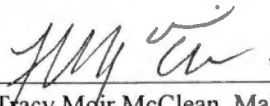


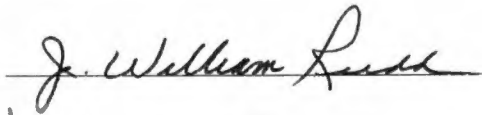
To the Graduate Council:

I am submitting herewith a thesis written by Christina Heidel entitled "An Exploration of Engagement in the Contemporary Workplace." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Architecture, with a major in Architecture.



Tracy Moir-McClean, Major Professor

We have read this thesis and
recommend its acceptance:




Accepted for the Council:



Associate Vice Chancellor and
Dean of the Graduate School

An Exploration of
Engagement
in the
Contemporary Workplace

A Thesis
Presented for the
Master of Architecture
Degree
The University of Tennessee, Knoxville

Christina Heidel
August 1999

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ABSTRACT

This design investigation is based upon the observation that the lack of social, physical, and personal engagement in a building contributes to problems in the contemporary built environment. The vehicle for exploration is the speculative office building because it presently manifests a significant lack of engagement. The building as an entity, the corporate suite within the building, and the individual unit will be reconsidered.

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INTRODUCTION

The problem

During the past few years of my study of architecture, a few problems with the contemporary built environment have become apparent to me. I have repeatedly heard similar complaints from numerous sources:

1. Our American cities are lifeless, in particular the Central Business District.

The recent de-emphasis of architecture's social role contributes to this problem. Catherine Slessor explains that "without this social dimension, humankind is reduced to an assortment of individual private pursuits, with no notion of community or the greater good. As with most of the social arts, architecture has always had a critical role to play in this expression, providing the built framework that mirrors, regulates and defines society . . . Yet much recent architecture has retreated from social responsiveness, becoming instead self-referential and self-motivated. Empathy and social conscience have been replaced by narcissism and self-indulgence." (4) She attributes this problem to a current perspective, which views buildings as simply economic commodities.

The retreat from social responsiveness results in the privatization of space. Peter Calthorpe describes this plight saying that this private domain, the world behind walls, has in fact displaced the public realm, resulting in isolated [lifeless] communities. Public space now lacks identity and is anonymous. He says, "Our communities are zoned black and white, private and public, my space or nobody's." (23) This concept is illustrated in the photograph a parking lot (figure 1) located in an American downtown.

As a consequence of this privatization and zoning of space, buildings are programmed in a limited way. They are intended only for a few uses by the particular private entity during a selected time period of the day, and the impact that the building may have on city dwellers is not considered. Because these buildings do not offer anything to city dwellers, the areas in which they are located, typically the Central Business District, often remain empty after the five o'clock hour, resulting in a lifeless city.



Fig. 1: A private, "zoned" space within a city.

2. *The building industry does not build in a way that considers and is sympathetic to our natural environment.*

Diana Lopez Barnett, author of *A Primer on Sustainable Building*, states that today's buildings "place undue demands on the earth, wasting tremendous amounts of energy and water. Sited and designed with little regard for local climate, new buildings are far more expensive to heat or cool than necessary. Meanwhile, leapfrogging, sprawling development erodes existing communities, converts prime farm lands into housing, requires expensive new highways for commuters, and exacts a heavy toll on the environment." (1)

The advocates of sustainable design argue that we have lost engagement with the earth, that we do not involve the earth and its cycles in informing our built environment. Barnett states: "It is only in the past century or so, as cheap energy, large sheets of glass, and air conditioning appeared, that architecture lost its moorings and forgot the ancient truth that the most important building covenants are dictated by the earth." (14)

3. *Many contemporary buildings ignore the needs of their users, thus, not helping the users to dwell.*



Fig. 2: A bleak space found in an office suite.
Source: Sommer

Barnett states that today's buildings neglect their occupants and continues, "The news is sprinkled with stories about "sick" office buildings whose air quality makes workers ill. Office workers often toil in bleak spaces (figure 2) with windows that won't open and lighting that is poor." (2) A space such as this is meant only to provide shelter.

However, humans have inherent needs that transcend shelter. Christian Norberg-Schultz speaks about this in *Genius Loci*: "Man dwells when he can orientate himself within and identify himself with an environment, or, in short, when he experiences the environment as meaningful. Dwelling therefore implies something more than shelter. It implies that the spaces where life occurs are places, in the true sense of the word. A place is a space which has a distinct character ... and the task of the architect is to create meaningful places, whereby he helps man to dwell.." (5)

Spaces such as the office space described above do not help an individual to dwell because the spaces do not provide for basic everyday human needs. One example of a basic need is

orientation. Workers that toil in the bleak spaces often have no contact with the outside world or are separated from it by tinted glass, which causes the individual discomfort and disorientation. William Lam states: "Visible evidence of the presence of sunlight satisfies a basic biological need, providing important clues about three dimensional form and orientation." (25)

Definition of engagement

It has been my observation that lack of social, physical, and personal engagement contributes to the present condition. This thesis will explore ways in which to increase engagement in the built environment, in order to offer alternatives to the current problems.

The investigation is concerned with the following parts of the definition of engagement as defined in *The American Heritage Dictionary*: to involve, to participate, to attract (454).

This thesis will discuss and explore three types of engagement, referred to as social, physical, and personal engagement.

Social engagement

Social engagement describes the condition in which an individual entity (a human or a building) participates in a collective life with other entities. This broad statement can apply to many issues in many disciplines. For the purpose of this architectural investigation, social engagement means involving the public in a building.

The goal of social engagement is to increase the amount of space within a building that can be used by the public sector. The public, in this thesis, refers to people that do not normally inhabit the building, such as city dwellers. The thesis will explore ways in which to offer spaces that are traditionally private to the public in order to revitalize the city, particularly the Central Business District.

Physical engagement

For the purposes of this thesis, physical engagement is the condition in which the climate of a particular site, the earth and its cycles, and the existing built environment are involved in the design of a building.

The goal of physical engagement is to design in a way that considers the implications of the inherent nature of a particular site. This thesis will explore the ways in which to utilize the site

in order to make a building a more sustainable entity.

Personal engagement

In this thesis, personal engagement describes the conditions in which an individual is involved in the formation of a particular space, in which an individual is attracted to a space, and in which one participates in choosing the characteristics and location of his or her space.

The goal of personal engagement is to make a space a place for an individual. The thesis will explore ways in which architectural programming and design of space can accommodate individual need and desire for personal engagement with space.

Relationships of engagement

A person can engage with:

1. the tectonic parts of the building
2. the space that the building encloses
3. the space and phenomena outside the building (the earth [ground], the city and urban ecosystem, the sky [air and sun])

A building can engage with:

1. the users
2. the city dwellers
3. the physical surroundings (the earth [ground], the city and urban ecosystem, the sky [air and sun])

Investigation of the speculative office building

The design investigation of this thesis will explore ways in which to increase engagement through analysis and reprogramming of the speculative office building for white-collar workers in the sales and service industry. This vehicle was chosen because it is the dominant type of office building in America.

The speculative office building manifests a significant lack of social, physical, and personal engagement. These office buildings are typically a private entity in the city, or are removed from the public by their location in suburban office parks. These buildings are typically placed upon a site without regard to its inherent nature and the spaces of work are often designed without regard to the needs of the occupants.

Reprogramming as a method for increasing engagement

The majority of contemporary office buildings are programmed without regard to social, physical, and personal engagement. The usual programming process for offices comprises of functional relationship diagrams and square footage allocations (Russell 138). This limits the way in which the designer conceives the use of spaces and the building as an entity on the site. In order to broaden this perspective, programming should include social, physical, and personal engagement. Consideration of engagement in the design of a building will provide alternatives to the aforementioned problems.

The building as an entity, the corporate suite in the building, and the individual unit in the suite will be reconsidered. Reprogramming this building type in terms of engagement will not only achieve the goals but will benefit the developer, the tenant/owner of the business, the worker, and the city dweller in practical ways.

In order to better understand the problem, the contemporary condition will first be analyzed through an investigation of the history of office buildings in the twentieth century.

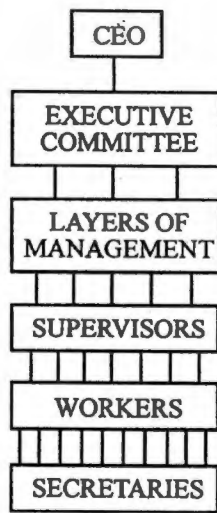


Fig. 3: The relationship between workers in the hierarchical structure.

Worker type	Characteristics
CEO and Executive Committee	Make decisions about business problems
Layers of Management	Summarize information to report to next level
Supervisors	Control and check the workers' tasks
Workers	Complete one specialized task
Secretaries	Draft letters for the upper layers

Fig. 4: The characteristics of the personnel in the traditional organization.

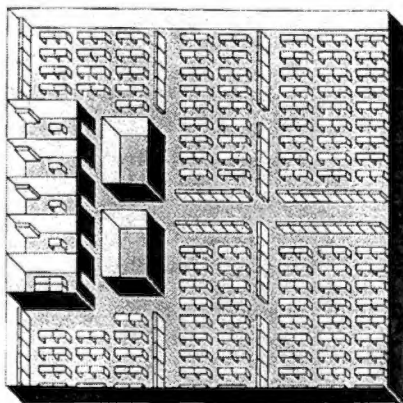


Fig. 5: The typical layout of desks in the open plan before the 1960's.
Source: Duffy

ANALYSIS OF THE PAST CONDITION

The traditional model of corporate organizational structure

The traditional organization is hierarchical (figure 3) with functional departments. In this model, information flows up a hierarchical chain of command, through many layers of management, and eventually reaches the chief executive officer and his committee, who make the decisions. The decisions are relayed back down the many layers of management and eventually reach the workers. Personnel in this model have distinct roles (figure 4).

The history of the office building, suite, and individual unit

In the early twentieth century, Frederick Taylor's Scientific Management Theory (Taylorism) changed the way in which office work was conceived. This theory emphasized the importance of production in the workplace. Time-motion studies were used to determine the most efficient use of the human body to complete a task, resulting in the division of work into small parts and in the implementation of assembly line methods in the workplace.

Frank Lloyd Wright's Larkin Building (1904) was the architectural manifestation of Taylorism. The ideas behind the Larkin Building gave form to the first open plan office. This open plan layout facilitated the overseeing of the "assembly line", the secretaries and clerks who performed the mundane tasks, as well as reflected the hierarchical structure of the office personnel. Workers in this type of layout sat at desks arranged in ordered rows (figure 5).

The Seagram Building

The offices of the early 1950's were places for the collection and routine processing of paper based information (Laing cited in Worthington 27). American office buildings of the 1950's were typified by the narrow slab tower of the Lever House (1952), and afterwards, the widely imitated Seagram Building (1954) (figure 6).

Mies van der Rohe and Philip Johnson designed the Seagram Building in New York City between 1954 and 1958. Imitations of this building proliferated around the world as a species of corporate imagery (Curtis 266). The layout of this building is an open plan with a service core (figure 7). The universal solution of the



Fig. 6: The Seagram Building's narrow tower.
Source: Drexler

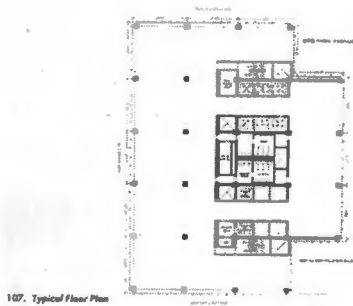


Fig. 7: The typical plan of the Seagram Building.
Source: Hilberseimer

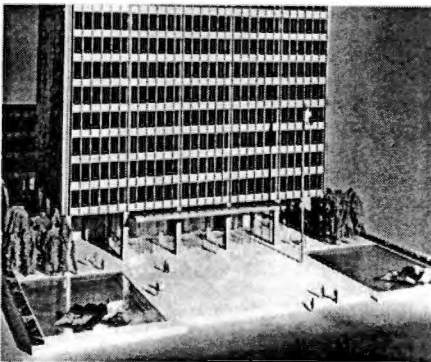


Fig. 8: The Seagram Building's position in relation to the street.
Source: Drexler

Seagram Building is a prime example of the lack of engagement found in office buildings.

Social engagement:

The building's position in relation to the street hinders social engagement. It is removed quite a distance from the street (figure 8), which does not invite the city dweller to use the building. Although, one may argue that the public plaza does offer something to the city dweller, interestingly, the public plaza was not conceived for the purpose of city dwellers. William Whyte, an urban planner, relates that Mies van der Rohe "was astonished to see people sitting, talking, sunbathing, and eating outside the Seagram Building. In designing the Seagram, it never occurred to van der Rohe that the steps and ledges would become a public place that promoted community in New York City." (Boyer 147)

While the plaza does offer something to the city, the building itself does not. Besides a first floor restaurant, there is little first floor program for the public (figure 9) The lobby offers little other than a bank of elevators. The building appears to float above the ground, which presents contradicting connotations. Spiro Kostof says, "The rectangular shaft stands regally on two-story stilts." (729) This indicates that the building is "too good" to touch the ground, thus engage with the city dweller. The second interpretation is that people are welcome into the building as the bulk of the building is pulled up so that the first floor is transparent to allow people to see in. However, this does not appear to be the intention as there is little program on the first floor that engages the passerby's interest or participation.

The articulation of a façade is also an important component of social engagement. A traveler judges a building by the face that it presents to the world and decides whether or not to enter. The façade of the Seagram Building is not welcoming to pedestrians. Kostof describes the Seagram Building: "This window wall is a homogeneous mesh of custom-made I-beam mullions of dull, oiled bronze arranged in unbroken runs, matching spandrels in a copper alloy and dark amber glass that is keeping with the overall somber quality." (729) This façade is unwelcoming to the pedestrian, for one loses a sense of human presence when faced with the reflective glass and the homogeneous articulation of the repetitive floors (figure 10). Juhani Pallasmaa says that reflective glass "reinforces the dreamlike sense of unreality and alienation.

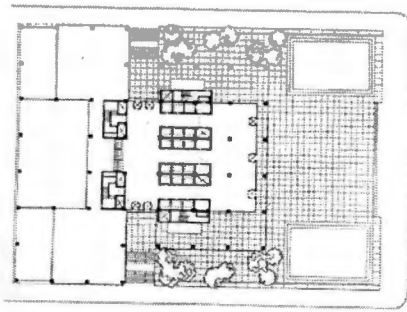


Fig. 9: The first floor plan of the Seagram Building.

Source: Hilberseimer



Fig. 10: A facade of the Seagram Building.

Source: Drexler

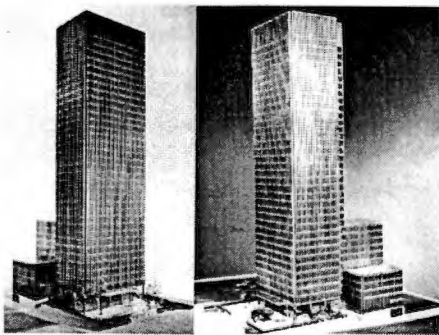


Fig. 11: The homogeneous facades of the Seagram Building.

Source: Hilberseimer

The contradictory opaque transparency of these buildings reflects the gaze back unaffected and unmoved; we are unable to see or imagine life behind these walls. The mirror that returns our gaze is an enigmatic and frightening device." (21)

Physical engagement:

Mies commented: "I don't think every building I put up needs to be different since I always apply the same principles." (Kostof 729) This implies that the architect did not engage the context in which the building is set, or acknowledge local identity and implications of the setting.

This is evident by the identical articulation of all four facades of the Seagram Building (figure 11). This articulation indicates that the cycles of the sun were not involved in the design of the building. Sunlight is regulated by a band-aid, the applied interior decoration of the shade, and not by an architectural element.

A sealed glass box such as this relies totally on air-conditioning and mechanical ventilation for its environmental quality (Curtis 263). The fact that the box is hermetically sealed indicates that engagement of exterior climate and the earth's cycles were not considered for natural ventilation capabilities.

Personal engagement:

"Glass boxes [such as the Seagram Building] implied a generalized view of human function: a space good for everything in which little attempt was made to individual incident or sense of place," states William Curtis (262). Duffy remarked on the Seagram Building: "Mies van der Rohe was 'more interested in the formal possibilities of reflective glass than any real organizational requirements or actual developmental possibilities'" (Worthington 27)

This is evident by the banal journey through the building. Curtis describes this journey: "One approaches along a main axis between symmetrical rectangular pools flanked by ledges of marble. A portico is implied by the overhanging slab and this then guides one to the main lobby, a space of little consequence." (266) As one ascends through the building, one loses sense of one's place in the whole; every floor becomes the same because there is nothing provided that distinguishes between floors.

In addition, the previously discussed schism between the office worker and the natural environment does not help the

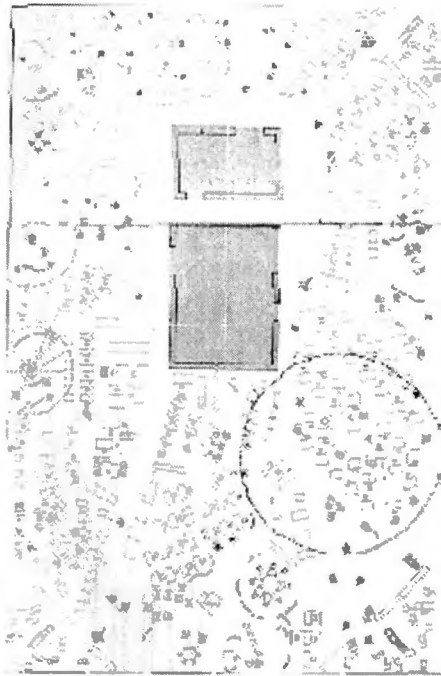


Fig. 12: The Burolandschaft plan.
Source: Duffy

worker to engage with his or her space of work.

The Burolandschaft

Glass boxes proliferated in the American landscape of the 1960's and 1970's, evolving into a deeper open plan facilitated by fluorescent lighting and air conditioning. The office suite within this large glass box evolved during the 1960's with Burolandschaft (office landscape) planning.

In the late 1950's people began to regard the office as more than simply a place for work. Psychologists noted the many complex interactions between people in the hierarchical chain and subsequently studied the psychology of group working.

These ideas were manifest in the Burolandschaft suite planning of the West German Quickborner management team. In the 1960's, the team presented a more democratic design of the workplace. After analyzing work patterns, they suggested that the layout of the office be determined by visual communication between workers and by the flow of paper. The large deep space of the office building was planned as concentric rings of lines of communication between groups (figure 12), ensuring the adjacency of people that needed to associate with each other. This differed from the former placement of people and equipment within the large open space dictated by building shape or by uniform straight lines of desks.

The layout was intended to be flexible and to allow a high degree of personal freedom. The large floor was filled with completely portable items; screens, desks, chairs, and filing boxes could all be easily moved. The shift from group work to individual work was achieved by rearranging screens and furniture. Because the worker was located within a large open space with minimal enclosure, he felt part of a group, yet retained individuality because he could adjust his screen and display his own pin-ups. Most of the managers were located on the open floor. However, hierarchy was still evident, as the managers' areas were bigger than the others and had better equipment.

Rest areas with comfortable chairs, tables, a sink, and a refrigerator were provided near a window. A worker could use this space whenever he felt as though he needed a change of scenery. Acknowledging that workers need breaks at different times and allowing this freedom of movement during the workday was a new concept at this time.

Uniform lighting and “white” noise were desired characteristics for the space. Artificial ventilation was also specified because it was thought that opening a window would result in complaints when so many people were affected.

Personal engagement:

While Burolandschaft planning does allow for individual choice, which helps one to dwell, it simultaneously created an illegible whole. Duffy writes that “Office landscaping appeared to offer unlimited freedom but in fact created a whole series of problems in ... defining spaces for groups of office workers within endless office floors” (Laing cited in Worthington 30). One can imagine getting lost trying to find one’s way through the maze, losing the sense of orientation, as Christian Norberg-Schultz states is a requirement of dwelling. In addition to the illegibility, the sterility of the uniform light and air contributes to the placelessness of this space.

American Office Landscaping

The American approach to the Burolandschaft, was termed “office landscaping” (1967). Many of the West German ideas, such as the casual meeting places and coffee bars were lost in the translation. The open planned offices did not provide well for individual concerns for privacy, environmental control, and personal identity (Laing cited in Worthington 30), and because these things were valued highly in America, the open floor became more enclosed. Managers and executives resided in private enclosed offices around the perimeter and clerical workers sat in fixed cubicles of a standard and uniform size in the open center of the deep floor, which further illustrates the difficulty the worker had in engaging with the outside.

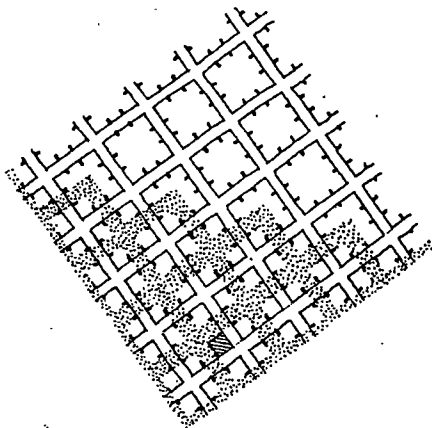


Fig. 13: Centraal Beheer's articulation by structure and circulation.
Source: Vale

Centraal Beheer

Herman Hertzberger designed this building for an Amsterdam insurance company in the 1970's. Most of the work performed in the building is routine clerical work but, directors and various other professionals work there as well. This plan opposes the Burolandschaft layout; Hertzberger uses tectonic elements to define the space in the interior.

A grid of structure and circulation (figure 13) articulates the building. This particular grid is not economical because the proportion of circulation space to floor area is quite high. The build-

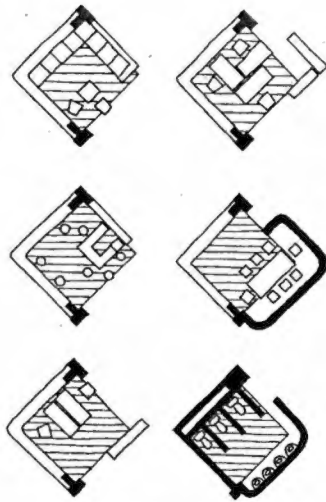


Fig. 14: The different configurations of cells in Centraal Beheer.
Source: Vale



Fig. 15: The interior of Centraal Beheer.
Source: Vale

ing is composed of a collection of repeating squares of office space, separated by nine-foot naturally lit voids. Bridges link the cells. Each cell is defined by eight large columns; their placement at the "third points" on each side of the square, helps further articulate the circulation. These cells are a basic standardized unit but can change configurations (figure 14). The interconnected organization of this plan and the strong articulation of the individual cells allow for a simultaneous sense of community and sense of individuality (Colquhoun 105).

The entrances and the main circulation, which include coffee shops, escalators, elevators, and shared areas, occur on the diagonal, and are visually interconnected with the office cells. Duffy says of this full height space: "On a bright day with shafts of sunlight from the rooflight contrasting with shadowed alcoves, the scale is perfect." (106) Hertzberger uses contrast to delineate space.

Personal engagement:

Hertzberger holds the individual in high regard. He states: "Architecture has never taken people very much into consideration. Pyramids, temples, cathedrals, and palaces were implements for making an impression on them rather than offering them a more liberal life." (Colquhoun 104) He subscribes to the theory that buildings are self-regulating systems, which suggests that the user plays the active role in a building, while the architect's role is to provide the framework that allows the user to choose his own behavior (Colquhoun 104). According to Hertzberger, form is more than an underlying structure; it has a catalytic function because it should help people, 'inciting them to make their own improvements'; strong architectural form liberates because it stimulates imaginative use (Duffy 105).

The form of Hertzberger's building allows the workers to modify their space. No space is fully enclosed; low walls, voids, paths, and furniture are used to express a sense of space for each individual (figure 15). Some workers modify their spaces by using the low walls for individual seats and for extensions of workplaces. Although the users can modify the building, the strong architectural form (the repetitive concrete columns, lightweight concrete block walls, green floor covering, and articulated ceiling) still dominates and controls (Duffy 107).

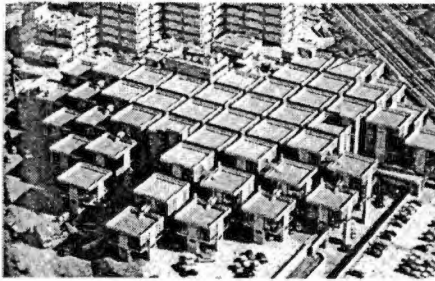


Fig. 16: The exterior appearance of the cells of Centraal Beheer.
Source: Curtis

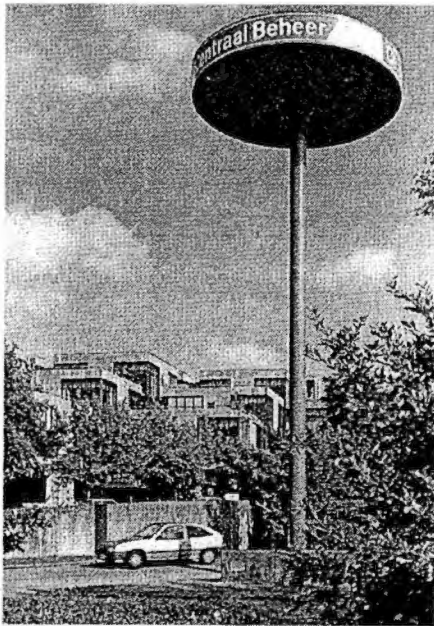


Fig. 17: One of Centraal Beheer's entrances.
Source: Duffy

Traditional North American speculative office



Fig. 18: The basic components of the speculative office building.
Source: Worthington

Social engagement:

The exterior of Centraal Beheer is problematic. Alan Colquhoun says that, "The cellular spaces become an embarrassment when translated into the necessarily opaque surfaces of the outside . . . on the outside one becomes aware of the purely mechanical way (figure 16) the modular boxes are assembled . . . the movement of the surface is by means of increments that are always the same, always blatant, monotonous." (108) A monotonous and opaque facade is lifeless and will turn the city dweller away from the building, which hinders the goal of social engagement.

Another important component of social engagement is providing a legible entry so that one knows how to enter the building. There is confusion as to how to enter Central Beheer. Colquhoun says that "the questions of how one enters the building and how the building relates to its surroundings do not seem to have been considered as serious problems." (109) He goes on to say that the articulation of the exterior (figure 17) "seems to deny the possibility of entry." (109) Duffy states that "Central Beheer is immediately identifiable but there are few signals as to how to access it." (114)

Duffy says that the "labyrinthine entrances symbolize the weak sense of collectivity." and goes on to say that "it is almost certainly against its interests to have complicated entrances because there is a collective need for welcoming strangers as well as controlling deliveries. The entrance is the organization's face to the world." (110) This comment sums up the ignorance of the responsibility of the building to address the public realm.

Physical engagement:

Colquhoun stated previously that the building relation to its surroundings did not appear to be a consideration. It is obvious that the building is solely informed by the interior, which contradicts the goal of physical engagement, which is to use the surroundings to inform the design of a new building. The homogeneity of the four sides further illustrates this fact.

Speculative offices of the 1980's

The speculative office building is primarily a North American and United Kingdom phenomenon. This building configuration contains a central service core surrounded by undefined office space (figures 18, 19, 20). This building type evolved

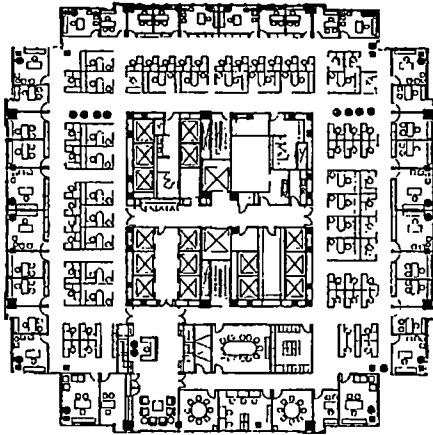


Fig. 19: The typical layout of spaces in a speculative office building.
Source: Worthington

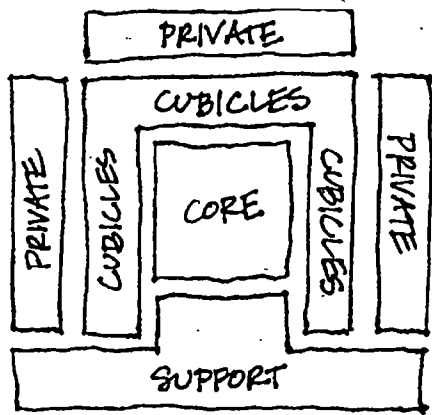


Fig. 20: A diagram of the typical layout of spaces in a speculative office building.

throughout the 1960's and 1970's to more cost-effective standards in the 1980's. These large buildings were produced as simply and cheaply as possible (Laing cited Worthington 35). This type of office building is described as a container with the thinnest possible skin containing the maximum number of productive people in the smallest possible rentable space (*The Economist* 90). Nicholas Grimshaw describes the speculative office building as "an anonymous building in which standards are kept to the minimum." (*The Economist* 92)

The fact that the speculative office building was designed for unknown tenants, furthered the idea [seen in the Seagram and its subsequent imitations] of the building as solely a container for the activity within it. The role of architectural form in defining the office suite has disappeared. Duffy writes that in the 1980's architects retreated into the "skin trade, the abdication of responsibility for deciding what the building is for, how it is going to be used and how it will be serviced." (Laing cited in Worthington 24).

Andrew Laing writes that the design of office buildings have not often coincided with the needs of the people who use them, saying that "the speculative nature of much office development has encouraged design focused on maximizing economy and flexibility of space" and "even when a particular client has been directly involved, the design has all too often focused on corporate image expressed in reception spaces and façade design." (Worthington 24)

Chapter 3 will discuss the present condition and will summarize the points that describe the lack of social, physical, and personal engagement in an office building.

ANALYSIS OF THE CONTEMPORARY CONDITION

"It's [the workplace] not about hierarchy anymore. It's not about an organizational shape that is vertical and linear. Today's organizations are about horizontal structures. They're about teams, and networked clusters, and empowered project groups, and flattened companies. As if that weren't enough, today's forward-thinking companies are about managing as leadership rather than control; they're about informal work styles rather than uniform formality; they're about creating workplaces that delight rather than offices that bore." (www.steelcase.com)

The new corporate structure— flat and team-oriented

The organizational structure of the corporation of the 1990's differs profoundly from the previous hierarchical model. The old corporate pyramid is disappearing and is being replaced by a team structure with no middle managers (MacLaren 2). This type of structure is referred to as a flat structure; middle management is eliminated, resulting in a smaller or flatter hierarchical chain.

Michael Hammer and James Champy, the authors of *Reengineering the Corporation* discuss this emphasis towards teamwork: In the 1990's the work unit changed from the functional department to process teams; teams do not contain representatives from departments, but replace department structures . . . Tasks are reunified into processes (a set of activities that produce a result of value to customer) and distinct jobs integrated into one. . . Work shifts across organizational boundaries. . . The flat organizational structure results when the whole process becomes the work of a team. . . Teams now make decisions that formerly required layers of managers (77).

Similarly, Franklin Becker, director of the International Workplace Studies program at Cornell University, says that "each new project, each new service, and each product innovation is handled by an interdisciplinary team with members that change, and who work in locations that may shift, depending on the project." (Russell 139)

Likewise, other individuals have commented on the new structure, describing current organizations as "virtual", "sham-rock", and diamond".

William Davidow and Michael Malone, the authors of *The Virtual Corporation* write that traditional offices and departments are now constantly reforming according to need. . . The

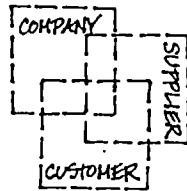


Fig.21: A diagram of the Virtual Corporation.

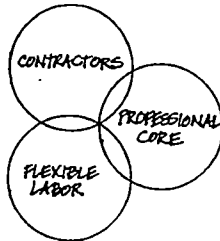


Fig.22: A diagram of the "shamrock" organization.



Fig.23: A diagram of the "diamond" shape profile.

Logistics and information is low interaction/intermittent occupancy. People come in for short periods to check their mail, synchronize diaries, log in and download/upload information, make calls and so on.

Meetings are high interaction, intermittent occupancy, with intensive peer group or one-to-many training activities, often time-constrained and goal oriented.

Tasks are low interaction/continuous occupancy, again goal-oriented, but more individual in character such as report-writing.

Projects are high interaction/continuous occupancy, but of variable duration and intensities.

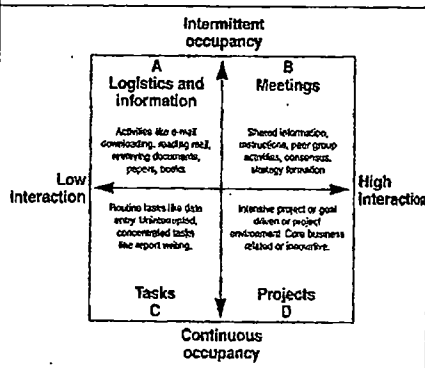


Fig.24: The activities of the new workers. Source: Worthington

new corporation is edgeless, with permeable and continuously changing interfaces between company, supplier, and customer (figure 21). . . The job responsibilities and lines of authorities continuously shift. . . Middle management has disappeared, resulting in a "flatter" structure, as computer networks can more efficiently carry information about the status of operations than people. . . The definition of employee changes as customers and suppliers often spend more time in the company than the firms' own workers. . . This type of corporation thrives only in an environment of teamwork; employees, management, customers, and suppliers must work together to achieve a common goal (5).

Charles Handy, author of *The Age of Unreason*, describes the new organization: the "shamrock" organization (figure 22) consists of three parts: a small core of essential executives and full-time workers augmented by outside contractors and part-time help ().

Michael Brill, president of the Buffalo Organization for Social and Technological Innovation (BOSTI), notes that the composition of the workforce is moving toward a "diamond" shape (figure 23), with smaller clerical staffs and fewer managers at either end of the hierarchy, and more professionals in the middle (Freiman 50).

The new worker profile-knowledgable, autonomous and mobile

The new workers are highly trained, group-based 'knowledge workers' and are replacing clerical departmentalized 'information processors' (Harris cited in Worthington 41). They now work alongside the CEO and managers.

Many employees do not have fixed duties nor do companies have fixed jobs (Russell 138). Figure 24 illustrates the activities of the new workers.

These professionals work with autonomy. Brill states that "people are out there with their laptops and cellular telephones, riding the range, prospecting, being cowboys and cowgirls again." (Freiman 50). These new workers are highly mobile, have nomadic work patterns with extended and erratic periods of working (Laing cited in Worthington 26).

Studies have shown that workers are out of their workplaces for a great deal of the time- on the road, in meetings, or on the site with clients. . . The traditional nine-to-five work structure is no longer predominant (Harbour cited in Tetlow 7). Only one third of workers now work the 'normal' nine to five day. . . Night shifts

and 24-hour operations are already commonplace in organizations that rely on continuous trading, and are becoming more so in legal and financial offices (Harris cited in Worthington 44).

The new ways in which workers are utilizing space

Andrew Laing relates that the workers are using space in new ways: multiple shared group work settings, diverse task based space, and shared and temporary ownership of settings within the office (Worthington 26).

Workers are no longer sitting at their fixed place for a long period of time during the day (figure 25). Bedford and Tong say that "even in organizations in which few staff spend large proportions of their time working outside the office, staff are not entirely desk-based in their work; the proportion of time that workspaces are observed to be temporarily unoccupied is high—staff are in meetings, working elsewhere with colleagues, at fax machines, and photocopiers." (Worthington 72)

Term	Definition
Hoteling	Workers can reserve a space for the time when they will be in the office.
Free address	Workers do not have a permanently assigned space, but select a space that accommodates the particular task of that time.
Telecommuting	A worker works at home or at a satellite office, while remaining electronically connected to main office.

Fig. 26: The definitions of the terms of AO

The new spaces in the corporate suite

Harris states: "Cellular offices are being replaced by group areas encouraging interaction, cooperation and innovation. . . The practice of a permanent place to work with a fixed, dedicated workstation for each individual is no longer a given for everyone." (Worthington 41) Top management is no longer removed from the rest of the work force and are no longer the recipients of lavish environments while the majority of the workers work in cubicles (www.steelcase.com).

Accordingly, designers are adjusting the space of the office suite to accommodate the new way of working, which has been

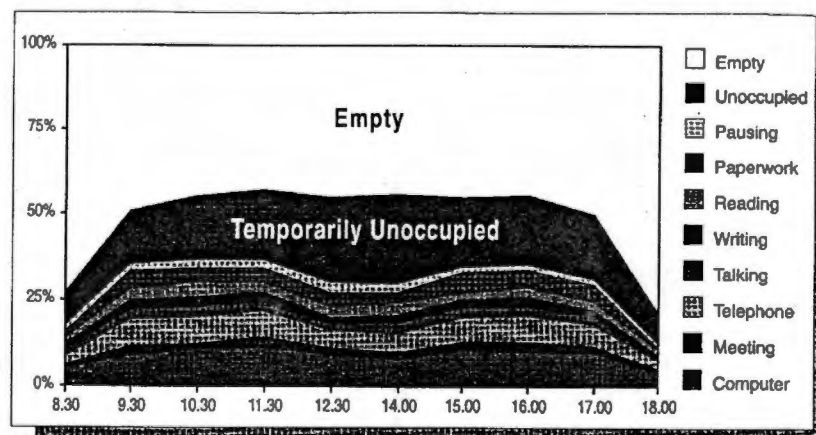


Fig.25: The amount of time that a worker spends at the workstation.
Source: Worthington.

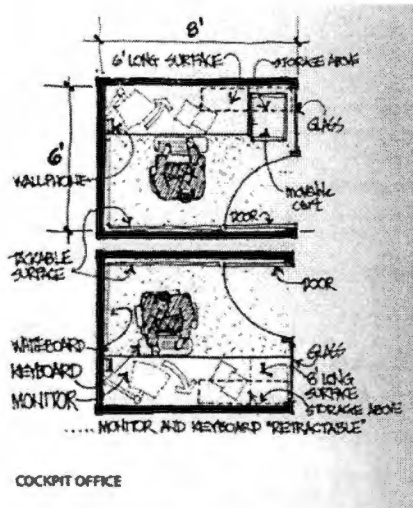


Fig. 28: The cockpit office
Source: Freiman

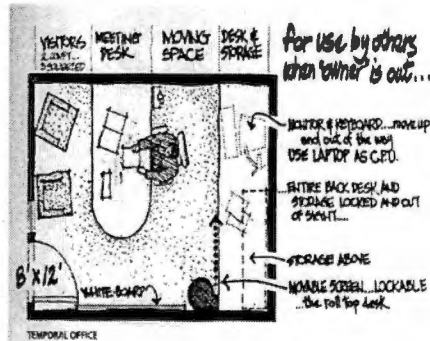


Fig. 29: The temporal office
Source: Freiman

termed alternative officing (AO) (figure 26). Karin Tetlow describes AO, saying that it “includes ‘hoteling’ and ‘free address’ for salespeople and consultants usually in the field, and ‘caves and commons’ for project team members who need private and community spaces for solitary tasks and ‘teaming’”. Other options are telecommuting from home or satellite offices and work anytime, anywhere in the ‘virtual office’ using laptops and cell phones.” (9)

Andrew Laing speaks about the office as a “club”. The office suite is related to the traditional gentleman’s club in which “a variety of rich and highly specific settings provided for many different social and individual activities. . . The club environment can support the creative knowledge work that demands a combination of highly concentrated individual work alongside interactive team work.” (Worthington 38)

Michael Brill’s proposal for a machine manufacturer’s office

Brill’s design for an office machine manufacturer’s satellite office (figure 27) includes small spaces called phone booths, cockpit offices (figure 28), and temporal offices (figure 29), as well as common areas with office equipment. These spaces are not dedicated to a particular individual, which is consonant with the current way of working. The cockpit and temporal offices have retractable and moveable items so that the offices can adapt to different people.

Personal Engagement:

This office suite proposed by Michael Brill provides new spaces of work. However, it does not completely break away

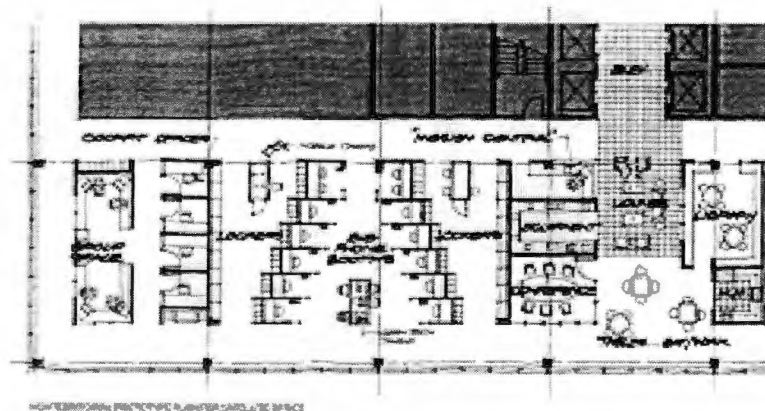


Fig. 27: The layout of Brill’s satellite office
Source: Freiman

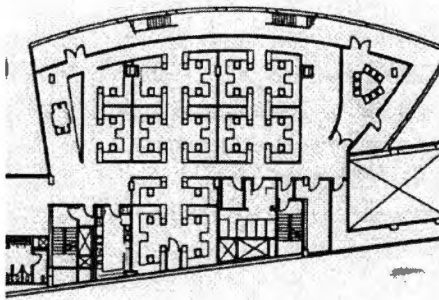


Fig. 30: The old layout of the Chiat Day office.

Source: Freiman

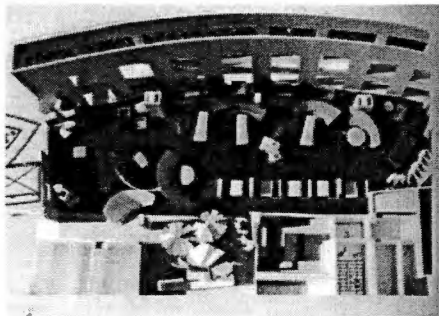


Fig. 31: The new layout of the Chiat Day office.

Source: Freiman

from the past. The 8' x 6' standard cubicle and the 8' x 12' office are still found, but with different setups. The office suite is still rigid in its configuration: the spaces are defined by function and partition walls and are lined up in rows within an open plan.

Chiat/Day Advertising

The building for Chiat/Day Advertising in Santa Monica, California provides an example of the new office suite. The original layout (1991) of the space was simply a grid of open workstations (figure 30). A few years later Chiat, became convinced that his employees were working in an "archaic" way and he brought in the team of Lubowick and Lanier to rework the interior. The new layout was based upon the prototype of a college campus, where people continuously move from place to place.

Dedicated offices were eliminated because the client wanted to undermine the "hierarchy-driven standard office planning" (Freiman 51). These spaces are now replaced by team-oriented and common spaces. Workers are not assigned to desks. Instead, they check out computers and phones at the "company store" and go to places that house the resources that they need. One type of space is the meeting room that is temporarily equipped with a computer, video equipment, tack space, and white board. Another space has a seat in the quiet corner.

Personal Engagement:

Lanier felt that the loss of the personal space might be a problem, stating: "To allow people to move to a zone to perform a task doesn't mean everything has to be moveable. If that was the tack, you'd end up with a rather mediocre space architecturally and otherwise. Things get moved around and left, and it's nobody's space. There can be some smaller moveable objects, but the spatial character needs to be maintained." (web.gmu.edu) To combat this problem, she introduced the store and concierge space to provide the "comfort zone of familiarity" to act as neighborhood landmarks, because one knew the people working there.

However, this space is still placeless. The new layout (figure 31) is similar to the Burolandschaft layout, that is, it lacks the definition needed to make a space a place. While landmarks may act as anchors, the individual spaces of work are randomly scattered in the open room (figure 31). A space such as this confuses the user because it lacks legibility as one walks through it.

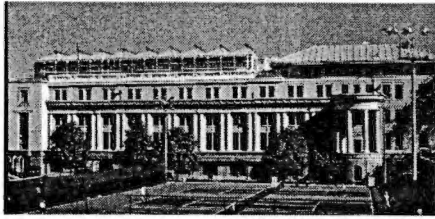


Fig. 32: The Intelligent Workplace.
Source: Sullivan



Fig. 33: View of the Owens Corning complex.
Source: Russell

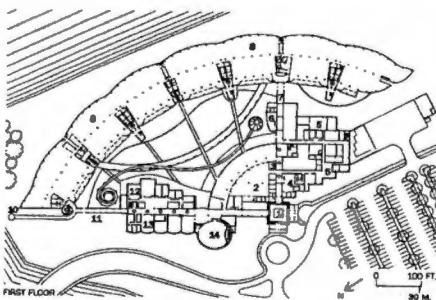


Fig. 34: The "arc" and "village" of the Owens Corning complex.
Source: Russell

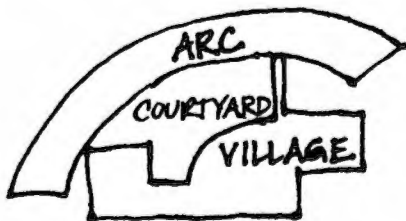


Fig. 35: A diagram of the "arc" and "village" of the Owens Corning complex.

The building as an entity

The Intelligent Workplace

The Intelligent Workplace, designed by Volker Hartkopf and Vivian Loftness of Carnegie Mellon, sits on top of an existing building on the campus (figure 32). It relies on daylight, shading and fresh air for environmental control. Its open plan and narrow section facilitate natural ventilation. This is controlled by a network of sensors that monitor everything from air temperature and humidity to light levels and occupancy. A computer that responds to the changes in daylight levels and temperatures controls the reflective shading louvers. Users can adjust the temperature around their own workstation, by using the Johnson Controls Personal Environmental Module. The modular steel skeleton, façade, and flooring system can be quickly disassembled and reconfigured if needed. The modular raised floor allows the personal workstations to be rearranged as needed in the open plan layout.

Physical Engagement:

The building responds to the environment on a certain level. The façade, relying on artificial means, opens and closes in response to the climactic conditions. However, the building is not truly informed by the conditions of the site. The four facades of the building are articulated in the same manner, as glass louvered facades, which is not appropriate for every side of the building because each side receives a different amount of sun.

The Owens Corning Building

In the mid 1990's, the leaders of Owens Corning reconfigured the hierarchical structure of their corporation to a flat structure in which employees work collaboratively. In 1996, the company relocated from their Fiberglass Tower skyscraper into a three-story building, designed by Cesar Pelli and Associates, located at the edge of downtown Toledo (figure 33). This building has two main parts, the Arc and the Village (figures 34 and 35) separated by an outdoor courtyard.

The spaces of work are located in the Arc. A range of work areas were provided to compliment the variety of work performed in the office, and these were based upon activity performed, not status. Individual workstations are open to invite collaboration, but vertical screens can provide privacy when seated. Storage towers are provided in the workstation for storage of personal

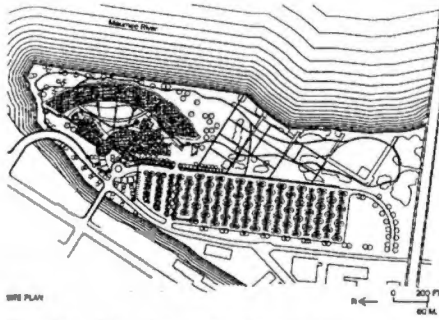


Fig. 36: Site plan of the Owens Corning complex.

Source: Russell

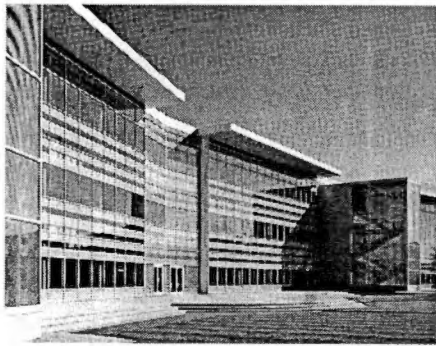


Fig. 37: The Owens Corning building's western facade.

Source: Russell

items. Small, enclosed areas, which can be used by any worker, provide privacy and are equipped with phone and power lines. Rooms for teamwork have presentation and teleconferencing capabilities.

The Village contains the support area, which includes a cafeteria, bank, fitness club, drycleaner, medical facility, general store, and continuing education center, as well as conference rooms.

Elevators were removed from the main circulation route in favor of a large corridor with sunlit stairways and informal break areas. These areas encourage employees to collaborate with others informally.

A raised-flooring system, which allows access lines to penetrate the floor almost anywhere, achieved the necessary flexibility for technological services. The foot deep floor includes the air-circulation system and cables for phone lines and computers.

Social engagement:

The location of the complex on the edge of the city hinders social engagement. The complex offers services that have the potential to be used by the public, but the complex does not appear to be easily accessed by the city's inhabitants, as seen in the site plan (figure 36). The building is located in the cusp of the river and is also set back by a large parking lot,

Conversely, employees cannot easily engage with people and functions of the city. The complex provides the workers with services that can be found within the city, and these may not have to be provided given a different location; thus, saving space and money for the company.

Physical engagement:

The east and west facades of the Arc are enclosed with different types of glass: reflective on the east and clear on the west. The reflective glass on the eastern side can prevent the building from becoming overheated in the morning. The choice for clear glass on the western side, perhaps to enhance the relationship between the corridor and the courtyard, was not thoroughly evaluated; there is no means by which to block the western sun. The slight overhang pictured (figure 37) proves not to be effective when the sun sits lower in the western sky. The full implications of the existing climatic conditions were not taken into consideration in the design of this building.

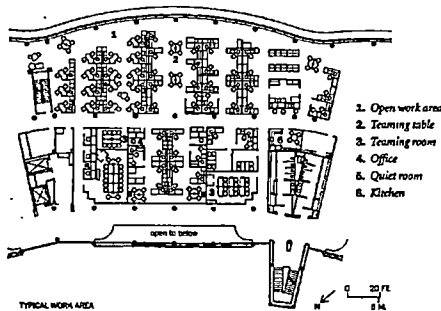


Fig. 38: The typical layout in the "arc".
Source: Russell

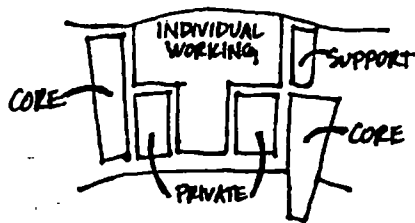


Fig. 39: A diagram of the typical layout in the "arc".

Personal engagement:

The shape of the Arc allows most employees to see daylight, which is a positive achievement of this building. The clear glass on the western side allows a person in the courtyard to see into the building, positively enhancing the relationship between the courtyard and the interior corridor. However, this glass curtain wall homogenizes the light, a characteristic that contributes to placelessness of a space. Also, the curtain wall is hermetically sealed, which does not allow one to control his or her thermal environment.

The workspaces are differentiated according to the type of work being undertaken, which results in a variety of workspaces, as contrasted with the traditional designation of one cubicle per individual. However, the space is essentially the same as in a traditional building. The individual spaces of work and the private and team spaces are still located in one large room, simply subdivided in a different manner than a traditional office suite (figures 38 and 39).

Summary of the past and present conditions

The office buildings described in Chapter 2 and 3, manifest a significant lack of social, physical, and personal engagement. Such lack can be summarized as follows:

Location: The location of the building in the landscape will impact social engagement. A building that is located in the suburbs is difficult for the pedestrian to access.

Position: The position of the building relative to the street will impact social engagement. A building that is located far from the street will not welcome the pedestrian into the building.

Facade: The articulation of the facade will impact social engagement. Homogeneous and reflective facades do not welcome the passerby. A legible entrance will invite the pedestrian into the building.

The articulation of the facade also impacts physical engagement. Designing the facade so that it responds to the cycles of the sun and wind promotes this goal.

Quality of space: The design of a space will impact personal engagement. Spaces that have uniform light and air, and in which

the user has little involvement in making a space one's own place, create a placeless environment. Illegible spaces, in which a person cannot find his or her way, also contribute to this problem.

THESIS GOALS AND ISSUES

This section elaborates the thesis goals and introduces the three ways these goals will be explored through the design investigation.

The goals of the thesis

Social engagement describes the condition in which an individual entity (a human or a building) participates in a collective life with other entities. The goal of social engagement is to increase the amount of space within a building that can be used by the public sector. The thesis will explore ways in which to offer spaces that are traditionally private, to the public in order to revitalize the city, particularly the Central Business District.

Physical engagement is the condition in which the interaction with and the effect of the climate of a particular site, the earth and its cycles, and the existing built environment are involved in the design of a building. The goal of physical engagement is to design in a way that considers the implications of the inherent nature of a particular site. The thesis will explore the ways in which to utilize the site in order to make a building a more sustainable entity.

Personal engagement describes the conditions in which one is involved in the formation of a particular space, in which one participates in choosing one's own space, and in which one is attracted to a space. The goal of personal engagement is to make a space a place for an individual. The thesis will explore ways in which to help an individual to dwell.

Three ways in which to explore the goals of the thesis

1. through a reprogramming of the traditional function based program method to include engagement as a programming criteria
2. through a site analysis that considers and emphasizes engagement
3. through the exploration of the following issues in the design investigation:

Re-use implies that the use of an entity can change through out time. Re-use can be considered on different levels: space, tectonic elements that comprise the building, and daily occurrences in the building.

Robustness implies that a space can house a variety of functions simultaneously.

Migration/position considers that the user can change his/her position in space.

Temporality, in this thesis, implies that a permanently constructed space can change characteristics throughout the day as influenced by external elements.

Malleability is the condition in which the tectonic elements that comprise the building can alter the physical characteristics of a space.

The architectural issues and their role in promoting social, physical, and personal engagement will be explained throughout chapters five, six, and seven.

REPROGRAMMING

This section will first present practical reasons that reinforce the argument for reprogramming the speculative office building. Following is a discussion of the reprogramming of the building as an entity, the corporate suite, and the individual unit.

Engagement as part of the programming process

Engagement should be part of programming process of speculative office buildings because it is beneficial to the three parties involved: the developer, the tenant/employer, and the employee. The practical reasons that reinforce the argument for engagement are as follows:

Social engagement:

Designing in way that welcomes the public into a building can help achieve exposure, something that is especially desired in the sales and service industry. Encouraging the public into the building enhances awareness of the products and services that the corporations have to offer. The additional exposure gained through public space is also beneficial to the business because it does not require a costly marketing effort, such as the purchase of media time.

Physical engagement:

Involving the earth and people in design, a consideration of green building, has benefits for all three parties. Barnett states: "Although green buildings cost about the same as conventional ones, their improved aesthetics, comfort, and performance translate into higher initial sales prices and rents [benefit for developer], and then into lower operating costs [benefit for employer/tenant]. Green buildings are much cheaper to heat, cool, and light. Because they consume so much less energy, they produce correspondingly less pollution. Lower utility bills make them more affordable. Last but not least, they are healthier spaces in which to work or live [benefit for employee]- important now that typical Americans spend 80% of their time indoors." (7)

Personal engagement:

Providing a worker the ability to choose a comfortable working environment will not only benefit the well-being of the employee, but will benefit the employer for the reason of productivity and the developer for the reason of economics.

Workers are concerned about the lack of comfort that is found in the current office environment. An International Facility Management Association survey about the frequent complaints about the workplace includes: "the office is too cold", "the office is too hot", and "indoor air quality is poor" (*Building Design and Construction* 10). "People want more control over their working environment; they want to be able to open a window and to turn the lighting and heating in their own offices up or down" (*The Economist* 90).

Employers also want spaces that make their employees feel comfortable enough to work productively and valuable enough to stay for years (*Buildings* 16). Michael Brill has found that the work environment has impacted worker's productivity, stating that "the various studies show that if you provided a very supportive work environment, the dollar value of the benefits would probably equal from three percent to twenty percent of salary annually for workers in all job categories" (Freiman 51).

It is beneficial to the developer to provide a building in which the employees enjoy being. Maureen Patterson, Associate Editor of *Buildings* says that "companies are paying premium rents to building owners who can help them attract long-term, motivated, efficient employees" (16).

Programming for the public

This section reprograms the office building as an entity. The current condition is that these buildings are programmed for a limited sector of people, which plays a role in causing the lifelessness of the central business district. Programming for the public helps achieve the goal of social engagement, that is, to increase the amount of space in a building that can be used by people who typically would not be considered users of the building. The first floor program promotes the re-use of space because it provides functions that can be used by both the office workers that typically inhabit the building and city dwellers. Program on other floors considers the public as well.

Office center

The office center is intended to engage the public and to provide supplemental services to the workers who occupy the building. The center can be used on a twenty-four hour basis, which can bring vitality to the area.

OFFICE CENTER			
elements	activities	equipment	sf
multimedia conference center	sitting at table presenting info. viewing large screen taking notes	satellite 2 ceiling-mounted video cameras projection television monitor control console large table, chairs telephone outlets, jacks, cables	800 sf each room
shared computers	checking e-mail using Internet using programs	monitors hard drives keyboards printer chairs, tables outlets, jacks, cables	12 sf each station
copy center	photocopying faxing cutting/pasting displaying supplies purchasing supplies	copier fax machine outlets, jacks, cables counters cutting boards, tools shelving cash register	1400 sf
recycling/shredding	discarding paper collecting used cartridges shredding	bins/ chutes shredding machine	100 sf
snack bar kiosks	preparing foods selling foods	microwave sink small refrigerator counters outlets, cables	100 sf
technology help desk	repairing computers computer-use advising	counter, chairs guidebooks	100sf

Fig. 40: Characteristics of the office center.

The office center (figure 40) includes :

Multimedia conference centers (video-conferencing):

This is an important asset for the target market. Reaching and catering to customers across globe during their business hours is important to the sales/service industry. Prospective tenants have asked developers for this facility. "Companies are demanding access to a local library's databases and videoconferencing," says Jonathan Rudes, senior managing director at Newmark & Company Real Estate Inc. He states that shared amenities such as multimedia conference areas and training rooms can be especially attractive to tenants. "If you provide to your tenants access to the multimedia facilities ... it saves them a tremendous amount of money." (*Buildings 16*). Sharing amenities demonstrates re-use and helps promote the goal of social engagement, as well as bringing in extra income for the owner of the building.

Shared computers:

Many non-office workers do not have access to a computer. Companies may wish to limit their office's computers or space after hours or a company's computers may not have certain programs. Employees can use the computers in this facility to complete tasks after hours. Also, companies can save money by sharing non-confidential databases, such as Internet access software, instead of purchasing the programs themselves.

Copy center:

This area offers basic services such as photocopying, faxing, and office supplies sales.

Recycling and shredding places:

These activities involve individuals in the responsibility of preserving the earth's resources and demonstrates another facet of re-use.

Snack bar kiosks:

Vendors from the city's many cafes and restaurants, as well as independent contractors, can present samples of their foods at these kiosks. These kiosks can be re-used throughout the day by different entities, adding robustness to public spaces.

GREENHOUSE			
	activities	equipment	sf
	office working	moch. system-pipes	3000 sf
	gardening	outlets, jacks, cables	
	collecting heat	garden tools	
	composting waste	tables, chairs	
	collecting rainwater	cistern	
		cash register	
		counter	

Fig. 41: Characteristics of the greenhouse.

DISPLAY AND DEMONSTRATION			
	activities	equipment	sf
	advertising	counters	2000 sf
	selling	shelves	
	demonstrating	tacks	
	displaying	glass cases	
		tables, chairs	

Fig. 42: Characteristics of display and demonstration.

Technology help desk:

Workers and community members can bring their laptops here for assistance in using programs and for minor repairs.

Greenhouse

The greenhouse provides numerous functions (figure 41) that serve the public, the workers, and the building. Both city residents and workers who would like to tend a garden, can rent a plot. In the spirit of the sales and service market, the plants can be sold.

The greenhouse is equipped with plug-ins for laptops. Providing a place for office work in the greenhouse demonstrates the robustness of a space. Migrating to this alternative workplace helps promote the goal of personal engagement.

Display/Demonstration

Display/demonstration (figure 42) provides functions for the users of the building and for the public. Tenants of the building can advertise their products or services for the public. Outside vendors can sell their services to the businesses, by coming in and giving demonstrations as well as setting up displays. The people of the city who may be wandering past can stop and view the demonstrations and displays, which promotes the goal of social engagement, as well as increasing awareness of products that are sold by the businesses of the building.

Redefining the typical program for workers

This section reprograms the office suite and the individual working area. The following conclusions derive from the consideration of the characteristics of the present way of working, as well as an analysis of the old suite contrasted with the new suite (Appendix A).

Some **individual working** tasks can occur in places other than the office suite because the workers of today are mobile, autonomous, and perform many activities that do not require use of their desks. Individual working can be "removed" from the suite, as well as **conference rooms**, which can be shared among different companies and can be rented by the public. Removing these entities from the private realm decreases the amount of space that a company needs. Locating these areas in a more public place encourages re-use of public space and increases the

amount of space that can be accessible to the public, which is the goal of social engagement.

Of course, each company needs to have a secure space which to call their own. This is achieved by providing **home bases**. The home base is a modified version of the office suite because it does contain as many function specific spaces as the old suite.

Removing the individual working from the office suite promotes personal engagement because the individual chooses the space of work through migration. One can find the place that is comfortable or stimulating, which is the goal of personal engagement.

Functional support and systems

Support functions include: boiler/chiller room, fan rooms, switchgear room, electrical and phone closets, emergency power, transformer, garbage dumpster, bathrooms, and circulation.

The building's design will maximize the use of passive heating, cooling, and ventilation. Considering the site in this way can fulfill the goal of physical engagement. These concepts will be discussed further in the next chapter, the site analysis.

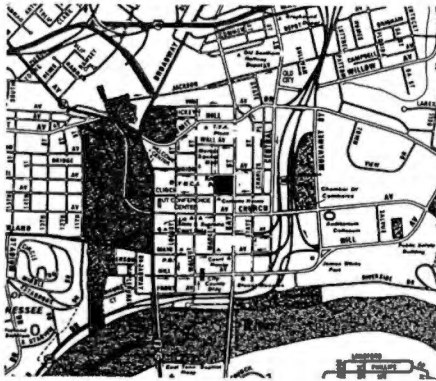


Fig. 43: Location in the city.



Fig. 44: Facade of First Tennessee Bank.



Fig. 45: Street level at First Tennessee Bank.



Fig. 46: Entrance to First Tennessee Bank.

SITE ANALYSIS

This section introduces the site, presents site-related case studies and analyzes the site in terms of engagement.

Introduction to the site

This site is located in the Central Business District of downtown Knoxville (figure 43). It is chosen on the basis of the critique, as well as the opportunities that it affords. Locating the speculative office building in the city helps promote the goal of social engagement: the building is accessible to the public and is not removed from the public in a suburban office park.

The site faces Gay Street, a main street in the downtown area, and is enclosed by two large office buildings (First American building and Charter Federal building) of different character as well as an urban park (Krutch Park). The site is zoned C-2 commercial, with no side or rear restrictions and no height regulations. The first floor setback on Gay Street is to be no less than five feet. Off-street parking is not required.

Site-related case studies

The office buildings on Gay Street can be critiqued for their lack of engagement with the surroundings and with people.

First Tennessee Bank

This skyscraper and its large plaza are located a few blocks to the south of the site.

Social Engagement:

This facade's placeless curtain wall of reflective glass (figure 44) does not promote social engagement for the city dweller. As one peers upward, one is confronted with a single module of homogenous windows which reflects the building next door. The pedestrian loses the sense of human scale and thus, oneself, when faced with this facade.

On the first floor level, the facade presents an unwelcoming face to the pedestrians, as well. As a pedestrian walks down the street, the individual is confronted with a blank facade and entrance; one is not allowed to see into the building and understand what activity it contains (figures 45 and 46). These conditions do not promote social engagement, as discussed previously in Chapter 3.

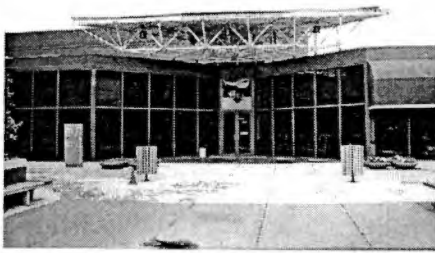


Fig. 47: The plaza of First Tennessee Bank.



Fig. 48: A facade of a Center Square Building.

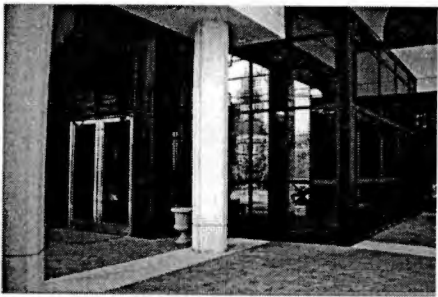


Fig. 49: An entry of a Center Square Building.



Fig. 50: A phone outside a Center Square Building.

A small piece of the building provides commercial functions, such as shops and a drycleaner, which could be used by the city dweller. However, these areas do not display themselves to the street; they are hidden in a glass box, far removed from the street by a large plaza (figure 47). A small sign at the beginning of the plaza announces the commercial functions, but nothing entices the pedestrian to cross the empty plaza and enter the building.

Physical Engagement:

All four facades are hermetically sealed and articulated with the same reflective glass. This indicates that the influence of climactic conditions on the different facade exposure were not taken into consideration, which does not promote physical engagement.

Personal Engagement:

This hermetically sealed building hinders personal engagement as well, because the workers are not able to connect with the outdoors during the workday and lose touch with the sense of the natural thermal environment. They are not allowed the choice of the Knoxville's often pleasant climate as a working environment, despite the large area devoted to the plaza.

Center Square Buildings

This complex of buildings is located one block to the south of the site. The two buildings that comprise the complex are identical in nature.

Social Engagement:

These buildings are more favorable to the pedestrian. While the first floor is a bit grandiose, the difference in articulation between floors (figure 48) does provide a sense of scale to the passerby. The pedestrian does not feel "lost" when looking at this building. Another welcoming feature is the street level arcade. The pedestrian can be sheltered from the sun and rain by stepping under the arcade. This could be used as a tool to entice the pedestrian into the building.

However, the arcade does not work in that manner. The glass is reflective and difficult to see through (figure 49), which does not welcome the pedestrians. They cannot see the functions that are located inside this building, and thus, would not be enticed to enter. Furthermore, the doors of these buildings are

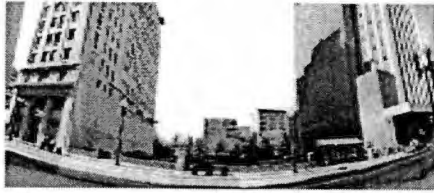


Fig. 51: The two adjoining buildings of the site.

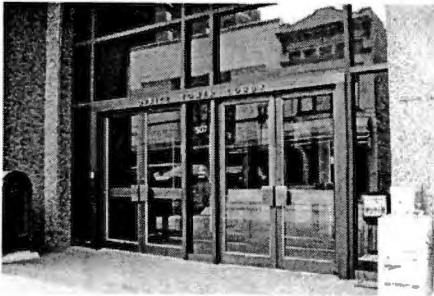


Fig. 52: The entrance to First American Bank.



Fig. 53: The entrance to the Charter Federal Building.

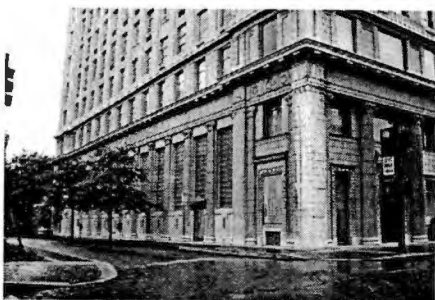


Fig. 54: A side of the Charter Federal Building.

locked at all times. One must use a phone (figure 50) to access someone inside. These conditions do not promote social engagement.

Personal Engagement:

There are decks located on top of these buildings. An architectural element such as this can help promote personal engagement. A person can be given another environment in which to migrate. One can imagine the office worker choosing to work outside on these decks, and in doing so, regaining a sense of one's thermal environment. The extent to which the decks of these particular buildings can be used for working is unknown.

First American Bank and Charter Federal Building

The two adjoining buildings (figure 51) of the site manifest the same problems as the First Tennessee Bank and the Center Square buildings.

Social Engagement:

Both buildings have unwelcoming facades. First American Bank has a reflective glass entry that prevents the pedestrian from seeing inside (figure 52). The Charter Federal's entry comprises two blank windows and a door that is locked at all times (figure 53). The southern side of this building is unwelcoming as well. The windows have been filled in with translucent glass block, which is difficult to see through (figure 54). The pedestrian walks down the street and is presented with a blank facade, which does not contribute to one's experience in the city.

Physical Engagement:

Both buildings have the same size windows on all four sides of the building, regardless of the orientation of the sun and wind. As with First Tennessee Bank, this shows lack of consideration for the inherent nature of the site.

Personal Engagement:

Inside the First American building, the floor plan is the same for each floor. The daylight quality is poor, with no light reaching the inner offices. This results in a homogenous space, in which there is little regard for personal engagement.

However, there are two positive features: the smokers deck on the fourth floor of First American and the operable windows



Plate 1: Gay Street- past and present

of the Charter Federal. Both of these conditions do present the opportunity to choose the desired connection to the thermal environment of the outdoors.

Analysis of the Site in Terms of Engagement

This area in the city manifests the problem of the lifeless city, that is, Gay Street (plate 1), once had vitality and is now lifeless. The old Gay Street offered amenities to the city dweller that today's Gay Street is lacking. First floors of buildings offered commercial functions to pedestrians. Awnings provided shelter from the elements. Signage on buildings advertised the businesses, which beckoned the city traveler to engage with the

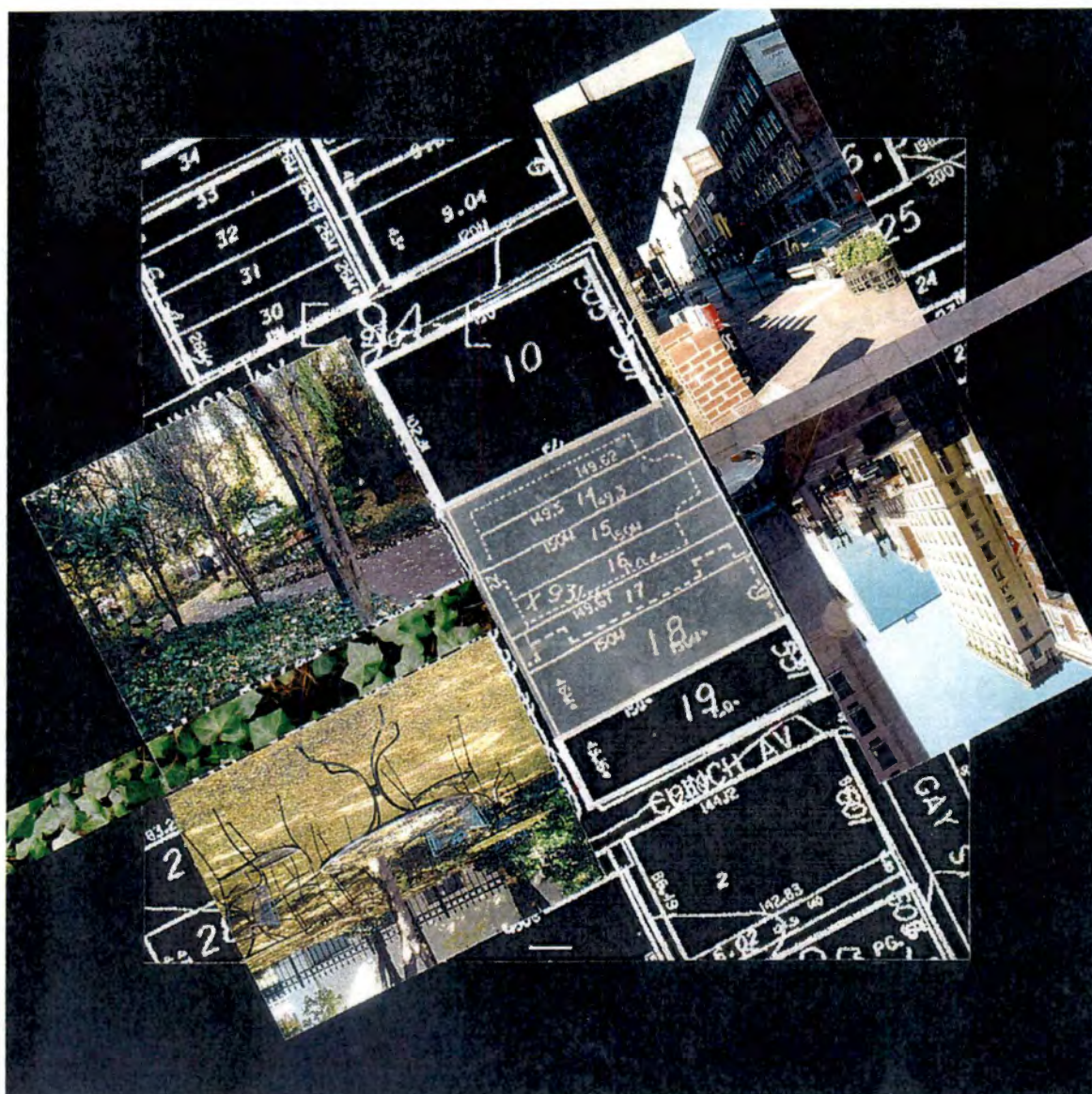


Plate 3: Two sides of the site.

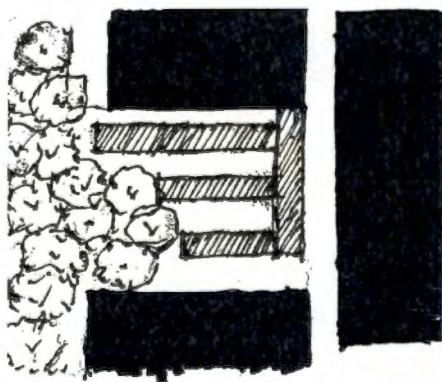


Fig. 55: Informal/ formal.

idea of social engagement on a larger scale. The building is considered part of a greater whole and not as a self-sustaining entity, which is the current perception of office buildings.

The site offers two different urban opportunities, the street and the park (plate 3). The articulation of the building's form should respond to both sides. The street side suggests a more "solid, formal" wall that would maintain the continuity of the urban fabric. The park side allows a more "informal" articulation (figure 55). The opportunities for choice and for the synthesis of the two forces, natural and man-made, exist for the design. Involving the existing built environment in the design is a consideration of physical engagement.

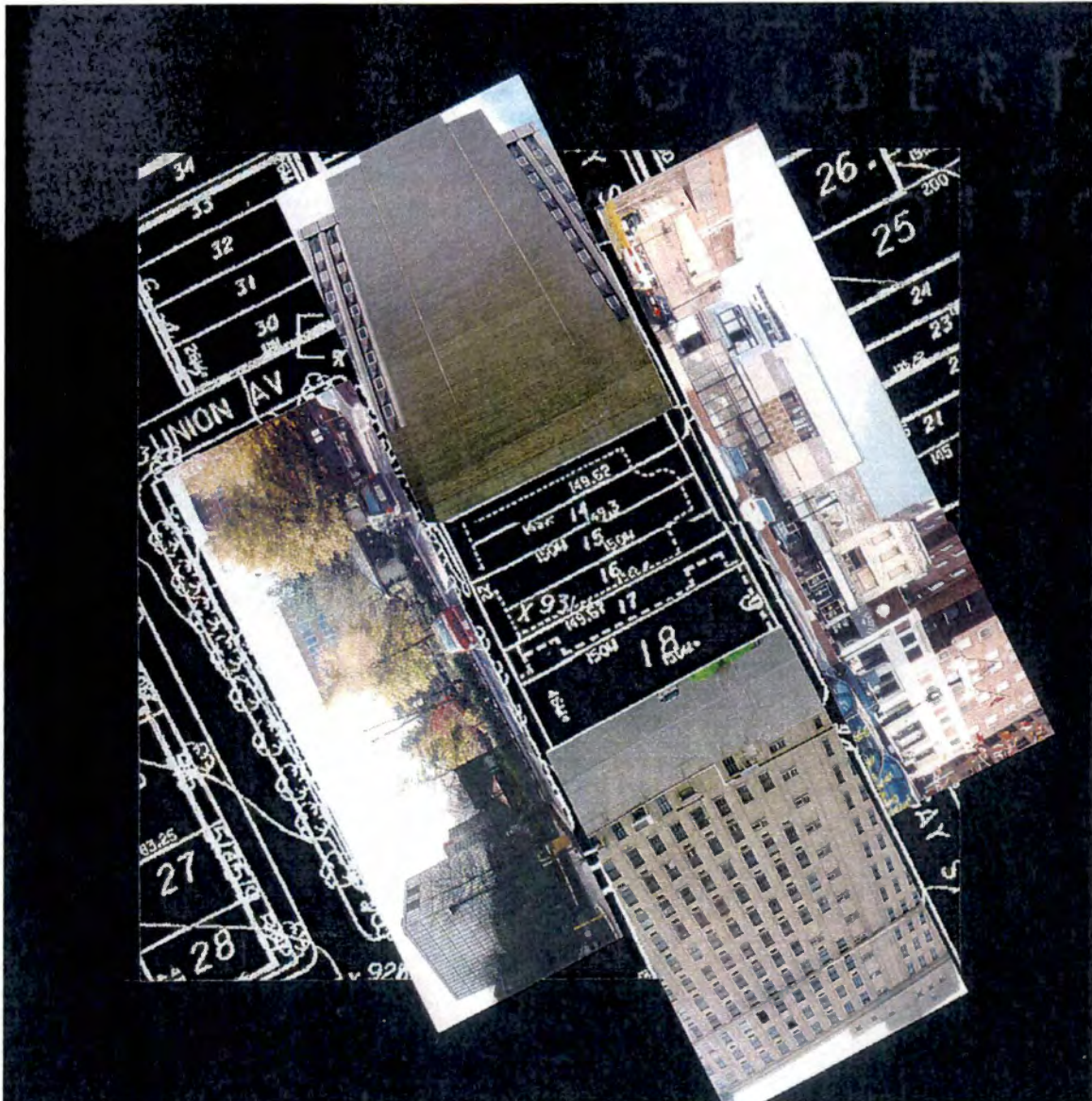


Plate 4: The walls of the site.

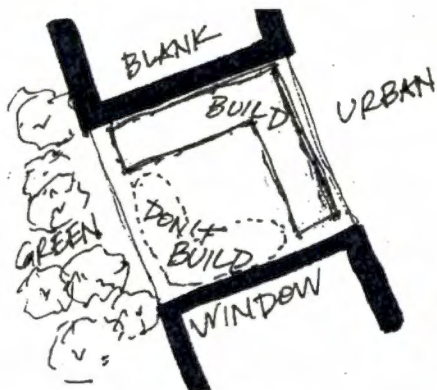


Fig. 56: "L-shaped" configuration.

The different "walls" of the site elicit different responses (plate 4). The First American building has a solid wall and the Charter Federal building has a window wall. The Gay Street "wall" is continuous and the Krutch Park "wall" has an open character. The character of these "walls" indicates an L-shaped building configuration (figure 56). This "L" shape was derived from considering the inherent nature of the site. One consideration is that the window wall of the neighboring building is something of value to that building and should not be blocked. Leaving the back unbuilt in this manner affords the opportunity for a connection between the park and the new building. Another consideration is that the street side should respond to the con-

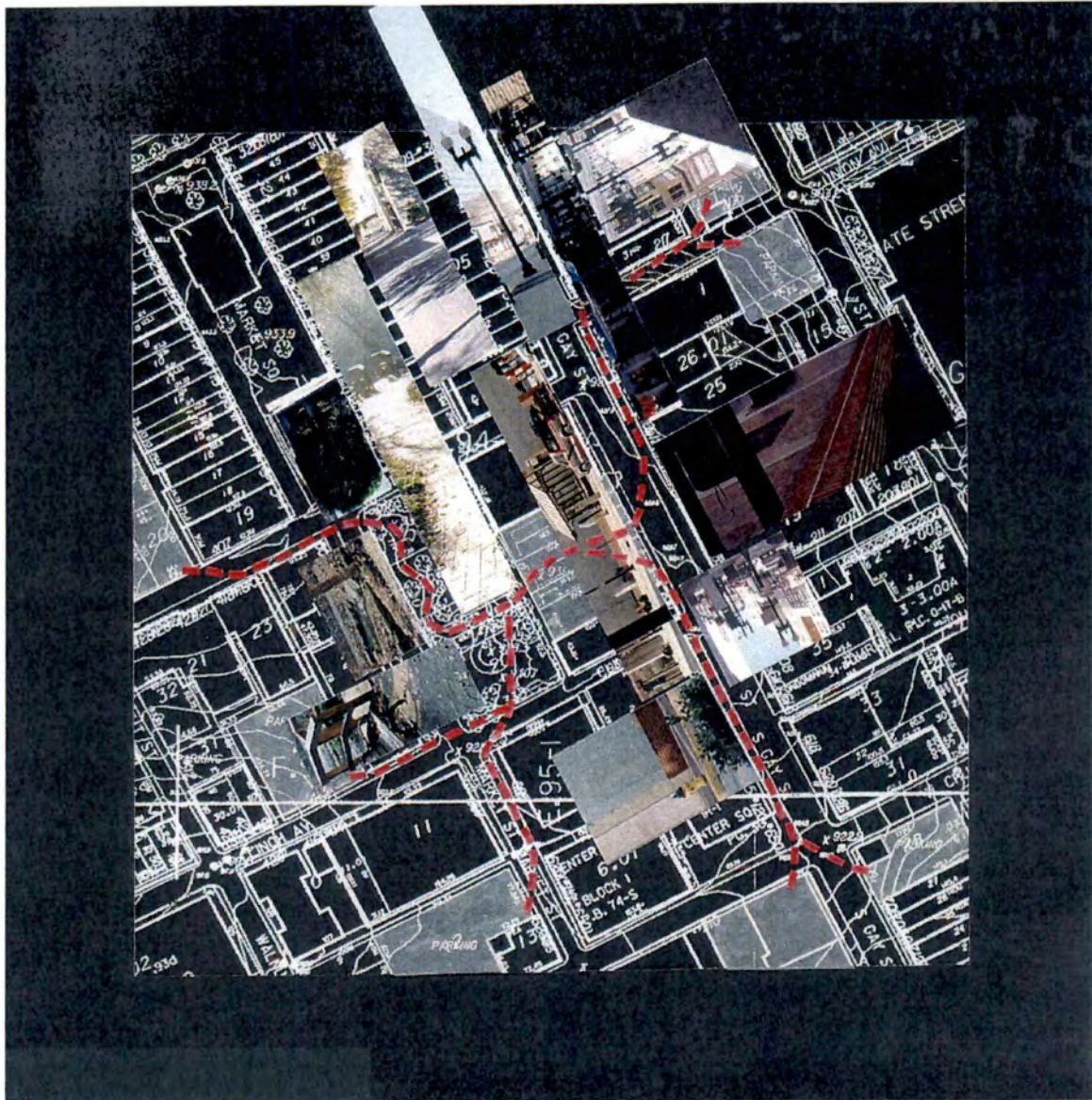


Plate 5: Path to the site from various parking lots.

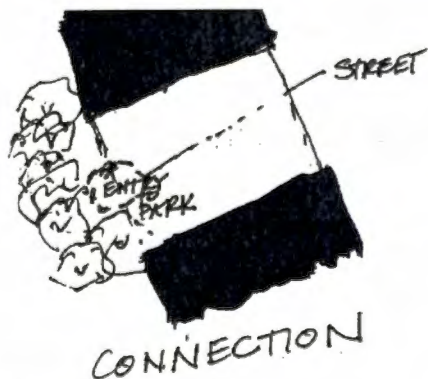


Fig. 57: Connection.

tinuous character of the existing street, thus, suggesting that the majority of the building lie to the front of the site.

There are various ways in which one may arrive at the site (plate 5). A bus stop is located on Gay Street, directly in front of the site. Various parking lots are located within close vicinity to the site. One may approach the site by Gay Street or by progressing through the park. The suggestion of a connection (figure 57) between the park and street introduces the idea that a path be "cut" though the building.

One encounters a variety of experiences when walking to the site. The idea of an experiential path can be considered in the design of the building, which opposes the typical banal corridor

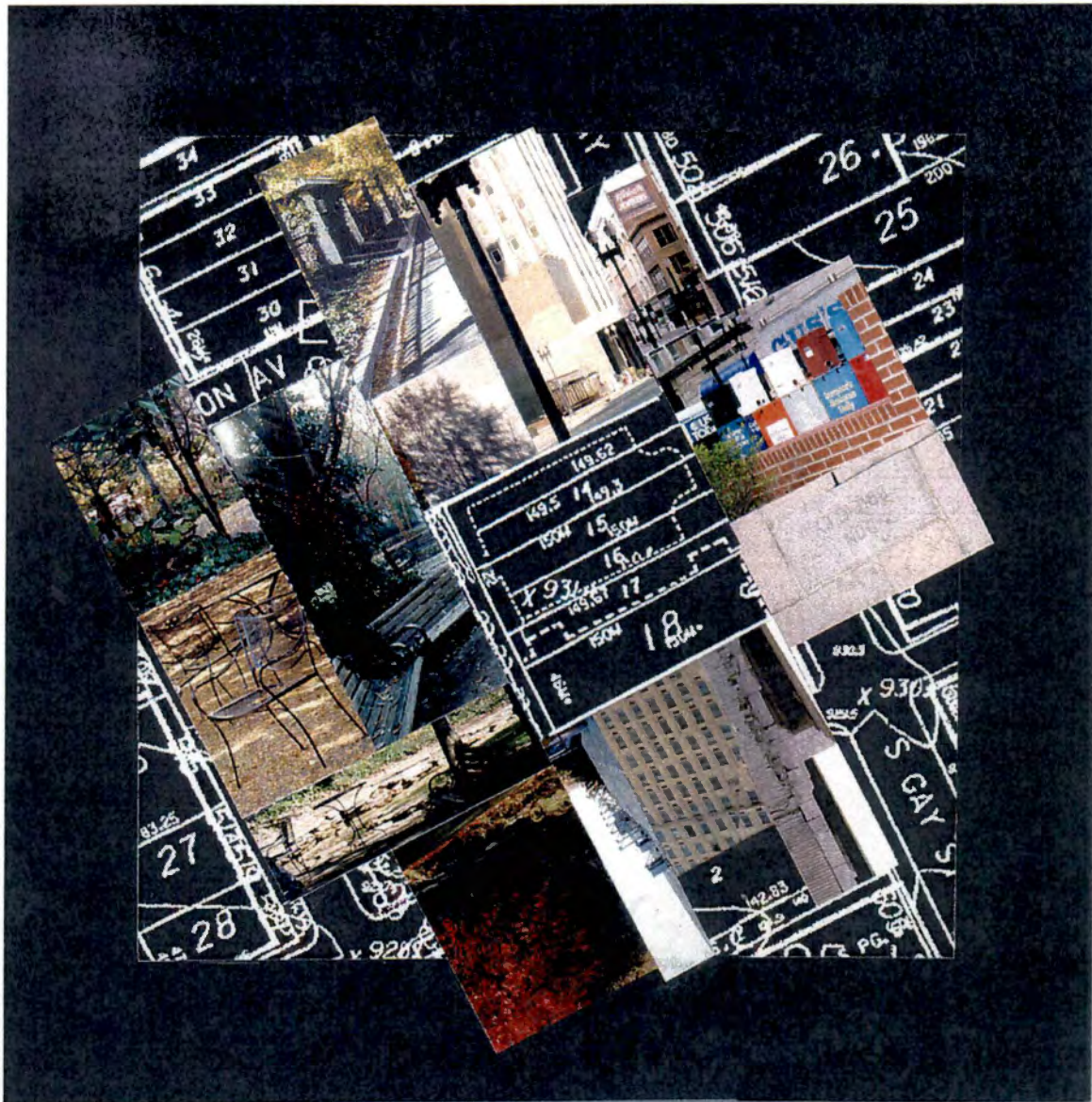


Plate 6: Engagement currently present at the site.

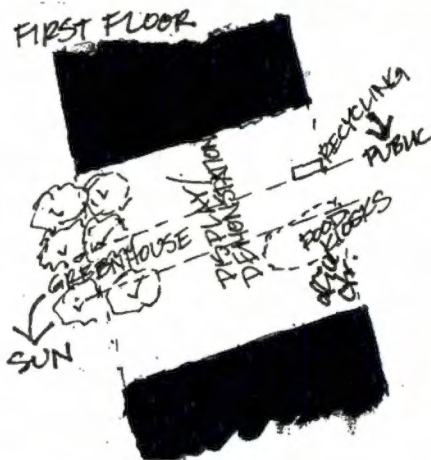


Fig. 58: First floor program.

of a speculative office building. A more “attractive” corridor can promote personal engagement. City dwellers are invited to penetrate the building via the path, which promotes the goal of social engagement, that is, the offering of public space to the city. On the first floor, the path will include the functions derived in the reprogramming (figure 58), which include the office center, food kiosks, display, demonstration, and the greenhouse. These functions encourage the pedestrian to enter.

Clues found around the site offer additional opportunities and considerations for engagement (plate 6). Design influences include: chairs and benches in the park that offer a seat to the pedestrians, signage on the side of a building that informs pass-

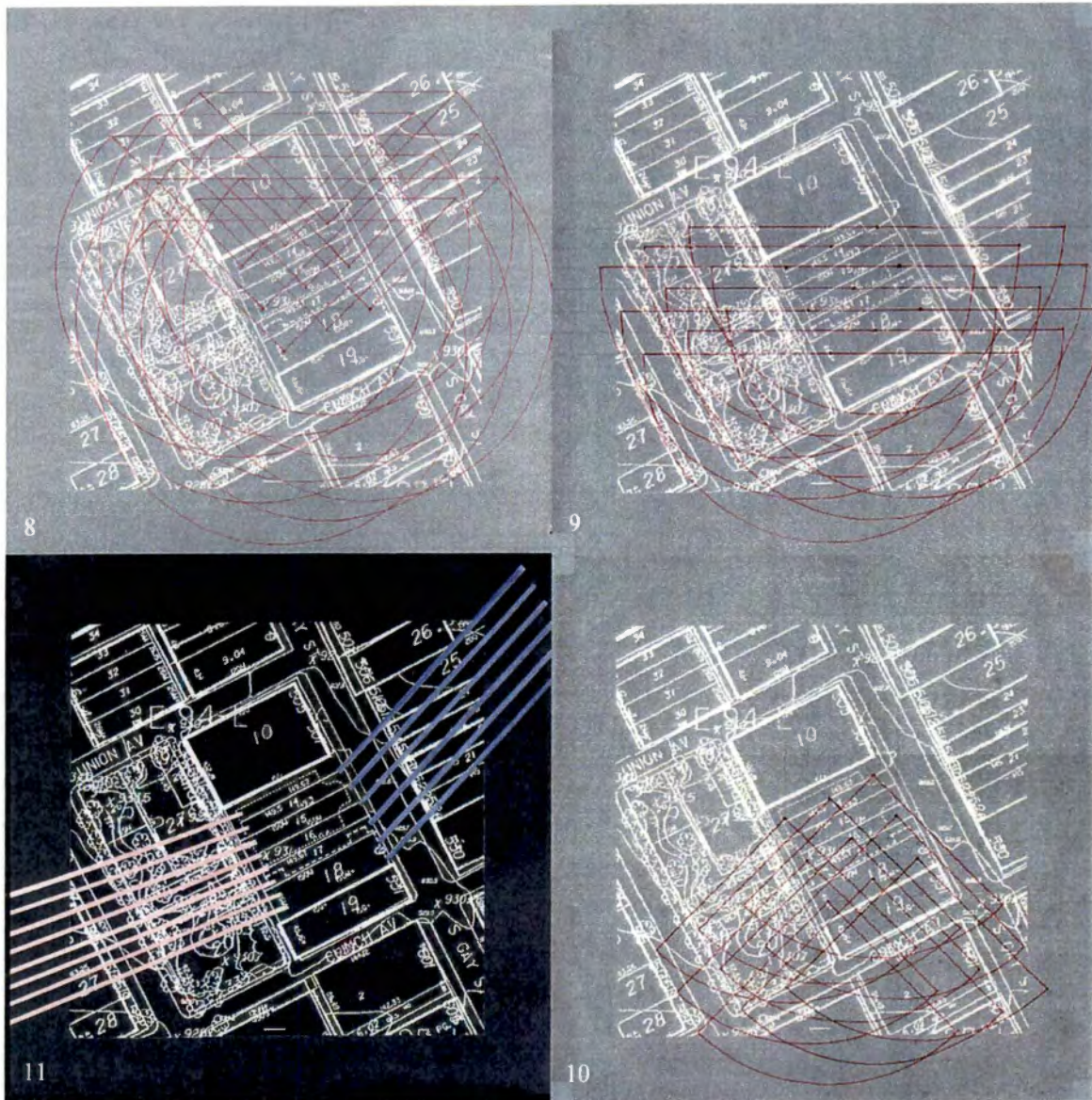


Plate 8: Summer solstice, Plate 9: Equinoxes, Plate 10: Winter solstice, Plate 11: Winter and summer wind.

form the skin of the building. The greenery and water can be integrated into the new building. The different textures/materials of the paths can be used for the path of this new design, which further ties the building to the existing surroundings.

Considering the cycles of the sun and wind (plates 8-11) is an integral part of the exploration of physical engagement. The overall form of the building can be determined by these factors.

The cycles of the sun reinforce the placement of the greenhouse on the park side of the side.

The summer wind pattern indicates the possibility for a breezeway (figure 59). The breezeway can be utilized for natural ventilation and cooling. This wind pattern also suggests the



Fig. 59: Breezeway.

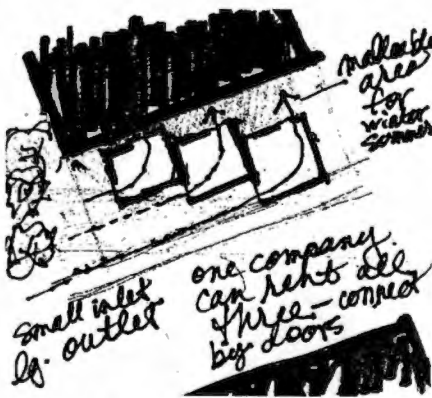


Fig. 60: Offset masses.

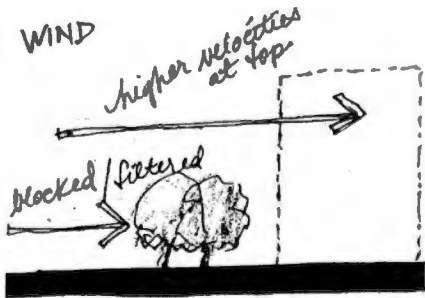


Fig. 61: Wind in section.

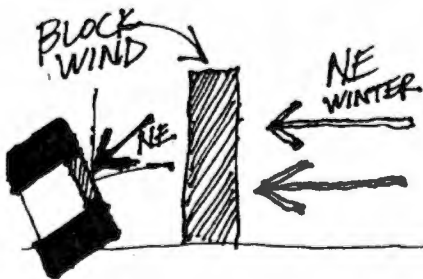


Fig. 62: Solid articulation.

placement of building mass and windows in order to encourage natural ventilation and cooling within smaller pieces of the whole. Some building masses are offset to facilitate natural ventilation (figure 60).

In section, the wind analysis suggests the consideration of the different conditions (figure 61): the blocked and filtered wind on the lower level, the higher velocity wind on the upper levels. The higher velocities at the top suggest a more malleable articulation of the building's skin at the upper levels to maximize natural ventilation.

The winter wind pattern and the lack of winter sun on the northeastern wall suggests that the wall facing Gay Street be "solid" (figure 62). This side of the building should be articulated with different materials than the other sides.

The ideas introduced in this site analysis suggest an alternative way to designing the facade of the speculative office building. The resolution of these ideas will be discussed in the next chapter.

DESIGN INVESTIGATION

This section will first present the final resolution of the design. The written explanation will follow. This section is formatted in this manner so that as one may read the explanation, one may be familiar with the design.

Presentation of the design solution



Fig. 63: City Plan

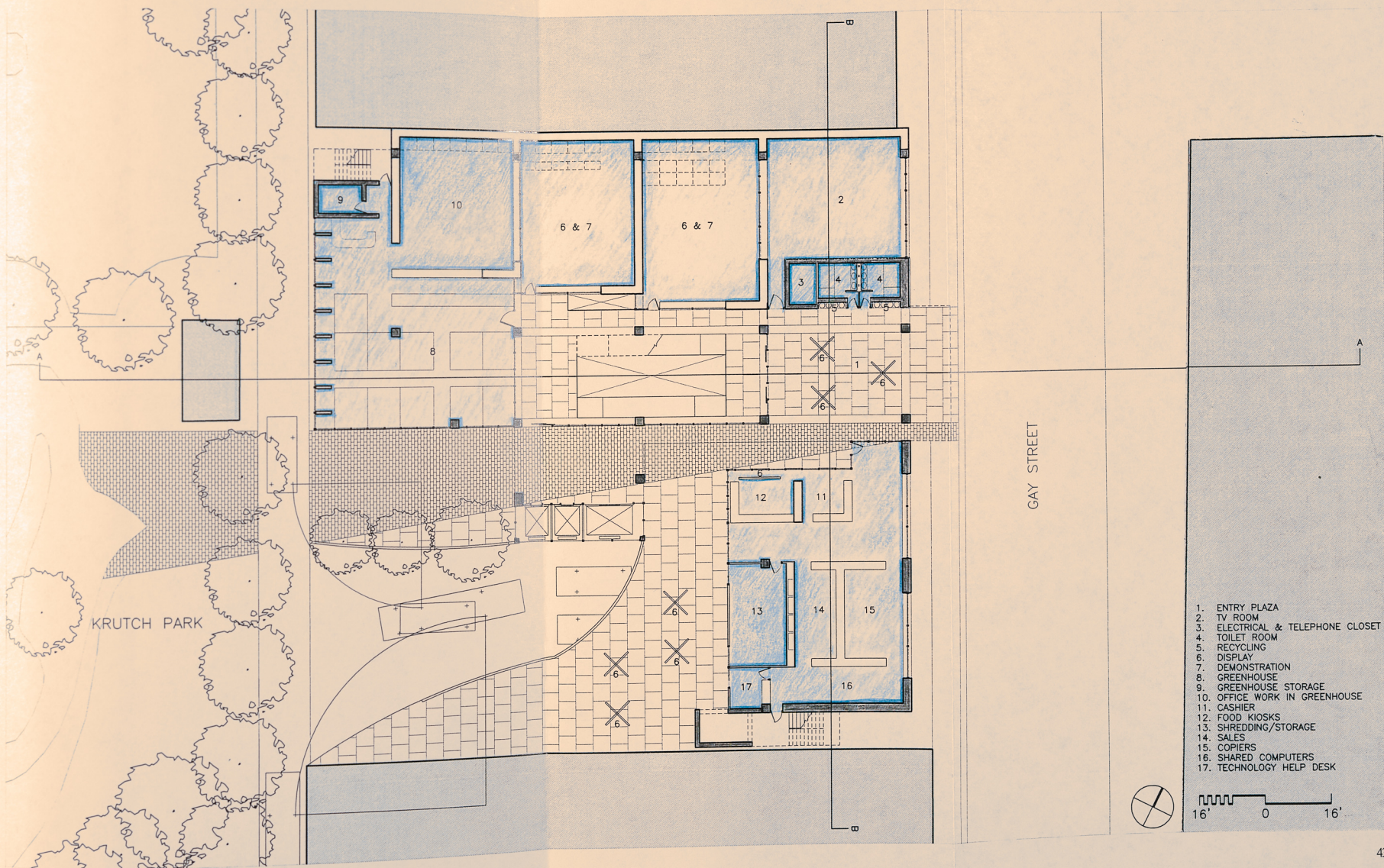


Fig. 64: First floor plan

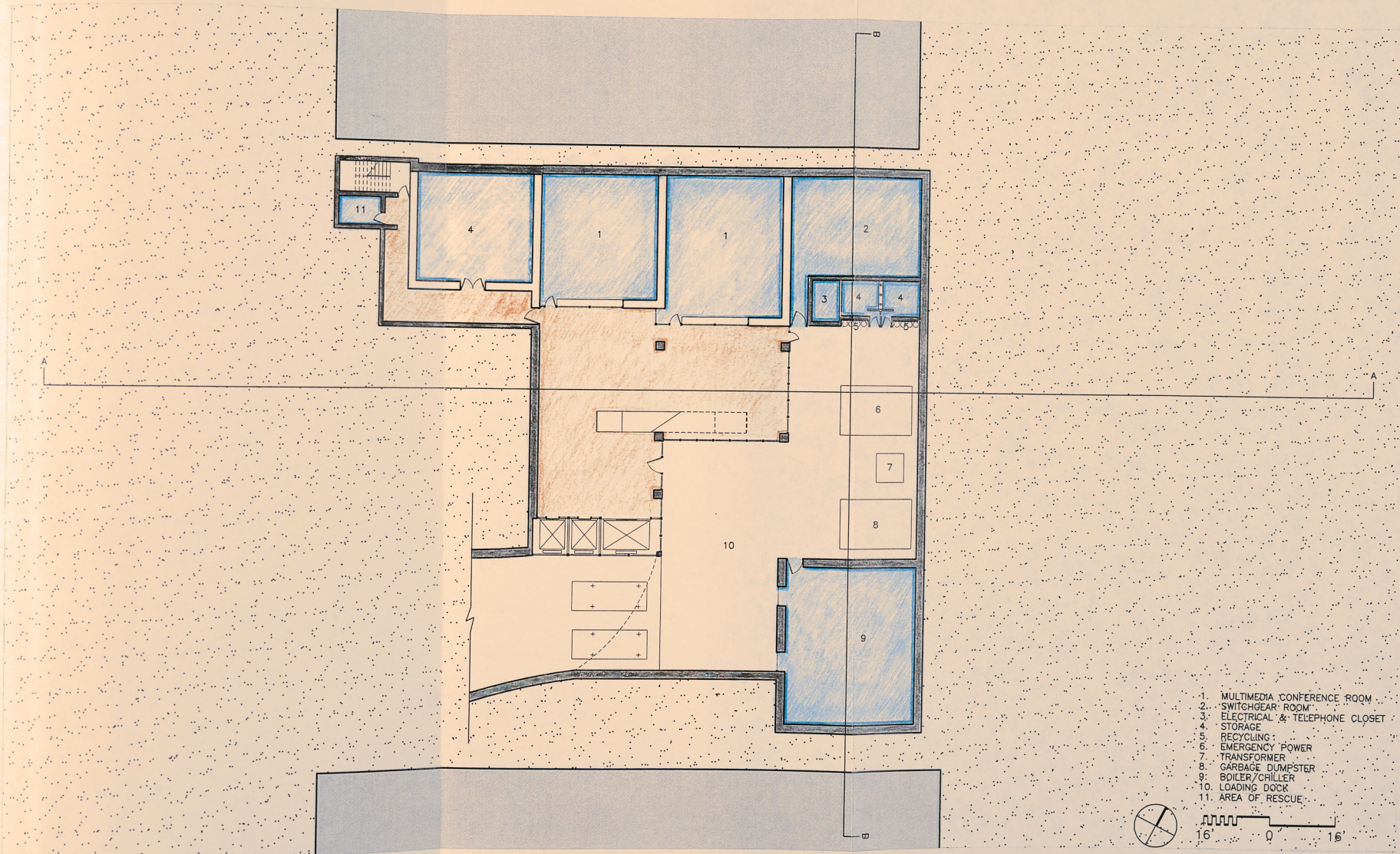


Fig. 65: Lower level plan

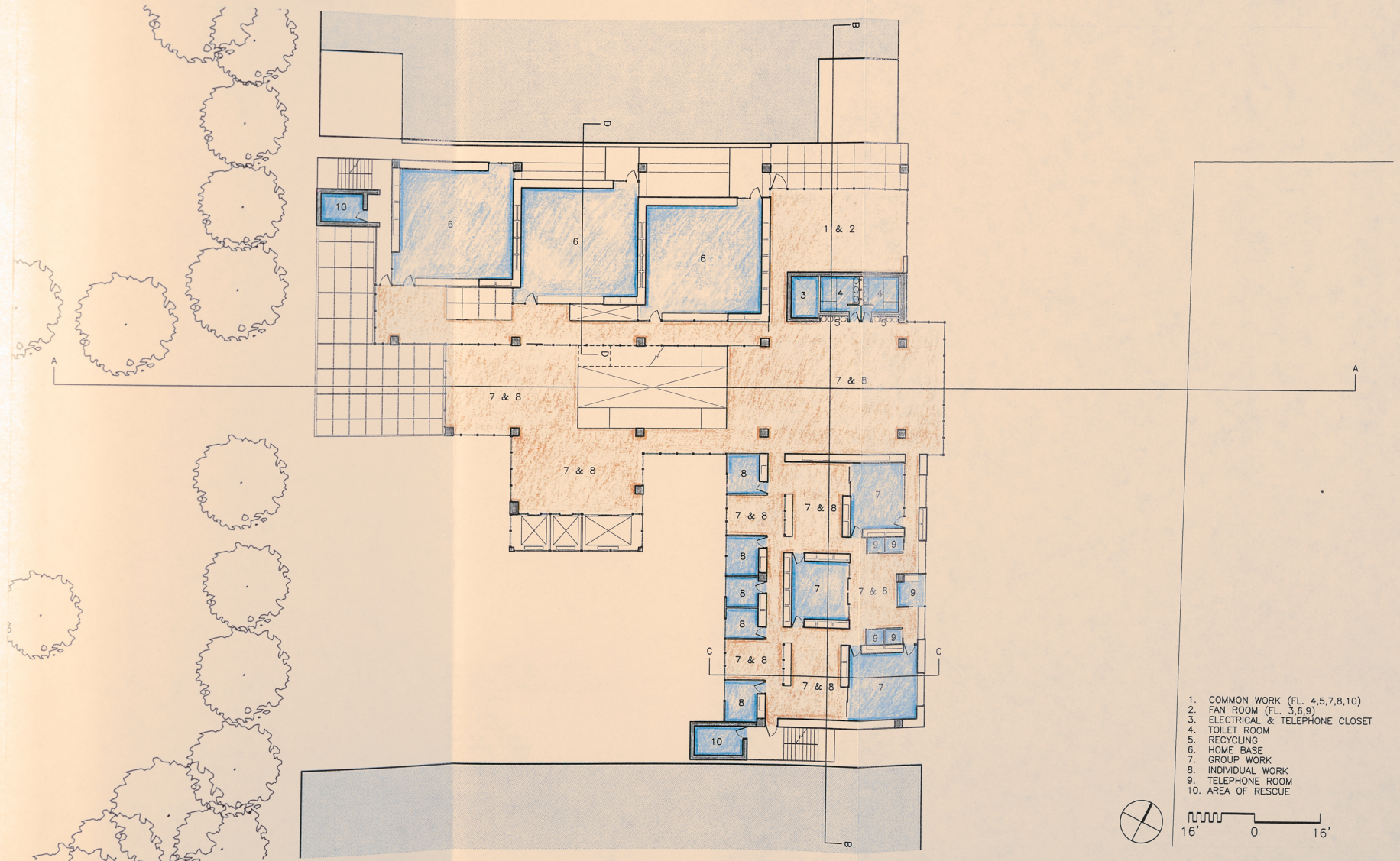


Fig. 66: Typical floor plan: floors 3-10

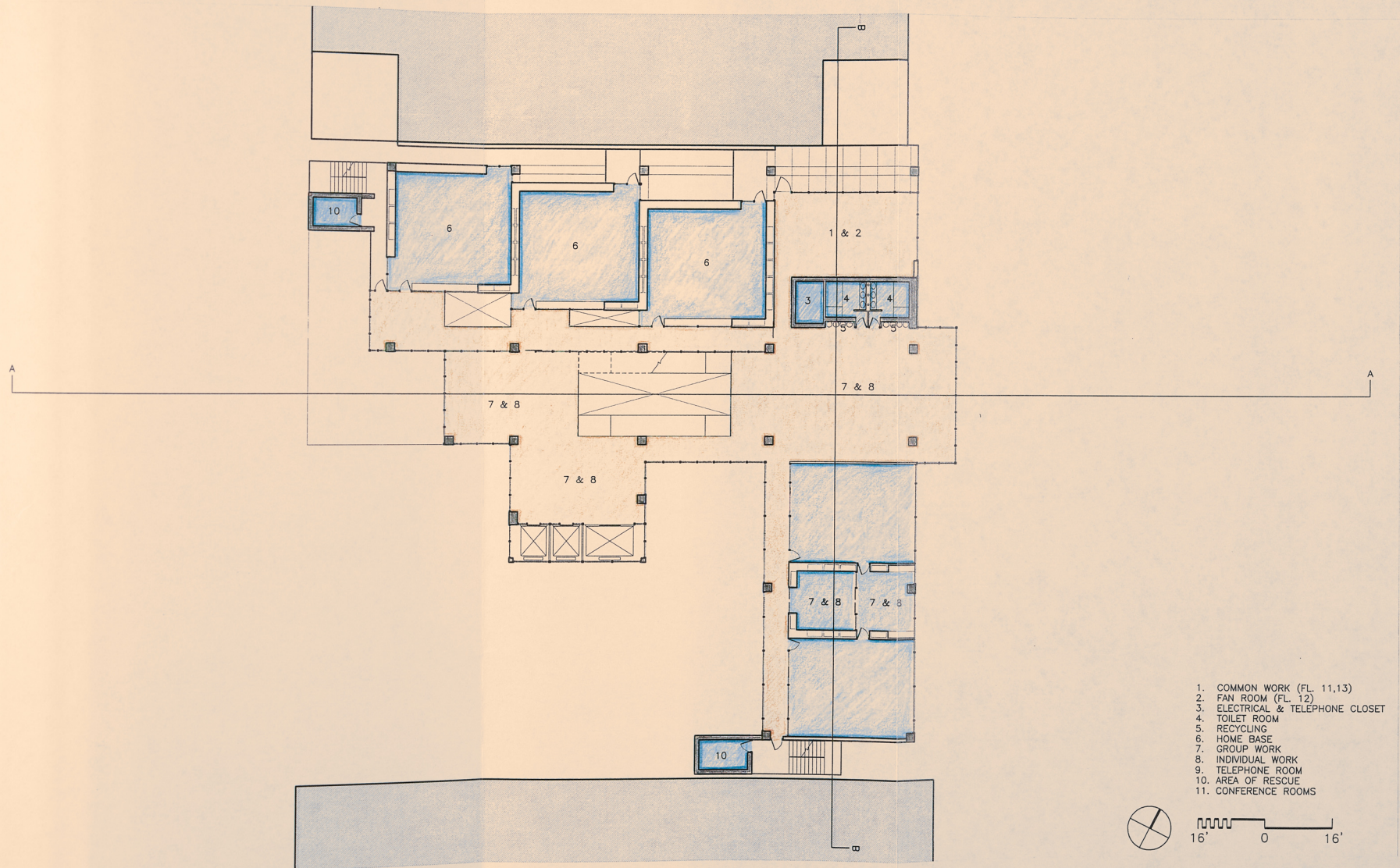
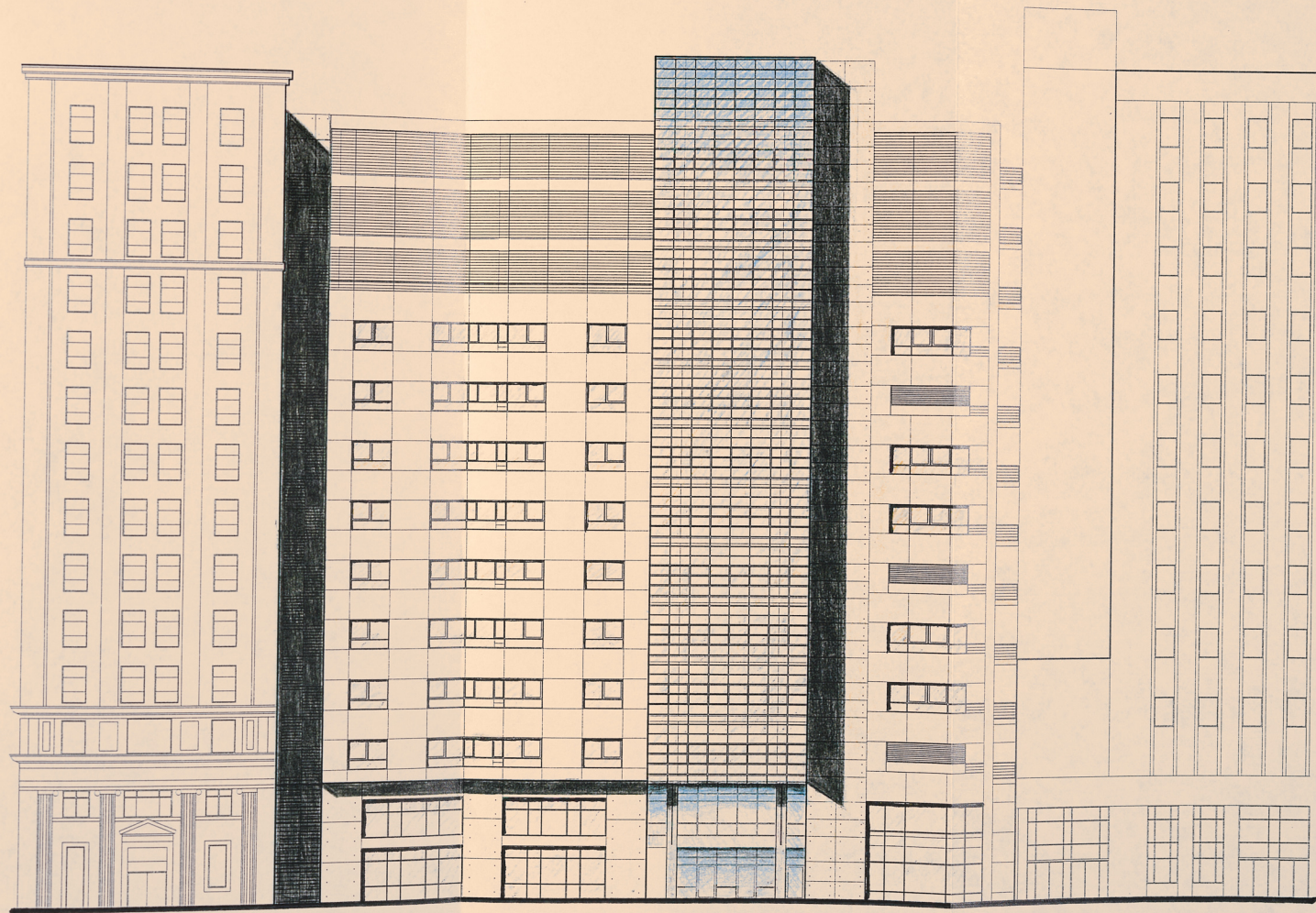


Fig. 67: Typical floor plan: floors 11-13



16' 0 16'

Fig. 68: Gay Street elevation

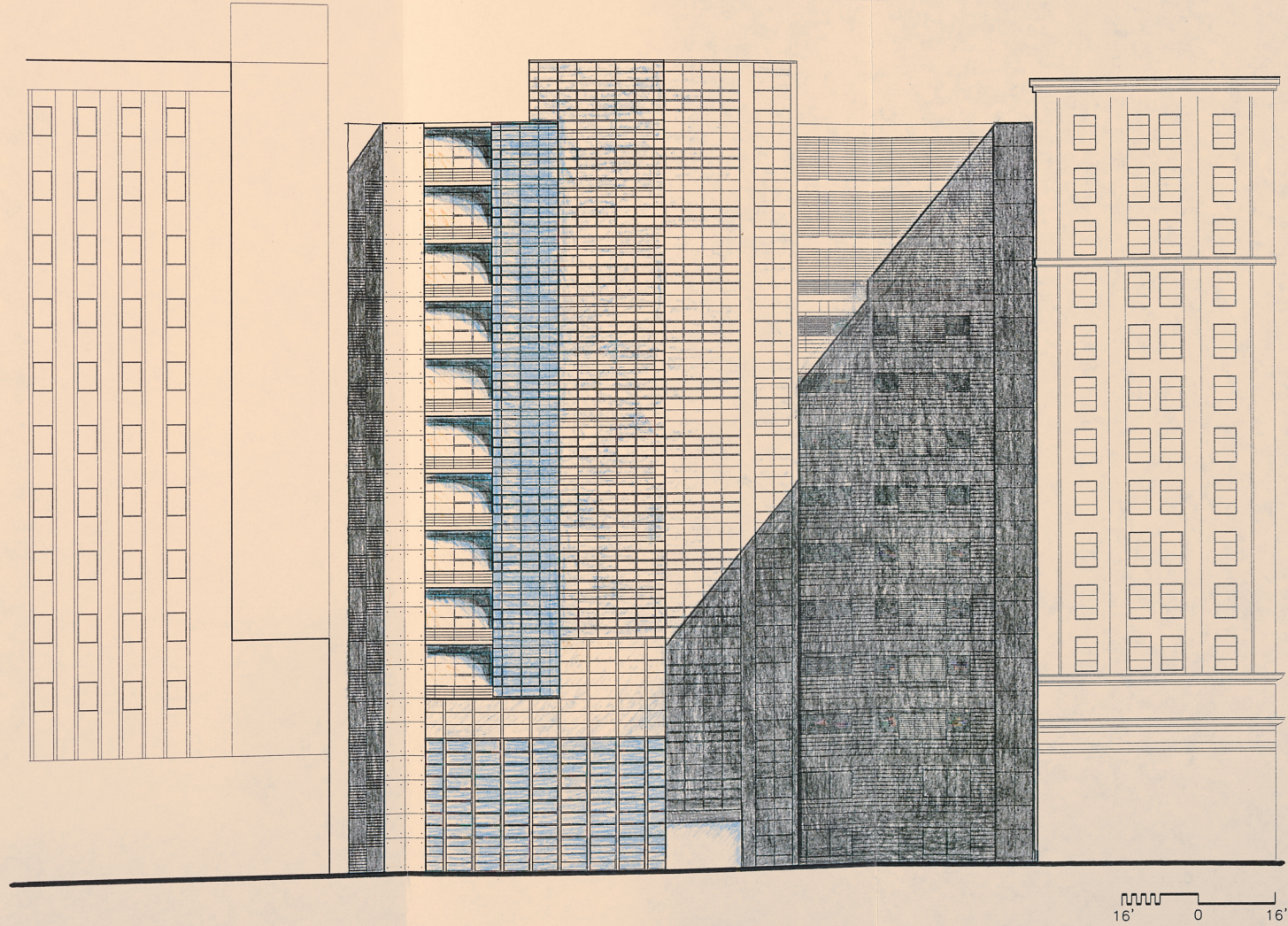


Fig. 69: Krutch Park elevation



Fig. 70: Longitudinal section A-A



Fig. 71: Cross section B-B

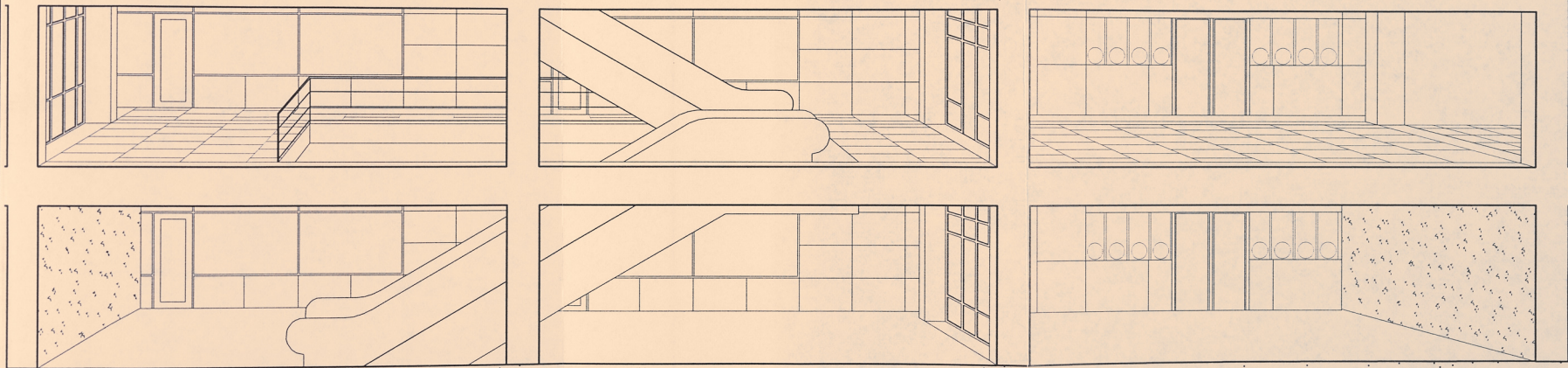


Fig. 72: Sectional perspective

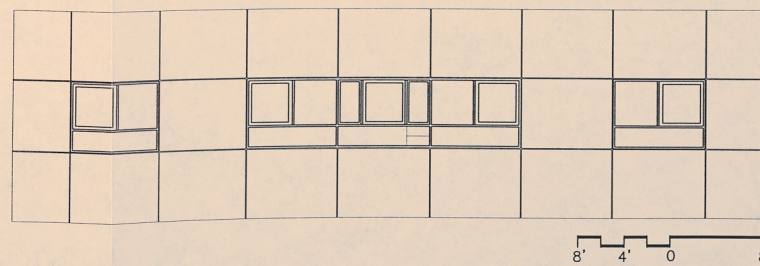
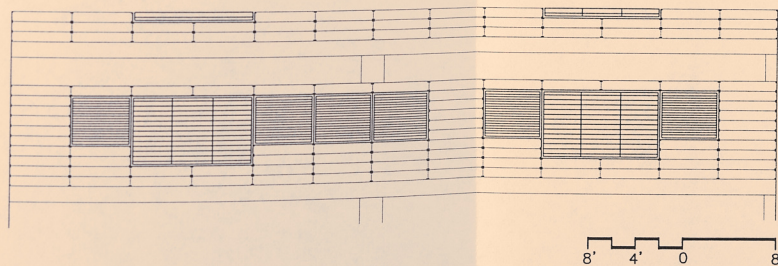
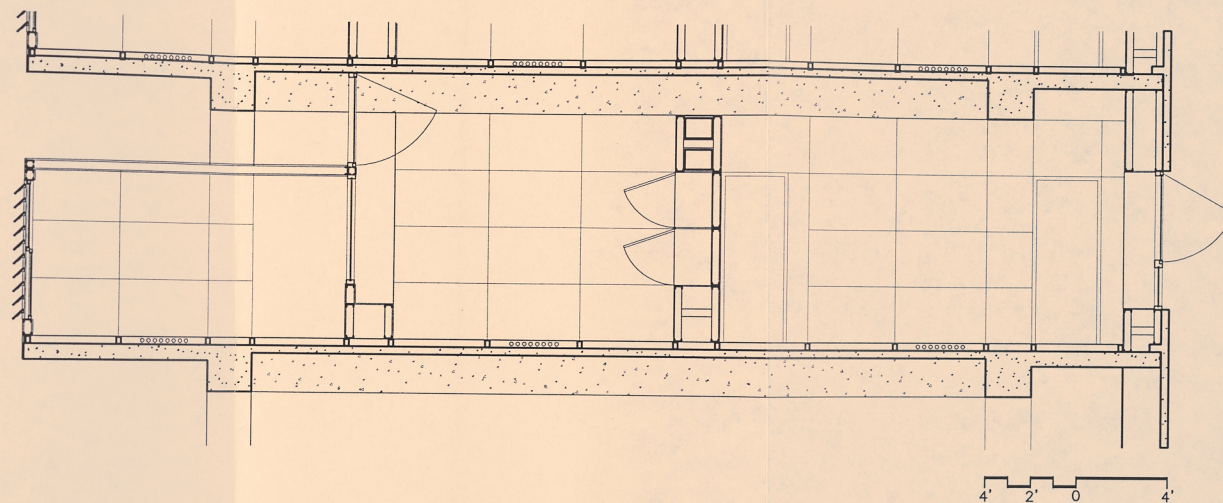


Fig. 73: Section C-C and corresponding elevations

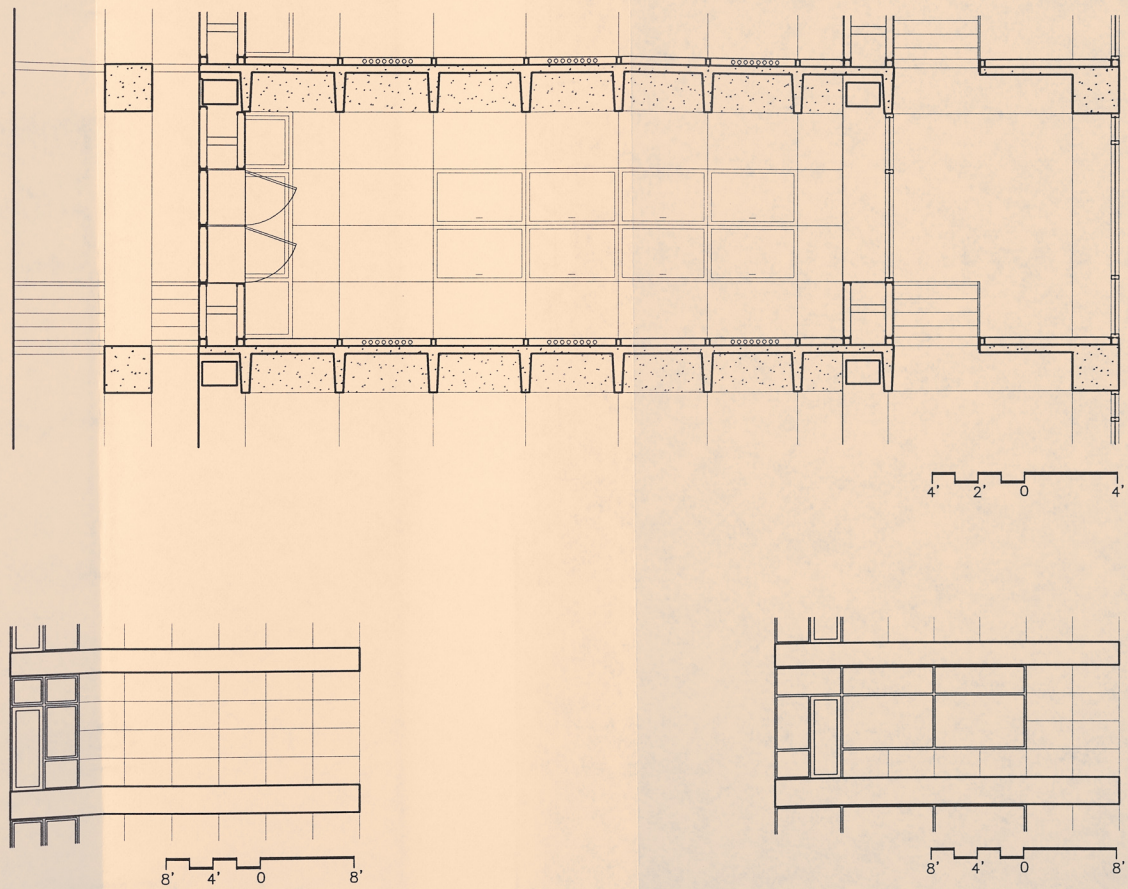


Fig. 74: Section D-D and corresponding elevations

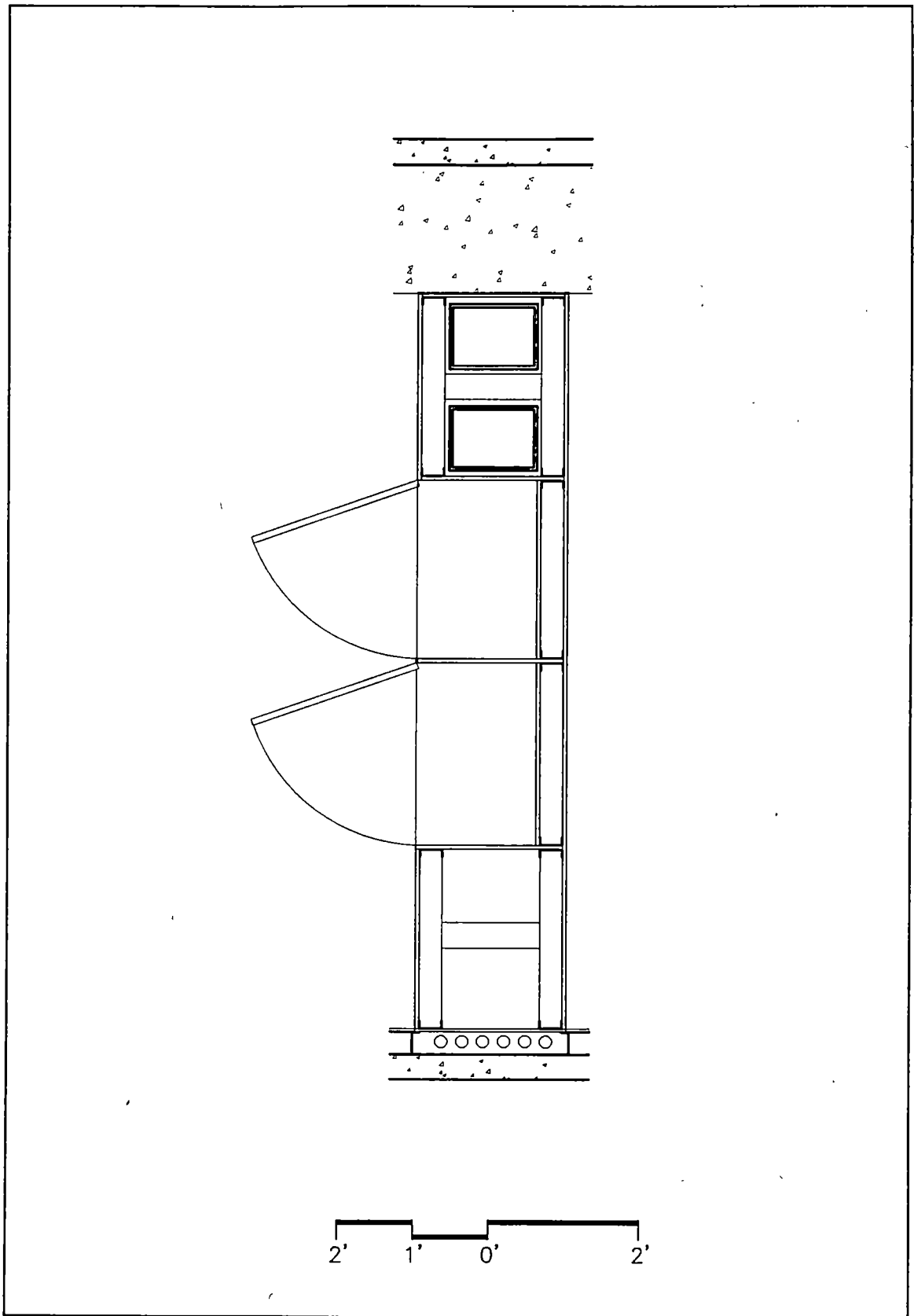


Fig. 75: Wall section through a robust wall

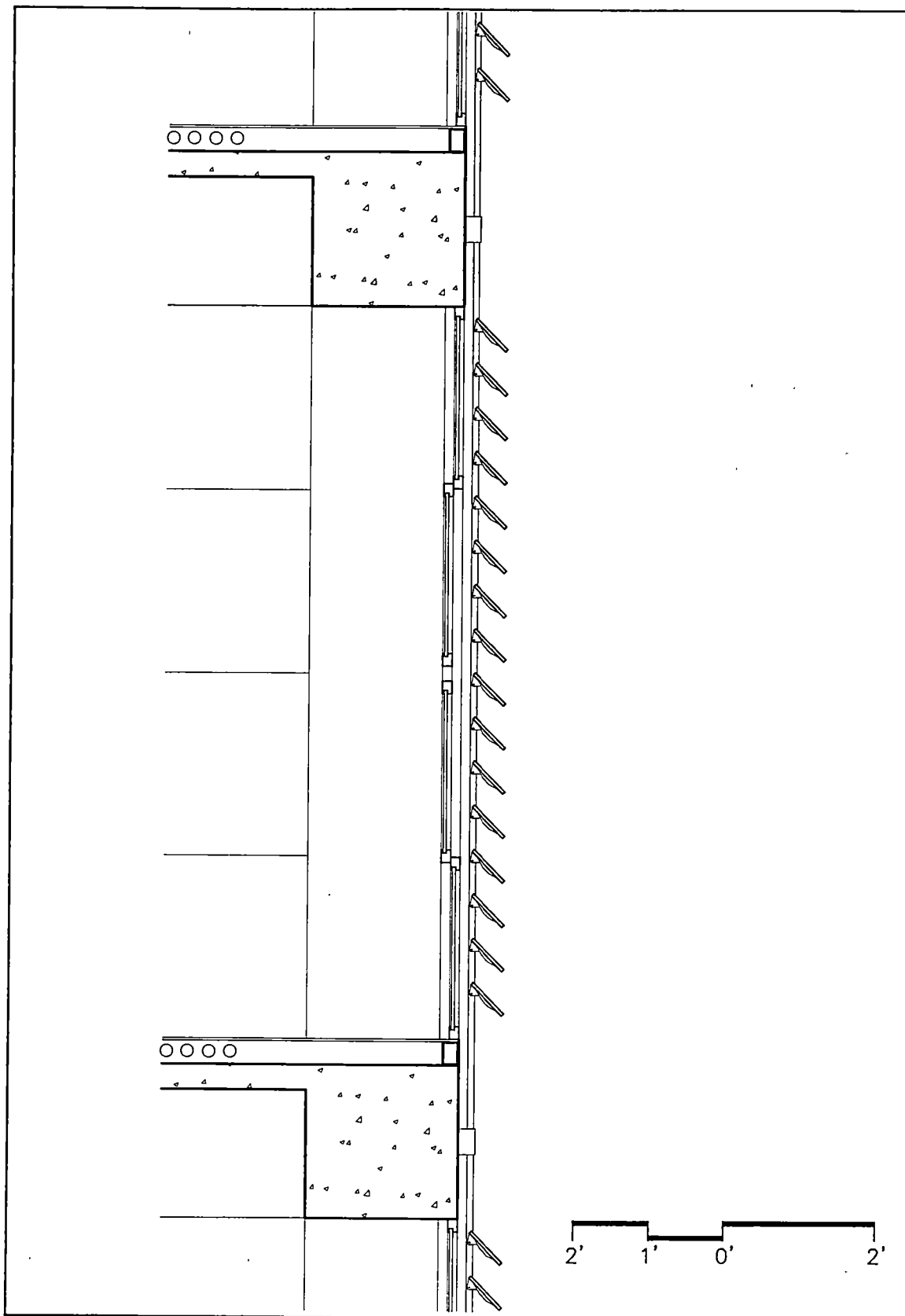


Fig. 76: Wall section through an upper level exterior wall

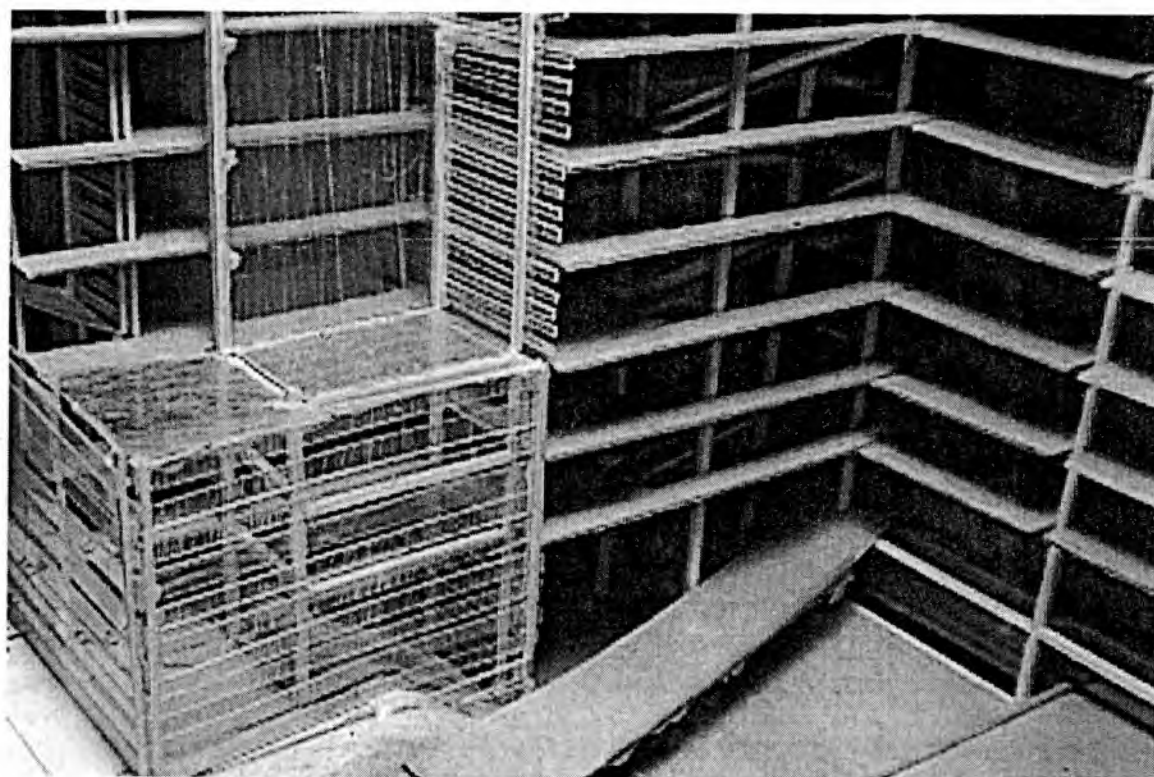
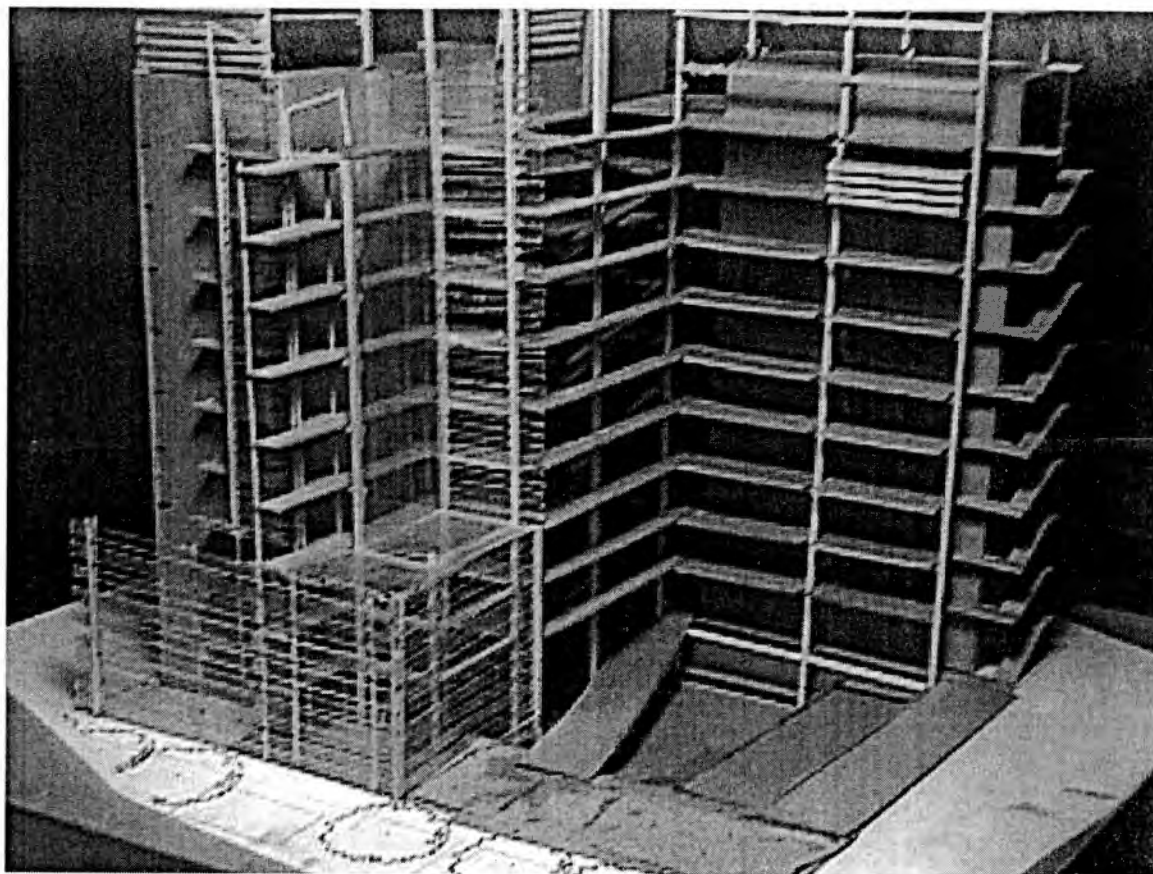


Fig. 77 and 78: Photograph of a study model

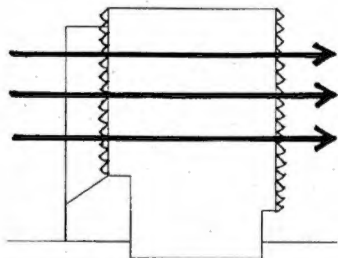


Fig. 79: Spring/ autumn strategy

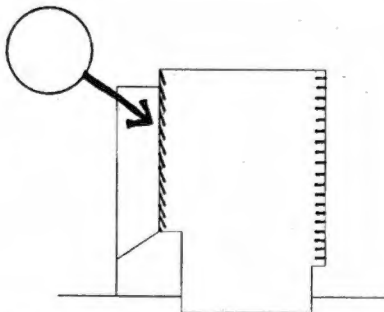


Fig. 80: Summer strategy

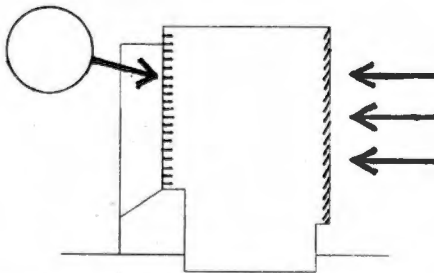


Fig. 81: Winter strategy

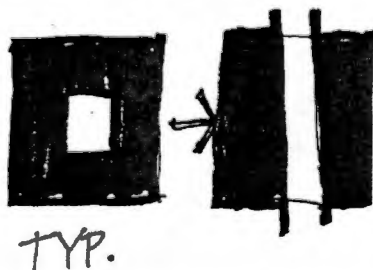


Fig. 82: Incision versus typical core/ open space.

This section will discuss further developments of the solutions introduced in the site analysis, as well as other ways to promote social, physical, and personal engagement.

The building as an entity

The design investigation of the thesis began with the site analysis. The overall building envelope is derived from consideration of the inherent nature of the site. The placement of spaces is influenced by the cycles of the sun and wind and by the characteristics of the surrounding built fabric. These considerations explore physical engagement and its goal of making a more sustainable entity for the environment and for people. Designing in this way suggests an alternative to the generic speculative office building condition in which a building is placed upon a site without responding to its surroundings.

The path

Creating a path through the building is first introduced in the site analysis. The path cut through the building is robust. It simultaneously acts as a breezeway, circulation, and place of work.

The skin of the path is glass with malleable windows. The path can be transformed into a breezeway for cooling purposes during the spring and autumn months. Different strategies for each season (figures 79-81) involve the use of malleable elements, such as louvers and shutters.

Making an incision through the building for this path opposes the typical core/open space configuration of the generic speculative office building (figure 82). In the typical building, stairs and elevators are placed in the core. In the building of this design investigation, the typical core of the speculative office building is redefined. The stairs are taken out of the core to facilitate migration through the building. To further promote this concept, escalators replace the stairs.

Ascending the escalators, one finds spaces in which to work on the landing of every floor. One can choose to work at either end of the axis, city or green. Providing one with a choice promotes the goal of personal engagement.

An individual continuously reconnects to the outside by sight as the individual arrives on each floor. In this way, place is understood by its outer surroundings. The space inside the building becomes more legible because the surroundings differ.

Another reason that the space inside becomes more legible is that the large path allows one to see more parts of the building. Places are more easily found because building is "cut" in half by the path, creating a greater range of vision. Parts of the building are differentiated by set-backs, as in the home bases, as well as different materials. One can identify one's location in the building because the parts are differentiated and are easily seen, which differs from the current condition. These are methods in which to combat the problem created by the use of repetitive floors in a speculative office building.

For practical reasons, the escalators found in the path are enclosed in glass. This area can be locked at night for security, which is an issue that cannot be ignored. However, this does not mean that the building cannot be used twenty-four hours a day. The entry can be monitored by the office center. The office center is the check-in for the rentable space in the building that was mentioned in chapter five and will be discussed in more detail in this chapter. The glass enclosure also serves as a barrier to Knoxville's occasional cold weather. However, it can be opened at certain times of day and season.

The entry and front facade

Providing first floor functions encourages the pedestrian to enter. To further promote this, the manner in which the façade is articulated, especially at street level, and the position of the entry relative to the street are critical considerations. In this case, the volume that comprises the path extends over the sidewalk, indicating the entry. A small plaza at the entrance invites the pedestrian to enter the building. There are no barriers, one is free enter, as opposed to the other Gay Street buildings. One is free to roam about and encounter the programmatic functions along the path.

The front facade consists of different materials that enclose its different parts. As mentioned the skin of the path is glass, with louvers that can block the winter wind on extremely cold days. The remainder of the "typical" core, now only consisting of restrooms, the electrical/ telephone closets, and recycling chutes, is constructed with poured-in-place concrete. The other two volumes, which contain working areas are differentiated in three different ways. The lower two floors, which house the most public functions, comprise mostly of glass (clear and not reflective as in First Tennessee on Gay Street), so that pedestri-

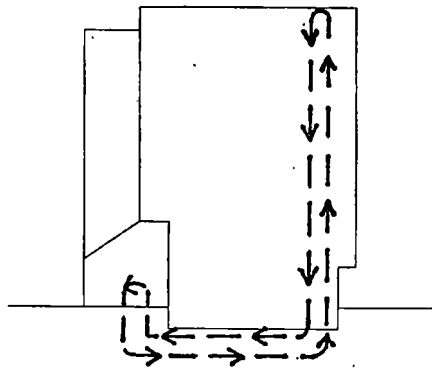


Fig. 83: Plumbing and wastewater

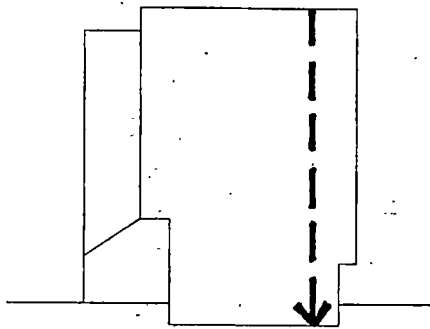


Fig. 84: Office Recycling

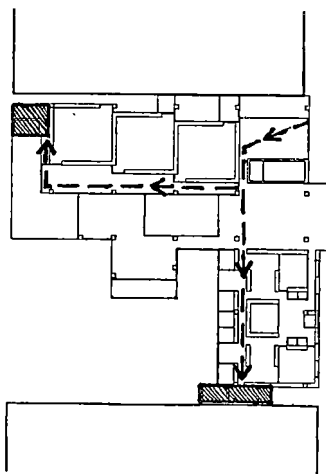


Fig. 85: Fire egress

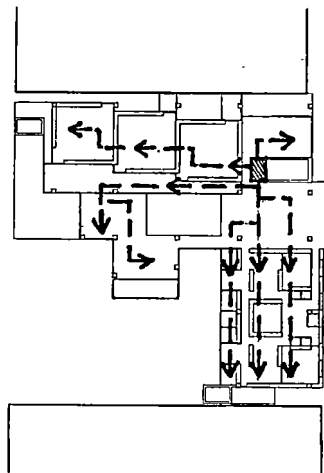


Fig. 86: Electric and telephone lines

ans can easily see inside. The middle floors comprise of a concrete panel and window system. Considering this northeastern facade, concrete is chosen because it is a material that can act as a barrier to the winter wind. The upper floors are sheathed in operable glass windows for the reason that wind flows with higher velocities at the top of a building and the amount of operable windows should be maximized in order to maximize cooling during the spring and autumn. However, a louver system that can block the winter wind is provided as well.

As mentioned, the "typical" core now consists of the restrooms, the electrical/ telephone closets, and recycling chutes. The graywater from the sinks in the restrooms can be piped to the greenhouse (figure 83) where it can be recycled, piped back to the restrooms and reused for the flushing of the toilets. The recycling chutes (figure 84) are located in this common area along the path to promote their use and extend the height of the building. The recycling is to be picked up on the lower level.

The stairs in a typical core act as firestairs as well as normal circulation. The stairs in this design investigation have been removed from the core, resulting in a new placement of the fire stairs. They are located at the ends of the "L-shape" building (figure 85).

The office suite and the individual unit

As discussed in the reprogramming, individual working is removed from the office suite, which is feasible because modern workers are transient and autonomous. Necessary services, such as electric and telephone lines (figure 86) can be located anywhere by the use of an access floor. Individual working is now

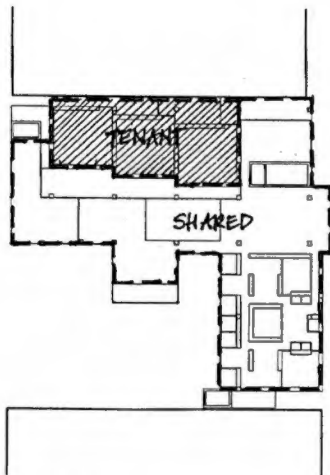


Fig. 87: Individual tenant versus common spaces

situated in the path and common areas located in the front mass of space (figure 87). Other places to which one can migrate include the greenhouse, office center, TV room and lounges. A possible configuration of a suite is shown in Appendix B.

Individual working is no longer solely located in spaces that require security (figure 88), and as a result, these spaces can be used by the public as well. This reuse of space helps promote social engagement. The home bases, which are formerly known as the suite, decrease in size, which can benefit the different companies as well.

In addition to the individual workspaces, the conference rooms are removed from the suite as well and are placed in the front section that faces Gay Street. These spaces are defined by thick walls. Because the user should be able to participate in the formation of one's own space, the walls are malleable. The user can engage the wall, which is robust because it simultaneously defines the room, allows for storage, locker or seating.

The thermal environment

In the typical suite, the workers are lined up in cubicles in an open room. The temperature remains constant in this room, regardless of what the individual desires; the building is designed to satisfy the collective norm at 72 degrees. This is not suitable for everyone, as evidenced by the IMFA survey concerning the top ten complaints in the workplace, which included complaints that the office was "too hot" and the office was "too cold." Some facilities, such as the Intelligent Workplace, do recognize this problem and provide units that allow one to regulate the temperature at one's own desk. These units are rather expensive and

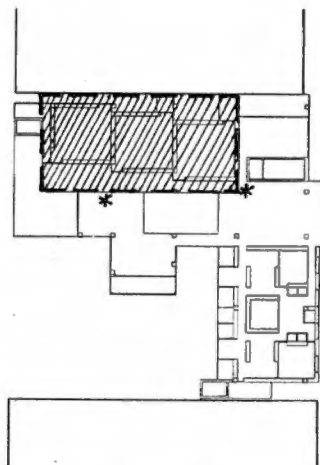


Fig. 88: Home base security

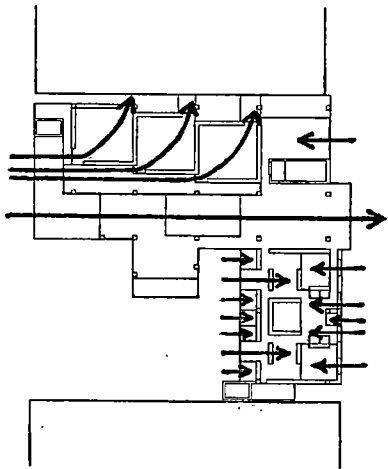


Fig. 89: Natural ventilation.

do not solve the problem of the lack of engagement with the natural thermal environment.

This design investigation presents ways in which to facilitate the adjustment of space to suit one's comfort through architectural design. As first mentioned in the site analysis, the spaces are placed upon the site in a way that promotes natural ventilation (figure 89), which offers spaces that range in temperature.

Another way that architectural design can promote personal engagement is to "break down" the spaces into smaller parts so that each unit of space can be controlled by its own thermostat (figure 90-91). The units have malleable tectonic pieces, such as operable windows and shutters, and can be controlled by the user. The malleable elements help the user participate in the making of one's own place. If one chooses to turn on the air conditioner in one room then one can, and the person next door can open his or her window. One can migrate to these places so that one can find the right place.

The design provides a mixture of individual spaces and collective spaces. It is in the collective spaces that there exists a tension between the individual and collective. The large collective space, the path, runs along the southwest-northeast axis. While the temperature in that space may be set at a constant level, the end of the axes can differ in temperature due to their different orientation. The individual can choose to migrate to either end.

The issue of a mixture of mechanical air and natural air system is very complex. This design is by no means a finished solution, but merely presents suggestions, by exploring simple ways that people can be involved in the regulation of their ther-

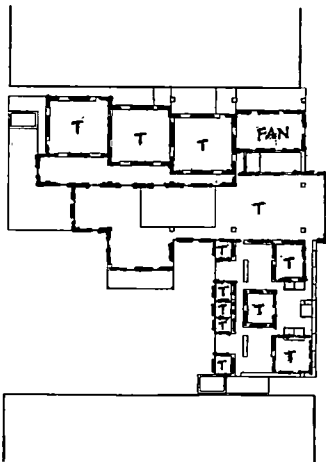


Fig. 90: Thermostats.

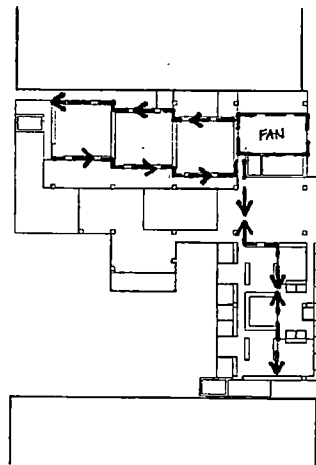


Fig. 91: Major ducts.

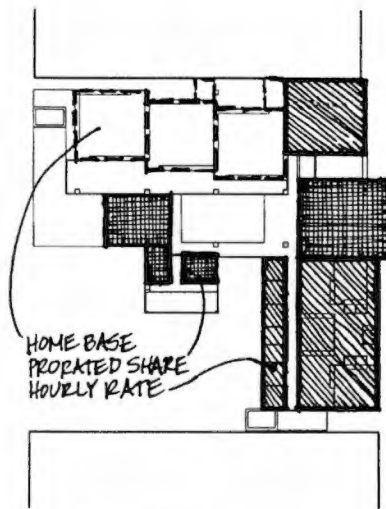


Fig. 92: Rentable area.

mal environment as an alternative to conventional way to regulate the temperature in the office.

Rentable area

The speculative office building does not have to be an open space/core configuration in order to be of value. Designing the spaces so that they may be reused alleviates the problem of the empty desks in the current office suite, which results from the migrant nature of today's worker. Figure 92 illustrates the different types of rentable square feet on a typical floor. As stated previously, considering engagement as a programming criteria provides numerous benefits for the developer, tenant/owner, and employee, which outweigh the need for a simple numerical figure that conveys the building's efficiency (72%). However it should be noted that this building, with 135,000 rentable square feet does indeed meet and exceed the goal of 112,500 rentable square feet (Appendix C) that was targeted as a goal for this site. The total gross square footage equals 187,500 square feet.

CONCLUSION

The building as an entity, the corporate suite, and the individual unit were reconsidered in this thesis investigation.

The building as an entity was designed with regard to the implications of the inherent nature of the site, which is the goal of physical engagement. Designing in this way opposes the current condition in which a speculative office building is simply placed upon a site without consideration of the site conditions. The configuration of the building was derived from clues from the site analysis. The façade of the building was designed to respond to the cycles of the sun and the wind.

The location of the site was chosen to facilitate social engagement. A site in a city is more accessible to pedestrians than a site in the suburbs. The building as an entity was reprogrammed to provide functions for the public and was designed in a way that welcomes the public into the building, which is the goal of social engagement. A path was cut through building, which allows the public to move through the building. The building's position close to the street welcomes the pedestrian. The façade with its varied articulation, non-reflective glass, and a large, legible entry welcomes the pedestrian as well.

The redesign of the corporate suite and the individual unit within the building increases the quality of space found within the building. Spaces for work are no longer located in a large, open, undefined room, with hermetically sealed windows. The robust walls define the spaces and one's place within the building is defined in relation to the outside. By considering the surroundings, the building is no longer generic, but specific. Place is legible because it is directly related to its surroundings and walls are malleable so that one can have control over one's own thermal environment; both promote the goal of personal engagement.



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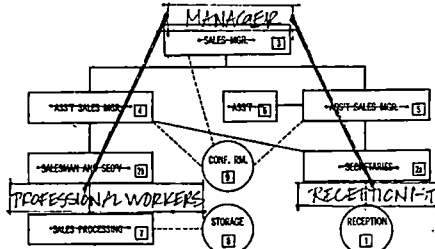
1997 Knoxville Knox County Office Market Analysis.

APPENDIX A

OPERATIONAL REQUIREMENTS ABC Corporation, Sales Division

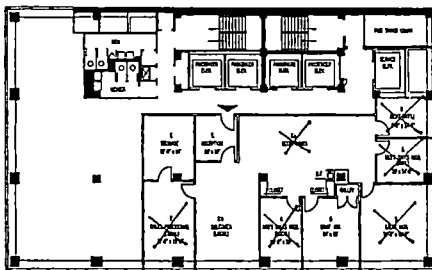
The ABC Corporation manufactures and sells office machines, such as typewriters and adding machines. This sales-division office (not part of a street-floor showroom) houses both the local sales department and the international sales department. Both are under the sales manager of the company who is also a corporate vice-president. The visitors to these offices are mostly buyers from foreign countries and company officials who meet in the division conference room at least three times weekly.

Identification Number	Locate Near
1. Reception room—seating for four-to-five people—table for literature—control by secretary	210
2. Open area	7, 8, 9
3(a). Three secretaries	4, 7
3(b). Four salesmen and one secretary	4, 5, 9
4. Private office—sales manager (needs large office with seating for six to seven people—prefer no desk—would like a conference table instead)	210, 210 1/2, 3
5. Private office—assistant sales manager—local sales	210, 3, 6
6. Private office—assistant sales manager—international sales	4
7. Private office—assistant to five	210 1/2, 6
8. Storage and reproduction room—used almost exclusively by 7—room is now 100 sq ft—wood twice as much space	7
9. Conference room—meeting room—seating for six-to-seven informally with no conference table—access to galley for coffee-making, refrigeration, sink	3, 8, 9

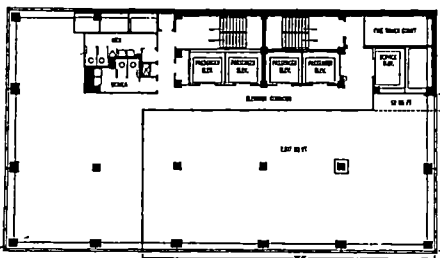


ORGANIZATION CHART
ABC Corporation, Sales Division

The organization chart illustrates the interrelationships and responsibilities of the personnel of the ABC Corporation. The chain of command is indicated by the solid lines, while the broken lines show the relationship of personnel to service areas. The identification numbers have been taken from the requirement form.



SPACE STUDY
ABC Corporation, Sales Division



AREA CALCULATIONS

The two shaded areas of this drawing represent the amount of usable space required for the ABC Corporation. (Actually, it provides for 30 square feet more than is needed, but the desirability of maintaining a straight wall between the client's space and the balance of the floor forced this change.) The usable footage of 2,450 square feet, multiplied by the already established factor (last page 49) of 1.3, brings the total to 3,185 square feet of rentable space.

1012
x 1.3
1315 SF OF
RENTABLE SPACE (NEW)

INVENTORY AND FOOTAGE TABULATION (Simplified Form)

ABC Corporation, Sales Division

Identification Number	Footage Required
1. Reception—four chairs (purchase)*, two tables (purchase)	Sq Ft 100'
3(a). Secretaries—three 60 X 30 in. desks with 18 X 36 in. L's and one interview chair next to each—each with telephone and electric typewriter—One desk to carry five typewriters (monitors bound)	405'
3(b). Salesmen—four 60 X 30 in. desks—each with telephone	240'
4. Private office—(purchase) sofa, end table, lounge chair, round conference table for four, four conference chairs, two telephones	320'
5. Private office—60 X 30 in. desk, swivel, two pull-up chairs—seating and table—telephone	160'
6. Private office—60 X 30 in. desk, swivel, two pull-up chairs, one 42 in. credenza, telephone	160'
7. Private office—60 X 30 in. desk, swivel, two chairs—telephone	160'
8. Storage—five legal files; Xerox 813; small mail machine on counter—approximately 10 to 15 ft of counter with storage beneath and above	250'
9. Conference room—sofa, end table, coffee table, four lounge chairs, one small table for telephone (purchase) Galley (purchase). Should be a spacious room	250'

Add 15% for intradept. traffic

* All furniture is existing, except where indicated for purchase.
† Reception-room footage is arrived at by assigning 20 square feet per person. This can vary greatly, depending upon other requirements of the room, such as display areas. All other sizes are based on job requirements.

TOTAL WORKERS 16 (OLD) 6 (NEW)

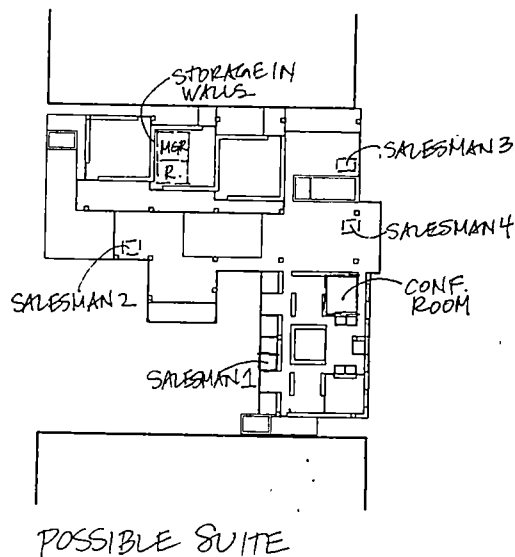
APPENDIX B

INVENTORY AND FOOTAGE TABULATION (Simplified Form) ABC Corporation, Sales Division

Identification Number	Footage Required Sq Ft
1. Reception—four chairs (purchase*), two tables (purchase)	100†
2(a). Secretaries—three 60 X 30 in. desks with 18 X 36 in. L's and one interview chair next to each—each with telephone and electric typewriter. One desk to carry five-trunkline monitor board	745
2(b). Salesmen—four 60 X 30 in. desks—each with telephone	140 (SHARED DESKS/INDIV. WORK OUTSIDE SUITE)
Secretary—One 60 X 30 in. desk with 18 X 36 in. L Telephone and electric typewriter	289
3. Private office (purchase)—sofa, end table, lounge chair, round conference table for four, four conference chairs, two telephones	760
4. Private office—60 X 30 in. desk, swivel, two pull-up chairs, coffee end table, telephone	760
5. Private office—60 X 30 in. desk, swivel, two pull-up chairs, one 42 in. credenza, telephone	760
6. Private office—60 X 30 in. desk, swivel, two chairs, telephone	760
7. Semiprivate office—four 60 X 30 in. desks with 18 X 36 in. L's, five legal files, with storage above one 60 X 30 in. worktable, one telephone, four typewriters	254 (ELECT FILES OR WALL STORAGE)
8. Storage—five legal files, Xerox 813, snail-mail machine on counter approximately 10 to 15 ft. of counter with storage beneath and above	125 (OUTSIDE SUITE)
9. Conference room—sofa, end table, office table, four lounge chairs, one small table for telephone (purchase). Galley (purchase). Should be a spinout room	250
	2,055
Add 15% for intradep. traffic	308
	2,363

* All furniture is existing, except where indicated for purchase.

† Reception-room footage is arrived at by assigning 20 square feet per person. This can vary greatly, depending upon other requirements of the room, such as display areas. All other sizes are based on job requirements.



APPENDIX C

BUILDING NAME	GROSS AREA (S.F.)	RENTABLE AREA (S.F.)	LOT SIZE (S.F.)	% RENTABLE GROSS (S.F./ S.F.)	% RENTABLE LOT SIZE (S.F./ S.F.)
Center Square One	113,100	93,711	20,250	82 %	462 %
Center Square Two	110,034	91,426	24,700	83 %	370 %
Charter Federal	93,000	78,128	7680	84 %	1017 %
First American	150,000	123,797	15,500	83 %	798 %
First Tennessee	469,672	423,176	90,000	90 %	470 %
TVA Towers	690,000	586,500	129,600	85 %	453 %
Thesis Building	132,353 (goal)	112,500 (goal)	22,500	85 % (goal)	500 % (goal)

Statistics compiled from the 1997 Knoxville Knox County Office Market Analysis

For the thesis building to be competitive within the Knoxville market the following square feet should be provided:

$$22,500 \times 500\% = 112,500 \text{ rentable SF}$$

$$\frac{112,500}{\text{gross SF}} = \frac{85}{100} = 132,353 \text{ gross SF}$$

VITA

Christina Heidel studied architecture for four years at Lehigh University and received a Bachelor of Arts degree in 1995. She enrolled in the Master of Architecture program at the University of Tennessee in 1996. During that time she received a fellowship from Pilot Corporation in Knoxville, TN. In the summer of 1998, she became a full-time architectural intern at Johnson Johnson Crabtree Architects in Nashville, TN, where she will continue studying the issues of sustainability for the firm. She plans to become a registered architect in the summer of 2001.