

*A Military
Headquarters
Facility*

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10 June 88

Date

Military Headquarters Facility
The Implications of Environmental Psychology

by

Laura L. Luloff

A program document submitted in partial fulfillment
for the degree

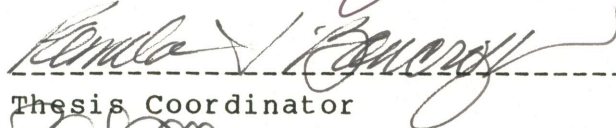
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June 1988



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Dedicated to my brother,
Richard D. Luloff

for giving me the inspiration
to continue even when I wanted
to quit.

Thanks Rick!

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Introduction



INTRODUCTION

THE PROBLEM

The project being proposed for this project is the redesign of the Headquarters Facility for the Montana Air National Guard. The site for this project is the Montana Air National Guard Base near the Great Falls International Airport on the top of Gore Hill in Great Falls, Montana. The project will consist of gutting out the whole building and starting over. Also incorporated into the design will be environmental psychological aspects to prove that how people react to an environment has a direct impact on their work, even in the military. To create a military headquarters, the functions of an office building and a corporate headquarters building are combined.

Albert Einstein once said:

" It is characteristic of the military mentality that non-human factors...are held essential while the human being, his desires and thoughts - in short, the psychological factors - are considered unimportant and secondary."

Using psychological influences on people in the military seems like an extreme conflict of interest. However, the facts seem to favor the idea that the military could profit by implying some environmental psychological ideologies in their designs, because these ideologies seem to provide for optimal communication resulting in optimum efficiency. Behavior in the military is geared toward one purpose-maximum output within reasonable cost limitations.

To be able to explain how environmental psychology can have an impact on personnel, some research has to be done on the topic. The following pages will briefly explain a little about environmental psychology and how it affects people and their relationship to their environment.

THE THEORY

Up until the last decade, the working environment has never had the attention that it deserves because for generations "we have been schooled to live for work rather than work to live".¹ In the militant society, the individual was "owned by the state and subordinated to the goal of the preservation of society".² In both of these ideals, the human being's comfort and thoughts are considered secondary to the function of the establishment.

Many assumptions are made as to what man is like and how he will react to and feel about his given environments. The human presumably spends most of his life in the working environment and much of his behavior occurs in the built environment, therefore it would be reasonable to study and determine the great potential the built environment has over influencing man's activities. Because of this factor, we as designers must consider the human beings and their relationship to the environment around them. This theory is called **Environmental Psychology**.

Environmental Psychology is the "study of the inter-relationship between behavior and the built and natural environment".³ The dynamic interchange between man and his environment has been the study of psychologists for decades; however, designers have been known to not always be sensitive to the user's needs. Sir Winston Churchill was

1. Judy Graf Klein, The Office Book (New York: Facts on File, Inc., 1982), p. 7.

2. Samuel D. Huntington, The Soldier and The State (Cambridge, Massachusetts: Belknap Press of Harvard University Press, 1957), p. 215.

3. Paul A. Bell; Jeffrey D. Fisher; and Ross J. Loomis, Environmental Psychology (Philadelphia: W.P. Saunders Company, 1978), p. 6.

once quoted after the collapse of the House of Commons: "We shape our buildings; thereafter they shape us". This means that although we create the buildings we live and work in, these same buildings are able to model our behavior. Therefore "designers must shift some of their attention away from the past (buildings that have been) and the future (Utopias) and study buildings on the narrow plane of the present and from the standpoint of user behavior".⁴

Although architecture may be beautiful, it should also "enclose space in which certain activities can take place comfortably and efficiently".⁵ The personal expression of the designer must succumb to the functions that the building will ultimately serve.

4. Robert Sommer, Personal Space: The Behavioral Basis of Design (New Jersey: Prentice Hall, Inc., 1969), p.4.

5. Ibid, p.6.

THE IMAGE

How the public views organizations and how a building communicates to the public are growing concerns not only to the designers but also the organization itself. The organization being considered in this case is the Montana Air National Guard. The unit itself has not only a military obligation, it also has a civic obligation to the public consisting of information and safety. How a person of the unit displays him/her self is a direct response to the unit. Even how a building is communicated has a direct response on the community. It is therefore vital to portray the correct image of the unit to the public.

The image of the unit is its **COMMITMENT TO EXCELLENCE**. This motto was developed in 1985 after the Montana Air National Guard the Hughes Trophy award and was the reason the trophy was won. In all that is done by the unit, either civically or militarily, striving to do the best anyone can do is always stressed. To portray this image in the most important building on the base would seem logical since the headquarters building on the base is the first building visitors and new recruits come into, and should have the most impact on these people.

Ideally, buildings should be built "from the inside out, by first evaluating the needs of the users and then designing the building to meet those needs".⁶ The interior of a building says just as much to people as the exterior, and the thoughts, feelings and ideologies should be carried throughout the building.

Because people experience themselves in terms of their environments, the spatial settings influence the total experience. Edward Hall, anthropologist, says "man's experience of space is not visual alone but multisensory

6. Karen Gustafson and Roger Yee, Corporate Design (New York: Interior Design Books, 1983), p. 36.

and related to action"⁷ The presence of sensory stimuli gives the feeling that someone cares. For a military facility, this factor alone can make an enormous impact on the way the public sees the unit.

The **COMMITMENT TO EXCELLENCE** image must be instilled in the individual from the minute upon seeing the facility, carried on through the facility, and remain when the individual leaves the facility. The **COMMITMENT TO EXCELLENCE** must be conveyed throughout the whole building by the use of materials, colors, and design. If this excellence is communicated, then the job of the designer is complete.

7. Ibid.

Goals



EDUCATIONAL GOALS

- * To be able to prove that how people feel and react to an environment has direct impact on their work even in the military
- * To acknowledge the 120th Fighter Interceptor Group for the encouragement and understanding they have given me in the last three years by considering them in my final project
- * To be able to combine all that I have learned in the past four years to create my best project ever
- * To use Computer Aided Design techniques as much as possible

PROJECT GOALS

- * To apply the environmental psychology implications to a military facility.
- * To create a people-oriented environment
- * To produce a functional, yet exciting, working environment for the personnel utilizing this facility
- * To avoid the idea of military institutionalism
- * To explore beyond the typical average and mundane solutions for military offices
- * To use natural light and natural ventilation as much as possible
- * To use bold and exciting colors
- * To use the "landscaped office" theme in office sections
- * To produce an environment conducive to communication
- * To induce the patriotism theme throughout the facility
- * To implement ways of creating more social interaction through design
- * To create an entry that is inviting for the wanted but a deterrent for the unwanted
- * To create an bold yet calming break area
- * To create an interior/exterior courtyard for enjoyment and relaxation

BEHAVIORAL OBJECTIVES

- * To create an environment that will make people feel warm, safe and secure
- * To create an exterior courtyard as a behavioral focal point- a place where people can interact regularly on a face-to-face basis
- * To be conscious of human psychological and physiological reactions toward color, design, and light
- * To present the principle that unity and complexity balance must be satisfied at all times, and various color effects are an aid in achieving that balance
- * To consider the positive and negative effect of open office plan on the human behavior
- * To remember that the most significant influence of a room on human behavior is the purpose of the room or what is to go on in the room
- * To model the environment to fit the behavior
- * To remember that aspects such as scale, appropriateness, design, knowledge and a heightened awareness of and respect for what is involved in being human helps in coping with environments
- * To cause dynamic people interaction beyond visual contact
- * To promote a sense of unity and a strong civic image
- * To reduce the sense of confinement
- * To enhance the the everyday routine of the personnel

History



HISTORY OF THE 120th FIGp, MONTANA AIR NATIONAL GUARD

The Montana Air National Guard came into being on 27 June 1947 when the 186th Fighter Interceptor Squadron, equipped with F-51 Mustang fighters, was federally recognized. Lt. Col. William Sperry was commander and the Montana Air National Guard held their first encampment at Gore Field in Great Falls, MT in June of 1948.

The Montana Air National Guard was mobilized for the Korean Conflict in May of 1951. After twenty-one months, the unit was released from active duty and returned to Great Falls.

In October of 1953, the Montana Air National became the first unit to receive the F-86A Sabre Jet.

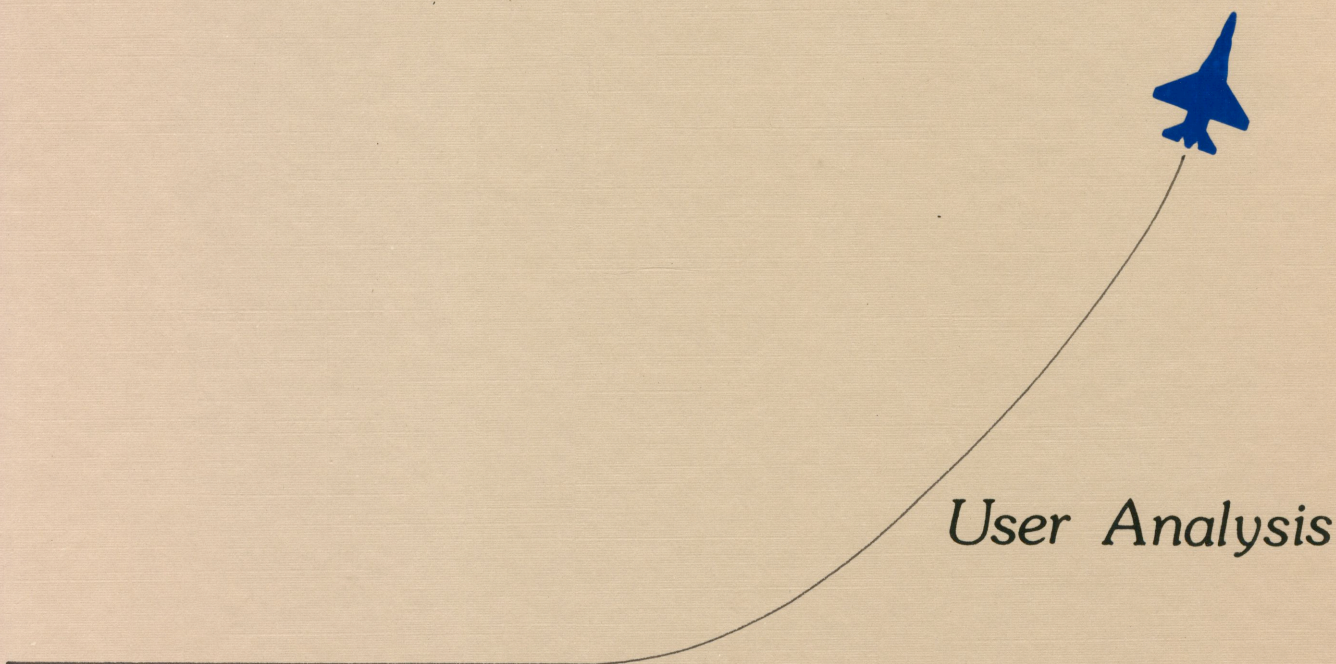
In 1954, the base was expanded with six new buildings. The F-94 arrived for a short stay in 1955, but were replaced by the F-89C that same year. In 1956, the unit became the 120th Fighter Interceptor Group and was assigned to the Aerospace Defense Command. During 1958, the Fighter Group assumed around-the-clock air defense alert and has maintained five minute alert status since that time. In 1960, the group received the F-89J and the unit went into the nuclear business. One F-89J remained with the unit, mounted for public display at Gore Field. This particular aircraft held the distinction of being the only F-89 to ever have fired an atomic missile (in testing at Indian Springs Proving Grounds, Nevada in 1957).

With the arrival of the F-102 Delta Daggers in mid 1966, the 120th began supersonic flight. In 1972, the unit gained F-106's to replace the F-102's. The 120th Fighter Interceptor Group was selected the first Air Guard unit to receive the F-106 Delta Dart. With the F-106 Delta Dart came many prestigious awards. In 1974, the Montana Air National Guard competed in their first William Tell competition, winning all the trophies in their category. During 1974 and 1975, the 120th received the Spaatz Trophy and the Winston P. Wilson Award from the National Guard

Bureau distinguishing them as the Outstanding Interceptor and Flying Unit in the Air National Guard. The unit was acknowledged by the Air Force with the Air Force Outstanding Unit Award and by the Aerospace Defense Command with the ADCOM "A" Award. To date, the unit has participated in four William Tell competitions, winning two and placing second in two. The Montana Air National Guard's Load Team has competed eight times since 1974, winning four and placing second in four. The unit has received five Distinguished Flying Unit Awards, the USAF Supply Effectiveness Award and the USAF Maintenance Effectiveness Award. The list goes on. In 1985, the unit received the highest award possible for a Fighter Interceptor Group by winning the prestigious Hughes Trophy (the trophy itself is estimated at being worth \$300,000). The Hughes Trophy originated from Hughes Aircraft Co. and is awarded to the best Fighter Interceptor Group in the United States Air Force. The 120th is only the second Air National Guard Unit to have won this award in the thirty-three year history of the award.

At present the unit flies the F-16 Fighting Falcon, converting from the F-106 in 1986. Col. Gary C. Blair is currently the Group Commander. The 120th prides itself for its **COMMITMENT TO EXCELLENCE**.

The implications of the history towards the design of this project are that all these trophies, plaques, and awards are to be displayed in the main entry of the building, visible not only to members of the unit but also to visitors.



User Analysis

USER PROFILE

The users of this facility are a mixture of active duty and civil service personnel. Both groups work full time and the only difference between the two groups is the active duty personnel are military twenty-four hours a day, seven days a week. The civil service personnel are only military on one weekend a month and the fifteen plus days a year. Both groups wear the Air Force uniform and all work towards one purpose - the benefit of the whole unit.

There are approximately 100 people that will work in this building on a daily basis. There are also approximately 700 other personnel that will utilize this facility, about 200 on a daily basis and the other 500 on the weekend duties and fifteen plus days a year, since this facility is the center of all activities on the base. The age group of the personnel is between eighteen and sixty, the average age being around forty-three. The Air National Guard originally was for men only. Today, the unit is male dominated with about sixty-five percent still being male and the other thirty-five percent being female.

The types of duties being conducted are mainly office and administrative. The office duties include basic clerical, such as typing and filing, as well as word-processing and keeping each person's records up to date with promotions, training and medical examinations. The administrative duties include management decisions, executive authorizations and issuance of orders. The unit at times is visited by foreign dignitaries, ambassadors, and important air crews. The entertaining of these V.I.P.'s until their visiting arrangements are complete is another function of this facility.

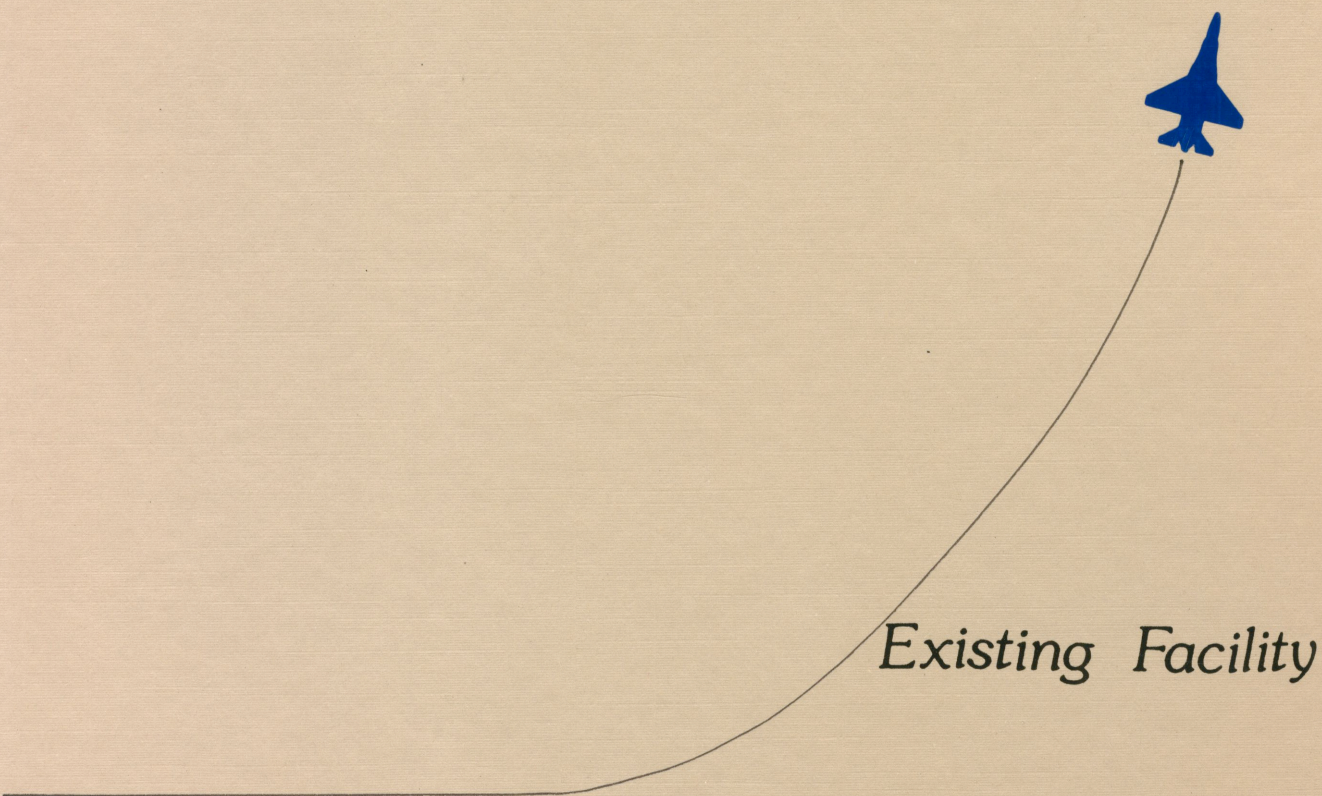
Although the users are quite different from each other, all of their basic needs must be met. Since different personnel will have different needs, it is obvious that not every need can be met. If the basic behavioral needs are met, more than likely most of the users will be satisfied.

USER NEEDS

Today, being overworked and stressed is a part of every day life. To relieve some of the trouble and tension the behavioral needs of the person must be accommodated. What people feel and do in their spatial setting is vital. The interface of physical environment with human functioning is the main concern.

The personnel in this building need to feel warm, safe, and secure. They must also feel excited and bold. The reason for this contradiction of feeling is again reflected on the military and civic obligations. The personnel working in this environment must feel comfortable enough to be efficient and productive. The public on the other hand looks toward these people for leadership and excitement; leadership since it is a government entity, and excitement since the unit flies fast jets and accommodates air shows.

Whether behavioral, perceptual or symbolic, implications must be lodged in the design. The presence of the physical environments is an integral part of environmental design.



EXISTING FACILITY

The M.A.N.G. headquarters building was built in 1958 by the use of definitive drawings, which are drawings the Army Corp of Engineers develop to standardize military establishments throughout the world. The U-shaped (Fig. 1) plan was thought to be the most functional design of that time by the Army Corp of Engineers and therefore was used for all headquarters buildings between 1958 - 1962.

The building is a two-story brick masonry structure, oriented on an east/west axis, with a north facing entry (Fig. 1). The only major problem of the site is the wind speed which sometimes reaches more than 50 m.p.h. since the building is located on the top of Gore Hill. The building is supported with interior columns and exterior bearing walls. There are no interior bearing walls. The interior walls are steel stud non-load bearing partitions used only to create the individual spaces.

All the fenestration is located on the outer walls. There is a five percent glazing area on north facing walls. The other walls all have approximately fifteen percent glazing. On the majority of the existing windows there is an insulation treatment covering due to a lack of any other energy conscious ideas.

The existing finishes are mainly gypsum wallboard with paint. None of the exterior masonry was brought to the interior. The paint on the walls is off-white in color. The furnishings in the existing building are all government issue of metal with gray primer. Only recently has the unit contracted with local furniture suppliers for computer terminal desks and executive desks.

The building is the first building passed when driving on the base. The security police building is located to the east of this building. Parking lots surround the building on other sides. There is a parking lot in the center of the building (Fig. 1). The landscaping of the building has

been limited to grass in the front. Asphalt covers the rest of the areas that could have been turfed.

The roof is flat and covered with metal sheathing. It was not particularly designed for the snow loads of Montana but it works very well with the wind speeds accumulated in the area (see climatic analysis).

The existing facility was a prototype of a military facility that was prominent in the late fifties and early sixties. Today plans for the redesign of this facility are in the planning stages. Therefore the need for the redesign of this facility has already been justified by the United States Air Force.

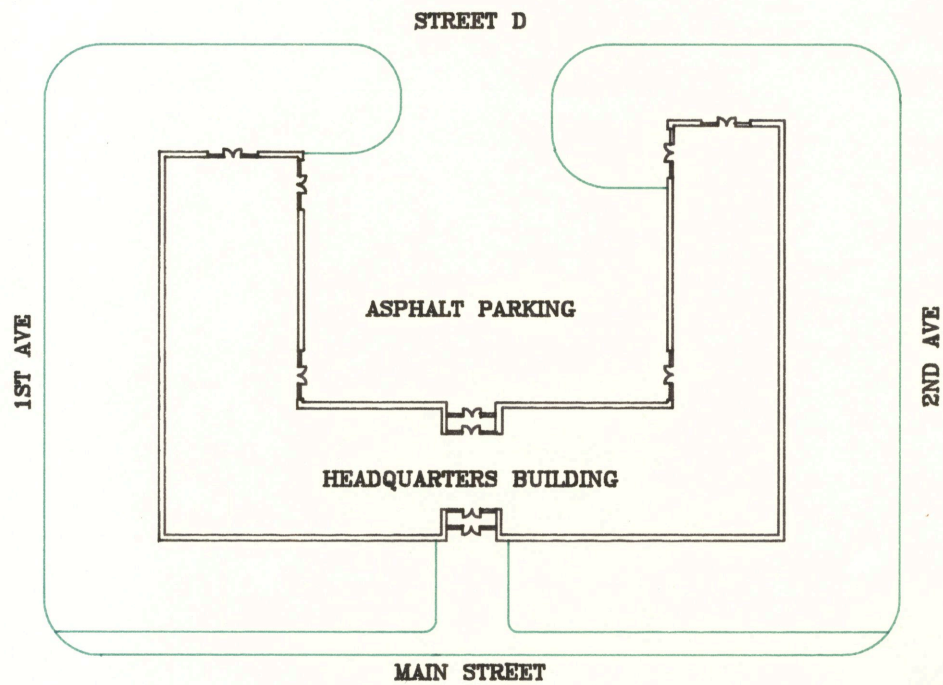


Fig. 1



Climatic Analysis

CLIMATIC ANALYSIS

The city of Great Falls, Montana, is located at the main stem of the Missouri River where the Missouri and Sun River meet. The Air National Guard base is located near the International Airport on a plateau 200 feet higher than the immediate valley area, two miles S.W. of the Sun and Missouri River junction.

Topography plays an important part in Great Falls' climate. The Continental Divide to the west and Big and Little Belt Ranges to the south are primary factors in producing frequent wintertime "chinook" winds. As a result of recurring "chinooks" throughout the winter season, snow seldom lies on the ground for more than a few days. In fact the ground is usually bare, or nearly bare of snow, most of the winter except in surrounding mountains and foothills. Invasions of cold air from polar regions cause sharp temperature falls from above freezing to way below zero within twenty-four hours between the months of December and March. This factor also causes for extremely cold wind chill factors (up to 120 degrees below zero wind chill) in the winter months.

Most summers pass with the highest temperature failing to reach 100 degrees and an average year will have only fifteen days with maximums of 90 degrees or higher. Great Falls' average annual precipitation would normally classify the area as semi-arid; however, 70% of annual total precipitation falls normally during the April through September growing season which normally has sun about 75% of the time.

Although the average wind speed is very high, extreme strong winds (over 70 m.p.h.) are seldom observed and visibility is excellent (15 miles or more). The wind blows the average of 20 m.p.h. at fifteen degrees S.W.

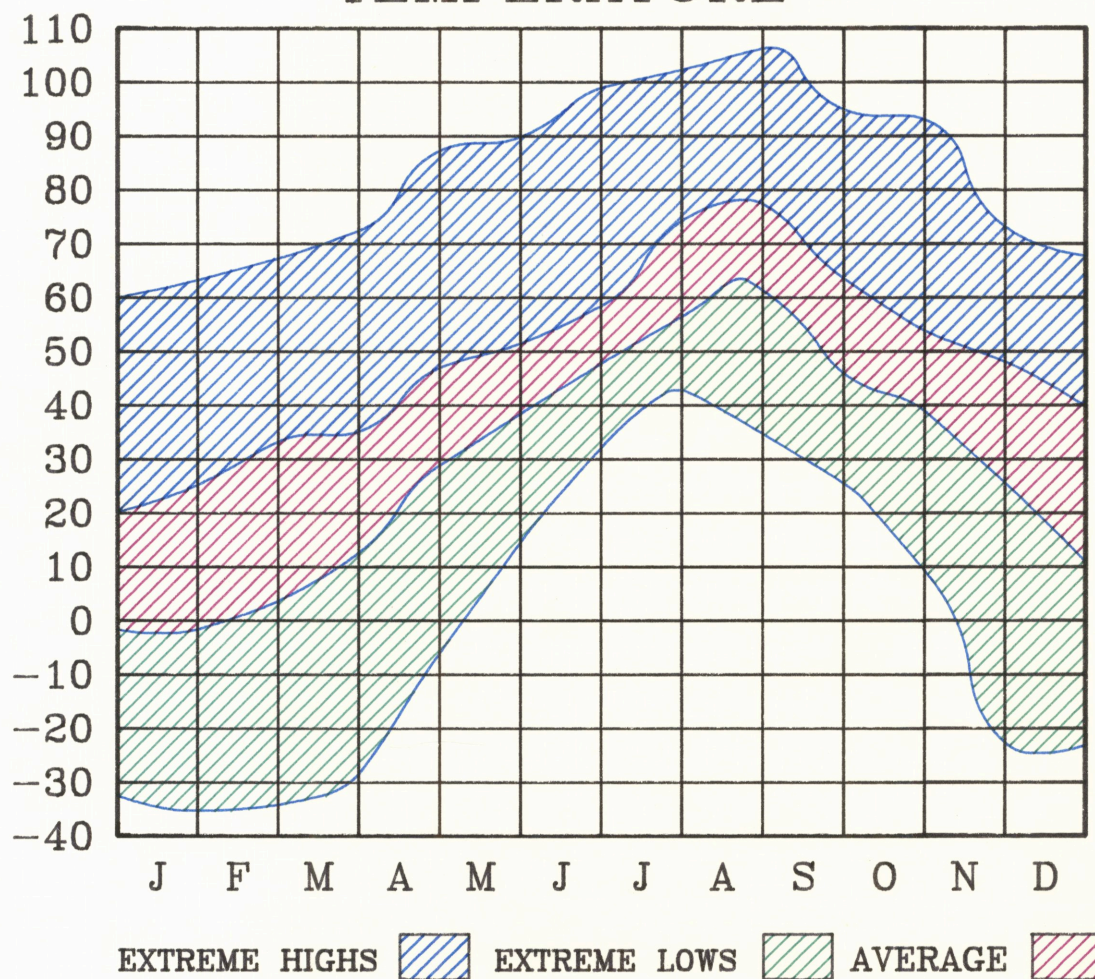
CLIMATIC IMPLICATIONS

The dramatic changes in Great Falls climatic caused by the valley-plateau conditions gives the designer a great challenge to create spaces that are desirable year round, whether inside or out.

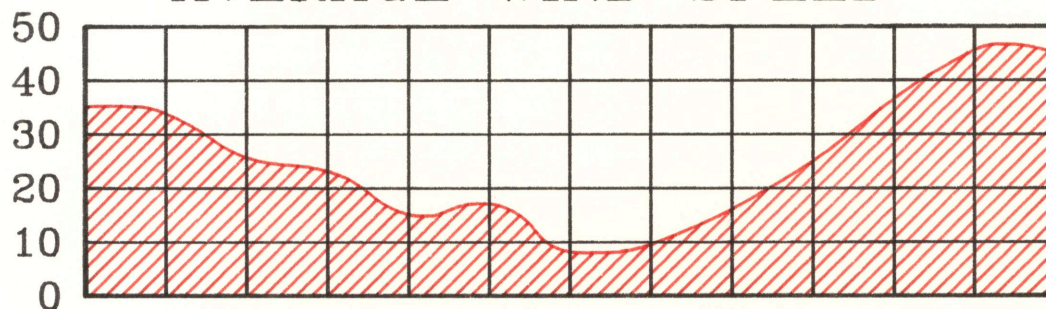
The need to create the best possible spaces for any kind of weather is vital to the congruency of the whole project. Since the environment influences the way people act and feel, the spaces that are created will have a definite impact on the psychology of the environment which is the basis of this whole project.

Using this information to create spaces will allow for better people-oriented environments. The main emphasis of this section is focused upon will be in regards to the exterior courtyard which will be used as a behavioral focal point.

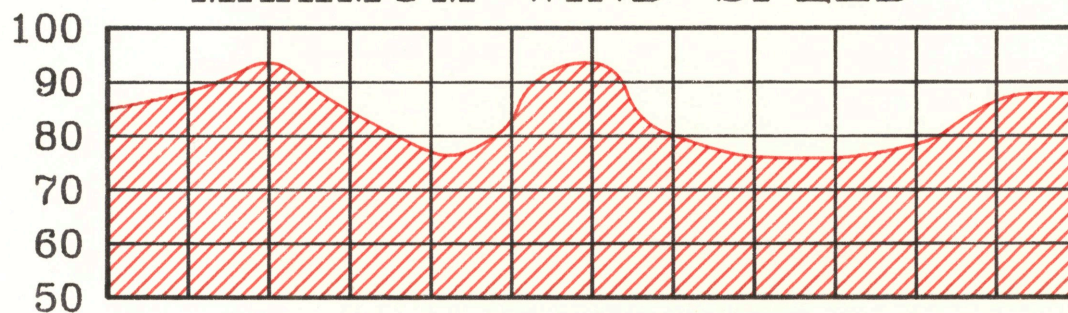
TEMPERATURE



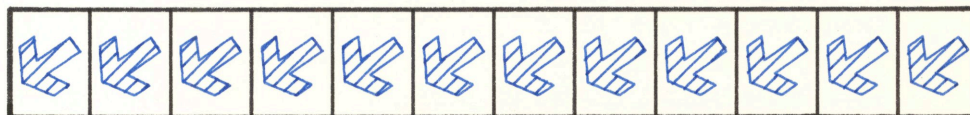
AVERAGE WIND SPEED



MAXIMUM WIND SPEED

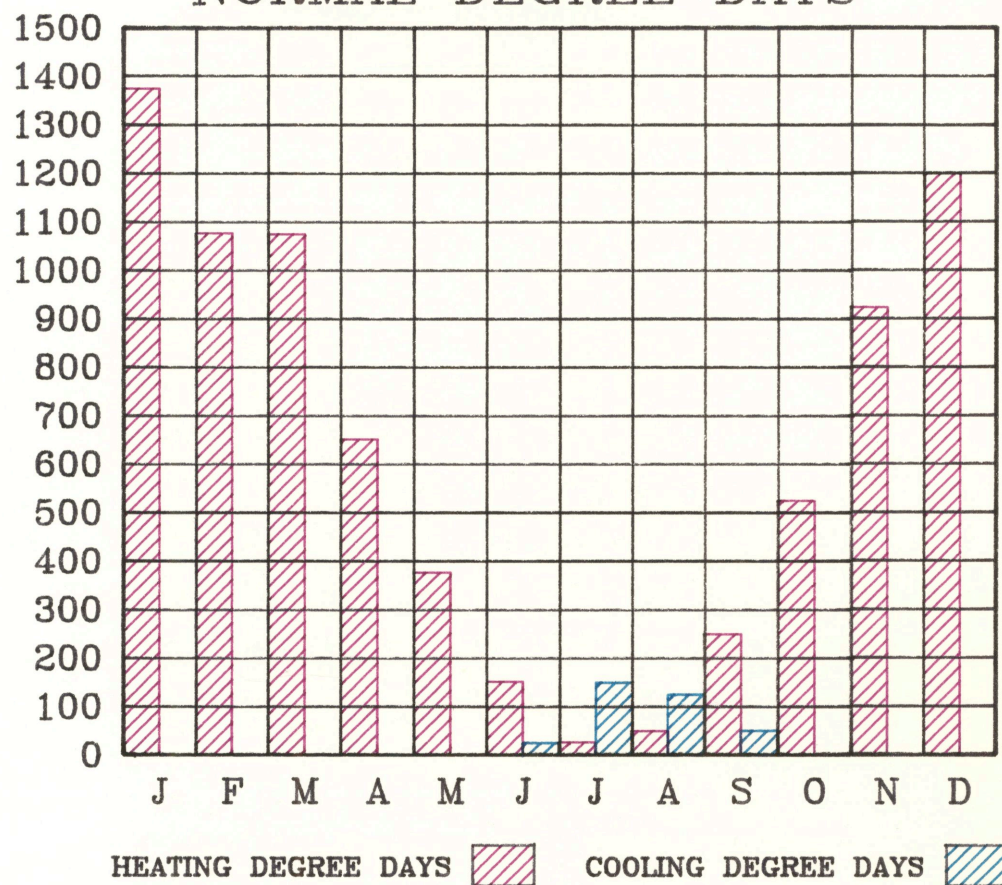


WIND DIRECTION

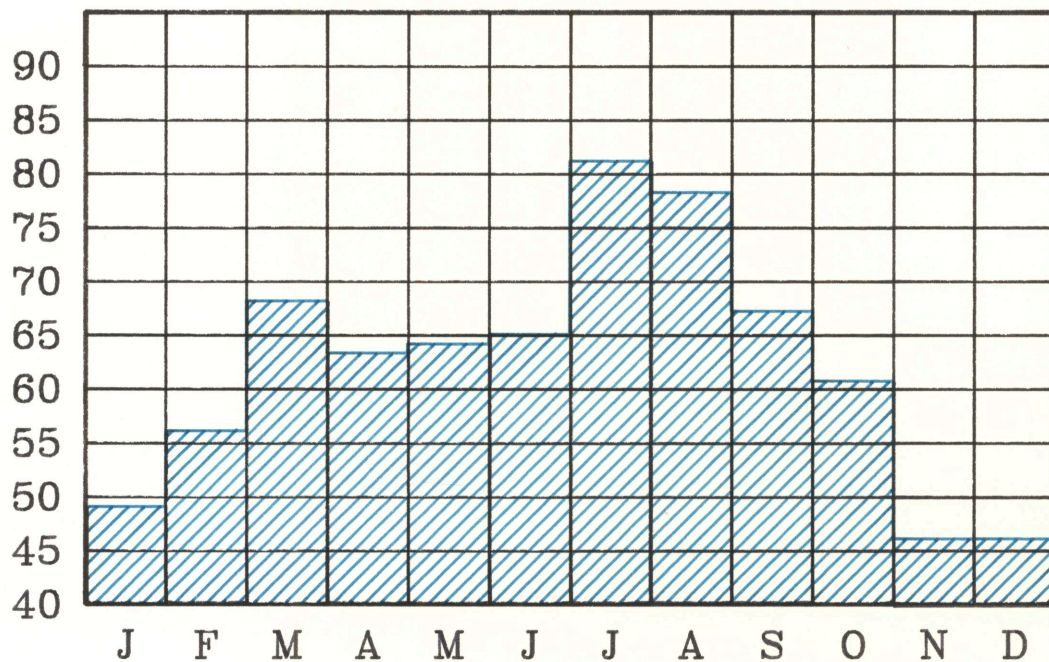


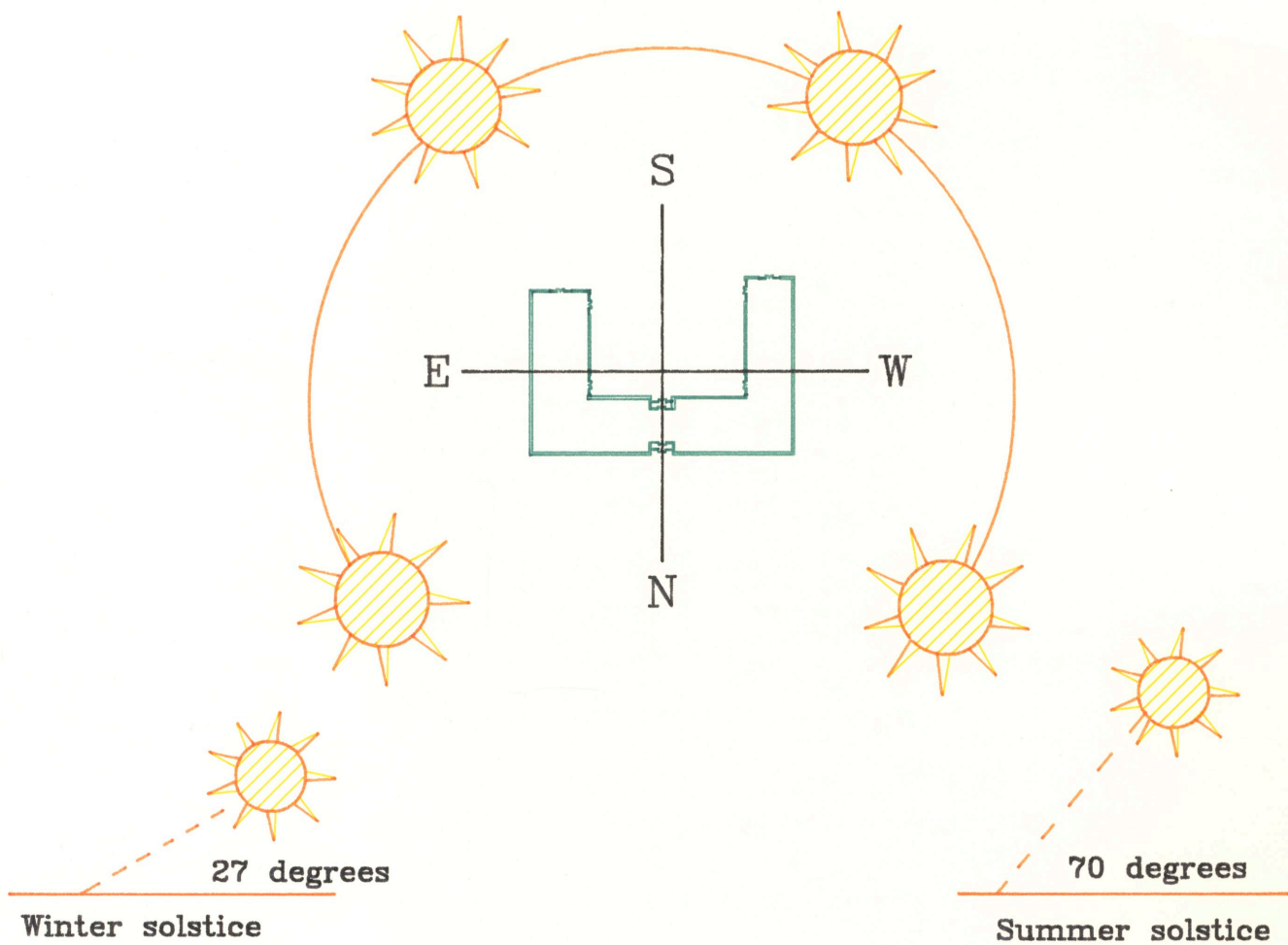
J F M A M J J A S O N D

NORMAL DEGREE DAYS



PERCENT SUNSHINE





Case Studies



CASE STUDIES

Studying past examples of headquarters facilities makes the designer more aware of the problems that can arise by attempting to create a people-oriented environment. The following case studies are chosen for their pertinence to the proposed project. There are three cases of military headquarters facilities, one world headquarters focused on image, and one corporate headquarters focused on humanistic approaches to design. The relationship of these cases to the proposed project is discussed in the implications section of each case studies.

CASE STUDY 1

Project: Frito-Lay Headquarters

Location: Plano, TX

Designer: Lohan Associates

Introduction:

This corporate headquarters was designed for Frito-Lay Incorporated. The site for this facility is in Plano, Texas, which is twenty-four miles north of Dallas. At this location flat dry country of Texas gives way to green swells and dips of water. The reason that this facility was chosen is because every aspect of the project reveals the designer's humanistic approach to architecture.

Analysis:

The function of this facility is a corporate headquarters; however, the emotional qualities of view, color, and nature are just as important as the functional aspects. The designer has made sure that there is an increasing emphasis on interior design.

This facility is a combination of closed executive offices and open office plan. The main goal was to encourage communication among the employees and more sense of identity in a large corporation. The horizontal circulation patterns facilitate social interaction. The circulation itself relates to the courtyard, making walking anywhere a new experience.

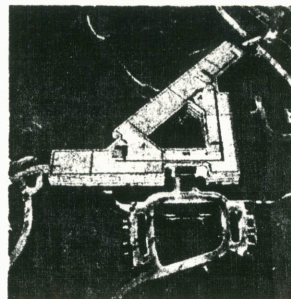
The office areas with space planning based on an efficient five foot module are mainly open and use seventy inch high panels for visual privacy. All the ceiling heights were raised to nine feet six inches. The numerous perimeter offices have clerestories on their inner walls and let in natural light. The narrow 90' width of the wings was

chosen specifically to maximize daylight and to provide unblocked sight lines.

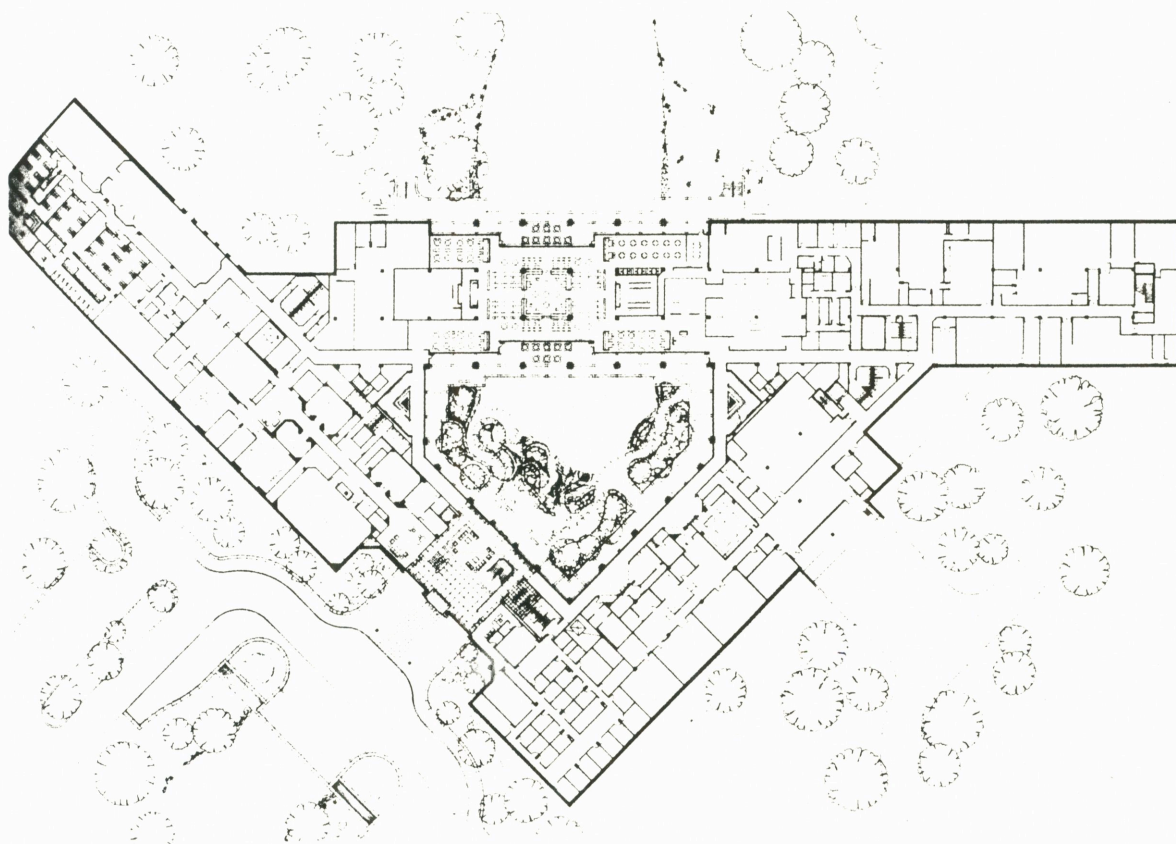
Implications:

The implications that this facility has towards the proposed facility is how the design relates to the personnel that will work in this facility. The approaches of environmental psychology are visible in all aspects of this facility. The designer's concern to humanize architecture, to make the environment warmer and richer is evident. Incorporating these ideals into the proposed facility, creating an environment that is designed for the people inhabiting these spaces rather than for other designers, is to be strived for.

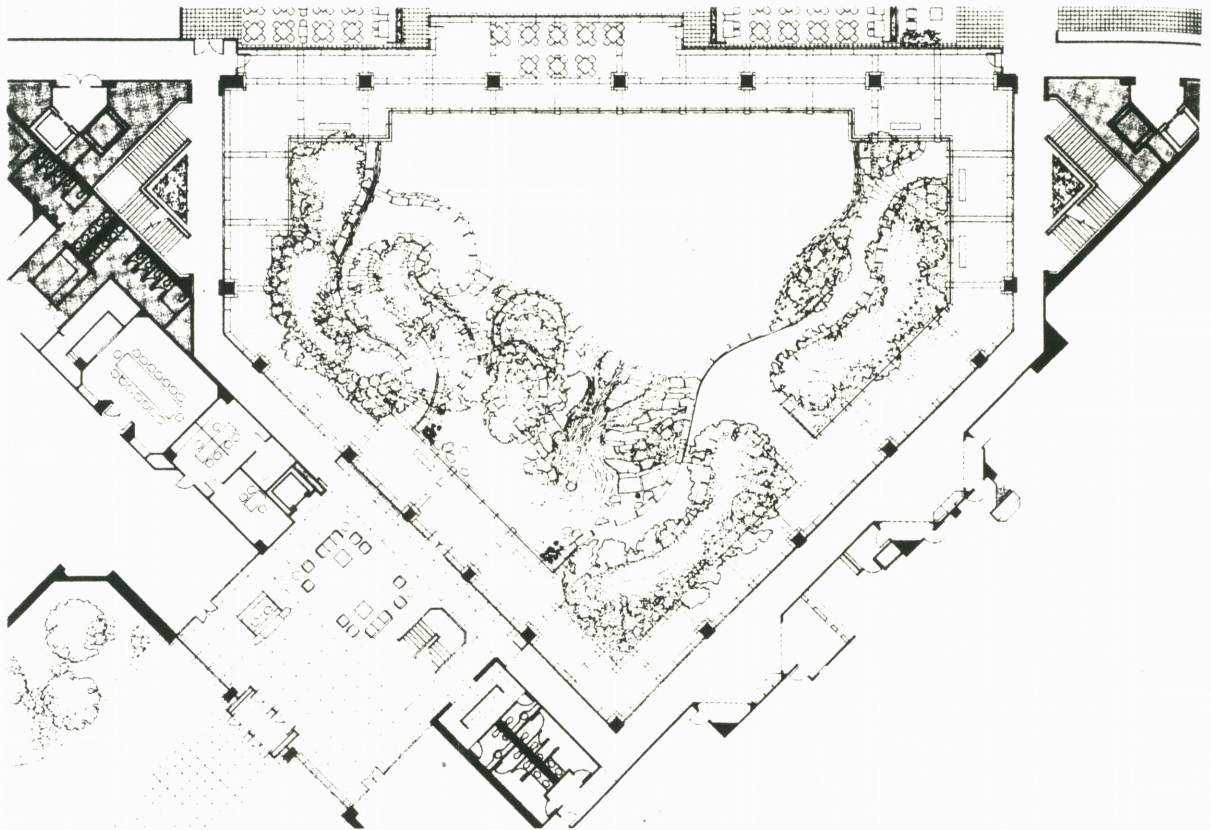
Right: Wooded, watered site suggested unique treatment for facility. Lake was integrated into design of low-lying wings.

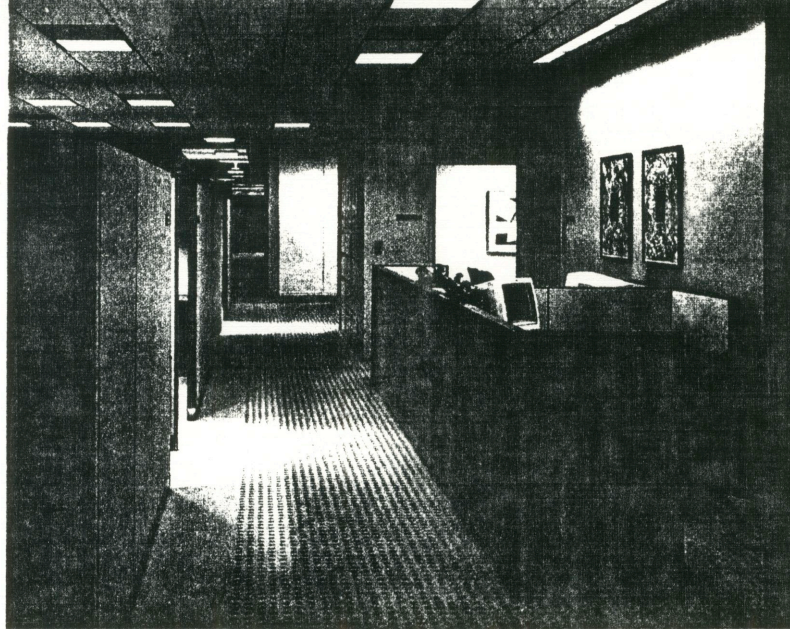


Below: Three wings intersect around central landscaped courtyard to form distinctive footprint of building.



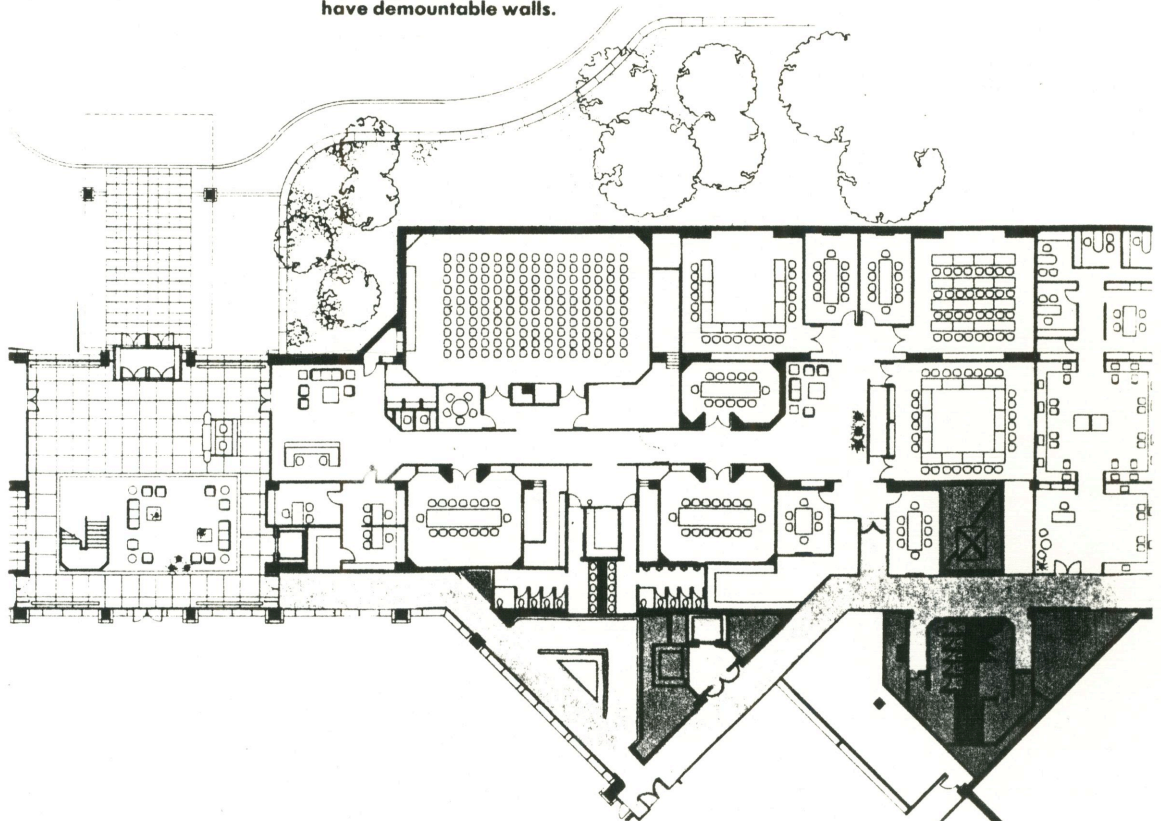
**Below: Elevated pool flows
under lobby (bottom) through
courtyard, empties under caf-
eteria into 8.3 acre lake.**

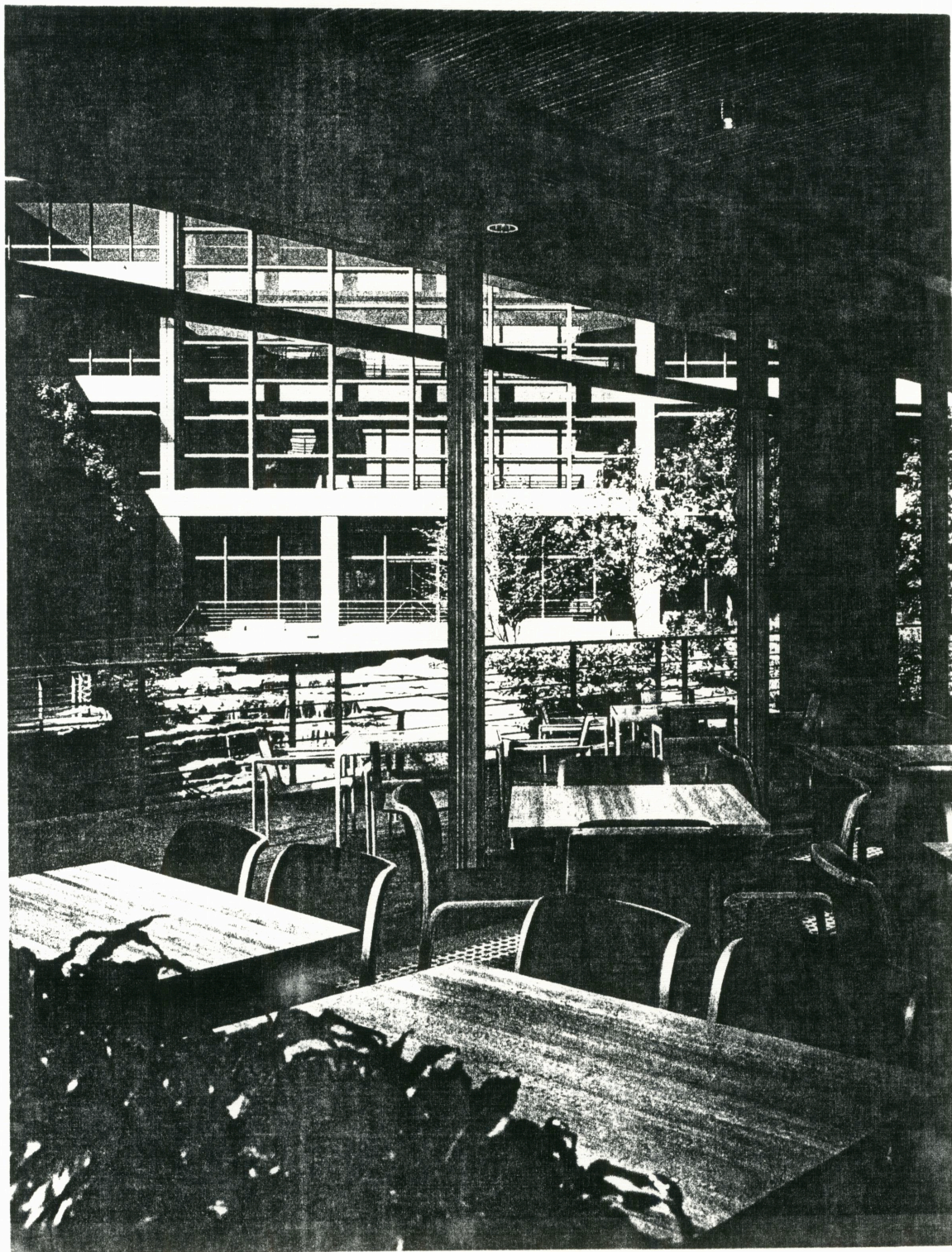




Above: Open plan areas use high end wood and upholstered system. Colors signal specific departments.

Below: Extensive Management Conference Center can accommodate a variety of meetings. Flexible rooms have demountable walls.





CASE STUDY 2

Project: Merrill Lynch World Headquarters

Location: New York's World Financial Center

Designer: Skidmore, Owings and Merrill

Introduction:

The Merrill Lynch world headquarters, built on the tip of Manhattan, occupies two of the four landmark towers in the World Financial Center designed by Cesar Pelli. However, the interiors of these towers are designed by Skidmore, Owings and Merrill. The reason this project was selected is because not only are people being considered but also cost, efficiency and function. These are also what the military's main goals are in design projects and should be considered for the proposed project.

Analysis:

With the Merrill Lynch world headquarters, SOM had to strive for new heights of elegance for a financial headquarters. SOM also had to monitor a nine figure budget very closely, put up with an exceptionally complex schedule, plus had the challenge of designing environments appropriate to an icon of finance.

The image that was trying to be conveyed was Merrill Lynch's image of leadership, the leadership that was derived from always striving to be on top in not only the United States stockmarket but also foreign markets such as Tokyo, Toronto, and London.

This facility has unique demands for communications and physical comfort. For this reason level changes were created for increased eye contact and a louvered ceiling was created for a decrease in noise. Along with this are demands for elegance. Merrill Lynch also has stressed that

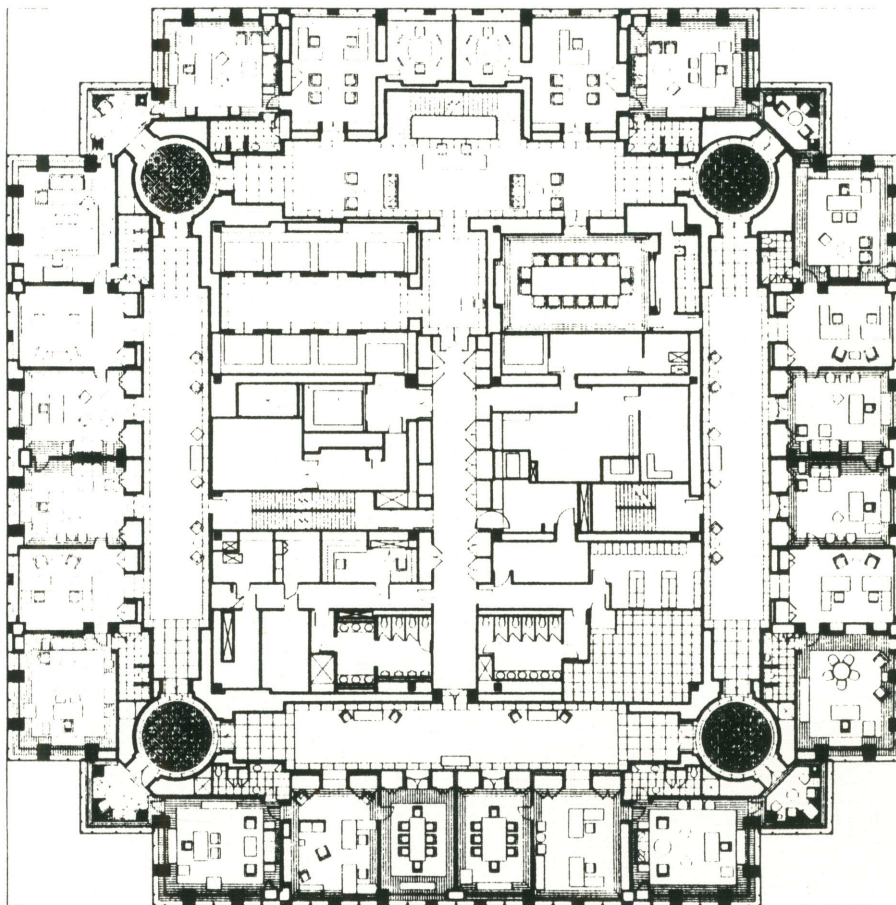
the physical environment has to be as crucially important as the function of the facility.

Cooperation between all disciplines played a vital role in producing this people/function oriented environment. SOM realized the importance of getting those who were going to occupy and manage the space involved in the project from the start. One of the first steps to this was developing a unifying theme that tied everything together.

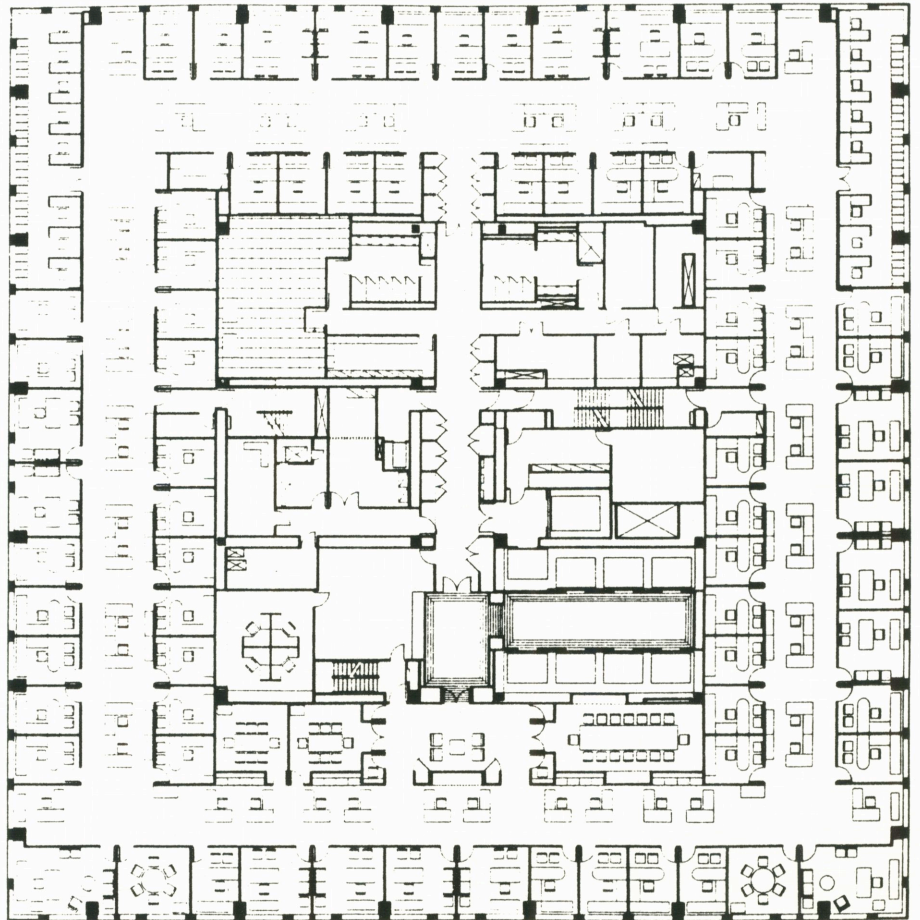
Cost was kept to a minimum by the use of reusable components that would probably pay for themselves in about three to four years. All the furnishings and finishes were evaluated on the relationship between cost, image and efficiency.

Implications:

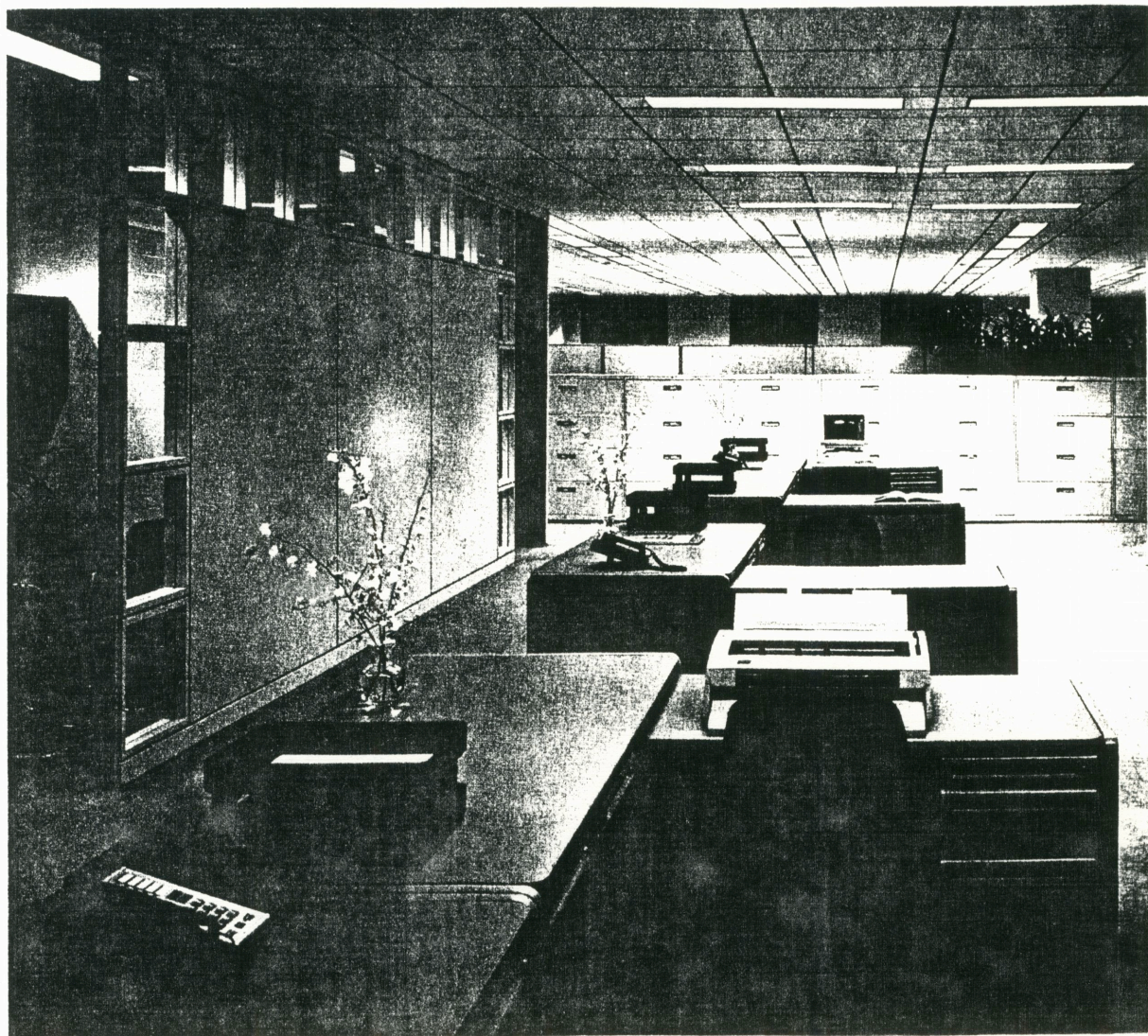
The implications of this project toward the proposed project are the three main considerations: cost, image and efficiency. The military finds cost to be the determining factor for projects. Although human functions are sometimes considered, cost is more important. Image is also a main concern for the military. To maintain an image of professionalism and leadership through design is vital. Often, more importantly, the military strives for efficiency: to create an environment that will increase the efficiency and productivity of the workforce. This case study demonstrates how an efficient professional design can be accomplished within a strict budget, yet look elegant and be very people-oriented.

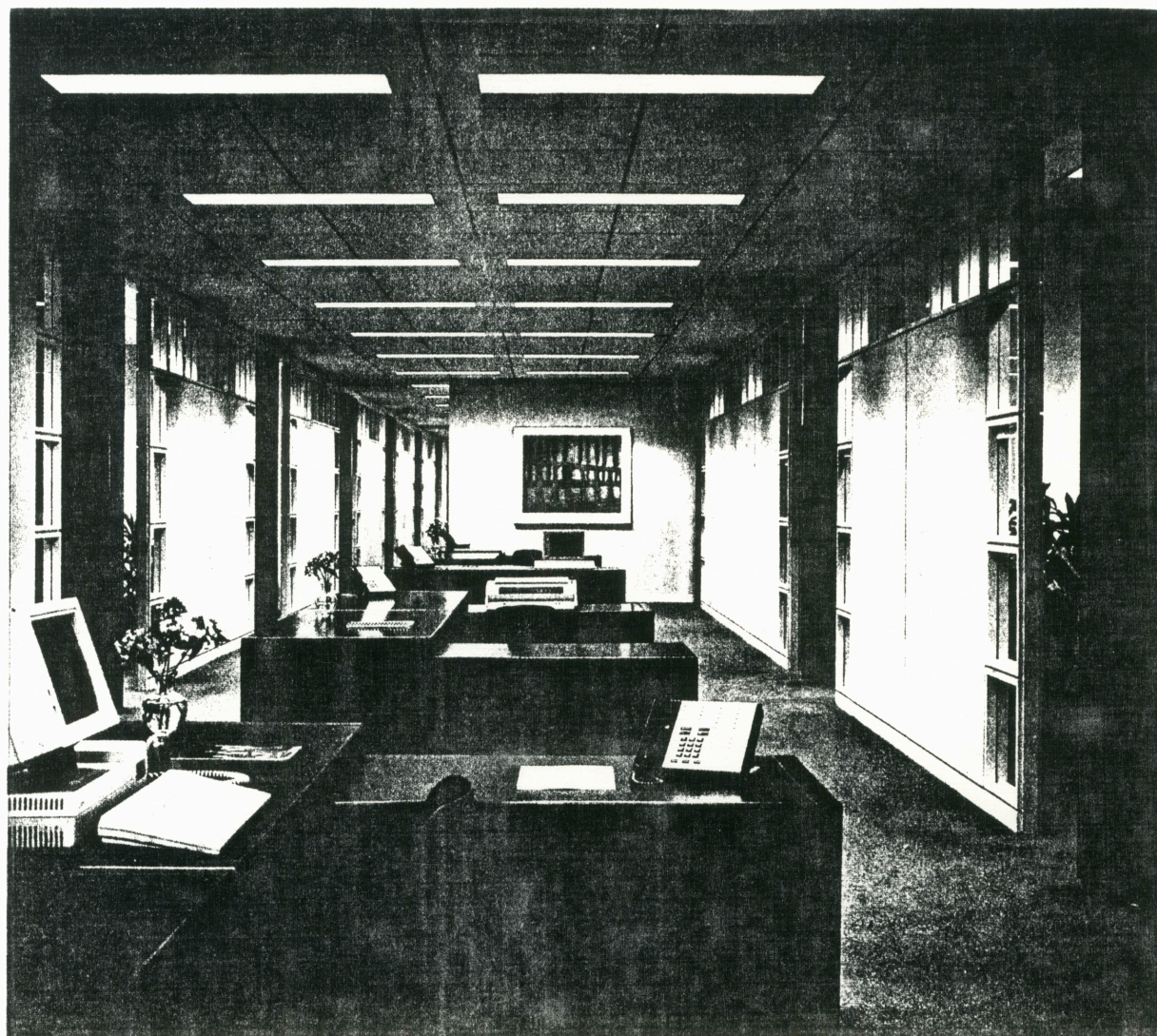


Above: Symmetrical plan of 32nd floor shows executive office suites communicating with galleries connected by rotundas.



Above: Typical investment banking floor with exterior private offices along the window wall. Light enters interior through glazed vertical grid.





CASE STUDY 3

Project: Headquarters Buildings

Location: Tucson, AZ; Duluth, MN; San Antonio, TX

Designer: The Army Corp of Engineers

Introduction:

The evaluation of these buildings are relevant due to the fact that all of these buildings are exactly identical to the building proposed for this project. All of these buildings were constructed between the years of 1958 and 1960 in accordance with 'definitive drawings' drawn up by the Army Corp of Engineers. At the time these buildings were considered to be highly functional, highly economical, and highly institutional. The U-shaped plan of these buildings was the norm for headquarters buildings of not only the United States Air Force but also for National Guard units.

Analysis:

The functions of these buildings are the same, being headquarters facilities. This means besides housing the group commander and his colleagues, this building must also function as the base administrations main operations.

The colors of the interiors are all of gray, white, and green. The windows that once lined the walls are boarded up with painted gypsum board and insulation due to the energy crunch of the 1970's. The only windows available for any natural light or natural ventilation are the small windows at the bottom.

There is a long narrow hallway in the middle of each wing and offices that line both sides. Although these offices may allow for communication within, they lack privacy and deter from inter-department communication. There is no

fenestration that allows for natural light or natural ventilation to the hallway, making the hallway very poorly lit.

Implications:

The implications towards this project are that the building being used is identical to these three case studies in shape, design, materials and even colors. The environments that these buildings create are not the type of environments that are conducive to productivity in the work force. A complete departure from the institutionalism is desired, resulting in something that the military rarely does--create an environment that is people-oriented and enjoyable to work in.



Interviews

INTERVIEWS

In February of 1988 interviews were conducted at the Montana Air National Guard of personnel in supervisory positions as well as personnel in subordinate positions. The proposed project was explained to them and they were asked what they felt and what they would like in their offices and in the surrounding areas. Below is a list of who they are, what their positions are and their answers.

Lt. Col. Gary Hindoien
Deputy Commander for Support

"I think that the whole building should be gutted out and a Steelcase system be installed. More conference rooms and briefing rooms."

Maj. Brad Livingston
Chief CBPO

"I think a compromise between a open office and conventional would be nice. There needs to be some private offices for confidential matters."

Maj. Dan Mortag
Commander of Communications

"I finally have my own office and now I have to move? Actually, some built in cabinets would be nice."

CMSgt. Roger Larsen
Personnel Resources Manager

"More room and more privacy. Right now we have seventeen people working in an area planned for nine. We are a bit cramped."

MSgt. Jack Carte
Audio-Visual Superintendent

"Stainless steel sinks and not being located next to the weight rooms. A better arrangement of Graphics area."

MSgt. Russell Jacques
Radio Superintendent

"I would like only the areas that need to be secured be secured so all of us don't have to feel locked up. Built-in closets, bookshelves and cabinets would be great."

MSgt. Tom Sutton
Disaster Preparedness Superintendent

"If everyone in Education and Training were located in at least the general vicinity of each other we could get a lot more done than having to run around to find each other. Is there a regulation somewhere that says everything has to be green? It's such a morbid color. A bigger testing room."

Raylene Sutton
Switchboard Operator

"There are never enough outlets to accommodate all the equipment. I really hate these fluorescent lights because they make everything look dull and they really wear on the eyes."

TSgt. Larry Barghultz
Recruiter

"A nicer view of the planes, that would really help. Also we will still need to be near the front door so we are easy to find for potential recruits."

TSgt. Joe Zigan
Reproduction Specialist

"A bigger area, but we still need to do the distribution so probably in the same room."

SSgt. Traci Keller
Customer Service

"Nicer desks and a bigger area. We are way to cramped."

SSgt. Melodee McCluskey
Administration Specialist

"Some built-in cabinets is a must so we can get rid of these ugly wall lockers."

SrA. Debbie Gallagher
Distribution Specialist

"A better way of keeping organized in the distribution area. We need a room for storing office supplies."

Although all of the interviews did not relate to the proposed project in terms of design, there were some valid suggestions that are quoted above. The main suggestions received from these interviews are that most of the personnel would like more room with built-in storage and be in a closer proximity to the departments that they work with. None of them mentioned that they felt that the military had accommodated the need of their particular offices this far.

Interior Space Analysis



THE OPEN OFFICE PLAN

The open office plan, otherwise known as the landscaped office, was designed by a management consulting group - the Quickborner Team. The Quickborner Team felt that the office layout should reflect the work process.⁸ The landscaped office can be very efficient and can improve inter-office communication if planned correctly. Therefore, most corporations today are using the open plan system. Before using this plan, however, an office should determine how much visible and acoustical privacy is needed and how the spaces will affect the workers.

To be a productive worker, each employee must have a work area large enough to accommodate the paperwork, equipment and other paraphernalia needed to do the job. The work station should adjust to individual work styles and varying dimensions.⁹ The color and design should support the work effort.

As with any system there are advantages and disadvantages. Some of the main advantages are that the open plan allows for more natural light and natural ventilation. The open plan is also highly flexible and inexpensive to add on to when expansion occurs. Some of the main disadvantages are that privacy is reduced and it is more difficult to direct visitors or other personnel than it is with a conventional plan.

8. Judy Graf Klein, The Office Book (New York: Facts on File, Inc., 1982), p. 7.

9. Karen Gustafson and Roger Yee, Corporate Design (New York: Interior Design Books, 1983), p. 130.

Although the open plan is not suitable for all organizations and not suitable for all buildings, it seems to be very appropriate in this situation, and the Air Force would like to integrate this system. It may not always be the best solution but it is one of the many space solving tools available to aid in office design.

SPATIAL REQUIREMENTS

In the following section the spatial requirements of each section is identified. The name of the space, the amount of square footage, number of occupants and the hard and soft requirements of each space are recognized so that the design of each space will correlate with the needs of each space. In the proposed facility there are twenty-four spaces that have specific needs and all need to be accommodated.

1. RECEPTION / SECURITY

SQUARE FEET: 300

OF OCCUPANTS: 5-10

SOFT REQUIREMENTS:

- Open
- Elegant
- Welcoming
- Unique

HARD REQUIREMENTS:

- Accommodations for a receptionist / security guard
- Connecting with the trophy area
- Unique design ideas implemented and visual access to these ideas.
 - Sofas
- Chairs
- Tables
- A view outside
- A way of disguising a security guard if there is one present

2. TROPHY AND AWARDS AREA

SQUARE FEET: 200

OF OCCUPANTS: 5-10

SOFT REQUIREMENTS:

- Feeling of Admiration
- Welcoming
- Prestigious
- Awe

HARD REQUIREMENTS:

- Trophy case
- Wall for hanging plaques
- Display areas
- Gallery appearance
- A view to outside
- A way to protect awards from sunlight

ADJACENCIES:

- Connecting with the reception/entry area

3. CONSOLIDATED BASE PERSONNEL OFFICE (C.B.P.O.)

SQUARE FEET: 800

OF OCCUPANTS: 10-20

SOFT REQUIREMENTS:

- Productive
- Inviting
- Open
- Organized
- Contemporary

HARD REQUIREMENTS:

- Chief of C.B.P.O. private office
- Supervisor of C.B.P.O office
- Includes 300 S.F for Customer Service
- Mini reception area
- Open office systems including:
 - desk
 - chairs
 - files
 - partitions
- Design promoting office communication
- Computer setups
- Lateral file system
- Typewriters
- An outdoors view

4. QUALITY FORCE

SQUARE FEET: 600

OF OCCUPANTS: 10

SOFT REQUIREMENTS:

- Organized
- Productive
- Open
- Contemporary
- Welcoming

HARD REQUIREMENTS:

- Mini reception area
- Open office systems including:
 - desks
 - chairs
 - files
 - partitions
- Computer Setups
- Design to promote inter-office communication
- Lateral file systems

ADJACENCIES:

- In general area of C.B.P.O

5. EDUCATING AND TRAINING

SQUARE FEET: 800

OF OCCUPANTS: 10-20

SOFT REQUIREMENTS:

- Organized
- Open
- Exciting
- Contemporary
- Conducive to learning

HARD REQUIREMENTS:

- Mini reception area
- Open office systems including:
 - desks
 - chairs
 - files
 - partitions
- Computer Setups
- Design to promote inter-office communication
- Lateral file systems

ADJACENCIES:

- Near testing room

6. CLASSROOM

SQUARE FEET: 600

OF OCCUPANTS: 25

SOFT REQUIREMENTS:

- Bright
- Open
- Conducive to learning
- Contemporary

HARD REQUIREMENTS:

- Desks
- Chairs
- Chalk boards
- Storage

ADJACENCIES:

- Near Education and Training office

7. BASE CAREER ADVISOR

SQUARE FEET: 250

OF OCCUPANTS: 3

SOFT REQUIREMENTS:

- Bright
- Open
- Welcoming
- Contemporary
- Organized

HARD REQUIREMENTS:

- Desk
- Chairs
- Bookshelves
- Lateral files
- Computer setups

ADJACENCIES:

- Near Education and Training office

8. RECRUITERS

SQUARE FEET: 600

OF OCCUPANTS: 6-8

SOFT REQUIREMENTS:

- Welcoming
- Warm
- Open
- Contemporary
- Bright

HARD REQUIREMENTS:

- Mini reception area
- Open office systems including:
 - desks
 - chairs
 - files
 - partitions
- Computer Setups
- Design to promote inter-office communication
- Lateral file systems
- View of flight line

ADJACENCIES:

- Near the entry

9. DISTRIBUTION / ORDERS

SQUARE FEET: 400

OF OCCUPANTS: 6-8

SOFT REQUIREMENTS:

- Organized
- Bright
- Open
- Welcome

HARD REQUIREMENTS:

- Distribution boxes (labeled)
- Storage for office supplies for building
- Desk
- Chairs
- Typewriters
- Computer Setups
- Lateral files
- Reproduction machines

ADJACENCIES:

- Near entrance of building
- Near center of activities

10. ORDERLY ROOM

SQUARE FEET: 400

OF OCCUPANTS: 10

SOFT REQUIREMENTS:

- Open
- Bright
- Contemporary
- Welcoming
- Exciting

HARD REQUIREMENTS:

- Mini reception area
- Open office systems including:
 - desks
 - chairs
 - files
 - partitions
- Computer Setups
- Design to promote inter-office communication
- Lateral file systems
- Typewriters
- Built-in Storage

ADJACENCIES:

- Near Deputy Commander of Support office
- Near C.B.P.O.

11. CONFERENCE ROOM

SQUARE FEET: 400

OF OCCUPANTS: 15-20

SOFT REQUIREMENTS:

- Executive
- Important
- Open
- Bright
- Private

HARD REQUIREMENTS:

- Table
- Chairs
- Podium
- Screens
- Storage
- Wet Bar
- Multi-purpose use

ADJACENCIES:

- Near Commanders office

12. BASE ADMINISTRATION

SQUARE FEET: 550

OF OCCUPANTS: 10

SOFT REQUIREMENTS:

- Organized
- Open
- Bright
- Inviting
- Contemporary

HARD REQUIREMENTS:

- Mini reception area
- Open office systems including:
 - desks
 - chairs
 - files
 - partitions
- Computer Setups
- Design to promote inter-office communication
- Lateral file systems
- Typewriters
- Built-in Storage

13. COMMANDER'S OFFICE

SQUARE FEET: 1000

OF OCCUPANTS: 5-8

SOFT REQUIREMENTS:

- Executive
- Important
- Open
- Spacious
- Contemporary

HARD REQUIREMENTS:

- Reception area, including:
 - desk
 - chairs
 - sofa
 - tables
 - computer setup
 - lateral files
- Private office, including:
 - executive desk
 - executive chairs
 - computer setup
- Private toilet facilities, including:
 - toilet
 - shower
 - dressing area
 - closet
- Conference room, including:
 - table
 - executive chairs
 - podium
 - sound proof walls
 - screens
- A view of flight line

ADJACENCIES:

- Near security

14. DEPUTY COMMANDER FOR SUPPORT

SQUARE FEET: 500

OF OCCUPANTS: 5-7

SOFT REQUIREMENTS:

- Important
- Executive
- Open
- Bold
- Contemporary

HARD REQUIREMENTS:

- Mini reception area, including:
 - desk
 - chairs
 - sofa
 - computer setup
- Private office, including:
 - executive desk
 - executive chairs
 - conference table
 - computer setup
 - lateral files

ADJACENCIES:

- Near orderly room
- Near center of activities

15. STORAGE ROOMS

SQUARE FEET: 4 @ 250

SOFT REQUIREMENTS:

- Clean
- Well lit
- Organized

HARD REQUIREMENTS:

- Shelves
- Cabinets
- Two on first floor
- Two on second floor

16. TOILET ROOMS

SQUARE FEET: 50

OF OCCUPANTS: 3-5

SOFT REQUIREMENTS:

- Private
- Clean
- Organized
- Bright
- Airy

HARD REQUIREMENTS:

- Toilets
- Urinals (men only)
- Sinks
- Handicap accessible
- For use by public

17. JANITORIAL CLOSET

SQUARE FEET: 100

SOFT REQUIREMENTS:

- Clean
- Organized
- Well lit

HARD REQUIREMENTS:

- Utility sink
- Shelves
- Cabinets
- Mechanical vent area

ADJACENCIES:

- Away from front entry
- In same wing as personnel areas

18. PERSONNEL LOUNGE

SQUARE FEET: 1000

OF OCCUPANTS: 50

SOFT REQUIREMENTS:

- Inviting
- Exciting
- Organized
- Clean

HARD REQUIREMENTS:

- Tables
- Chairs
- Vending machines
- Refrigerator
- Microwave
- Coffee maker
- Sink
- Storage
- A place for visitors also

ADJACENCIES:

- Away from entry

19. PERSONNEL TOILET ROOMS

SQUARE FEET: 200 each

OF OCCUPANTS: 5-7

SOFT REQUIREMENTS:

- Clean
- Organized
- Bright
- Airy
- Private

HARD REQUIREMENTS:

- Toilets
- Sinks
- Urinals (men)
- Dressing areas
- Lockers
- Showers
- Saunas
- Handicap accessible

ADJACENCIES:

- Away from front entry
- Near personnel lounge

20. COMMUNICATION CENTER

SQUARE FEET: 3500

OF OCCUPANTS: 25

SOFT REQUIREMENTS:

- Professional
- Organized
- Secure
- Contemporary

HARD REQUIREMENTS:

- Switchboard area, including:
 - switchboard
 - desk
 - chairs
 - computer setup
 - typewriters
 - lateral files
 - office supplies storage
- Commanders office, including:
 - desk
 - chairs
 - computer setup
 - lateral files
- AFFC Advisors office, including:
 - desk
 - chairs
 - computer setup
 - lateral files
- Safety Vault, including:
 - desks
 - chairs
 - computer terminals
 - classified equipment
 - security locks and safes

ADJACENCIES:

- Close to security guards
- Second floor

21. AUDIO-VISUAL

SQUARE FEET: 3500

OF OCCUPANTS: 30

SOFT REQUIREMENTS:

- Clean
- Organized
- Professional
- Bright
- Airy

HARD REQUIREMENTS:

- Mini reception area
- AV Supervisors office, including:
 - desk
 - chairs
 - computer setup
 - lateral files
- AV equipment checkout, including:
 - storage
 - desk
 - chairs
 - lateral files
 - computer setup
- AV studio, including:
 - Taping room with equipment
 - Editing room with equipment
- AV graphics studio, including:
 - drawing tables,
 - storage for graphics materials
 - computer graphics setup
 - reproducing machines
- Photo lab, including:
 - dark rooms with equipment
 - print room with equipment
 - mounting area with equipment
 - portrait studio

ADJACENCIES:

- Near Comm center

22. DATA OPERATIONS

SQUARE FEET: 2500

OF OCCUPANTS: 25

SOFT REQUIREMENTS:

- Professional
- Organized
- Well lit
- Bright
- Airy

HARD REQUIREMENTS:

- Desks
- Computer setups for 20+ computers
- 12" sub floor for air-conditioning and wires
- Security equipment
- Maintenance area, including
work benches
storage

ADJACENCIES:

- Near Comm center

23. RADIO OPERATIONS

SQUARE FEET: 3500

OF OCCUPANTS: 25

SOFT REQUIREMENTS:

- Organized
- Clean
- Bright
- Well lit

HARD REQUIREMENTS:

- Supervisor's office, including:
 - desk
 - chairs
 - built-in storage
 - lateral files
 - computer setup
- Maintenance area, including:
 - work benches
 - storage

ADJACENCIES:

- Near Comm center
- Second floor offices with garage on first

24. EXTERIOR COURTYARD

SQUARE FOOTAGE: 11,340

OF OCCUPANTS: 25-50

SOFT REQUIREMENTS:

- Exciting
- Relaxing
- Warm
- Inviting

HARD REQUIREMENTS:

- Landscaping
- Tables
- Chairs
- Benches

OVERALL SQUARE FOOTAGE ANALYSIS

1. RECEPTION / SECURITY ENTRANCE	300
2. TROPHY AND AWARDS AREA	200
3. C.B.P.O.	800
4. QUALITY FORCE	600
5. EDUCATING AND TRAINING	800
6. CLASSROOM	600
7. BASE CAREER ADVISOR	250
8. RECRUITERS	600
9. DISTRIBUTION / ORDERS	400
10. ORDERLY ROOM	400
11. CONFERENCE ROOM	400
12. BASE ADMINISTRATION	550
13. COMMANDER'S OFFICE	1,000
14. DEPUTY COMMANDER FOR SUPPORT	500
15. STORAGE ROOMS	1,000
16. TOILET ROOMS	100
17. JANITORIAL CLOSET	100
18. PERSONNEL LOUNGE	1,000
19. PERSONNEL TOILET ROOMS	400
20. COMMUNICATION CENTER	3,500
21. AUDIO-VISUAL	3,500
22. DATA OPERATIONS	2,500
23. RADIO OPERATIONS	3,500
TOTAL	22,100
CIRCULATION (15%)	3,315
VERTICAL CIRCULATION (10%)	2,210
 TOTAL SQUARE FOOTAGE	 27,615
 AVAILABLE SQUARE FOOTAGE	 35,700
 EXTRA SQUARE FOOTAGE	 8,085
 24. EXTERIOR COURTYARD	 11,340
(not included in square footage)	

Government Regulations



GOVERNMENT REGULATIONS

There are numerous government regulations that pertain to the design and construction of a military building. However, the regulations that pertain to this particular project have been specifically included. (The majority of the regulations pertain to a building being built for the first time on a new site rather than to a facility that is already existing.) Regulations have been paraphrased for clarity.

AFM 88-15(C6)

1-10. GENERAL CONSIDERATIONS

Air Force policy requires an economical selection of materials based upon construction and maintenance costs. Functional requirements, fire safety, expected tenure of use, energy conservation, and suitable appearance must also be considered before selecting a material. Both structural and finish materials will be consistent with simple functional design, and will be appropriate for local climatic conditions.

Local (native) materials should be used when suitable and practicable.

1-16. DESIGN EXCELLENCE

Excellence in design is a prime goal for all projects. This requires a commitment by designers and managers to achieve high design standards.

- a. Proper recognition must be given to economy of construction.
- b. New facilities must be design to complement and blend with the architectural character of existing facilities.
- c. A prime requirement is to create attractive interiors and exteriors using contemporary architectural treatment.

1-17. ARCHITECTURAL, STRUCTURAL, MECHANICAL, AND ELECTRICAL DESIGN.

The functional, structural, mechanical, and electrical components of each structure must be coordinated to achieve an end product which meets the operational requirements of the structure as a whole.

1-30. ADMINISTRATIVE FACILITY DESIGN

The "Open Space" concept must be used to the maximum extent possible for planning, designing, and rehabilitating all administrative facilities. Floor plans must be developed on all "office landscape" arrangements.

1-32. COLOR AND FINISHES

Special attention must be given to the selection of colors and finishes for all facilities in order to create a people-oriented environment.

1-33. COMPLIANCE WITH THE LOCAL BUILDING CODE.

Local building codes must be complied with to the maximum practical extent for military buildings located within an urban area under jurisdiction of an established code. Where requirements of local codes would lower Air Force design and construction standards, Air Force Standards must be used.

3-1. NEED FOR ECONOMY

The primary objectives in military construction are low construction costs and low long-range maintenance costs in developing an economical design consistent with the anticipated duration of the military facility.

24-35. BASIC ITEM 171-445, RESERVE FORCES OPERATIONAL
TRAINING

Space will be provided for operations, base personnel office, accounting, chaplain, Staff Judge Advocate, command, reproduction, library, conference (training) area, full-time ARTS and civilians, administration and support, and locker rooms.

Additional requirements will be programmed only if it has been established that comparable active force facilities are not available or do not exist at the installation in question.



U.B.C.

UNIFORM BUILDING CODES (U.B.C.)

HANDICAPPED REGULATIONS

Where toilet facilities are provided on any floor needing access by the physically handicapped, at least one such facility for each sex shall be provided. All doorways leading to handicapped accessible toilet rooms shall have a clear and unobstructed width of not less than 32 inches. Each such toilet room shall have the following:

1. A clear space of not less than 44 inches on each side of doors providing access to the toilet rooms.
2. A clear space within the toilet room of sufficient size to inscribe a circle with a diameter not less than 60 inches. Doors in any position may encroach into this space by not more than 12 inches.
3. A clear space not less than 42 inches wide and 48 inches long in front of at least one water closet stool for the use of the handicapped.
4. Grab bars near each side or one side and the back of the toilet stool securely attached 33 inches to 36 inches above and parallel to the floor. Grab bars at the side shall be 42 inches long with the front end positioned 24 inches in front of the water closet stool. Grab bars shall have an outside diameter of not less than 1 1/4 inch nor more than 1 1/2 inches and shall provide a clearance of 1 1/2 inches between the grab bar and adjacent surface. (Fig. 2)

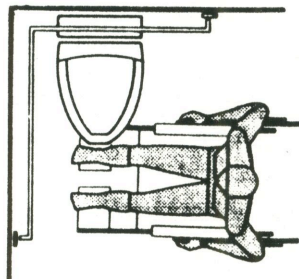
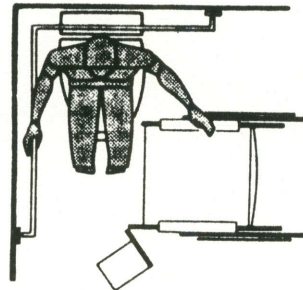


Fig. 2



Where lavatories are provided, a clear unobstructed space 30 inches in width, 29 inches in height, and 17 inches in depth shall be provided under at least one lavatory. (Fig. 3)

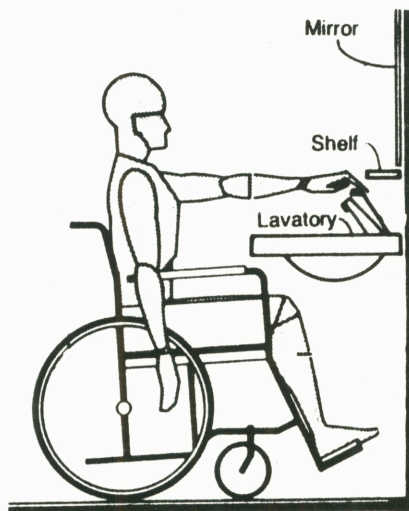


Fig. 3

Where water fountains are provided, at least one shall have a spout within 33 inches of the floor and shall have up-front, hand-operated controls. (Fig. 4)

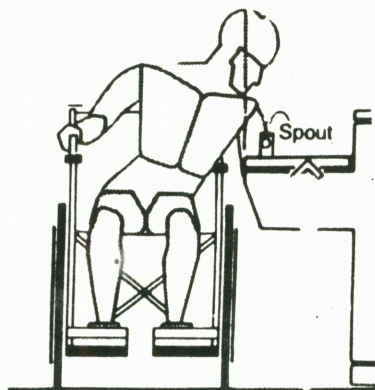


Fig. 4

Where public telephones are provided, at least one shall be installed so that the handset, dial and coin receiver are within 54 inches of the floor. Unobstructed access within 12 inches of the telephone shall be provided. Such access shall be not less than 30 inches in width. (Fig. 5)

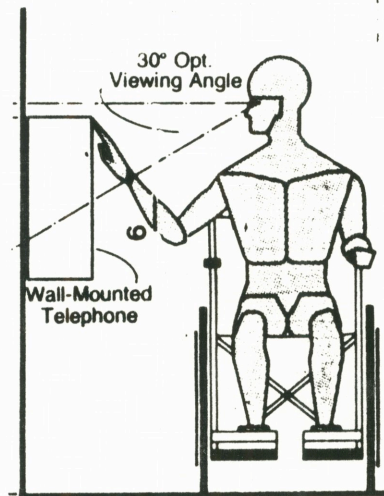


Fig. 5

At least one primary entrance to the building which is required to be accessible shall be usable by the physically handicapped and be on a level that would provide accessibility to the elevators where provided.

Every required exit doorway shall be of a size as to permit the installation of a door not less than 3 feet in width and not less than 6 feet 8 inches in height. When installed, exit doors shall be capable of opening so that the clear width of the exit is not less than 32 inches.

The width of ramps shall be no less than 44 inches wide. The slope shall be not steeper than 1 vertical to 12 horizontal. Ramps having slopes steeper than 1 vertical to 15 horizontal shall have landings at the top and bottom, and at least one intermediate landing shall be provided for each 5 feet of rise. Doors in any position shall not reduce the minimum dimension of the landing to less than 42 inches and shall not reduce the required width by more than 3 1/2 inches when fully open. Ramps having slopes steeper than 1 vertical to 15 horizontal shall have handrails as required for stairways. The surface of ramps shall be roughened or shall be of slip-resistant materials. (Fig. 6)

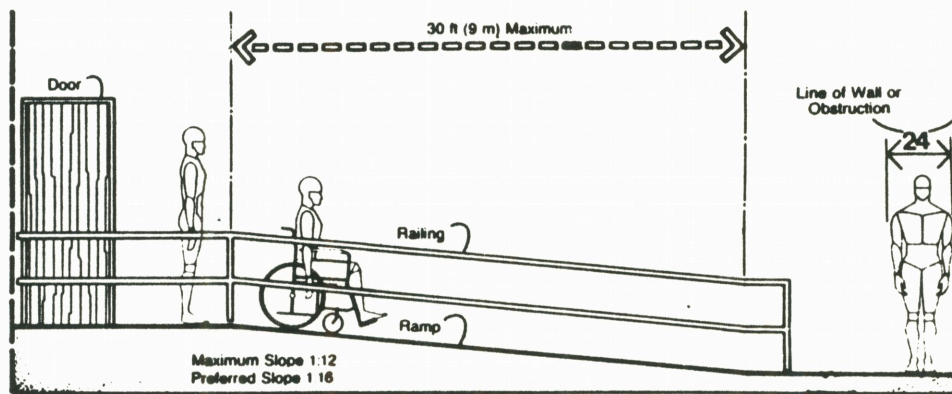


Fig. 6

Diagrammatic Solutions



DIAGRAMMATIC SOLUTIONS

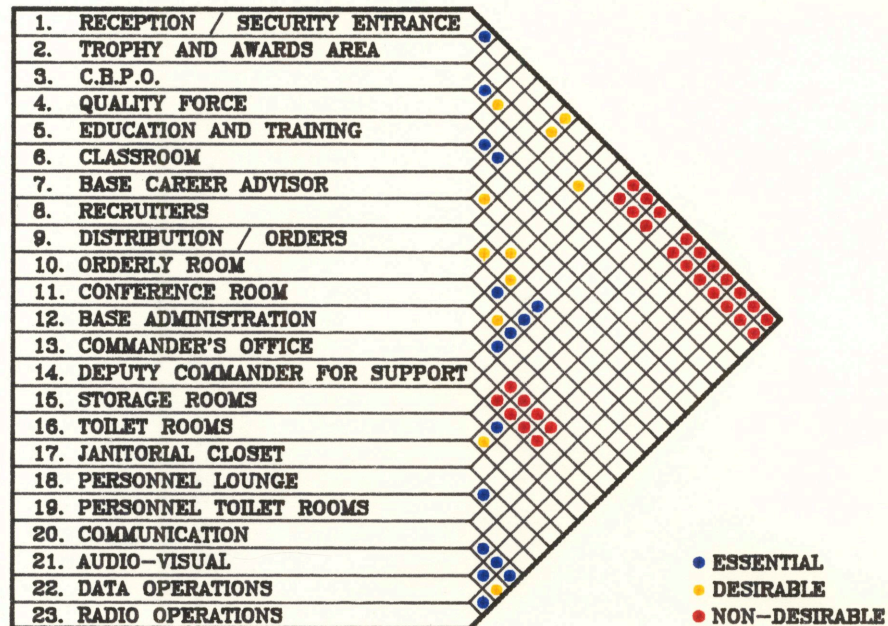
The purpose of these diagrams is to define the spaces and also show the interactions between each space. These diagrams will also try to establish the moods or feelings of each space. The diagrams are divided into six steps, each step having its own description.

Some of the main goals strived for are as follow:

- *An open office system will be used in almost all office areas, therefore there will be interaction between all offices which translates to constituting no walls or doors between these areas
- *All areas will require natural sunlight and natural ventilation
- *A single loaded circulation path will be strived for

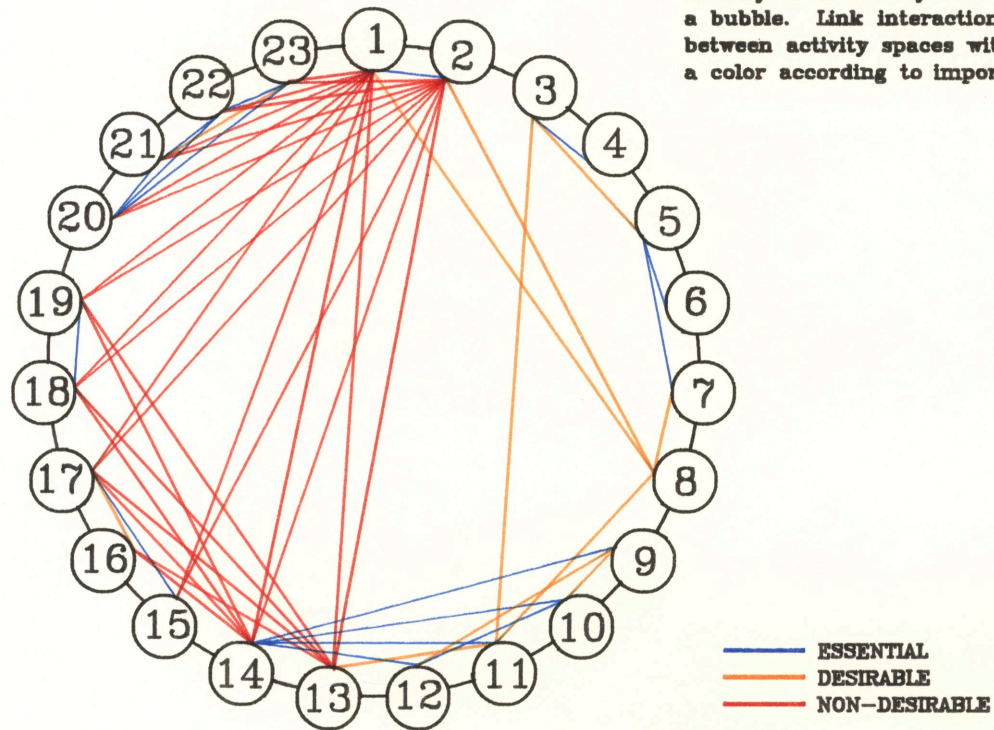
INTERSPATIAL MATRIX

Show adjacency relationships between spaces



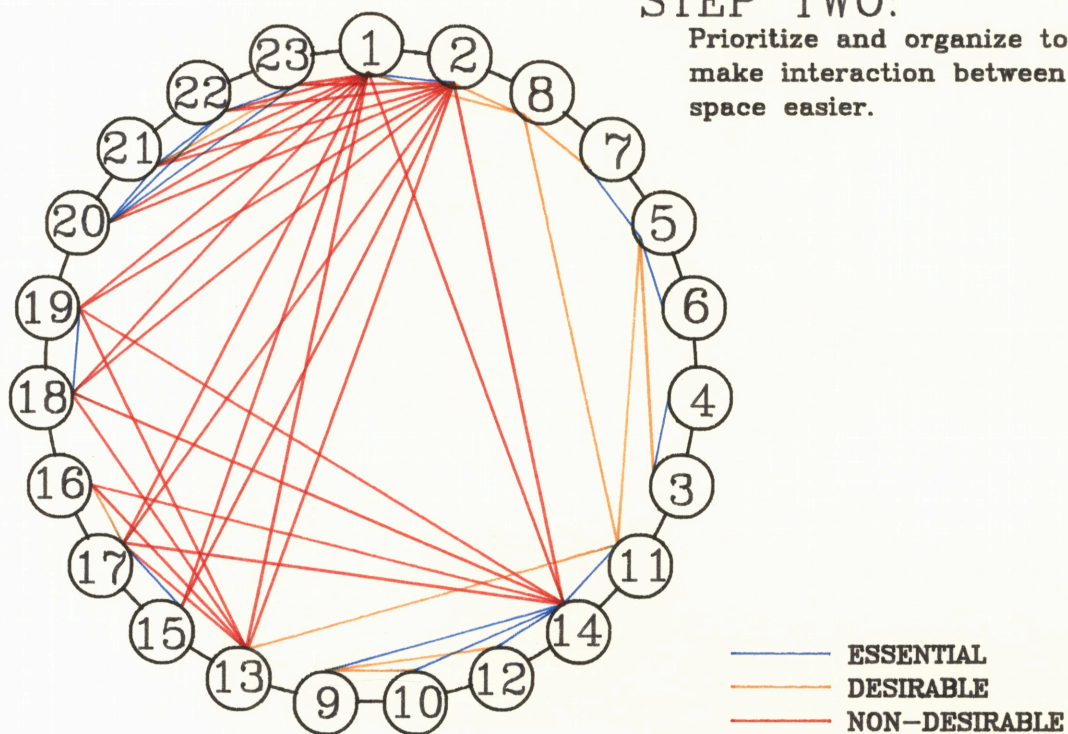
STEP ONE:

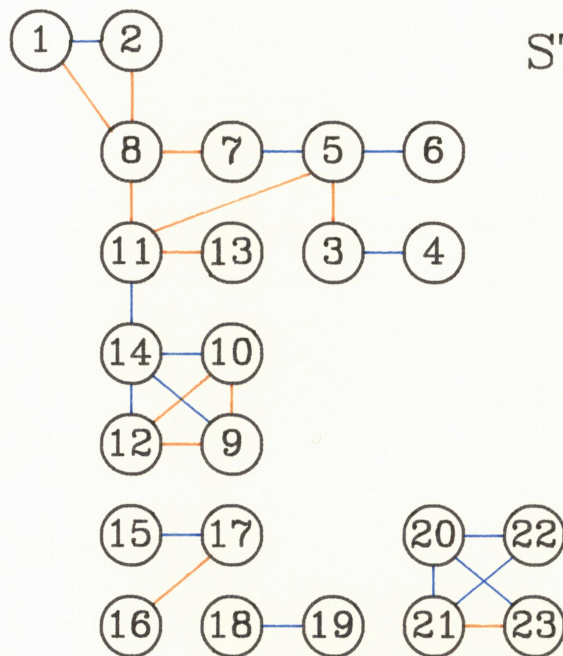
Identify each activity with a bubble. Link interaction between activity spaces with a color according to importance.



STEP TWO:

Prioritize and organize to make interaction between each space easier.





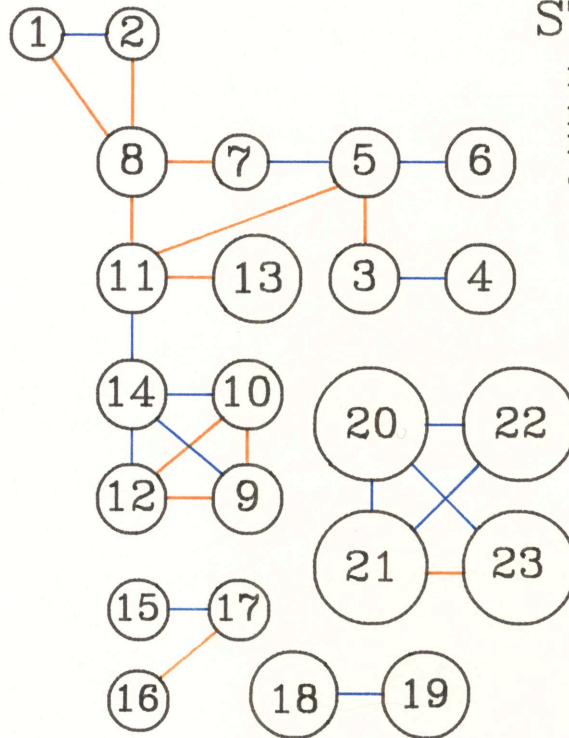
STEP THREE:

Maximize bubble diagram by
using free-form diagram

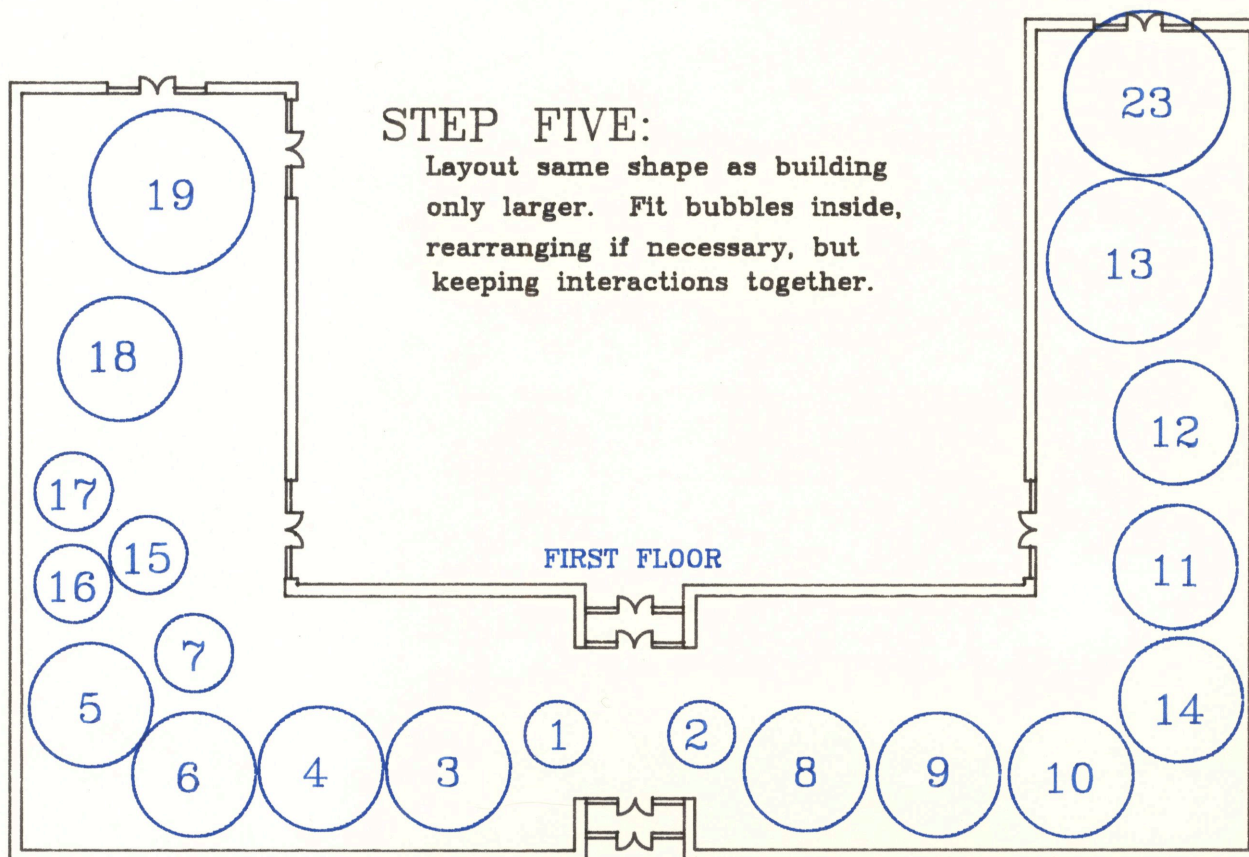
— ESSENTIAL
— DESIRABLE

STEP FOUR:

Redraw step three with bubble sizes proportional to the area of space, keeping distance from center to center equal if possible



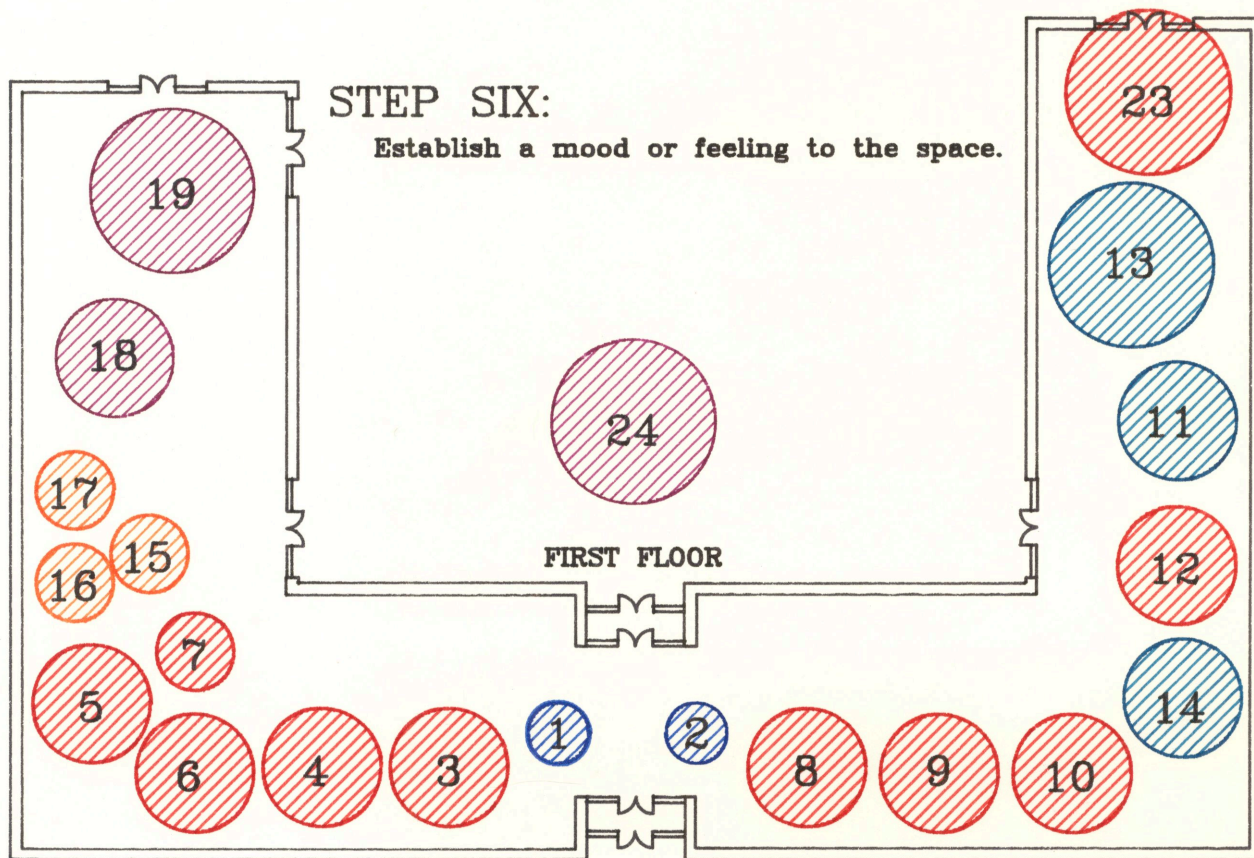
**ESSENTIAL
DESIRABLE**

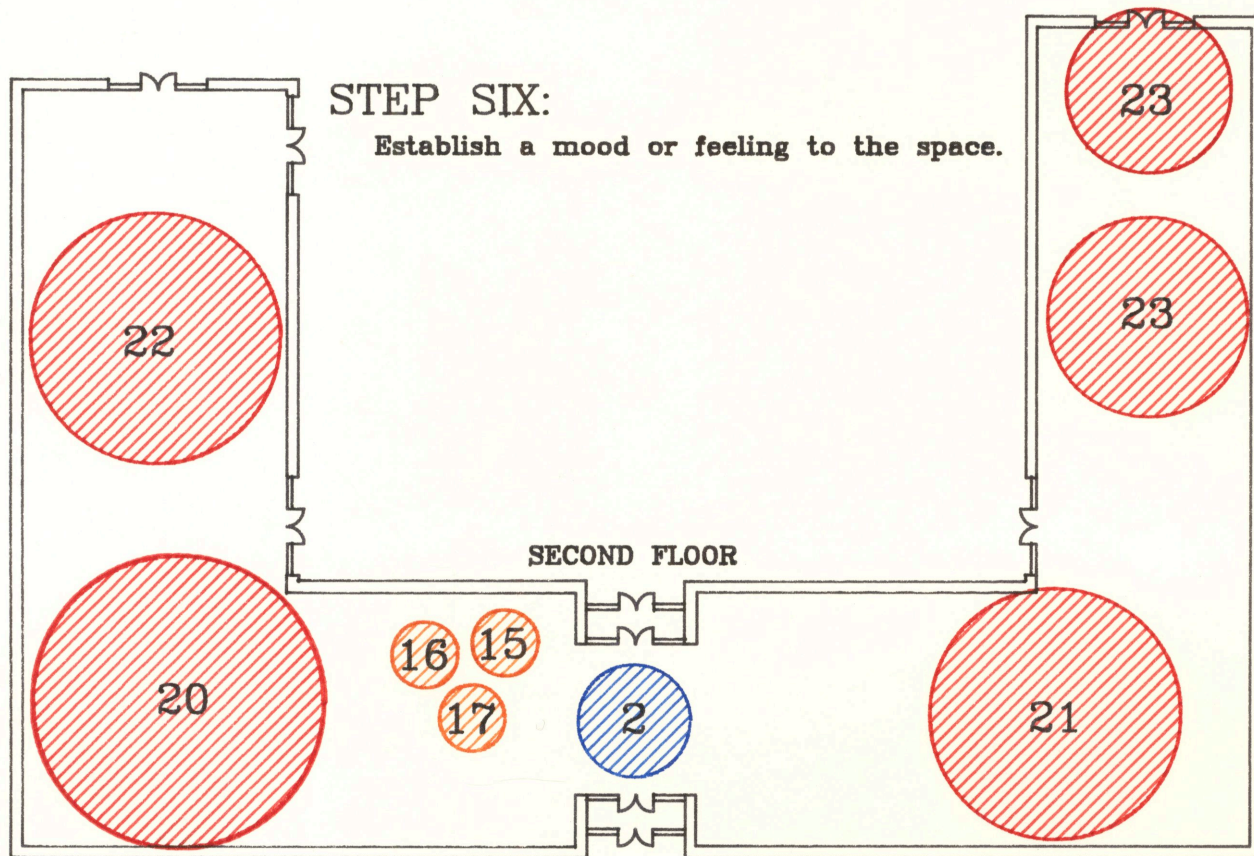


STEP SIX:

Establish mood or feeling of space

-  Open, airy, well-lit, prominent, spacious
-  Professional, functional, organized, welcoming
-  Executive, important, open, spacious, bold
-  Functional, clean, organized, well-lit
-  Relaxing, fun, inviting, bold





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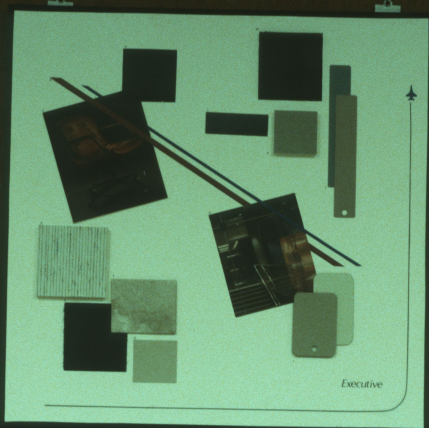
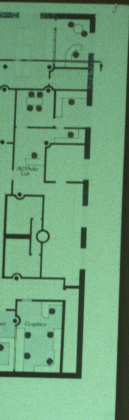
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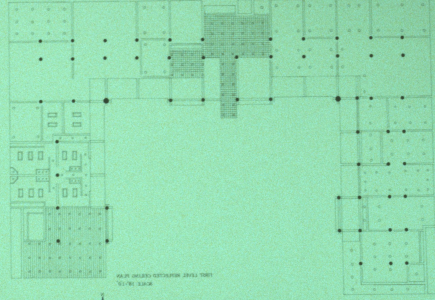
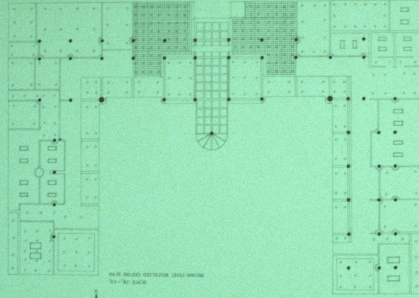
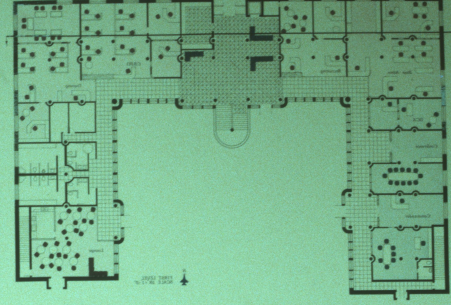
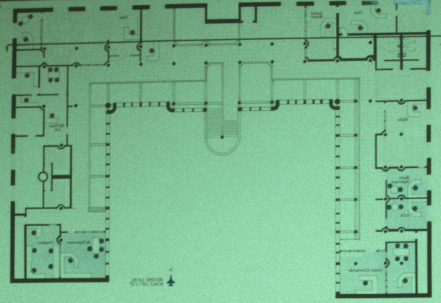
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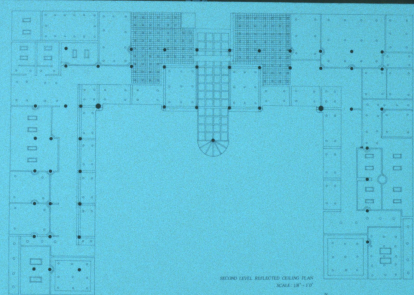
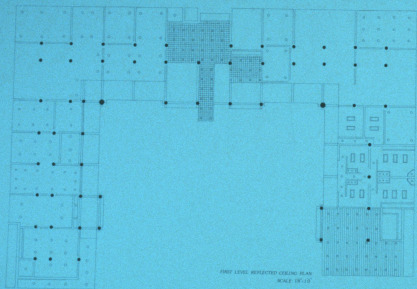
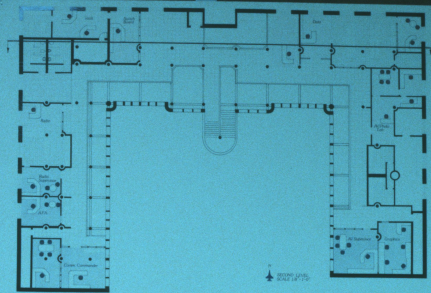
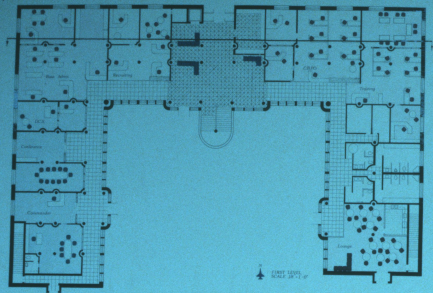
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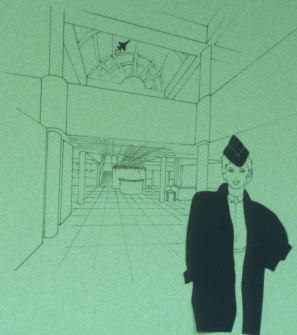
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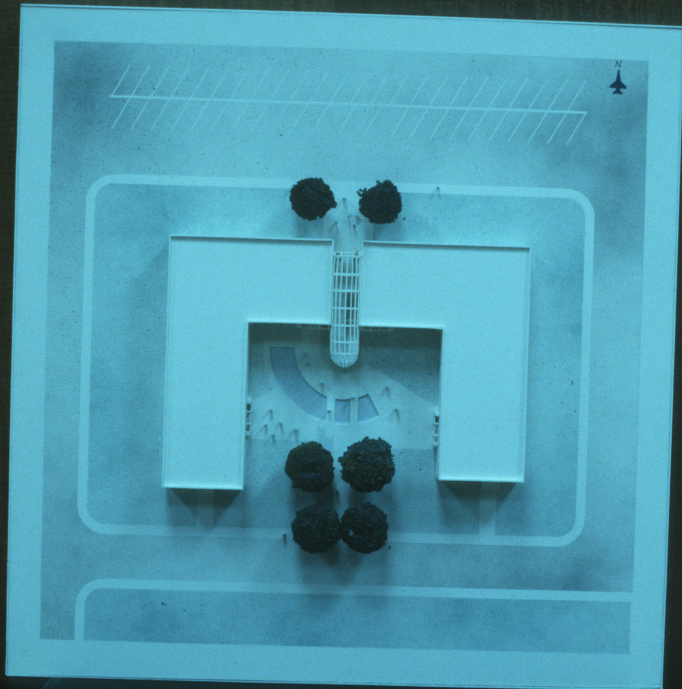


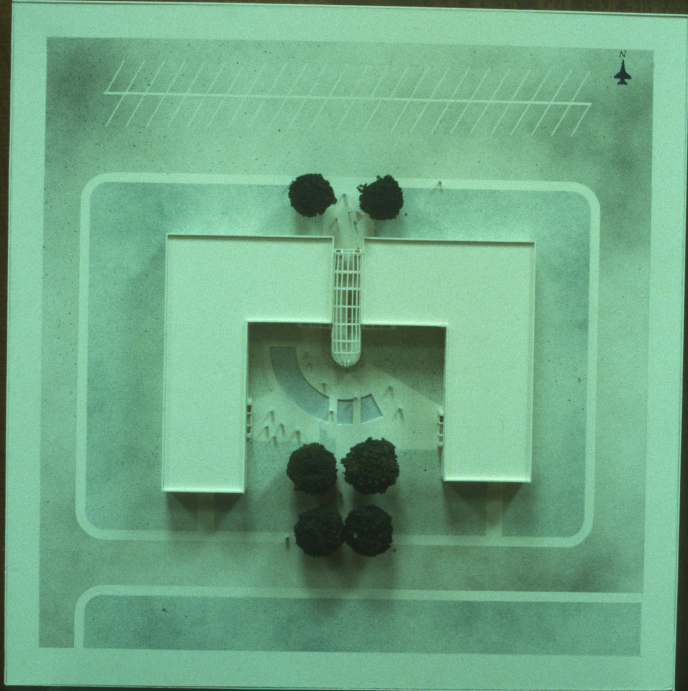












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