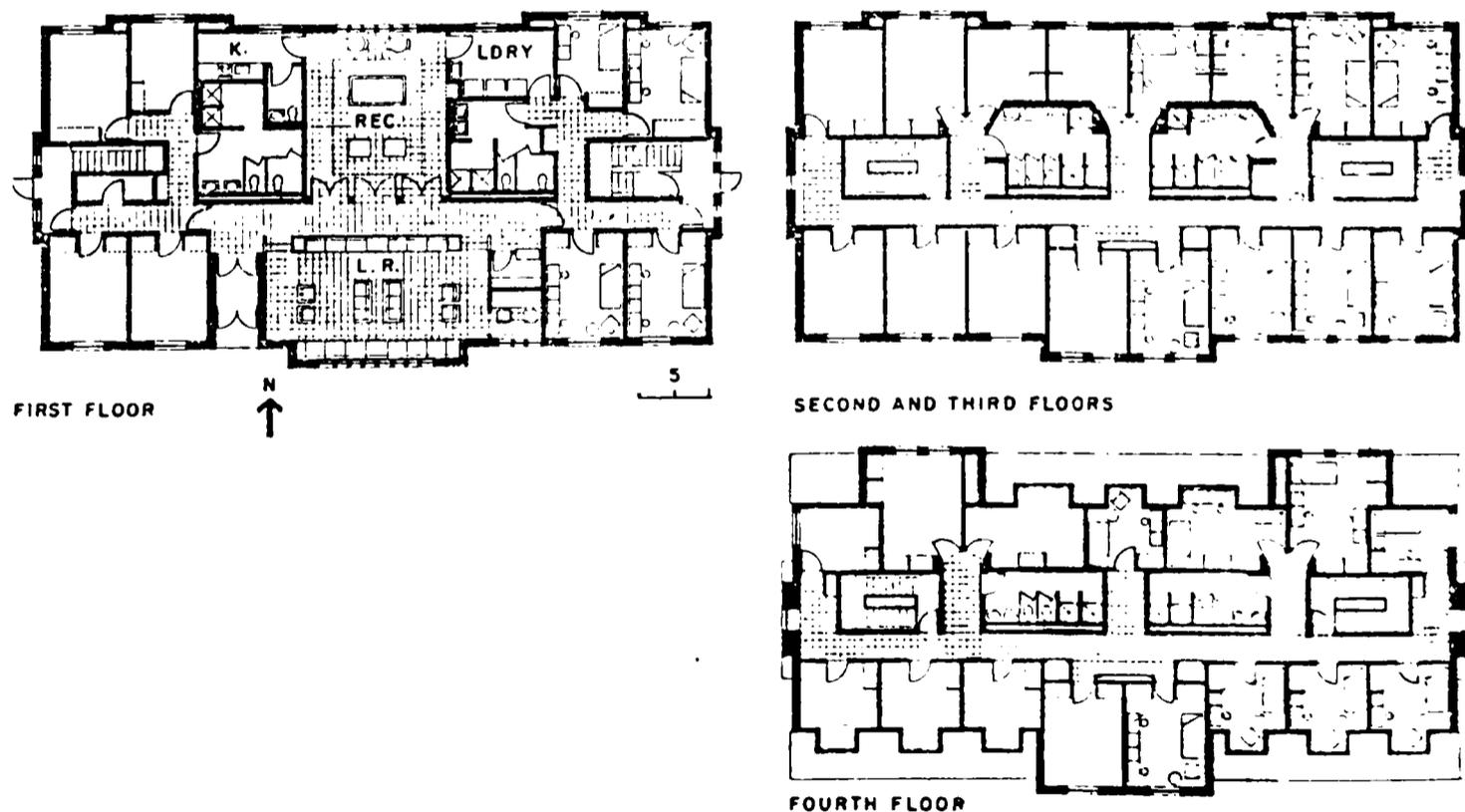


Figure: C.3-4 Mid-Quad Dormitories Floor Plans
Source: ARCHITECTURAL RECORD, p. 98, October, 1962

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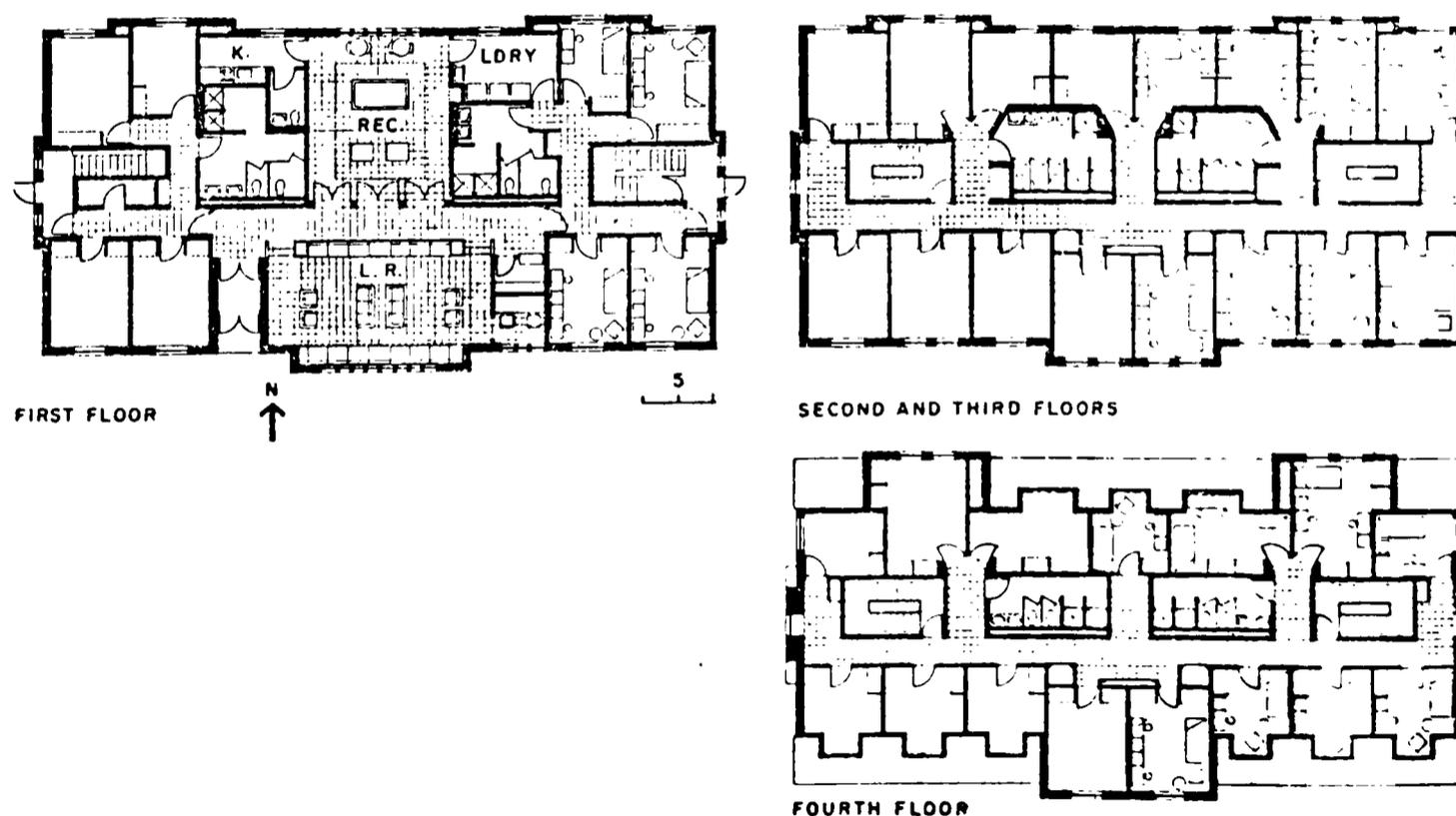


Figure: C.3-4 Mid-Quad Dormitories Floor Plans
Source: ARCHITECTURAL RECORD, p. 98, October, 1982

residences found in Cotswoldian, England. The Mid-Quad buildings site is directly between these houses (Refer to Site Plan). Each one of the two dormitory buildings known as the Mid-Quad is built at a residential scale, and thus appears to look like the large houses next door. In an effort to maintain the integrity of the block, the Mid-Quad buildings echo their traditional neighbors in style and materials as well as scale.

The interior living spaces utilize the same scheme as the other dormitories with eight-person suites. The first floor contains a laundry, recreation and living rooms as well as two four-person suites on either end of the building. Due to the smaller sizes of these dormitories, as opposed to the other new dormitories built on campus, only 55 persons were accommodated within each building.

CONCLUSION

Although each of the new dormitories was designed to have the same basic characteristics in layout and function internally, each dormitory building lends itself to fit into the immediately surrounding context of buildings; and yet still helps create a unifying effect for the entire southern portion of the campus. Kresge Hall leads one into the university proper by the allowing the continuation of a long axial vista to be observed through its split design. North Allison Dormitory is the transition point between a wide open expanse of ground and modern structures to a more intimately scaled area filled with older, more traditional structures. Finally, the Mid-Quad complex settles quietly in with the neighboring buildings in a more intimately scaled area. The same basic internal design scheme for the Mid-Quad as the other dormitories at a smaller scale probably changes the whole atmosphere of the dormitory for the residents; an atmosphere that actually matches the exterior conditions - that of residential scaled intimacy.

BROWN UNIVERSITY'S PEMBROKE DORMITORY

INTRODUCTION

In the late sixties, Brown University became aware of the need to house an additional 200 to 250 students per year. The site selected by the university to construct a new residence hall was on a 39,750-sq-ft street corner at the edge of the university. Abutting the site to the east was a street filled with active commercial retail, a street of detached houses ran along the northern edge of the site, with existing university buildings to the west and south. The firm of MLT/Moore, Lyndon, Turnbull, of San Francisco was retained for the initial preliminary design work and Lyndon Associates Inc., Cambridge, with Donlyn Lyndon as the principal in charge, was to do the final design through construction phases.

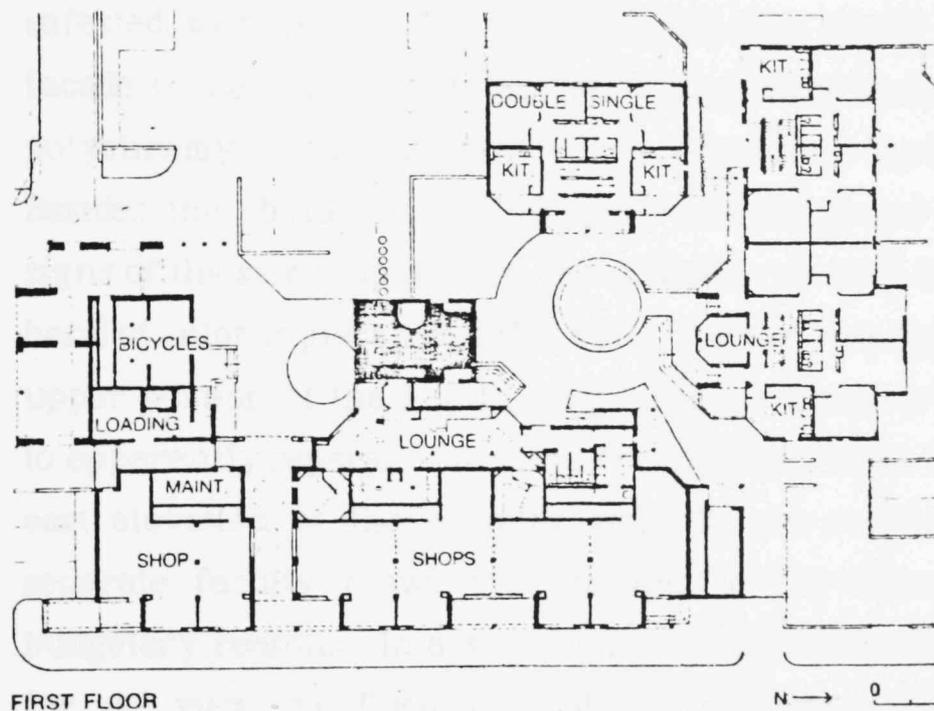


Figure: C.4-1 Pembroke Dormitory Site and First Floor Plan
Source: PROGRESSIVE ARCHITECTURE, p. 50, February, 1976

EXTERIOR

... In the initial stages of the project two immediate decisions were made that would become the basis for the entire design. First, the new dormitory would not repeat the barracks-like composition of existing dormitories immediately adjacent to it. Instead the complex would be broken up into a complicated massing consonant with a number of houses with separate entries. Second, the two street elevations of the new dormitory would respond to their immediate surroundings.¹ These are disparate and the elevations record the disparity. As one will note by looking at the first floor site plan above, the Pembroke dormitories are comprised of four buildings arranged to form an

inner court with a large open entrance on the northeast corner, a service area on the southwest corner, and numerous entrances formed by walkways going between the buildings. ... The outer edges of the complex are related to the neighborhood. The street on the north, dominated by large setback houses, is rhythmically continued by a configuration of walls, bays and windows. The character of the commercial street on the east is maintained by stores along the ground floor of the complex² The lower portion of the east façade (containing the stores) is covered with varicolored glazed brick which, according to the intentions of the architect: [Should draw a] "distinction between the street commercial life and the dormitory above and beyond"³

The longest elevation on Thayer Street (east elevation) extends the principal university shopping area, which contains the usual nondescript but lively jumble of low commercial buildings intermixed with converted houses, all infested with signs. The glazed brick that forms the "pop-graphic" on the façade is used as an architectural embellishment in the tradition of Victorian polychromy - which is seen on many buildings throughout the neighborhood. Besides the obvious embellishment, the blue band of glazed brick above the signs of the stores appears to be acting as a cornice (albiet a symbolic one as the band of color is placed in a flat wall); for the lower portion of the building. The upper portion of the building contains the dormitory proper which is set back to apparently separate the commercial spaces from the residential spaces. The east elevation of the complex stops before reaching the north corner. A separate faculty house was planned to fill this spot but was omitted for budgetary reasons. In a way the loss is not so great, as the corner is opened up for a view to Cushing Hall across the street (Cushing Hall is a turn-of-the-century brick clad dormitory built in a nominal "Queen Anne" style and thusly seves as a literal "hinge" from a commercial district on one side to the residential district on the other side).

Around the corner on the north side of the complex, the façade is changed (as stated) to take cues from the residential neighborhood across the street. The houses range in date and style from 1870's Victorian mansard to 1920's Neocolonial Revival. Here the four-story elevation drops to three stories and is moved back from the sidewalk behind an enclosing wall. Instead of the long horizontal planes which continue the theme of the shop fronts on Thayer Street (east elevation), the Bowen Street (north) elevation responds to the vertical blocks of the outsized houses opposite.

Inside the complex, in the courtyard, the deliberate straightforward

approach given to the street side of the dormitory gives way to a more three-dimensional composition of housefronts, terracing, balconies, bay windows, and towers - all surrounding a colorful metal-framed centerpiece with its tubes, boxes, and lights - ... part sculpture, part billboard, part lighting fixture⁴

The courtyard area really has two other centering devices besides the sculpture. A combination of three projecting fronts at the Bowen Street end of the complex with connecting lattice bridges, form a secondary centering on a square open space - just outside of the sculpture, but using the sculpture as one of its defining elements. Finally, the towers (three stories in height) on the Bowen Street side of the complex, along with those on the Thayer Street side of the complex organize the entire courtyard as a centering device for the complex. All the playfulness in the courtyard design appears to come off as a sort of urban recreation area.

The structural system for the complex consists of precast concrete plank floors and roof, supported by masonry bearing walls. Because of budget restraints the interior spaces are demised with gypsum board over steel studs. The major materials used throughout the Pembroke complex are: Plain and glazed brick on the exterior walls; built up roofing; expanded polystyrene insulation; steel casement and aluminum siding windows; double-glazed wire glass skylights in aluminum frames; end-grain oak block flooring in the main lounge, and carpeting throughout most of the rest of the building.

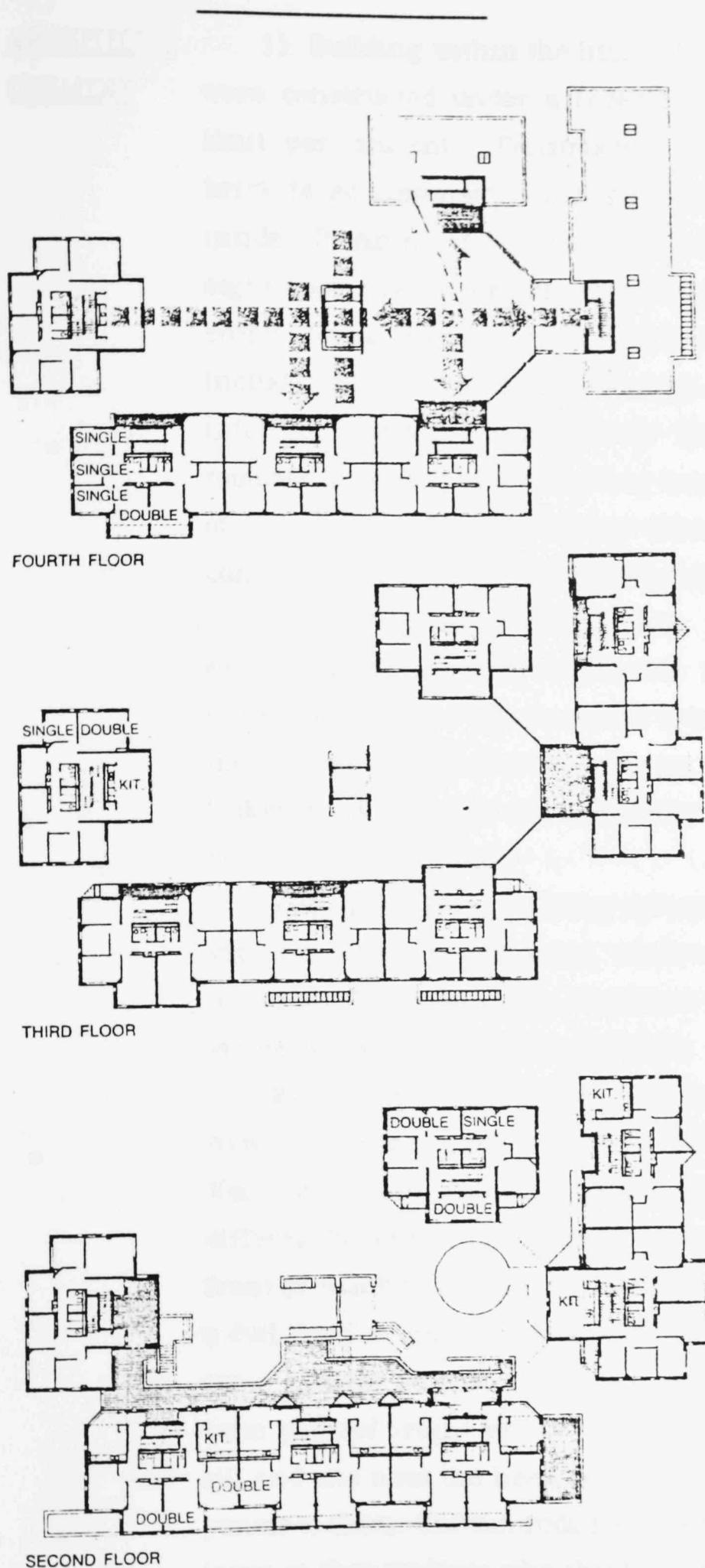
The complex is heated by fan coil units, using hot water supplied by a central university physical plant. A provision has been made for future air conditioning of the complex by utilizing the university central chiller.

The final construction cost for the project was \$2,472,000(actual, excluding furnishings and fees), \$115,000 over the original bid price of \$2,357,000.

INTERIOR

... Opening from the courtyard are seven entries that are the organizing elements of the plan. Each of the multilevel entries has a kitchen/lounge and outdoor deck. Around them are grouped various combinations of single and double deck rooms in various arrangements on three floors, housing from 26 to 34 students. The variations are intended to give a distinct identity to each entry cluster, just as the courtyard is intended to give identity to the entire complex⁵

The complicated exterior massing of the complex were further ... subdivided into locked clusters of rooms internally, so as to effect a further breakdown of the houses into groups of eight to ten students, and to provide the additional possibility of conversion into apartments should future student demand make such arrangements desirable⁶



Do the students like their quarters? Generally they seem enthusiastic about the rooms, particularly for their variety of shape and flexibility for furnishing, as well as for the clustering of rooms into groups. They especially appreciate alcoves in the halls outside the rooms which have become informal meeting places with music from open rooms nearby, as Lyndon (the architect) intended. The major lounge in the complex is easily by-passed, and all lounges are small, so students get to know their immediate neighbors, but find it difficult to become acquainted with the larger community. Balconies are also underused because too many are not projected into the sun, but set back inside the building in shade which is too cool for the New England academic year.⁶

... The architecture of the Pembroke Dormitories was governed by four prime considerations: building within a tight budget, providing students with choice, reinforcing the order of places adjoining the site, and bringing attention to the people who live there. Besides that, we wanted it to be a nice place.⁷

Figure: C.4-2 Pembroke Dormitory Floor Plans
 Source: PROGRESSIVE ARCHITECTURE, p. 52, February, 1976

ARCHITECT'S
COMMENT

1). Building within the limits of HUD sponsored financing. The dormitories were constructed under a Federal loan program, within the designated dollar limit per student. Construction is simple with precast concrete planks, brick-faced masonry walls, steel stud partitions and gypsum board surfaces inside. Planning is based on a repetitive three-story organization with six to eight rooms per floor arranged around a set of bathrooms and a scissor stair entry. Room sizes are small, and a common space limited, although each unit includes either two kitchen/lounge areas or one large one, and there is an informal Common Room Hall for the whole complex, off of which are two seminar/lounge rooms, a vending machine shrine and a small laundry. The use of the ground floor of Thayer Street for self-supporting commercial space contributed to the project's fiscal balance.

2). Providing students with opportunities for choice and personal expression: it should be possible for students (or any residents) to take possession of their own spaces and to be part of a social unit small enough so that their actions and preferences count. Each unit floor has 6 to 11 students and is lockable. Rooms are about equally divided between singles and doubles in varying combinations.

Within the basic building system we have introduced a number of simple variants: bays, projections, window placement, skylights, room shape, and corridor. These variants, combined with building position and outlook, make virtually every room distinguishable.

Within the rooms, options have been left open. When students rearrange a room it should make a real difference, not just fill pre-ordained niches. Wardrobes have been used rather than closets, so that they can be disposed differently within the rooms: separating areas or flat against the wall, in front of windows or blocking the door. The wardrobes have a bright façade and a dull finished back, so their position counts. The color of the rooms is a warm tan - neutral but not bland. An angled corner, small enough to repaint, has been painted bright yellow. Two 2 x 6s span across the window wall, one at the sill and one near the head, so that students can hang things from them or nail panels to them. Curtain rods are attached to their backs. Windows are generally large so that students who think them too large can cover them with curtains, panels or wardrobes (which they don't). Alcoves in the corridor are left to the group to claim for their own devices.

3). Making the form and use of the buildings accountable to the places they front: Each boundary of the site has a distinctly different character, and each

face of the building adjusts to those differences. Cushing Street to the side is a service and loading alley; the new building has cars and trucks at street level there. Thayer Street on the east is a characteristic college shopping street; that face of the building is a row of shops entered through a glazed brick sign-patched façade that distinguishes the shops from the bulk of the dormitory above.

By allocating this part of the site to commerce it was possible to extend the established pattern of storefront public space along a busy street and also to gain privacy for the rooms above (and space for the inner court) by placing the building quite close to the street, so that the shops and their façade shield second floor rooms from sidewalk view.

Along Bowen Street the established pattern was strikingly different, an easy pleasant street of walls, hedges, front stoops, and big blocky houses of a variety of sorts, mostly handsome. The Bowen street side of the complex is accordingly lower and shorter, scaled to the domestic rhythms of the street set back behind walls and ivy. The western boundary of the site is left largely open, to give light and outlook to the adjoining brick box dormitories. On the northwest corner an older house has been retained, renovated to accommodate students; it provides a welcome intrusion of forms and details from another time. (Earlier published designs showed an additional dormitory building on its site, which was carefully sited to allow retention of the old building as an alternative.)

All of the buildings face the court, and each entry stair is marked by inset buff brick walls and by the fundamentally symmetrical placement of rooms and windows around it. This recurrent pattern projects itself forward into the space, but the form of the buildings is also accountable to the court. On three sides pavillions made up of porch, rooms, and terrace set forward from the building to form three faces of a square courtyard (a direct crib from Islamic architecture). Their front faces are red glazed brick to emphasize their relationship. The fourth side is formed by a gate with light fixtures and sculpture.

But this square is only one of a multiple set of orderings. (See Exterior) At no point does one order dominate to the exclusion of others. People should be able to choose their alliance.

4). Bringing attention to the life of the place by framing the scene: paths through the complex all lead through the central courtyard: under the building from Thayer Street, through the light gate to entries facing the court or up across the terrace to entries above the common rooms and stores. The court,

with these paths, the round platform in the middle, and terraces that face it on the upper level, makes a place that sharpens the perception of community - highlighting the actions and movements of people on their way to and from classes, establishing numerous opportunities for casual encounter and greeting, providing places outdoors for the occupants of every entry. Stairways are shaped to focus attention on people using them, niches, porches, and benches to lodge people on the edges of the space, and precast caps for all the terrace walls so that they will be comfortable objects on which people might lean.

The light gate in the center casts networks of shadow across the space, further pictorializing the scene. The sculpture it bears plays with the shifting sun and inhibits its framed openings. The form of the light gate at once completes the square inner court and occupies the larger court formed by the whole complex. It shifts the focus of attention from individual incidents to the collection of paths that lead through it. Its forms and colors, the sculpture appearing in its frame, lay claim to the whole place as a theater for the everyday activities of Pembroke residents.

These considerations, and getting upwards of 200 students on the site, were our deliberate intentions. Obviously in any project many other factors affect decisions hard, cold ones like changes in program and budget, chance dreamy ones like the recollection of the gate at Sanchi, or the variation-packed turn of the century row houses on Boston's Beacon Street that Marvin Buchanan and I often drove by on the way to work - and many more.

COLUMBIA'S EAST CAMPUS COMPLEX

INTRODUCTION

... An Ivy League academic curriculum is only part of the education Columbia University offers undergraduates: a mandatory course in New York urbanism adds a second dimension. The Morningside Heights campus reaches deep into Manhattan's Upper West Side, from West 114th Street to West 120th Street, between Broadway and Amsterdam Avenue, with an East Campus sector extending to Morningside Drive (see figure C.5-1 site plan). The immediate contextual envelope is a tightly woven, densely built residential/ commercial neighborhood conspicuously past its prime. To the east, Frederick Law Olmsted's Morningside Park provides a sinuous band of green dividing Columbia from Harlem.¹

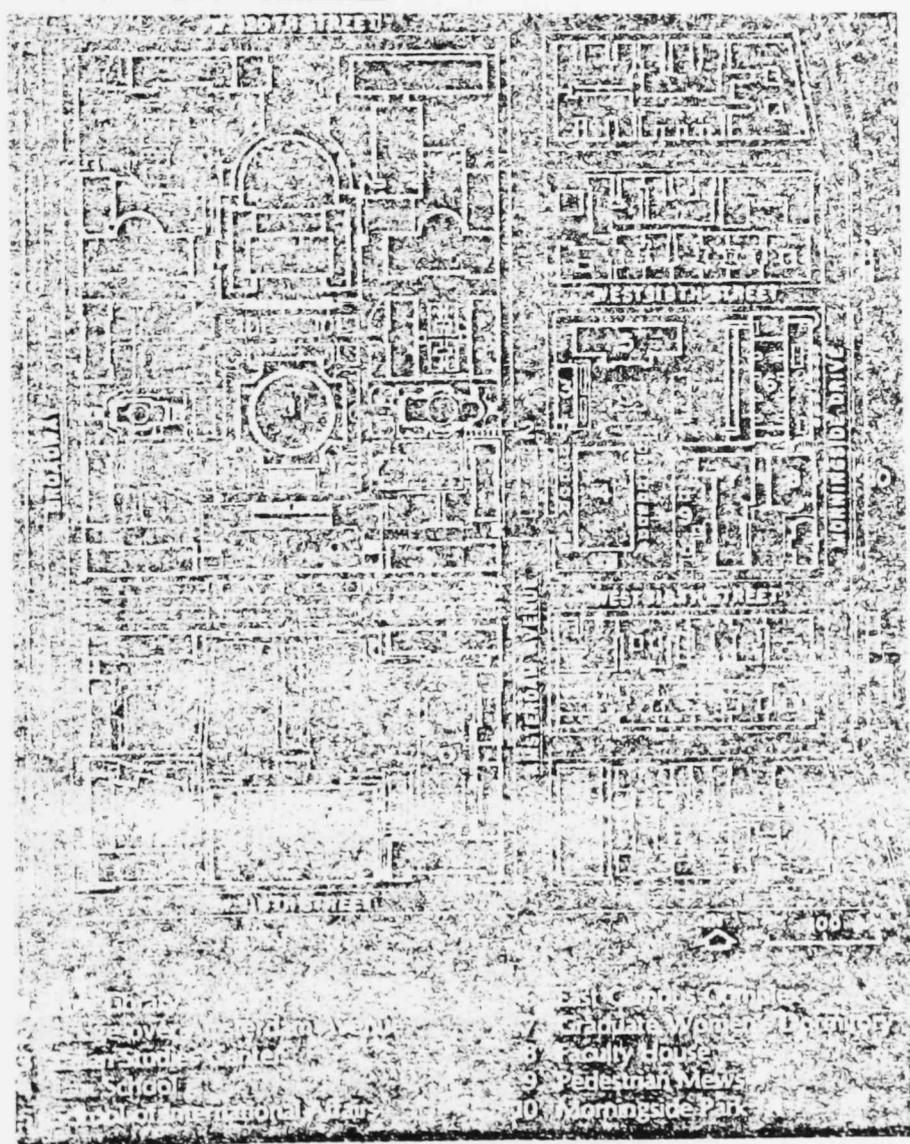


Figure: C.5-1 Columbia University Site Plan

Source: ARCHITECTURAL RECORD, p. 67, February, 1982

It was 1893 when McKim, Meade & White created the Master campus plan

for Columbia University. Since that time however, succeeding building additions have shown little if any regard for the the classical lines of the Main Campus. The original edge of the Main Campus was significantly broken when a bridge was built across Amsterdam Avenue connecting the main and East Campuses. East of Amsterdam Avenue, the bridge expands into a large concrete plaza; the plaza actually topping off an underground parking garage. The plaza provides access to Harrison & Abramovitz's 1971 School of International Affairs to the north, and 1963 Law School to the south. Until the time the East Campus Housing Complex was built, the plaza's east edge was terminated by two high rise tenements which faced Morningside Drive.

The idea of a new building to house residents came from alumnus Jerome A. Newman (class of '17) who, in the early seventies recognized that in order for his alma mater to remain academically and fiscaly healthy; residential needs of a growing student population would have to be met. Newman chaired a Board of Visitors under the heading "Quality of Life". The Boards mission was to provide answers for the problem of the university housing shortage. It was through the Board that reccomendations were made to the university president about building a new student housing complex.

The Board had chosen the site occupied by the two tenements as a prime location for the new housing complex; the reason being a lack of vacant building space in the area. The university had in fact already identified that parcel of land as underdeveloped, and as a desperately needed piece of real estate.

PROCESS

The commision for the proposed residential complex was awarded to Gwathmey Siegel & Associates. Columbia University as client offered Gwathmey Siegel & Associates enviable working conditions. There was no set budget in the begining of the project. Instead, a program was developed to provide answers to what should be most suitably included in the design. The program evolved with the aid of considerable input by students, and a 10-man building committee composed of deans. The committee responded to the students major preference for privacy and variety in living arrangements. The construction of such amenities would be a more costly process. A Foundation-sponsored study (conducted at the University of Massachusetts) provided Columbia with ... the impetus - and the statistics - to trade higher building costs for lower operational costs. According to then campus architect D. Dean Telfer, "We all felt that students living in apartment-type arrangements was not only a long term economic necessity, but preffered."² As the work of clearing the area began,

the architects encountered problems:

... Razing the two Morningside Drive tenements revealed an awkward wedge of land, bordered on the west by Harrison & Abramovitz's elevated plaza and the shear wall of a garage (under the plaza and beneath the School of International Affairs), and on the east by Morningside Drive. The plaza loomed like the edge of a cliff taking a dramatic dip to the site down on the drive, before a final plunge down to Morningside Park. The plaza's monumental scale and the drive's residential scale provided complexity (if not contradiction). The architectural opportunity being presented did not escape Charles Gwathmey and Robert Siegel.³

The site consists of 360,000 square feet. Some of the contextual environmental problems facing the architects were: 1) The extremes of the topography on the site, due to the large drop at the edge of the plaza/parking garage [see Figure C.5-2 Building Section and note the existing parking area below the plaza. The elevation of the shear wall on the right (or east) side of the garage gives the scale to the height of the drop the architects were working with]. 2) Terminating the campus properly; providing an "edge". 3) Relating the complex to the scale of the campus on the west, and to the scale of

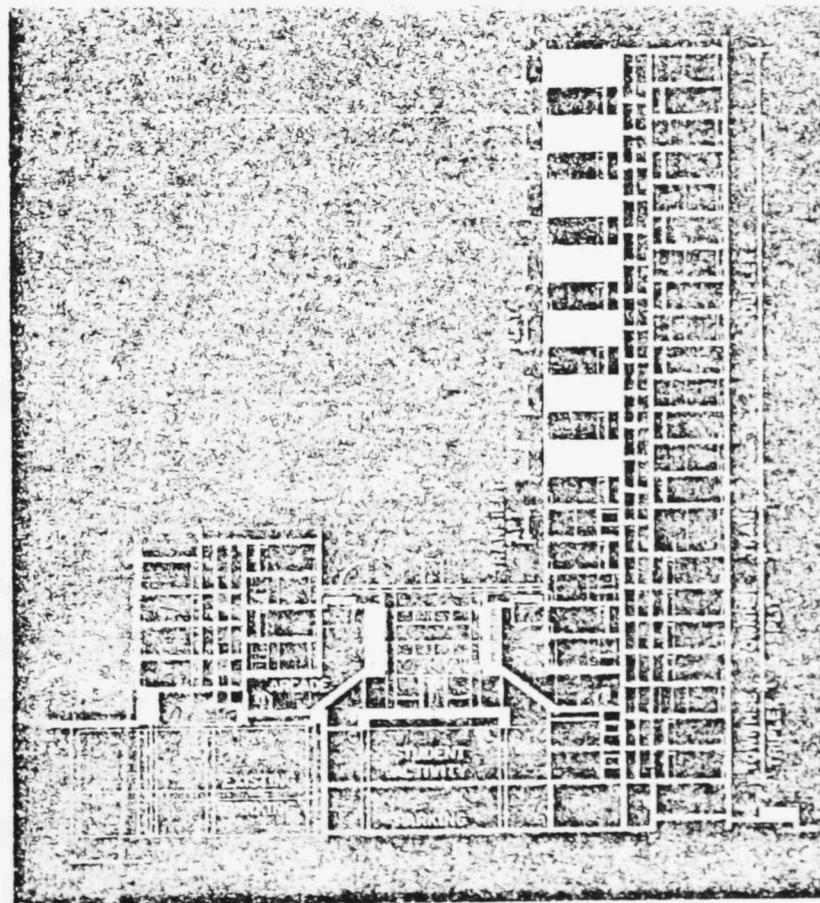


Figure: C.5-2 Building Section

Source: ARCHITECTURAL RECORD, p. 69, February, 1982

Morningside Drive and Morningside Park on east (two entirely different scales).

EXTERIOR

The approach to the complex from the west brings one across the bridge crossing Amsterdam Avenue, past the Italian Studies Center and the Law School, until one is faced with the termination of the long east-west axis that cuts Columbia University in half-- a four story cylindrical stair tower backed by a four story building that rests comfortably in scale, mass and materials with the other buildings in the East Campus. The buildings placement on the site, as well as the placement of its' entry (a large portal "carved" out of the four-story block just to one side of the stair tower), does much to rejuvenate the plaza. The large, nearly void, concrete plaza was thought to be a questionable design decision. With the addition of the East Campus Complex however, more pedestrian traffic has been introduced to the plaza.

Behind the four-story structure, although appearing to sit on top of it, is a high rise slab 23-stories in height. The "trundle-bed" arrangement of the buildings creates a visual damping effect for the individual approaching through the pedestrian mews in front of the complex (see Site Plan); ie the lower building is at a more pedestrian scale, and by being scaled to the surrounding buildings, serves to strengthen the much-deteriated cornice line of the neighborhood. This is important because the building's design is not dominating, but rather acting as a single unifying part to a larger organism - the East Campus. Another visual modifier to the housing complex is the choice of exterior skin materials utilized. The lower four-story structure is clothed in a red-tile skin, (intended to echo the brick of surrounding buildings). The high-rise structure is similiarly clothed in a beige/grey-tile skin (intended to echo the limestone of surrounding buildings). Between the low and high-rise structures of the housing complex, there is a 60' wide courtyard. The courtyard allows extra sunlight to penetrate student rooms on the lower levels of the complex, while also providing a communal cloister space for the students. On the east side of the courtyard is another low-rise structure, with the high-rise slab on top of, and set back from it. On either side of the courtyard (see figures: C.5-3 Axonometric, and C.5-4 Floor Plans - Entry/Cloister level) capsule-shaped stair enclosures (giving access to individual suites) face each other. Providing a north enclosure for the courtyard is a structure that the houses the Heyman Center for the Humanities, an academic center for interdisciplinary study and research. The south enclosure is formed by a loggia on the courtyard level, used

as an entry to the courtyard; with a two-level law school student center/lounge on top of the portal.

ANALYSIS

... The logic behind Gwathmey Siegel's scheme is perhaps best illustrated by charting a circulation route - from west to east - along the south elevation (shown in the axonometric, figure C.5-3). One enters through the portal in the low-rise, housing a stair which leads either up a few steps to the courtyard (and subsequently, to the elevator banks in the high-rise), or down to a loggia which

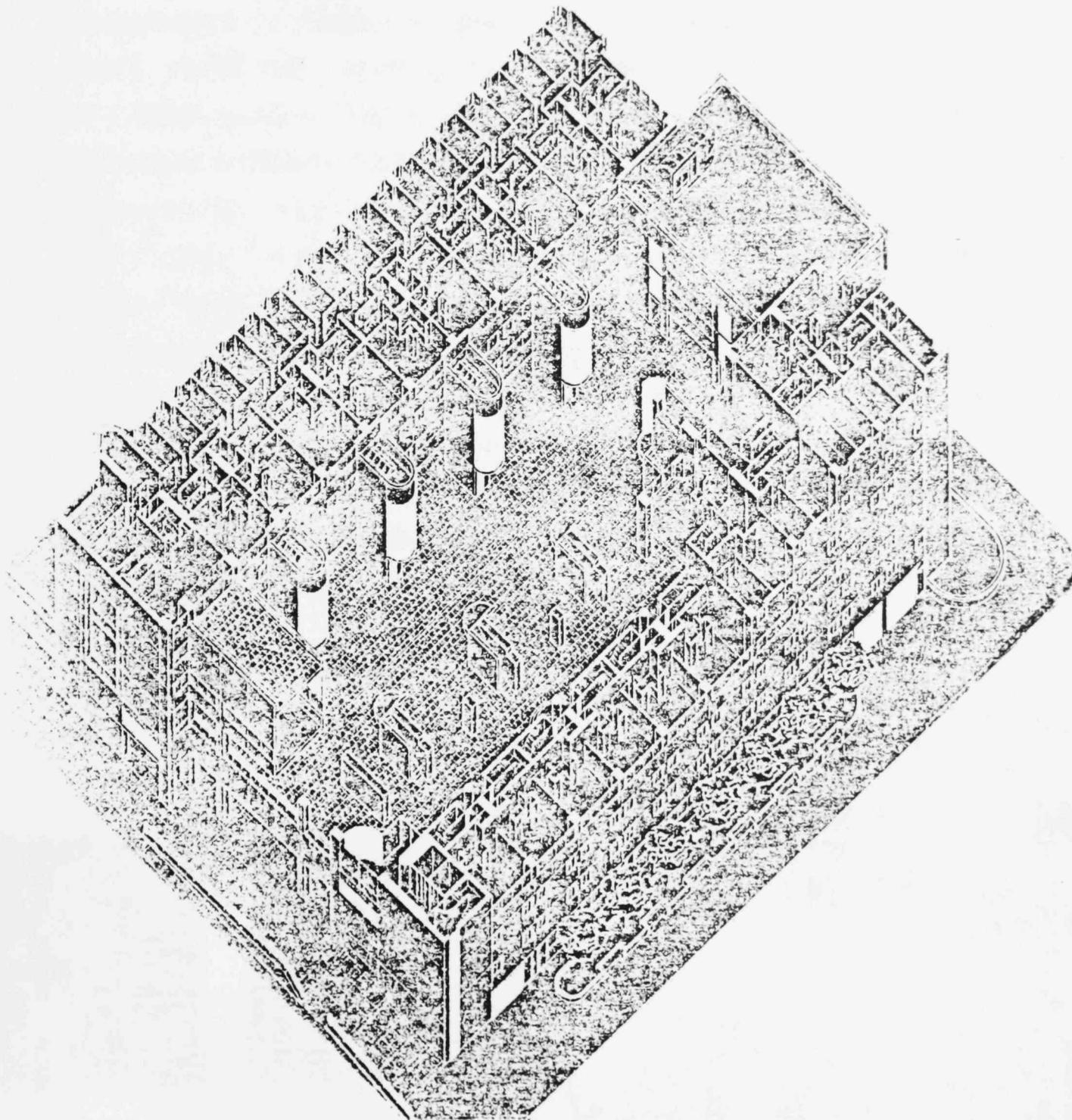


Figure: C.5-3 Axonometric of Low-Rises and Courtyard
Source: ARCHITECTURAL RECORD, p. 68, February, 1982

opens to steps leading out to Morningside Drive. From the south, one enters by way of West 116th Street and a pedestrian mew (between the elevated Law School and the graduate woman's dormitory and Faculty House) that gives access to the loggia.

In terms of urban design, the East Campus Complex follows the established New York tradition of treating high-rise buildings as "edge," both to parks and north-south avenues, although the 23-story slab is considerably more of an edge than Morningside Drive is accustomed to. Down along the drive, however the architects provided their slab with a base of heavily-glazed shops and/or offices, which will - when occupied - animate the street façade. By bringing their building down to street level, Gwathmey Siegel & Associates have reversed a Columbia tradition of elevating and isolating the campus from its environs. >(This tradition stems from the Heights' roller-coaster topography.) One has only to walk by either the adjacent Law School or School of International Affairs - both elevated, throwing blank masonry walls down to the street - to know how to welcome a change that is. It is only at the north façade that the full weight of the high-rise slab is felt, as it meets West 118th Street. (An earlier scheme extended the pedestrian mews from West 116th Street, through the cavernous spine beneath the courtyard, to West 118th Street: the interior street was to be used for recreational facilities and ad hoc student activities. Campus security, budgetary concerns, and changes to the program conspired against the scheme.)⁴

INTERIORS

The two low-rise buildings that form the base of the complex house 350

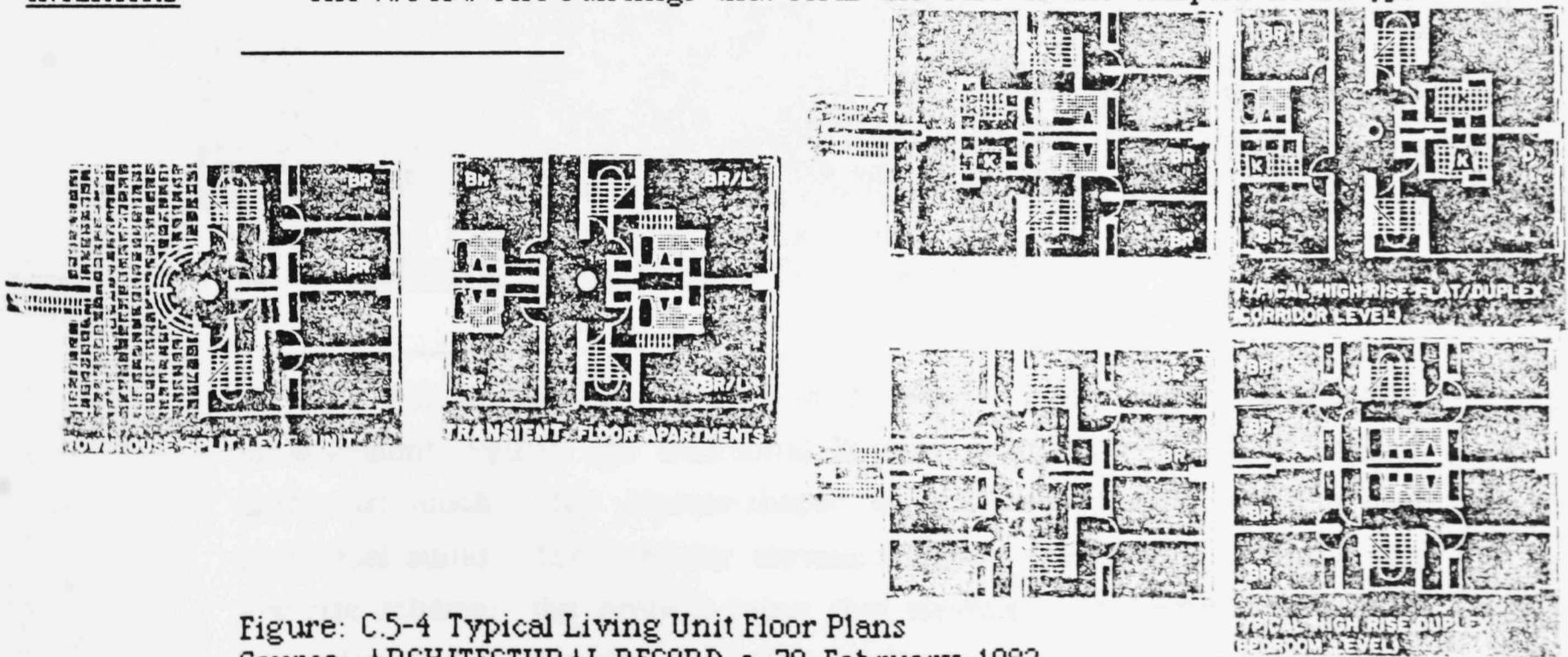


Figure: C.5-4 Typical Living Unit Floor Plans
 Source: ARCHITECTURAL RECORD, p. 70, February, 1982

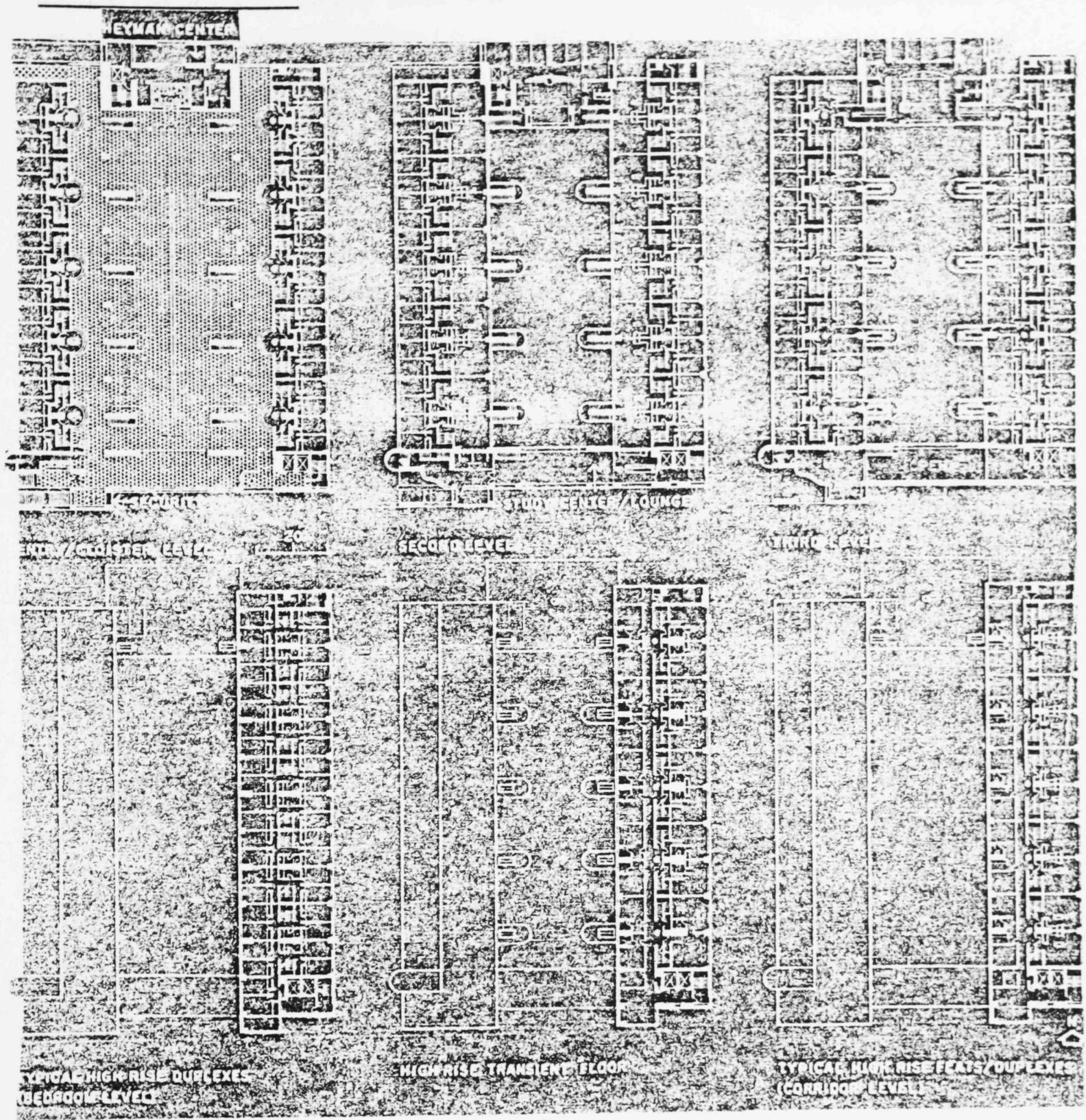


Figure: C.5-5 East Campus Complex Floor Plans
 Source: ARCHITECTURAL RECORD, p. 71, February, 1982

students with townhouse-type walk-up residential units. This type of living arrangement typifies the traditional English college system, albeit with a modernist touch. The capsule-shaped stair towers provide access to the individual suites. The need for elevators has been alleviated by using the low-rise scheme; the preface being that elevators are frequent targets of vandalism and malfunction in colleges. The remaining residential space is located in 14-stories of the high-rise. Sandwiched between the high-rise and

the low-rise is a transitional "hotel" floor containing double-height guest rooms for visitors to the university (see C.5-2: Building Section).

The East Campus Complex offers a variety of living units. The high-rise has two types of living spaces; Flats on the west-side of the building, and duplex's on the east-side. Below these spaces on both sides of the building are the "transient hotel suites." There are two types of townhouse plans; a split level and a triplex. (see Figure: C.5-2 Building Section).

CONCLUSION

Columbia's East Campus Complex does not break any new architectural barriers, nor does it advance the state of the art in technology. It does, however, provide for the needs of a lot of different activities in a logical and comfortable manner.

ENDNOTES

Yales Old Campus Revitalized:

¹Mildred F. Schmertz, ARCHITECTURAL RECORD, McGraw-Hill, New York. 1977. p. 96

²Ibid. p. 97

³Ibid. p. 98

⁴Ibid. p. 9

⁵Ibid. p. 95

⁶Ibid. p. 96

Postoccupancy Evaluation For Student Housing:

¹Ellen Perry Berkeley, AIA Journal, Washington. 1979. p. 58

²Ibid. p. 59

³Ibid. p. 60

⁴Ibid. p. 60

⁵Ibid. p. 61

⁶Ibid. p. 62

⁷Ibid. p. 62

⁸Ibid. p. 62

⁹Ibid. p. 62

¹⁰Ibid. p. 62

¹¹Ibid. p. 62

¹²Ibid. p. 63

¹³Ibid. p. 63

¹⁴Ibid. p. 63

¹⁵Ibid. p. 63

Putting Dormitories Into Context:

¹Architectural Record, McGraw-Hill, New York. 1982. p. 96

²Ibid. p. 96

³Ibid. p. 96

⁴Ibid. p. 100

⁵Ibid. p. 101

⁶Ibid. p. 101

Brown University's Pembroke Dormitory

¹William H. Jordy, "Making the Ordinary Extraordinary". Progressive Architecture. 1976. p. 48

²"College Dorms Ringing An Inner Court", AIA Journal. 1979. p. 182

³Ibid. p. 182

⁴Jordy. p. 51

⁵AIA Journal. p. 182

⁶Jordy. p. 48

⁷Ibid. p. 53

Columbia's East Campus Complex

¹Architectural Record. 1982. p. 66

²Ibid. p. 70

³Ibid. p. 66

⁴Ibid. p. 68

SITE ANALYSIS SUMMARY

The criteria which was used by Boston University in selecting a site was composed of four elements:

- The site must be in close proximity to the university campus
- The site must be of adequate size to accommodate a housing complex
- Land costs for the purchase and development of the site must be considered
- The historic context of the Back Bay area should be disturbed as minimally as possible

The site of the National Guard Armory was chosen because it was going to be vacated by the National Guard, and it meets all of the requirements set forth by the university. The site is situated in Boston University's West Campus, near the town of Allston.

The site consists of a ten-acre parcel of land that includes six buildings and a large open field of grass.

An analysis of soils for the site is necessary because of the shifting nature of the infill soil that makes up the site. The soils are mainly cool, moist orthods of the spodosol order which has sufficient moisture for maintaining plant life throughout the year. The soil is high in runoff potential, which leads to erosion if plants or trees are not protecting it; although leading to good groundwater recharge.

The general characteristics of the area include changeableness in the weather, large ranges of temperature, both daily and annual, great differences between the same seasons in different years, and equable distribution of precipitation. The weather is constantly changing in Boston with lots of rain yearly being one of the only predictable characteristics. Because of the heavy rains and the runoff potential of the soil, site planning should accommodate possible erosion of soil on the site.

Some of Boston's most severe weather comes from storms called "northeasters" by the locals. These storms in the winter months can cause heavy winds and ice storms. With the icy conditions care must be taken in the design of tall structures as ice will add to the surface area of the structure, making the structure susceptible to damage by the strong winds.

Gaffney Street to the south. (refer Figures SA-1, SA-2).

The location of the site was determined with the following criteria set by Boston University : 1) The site must be in close proximity to the university campus, 2) The site must be of adequate size to accommodate a housing complex, 3) Land costs for purchase and development of the site, 4) The historic context of the Back Bay area should be disturbed as minimally as possible. The National Guard is building a new Armory on another site outside of Boston. The land and old Armory building were for sale; and meeting all of Boston University's requirements. So in keeping with the tradition for revitalizing areas while maintaining historic integrity, Boston University could not have found a more appropriate site. The university is negotiating with the state to help fund some of the project renovation costs, but are currently hitting some red tape in the process.

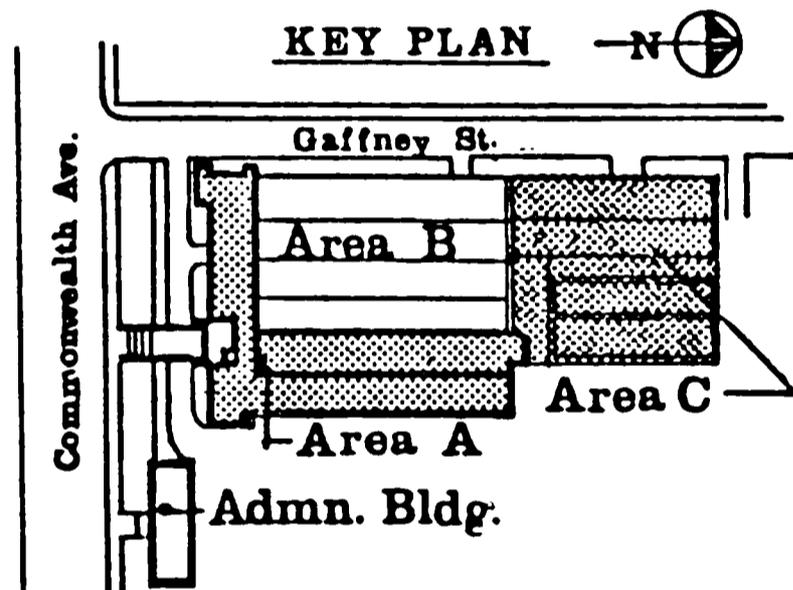


Figure: SA-2 Armory Building Location Plan
Source: Commonwealth Armory Renovation Study, p. 4

LAND DATA

The general order of soil in the infill section of Boston's Back Bay is of the soil order: spodosols. Spodosols are soils that have an accumulation of amorphous materials in subsurface horizons. The suborder of the spodosols in the area are classified as orthods - which means the common or typical soil. The orthods are generally cool moist soils, although there is traces of warm soils in the area. The cool soils have a mean annual soil temperature lower than about 47 degrees fahrenheit. The moist soil content means that the soil is usually not saturated with water, but for long periods have enough moisture for plant growth. The soil is capable of maintaining plant life such as found in the oak-hickory forests to the west and south of the site.

The foundations of the existing buildings are in good condition, except one

SITE ANALYSIS

The site is located on a land infill west of the city of Boston, Massachusetts. The area is known as the Back Bay. Boston University occupies a slice of land close to the Charles River, hence the nickname given to Boston University as the school with the "The Charles River Campus." The location of the National Guard Armory (building to be renovated for the project) is in Boston University's West Campus between 905-925 Commonwealth Avenue. The site is a 10-acre parcel, which extends north from Commonwealth Avenue to the tracks of the Boston and Albany Railroad. It contains six separate structures: The Armory; Administration building; and four garages, several of which contain shops and repair facilities. The Massachusetts Turnpike borders the site to the north, Buick Street to the East, and

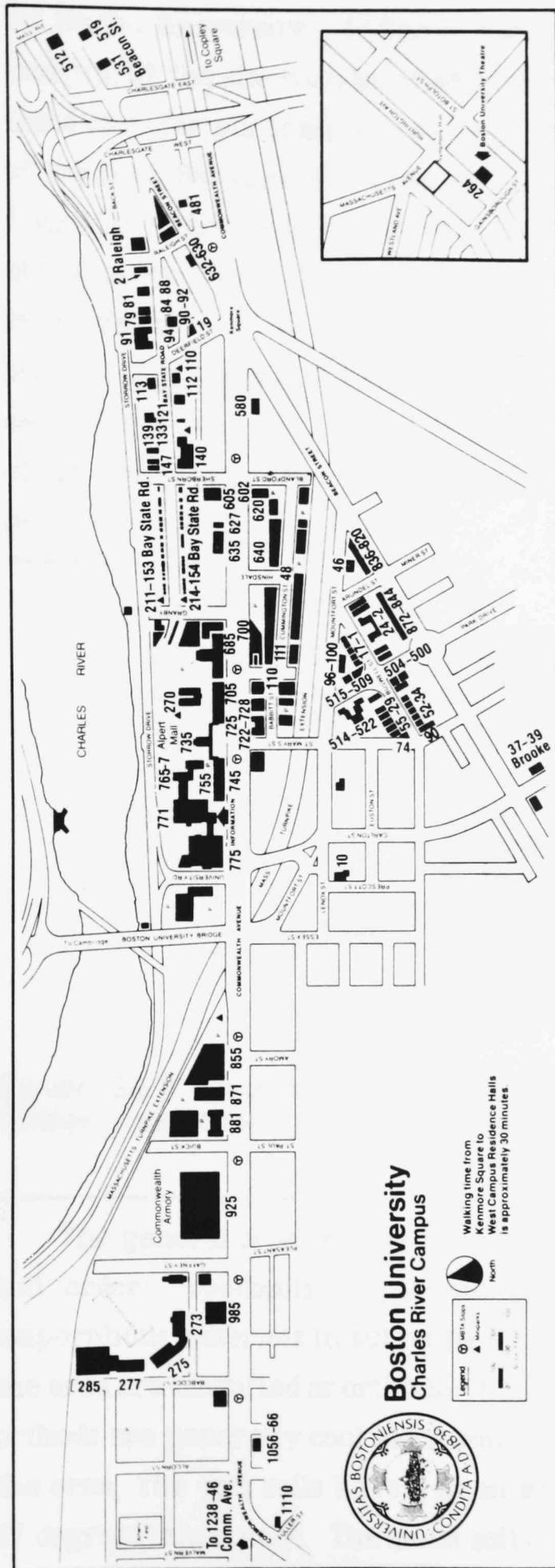


Figure: SA-1 Site Plan & Area Map

Source: Boston University
Residence Hall
Manual 1985/86

Gaffney Street to the south. (refer Figures SA-1, SA-2).

The location of the site was determined with the following criteria set by Boston University : 1) The site must be in close proximity to the university campus, 2) The site must be of adequate size to accommodate a housing complex, 3) Land costs for purchase and development of the site, 4) The historic context of the Back Bay area should be disturbed as minimally as possible. The National Guard is building a new Armory on another site outside of Boston. The land and old Armory building were for sale, and meeting all of Boston University's requirements. So in keeping with the tradition for revitalizing areas while maintaining historic integrity, Boston University could not have found a more appropriate site. The university is negotiating with the state to help fund some of the project renovation costs, but are currently hitting some red tape in the process.

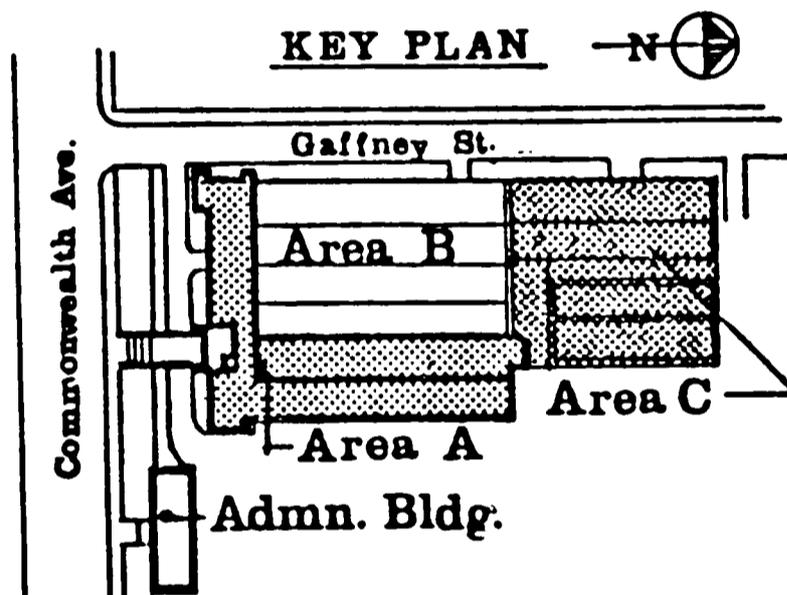


Figure: SA-2 Armory Building Location Plan
Source: Commonwealth Armory Renovation Study, p. 4

LAND DATA

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The foundations of the existing buildings are in good condition, except one

of the additions which has minor cracks in some piers; probably caused by shifting soil conditions. Any new structures to be built (including height additions) should have spot soil samples drilled to test the validity of the soil. Due to the nature of the infill soil, the armory's massive weight causes an uplifting in adjacent soil that could damage newly built structures adjacent to the armory. The effect would be similar to what the nearby John Hancock building is doing to its' neighbor - the Trinity Church. The church had some cracks forming in its structure; due to the John Hancock buildings' weight on the infill soil. This characteristic of the soil makes it necessary to spot check conditions prior to constructing new additions.

CLIMATE

The general climatic characteristics of the area include: 1) Changeableness in the weather, 2) large ranges of temperature, both daily and annual, 3) great differences between the same seasons in different years, 4) equable distribution of precipitation.

Boston lies in the "prevailing westerlies", the belt of generally eastward air movement which encircles the globe in middle latitudes. Embedded in this circulation are extensive masses of air originating in higher or lower latitudes and interacting to produce storms. Relative to most other sections of the country, a large number of such storms pass over or near Boston. The majority of air masses affecting the area belong to three types: 1) Cold, dry air pouring down from subarctic North America, 2) warm, moist air streaming up on a long overland journey from the Gulf of Mexico and subtropical waters eastward, and 3) cool, damp air moving in from the North Atlantic. Because the atmospheric flow is usually offshore, Boston is more influenced by the first two types than it is by the third. This is because the adjacent ocean constitutes an important modifying factor, but does not dominate the climate.

... The procession of contrasting air masses and the relatively frequent passage of storm centers bring about a roughly twice-weekly alternation from fair to cloudy or stormy conditions, attended by often abrupt changes in temperature, moisture, sunshine, wind direction, and speed.¹ There is no regular rhythm to this sequence, and it is interrupted by periods during which the weather patterns continue the same for several days, but not usually several weeks. The weather is more known for variety rather than monotony however. Another of Boston's weather features is its changeability over a longer time-scale. In other words, the same month or season will exhibit varying characteristics over the years, ... sometimes in close alternation, sometimes

arranged in similiar groups for successive years.² A "normal" month, season, or year is the exception rather than the rule.

The basic climate, as outlined above, obviously does not result from the predominance of any single controlling weather regime, but is rather the integrated effect of a variety of weather patterns. Hence "weather averages" in Boston usually are not sufficient for planning purposes without a further more in-depth climatological analysis. The averages are important; however, in getting an initial feel for the environmental conditions on the site.

Along the Coastal Division of Massachusetts (of which Boston is located) - elevation, slope of the land, and other environmental aspects, including urbanization has an effect on the climate conditions. The average temperature in the Coastal Division is approximately 50 degrees fahrenheit.

Summer temperatures are comfortable for the most part, in July the temperatures average from 70 to 74 degrees fahrenheit. Hot days during the summer will usually not exceed 90 degrees, and average from only 5 to 15 per year. Of course this varies from year to year. During a cool summer only a few very hot days may occur, but the figure may go up to as much as 25% during a hot summer.

Overall, the temperatures vary less in the winter months than in the summer months. The temperature average during the winter is around 30 degrees fahrenheit, and subzero temperatures occur generally only a few times per year.

The growing season for vegetation subject to injury from freezing temperatures averages from 160 to 200 days . The freeze-free season usually ends in October.

The precipitation for Boston is evenly distributed through the year. In this respect it does not have what are known as "rainy" and "dry" seasons. Storm systems are the principal year round storm producers. In the summer when this activity subsides somewhat, bands or patches of thunderstorms or showers tend to make up the difference. ... Though brief and often of small extent, the thunderstorms produce the heaviest local rainfall, sometimes causing minor washouts of roads and soils.³ The variations in monthly totals are extreme, ranging from no measurable precipitation to more than 25 inches. Such large fluctuations are rare, however, as most monthly totals fall in the range of 50 to 200 percent of normal. As prolonged droughts are infrequent, water supplies remain available during the fairly common shorter dry spells of summer. During the winter, Boston usually receives rain or wet snow. Occasionally

freezing rain occurs to coat exposed surfaces with troublesome ice.

Boston receives an annual precipitation of around 42.77 inches. Measurable amounts of precipitation fall on an average of 1 day in 3.

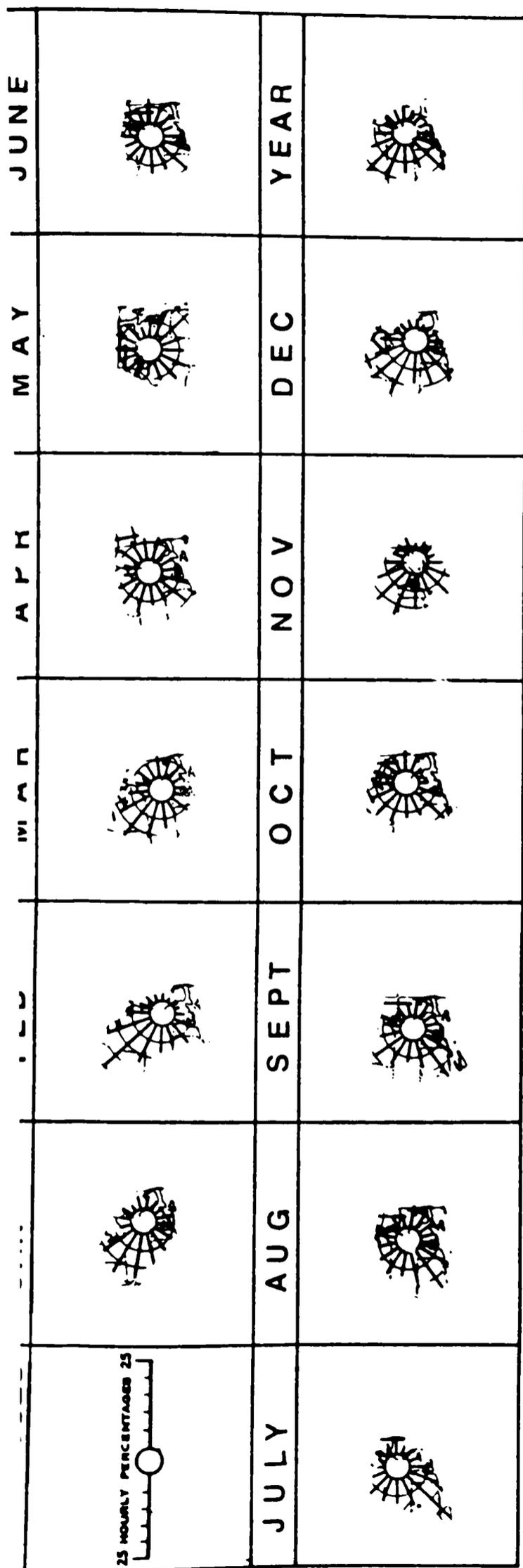
Average annual amounts of snowfall is around 30 to 35 inches. Topography has a marked effect on snowfall accumulation. The higher a location is, the more snowfall it is likely to receive. The armory is about 10 to 15 feet above sea level higher than downtown Boston. This may result in a bit larger snowfall even though the distance is not that far.

The average number of days with 1 inch or more snowfall varies from about 8 to 15. Most winters will have at least one snowstorm of 5 inches or more. These storms often tax the Boston snow removal facilities and delay public transportation. On February 16, 1958, Boston measured 19.4 inches of snowfall for a new record. The snow does not usually stay on the ground for any great period of time, due to the urban environment.

Flooding is usually not a problem with the Charles River. Possible flooding occurs in the spring due to heavy rains and melting snow, but the armory site is above the flood line nevertheless.

The percentage of possible sunshine averages from 50 to 60 percent yearly. The average number of clear days is between 90 and 120. Morning fog occurs from time to time, but is soon dissipated.

... The prevailing wind, on a yearly basis, comes from a westerly direction. It is more northwesterly in winter and southwesterly in summer. (refer to Figure: SA-3 for wind rose diagrams). Topography has a strong influence on the prevailing direction. Points in the Connecticut Valley, for example, may have prevailing north-south winds, paralleling the direction of the Valley. Along the coast in spring and summer the sea breeze is important. These onshore winds, blowing from the cool ocean, may come inland for 10 miles or so. They tend to retard the spring growth, but they are pleasantly cooling in summer. Boston is famed for its sea breeze along with its beans and cod. The easterly winds are most frequent in May. Coastal storms or "northeasters" are one of the State's most serious weather hazards. They generate very strong winds and heavy rains or snow. . . . In winter these storms produce the heaviest snow. Occasionally in summer or fall a storm of tropical origin affects Massachusetts.⁴ Such as the case with this past September's hurricane/tropical storm "Gloria", which caused damage to utility poles and the like around the area of the site. Storms of tropical origin seriously affect the area about once in two years, on the average. Two such storms in the same year



LEGEND:
 WIND ROSES SHOW PERCENTAGE
 OF TIME WIND BLES FROM THE
 16 COMPASS POINTS OR WAS CALM.

may be expected once in eight or ten years.

Thunderstorms and hailstorms have a similar frequency maximum from mid-spring to early fall. Thunderstorms occur on about 20 to 30 days a year, and the most severe are attended by hail. Hailstorms can break glass, dent automobiles, and damage other vulnerable objects. Fortunately, the size of an area struck by a hailstorm is usually small. Ice storms however, form a glaze that produces perilous conditions for transportation. These dangerous storms, however, are usually of brief duration. But a few widespread and prolonged icestorms have occurred which, besides affecting all forms of travel and transport, have broken trees and limbs, utility lines and poles. In designing tall buildings or structures it is recommended that considerations of ice load and its resultant magnification of the wind stress be calculated, because the ice increases the area exposed to the wind.

The adequate precipitation favors the growth of trees. It is recommended that trees be used to advantage to provide 1) protection from soil erosion, 2) scenic beauty.

The area is also fortunate to have ample runoff of the precipitation so that groundwater supplies are recharged. This further protects the water supply during shortages of precipitation.

Figure: SA-3 Wind Roses
 Source: Climatic Atlas of the United States, U.S. Dept. of Commerce

Endnotes

- ¹Robert E. Lautzenheiser, ESSA state climatologist, Climate Of The States.
U.S. Dept. of the Interior Geological Survey. Washington, D.C. 1970. p. 470
- ²Ibid. p. 470
- ³Ibid. p. 470
- ⁴Ibid. p. 471

ACTIVITY ANALYSIS



ACTIVITY ANALYSIS SUMMARY

There are many different activities occurring simultaneously within the housing complex that need to be described and understood. Many are activities which most people are involved with every day, yet must be understood in a different way. Each activity described within this section has a direct affect on one or more activities, and the implications for each must be understood.

One of the most often occurring activities to be found in a collegiate environment is that of study. People study at different rates, and with varying equipment. For example, some individuals will sit in an easy chair and be able to read and study, while others may find that stretching out across the floor with book in hand is more to their liking.

Much of the furniture provided in dormitory rooms is not adequate enough to meet the needs of the students. Rigidity in built in furniture is resented by most students because it does not allow the student to organize a workspace according to his/her own study needs. Desks are too small to facilitate the spreading out and collating of items. Lighting often is inadequate - not due to a lack of proper footcandles, but rather due to inadequate placement of one large luminaire rather than several smaller ones in strategic locations used for task lighting.

Since students schedules are rarely the same, it is difficult to have a room shared by two people. Sleeping and study times will often conflict. The student who is studying usually will have to find an area of proper seclusion, so as to remain undisturbed by a roommate.

The same holds true for sleeping. Quiet seclusion is hard to come by if one's roommate is banging away on a typewriter all night.

Socializing is an important activity in a students lives. Many times the dormitory room is unsuitable for socializing because furniture is restrictive, as a bed in the middle of the room conjures all sorts of social problems in intervisitation. It is also difficult to socialize in a space that should be used for seclusive activities, such as study or sleep. Again, students schedules vary widely, and social time for one individual might be study time for his/her roommate. The problem is who stays, and who goes somewhere else?

Personal hygiene and the disposal of human waste in a dormitory is accomplished through utilizing one of several different bathroom arrangements. The gang, or one large bathroom is common to most dormitories. The gang bath is usually cheaper to construct initially, but more expensive to

maintain in the long run because of the cost of janitorial maintenance. A bathroom shared by a suite of rooms is more desirable because private sundries can be left in the bathroom and students will be required to clean their own bathrooms - thus saving janitorial costs over the long run.

The large central dining facility found in most dormitories is usually undesirable because it restricts social interaction. Dining rooms of this nature can be designed however to provide intimate eating areas, and still maintain the cost efficiency of preparing food in one facility.

Snacking is an important between-meal activity for many students. Many students will eat and study, or gather in eating places to meet and talk with friends.

Recreation is many different things to different people. The provision of large lounge areas in dormitories, filled with t.v.'s, pianos, and intimate seating areas do not usually fulfill students needs and often go unused. These lounges usually cost quite a lot of the budget to construct being that they are the large, public, "show-off" areas. Smaller, more specialized lounges where students can meet in groups without feeling inhibited often work better.

Doing one's laundry is not a very popular activity to most students. It is therefore critical that the laundry process goes easily and smoothly as possible. Properly designed and *located* laundry rooms can do much to facilitate this process.

Learning should also be a part of dormitory life. The inclusion of faculty members into the dormitory is beneficial for this activity. Special areas within the dormitory for use by student and faculty having the same interests is a positive factor. By living in the dormitory environment, the faculty members can provide a much more fulfilling experience to students and themselves by touching base with the students in an informal environment. This usually works better with graduate students, and thus students wishing to participate in activities such as this one require different living accommodations. Self-sufficiency, (as with the additions of kitchens and house libraries) more seclusive living environments (as an apartment with a private bath provides) all work to better this type of environment.

Circulation must not be overlooked as an important activity for it serves as the means for a building to function properly. Vehicular parking is an activity that falls in directly with circulation. Vehicular circulation must be designed to work functionally with the building, and not added on as an after-thought, or problems with automobile circulation flow may occur.

ACTIVITY ANALYSIS

STUDY

As far as most students are concerned the major activity in their lives during the semester is studying. ... Individual study is accomplished within an amazing spectrum of activities. It takes place while standing, walking, sitting, lying, singing, whistling, eating, drinking - alone or with another person. Few participate in group studying.

People study at different rates. Some subject themselves to long periods of monklike concentration; others apply themselves for relatively short periods interspersed with intervals of social or recreational activity. The individual prefers to study in his own room and, for intense study, by himself. For this type of study, the roommate must be elsewhere.

The desk apparently is used for reading only in cases requiring extensive note-taking or use of several reference sources. Otherwise, it is a repository for study and personal equipment including typewriters, calculators, drafting equipment, radios, and phonographs. Yet it does not have the height accommodations or acoustical padding needed to use these materials quietly or effectively. Its length is inadequate for any use - the 42 in. standard desk is overtaxed with books and writing material [as well as] personal paraphernalia. The space requirements for multiple references, collation of materials, or large belongings create overflow onto bed or floor. Consequently, work is often done on the floor of the room, particularly if it is carpeted, and on the bed.¹

The students attending Bennington College in Vermont (refer case studies) showed similar forms of behavior in their preference of study areas. The quality of space for a study area appears to be secluded, quiet, and comfortable. Comfort means any number of different conditions however.

... Sometimes an apparent student idiosyncrasy has a real functional basis. Many students were observed typing on the floor when an adequate table was available. The students then demonstrated the drumlike sound of the unmuffled typewriter which conflicted with their roommates sleeping. Students often used the corridors and bathrooms as study spaces when typing and study rooms were missing or occupied and roommates were sleeping.²

It appears that seclusion has a high priority in the function of student studying, at least for some students; others appear to be able to study with distractions such as the sounds of stereos playing and people talking around them.

... Bookshelves are generally inadequate in size and length. Moreover, the

shelves are usually in places of difficult access and are poorly illuminated. There is a need for more shelves, preferably adjustable and flexible as to placement.

Built-in furnishings are resented because their rigidity impedes both individual living and study habits. Students are forced to supplement the university furnishings with such things as orange crates to create an individual study environment. The results may appear cluttered to some, but they accommodate the occupant. Clearly then, a book, pen, reading light, straight back chair, and a 42-in.-long desk constitute less than the optimum answer to the study problem.³

In the Pembroke dormitory case study, the intent for student furnishings was one of flexibility. The furniture was finished on both front and back sides so that the pieces could be turned around and used as dividers or barriers. Flexibility without rigidity is the key. A student's room must be able to reflect a personality, no matter how austere or extravagant. Many Bennington students expressed these same concerns in the postoccupancy evaluation. They complained about living in little white boxes, with no way to individualize them. Those few who had odd shaped rooms (known as "boat rooms" because the shape resembled the prow of a ship) were deemed as lucky, because their rooms were not little boxes. As a studying atmosphere, the arrangement of a space may not matter; however, studying, sleeping, and socializing should not take place in the same space because the student will feel cramped. The unused living room of the Bennington Dormitory provided an escape for studying for some, meditation and relaxation for others. At Yale's dormitories and at the East Campus Complex of Columbia, there are arrangements of rooms set up in suites that provide for various activities. At Brown University students could separate areas of sleep and study with movable furniture. The key is that in all of these cases, it has been shown that different spaces (not necessarily rooms) are needed for different activities.

... The telephone is a most important tool to the student. Its use is restricted only by the university's ability to provide an individual instrument and the student's ability to pay the toll. The telephone is finding increased use - both as a study and social aid.

The tremendous and continuing advances of the electronics industry are only beginning to be noted in the educational sector. Although the student of today is required to attend unilateral communication lectures in large halls, the student of tomorrow may view the lecture on TV in his room, coming out for

seminars or laboratory sessions. Future student housing must accommodate this

The students of all campuses could simultaneously be able to receive the lecture of one outstanding professor or professional team. Much of this communication will be at the discretion of the student. It is but one indication of the growing importance of the student room as a study aid. Only the provision of conduit access is needed to expand the horizons of the student room beyond imagination.⁴

... The student's pattern of activity is rarely consistent; he may sleep at any time of the day or night. Two occupants of a room very rarely follow the same schedule. Exams and social activities modify their patterns even more extensively. It is the varying patterns that present conflicts in multiple-occupancy rooms. Interesting improvisations - hanging blankets, relocated wardrobes and beds, and stacked dressers - were observed in situations where one student wished to study while the other slept. Perhaps beds with suitable acoustical light-separation screens could be one answer; single-occupancy rooms would be better.⁵

SLEEPING

... Present provisions for sleeping range from the studio bed in single rooms to bunkable beds in multi-occupancy rooms. Beds acquired a decade ago are increasingly limiting to the succeeding generations of taller students. Reading is more often done in the comparatively relaxed attitude of the bed or easy chair. However, the bed is seldom designed to provide the slight slope for proper sitting; some adjustment therefore is necessary. Beds could be made to resemble couches and have a mechanism allowing a shift from sloping for sitting to level for sleeping position.⁶

As with studying sleeping requires seclusion and quiet. The ways of achieving quiet seclusion varies. Two or more students sharing a room might not be bad - if all shared the same sleeping hours. As stated previously, student schedules vary quite considerably. Most of the case studies represented have a considerable number of single rooms - some attached to common living spaces in a suite arrangement.

Due to the information presented from the case studies and from outside sources, a conclusion can be drawn indicating that secluded student sleeping spaces work the best in providing privacy, and limited disturbances for sleeping and studying.

SOCIALIZING

... The student's room has also attracted social discourse. With more liberal

rules, the student's room becomes more of a social center for both sexes. The student room, however, with its split emphasis of study-sleep, presents difficulties as a social environment. The bed is the chief offender. The bed as a bed conjures all sorts of social problems in intervisitation. A bed with cushions or pillows tossed about is not acceptable because of the difficulty of sitting upright comfortably. Its conversion to a sofa, with its contributions as a living room furnishing, is most desirable - not to mention its more comfortable use for multiple seating.

Clothes and storage of personal possessions are also a bedroom symbol. Closets look like closets; dressers look like dressers. Contemporary furniture designers, however, have provided storage units for studio-apartment [which are] quite acceptable as living room pieces. Such pieces have yet to make their appearance in student rooms. It should be possible to have either intimate conversations or sessions with a number of additional individuals within one's own private room. The bed, hard and soft chairs, and even a desk top may be brought into use as sitting surfaces to accommodate a congenial group. The space should be such that furniture can be quickly arranged to make group conversation easy.⁷

DRESSING

... The concentration of clothes storage in the student room not only precludes its use as a social environment but also restricts its use for dressing. One study discloses that the normal 4-ft closet and five-drawer dresser just satisfies the male student, and it provides only half the female student's storage requirements. Both sexes require differing volumes and types of storage. Smaller combination-storage units might well accommodate student preference and allow flexibility of room arrangement.⁸

BATHING

... The gang bath is one of the most persistent features of residence halls. It has been defended on the basis of economy and its contribution to socialization.

Certainly, the initial construction cost of one central gang bath is less than that of smaller installations in several locations. It is also evident that when a bathroom serves more than a few student's, maintenance becomes nobody's business but the university's; the student does not realize that he is paying extra for the university's maintenance of the gang bathroom. The initial extra expense for smaller baths will actually result in long-term cost savings if the students themselves maintain the smaller bathroom, because it eliminates the need for maid service throughout the life of the building.⁹

The case studies are divided in how the bathrooms are layed out. In the Yale University dormitories the bathrooms were placed in private hallways attached to a suite of rooms rather than in a public hallway. This was done to maintain security of sundries left in the bathroom(s) and to let the students clean their own bathroom(s). The Bennington dormitories used a gang bath located in a public hallway, although the arrangement was such that only a small amount of people would share the facility. The bathrooms were cleaned by maintenance people however. Similarly, the dorms at Northwestern used gang baths cleaned by maintenance personel. Both Brown University and Columbia University have bathrooms located within suite arrangements where the students maintain their own bathrooms.

... Another economic factor against the gang bath is its inflexibility. Residence halls with gang baths are far less appropriate for participants in conventions, reunions, and institutes where families or both sexes are involved than are areas with smaller baths serving a few persons.¹⁰ The following Table examines the space relationships for bathrooms utilized in the different case studies:

Case Study	# of people using facility	MEN			total sq ft	WOMEN		
		# of sinks	# of stalls	#of urinals		# of sinks	# of stalls	total sq ft
Yale Univ.	5 - 6	2	1	0	40-50	2	1	40-50
Bennington	5	2	2	0	55	2	2	55
Northwestern	9	4	2	1	65	4	2	65
"cottage dorm"	8	4	3	0	120	4	3	120
Brown Univ.	5	3	2	0	100	3	2	100
Columbia U.	2-4	2	1	0	40-50	2	1	40-50

Table: AA-1 Bathroom Space Requirements
Source: Information Taken From The Case Studies

Comparing the case study information provided in table AA-1, an interesting fact becomes readily apparent. In most cases the bathroom facilities, even if they were in a gang bath arrangement, were designed analogously without urinals. This would permit entire suites of rooms, wings, or

even floors of these dorms to be utilized for either male or female occupancy whenever reorganization is required. Clement Hall of Texas Tech University was modified to house male residents in one wing (the dormitory originally housed all females) by adding urinals to the bathrooms. This is awkward during freshman orientation sessions when families are housed in the dormitory in both wings. Women will occupy one floor and men another floor. Personal experience has led me to understand the shock of a mother who has gone into the bathroom, spotted the urinals and wondered if she was in the correct place.

Bathrooms shared by a low number of individuals (five or less) that are cleaned by the individuals are the most effective as concluded by the data presented here. All bathrooms should be designed unisexly, both for men and women, so a more flexible means of living arrangements can occur. In this manner, while suites are either male or female, coed living need not be separated to separate wings or even floors of a housing complex, but only to separate suites. While this arrangement leads to a higher initial building cost, time analysis has shown a lower long-term cost by eliminating a major portion of maintenance services.

DINING

... There is universal agreement that the single, large rooms for hundreds of students is not the satisfactory solution to the problem of student dining facilities. Although the large kitchen with its extensive equipment, service line arrangements, and building area is the most economical and efficient method of food preparation, the one large dining room for all students negates a congenial atmosphere for social interaction during mealtime.

Dining facilities that combine the best advantage of the large kitchen - efficiency, economy, and flexibility - while at the same time providing a pleasant and social dining environment can be built. Proper planning permits large central areas to be divided by movable walls into smaller or intimate dining rooms. The walls can be moved when a large scale is needed for social events such as dances, etc.

Food preparation in student rooms presents a safety and sanitary problem, but the need for between-meal snacks can be solved independently of the central dining room. Students can be accommodated by automatic vending machines located at strategic points in the residence hall or by provision of facilities in which they can prepare snacks themselves. Student food preparation problems cannot be solved by unenforceable prohibitions but only by construction of appropriate areas with automatic cooking devices and

inhabitants of the building, and 3) as a meeting/lounge area.

RECREATION AND SOCIAL ACTIVITY

... Assimilation into the student society is the foremost concern of most new students. Recreational spaces and facilities are important in providing environmental support to the personal interaction of students, both new and old, since academic assimilation and involvement are not restricted to the classroom or student room. However, care must be taken in the areas programmed for recreation so that they truly accommodate the intended activities. Otherwise, the spaces will fail to accomplish the intended purposes. Evaluation of the success of social spaces in meeting their intended needs indicates that a variety of smaller spaces are likely to be the most popular and useful.

Student complaints are universal concerning the typical residence hall's main lounge. It has been relatively unpopular with students because of its large size and lack of individualized space. The tendency is for this space to become monopolized by one small group, or even one couple, making other individuals or groups hesitant to intrude. A recent study shows that 32 percent of student residents use the lounges less than once a week and that 36 percent of them use the lounge only one to three times a week. The lounge fails because it cannot simultaneously accommodate incompatible activities. The piano, TV set, and sofa are not appropriate companions. The main lounge, furnished with expensive, hotel-like furnishings, is usually designed, and is mainly suited, for large, quiet groups. It is seldom used by the students for entertaining friends.

The suite living room can accommodate both quiet and active uses, although conflict occurs when the space attempts to serve socializing and study¹²

This is the case in the Bennington dormitories. As noted the space is not used much by groups of students large enough to justify such a large space. It is successful in the role of another type of space (whether for relaxing or studying, as noted previously) for the students to go to get a change in atmosphere from their room.

... Small "date" rooms, as observed on some campuses, are popular when not overly supervised. However, date rooms seem to be an artificial solution to a problem better solved by a wider range of social rooms.

Television rooms are losing their effectiveness as social centers because the diminishing cost of television sets makes it possible for students to have individual sets in floor lounges or in their rooms.

Spaces allowing vigorous activity are important to all students, especially

controlled food storage facilities.¹¹

The case studies show, again, various ways of dealing with food preparation and dining. The dormitories of Yale, Bennington and Northwestern do not have dining facilities or kitchens for suites. (Although Northwestern does have small kitchens located near seminar rooms on the first floor of each dormitory. These kitchens are used as food preparation areas for conferences, etc.) It is assumed that the students in these dormitories eat in a large central dining facility in another building on a meal plan. Brown University has kitchens arranged within suites. Each kitchen is utilized by approximately 8 - 10 persons. Columbia University also has kitchens shared within the suites. The kitchens are used by the six persons sharing the suite. Boston University uses a meal plan method for some of its' high-rise dormitories on Commonwealth Avenue and for some of the brownstown dormitories on Bay State Road. Students who live in these dormitories can eat in any one of fourteen dining locations on the Boston University Campus if they are on the Budget Plus Cash Account. (A meal plan). Other brownstown dormitories have kitchens on some of the floors to be used by students living on those floors only, or in some cases, a suite of rooms on one floor will have a kitchen, while residents in separate rooms on the floor will buy a meal plan.

In apartment situations (such as the walk up residential suites of Columbia's East Campus Complex) the kitchens work quite well as an integral part of the suite concept. This is especially true for married and graduate students, traditionally wanting more privacy. A lot of students; however, enjoy not having to cook (or having to learn how to cook!) or clean-up for themselves. This is why meal plans provided by the university are also popular. (As well as cheaper a lot of times). Both methods appear to work out satisfactorily and it would be well advisable to give the students a choice as to the way they would rather live; therefore both methods should be utilized.

SNACKING

An area should be provided for the purchasing of snack foods. As previously mentioned, a separate eating facility besides the main dining room is needed. This will be more convenient to the student who does not wish to run to the store to buy some snacks to eat while studying or relaxing. Another important consideration of the snack area is that it can serve as a small lounge for students to meet, talk or study in. In this way the snack area provides a triple purpose: 1) To provide income for the dormitory, 2) as a convenience for the

inhabitants of the building, and 3) as a meeting/lounge area.

RECREATION AND SOCIAL ACTIVITY

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Television rooms are losing their effectiveness as social centers because the diminishing cost of television sets makes it possible for students to have individual sets in floor lounges or in their rooms.

Spaces allowing vigorous activity are important to all students, especially

men. At present, such activities (if provided for) are usually located in drab, ill-equipped basements. In those residence halls where suitable spaces are accessible to food sources and open occasionally to both sexes, they are very popular and used continuously.

The comparison of expenses for furnishings between main lounges and recreation spaces shows the latter to be less expensive. Since main lounges are infrequently used, money spent on them is largely wasted. To provide more useful variety than is now available, the question of area allocation to main lounge - recreational spaces should be carefully considered.

One way to provide close at hand recreational space is to equip the rooftops of residence halls for recreational activities. Problems arise in regard to construction, cost, controlling vents, and flues; nevertheless, rooftops are a desirable location for many activities.¹³ Activities such as tennis, jogging, and perhaps even sunbathing can be accommodated on the roof. Due to Boston's climate during the school term, and the existence of a roof not able to support such activities, the choice of the Armory roof-top is undesirable for these activities. Rigorous activities can be accommodated; however, one street away at the Nickerson field complex. (refer to Boston University site plan in the BACKGROUND).

Columbia University's East Campus Complex has reserved a space for student activities in the basement above a parking garage. Brown University's Pembroke Dormitory, like Bennington's Dormitories, has a main lounge that is rarely used. Instead, the students make use of the small alcoves near their rooms. It appears that smaller spaces are better for socializing. While students often get to know their neighbors, because of the community or neighborhood effect of the smaller spaces located near their rooms, getting the "larger picture" as one Brown University student put it - is harder.

Yale University dormitories (which utilize the suite of rooms concept) has individual, and double occupancy bedrooms sharing a common living area, which is a good catch-all space for various activities previously mentioned. Where the suites connect, there are small alcove spaces (similar in concept to the alcoves in Brown University's Pembroke dormitory) in which students can gather and socialize. The recommendation, then, is to keep lounging spaces small, and with no institutionalized furnishings; the students are then free to form whatever type of atmosphere comes naturally to them. This doesn't mean that furnishings will be set up, or that posters will cover the walls. The alcove spaces are usually just areas for "shooting the bull" which is an important part

of dormitory life.

... Another important form of recreation, but seldom provided for, is student hobbies. The mess and equipment involved in many hobbies suggest that perhaps older utility buildings on campus could provide spaces for these activities. It is more difficult to foresee the needs of hobbyists and expensive to introduce into residence halls the sufficient acoustically isolated spaces for them.¹⁴

CULTURAL

Residence halls can participate in the overall academic environment of the university with the inclusion of facilities for library, music, and discussion. It is part of the job of housing to smooth the transition from green freshmen to sophisticated seniors. At Harvard University, house libraries relieve some pressure on central facilities, creating a sense of academic community as well as making books more readily available. Inexpensive paperback libraries are quite adequate for providing both stimulating and enjoyable reading materials within a residential atmosphere. Eventually these libraries will include random-access listening stations; it is therefore advisable to initially provide adequate distribution access into the structure.

Music rooms can also serve as tape and record libraries, although the centrally located equipment will be used less frequently as more students can afford their own equipment. All music involves a noise factor which must be considered.

Formal academic classes in residence halls present difficulties in mechanical services and density beyond the capability of most residence hall structures, but informal classes and seminars can be successfully held in the social spaces in the hall.¹⁵

The three new dormitories of Northwestern University boast spaces designed to be used for specialized activities. While actual classes are not held in these spaces, they are used for informal lectures and conferences. Each dormitory has a catchment population consisting of students with alike majors and or interests; for example engineering students have access to computer rooms. These types of spaces that are used by the community of the dormitory can be quite successful in relieving pressure on university facilities as with the case of the Harvard house libraries.

LAUNDRY

... Laundering includes a host of tasks - collecting and sorting dirty clothes, pretreating, washing, drying, sprinkling and ironing - all of which are tiring, for they require a great deal of stooping, lifting, and carrying. To reduce the

amount of effort required, a laundry center (either separate or combined with another area) should be carefully planned. Laundry is done at all times of the day and night with large amounts of laundry being washed on the weekends (Sunday especially). Some basic planning considerations are as follows:¹⁶

Arrangement

... The sequence of laundering operations should determine the planning of space and facilities and the placing of equipment.¹⁷

Traffic Lanes

With automatic equipment at their disposal, students may not wash clothes but once every one or two weeks. Although, all students do not wash clothes at the same time (although the weekend is a peak period as mentioned), note that laundering is a space consuming activity that should be free of congestion regardless of the amount of individuals washing clothes in the same period. Making clothes washing easier is a matter more than just what type of equipment is used. A proper flow of work will ease congestion, and should expediate the laundering process on peak usage days.

Flow of Work

... Convenience and efficiency are achieved by placing the equipment in their natural order of use: (1) Sorting and pretreating table or counter, (2) Washing machine(s), (3) Laundry tray, (for pretreating, and starching) (4) Dryer(s), (5) Ironing board(s), and (6) Standing or hanging bar and counter for ironed items.¹⁸ The activities do not necessarily require individual tables for both sorting and folding, a centralized counter for both will save space and initial costs.

Related Activities

The laundering of clothes can coincide with additional activities. Taking cues from residential living - within a laundry room (as in a private residence), or in a laundry facility (laundromat, or laundry room in an apartment complex), there is often space for small children to play; so that they can be watched by the parent while washing clothes. On the college level, a laundry facility should provide an area for those who wish to study, or read a book while washing their clothes. Many students can be observed sitting on top of sorting

tables, or washing machines while studying or reading. Providing an area for seating is only a partial requirement. Reading requires proper lighting levels, and studying may require a writing surface such as a counter, table or desk(s).

Utilisation

The optimum amount of people for a laundry facility to utilize depends on the following factors: Is the entire housing complex going to use a single laundry facility? This would mean a usage by around 550 persons; the minimum number of students the complex is being designed for; see BACKGROUND. This is assuming all did their laundry in the complex; and at the same time. There can be a laundry facility to be used by each separate floor, or by a certain number of rooms in a wing. The amount of equipment is another factor; according to Architectural Graphic Standards 7th Edition, p. 543, three washing machines and three dryers (coin-operated residential capacity) will service a 20-unit apartment complex. Assuming two people per apartment, that would make each washing machine used by 13.333 or 14 persons.

Washing clothes in a large apartment complex, and especially in coed dormitories tends to function as ... social gathering areas and should be designed to accommodate this function.¹⁹

LAUNDRIES FOR THE HANDICAPPED: ... For the chairborne (individual), having laundry facilities close to (their living quarters) is a practical way of coordinating several time consuming activities with a minimum of movement from place to place.²⁰

According to Architectural Graphic Standards 7th Edition, p. 14, a front loading automatic washer and dryer with controls up front and within reach are recommended for use by people restricted to wheelchairs. Ironing boards should be set at a comfortable seating level of 29 inches.

MAIL

This activity is providing mail service such as the picking up and sending of mail, the purchase of postage stamps, envelopes, boxes, mailer packets and other items consistent with and related to the postal process.

Students living within the confines of the dormitory will have the means of sending and receiving mail and purchasing mailing supplies from within the building. There will be one administrative person to handle the task of selling supplies. The selling of supplies is not a job that will require much, so the job can be delegated as an additional duty to an employee with other responsibilities.

Boston University presently has six locations providing mail services at various points around the campus (refer to BACKGROUND). During the time of the day when mail is delivered to the complex by the post office there may need to be additional personnel available to help sort the mail. This will require the postage facility to be located adjacent to an administrative area.

By having mail service within the building, the student will not have to travel to a separate facility to send or receive mail - a valuable time-saver, especially considering Boston's cold, rainy climate.

People should be able to pick up and mail letters at any time of the day or night, but access should only be to the mailing and retrieval areas. The supplies and bulk mail receiving area(s) will operate between 9a.m. - 5p.m. EST and should be secured from the public the remainder of the time. The amount of people that will be partaking in this activity depends on peak periods. Peak periods usually occur when the mail from the post office is known to arrive, and there are many people checking if they have received any mail or not.

To provide a smooth flow of people during these times (and to provide security for ones' mail) it will be necessary for each room address to have an individual mail box with a form of locking device on it to prevent unauthorized opening. The mail boxes can be lined up in any number of ways, but the following factors should be considered: 1) It is necessary to provide easy access to the mailboxes for the individual(s) who sort the mail. The mailboxes should be located within a common wall; open at the back with the proper identification (a room number, or current occupant(s) name(s) for example) affixed onto the boxes to facilitate the placement of mail in the correct location; this will enable the mail to be sorted in one area. 2) There must be plenty of room around the mail boxes to accommodate people entering and leaving the area. 3) The mailboxes should not be placed above the comfortable reach of height for the 2.5 percentile woman, which is 59 inches. Reach was determined by using the high forward reach diagram for objects placed on the back of a high shelf, Architectural Graphic Standards 7th Ed., p. 4. This will enable anyone to reach their mailbox no matter where it is located. Persons restricted to a wheelchair will have mailboxes assigned that are within reach from a sitting position, which according to Architectural Graphic Standards 7th Ed., p. 8, can be no higher than 18.5 inches for a comfortable reach (without extending shoulder, rotating trunk and bending trunk). This is for the 2.5 percentile height for adult woman in wheelchairs. Also to be taken in consideration is the approach of the person in a wheelchair. There must be a minimum turnaround clearance

height spaces taking up two floors. There are approximately 20 such rooms in the complex. Therefore, based on the case studies and the size of Boston University, it is recommended that between 15 to 20 separate (those not traveling with each other) guests be able to be provided for, or 30 to 40 guests who are traveling together should be accommodated.

The guest will have to register or be registered in advance of arrival. Visiting faculty lecturers would be given priority over visiting students, and would actually have been registered by someone at the university in advance. While this venture is not meant to be profit making, the cost of one of the rooms should be substantial enough so as to pay for its initial cost over the long run, and its continuing maintenance. After the guest leaves the room, the room must be cleaned-up. This activity will have to be provided by maintenance staff who clean the rest of the public spaces of the facility.

As guests will have their own keys, access to the rooms will be twenty-four hours a day; however, reservations for the rooms will only be available during normal operating hours. The duration of time that a visitor stays will vary of course, but should be kept to two days or less. This should enable less of these rooms to be constructed, less to maintain, and should still provide for a constant flow of visitors to the university.

This activity should take place in proximity to public space, but should also be located to provide an appropriate level of privacy and sound control. Such a location will separate the activity from full-time residents of the facility.

The space should be able to maintain a relaxing atmosphere, as a hotel room would. There should be provisions for natural light to enter the room to give it an open and clean atmosphere; rather than a cube in which to spend time in. And while it is probably true that people do not spend much time during the day in guest rooms, natural light and possibly pleasant views to the outside will make for a more pleasing atmosphere, reflecting favorably for the university.

HOUSE LIBRARIES The house libraries are an important part of a residential college system. They provide in essence, miniature libraries or reference facilities for students living on the premises. They help take some of the pressure of central university facilities. When the main library closes down these house libraries provide a place to work, research and study in an environment conducive to such activities.

There may be more than one such library within the facility depending upon the number of different types of specialties. For instance, there may be

one for law students on one wing or floor, and another for graduate business majors somewhere else in the facility.

The library would be locked for security reasons, and each affiliate "member" (student) who has authorization to the space would have a key to be able to enter. Members should have access to the space at any time of the day or nite.

The library should be located in an area central to the living quarters of the students and faculty using it.

FACULTY HOUSING AND OFFICES

The purpose of the housing complex is to provide upper level and graduate students with a living and learning environment. The addition of some faculty members living in the facility will provide more of a chance for interaction and learning for both the students and faculty. The faculty member would also be able to take charge of the house libraries.

Obviously these are not the living arrangements preferred by all faculty. They are not meant to be. They are intended for those (either single or married) who have special reasons for living in the facility; such as doing full or part-time research requiring the aid of graduate students. This situation would allow more productivity to take place.

The live-in faculty must be provided with apartment-like accommodations for the process of living in the facility. The accommodations would include sleeping, food preparation, dining, and appropriate working and socializing environments.

The faculty member(s) should live where they are accessible by the students, but not in the mainstream of student living. The living quarters should be located near the appropriate house library.

The quality of the space should be that of a comfortable living environment. There should be flexibility in the way spaces are set up and arranged. The faculty member should get maximum natural lighting with operable windows located to provide cross ventilation, and views to the outside. Acoustical privacy should also be of a high degree. These accommodations should add up to provide a year-round comfortably-livable atmosphere.

While Northwestern University does not house the faculty a provision for faculty office spaces is made on the public level of some of their new dorms. None of the dormitories analyzed for the case studies have live-in faculty. To

take advantage of the available space within the Armory, it is possible that two separate disciplines can be accommodated - that is two house libraries for two separate specialties. Provisions for two faculty members of professor status should be designed for. This does not mean that teaching assistants, or other faculty members cannot live in the facility. It is recommended that upper level undergraduates be housed in suites, while graduate students and the like be housed in small apartments, the same concept as the individual living suites of the Columbia Complex.

ADMINISTRATIVE The complex will require professional people to insure the health, safety, and welfare of the inhabitants. The activities performed by the professional, or administrative people include: keeping track of the logistics and supplies for the facility, maintaining records on the inhabitants of the facility, controlling various activities within the facility such as food preparation, mail service, and organization of maintenance crews. A series of spaces must be available for the administration of the tasks required.

The spaces will be provided for the employees hired by Boston University to control such administrative duties as previously stated. Three of the dormitories presented in the case studies have space for administrative personnel. It appears that only the larger dormitories need such facilities. As the dormitory complex gets larger, the administrative department gets only fractionally larger (maintenance crews excepted as they are not administrative and do not require an individual space to work in). Columbia University's East Campus Complex has a larger than normal administrative staff; however, this is due to the fact that the dormitory houses the 20-odd guest rooms and Heyman Center for the Humanities.

The administrative areas should be available for access by the public during normal operational hours. The spaces should be in proximity to the operations that they are in charge of, the dining and mail facilities for example. During the hours that administration personnel are not at work, (at night for all the personnel and weekends for some of the employees) the spaces should be able to be secured from the public. In analyzing the case studies and the scope of this project, it is recommended that between 10 to 15 administrative personnel be provided for.

Since administrative tasks require frequent reading and writing, the activity should have adequate natural daylight with views outside of the space they are working in to relieve eye strain. This activity should be made

comfortable by the surrounding environment so that long periods of time may be spent doing the activity. ... Permanent staff members should have individual work areas which afford them a reasonable degree of privacy.²

PARKING AND CIRCULATION

Parking space in Boston are rare. The same holds true for Boston University. Students are discouraged by the housing department from bringing cars on campus because of this fact. The parking spaces that are available go for a very high rate of rental. Nevertheless with the development of the new housing complex from the Commonwealth Armory, an opportunity is provided to increase the amount of parking on campus to ease this tension somewhat

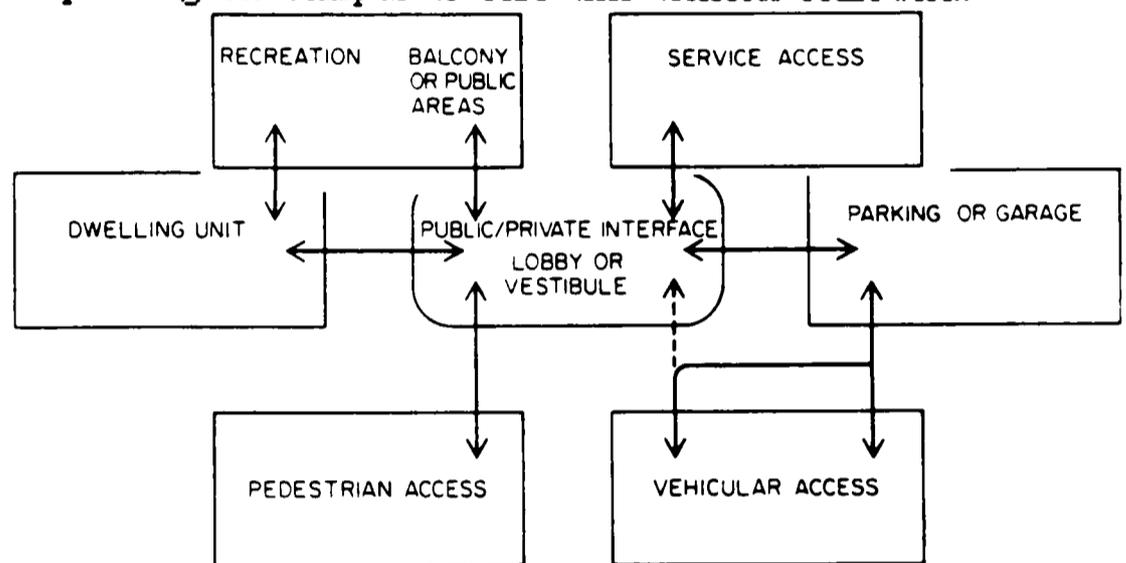


Figure: AA-2 Planning Element Diagram
 Source: TIME-SAVER STANDARDS FOR BUILDING TYPES, p. 72

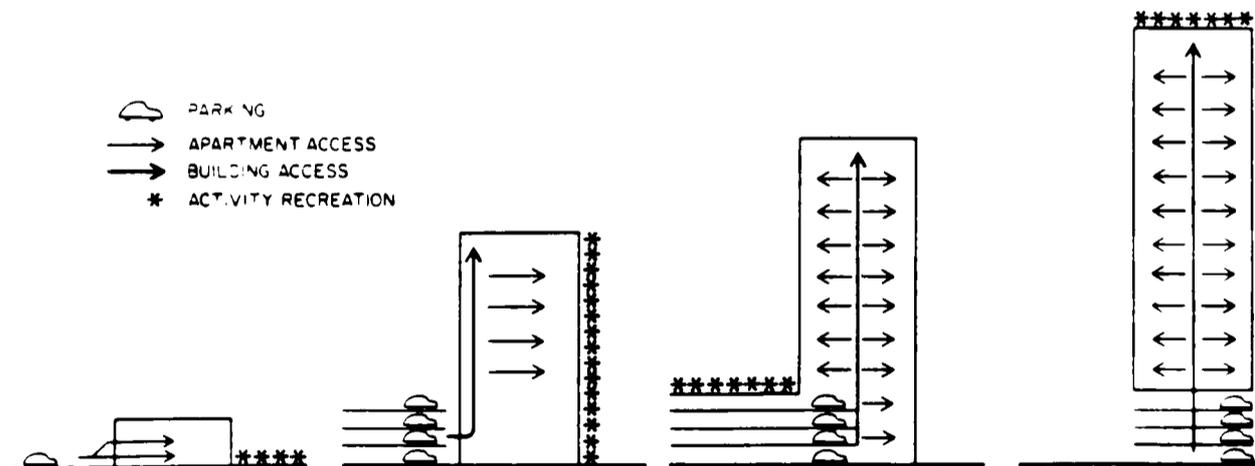


Figure: AA-3 Vertical Circulation Relationships
 Source: TIME-SAVER STANDARDS FOR BUILDING TYPES, p. 73

while providing additional income for the university

The parking must be developed as an integral part of the whole project. decisions should be made at the beginning as to how much parking activity can be accounted for.

Along with the relationship of parking to the whole facility, the relationship of parking *and* vertical circulation to the whole facility should be analyzed from the start. Circulation is not merely left over space in a design used for getting from one space to the other, but is actually a vital *activity* that forms the backbone of how well an entire building functions in terms of access and ease of understanding the layout of a large facility.

ENDNOTES

¹ Joseph De Chiara and John Hancock Callender, Time-Saver Standards For Building Types. McGraw-Hill. New York. 1980. p 243

²Ibid. p. 243

³Ibid. p. 243

⁴Ibid. p. 246

⁵Ibid. p. 246

⁶Ibid. p. 246

⁷Ibid. p. 246

⁸Ibid. p. 246

⁹Ibid. p. 251

¹⁰Ibid. p. 251

¹¹Ibid. p. 251

¹²Ibid. p. 248

¹³Ibid. p. 251

¹⁴Ibid. p. 251

¹⁵Ibid. p. 252

¹⁶Ibid. P. 41

¹⁷Ibid. p. 41

¹⁸Ibid. p. 41

¹⁹Arthur J. Pettorino, R.E. Powe, Jr., and Hugh N. Jacobsen, "Laundry Data" Architectural Graphic Standards. John Wiley & Sons, New York. 1981. p. 14

²⁰Ibid. p. 14

²¹DE Chiara and Callender, p. 1267

SUMMARY

Each of the activities requires a specific space to accommodate that activity. The spaces have important characteristics such as quality, quantity, and relationships to other spaces and to the exterior.

The quality of the spaces vary, and are described based on the background, case studies, and activity analysis.

The quantity of the space may be derived from the amount of people that are involved in an activity, and the amount of space that each person needs. Standard text references are also given as suggestions or recommendations as to the quantity of a space. Further, the case studies also give some idea to what has been done before. These are all considered to decide upon a specific quantity of space.

The relationships are then stated, based on the case studies and activity analysis, as to how spaces relate to spaces and how spaces relate to the exterior.

SPACE SUMMARY

The housing facility should accommodate a minimum of 550 students, as per Boston University requirements. There should be accommodations for 367 upper-level undergraduate students and 183 graduate students/faculty. Other accommodations will be for transient guests - refer Activity Analysis.

The following contains information pertinent to the design of the following spaces:

- student bedrooms
- guest rooms
- faculty bedrooms
- faculty/graduate student study or workrooms

Dimensions of student rooms. Student rooms are often the location for study, sleeping, dressing, and socializing. The size required for the single bedroom to accommodate all of these activities would have to be too large in terms of efficiency. The student; however, is reputed to spend much of his/her time in the room participating in the previously mentioned activities. Some of the activities then, must take place outside of the room to keep the room size to a minimum. It is recommended that a bedroom accommodate only one student, with adequate space for sleeping, studying, and occasional socializing; however, discretion must be used in determining the correct size of a student room. Through the analysis of case studies and text references, it has been determined that single bedrooms are the best choice for students. The rooms should share common spaces such as bathrooms, living rooms, and possibly kitchens. Single bedrooms for students will provide each student with privacy for studying - and for sleeping. Acoustical privacy is difficult to maintain, the placement of the single bedrooms away from potential noise sources being a major consideration; however, it is extremely difficult to second guess where noise will emanate from.

... Rooms of minimum size cause many complaints from students; this was reflected in both the URBS and another recent study. The situation has changed a great deal in the past 25 years. Stern Hall at Berkeley was built in 1940 and allowed 480 gross sq ft per student with 250 sq ft in the student room. Present rooms of 85-95 sq ft per student create serious problems of constriction.

Built-in furnishings compound this problem by preventing an expressive control by students of the layout of their rooms. Movable furniture, in most instances, would not alleviate the problem because the small room size dictates only one possible arrangement. The need for expression is so important to the student that he sometimes resorts to an irrational layout, such as placing the bed across the door opening, in an effort to control his environment.

The allocation of space will be the decision of the campus. Adequate space allocation within the student room must have first priority so that enough space is provided to allow both immediate individual expression by the student and future arrangement by the university.

Several studies have recommended that a single student room of rectangular shape contain 100 to 115 sq ft.. The rationale for this recommendation is that a room must contain enough space to provide the student with (1) the furniture he needs, (2) space for the use and service of this furniture (make beds or open drawers), and (3) possibility of a variety of furniture layouts.¹ One authority believes the single room is "unlikely to be really humanely satisfactory if it is less than 120 square feet. The furniture should be movable, not fixed, to allow the student to organize his own

University	ASF ^a		OGSF ^b	
	Single	Double	No dining	With dining
University of California ^c	100	100	239	265
California State Colleges ^d	94-110.5	84-91	215.5	230.5
University of Guelph ^e	115	NR	230	
University of Pennsylvania ^f	108	NR	271.5	290
M.I.T. ^g	140		470	486
Aggregate United States ^h				
Men		96.7	211.1	234.7
Women		103.5	237.4	261.4

^a Assignable square feet per student.

^b Outside gross square feet per student.

^c University of California. UC Standing Committee on Residence Halls, Meeting of August 29 and 30, 1966, Hilton Inn, San Francisco International Airport.

^d Development Guide for Campus Housing, California State Colleges, July 1968, Table 1, Summary of Project Norms, p. 13.

^e University of Guelph Student Housing Study, Evan H. Walker, Student Housing Consultant, November 1965, pp. 56-86.

^f University of Pennsylvania. Study of Undergraduate Men's Housing System, Geddes, Brecher, Qualls and Cunningham, Architectural Consultants.

^g Massachusetts Institute of Technology. A Program for Undergraduate Men's Housing, MIT Planning Office, August 1965.

^h Eugene E. Higgins, M. Louise Steward, and Linda Wright, Residence Hall Planning Aids, Report OE-51004-9A, College and University Physical Facility Series, Department of Health, Education and Welfare, U.S. Office of Education, Washington, D.C.

Table: S-1 Recommended Space Standards per Student
from a Group of Recent Studies

Source: TIME-SAVER STANDARDS FOR BUILDING TYPES, p. 249

environment."² So where as there is dispute about the size of the room,

both the studies and the authority agree that the furniture should not be fixed, but should be moveable. The following spatial requirements provide minimum specifications that should be accommodated within the student bedrooms and suite arrangements:

Sleeping and Study Quarters Space: ... There must be a minimum clear floor space in such areas of 6' [183 cm] by 6' [183 cm] enabling a 360⁰ turn by a wheelchair.

Working Area: Space clearance under counter, table, and desk tops to be used by a wheelchair student shall be a minimum of 27 1/2 [69.8 cm] in height and 32" [81.3 cm] in width.

Beds: Beds shall have minimum dimensions of 3' [92 cm] by 6' [183 cm] and between 19" [48.3 cm] and 22" [55.9 cm] in mattress height from floor level.³

Closets: ... Where one closet is provided for each occupant, the clothes bar should provide two different heights. Three-quarters of the total length should be at 52" [132 cm] and the remaining quarter at 62" [157.5 cm]. To achieve this, the lower bar, three-quarters of the total length, can be suspended from the higher bar. Wall hooks shall be installed within a height range of 40" [101.6 cm] to 56" [142.2 cm]. Shelves of various height intervals shall be installed on the side-closed wall. The top shelf shall not exceed 45" [114.3 cm] in height. Shelves above the clothes bars shall be provided for long-term storage.⁴

The less wall space in a bedroom taken up by doors and low windows the better. This will allow more useable space in the room for the rearrangement of furniture to suite the students needs. A smaller room with the proper placement of doors and windows will function quite efficiently. Windows should be large to let in ample daylight, but placed high enough above the floor so that furniture pieces can be placed underneath.

A good solution to provide more wall space in the room is to have the least possible amount of doors opening into the room. This means that closets would have to be placed outside of the bedroom, perhaps forming a separate dressing area.

From an analysis of the case studies, and from text references such as Table: S-1, the recommendation is that student rooms be approximately 100 sq. ft. with the provision that wall space is used efficiently to provide maximum use of the

to space. Those spaces grouped about a room or wide corridor make up a more residential environment through the use of attractive carpets, colors, and materials. Corridors can be more fully utilized; for example, conversation spaces that do not impede circulation can be provided by window seats and railed landings. Although stairs must conform to fire regulations, their configurations can be a pleasant contribution to the environment.⁵

The following section contains information pertinent to the design of the following spaces:

- common living room for undergraduate student suites
- common living room for graduate student suites
- living room area for faculty/graduate student apartments
- bathrooms for undergraduate student suites
- bathrooms for graduate student suites
- bathrooms for faculty/graduate student apartments
- bathrooms for transient guest rooms

Living Areas and Bathrooms: It is recommended that a suite of four students each with a single bedroom share a common bathroom. As mentioned in the Activity Analysis, this will enable students to keep personal sundries in the bathrooms, and to clean their own bathrooms.

The quality of space for the bathroom should be a residential, rather than institutional in character to facilitate a "home-like" atmosphere. As it is not desirable to open windows for ventilation during Boston's long winter, appropriate mechanical ventilation should be utilized. It would be desirable to let daylight into the space to provide a "cleansing atmosphere," and to help keep the space warmer feeling in the winter; however, locating the bathrooms on an outside wall is not always possible. This is due to other spaces with a higher priority in receiving daylight and views, such as single bedrooms and living rooms.

From the case studies, the area utilized for suite bathrooms was between 40 to 100 sq. ft. Based on the findings of the case studies and text references, it is recommended that between 60 to 100 sq. ft. be used for bathroom area.

The relationship of the bathroom to other spaces should be such that one does not have to travel through the living room from the bedroom in order to get to the bathroom. This would be awkward with the presence of another

bathroom constitutes a suite, group, or floor. A number of rooms under the direction of a resident assistant will establish a unit. All the rooms on one floor having common access and services may also be considered as a unit.

The predominant traditional pattern is the familiar double-loaded corridor arrangement wherein the unit is one floor of a residence hall. This plan offers easy control opportunities. With a group of 48 to 72 students, it facilitates the organization of intramural and academic activities. Another source of group size derivation is the optimum number sharing bathroom facilities.

Efficient space utilization requires that the circulation area comprise the smallest possible percentage of the total area. Studies of existing student housing show the efficiency percentage varying from 7 percent to 25 percent. Although it is advantageous to reduce circulation areas, building safety codes prescribe minimum areas and arrangements. Corridors which are mean, cramped, and possibly dangerous in an emergency are not acceptable.

Economy is the obvious feature of double-loaded corridors because core plans require more circulation area. When each student has a single room, economy of circulation space is difficult since each room must have a window on the periphery of the building. This arrangement, in its simplest configuration, requires extremely long frontages. Irregular building configurations to reduce corridor space must be considered in a cost context also.

Elevators for freight and disabled students are useful in all buildings. In high-rise buildings, passenger elevators are essential, although they tend to make insular entities of each floor. This problem can be reduced by skip-stop elevators stopping at unit lounges linking two floors. The initial expense of good elevators is not offset by cheap ones requiring much maintenance. Competent servicing can be provided by including maintenance contracts in purchase agreements. The better service an elevator gives, the less likely it is to be abused. Elevator switches, as common targets of student pranks, must be tamper-proof. Escalators are too expensive and have far too great a passenger capacity to be viable alternatives in residence halls.

... The location and intensity of such fixed facilities as baths, stairs, and elevators are the main inhibitors of future rearrangement. The URBS approach permits choice based on requirements rather than custom and makes possible alteration to new unit sizes to satisfy rapid social change. Hence the initial placement of the fixed facilities is a critical decision.

A major determinant of environment is the access to movement from space

to space. Those spaces grouped about a room or wide corridor make up a more residential environment through the use of attractive carpets, colors, and materials. Corridors can be more fully utilized; for example, conversation spaces that do not impede circulation can be provided by window seats and railed landings. Although stairs must conform to fire regulations, their configurations can be a pleasant contribution to the environment.⁵

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The relationship of the bathroom to other spaces should be such that one does not have to travel through the living room from the bedroom in order to get to the bathroom. This would be awkward with the presence of another

"suite-mates" guests in the living room.

DINING AND SNACKS

The dining room being a place for social gathering as well as for eating should be scaled more for smaller groups. The total area of the dining room should accommodate all the students who are expected to eat there on meal plans (this includes any student on campus who has a meal card, or any faculty/staff member with a guest card). The idea; however, is to *scale* different areas to accommodate various size groups. There should be large round tables for big groups (approximately 60" in diameter) and smaller four-top (tables with a capacity for four people), and booths for smaller groups. Smaller two-top tables should not be used in the main dining room, but rather in smaller snack areas.

Varying ceiling heights and table arrangements create different scale effects. Changing floor levels is not recommended unless access is provided by a ramp or some other means to provide handicapp accessibility.

The dining room should be easily accessable to the main kitchen facility to decrease the amount of time it takes to get food into the dining room. A serving line arrangement, or buffet arrangement are the commonly used methods of serving food in housing complexes - this allows choice of a food item by the individual who is going to be eating.

Smaller snack areas should be located about the complex in areas that are conducive to use by the inhabitants. A snack area could be used primarily by a group of suites, or by a floor wing. The snack areas size will depend on how many people will generally be using it. The case studies do not provide size references for snack areas, but it can be assumed that 150 sq. ft. of space would be adequate for use by a couple of housing groups (32 students).

The snack areas would best be suited to be located at intersections (or similiar situation) of suite areas. In this manner they can also be used as alcoves for informal gatherings - the like of which are commonly known as "bull sessions."

The snack area should contain a microwave oven, a sink and possibly vending machines.

TRASH

An area needs to be provided to contain the large amount of collected trash that accumulates in a housing complex. In a hotel room, the average amount of trash is three pounds per day, according to Architectural Graphic Standards, 7th, Ed. The space would have to hold the large accumulation of trash until it was

picked up by the sanitation department. Collection should be every two to three days. Allowing for heavy periods of trash disposal, it is recommend that the area be able to hold a weeks worth of trash. This would require the area to be within the range of 150 to 250 sq. ft. The space would contain a large-scale compactor to compress the trash into more manageable amounts of about 50 lbs for each bundle of trash.

The disposal collection space should be located on an outside wall by the dining room and the service parking/delivery area. A six-foot opening would facilitate trash removal from the collection room.

HOUSE LIBRARIES

The house libraries used by graduate students and faculty should be well stocked full of books, computer terminals, comfortable, yet easily moveable chairs, or other materials necessary for academic pursual. The equipment choices - computer terminals for example, will depend on the specialty of the particular house library.

The quality of the space should be similiar to a library reading environment - quiet, seclusive, comfortable with ample light for reading. Plenty of daylight is desireable with exterior views if possible to reduce eye strain.

The space should be accessable to the graduate students suites, and or apartments, as well as to the faculty member's apartment who will be overseeing the facility.

The space should be accessable 24-hours-a-day by the members who make use of the facility. The library should be lockable however, to deter theft of materials.

The space should be approximately 1,200 square feet allowing for cabinet storage of audio-visual equipment or the like. It should be noted that divisions of space within the facility are different for various groups. Law students will require more shelf space for books, and more reading/study area, than a facility for engineering students requiring computer terminal access to the university's mainframe.

ADMINISTRATION

As described in the activity analysis, there will be approximately 10 to 15 full - time employees administering the complex.

Hall Director: The Hall Director's responsibility is controlling the operations of the hall. The Director must manage the area and interact with the campus

housing office. His space should be private but accessible to other administrative personnel for personal interaction.

The other staff can work in an open office environment divided by acoustic partitions. Each employee should have an area the equivalent of 30 - 40 sq. ft. This will require the area to be about 600 sq. ft. maximum.

As stated in the activity analysis, the administrative area should be located next to the postal receiving area. The administration area should have a source of daylight, but views to the outside are not necessary. One employee's area should be located within the postal receiving area, which according to Architectural Graphic Standards, 7th Ed. should be approximately 150 sq. ft. No views to the exterior are necessary; however, the space should be located on an outside wall to facilitate the delivery of mail through service doors.

LAUNDRY ROOMS

Space Arrangements: Laundering may be done in a room designed especially for this purpose, or in a multiuse room, designed also for reading and or studying.

The best location, of course, is convenient to student rooms, so that there will be a minimum of carrying necessary. Generally, basements are not considered desirable locations because of their inconvenience, dampness, and lack of adequate light.

SPATIAL NEEDS:

Sorting and pretreating table: ... Ample space should be allowed on a table or counter for sorting and dampening the clothes, and for a clothes basket, as well as space for the worker using the table. The table size required will depend upon the size of the average wash load. Research at Pennsylvania State University indicates that a table 6 x 2-1/2 ft is required for a 32-lb, 4-load laundry. For pretreating, an area 20 x 36 in. is adequate for work and supplies⁶ (soap, fabric softener, bleach, measuring cups, laundry baskets, etc).

Washing machine: Automatic washers and dryers permit much more convenient and compact arrangements than were possible with nonautomatic equipment. The total floor area needed is determined by the type of washer, the equipment needed, and the space for the worker. The old-fashioned, galvanized tubs are not required with automatic equipment, but as indicated earlier (see flow of work), a laundry tray is desirable (usually a 14-inch porcelain enamel

waste, and water supply should be checked against the manufacturer's data after units have been tentatively selected.

Drying: ... The space requirements for different styles of dryers, and for operating them, are shown in Figure: SS-2. The combination washer-dryer or the stacked arrangement of washer-dryer requires less floor area than other arrangements. These dimensions are shown in Figure: SS-2. Since some garments must be hung to drip-dry, a pull-out drying rod or similar arrangement should be provided, preferably above a laundry tray (or a floor drain).⁸ This arrangement might only be possible with a limited number of students sharing a lockable facility (which will obviously require more laundry rooms) due to a probable security problem.

Ironing: ... An ironing board adjustable from a height of 23 to 37 in. accomodates most people when sitting or standing to iron⁹ To prevent theft and save space, the choice of a built-in board(s) would be better than a freestanding board(s). The space needed to use a hand iron at a board is shown in Figure: SS-3.

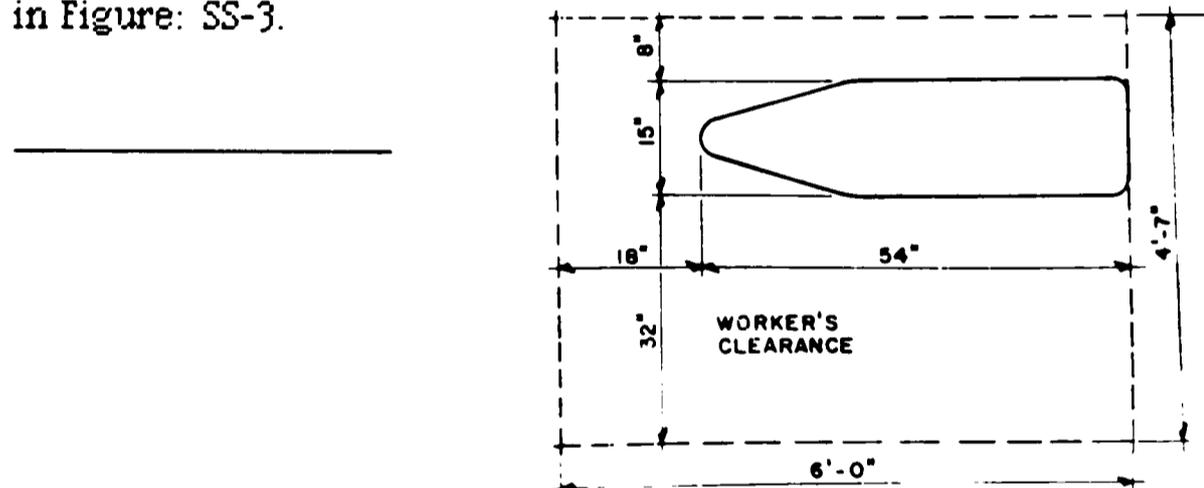


Figure: SS-3 Space Requirements For Ironing Board(s)
Source: TIME-SAVER STANDARDS FOR BUILDING TYPES, p. 42

... Laundry rooms should be open to visual inspection to ensure the safety of the users.¹⁰ To ensure user safety and to deter vandalism, the facility should be placed within relative proximity to an administrative area, or employee occupied area such as a snack bar, etc.

PARKING

There does not have to parking spaces available to every inhabitant of the the facility. The university discourages students from bringing cars on campus because of the extremely limited amount of parking space available

sink). To ensure that a laundry area is both economical in use of space and

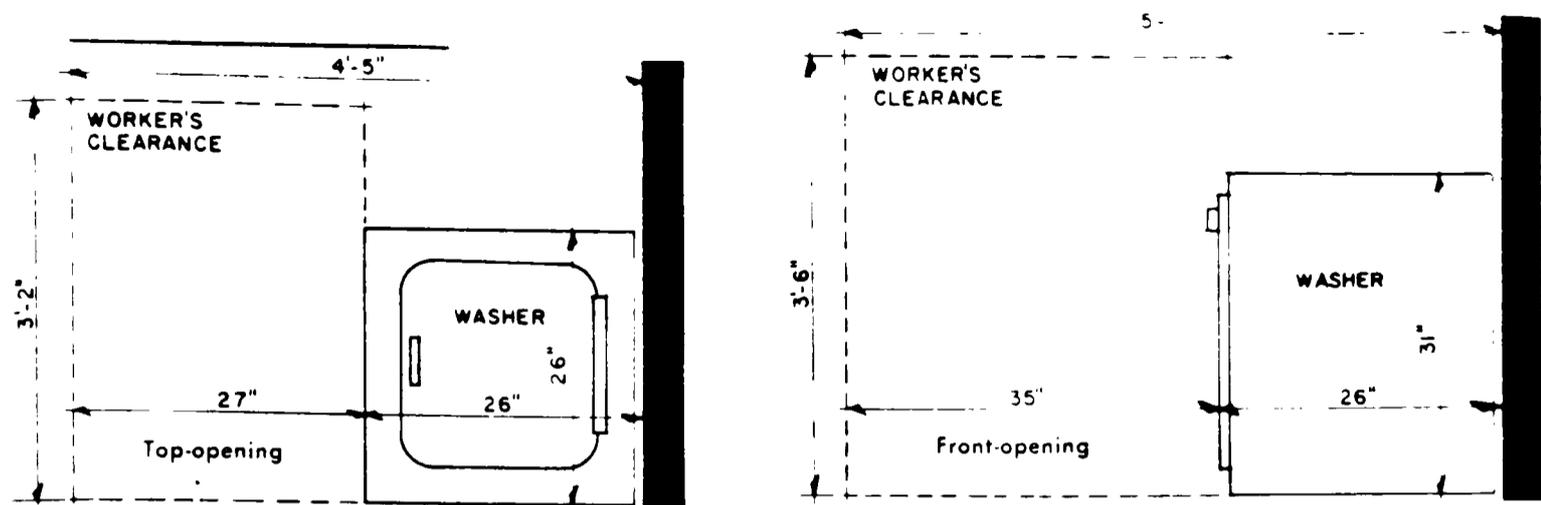


Figure: SS-1 Space Requirements For Two Types Of Washers
Source: TIME-SAVER STANDARDS FOR BUILDING TYPES, p. 43

convenient to work in, the dimensions shown in Figure: SS-1 should be followed. NOTE: Figures SS-1 & SS-2 ... provide basic dimensions of a typical automatic washer and dryer. These dimensions may be used for preliminary planning purposes, but final selection of equipment and detailing of working drawings should always be based on specific manufacturer's data.⁷

The dimensions have been drawn from the current catalogs of leading manufacturers of each type of equipment. Dimensions are generally given only to the nearest half inch since dimensions of new models vary slightly from year to year.

Door swings, locations of vents, and the specific requirements for power,

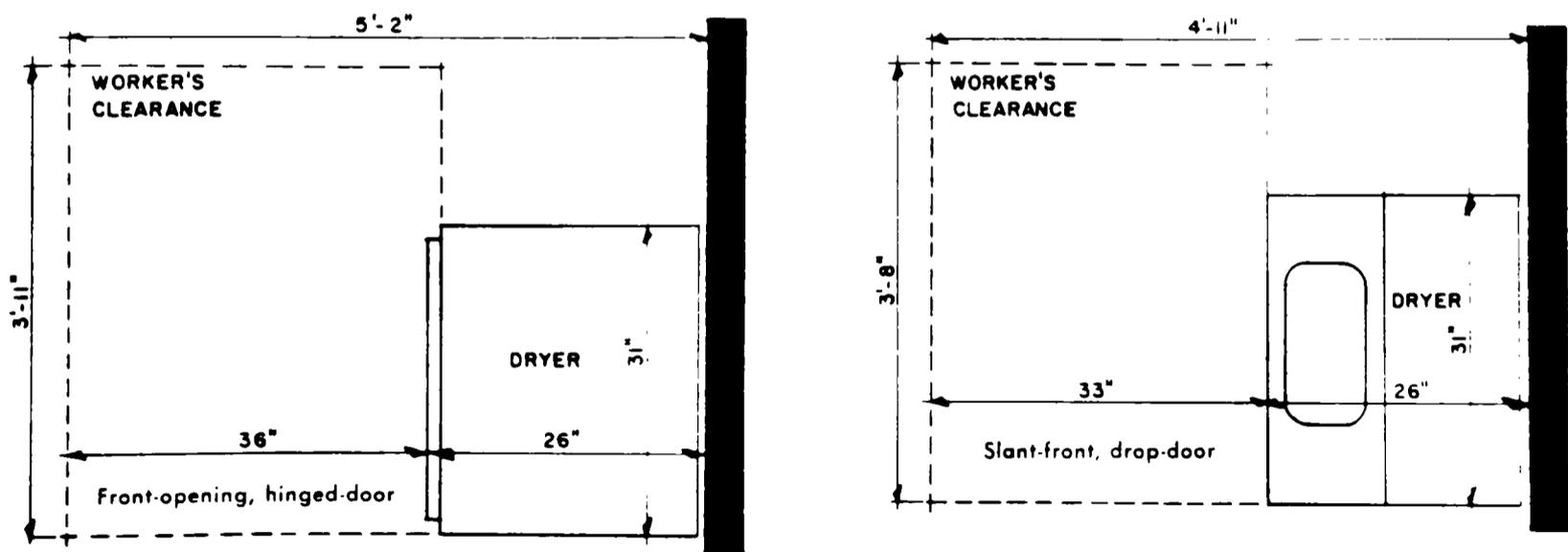


Figure: SS-2 Space requirements for two types of automatic dryers
Source: TIME-SAVER STANDARDS FOR BUILDING TYPES, P. 43

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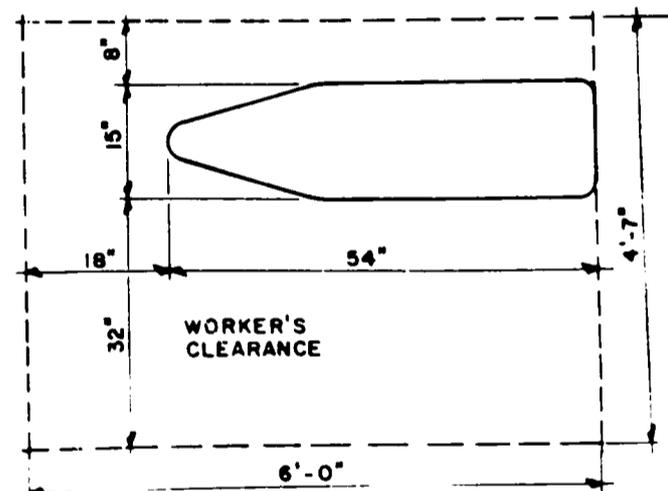


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PARKING

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There should be as much parking available on the site as budgetary, circulation, and aesthetic determinants will allow. I have assumed that there should be space available for 200 cars @ 162 sq. ft. per space. Parking access should be either from Gaffney or Buick Streets (streets that run along side the complex - refer to site analysis). This would provide Commonwealth Avenue, a major thoroughfare located to the south of the Armory, with less traffic congestion.

There is also a need to provide temporary service parking. This would be an area designated for repair trucks and the like to park in. A delivery area for such items as food and mail, and trash to be taken away, would be adjacent to the service parking area, but not obstructed by it. The service parking area should be located adjacent to the administration area. The service parking area need only provide space to 4 vehicles.

ENDNOTES

¹ Joseph De Chiara and John Hancock Callender, Time-Saver Standards For Building Types. McGraw-Hill; New York. 1980. p. 249

²Ibid. p. 246

³Ibid. p. 255

⁴Ibid. p. 255

⁵Ibid. p. 254

⁶Ibid. p. 41

⁷Ibid. p. 41

⁸Ibid. p. 41

⁹Ibid. p. 41

¹⁰ Arthur J. Pettorino, R.E. Fowe, Jr., and Hugh N. Jacobsen, Architectural Graphic Standards 7th Ed. John Wiley & Sons; New York. 1981. p. 14

SYSTEMS PERFORMANCE CRITERIA



SYSTEMS PERFORMANCE

STRUCTURAL SPANS

The National Guard Armory building is made up of two large Drill halls that have spans of 175 feet in width each. The floor area is around 52,500 square feet. These large spaces will have to be broken up into smaller areas to provide for the spatial requirements of the housing complex. There is vertical height enough in the spaces so that a second floor can be added. The support of a new structural system in these areas will require new piers to be drilled in spots through the existing two layer bitumous slab. The large spaces with oversized garage doors will provide for mobile drilling equipment to enter the building without any structural modifications or tearing out of any walls. A decision must be made by the designer as to what kind of new structural system should be utilized for the additional second floor. As the original Drill halls had three large skylights in the roof, it is recommended that such systems ought to be used once again to provide natural daylight to enter the building. The roof is already designed to take the load of skylights, and is framed to do so as well. Modern skylights are much lighter and stronger, and less prone to leaks than the ones originally used. The additions of the skylights should be taken into consideration when planning the new floor. Should the floor be split? And if split, then how? The following information documents the trends in structural bay spanning for dormitory structures, and should be used as a reference guide in determining the choice system to create more space:

... The 40-ft span with a 20-ft bay length derived from study of many existing dormitory plans as well as proposed ideal environment spaces. On the national scale, older dormitory types were studied along with the newer ones being built. Whereas 10 years ago most structures were a simple, rectangular shell, a present-day trend seems to involve more complex configurations relating to more complex hierarchies in the social structure.

As a frame of reference, residence halls were classified in five basic plan types:

1. The Double-loaded Corridor - a series of perimeter rooms on both sides of a five-foot + corridor, usually with gang baths and stairs at either end.
2. The Gallery Plan - a variation of the Double-loaded Corridor with rooms on one side only of an open or closed corridor.
3. The Extended Core Plan - a series of perimeter rooms around four sides of

a structure. In the center is a core of service rooms including gang toilets, janitor's closets, elevators, etc. A corridor usually surrounds the core on four sides.

4. Vertical House - a series of 4, 6, 8 rooms, suites, etc. A stair serving one or two such configurations of rooms or suites is provided, creating the feeling of an individual house.

5. Point Tower Plan - usually but not always high-rise with vertical circulation such as stairs and elevators in a center core along with gang baths and service rooms. The rooms, suites, and arrangements are on the perimeter. Shared baths are often used with suites of 4, 6, 8 persons.

Once these five types were defined, all plans were classified accordingly, and a study of their structural requirements was begun. These plans were studied not as actually constructed but rather as they would need to be framed to permit maximum adaptability.

Based on these studies, frequency of occurrence charts showed that very few long spans over 35 ft were used and that a corresponding maximum short span of 20 ft was adequate. Coupling this study with spatial needs and assuming a fixed toilet space, it was concluded that a maximum 35-ft by 20-ft bay would be required. Provision by a given system of bays larger than 35 by 20 ft will, of course, be acceptable provided the required spans are taken care of.

A variety of bay sizes will be needed in addition to accommodate balconies, overhangs, stairways, and elevators. The precise conditions for these accommodations will be defined in the performance specifications for structure.¹

ENVIRONMENTS

Thermal. Student rooms require an appropriate thermal environment for the functions carried on within them. The environment is affected by temperature, ventilation, humidity, radiation, and the quality of air produced by filtration.

The thermal system in student housing allows for individual requirements and the wide range of conditions which personal preference may demand. In a mixed community of smokers and nonsmokers, it is important that the air be kept moving and clean, particularly in student rooms, interior spaces, lounges, and study areas. Because of variations in student hygiene, separate ventilation of individual spaces is required, especially in the more athletic men's halls. The

odors in many residence halls were found by visitors to be "overpowering."

Although conventional air conditioning is more economical within a sealed space, it is important that students be able to open their windows to enjoy the soft, fresh morning and evening air, and in the lower-height buildings to enjoy communication (but not access) through an open window ²

In large residence halls, (as with other large structures) there is usually a central heating and air conditioning system. For public spaces this is usually appropriate. For individual rooms; however, the use of a centralized system can often times be a problem. As Victor Olgyay points out in his book Design with Climate, the human comfort zone in the United States lies within a range from 69 to 80 degrees fahrenheit. A central system is only going to maintain one constant temperature which may not be correct for all people. This often results in students blocking their air registers if they get too cold with the central air conditioning, or too hot with the central heating. The blocked registers cause air velocity in the ducts to increase to a higher rate. The result is more and more higher air flow velocities as students in each room react to the higher flow rate and block their registers. In some situations, the air pours out of the one unblocked register - which is most likely located in a gang bathroom. If there is poor return air circulation in the bathroom, then the pressure differential between the hallway and the bathroom causes the bathroom door to be held closed by the pressure, making it very hard to open.

It is recommended that the apartments and the suites use individual fan coil units for temperature control. Vertical units such as these are located in a closet, and take up very little space. The units would have chiller lines running to them from a central system. In the upper-level undergraduates' rooms and suites, it is recommended that a thermostat with limited temperature ranges be put to use. This will enable the students to set the temperature at their discretion - within the reasonable levels set on the thermostat. In effect the thermostat would be controlling central airflow to the living room, bathroom and four bedrooms of each suite; but without the disastrous effects caused by manually blocking the air registers.

Even with the use of such recommended mechanical air controls, it is recommended that all bedrooms and living areas be placed on outside an outside wall and have operable windows. The rooms should be vented so that when the windows are open, cross-ventilation may occur.

Lighting. ... The quality of lighting in students rooms is determined by the

quantity and brightness of both the light sources and their general surroundings. High illumination levels are appropriate to study; lower levels to social functions. In the daytime, natural daylight may provide much of the necessary illumination if windows are well placed and the glare eliminated. However, high illumination levels are necessary in areas where concentrated study is to be done, but the brightness contrast between the work and its surroundings must be at a minimum.³

For the facility to function effectively, the lighting should create an efficient and pleasing interior.

... Lighting sources in student rooms should be integrated with the movable furnishings. This tends to minimize maintenance and fix the light's proper level. Light for reading in bed, including a reading light for a bunk bed, is necessary. Because of the highly individualized nature of activities performed in student rooms, light from a number of well-placed but relocatable point sources is far more useful than light from one central source.³

... Lighting levels should be adequate for efficient seeing of the task involved. Variations within acceptable brightness ratios in a given field of view are desirable to avoid monotony and to create perspective effects.

Lighting equipment should be unobtrusive, but not necessarily invisible. Fixtures can be chosen and arranged in various ways to compliment the architecture or to create dominant or minor architectural features or patterns. Fixtures may also be decorative and thus enhance the interior design.

Lighting must have the proper quality. Accent lighting, directional lighting, and other highlighting techniques increase the utilitarian as well as architectural quality of a space.

The entire lighting design must be accomplished efficiently in terms of capital and energy resources; the former determined principally by life-cycle costs and the latter by operating energy costs and resource-energy usage. Both the capital and energy limitations are, to a large extent, outside the control of the designer, who works within constraints in these areas. Obviously, these constraints are maximal.⁴

Acoustics. ... Quiet is the most desired characteristic of any living arrangement in the opinion of students, so acoustical considerations are of great importance. Fundamental to providing quiet environments are walls, floors, windows, and doors providing adequate reduction of sound from adjacent activities. Doors do not facilitate noise reduction. Since standard doors are poor in acoustic

performance and high-performance doors are too expensive for student housing use, a solution isolating noise at low cost will have to be developed. The best inhibitor of noise is good planning of the relationships between rooms. Wherever possible, social areas should be isolated from student rooms by at least two doors.⁴

Windows on the same wall should be a minimum distance of six feet apart to prevent sound from traveling between rooms. If windows face each other from across a courtyard, then the windows should be a minimum distance of twenty feet apart.

Appliances. Appliances have a lot to do with the amount of electricity a facility uses. The following data is an overview of the types of appliances that are being brought to universities these days, and what effects they have on the electrical system, and other systems. ... A revolution in the design, production, and marketing of economical personal appliances has been occurring in recent years. As a result, the number of electrical appliances brought by the student to college invariably exceeds the number anticipated by the designers of present-day residence halls. Consequently, this has precipitated problems of general safety, fire hazards, intolerable odor, noise levels, and frequent interruption of electrical services.

Another significant new trend is in the personalization of entertainment and cultural media; tape recorders, radios, phonographs, and miniature TV sets are within the economic reach of most students. The transistor radio permits the student to listen to the world beyond the campus even as he walks from one class to another. Similarly, the personal, transistorized TV is making the TV room out of date, just when most residence halls are specifically providing such space.

Hot plates, coffee pots, and popcorn poppers are sources of potential fire hazards and odors. At the minimal level of food service, there is need for facilities enabling students to make their own coffee. This requires but an appropriate surface and an outlet, with the student providing the appliance. At the next level is a desire for cold drink storage facilities. Students will sometimes buy old refrigerators - often hazardous and awkward in size and arrangement. The idea of partitioned refrigerators, as in English residence halls where students may keep track of their own belongings, would seem to be a good solution. The minimal cooking done on a hot plate introduces the need for clean-up facilities. The sink becomes necessary; the problem becomes one

of the minimal kitchen facility - a project expensive enough to require careful consideration of how many students it is going to serve. Where such kitchens are provided in addition to full food service facilities, they must inevitably be few and far between. Women are far more interested than men in such a facility.

Television, radios, tape recorders, stereos, movie projectors, and phonographs create disturbing noises for others. These require, in most buildings, extensive and expensive noise abatement policing. The better solution to the problem of appliance noise, previously mentioned, is good planning for adequate isolation between rooms.

Most of all, new buildings must recognize the evolution of electrical use by providing initial high capacity with provision for easily adding to that capacity with minimum disruption.⁵

In addition, many students are bringing personal computers to school. The computer is indeed a remarkable tool. As the years go on, computers will become both more affordable and more powerful. There is a problem with computers in that they are very choosy about the electricity they use. If there are surges in the line there is a possibility of partial memory failure in either the computers' storage media (floppy discs for example), or the computers' RAM memory which will cause work done on the computer to be lost. One solution to the problem is putting computers on separate circuits. Realizing the growth potential of the computer, and its influx into university life, it is recommended that there be a computer circuit in every bedroom.

Color, texture, materials. ... Materials presently used are hard, unyielding, and chosen for their durability and ease of maintenance. However, those used invariably lead to a depressing, sterile, institutional appearance.

The student's need for expression and the university's need for ease of maintenance need not conflict. Walls can be covered with safe, removable wall-covering panels that provide the student with unrestricted freedom of color and decoration. At the same time, these wall coverings can still protect the underlying materials to the university's satisfaction. It should be possible for the student to roll up his wall coverings at the conclusion of use and use them again elsewhere if desired.

Such panels would allow women students to compensate for the universal institutional aspect of student housing by softening the environment through the use of feminine colors, textures, and materials.

It was observed that in rooms with hard walls, pinup materials are often fastened to the softer acoustical tile ceilings. Resawn wood wall panels, (or the like) however, would permit unrestricted tacking up of decorations.

It was noted that carpeted residence halls are far more quiet and that the behavior of the student was more adult. Since many study and social activities are performed on the floor, the comfort and quiet provided by carpeting are quite desirable.⁶

HANDICAPP ACCESSABLE FEATURES:

The following information is a list of requirements that should be followed in the space planning of the complex:

... Windows, Heating, and Air Conditioning: Windows shall close and open easily, using hardware latches, cranks, or slides which are within the accessibility range limits of 20" [50.8 cm] to 48" [121.9 cm] above floor level. Heating and air-conditioning controls and thermostats shall be mounted within the same height range.

Power Curtain Traverse Rods: Power traverse rods should be installed in rooms occupied by the physically handicapped. All controls should be placed within an accessibility height range of 20" [50.8 cm] to 48" [121.9 cm]

Mirrors: Mirrors should be adjustably hung (a minimum of 2' - 0" [61.0 cm] in length) so that the bottom is 30" [76.2 cm] above floor level. Where this lower height is not feasible, mirrors of greater height shall be tilted from the top to a degree to sufficiently accommodate individuals described in rational.

Electrical Outlets: Electrical outlets shall be mounted no lower than 20" [50.8 cm] above floor level.

Handles and Switches: Protruding desk and dresser drawer handles shall be installed. Switches for electrical fixtures and equipment shall be of a toggle or push-button type or equipped with pull-chains of a minimum length of 15" [38 cm].

CAFETERIAS

Self-Service Areas: Salad bars, condiment areas, beverage dispensers, utensil racks, and other areas where self-service is required shall provide access within the unilateral vertical reach range of 20" [50.8 cm] to 48" [121.9 cm].

Food lines: Food lines of cafeterias shall employ tray slides no higher than 34" [86.4 cm] in height and, where a security wall or railing runs the length of the line, the area shall be at least 36" [92 cm] in width for passage as measured from the outer edge of the tray slide. (refer to Figure: SP-1).

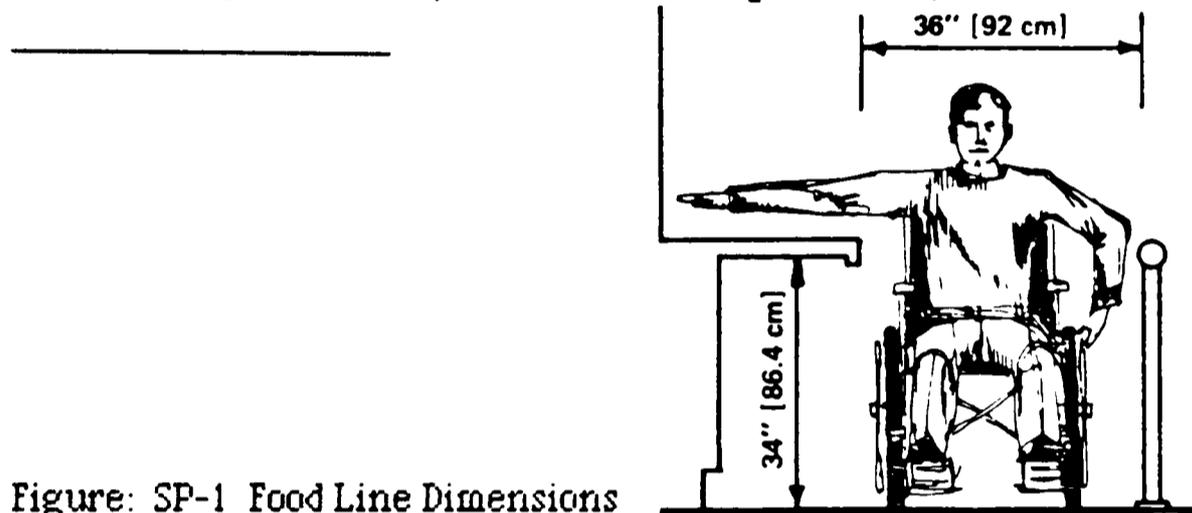


Figure: SP-1 Food Line Dimensions

Source: TIME-SAVER STANDARDS FOR BUILDING TYPES, p. 256

Dining Areas: Tables shall be provided within the dining area which provide a knee clearance of at least 27 1/2" [69.8 cm] in height and 32" [81.3 cm] in width.

Pedestal tables are not recommended because the center post hinders wheelchair footrests.

Aisle widths shall be at least 6' - 0" [183 cm] as measured from table edge to table edge (refer to Figure: SP-2 "A"), or 3' - 0" [92 cm] from table corner to table.

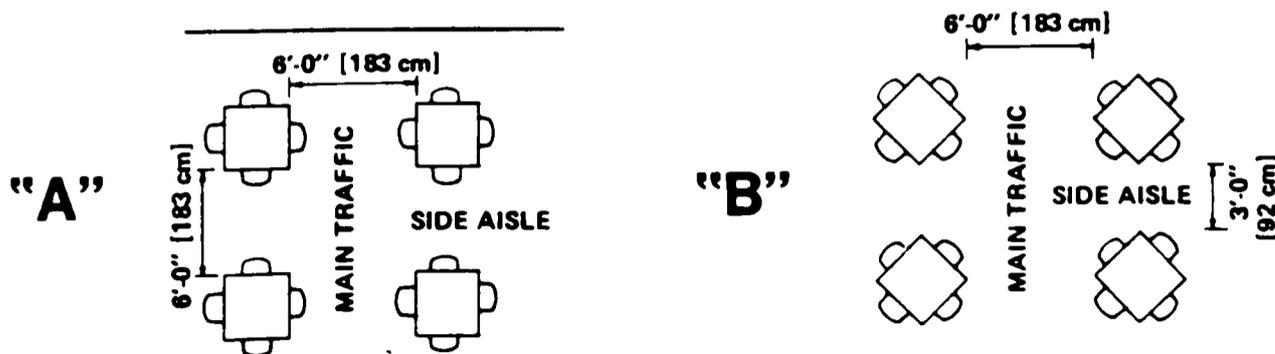


Figure: SP-2 Table Spacing

Source: TIME-SAVER STANDARDS FOR BUILDING TYPES, p. 256

corner (refer to Figure: SP-2 "B"), in those areas used by persons in wheelchairs

The width of main aisles, in areas of normal traffic pedestrian flow, shall be at least 6' - 0" [183 cm] to allow two wheelchairs to pass each other.

Ramps:

Width: A ramp shall be at least 4' [122 cm] in width.

Length: The inclined section of a ramp shall not exceed 30' [9.14 m] in length. At both ends of each 30' [9.14 m] (or smaller) section and at each turning point shall be a level area of at least 6' [183 cm] in length and the width of the ramp.

Gradients: *In Modifying Existing Spaces:* If an area to be ramped has a vertical drop of 3" [7.6 cm] or less *and* is situated either in an open area or at a door with no closing-device pressure, then a gradient of not greater than 1: 4 (25%) shall be used.

In Modifying Existing Spaces: If an area to be ramped has a vertical drop of 2" [5.1 cm] or less *and* is situated at a door with a closing-device pressure, then a gradient of not greater than 1: 6 (16.66%) shall be used.

In New Construction: Any vertical drop over 1/2" [1.27 cm] shall be ramped using a gradient not greater than 1:12 (8.33%) and preferably 1:16 (6.25%) where feasible.⁷

REQUIREMENTS FOR LAUNDRY FACILITIES:

... The space should be dry, heated, and well lighted, with sufficient electrical outlets, properly located. The space should be ventilated to remove moisture and odors.⁸

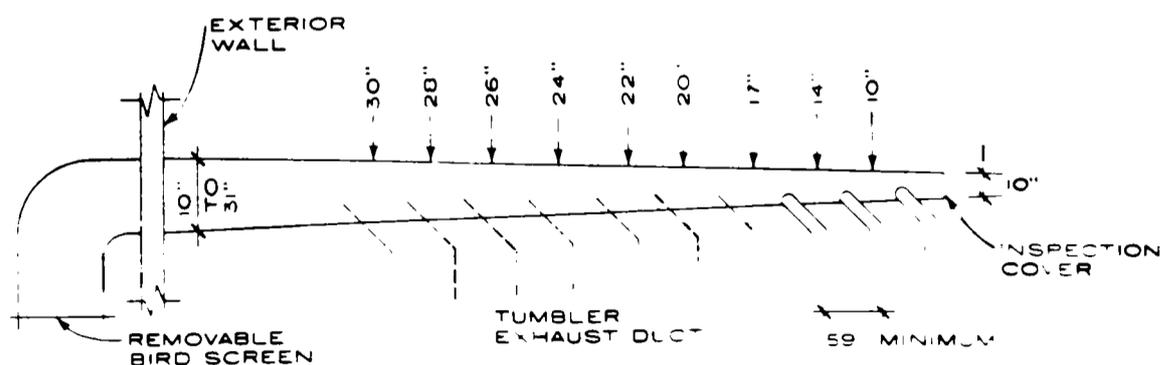


Figure: SP-3 Exhaust Duct Requirements

Source: ARCHITECTURAL GRAPHIC STANDARDS 7th EDITION, P. 543

ENDNOTES

¹ Joseph De Chiara and John Hancock Callender, Time-Saver Standards For Building Types. McGraw-Hill Book Co., New York. 1980. p. 254

²Ibid. p. 250

³Ibid. p. 250

⁴William J. McGuinness, Benjamin Stein, and John S. Reynolds, Mechanical And Electrical Equipment For Buildings, John Wiley & Sons, New York. 1980 p. 939

⁵De Chiara and Callender p. 251

⁶Ibid. p. 250

⁷Ibid. p. 255 - 257

⁸Ibid. p. 41

Adequate exhaust vents for the dryers aid in the removal of moisture from the air. Figure: SP-3 illustrates a typical linear exhaust duct/vent set-up.

Hot water demand for laundries (and for other daily uses) is hard to judge accurately due to the different living habits and needs of various people. An estimation for the use of hot water by individuals is listed in Table: SP-1. This estimation can be used in the initial calculations for a forced circulation system which maintains a constant flow of hot water to specific fixtures requiring frequent useage of hot water.

BUILDING TYPE	HOT WATER ¹ PER PERSON	HOURLY DEMAND DAY'S USE	DURATION OF PEAK LOAD	STORAGE CAPACITY DAY'S USE	HEATING CAPACITY DAY'S USE
Residences, apartments, hotels ²	20-40 gal/day	1	4 hr	1/5	1/7

1. At 140°F.

2. Allow additional 15 gal per dishwasher and 40 gal per laundry washer

Table: SP-1 Estimated Hot Water Demand

Source: ARCHITECTURAL GRAPHIC STANDARDS 7th EDITION, p. 647

There should be a drain trench underneath or behind washers sized to contain one complete dump from all machines. The wast line should be a minimum of 2 inches in diameter, and have an inegral lint grating. The venting, electric, and gas lines should run overhead and drop down to the machines. This makes for easier servicing than if the lines and vents came up through the floor. (In a slab situation only: if the laundry rooms are tiered, then service could go through all floors until reaching a mechanical space). (Refer Figure: SP-4).

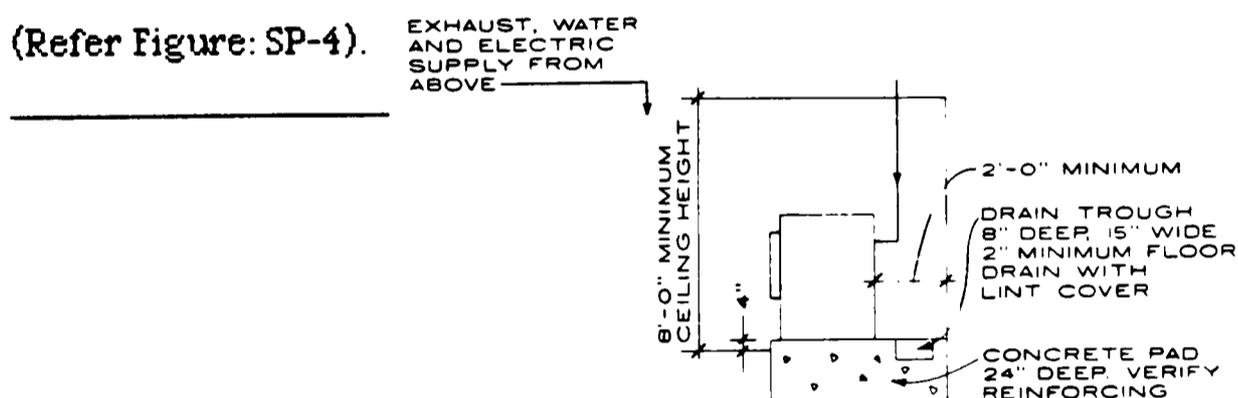


Figure: SP-4 Section Location(s) Of Service, And Physical Requirements

Source: ARCHITECTURAL GRAPHIC STANDARDS 7th EDITION, p. 543

DETAILED SPACE LIST



DETAILED SPACE LIST

The following information on room types provides a more detailed analysis of the requirements for that space. They deal with three types of living arrangements which are recommended to be utilized for the inhabitants of the Armory. Single bedrooms are recommended for all inhabitants and fall into two categories: 1) that of a single bedroom as part of a multi-unit suite sharing common areas such as living rooms and bathrooms. For graduate students in the residential college, a kitchen should be added to the list of shared, common spaces. 2) The single bedroom as part of an apartment. This arrangement differs from the suite concept in that a limit of two single bedrooms per apartment will be maintained. For faculty, or one graduate student living in an apartment, the extra single could serve as a study, or workspace.

Single rooms. The single room provides controlled privacy for its occupant with respect to all other students. It may open directly to a corridor and thus provide complete privacy coming and going, or it may be part of a suite or apartment. Privacy for sleeping can be controlled if adequate acoustic separation between adjacent spaces is provided.

The single room should be arranged suitably so that it is possible to study effectively with an invited second person. In addition, the student should be able to play the radio, phonograph, tape recorder, or quiet instruments and to indulge in reasonable recreational activity without creating an accoustical problem for his neighbors.

Suites. ... A suite is an arrangement in which four or more students share the total space in single and double rooms, with or without a bathroom, and at least one extra common space.¹ It is recommended that the suites consist of four single bedrooms with a bathroom and living area. This arrangement allows a group of students working and living together in the residential college concept to have at least one space under their own control which may be used for any of the three major facets of room life: sleep, study, or social activities. "The major value of the suite plan is the opportunity it affords for closer student association and the freedom it gives students using the various spaces as they wish."² The common space within a suite (1) reduces some of the pressures felt by students trying to share large whole-dormitory facilities; (2) provides for social activities as does a residential living room, and (3) includes in social

activities those students who might not have direct or easy association with other students.

The sharing of a fair amount of space by a group of students makes possible a variety of usage patterns and provides considerable flexibility in room rearrangement so the space may be organized in the best possible way

... Typical patterns are a common room also used as a study room; one room used only for sleeping, with separate rooms for study and social purposes; and four single rooms or two double rooms with a common living room.³ The flexibility of the spaces is demonstrated in this way, for the students living in a suite arrangement might decide to double-up sleeping quarters in order to use the two additional bedrooms for other purposes.

Suites composed of single rooms rather than double rooms increase the potential for privacy. However, this arrangement does require additional square footage above that normally required for four students. This additional space can be gained through a reduction in the large lounge spaces on the ground floor.

... Another way to obtain sufficient area for a suite is to incorporate some corridor space in the common room. Corridors may not be necessary for a four-student suite; therefore, this approach works best when perhaps eight or ten students share a suite. A major problem in optimum use of the common room of a suite concerns doors that do not provide sufficient acoustical separation between the common room and the individual's room. In such a case, spaces for study outside the suite become necessary.⁴

Bathroom facilities pose one of the major questions in the design of suites: should these facilities be available just for the suite or for a larger group of students? Although initially it is less expensive to build gang facilities for larger groups, long-term economy can be obtained by providing residential-scale bathrooms for suites wherein students, instead of maids, clean the facility. The reduction in maintenance requirements will more than amortize the increased first cost of smaller bath facilities, while also considerably improving the human quality of the housing environment for the student.

Suites must also be considered for the social impact resulting from them. Students developing a strong social life around the activities of their suite may have less incentive to make friends outside their circle. Objections might be posed for this reason, especially in regard to freshman students who desire maximum opportunities to meet fellow students.

Another problem in suites composed of four students is the possibility that strong friendship patterns may have a detrimental influence on a student's academic life. The peer group pressure to go out for coffee or a hamburger is quite strong on one out of six. Riesman notes this "encapsulation." One size of an encapsulated group has been equated with the six occupants of an automobile. Therefore, the organization of space into suites must be such that the students in different suites may interrelate. If, for example, three suites of four students share a larger living room so that a group of twenty have something in common, it is quite unlikely that a small group desiring a coffee break could interrupt the study pattern of the other students. More likely, they will find only one or two others willing to go along.

The shared living room also provides a larger base for friends and tends to reduce stress. The value of grouping students into a suite where an ordered pattern of relationships may develop (first with a roommate or perhaps with two or four additional students and then with a larger number) provides some balance in the way outside attachments are formed. Such relationships are not well studied at this time and the patterns of change in the future may be very considerable. *Therefore an approach to the use of suites should leave open the maximum number of options for future living patterns.*

Within the suite it is important to organize the common spaces so that privacy is maintained between the sleeping rooms and the bathroom. Problems occur where the common room(s) in a suite may be open for coed activities and it is necessary to pass through the common area when going between one's room and bathroom.

... With eight or more students in double rooms, more than one common space in a suite is required. At least one separate study as well as a social room should be provided to accommodate privacy for study and typing late at night and the noisy social sessions that inevitably occur within a suite. Obviously, single rooms designed so that privacy may be maintained represent the most ideal solution.⁵

If the suite is entered through a common space, this space is useful only for purposes where quiet and privacy are not essential. Attempts to provide a combined living-study room in the suite are not successful because students soon revert to using their bedrooms for study. The suite telephone must not interfere with study activities.

Apartments. An apartment differs from the undergraduate suite in providing a

kitchen and only two bedrooms (A graduate student suite will have a common kitchen facility). ... It may consist of single or double rooms built around common spaces as in a suite, or it may have a number of students in a sleeping room with the other spaces in common for social, dining, and study purposes.

A consensus of opinion among students indicates that three to five single students form an optimum group for apartment living. This number tends to work well in arranging cooking chores for the week, with weekends left on an individual basis. With more than five students, assignment of cooking chores becomes difficult. Indiana University and Michigan State University have extremely popular facilities accommodating four students.⁶ In this situation, however, the apartments are not going to be used as communal living spaces. The suites with kitchens are a form of apartment, and four students sharing one ought to provide a close to ideal situation.

Some students believe they get better food at less cost if they do their own cooking and shopping. Therefore, the apartment requires adequate food supply capacity to handle a week's supply of groceries. The apartment's dining area must be of a size to permit the occupants to have dinner guests.

Experience indicates that most students living in apartments tire of the responsibility of cooking and cleaning. It would seem appropriate to develop central food service to relieve apartment groups of the cooking chores while still retaining the benefits of apartment-type living.

... For example, Indiana University has two living groups of 60 students having common kitchen facilities with another residence hall which provides the food service of the small living unit. Trolleys containing food for 60 students are wheeled from the central kitchen to the serving kitchen within the living units. All services and cleanup are then handled by the living units at a very considerable savings in cost. These two facilities are the most popular ones on the entire campus.⁷

Much of the attraction of the apartment is its comparative freedom from behavioral control, particularly in regard to coeducational activities. This does not mean complete relinquishment of responsibility on the part of the university but rather the more positive recognition of the student's adult qualities.

Students living in apartments tend to develop a very close relationship with those sharing the space. Therefore it is a pattern perhaps more appropriate for upper division and graduate students than it is for lower division students. These students have developed a range of acquaintances on a campus and now

are interested in cultivating specific friendships. Apartments, like suites, can be grouped to provide activities through combined use of spaces for recreation, study, and social affairs so that a wide range of friendship is possible.

ENDNOTES

¹ Joseph De Chiara and John Hancock Callender, Time-Saver Standards For Building Types. McGraw-Hill. New York. 1960. p. 248

²Ibid. p. 248

³Ibid. p. 248

⁴Ibid. p. 248

⁵Ibid. p. 247

⁶Ibid. p. 249

⁷Ibid. p. 248

COST ANALYSIS



COST ANALYSIS

The cost analysis of this building prior to construction can give some idea to the designer and client as to what kind of budget they will be dealing with. Two sources were utilized in order to come up with an analysis of the budget. Firstly, a computer program based on Pena's Problem Solving book. The computer program assumes a new structure to be built; however, this project is a renovation. Thus I employed a second method based on current costs of construction found from information within Dodge Reports. The print-out of the program is located in the Appendix.

The following is a summary of the computer program results:

To run the computer program, the derived quantities of space for each activity were taken from the space summary and fed into the program. The program keeps a running total of area and volumes until the last quantity is fed in, and then the gross square footage is calculated. The results were 285,140.5 sq. ft. and 2,311,924 cubic feet for the total amount of space to be utilized.

The efficiency ratio of the building is entered to give a resultant of total unassigned space. The efficiency ratio used for this building is austere - a 70/30 ratio. The efficiency ratio should have been more like 65/35, but I used an austere ratio to offset the program's inability to deal with an existing structure. The resultant square footage (for mechanical, circulation, **structure**, toilets, janitor, and unassigned storage) was: 122,203.1 sq. ft. resulting in a total of 407,343.6 gross sq. ft.

The building type category chosen for this program is "utilitarian," again, to offset the savings of not having to build new structure. The cost used by the program for construction was \$25 per sq. ft., which is admittedly too low for this project. For fixed equipment (such as service equipment, fixed seating, medical equipment, security and sound systems,) I chose 20% under the "high" category due to the fact that all mechanical systems and the like will be replaced in the Armory. - refer Armory Background, and Systems Performance sections.

Site development is analyzed by the computer program based on several site elements. Elements include: parking, roads, walks, screen walls, utilities, landscaping and outdoor lighting. The costs for these elements is figured into the building budget according to the percentage magnitude given to each. (Refer to the print-out for for a breakdown of the percentages).

Site acquisition is figured into the final budget, but since Boston University already purchased the site and buildings, the acquisition was figured in as zero.

To cover the cost of student furnishings for single bedrooms and the like, a percentage of 15% was given for furniture and other equipment not attached to the building.

Professional fees were calculated as a percentage of the building cost, using the group four category of 7%.

Based on the previously described factors, the computer program generated a cost of \$16,850,062.

For the Construction cost method, I used the buildings 300,000 sq. ft. as the amount of space to be dealt with. The remaining figures follow:

300,000 sq. ft. x \$50.00/ sq. ft. construction cost =	\$15,000,000
200 parking spaces @ \$4,500 ea. =	\$900,000
3,300,000 approx. cu. ft. x .44/ sq. ft. demolition =	\$1,452,000
	<hr/>
	Subtotal \$16,352,000
	<hr/>
Site development @ 15% =	\$2,452,800
Fixtures @ 15% =	\$2,452,800
	<hr/>
	Total Construction Cost \$21,257,600
	<hr/>
Add moveable equipment @ 15% of subtotal =	\$2,452,800
Professional fees @ 6% of the Total Construction Cost =	\$1,275,456
Add 10% of Total Construction Cost to provide for Contingencies =	\$2,125,760
Add 2% of Total Construction Cost for Administration =	\$425,152
	<hr/>
	Total Cost = \$27,536,768

Although comparing apples to oranges, the renovation cost of the Armory for use by the National Guard in 1980 was \$11,500,000.

The cost differential between the computer program and the above method is a large one to be sure. There were differences in each method, such as the cost of parking space per car. I figured \$4,500 per car to cover the cost of a possible parking garage structure, while the program figured \$250 per vehicle. Nevertheless, each method has a great amount of inaccuracies, so I can only conclude that the budget stands between 16 to 28 million dollars.

APPENDIX



SPACE	SIZE	AREA	VOLUME
-------	------	------	--------

E NO. 1
LTH? 3670
LH? 10
LHT? 8
3670 X 10 X 8 36700 293500

E NO. 2
LTH? 5505
LH? 15
LHT? 8
5505 X 15 X 8 82575 660600

E NO. 3
LTH? 2936
LH? 8
LHT? 8
2936 X 8 X 8 23488 187904

E NO. 4
LTH?
L 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET
LH? 15
LHT? 8
1380 X 15 X 8 20700 165600

E NO. 7

TH? 736

H? 8

HT? 8

736 X 8 X 8

5888

47104

E NO. 8

TH? 240

H? 12

HT? 8

240 X 12 X 8

2880

23040

E NO. 9

TH? 160

H? 8

HT? 8

160 X 8 X 8

1280

10240

E NO. 10

TH?

T. 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10FALET

160 X 8 X 8

1280

10240

E NO. 10

TH? 200

H? 10

HT? 8

200 X 10 X 8

2000

16000

E NO. 11

TH? 300

H? 15

HT? 8

CE NO. 12

GTH? 160

TH? 8

GHT? 8

160 X 8 X 8

1280

10240

10000

CE NO. 13

GTH? 30

TH? 40

GHT?

ST 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LFT1 8LOCATE 9COLOR 10PALET

160 X 8 X 8

1280

10240

CE NO. 13

GTH? 30

TH? 40

GHT? 10

30 X 40 X 10

1200

12000

CE NO. 14

GTH? 40

TH? 40

GHT? 9

40 X 40 X 9

1600

14400

CE NO. 15

GTH? 100

TH? 100

GHT? 10

100 X 100 X 10

10000

100000

DE NO. 16

PTH? 10

PH? 15

PH? 15

BT 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

100 X 20 X 8

100 X 100 X 10

10000

100000

DE NO. 16

PTH? 10

PH? 15

PH? 8

10 X 15 X 8

150

1200

DE NO. 17

PTH? 10

PH? 10

PH? 8

10 X 10 X 8

100

800

DE NO. 18

PTH? 412.5

PH? 15

PH? 8

412.5 X 15 X 8

6137.5

49500

DE NO. 19

PTH? 100

PH? 20

PH?

BT 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

DE NO. 19

PTH? 100

TH? 20

HT? 9

300 X 14 X 9

100 X 20 X 9

2000

18000

DE NO. 20

PTH? 30

TH? 40

HT? 9

30 X 40 X 9

1200

10800

DE NO. 21

PTH? 300

TH? 15

HT? 8

300 X 15 X 8

4500

36000

DE NO. 22

PTH? 100

TH? 8

HT?

BT 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

300 X 15 X 8

4500

36000

DE NO. 22

PTH? 100

TH? 8

HT? 8

100 X 8 X 9

800

6400

E NO. 23

TH? 200

H? 10

HT? 8

200 X 10 X 8

2000

16000

E NO. 24

TH? 80

H? 40

HT? 9

80 X 40 X 9

3200

28800

E NO. 25

TH? 3670

H? 10

HT?

1 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7."LPT1 8LOCATE 9COLOR 10PALET

TH? 100

HT? 9

100 X 100 X 9

10000

90000

THE DESIRED SAFETY LINE

E NO. 27

TH? 30

H? 40

HT?

30 X 40 X 0

1200

0

E NO. 28

TH? 20

H? 30

HT? 8

12000, 1

ASSIGNMENTS

285140.5

2311924

OF SPACES 28

ANY KEY TO CONTINUE?

1T 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

CIRCULATION*MECHANICAL*STRUCTURE*TOILETS*JANITOR*UNASSIGNED STORAGE

EFFICENCY RATIO

- 1 SUPERB-----50/50
- 2 GRAND-----55/45
- 3 EXCELLENT-----60/40
- 4 MODERATE-----65/35
- 5 AUSTERE-----70/30

ENTER THE NO. FOR THE DESIRED EFFICENCY RATIO? 5

CIRCULATION	65174.98
MECHANICAL	20367.18
STRUCTURAL	28514.05
TOILETS	6110.154
JANITOR	814.6873
UNASSIGNED STORAGE	1222.031

TOTAL UNASSIGNED SPACE 122203.1

TOTAL ASSIGNED SF 285140.5

ANY KEY TO CONTINUE?

3T 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

BUDGET

A.I.A. STATEMENT OF ARCHITECTS SERVICES DOC.B551 FOR DETAIL CATAGORY LISTING

BUILDING TYPE

GROUP 1 MONUMENTAL AND PRECISE DETAILING

GROUP 2 EXCEPTIONAL CHARACTER AND COMPLEXITY

GROUP 3 MODERATE COMPLEXITY

GROUP 4 CONVENTIONAL CHARACTER

GROUP 5 UTILITARIAN

ECT BUILDING TYPE GROUP (1-5)? 5

ANY KEY TO CONTINUE?

3T 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

BUILDING COST

ANY KEY TO CONTINUE?

1ST 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

BUDGET

A.I.A. STATEMENT OF ARCHITECTS SERVICES DOC.B551 FOR DETAIL CATAGORY LISTING

BUILDING TYPE

- GROUP 1 MONUMENTAL AND PRECISE DETAILING
GROUP 2 EXCEPTIONAL CHARACTER AND COMPLEXITY
GROUP 3 MODERATE COMPLEXITY
GROUP 4 CONVENTIONAL CHARACTER
GROUP 5 UTILITARIAN

SELECT BUILDING TYPE GROUP (1-5)? 5

ANY KEY TO CONTINUE?

1ST 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

BUILDING COST

DOLLARS

\$/SF

QUALITY

GROUP

ERB	2.647734E+07	65	1
ND	2.24039E+07	55	2
ELENT	1.833046E+07	45	3
ERATE	1.425703E+07	35	4
TERE	1.018359E+07	25	5

ECT QUALITY GROUP(1-5)? 5

ANY KEY TO CONTINUE?

ST 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

FIXED EQUIPMENT

EQUIPMENT INSTALLED BEFORE COMPLETION OF THE BUILDING SUCH AS SERVICE EQUIP
NT, FIXED SEATING, MEDICAL EQUIPMENT, SECURITY OR SOUND SYSTEMS

-----5%

IUM-----10-15%

H-----20%

CIALLY HIGH-----30%

ANY KEY TO CONTINUE?

1ST 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7 "LFT1 8LOCATE 9COLOR 10PALET

KING-----NO. OF CARS? 200	50000
DWAYS-----LINEAR FT? 50	2500
KS/TERRACES-----1%-7%? 2	203671.8
LS/SCREENS-----.5%-2.5%? .5	50917.95
SITE UTILITIES--1%-3%? 1	101835.9
-SITE UTILITIES-0%-5%? 0	0
RM DRAIN-----.5%-2.5%? .5	50917.95
DSCAPE-----1%-2%? 1	101835.9

AL SITE DEVELOPMENT

5351.3

ANY KEY TO CONTINUE?

ST 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

THE APPROPRIATE ZONING

SITE ACQUISITION

ING GROUPS

MAX. LOT COVERAGE

MD-2, MF-1, MF-2, MH, P, O, NS, GR

35%

IF-1, IF-2, IF-3, 2F, MD-1

45%

LC, HC

50%

I-1, I-2

75%

CB

100%

USE THE APPROPRIATE ZONING GROUP (1-5)? 3

ANTICIPATED NO. OF STORIES? 1

REQUIRED LAND AREA FOR ANTICIPATED NO. OF STORIES 814687.2

FRONT SETBACK 15

SIDE SETBACK 5

LAND AREA BASED ON F.A.R. 101835.9

REQUIRED PARKING SPACES 814,6872

REQUIRED LAND AREA OF SITE (SF)?

BT 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

MD-2, MF-1, MF-2, MH, P, D, NS, GR	35%
IF-1, IF-2, IF-3, 2F, MD-1	45%
LC, HC	50%
I-1, I-2	75%
CB	100%

END CON

USE THE APPROPRIATE ZONING GROUP (1-5)? 3

ANTICIPATED NO. OF STORIES? 1

REQUIRED LAND AREA FOR ANTICIPATED NO. OF STORIES	814687.2
. FRONT SETBACK	15
. SIDE SETBACK	5
. LAND AREA BASED ON F.A.R.	101835.9
REQUIRED PARKING SPACES	814.6872

NET LAND AREA OF SITE (SF)? 435600

LAND VALUE (\$/SF)? 0

NET ACQUISITION 0

ANY KEY TO CONTINUE?

BT 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

MOVEABLE EQUIPMENT

FURNITURE AND OTHER EQUIPMENT NOT ATTACHED TO THE BUILDING

5%

MEDIUM-----10%-15%

HIGH-----20%

ER APPROPRIATE %? 15

27539

ANY KEY TO CONTINUE?

ST 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

PROFESSIONAL FEES

BUILDING TYPE GROUP

UP 1 9%-12%

UP 2 7%-10%

UP 3 6%-8%

UP 4 5%-7%

UP 5 3%-6%

3996.1

 ANY KEY TO CONTINUE?

ST 2RUN 3LOAD" 4SAVE" 5FILES 6CONT 7,"LPT1 8LOCATE 9COLOR 10PALET

COST ESTIMATE ANALYSIS

A. BUILDING COST 407343.6

018359E+07

B. FIXED EQUIPMENT %DFA 2036718

C. SITE DEVELOPMENT LUMP SUM 765351.3

 D. TOTAL CONSTRUCTION (A+B+C)

298566E+07

 E. SITE ACQUISITION LUMP SUM 0

F. MOVEABLE EQUIPMENT %DFA 1527539

G. PROFESSIONAL FEES %DFD 908996.1

H. CONTINGENCIES %DFD 1298566

J. ADMINISTRATIVE COST %DFD 129856.6

 K. TOTAL BUDGET REQUIRED (D&E THRU J)

LIBRARY

BT 2RUN 3LOAD" 4SAVE" 5FILES 6CONT: 7,"LPT1 8LOCATE 9COLOR 10PALET

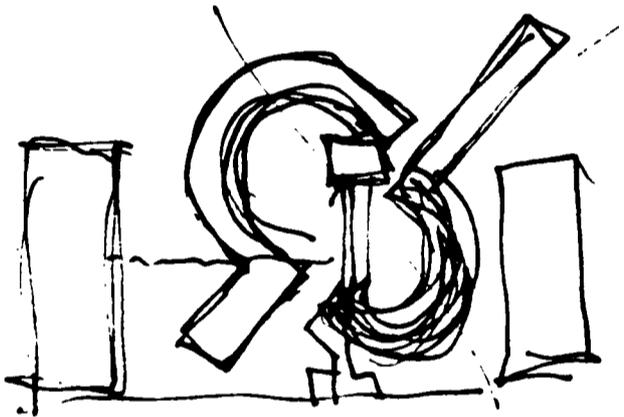
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BIBLIOGRAPHY

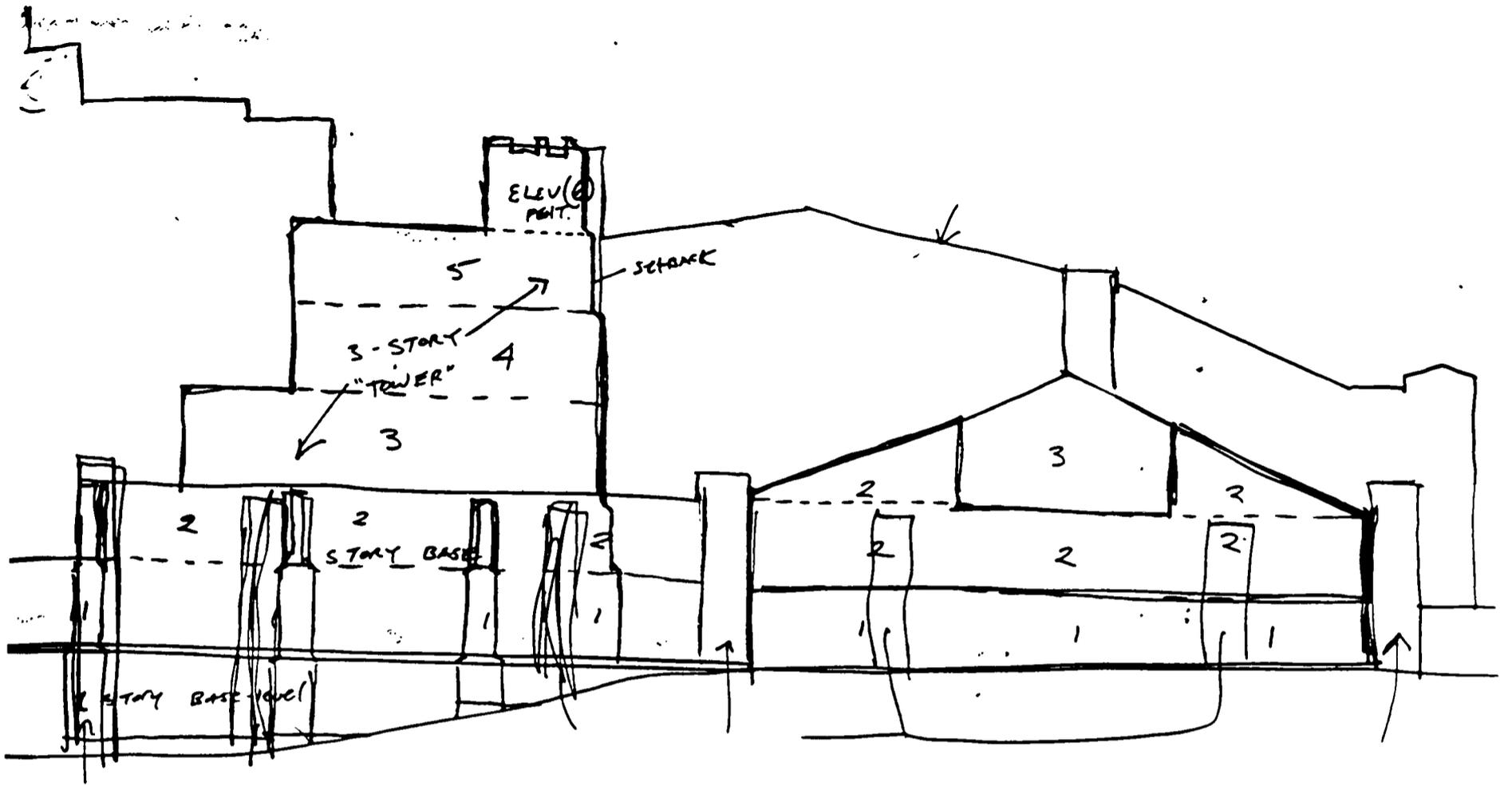
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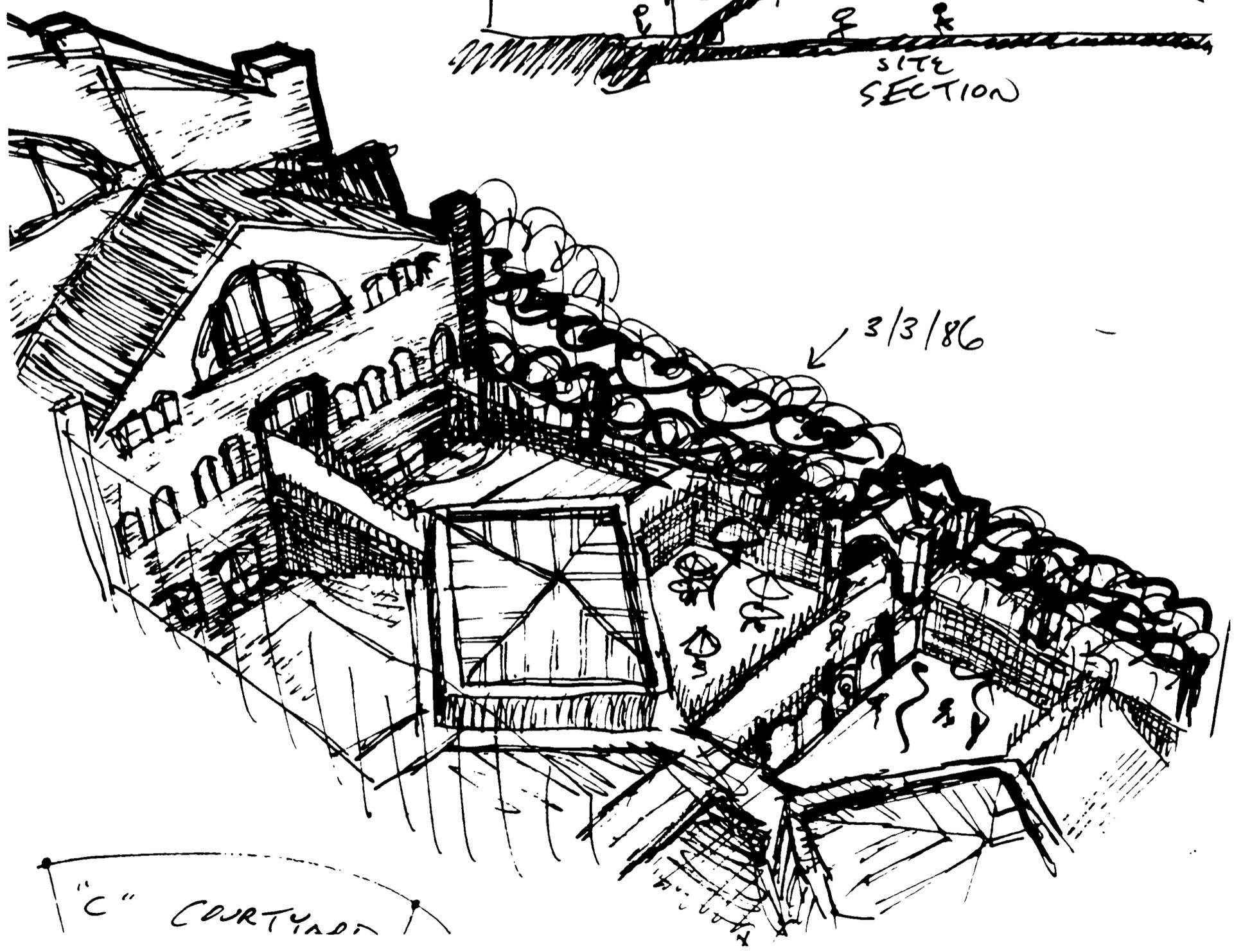
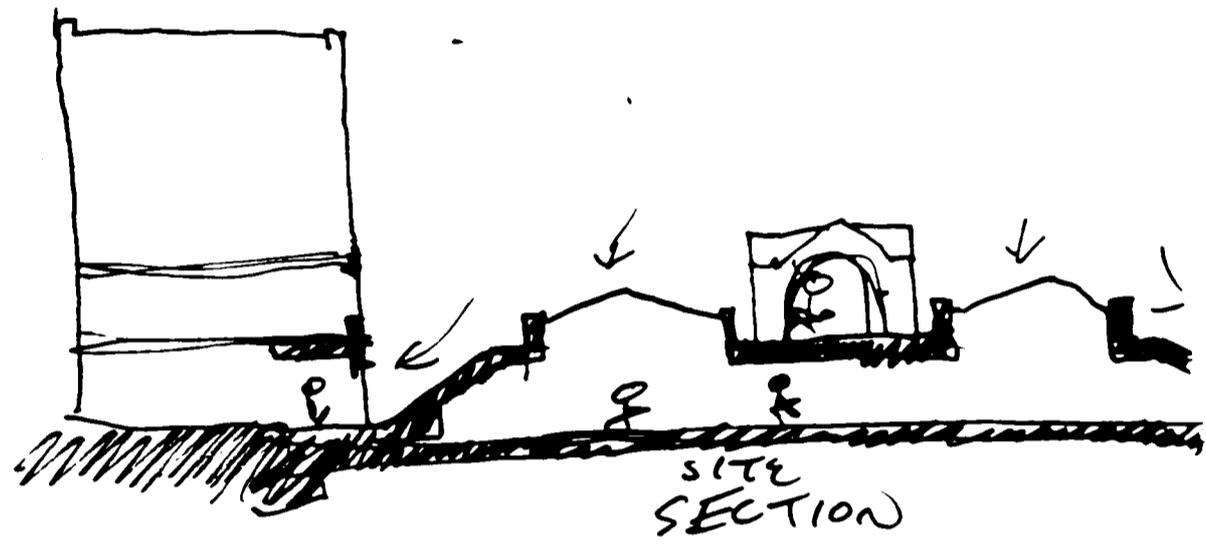
**JAMES
FLICK**



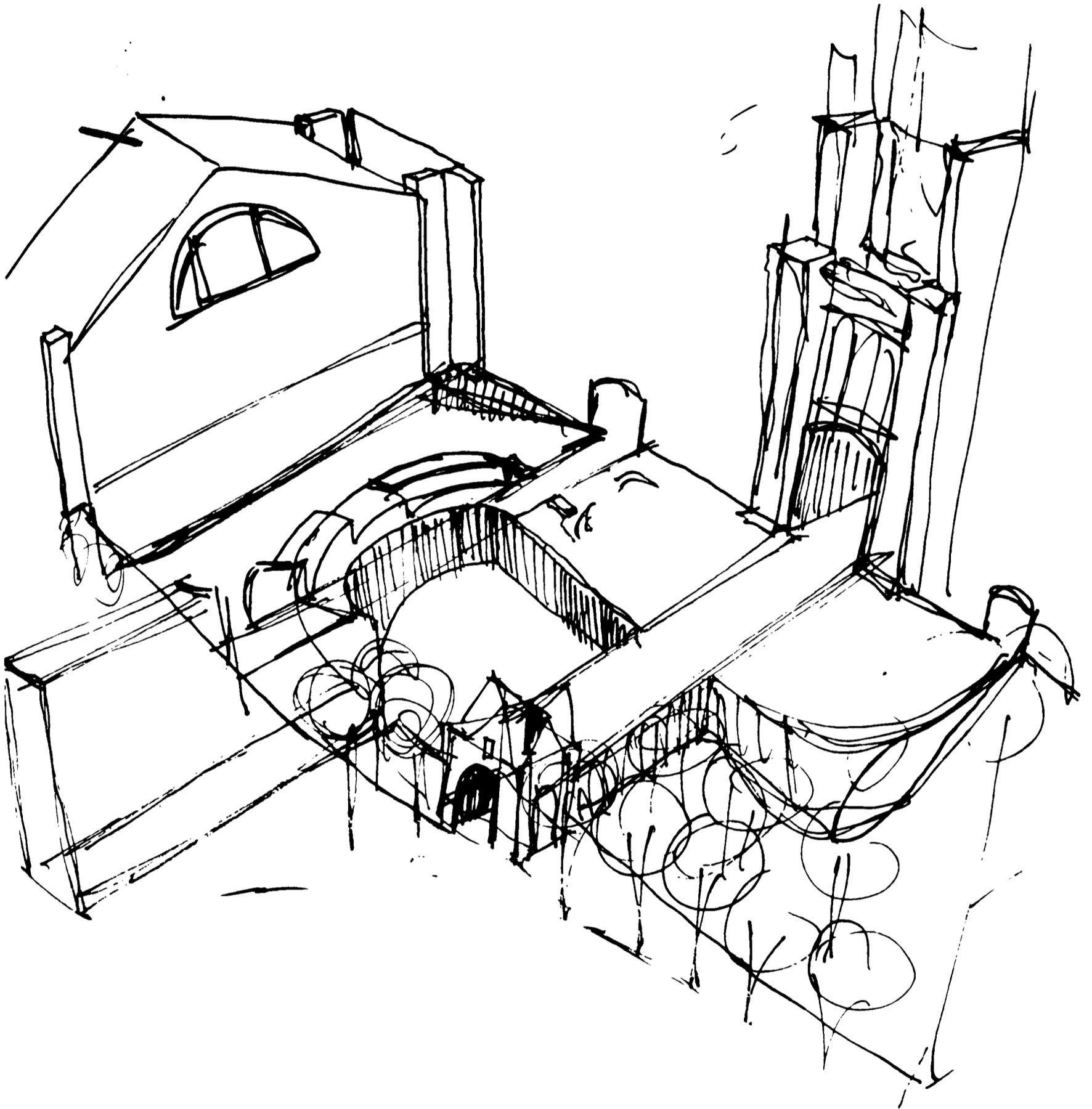
North Section
 between the varying grade levels.

Section of initial tower design showing the relationships

The following aerial view of the courtyard formed by the dissection of drill hall #2 was an initial attempt to create visual interest within the courtyard. The section shows that the two square objects would act as skylights to an underground dining facility. While a decision was made to retain the location of the dining facility, the symmetry of the two objects was felt to be visually uninteresting to the pedestrian - negating the intent of providing stimulation to a rectangular courtyard.

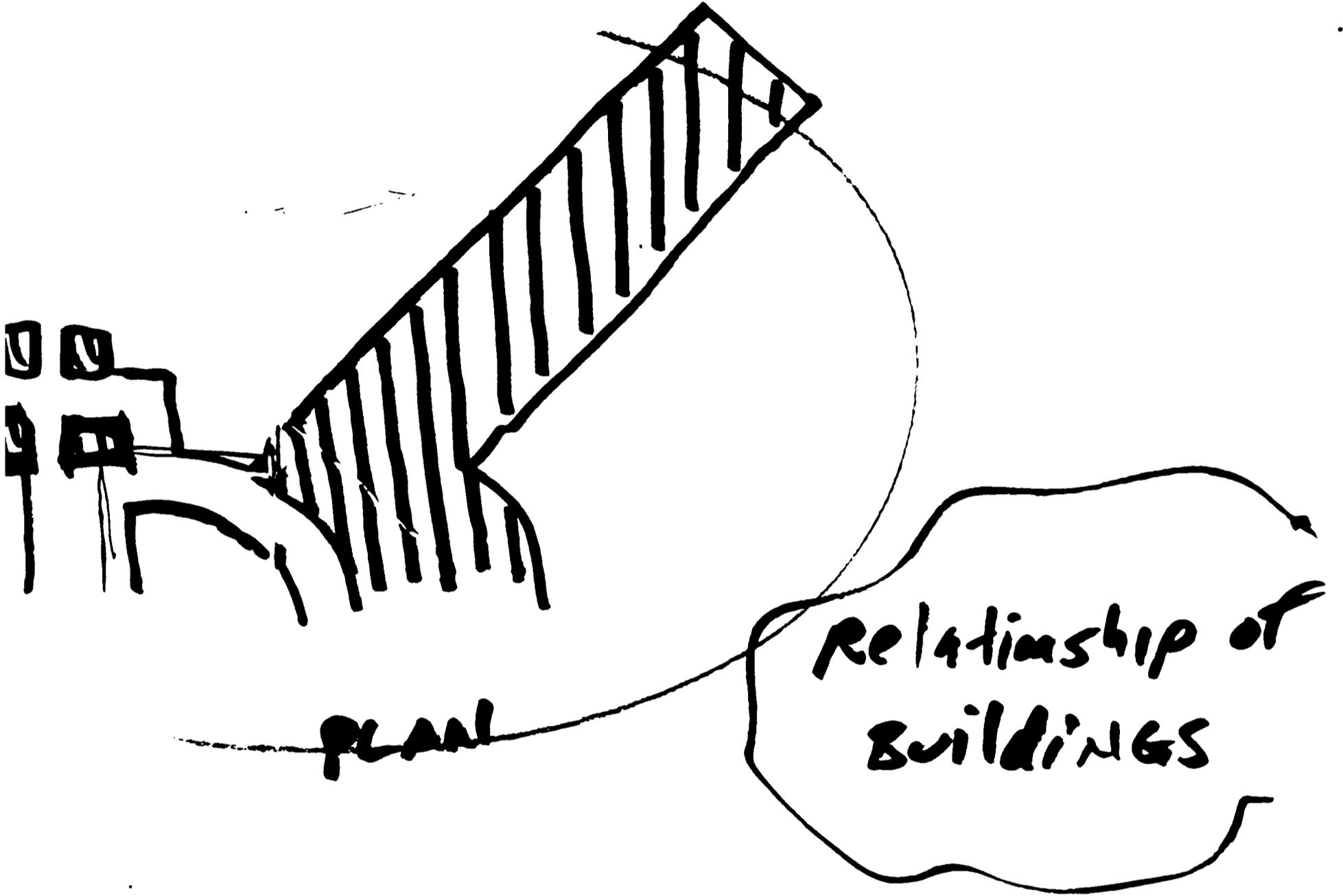


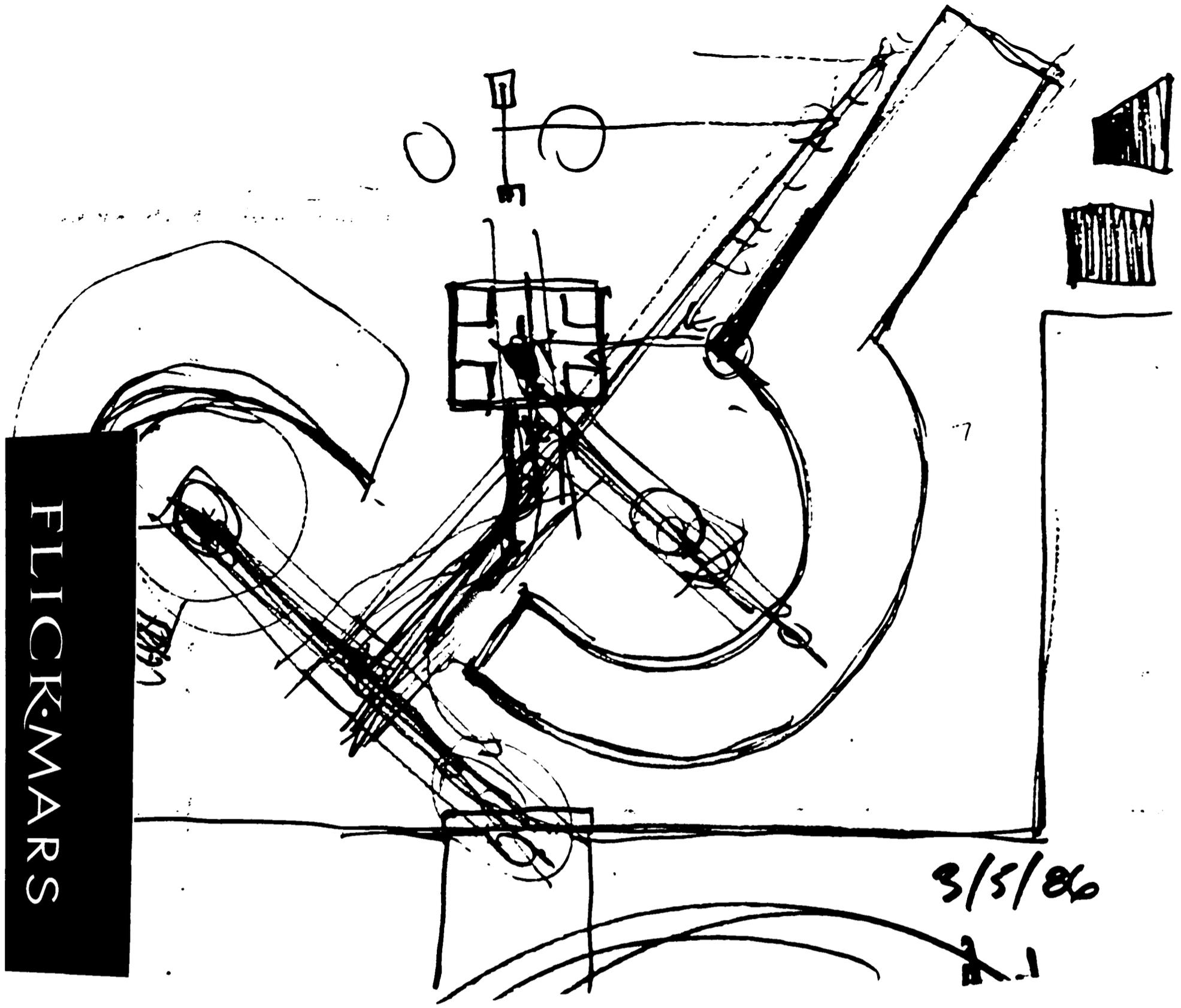
The following sketches depict a study of forms and their refinement in plan form for the structures that were to go into the courtyard.



Shape study - No scale The rectangular piece extending past the courtyard and onto Gaffney Street is meant to act as a visual barrier to the end of the street which dead-ends into North/South railroad tracks and the elevated Massachusetts Turnpike

Shape study - No scale The same shape tilted about on a different axis This provided more visual movement leading into the courtyard.

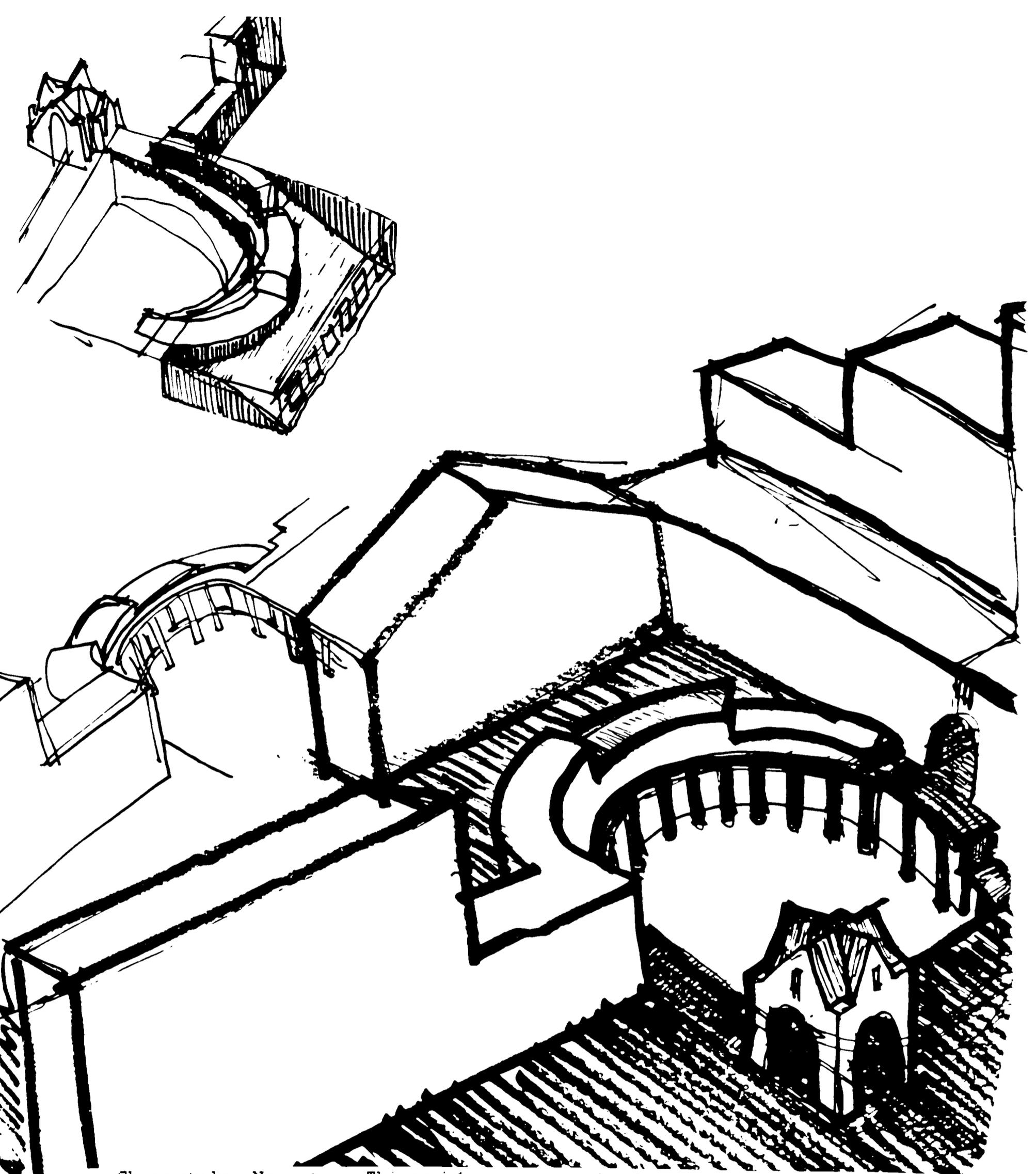




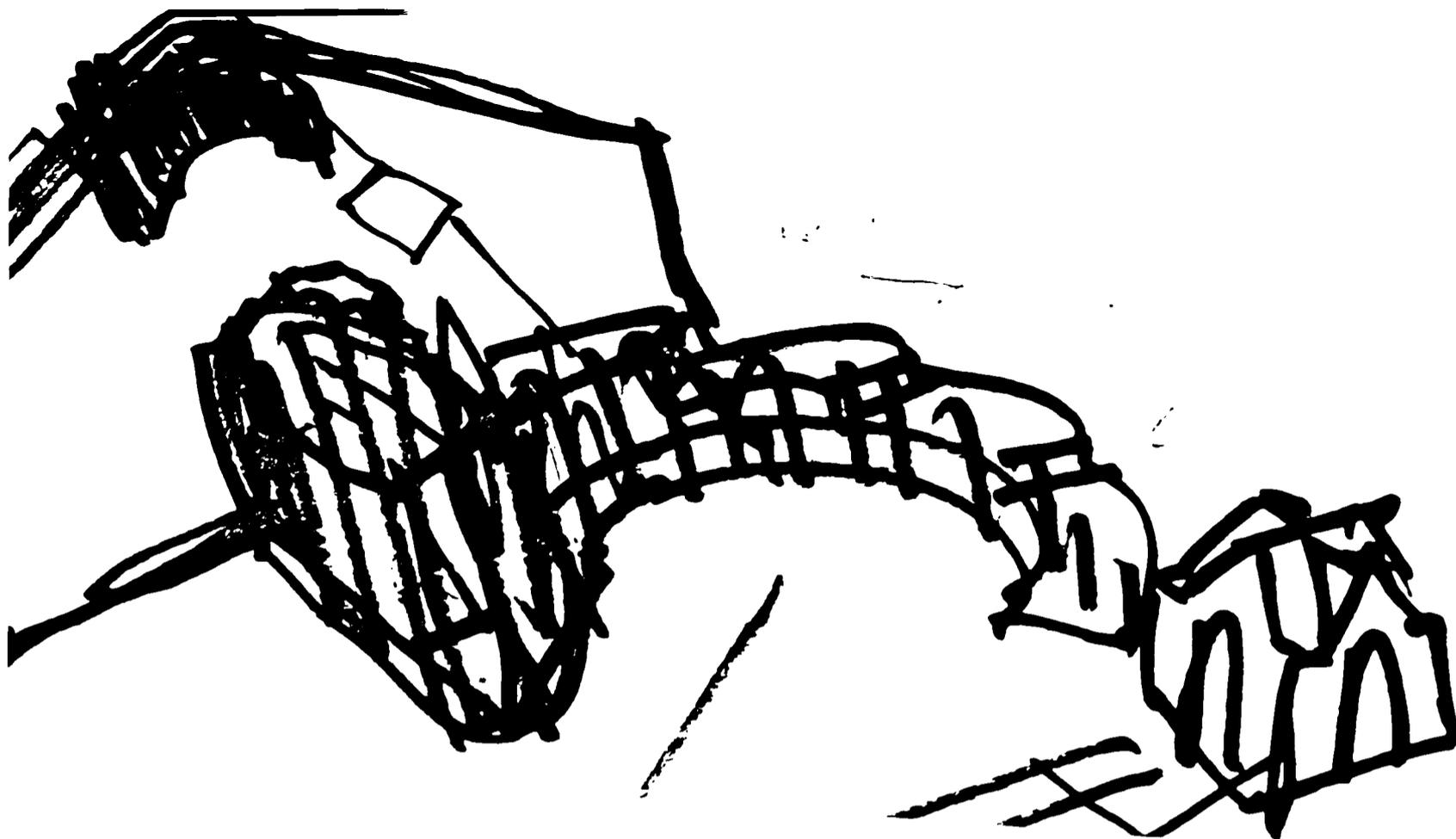
FLICKR·MARS

3/5/06
A.I.

Shape study - No scale The previous shape with the addition of another semi-circular shape facing from across the pathway leading from the gate to the main entrance.



Shape study - No scale. This serial axonometric sketch starts to define the 3-dimensional aspects of the previous plan sketches. The rectangular extension has vertical height so as to provide a visual barrier from the elevated turnpike and grade level railroad tracks at the end of the street. The curved shape steps down to allow south sunlight onto the adjacent building (which is the remaining portion of drill hall #1). The sunken courtyard below the curved shape is to allow light into the dining facility - which is still located in the same place as previous sketches depicted.

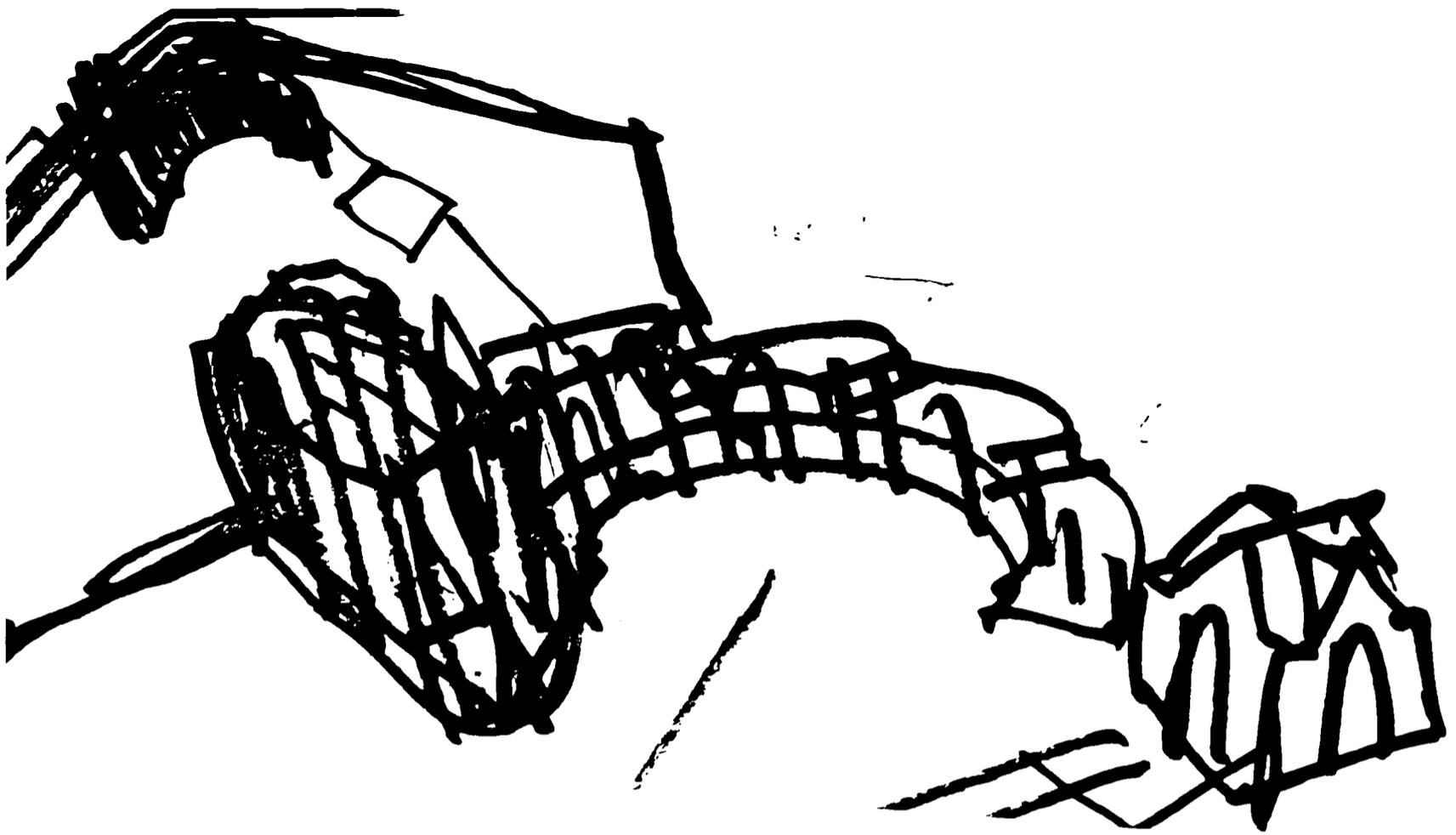


Shape study - No scale. The previous shapes with the addition of a secondary entrance leading into drill hall #1.

The following sketches depict refinements to the concept while working with various grade levels and detailing schemes.



Shape study - No scale. This thumbnailed sketch explored the detailing of the remaining facade of drill hall #1 (To be used as student rooms).

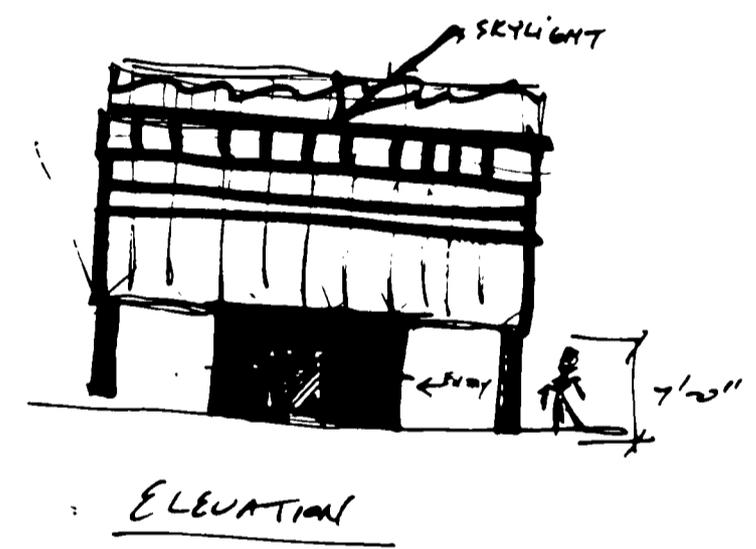
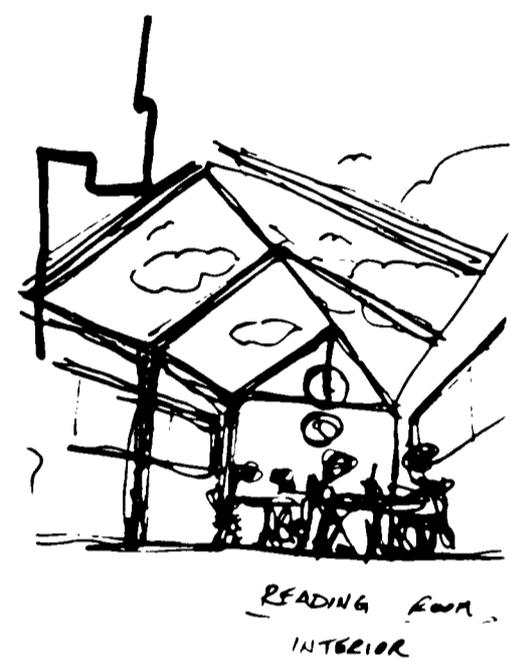
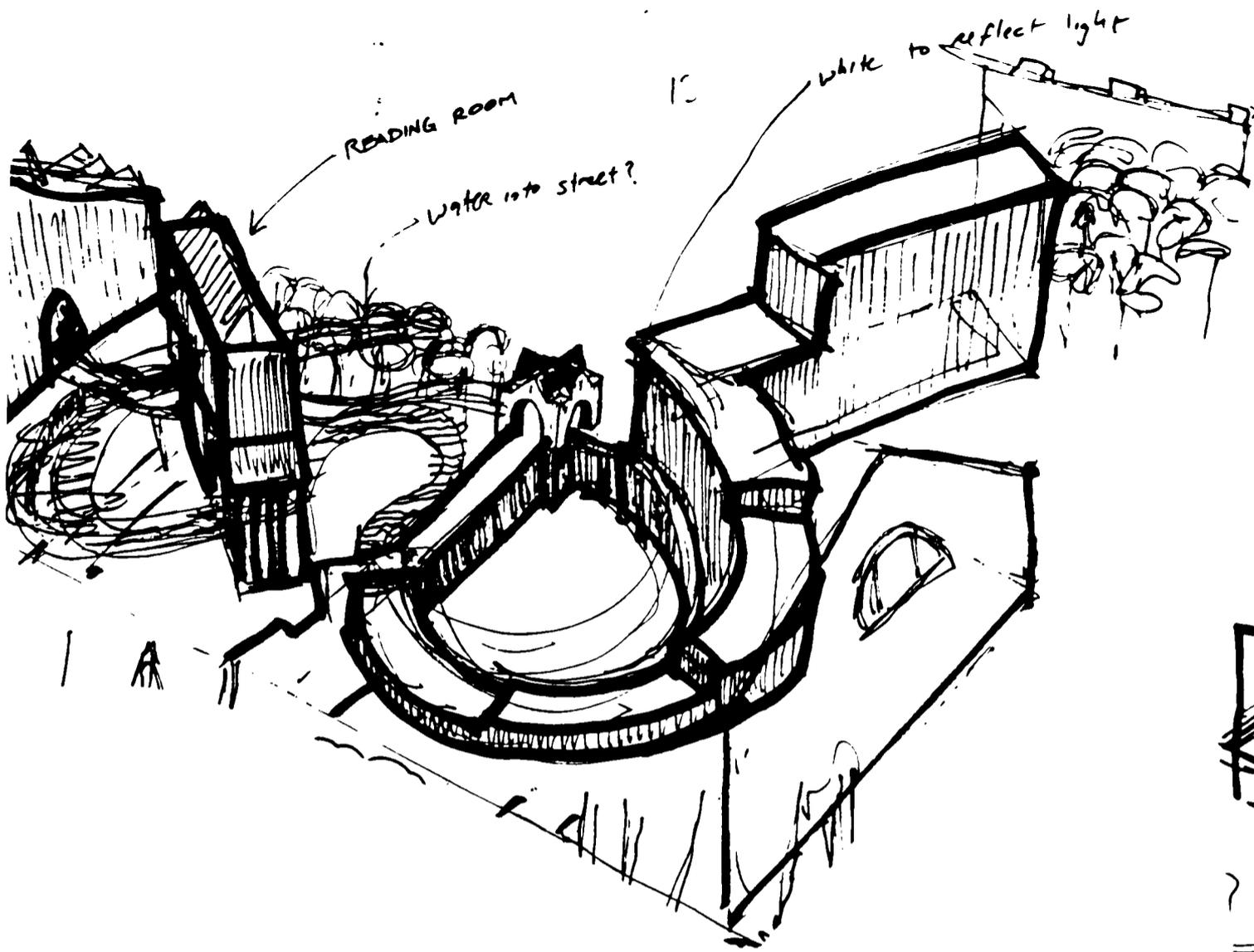


Shape study - No scale. The previous shapes with the addition of a secondary entrance leading into drill hall #1.

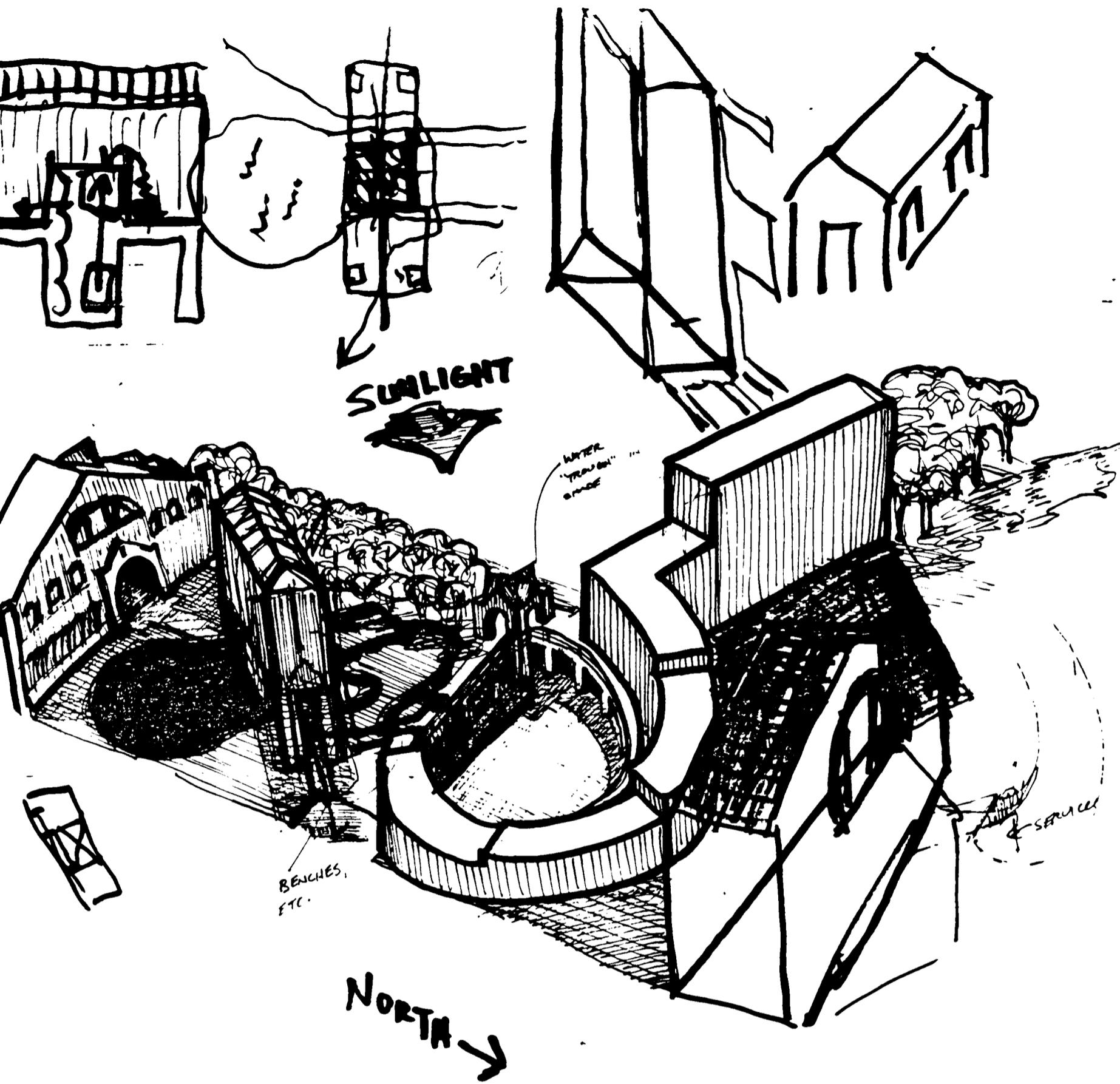
The following sketches depict refinements to the concept while working with various grade levels and detailing schemes.



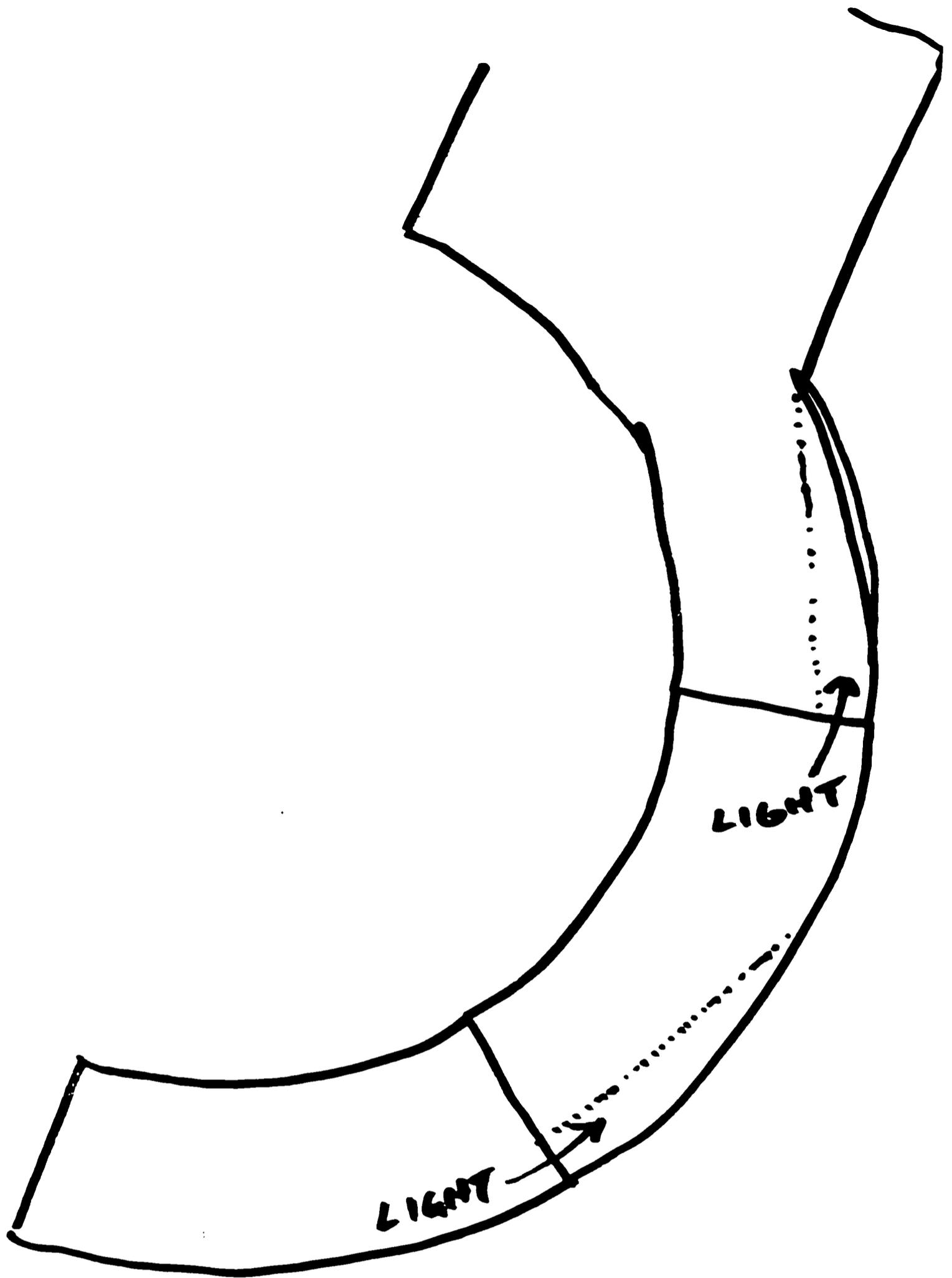
Shape study - No scale. This thumbnail sketch explored the detailing of the remaining facade of drill hall #1 (To be used as student rooms).



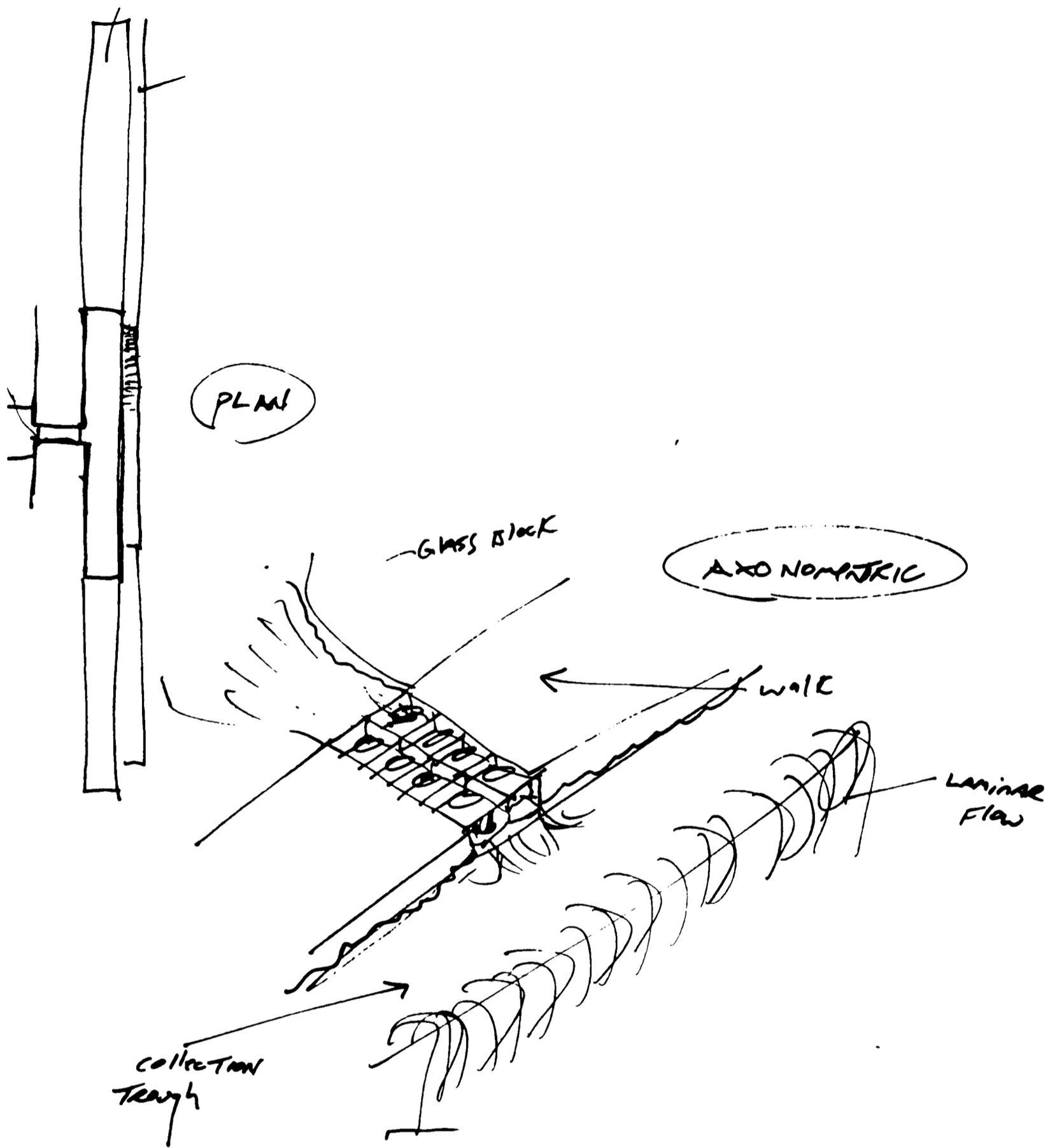
The aerial sketch of the courtyard depicts the rectangular shape rising above grade and looming above the curve shape. Sited at this angle, the rectangle would not intercept too much sunlight, thereby allowing daylight to pass thru the windows of adjacent buildings. The height of the rectangle also creates a rhythmical sense of movement by playing off of the lower curved building. The purpose of the reading room is that of a study lounge. The long gallery shape of the building, heightened by its' full length skylight provides the same linear shape and lighting characteristics of the successful reading rooms built into the the Bibliothèques of Paris in the 1800's. The interior of the reading room is depicted by the thumbnail perspective, while the exterior elevation shows the grade level to be used as vertical circulation to the second level reading room.



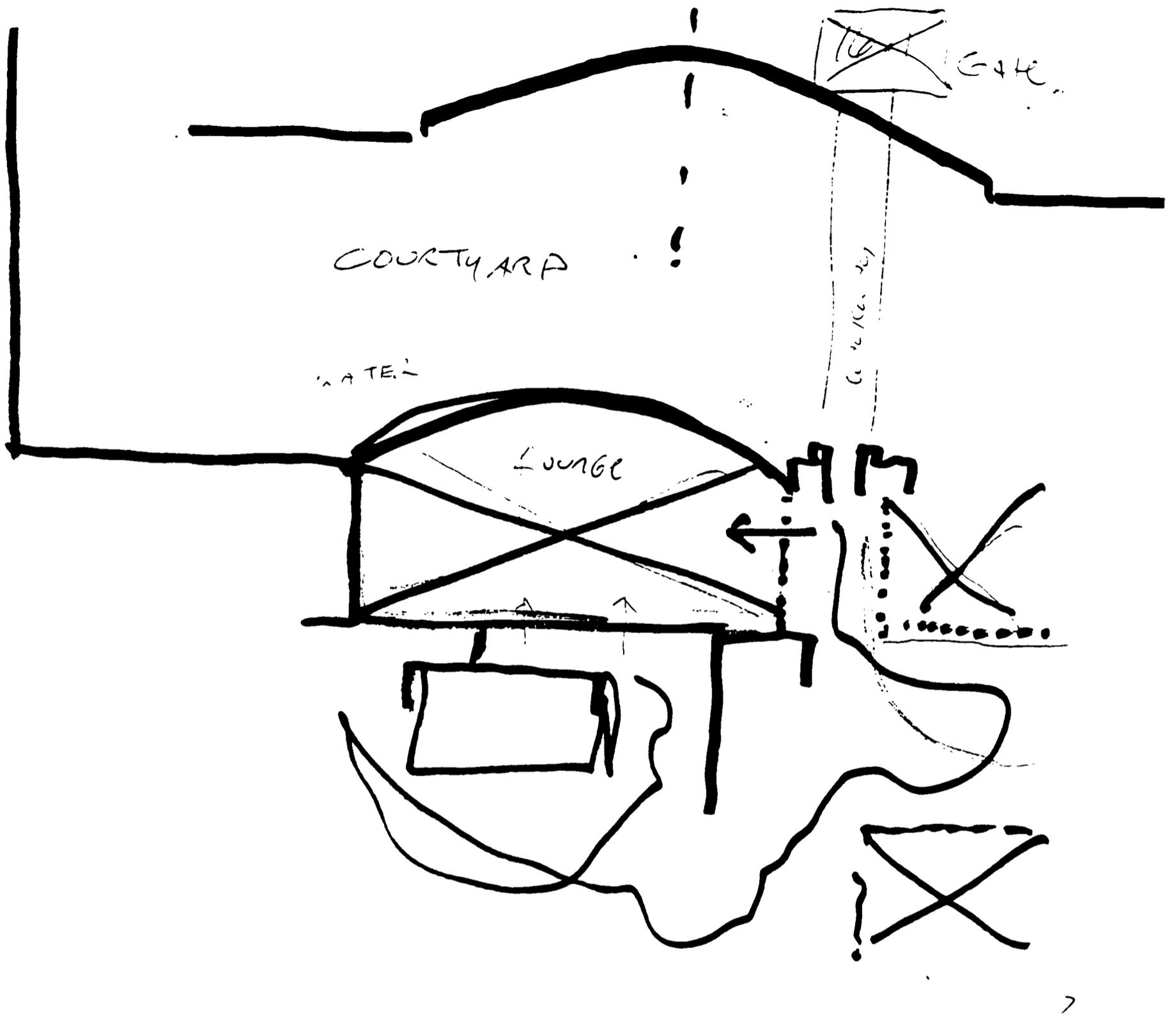
pe study - No scale. A further refinement to the courtyard shows a stream of water
 ing from a pond underneath the reading room (between its' pilotes') and into a
 iment trough, and finally over the edge of the trough, falling into a trough in the
 court below. The water would act as a cooling element in the warmer months of the
 roviding a place to dip one's feet into while studying - mimiking the nearby Charles
 at at a much closer proximity to the student living quarters, and most certainly
 han the Charles River. In the winter the water would freeze and could then be skated



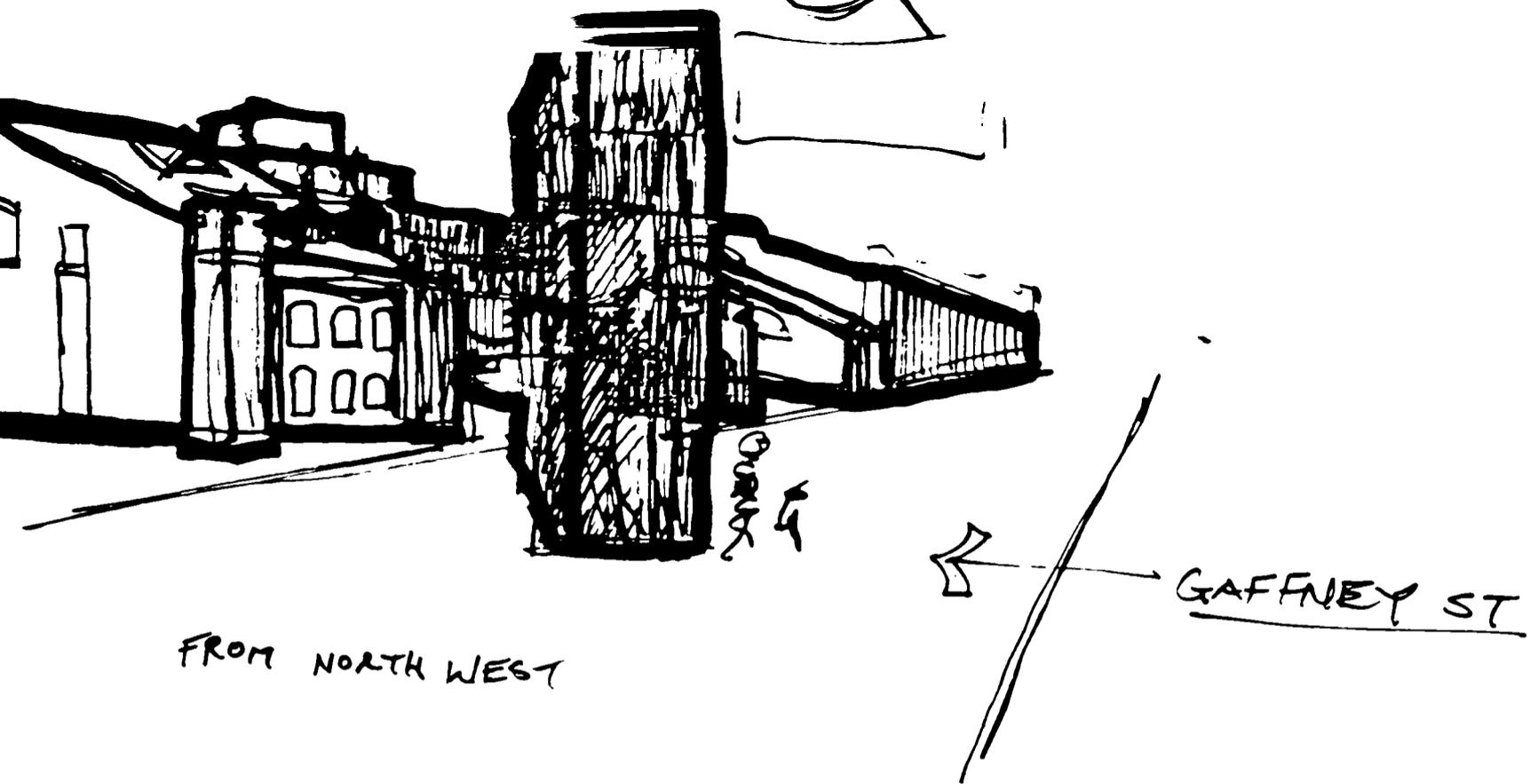
Shape study - No scale. The plan of the curve building depicts how light would enter through clerestory windows formed by the dropping height of the building (refer to previous axonometric aerial views of the courtyard to note the curved buildings decrease in height).



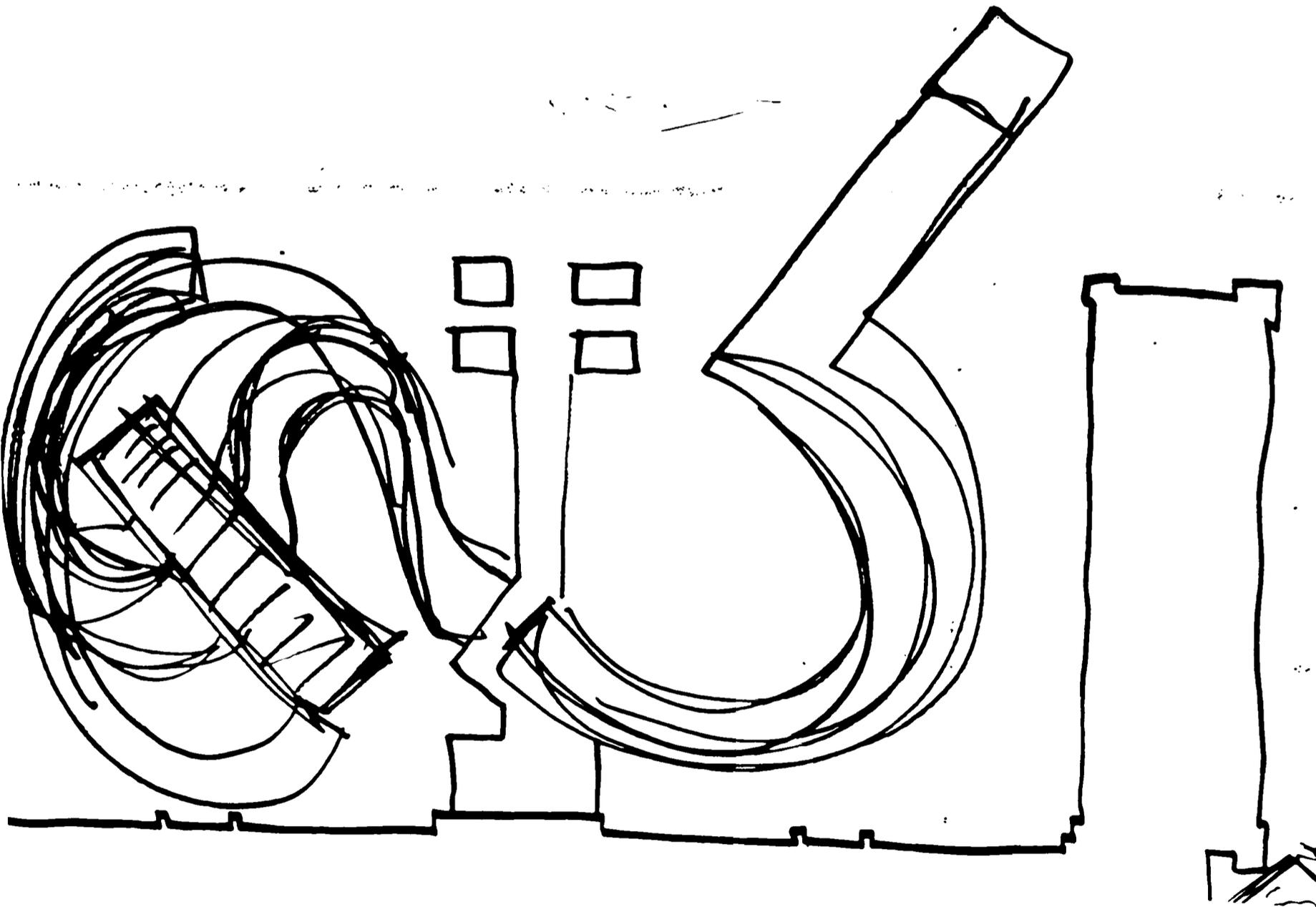
The following detail depicts how the water would flow under walkways. Glass block is used to provide a compromise for the translucent quality of water and the hard surface of a walkway.



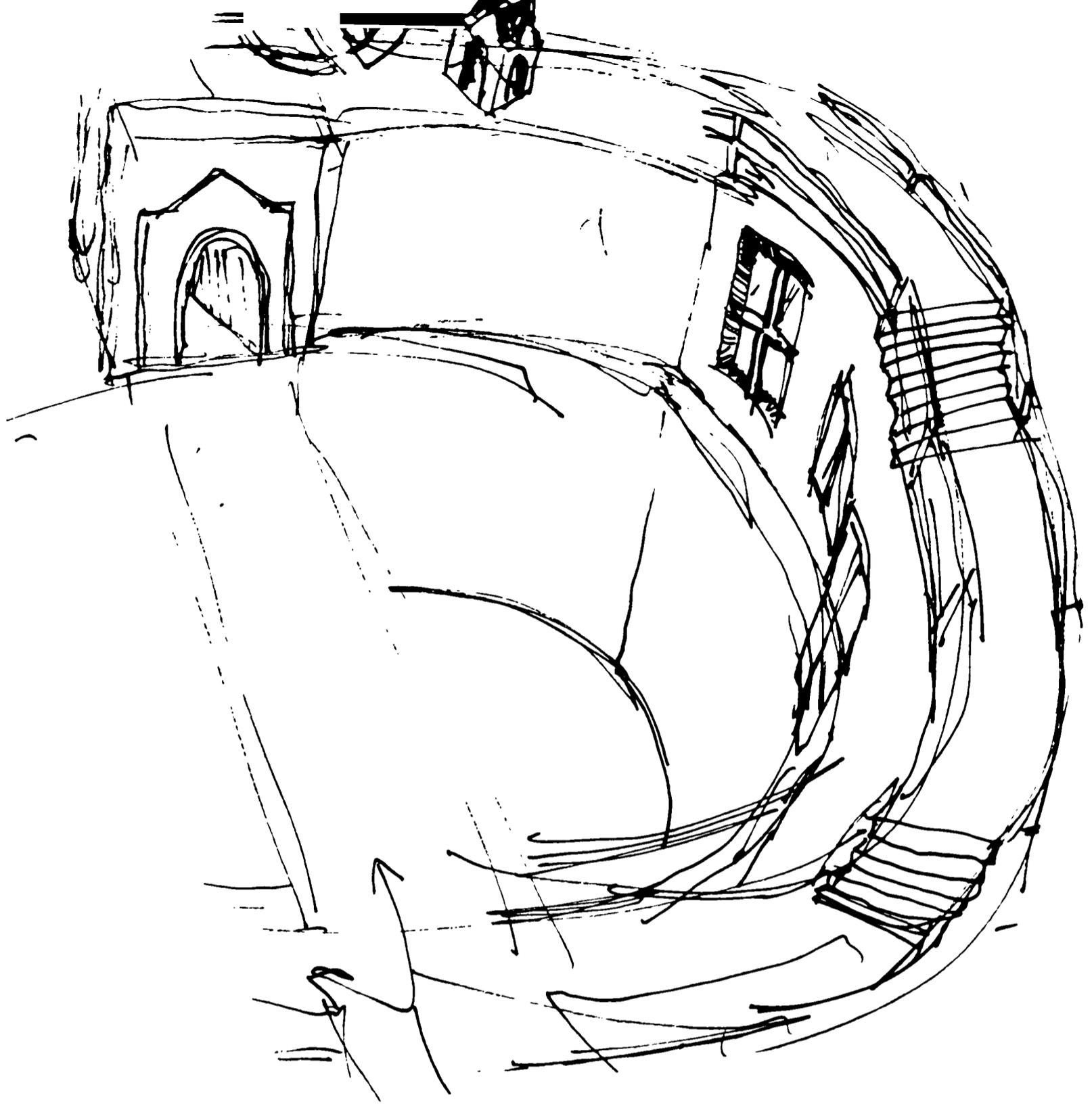
Shape study - No scale. This plan of a lounge shows the intrusion of a bay window into the pond behind the reading room. This intrusion would further the sense of visual movement in the courtyard thus opposing in a playful way, the symmetry of the contained courtyard



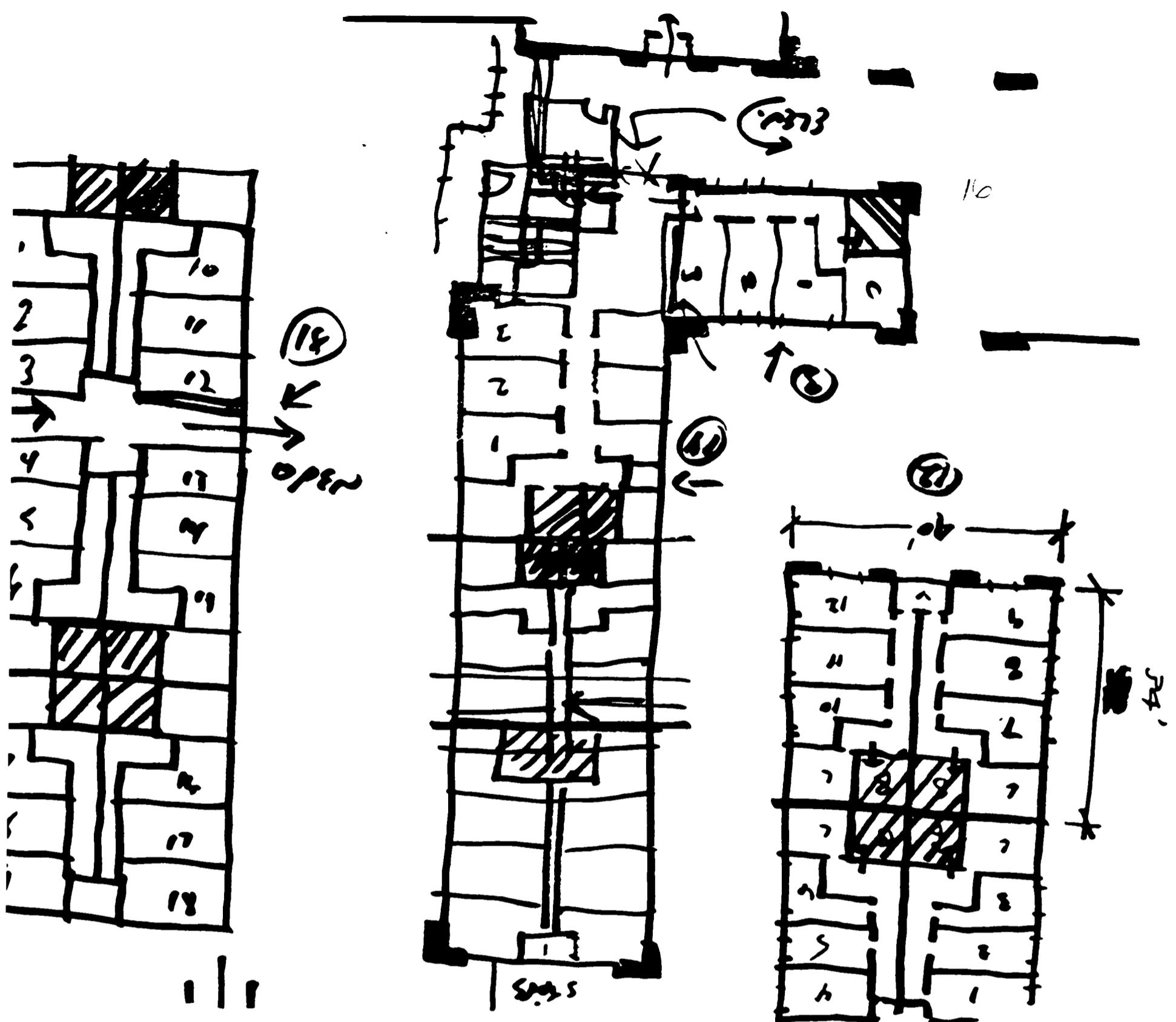
Shape study - No scale. This perspective depicts a north view of the "visual barrier" projecting onto Gaffney Street.



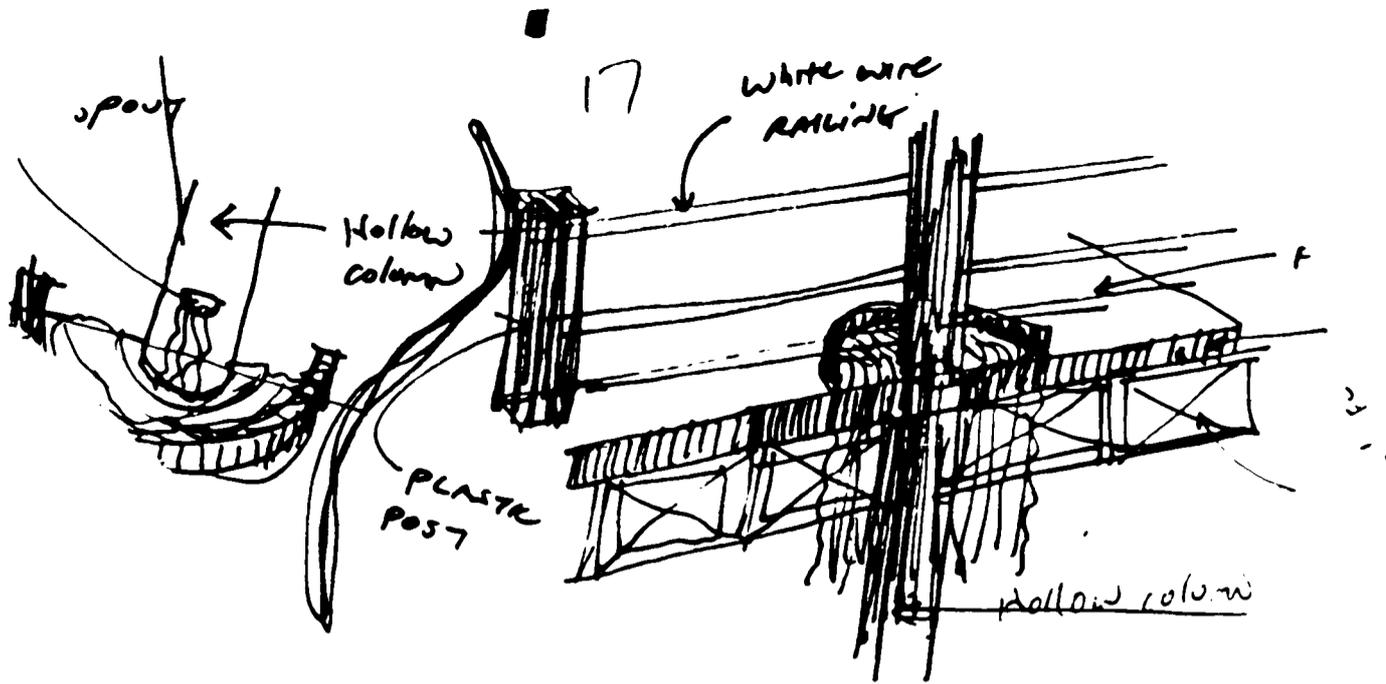
Shape study - No scale. The plan depicts a rectangular shape projecting from the curved shape on the opposite side of the entrance path. I felt another curved shape would merely become monotonous, hence the use of the rectangular form which reinforces the strength of the opposing curve.



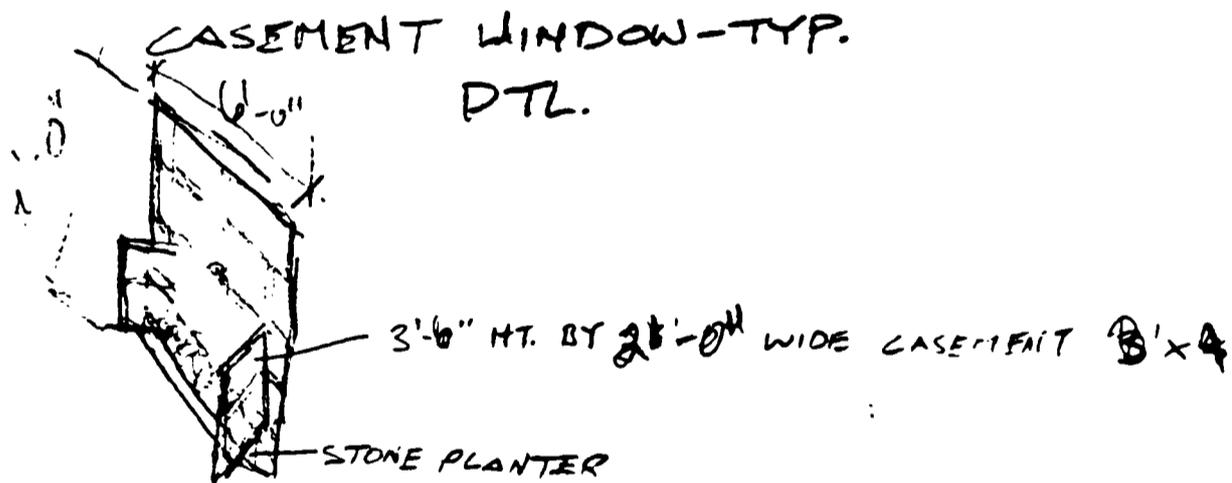
Shape study - No scale. This sketch explores the possibility of stepping the curved shape into the sunken court of the dining facility. This would add an exterior entrance. The idea was scrapped due to space limitations in having the building curve and sink into the ground.



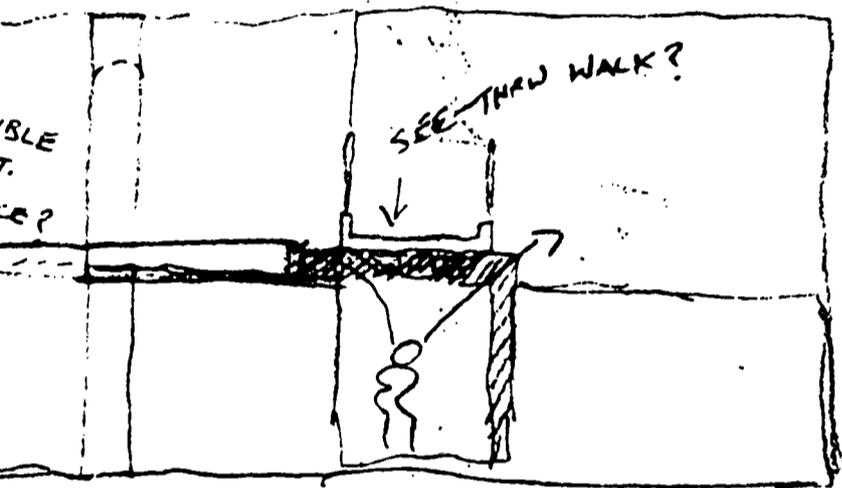
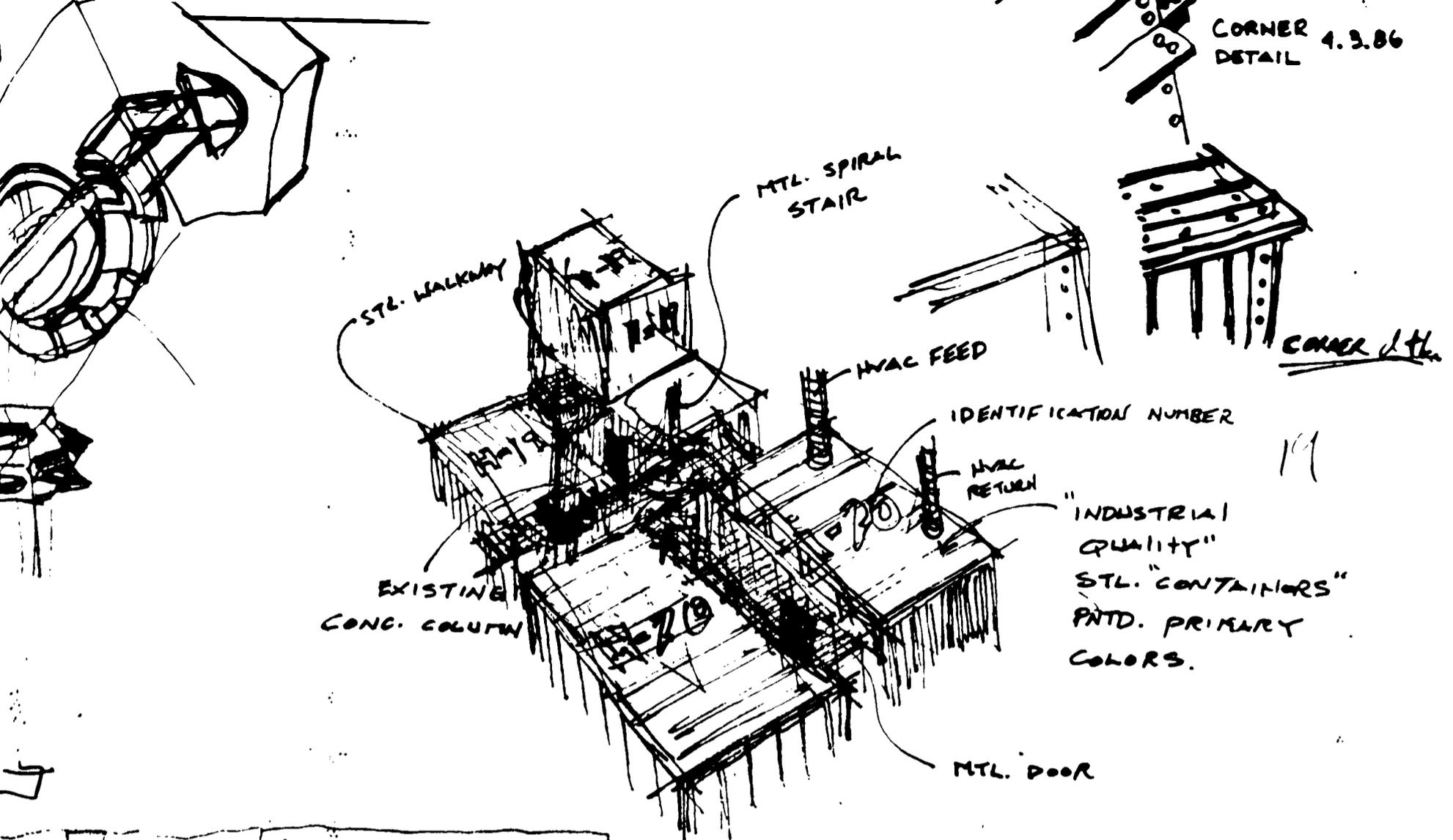
Shape study - No scale The plan depicts the room arrangement of the undergraduate rooms. A variation of these plans are used throughout the entire complex. The main attributes of the plan are that it provides a single room for each student, under six (and typically three) rooms per hall (which share a bathroom to be maintained by students - both for privacy, and to cut down on maid service costs). The many units formed by blocks of these rooms are arranged so as to provide a sense of individuality of living space for each student - whether the student lives in the tower or ground levels of the complex. I had hoped to mimic historic downtown Boston with this village-like approach to room arrangement.



Shape study - No scale. This sketch depicts a study of a fountain located above the shallow, grassy amphitheater on the east side of the complex. The water would fall from a semi-circular "feed" fountain on the bridge into a circular pond below. Water would be pumped up from the circular pond to the "feeding" fountain via a duct inside of a hollow column.



Shape study - No scale. The sketch depicts a casement window with a planter acting as a lintel element. This would be typical for all student rooms.

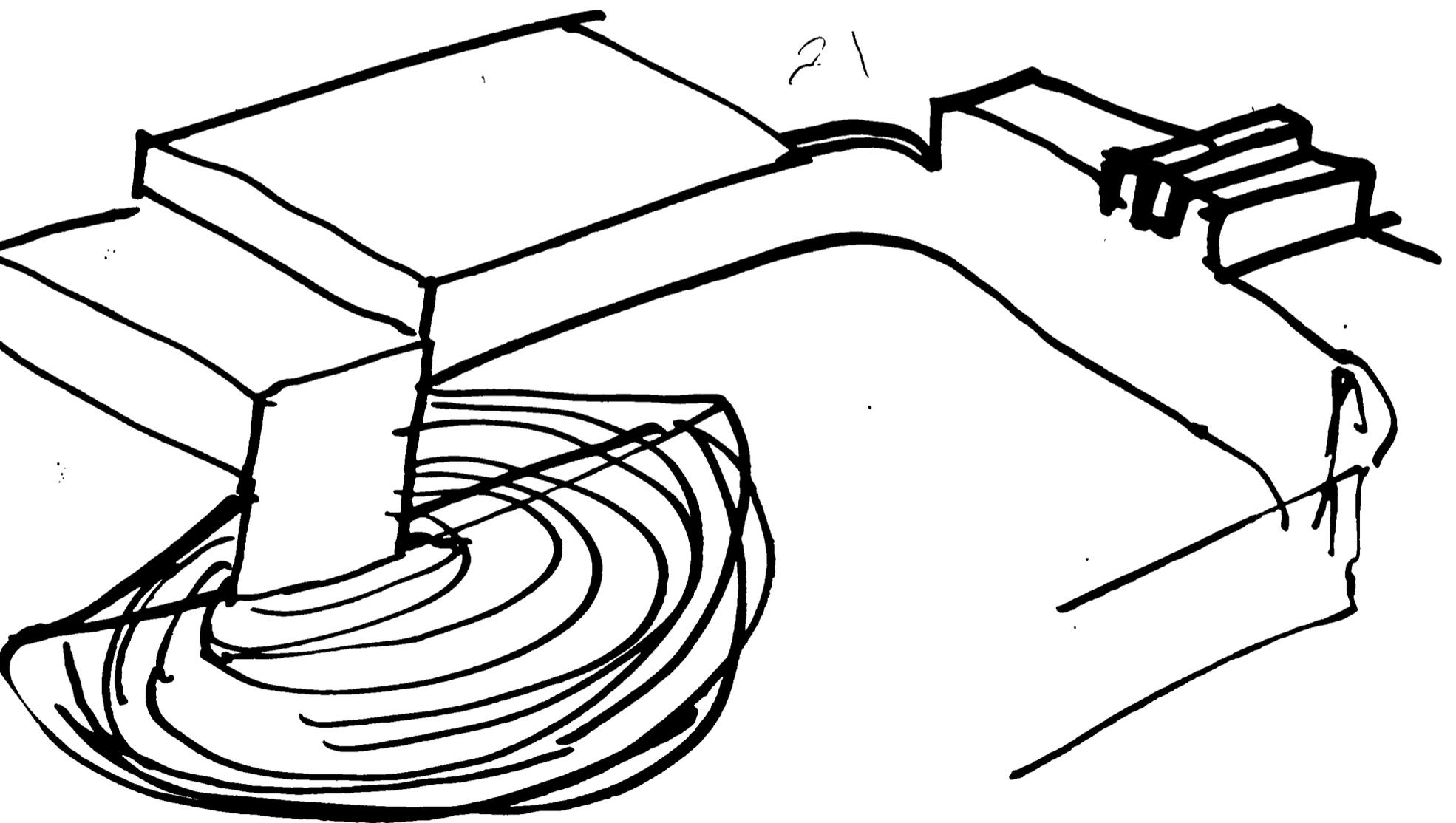


4.3.86
 MULTI-USE
 &
 STORAGE AREA

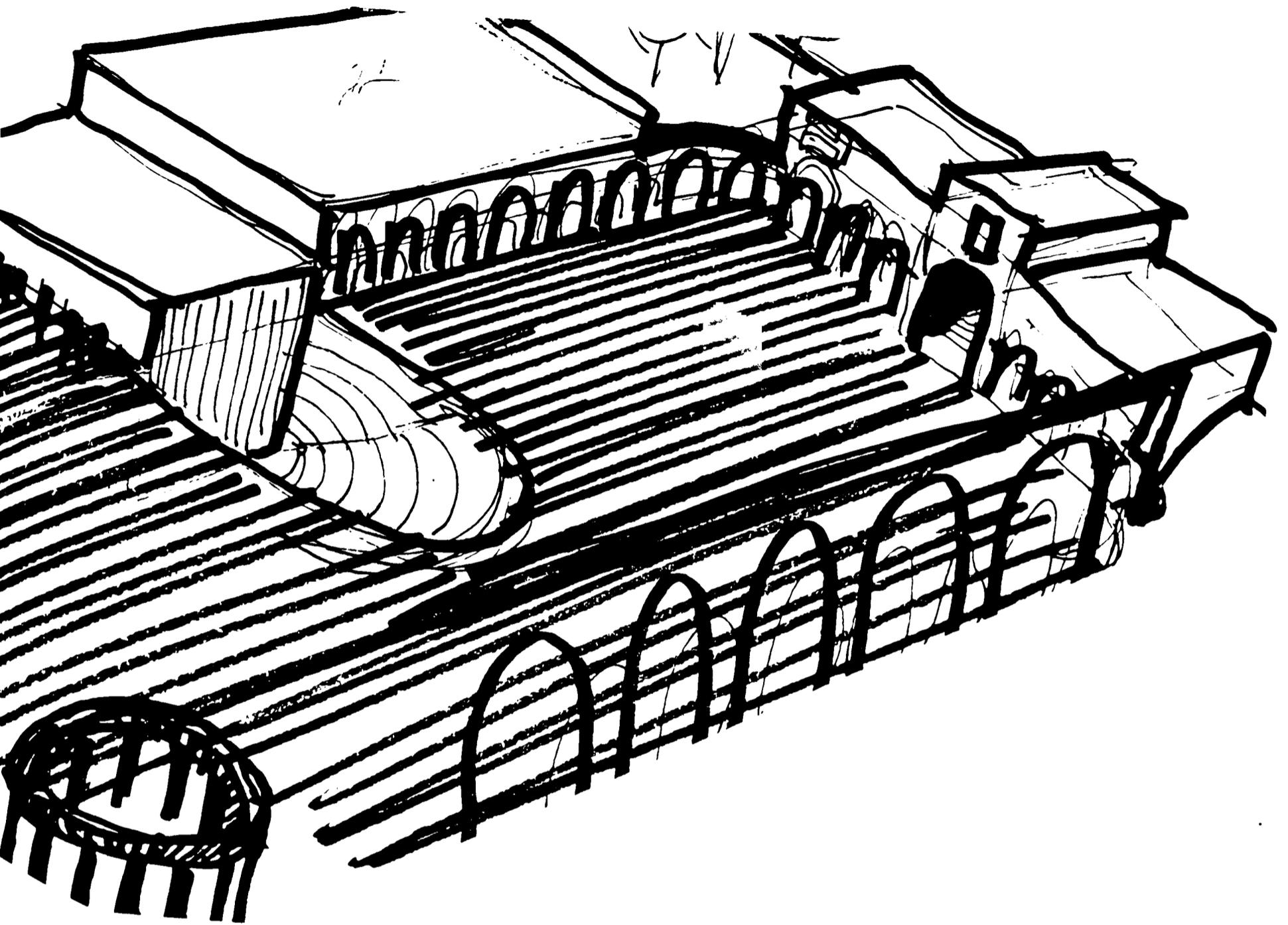
Shape study - No scale. The sketch depicts the interior of the existing armory building where a double-height space will be used for multi-use rooms and storage areas. The space for these areas will be made from industrial type, rectangular shaped, metal containers with doors, hvac, lighting and electrical power added depending upon the intended usage of each "container". Each container will be painted a bright color and a stenciled number added to the outside to identify the use of each space.



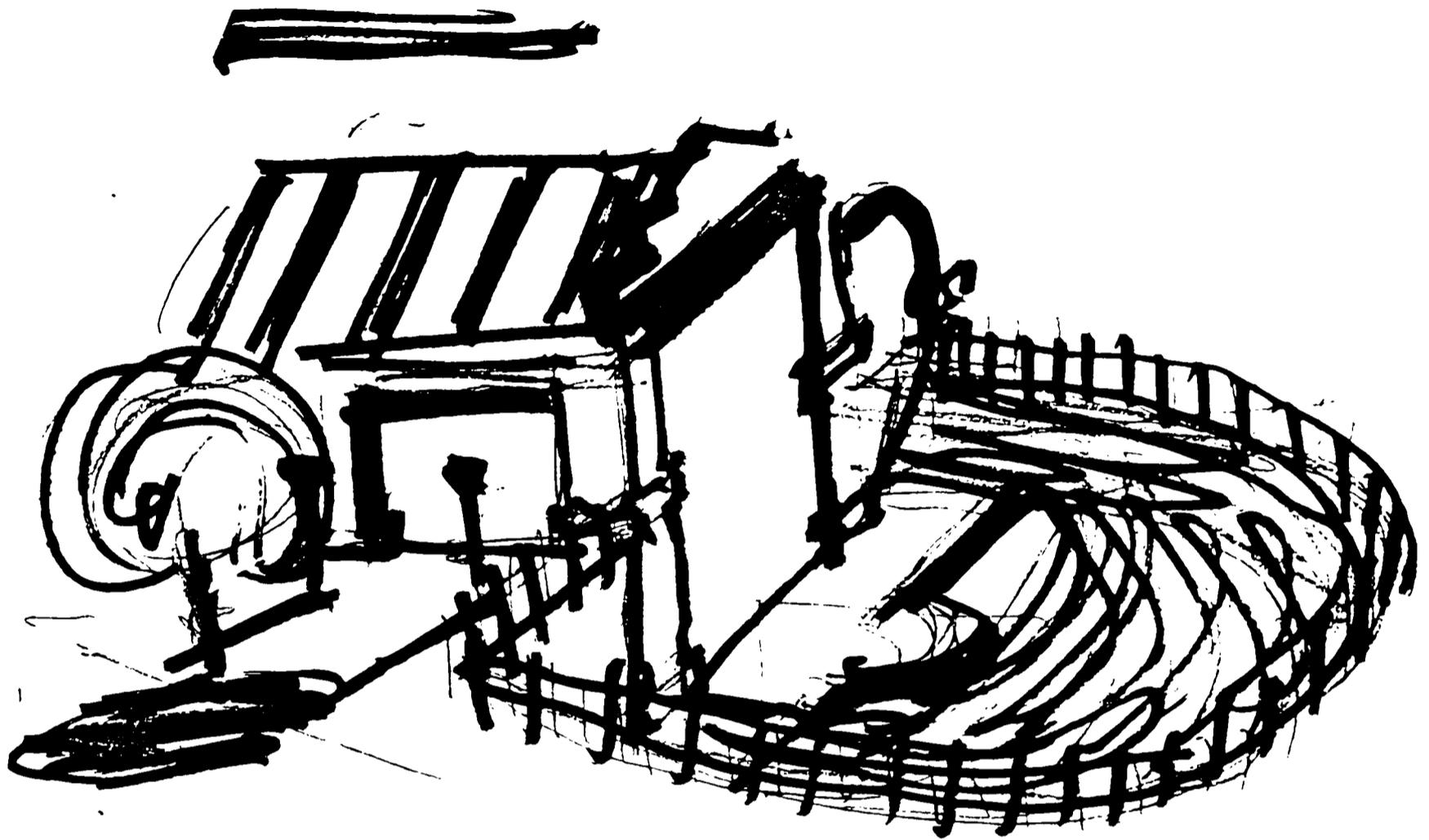
Shape study - No scale. The elevation depicts the circular stair landing that will serve as an identifying symbol leading from the open mall area to an entrance into the complex.



Shape study - No scale. The serial axonometric sketch depicts the open mall area used to provide a recreation space for student use. The amphitheater is to be used for outdoor productions by the theater department, and also for concerts, speeches, etc.



Shape study - No scale. This sketch depicts a further refinement of the mall area. Also depicted is the reuse of the existing administration building into a grand entrance to the site. The administration building would be used as a raquetball facility holding six courts, staff offices, space for the rental and sale of sports equipment, locker rooms and an observation deck overlooking the courts



Shape study - No scale. This perspective sketch shows the end of a proposed parking garage lowered to a pedestrian-scaled height, and sunk into the ground forming the backdrop for the amphitheater. Behind the backdrop would be space for practice rooms, equipment storage, teaching labs, and staff offices. A service drive runs behind the building to the east and converges with the entrance to the parking garage which comes into the site from Buick Street, an name aptly suited for a street used as a vehicular entrance to the site.

