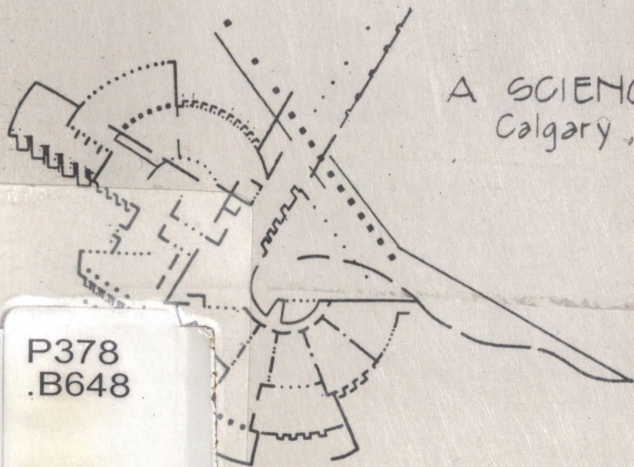




A SCIENCE AND TECHNOLOGY CENTER
Calgary, Alberta, Canada

Wendy Borggard

Architeturat Thesis I

P378
B648

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Clark E. Uhly
Advisor

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I DEDICATE THIS BOOK WITH THANKS TO CLARK FOR A
NUMBER OF UNSTABLE EVENTS
AND ESPECIALLY TO MY PARENTS FOR BEING STABLE
THROUGH ALL EVENTS.

TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	PROJECT STATEMENT	2
3.	THE PROJECT	3
4.	THE CITY	5
5.	THE SITE	8
6.	THE CLIMATE	25
7.	THE QUALITY	26
8.	THE SYNTHESIS	32
9.	CASE STUDY	33
10.	THE PROGRAM	41
11.	ZONING	43
12.	FOOTNOTES	46
13.	BIBLIOGRAPHY	47

INTRODUCTION



Architecture is the art and science of creating spatial experiences, both interior and exterior. Conceiving and achieving these experiences can come from a multitude of sources: through the personal experiences and values a designer brings to a project; allowing both intuitive and determinate decisions to become synthesized. Through analysis of requirements and conditions of the project and its site, and through the desires and requirements of the users. I believe the thoughtful integration of these influences can create a dynamic, unique and appropriate design.

My education has allowed me the opportunity to appreciate a broad range of philosophies, approaches and techniques of architecture and in turn, have enabled me to develop my own synthesis of these. It has, however, only provided me with a base of knowledge on which to build the lifetime of education I will soon encounter.

In this thesis, I will attempt the synthesis of my education: the approach of dealing with finite conditions, my intuitive visual and spatial development, and a continued exploration of my values as a designer.

PROJECT STATEMENT



The intent of this thesis is to design a Science and Technology Center in Calgary, Alberta, Canada. The solution shall be reached through analysis of environmental, physical and aesthetic issues. I shall seek to provide:

- an architectural statement that reflects the nature and feeling of the functions housed within it
- a series of rich interior and exterior spaces which remain conducive to the functions and surroundings
- a unique design that reflects Calgary's growing awareness of culture, its international exposure and its developing architectural appreciation

THE PROJECT



"When I hear, I forget
When I see, I remember
When I do, I understand."
• unknown •

This is the basic premise on which the idea of the science and technology center is based. There is an inherent difference between typical museums and science and technology centers (sometimes simply called science centers). Where museums seek to create a quiet, elitist "hands-off" environment, and their displays focus on objects of intrinsic value, science centers seek to create dynamic spaces and displays where visitors are free to the wonders of chemistry, biology, physics, industry, natural sciences and other divisions of the technological world by becoming an active participant in many varied experiments and exhibits that target the senses, emotions and the intellect.

Science and technology centers have been described as:

"a burgeoning new concept in the museum world" that
"beckons both children and adults to the world of science through
do-it-yourself experiments and a fascinating array of biological,
physical, and chemical phenomena."¹

The development of the science center has resulted due to the visiting public's growing and changing attitudes, needs and expectations.

Part of this transformation can be attributed to changing public interests, expectations, and needs. The world has become more complex as a result of scientific and technological advances. In general, people are better educated, earn more, and have more leisure time than past generations. There are more demands on their time by television, sports, community affairs, and other activities. When they go to museums, they like to be entertained. They also want to know more about the scientific and technological world around them.²

There are many types of science and technology centers which focus on diverse areas of scientific and technological world:

1. Comprehensive
 - larger, broader, more fully developed center
 - generally categorized as industrially, educationally, scientifically oriented, but can span several categories

2. Industrially Oriented
 - a comprehensive museum placing considerable emphasis on industrial developments
3. Educationally Oriented
 - usually operated by schools, universities, or governments that are primarily extensions of the classroom or laboratory
4. Scientifically Oriented
 - third form of comprehensive science center encompassing natural history and/or other fields in addition to physical and life sciences
5. Specialized Centers
 - may focus on a more narrow aspect of science and technology - energy, transportation, health, space and nature
 - typically smaller than comprehensive centers
6. Limited Centers
 - those that are limited in scope, size and funding

< Science is constantly producing new facts and theories, and technological advances are rapid. A science museum is a place where, throughout their lives, people can have direct contact with new technology and can experience the basis for scientific processes. Science instruction for the general public is increasingly important because citizens cannot participate in, and understand, political and social events of our time without a basic literacy in science and technology. Perhaps even more important, literacy in science is important for the quality of life. Understanding the living and physical world around us leads to a fuller life and is as important as an understanding of art and literature.³

THE CITY



Calgary, Alberta, Canada is located on the 51st parallel, 320 km north of the Alberta/Montana border. It sits in the lower eastern foothills of the Rocky Mountains. The plains of Canada's wheat belt extends to the east of the city. Two rivers wind through the city; the Bow and the Elbow. The major of the two, (the Bow) divides the city into its north and south halves. Running along side it is the TransCanada Highway, which as the name implies, is the major east-west route that links the country's eastern and western shores, and some of its major cities.

Calgary is a sprawling city, covering roughly a 15 km radius from the city's center, and is home to approximately 800,000 residents. The city bases the major portion of its economic livelihood on the oil and gas industry which has had a major impact on the fluctuations of the population over the years. During the economic "boom" of the mid-to late Seventies, Calgary saw a large influx of eastern Canadians as well as a very visible, and extremely swift urban development in the downtown core to house major oil and gas companies' corporate offices. The result was a large number of non-descript, glass-encased boxes in the city's center (Figures 1 and 2)

Subsequently, Calgary was one of the cities hardest hit by the early Eighties recession, where one saw the abrupt halt of almost all development as well as a significant drop in population.

In 1984, Calgary was chosen to host the 1988 Winter Olympics. To the city's benefit, this was a large contributing factor to its growing economic stability as well as its impact on the city's international recognition. This is reflected by the record number of tourists that visited the city during the winter of 1988, in addition to the subsequent winter and summer seasons.

Calgary has been gaining economic stability steadily, in addition to the city's growth as a major cultural center. The latter is a direct result of the former, along with the recent world-wide exposure. This is demonstrated in the city's current slower and more thoughtful architectural development.



Fig. 1

"Before" (1972)



Fig. 2

"After" - 1982

THE SITE



The location of the site is on the city's north side, settled on the hill that slopes up from the Bow River Valley. It overlooks this valley near Calgary's west end. The site's edges are bordered on its south side by the Trans Canada Highway (Figure 3), and on its west side by a major north-south feeder artery, Shaganappi Trail (Figure 4). In its entirety, this site is a provincially owned quarter section of undeveloped land, but this analysis shall only be concerned with area south of 24th Avenue (see site map pp 11). Adjacent to the site's east side is a residential community (Figure 5), and opposite its northwest corner is the University of Calgary campus (Figure 6).

ARCHITECTURAL PRECEDENTS

Most of the existing architecture near the site has been developed since the late Fifties and early Sixties.

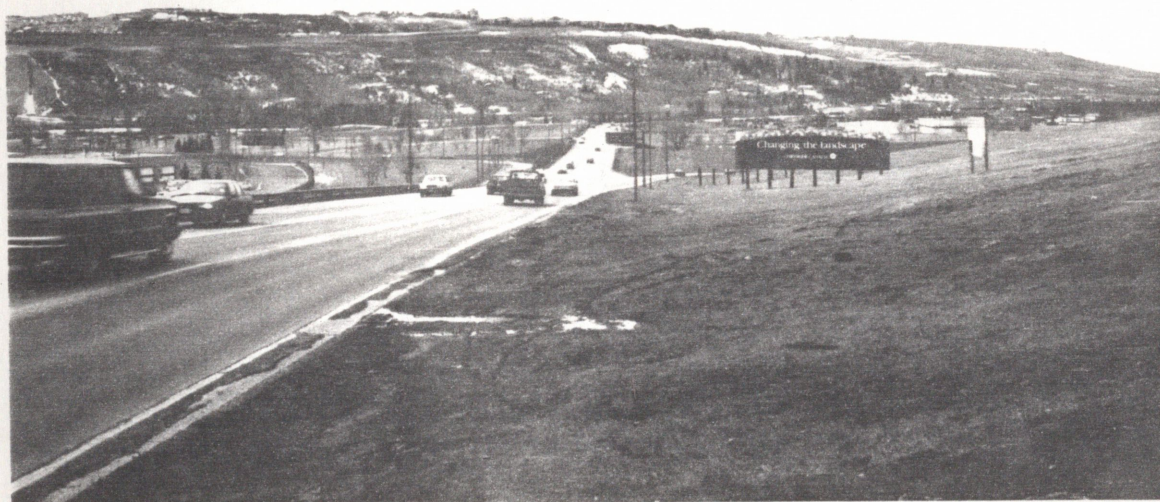
- The University of Calgary reflects the Sixties modern aesthetic (Figures 7 and 8) which emphasizes the pronounced vertical-horizontal grid
- The Foothills Hospital, located southeast of the site (see site map pp. 15), is predominantly the same Sixties style, but has since experienced additional development during the early Eighties, which is dominant in its solid form and post-modern glass atrium (Figures 9 and 10)
- Bordering the east side of the site are mostly two-story, single family homes built in the early Sixties (Figures 11 and 12)
- Due to a hill on the opposite side of Shaganappi Trail, the view of the adjacent development is obscured

Design Implications:

- Changing times, styles and values suggest the opportunity to explore new architectural directions

SITE VIEWS

The top half of the site is relatively flat, then slopes toward the south and west. Due to the land layout, potential views become apparent:



3.



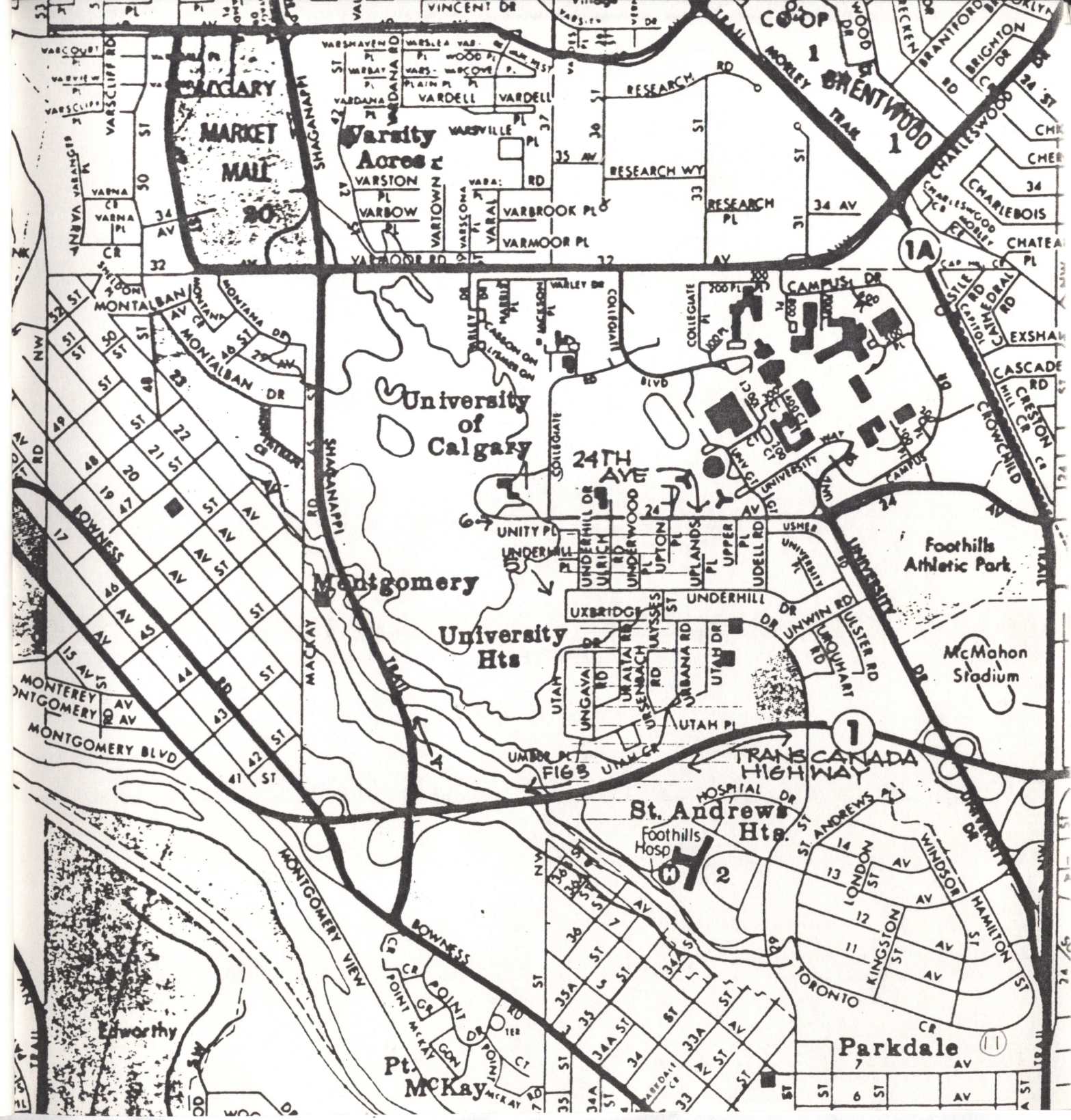
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5.



6.





7



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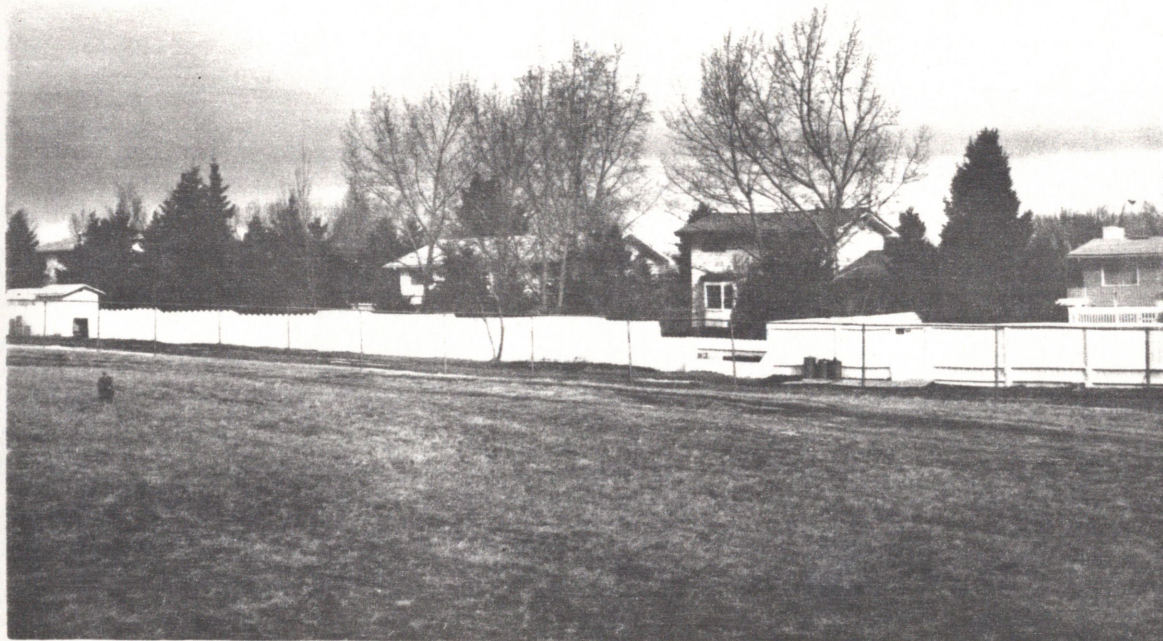


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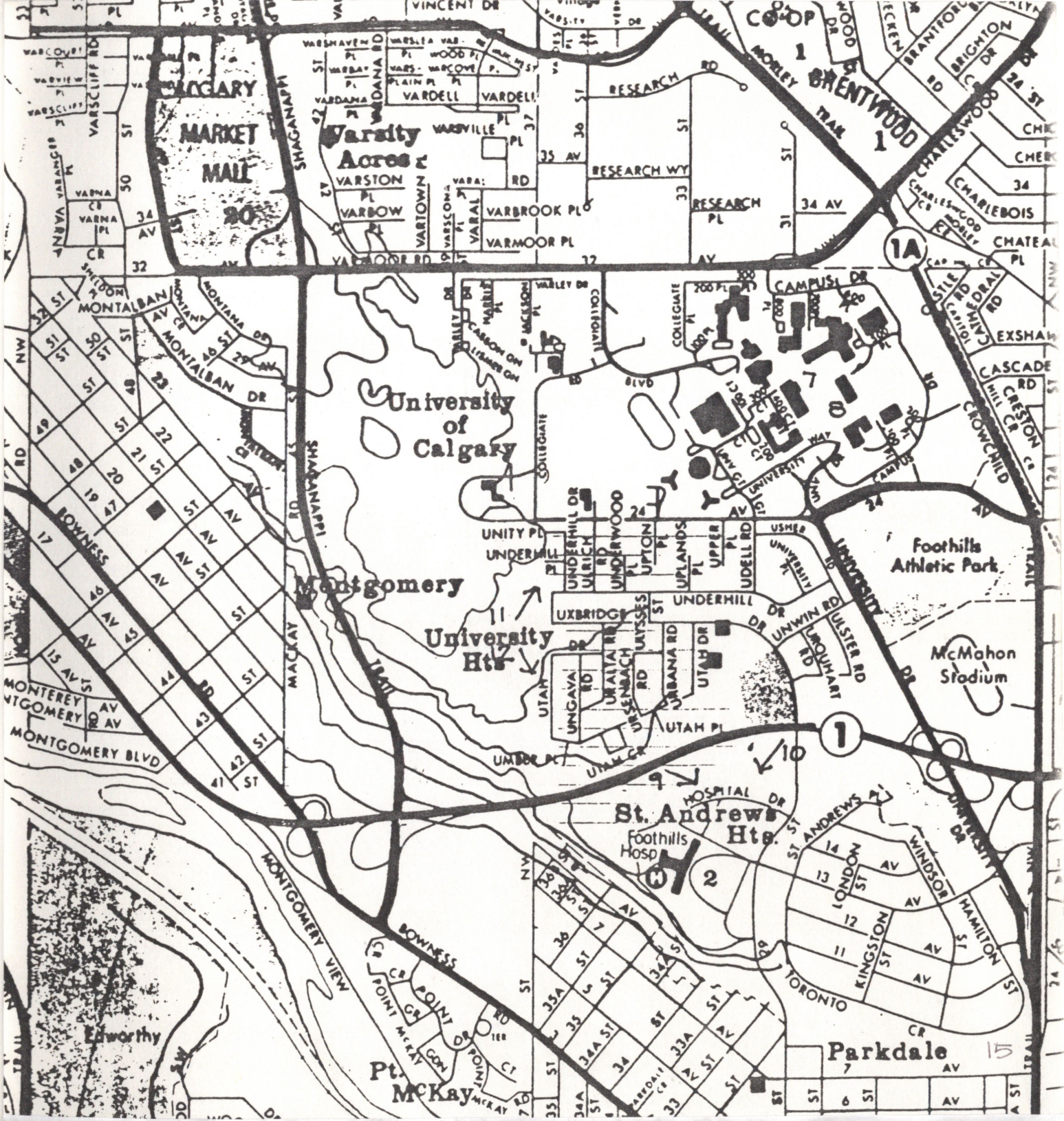
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11



12



CALGARY
MARKET
MALL

Varsity
Acres

University
of
Calgary

Montgomery

University
Hts

St. Andrews
Hosp

Foothills
Athletic Park

McMahon
Stadium

Parkdale

1A

1

2

Across the site:

- Looking diagonally from northeast to southwest corners, the view is of the slope of the hill across the river; the river itself remains out of site (Figure 13).
- Looking south from northeast corner along the east edge of site, the view is again of the opposing hill.

Off the site:

- Facing south at the crest of the hill which slopes toward the river, there is an extended view of the river valley (Figures 15 and 16).
- Looking west and northwest from the same position, there is a view of the Rocky Mountains and the continuing river valley.

Onto the site:

Due to its location, this site is extremely visible from many varied points:

- Driving both east and west, adjacent to the site on the TransCanada Highway, the hill is very visible as the flat part of the site remains unseen (Figure 17).
- Traveling north and south on Shaganappi Trail, the view of the upper part of the site is obscured by the hill; again the most visible part of the site is its corner as it slopes away to meet the perpendicular highway.
- Driving in from the west, the highway's elevation is much lower in relation to the site; the view of the site's southwest corner is very as it rises above the river valley development (Figure 18).
- Traveling along a major road on the river's south hill, the site is completely in view as one is at a higher elevation (Figure 19).

Design Conclusions:

- The corner of the site would be the most appropriate location for development because:
 - it is the most visible to vehicular traffic from around the surrounding area
 - it is the least visible to the residential community



13



14



15



16



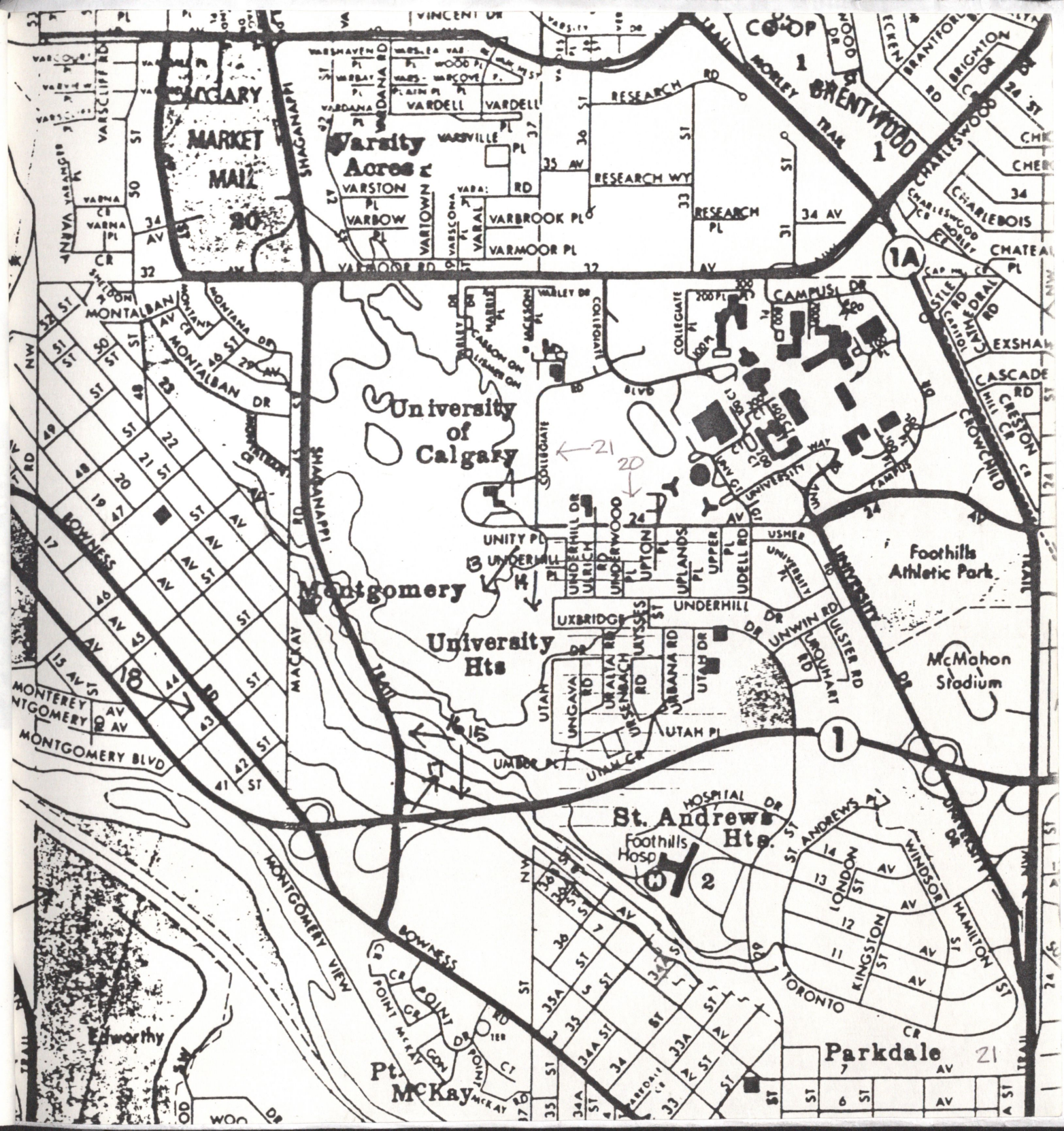
17



18

19





SITE CIRCULATION

There is no formal vehicular circulation access on the site. The vehicular around the site is :

- TransCanada Highway - a four lane highway, average speed: 70 km/h
- Exit from highway to meet north-bound traffic on Shaganappi Trail and borders the southwest corner of site
- Shaganappi Trail - a four lane arterial that becomes divided as it passes through the highway's underpass, average speed: 70 km/h
- 24th Avenue - a four lane, divided boulevard that separates the residential district and the university campus, developed to accomodate potential west campus expansion, and resulting traffic growth, average speed: 60 km/h (figure 20)
- Collegiate Drive - a two lane road that circles the west end of the campus and intersects 24th Avenue at the northeast entrance to the site, forming a "ring road", average speed: 40 km/h (figure 21)

Pedestrian

There is no formal pedestrian circulation, and due to the nature of its location and size, the site becomes a destination rather than an area is walked across to get somewhere else.

- Typically, the site is entered along the east side, from the back lane of the residential district at intervals where the chain-link fence accomodates pedestrian access
- After entering the site, there are meandering footpath across it as well as one that follows the fence

Design Conclusions

- Highway and major arterial that border the site are not conducive to entering/exiting traffic due to high speeds
- developed "ring road" provides logical access onto and off of site - due to speeds, potential expansion already anticipated, intersection of 24th Avenue and Collegiate Drive occurs directly at northeast corner of site



20



21

- due to the fact that the site borders a residential district, extra care must be taken with the development of vehicular circulation (both commercial and private)
- explore potential patterns, plans that provide the safest and efficient access and access and travel across the site

PUBLIC TRANSPORTATION

Public bus transportation passes at the northeast corner of the site as it travels through the university on 24th Avenue and Collegiate Drive. All bus routes through the university connect to the city's northwest leg of its Light Rail Transit System (LRT), which connects to all quadrants of the city through the downtown center.

Design Implications

- Existing bus/train connections to the northeast corner of the site provides potential connection between the project and the existing site entrance
- Existing public transportation facilitates access to the site by the pedestrian public

THE CLIMATE



Calgary has a broad temperature fluctuation from summer to winter, ranging from -31°C in January to 29°C in July. Cold winter winds blow out the north although the city does experience occasional warm westerly winds that blow over the Rockies called "chinooks", periodically relieving Calgary's sometimes bitter cold. Summer winds tend to be directed out of the southwest. The city experiences an average 437mm of precipitation annually; snowfall is a major portion of this.

Calgary experiences extensive sun coverage in the summer. On July 21, the sunrise azimuth angle is 50°ne , reaches a peak altitude of 63° at 163°se and sunset occurs at an azimuth angle of 310°nw - a range of 230° . In the winter, on December 21, the sunrise azimuth is 130°se , reaches its peak altitude of 17° at 169°se , and sets at an azimuth of 230° - a range of 100° .

Design Implications

- The large change in seasonal sun paths will have a great effect on the building's image both interior and exterior; from winter to summer - take advantage of this
- Design should respond to large temperature swings - through surface materials, colors, fenestration orientation, forms etc.
- Respond to wind and its impact on potential heat loss
- Respond to impact of precipitation

THE QUALITY



On the following pages, I have included sketches of projects that I believe embody certain qualities that make a building become architecture. I will not attempt to utilize these forms directly, but will aspire to achieve the same richness in my architecture that each design possesses.

RICHNESS OF SPACE AND LIGHT

Create spaces that are created by light. The character of space will change with time, with the day, the season.

"Architecture is the masterly, correct and magnificent play of masses brought together in light. Our eyes are made to see forms in light; light and shade reveal these forms..."

Le Corbusier: "Towards A New Architecture"

RICHNESS OF FORM

Aspire to create original form through the development of proportion and its interaction with light; form is a large factor in creating a memorable place.

RICHNESS OF IMAGE

Create a building original form, concept and execution. This will, in turn, effect memory and conjure images of place; the identity of form becomes synonymous with place.

RICHNESS OF DETAIL

Generate richness of space through light and form, but also through detail. Detail is where the project becomes unified by embodying the concept and perfecting it to its ultimate refinement. It brings even large spaces down to the scale of the individual experiencing it.

EXPERIENCE OF APPROACH AND ENTRY

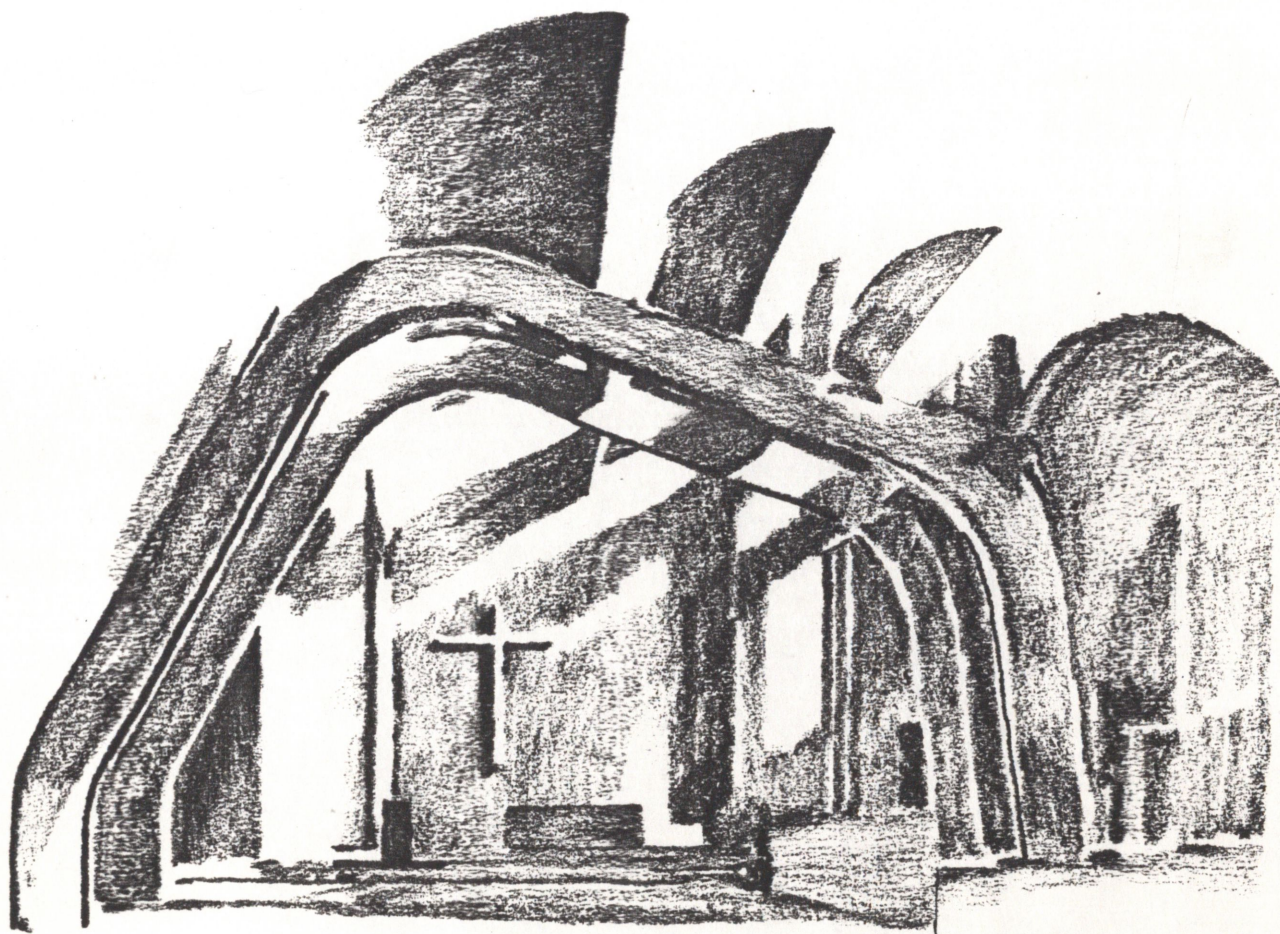
Create clarity, humanity and anticipation through articulation of approach and entry.

"...is not intended to awe or overwhelm (but) to welcome the visitor and to evoke a desire to enter."

Richard Meier

RICHNESS OF SPACE AND LIGHT

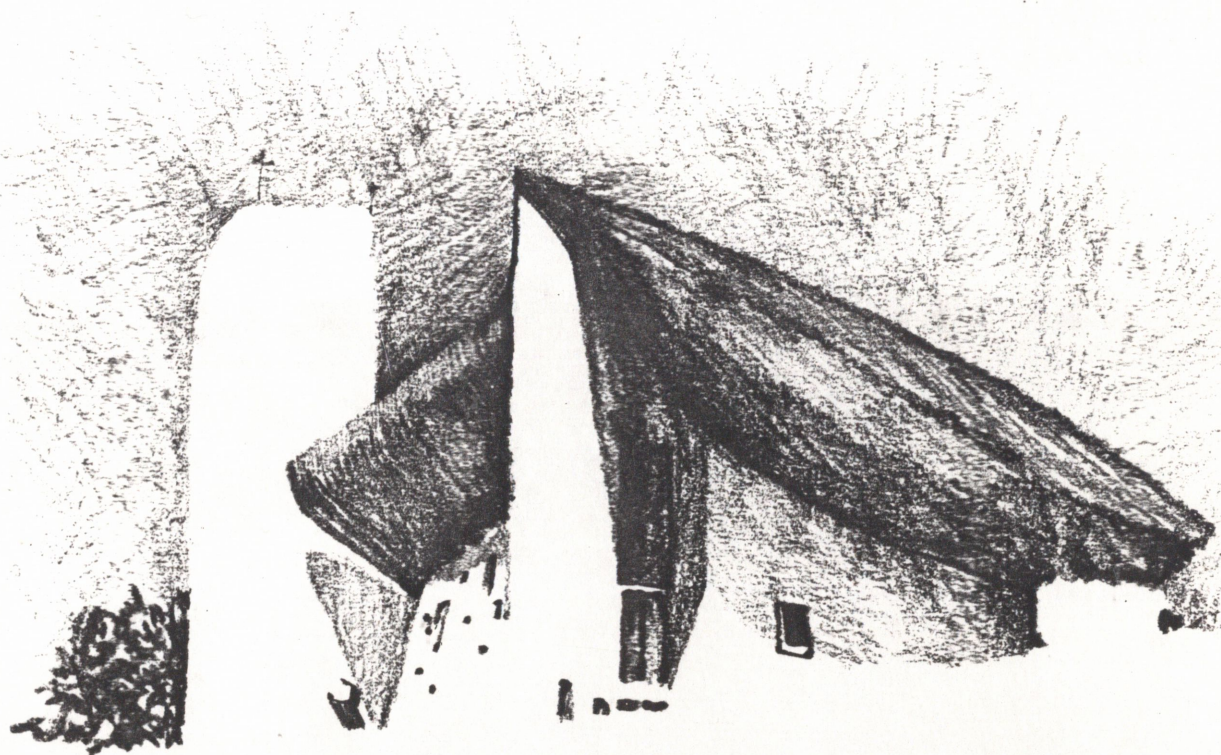
Church and Parish Community Hall • Alvar Aalto
Riola near Bologna, Italy

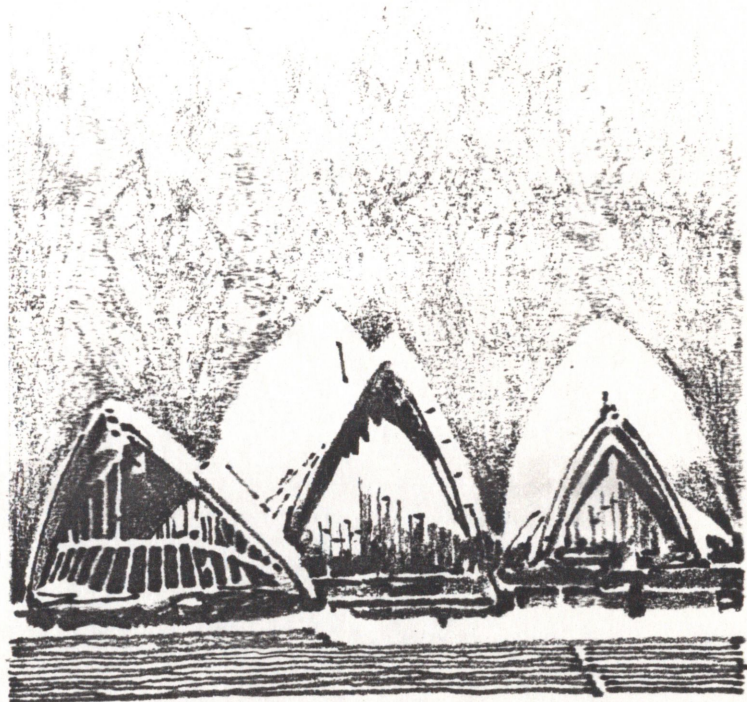


RICHNESS OF FORM

Nôtre-Dame-du-Haut
Ronchamp, France

Le Corbusier



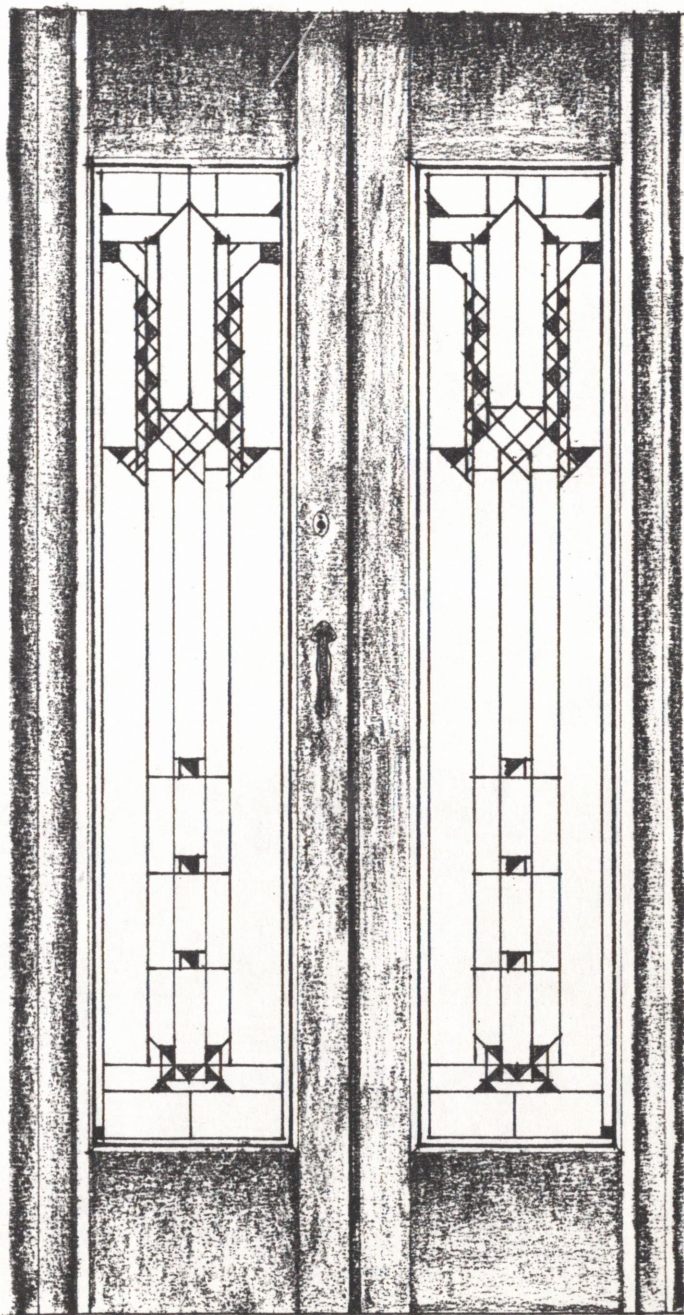


RICHNESS OF IDENTITY

Sydney Opera House • Jørn Utzon
Sydney, Australia

RICHNESS OF DETAIL

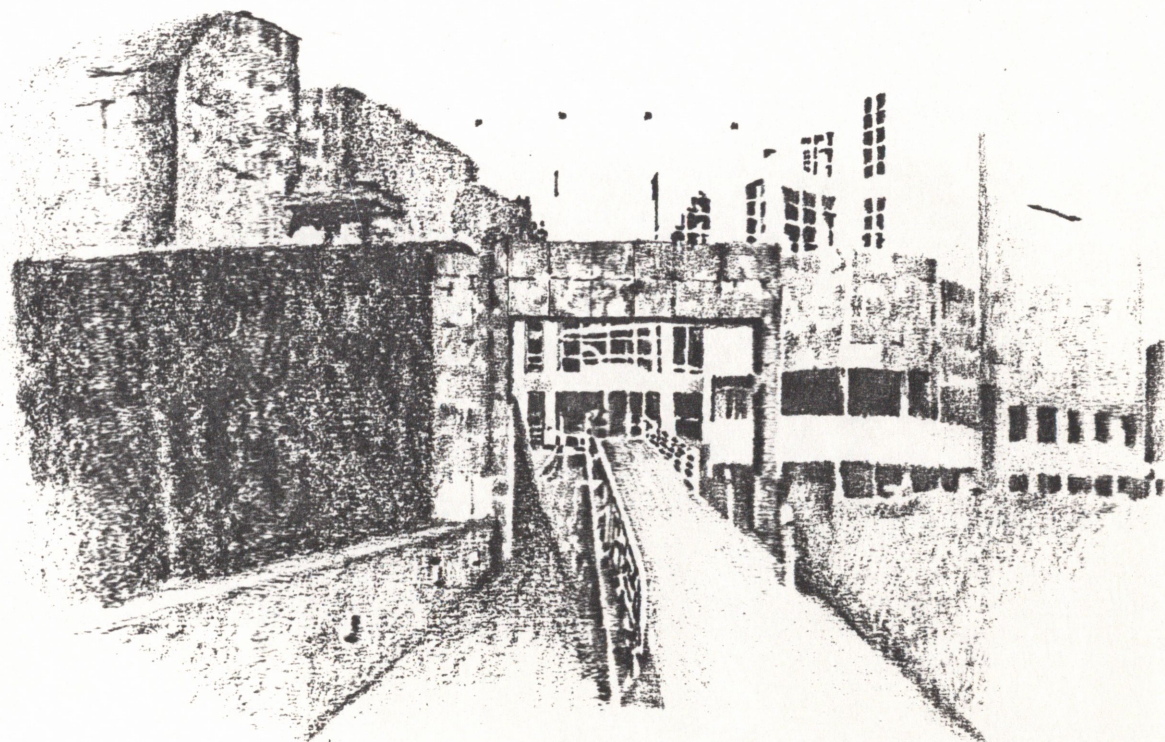
Pair of doors for Francis Little
house • Wayzata, Minnesota
Frank Lloyd Wright



EXPERIENCE OF APPROACH AND ENTRY

The High Museum
Atlanta, Georgia

• Richard Meier



THE SYNTHESIS



As described previously, a science and technology center focuses its efforts on teaching the ideas, and theories of scientific and technological advances through hands-on experimentation. I believe the environment I create must take this function as its primary concern. This solution shall be people-oriented. I will attempt to create spaces that are rich in detail, rich in spatial quality achieved through development and manipulation of form and light.

Because of its location, I feel there is an opportunity to create architecture that establishes an identity for the Center as well as for Calgary through purity and originality of form, and through the multiplicity of these.

Consideration must be given to several existing conditions: There are several positive views from the site, as previously outlined. These views should be manipulated and framed to create dynamic effects in and from the spaces in which they occur. Forms and their locations will be effected by these views. Another condition that will impact the architecture is the climate. Spaces, according to their function, shall be oriented appropriately to respond to various climatic conditions. Circulation of pedestrian and vehicular traffic onto site shall respond to existing traffic patterns, lay of the site, existing land uses.

After analysing the site for all of these conditions, it becomes apparent that, to take full advantage of the views, light and visibility of the site, the site's southwest corner is the most appropriate location for the project.

After determining the best and most logical position for the project, the second task is to decide the most appropriate path(s) to the project from off the site; both pedestrian and vehicular. There is a need to be sympathetic to the adjacent residential community by maintaining their existing views, and pay due consideration to traffic constraints. As previously discussed, the site's northeast corner would be the most appropriate entry node.

The resolution of this task of determining the paths to the Center will primarily be by the lay of the site. I propose to investigate the circulation of vehicles down the east side of the site then across; pedestrians would venture diagonally across the site (a more direct approach to the Center. Also investigate public transportation "loop", and how it could coordinate with other circulation paths.

In the zoning section of this document, the orientation of the center's spaces will be discussed in conjunction to this synthesis.

CASE STUDY



I believe that approach, entry and circulation will be the components of this design that will, as they say, 'make or break' it. The High Museum by Richard Meier, embodies the clarity; refinement and efficiency I wish to achieve in this project. I also intend for it to become more than functional - it must, in itself, possess architectural Quality.

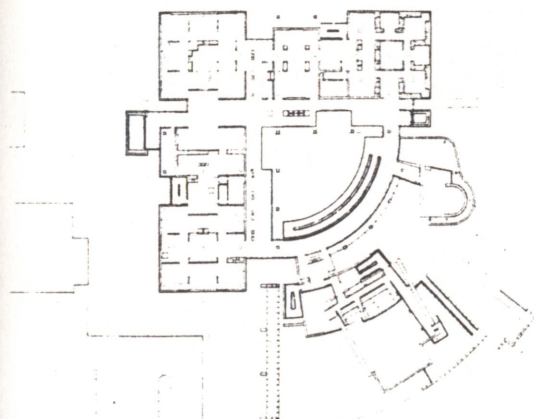
High specific

Turning to the specifics of the High: it gains its power by the conflict between two orders, a large square in plan is divided into four quarters, three containing equal squares. The fourth explodes into a contradictory radial order. The three equal squares hold corner towers (a distinction not articulated internally) which bridge together to form the galleries. The expressive third quarter contains all the public life of the architecture — entry ramp, vestibule, lecture theatre and atrium. In the first published designs the explosive force of the entrance quadrant was anchored by cubic entrance porch at the roadside; it was both fragment and ideal. Ideal in the sense that it maintained the memory of the form that had been exploded. The gate that replaces it half way up the ramp, fails to establish any dialogue to the master order, and in a sense trivialises and makes picturesque what should have been a paradoxical confrontation of forms.

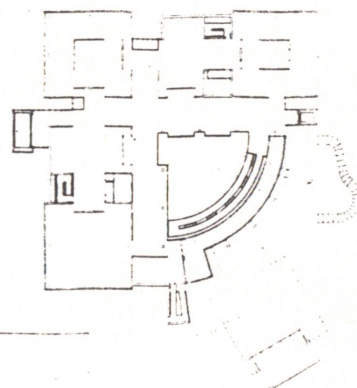
The paradox that remains presents a series of formal and plan moves that must be among the most brutal in Meier's work. Turning back from the top of the ramp to the entrance doors takes one past a patchwork of unresolved elements. The sinuous elegance of the vestibule ushers the visitor forward into the atrium and confusion. At first there is nothing to suggest where to go, or what the experience might be. The junction is so abrupt that it seem as if the architect wishes the visitor

to take stock, readjust to the demands of the architecture and begin carefully to read and experience. Consistent with Enlightenment typology, this is architecture whose content is in its form. It shows no concern with technology. It shows no concern with social or political display. Its ideological nature is in its essential humanism: shaping an architecture which is, in a physiological sense, man centered. From the point of entry the visitor is placed in a multiplicity of frames. Frames which turn spectator into performer, turning floor into stage, and wall into set. The ensemble as theatre makes endless portraits and intriguing social vignettes of all the participants. Significantly it provides a new social setting in which to enjoy art. In the galleries where the aedicular enclosures are pierced by window like openings, the experience recalls the domestic roots of the art museum, creating an intimacy with the objects that enhances their pleasure. There is an unresolved conflict in all this. Meier writes that the building is designed to encourage people to 'experience the art of architecture as well as the art displayed'. And this has led to two orders of architectural experience. The public architecture is dramatic, engaging and powerful. The gallery architecture is modest and undemanding, as is much of the High collection. Viewing the art in the museum is enjoyable, but not as compelling as experiencing the architecture. The piercing light of reason saturating every corner proves too intense not just for contemplation, but for the chemistry of paint. The inner walls of the atrium must, of necessity, be constructed to defend the galleries against the light. These walls are incomplete and allow the daylight to penetrate in such way that despite Meier's exquisite interior architecture one is aware of a greater presence outside these intimate places.

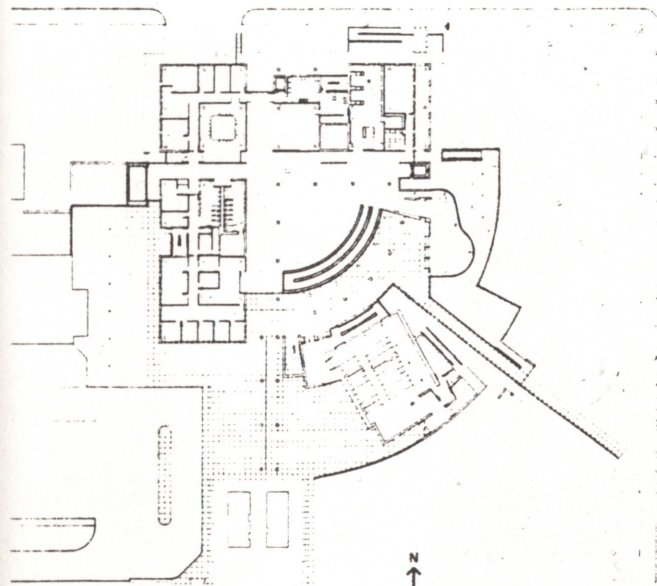
The art is beautifully displayed. And use will in time establish a fitting balance between architecture and art.



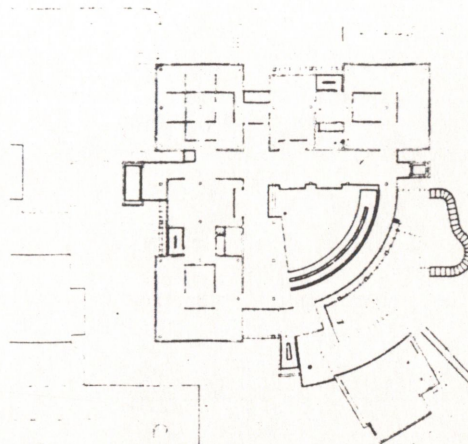
SECOND FLOOR



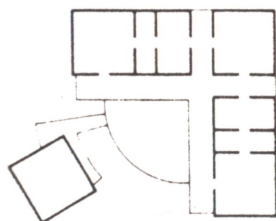
FOURTH FLOOR



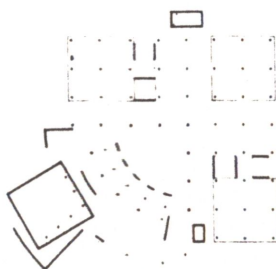
MAIN FLOOR



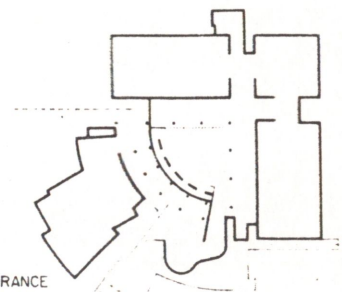
THIRD FLOOR



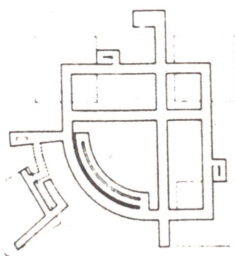
PROGRAM



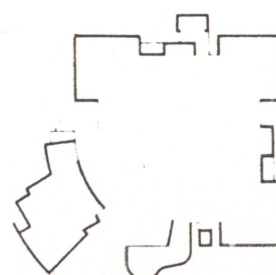
STRUCTURE



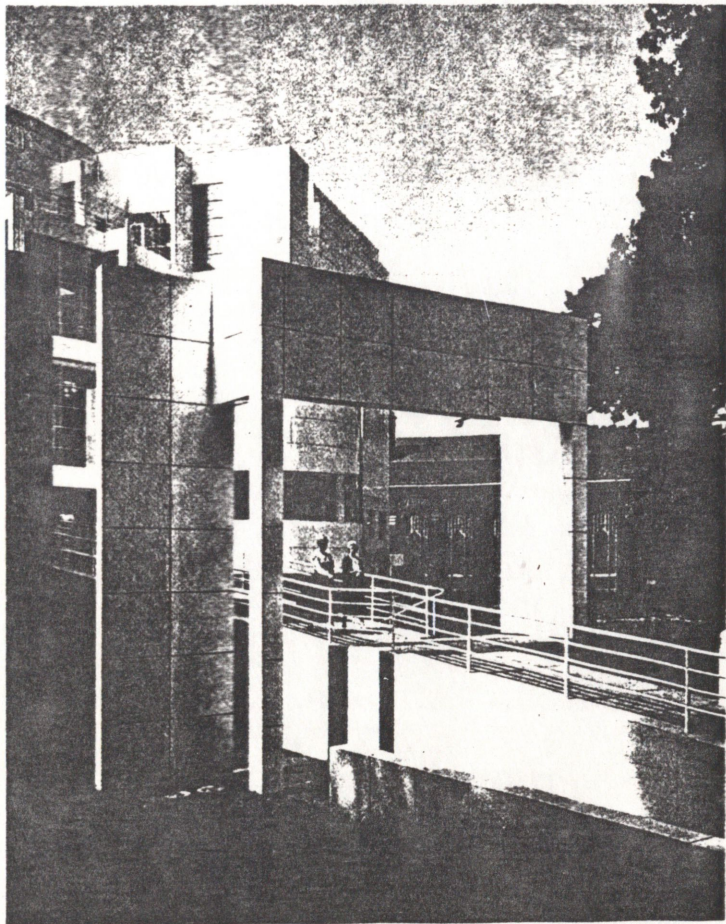
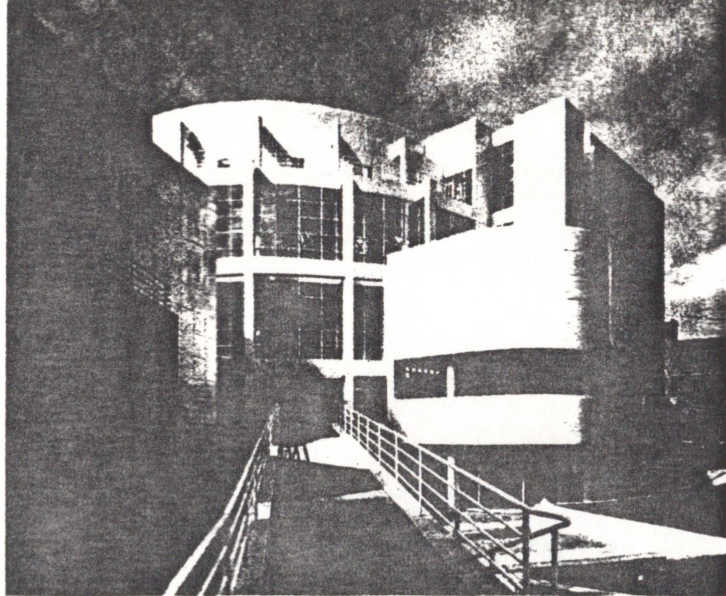
ENTRANCE



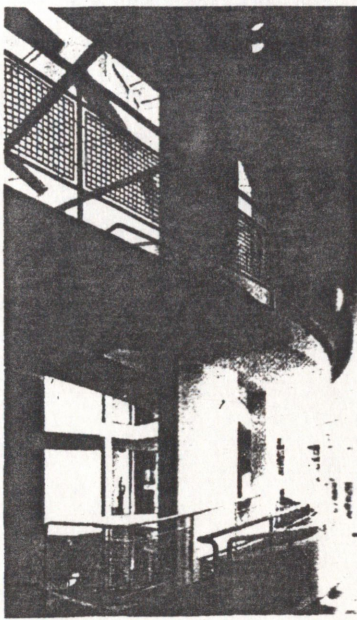
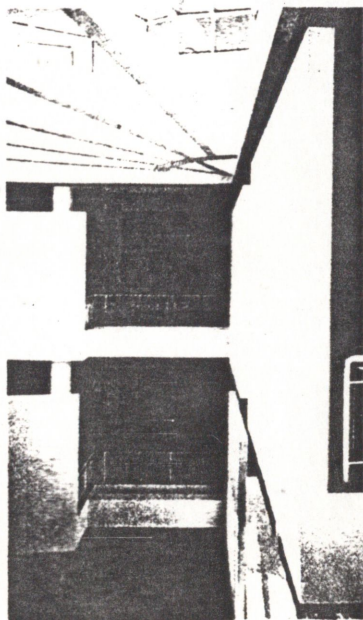
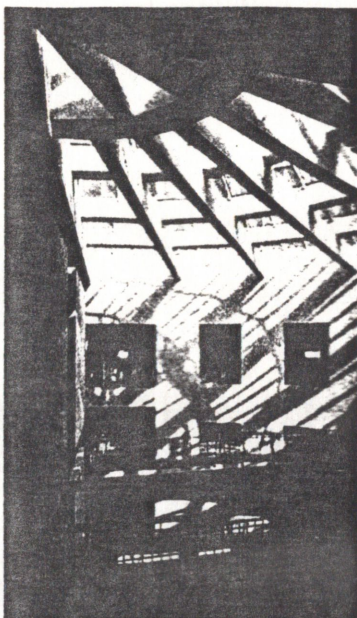
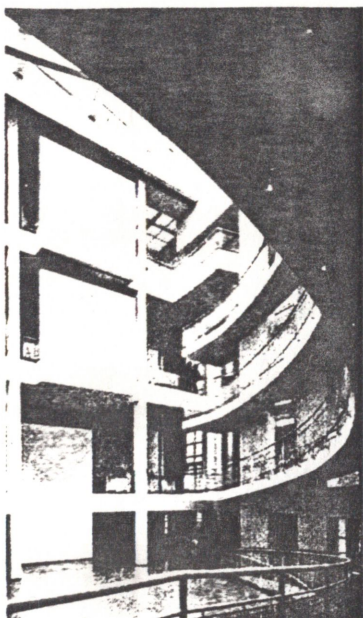
CIRCULATION



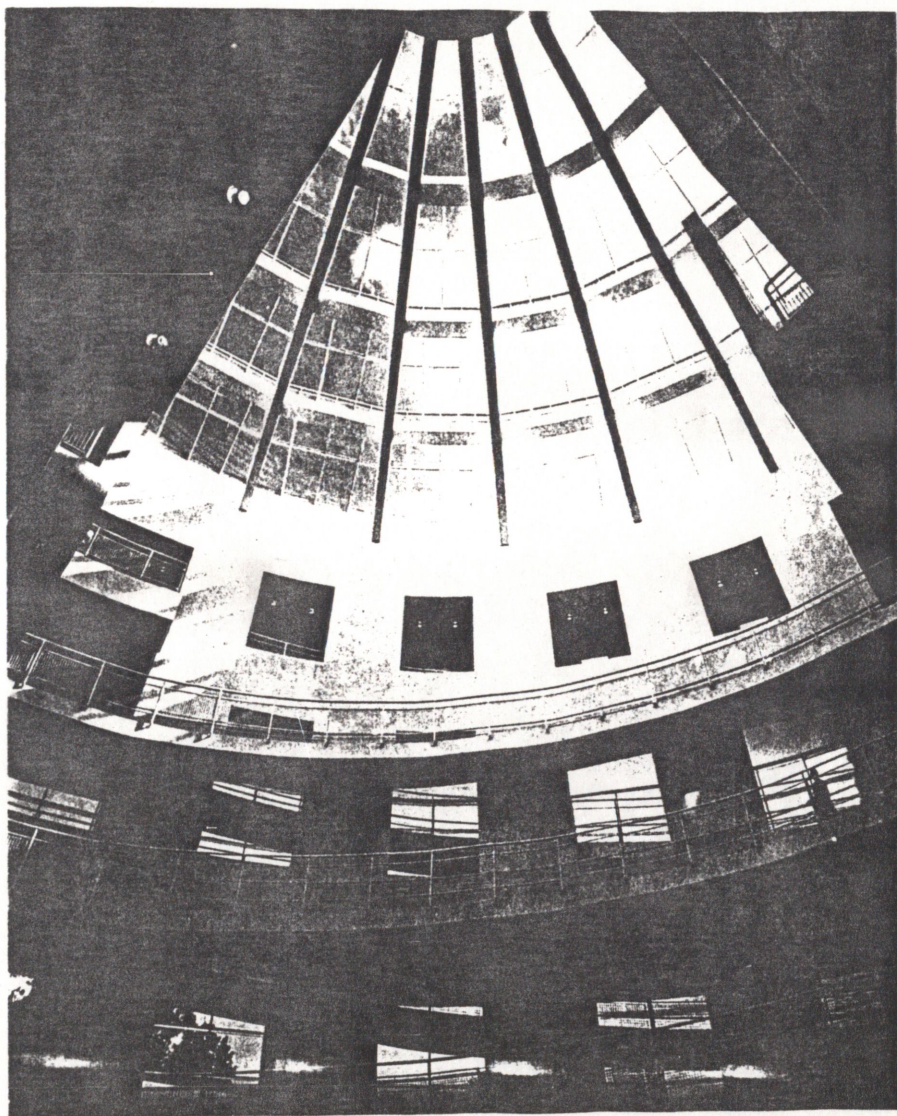
ENCLOSURE

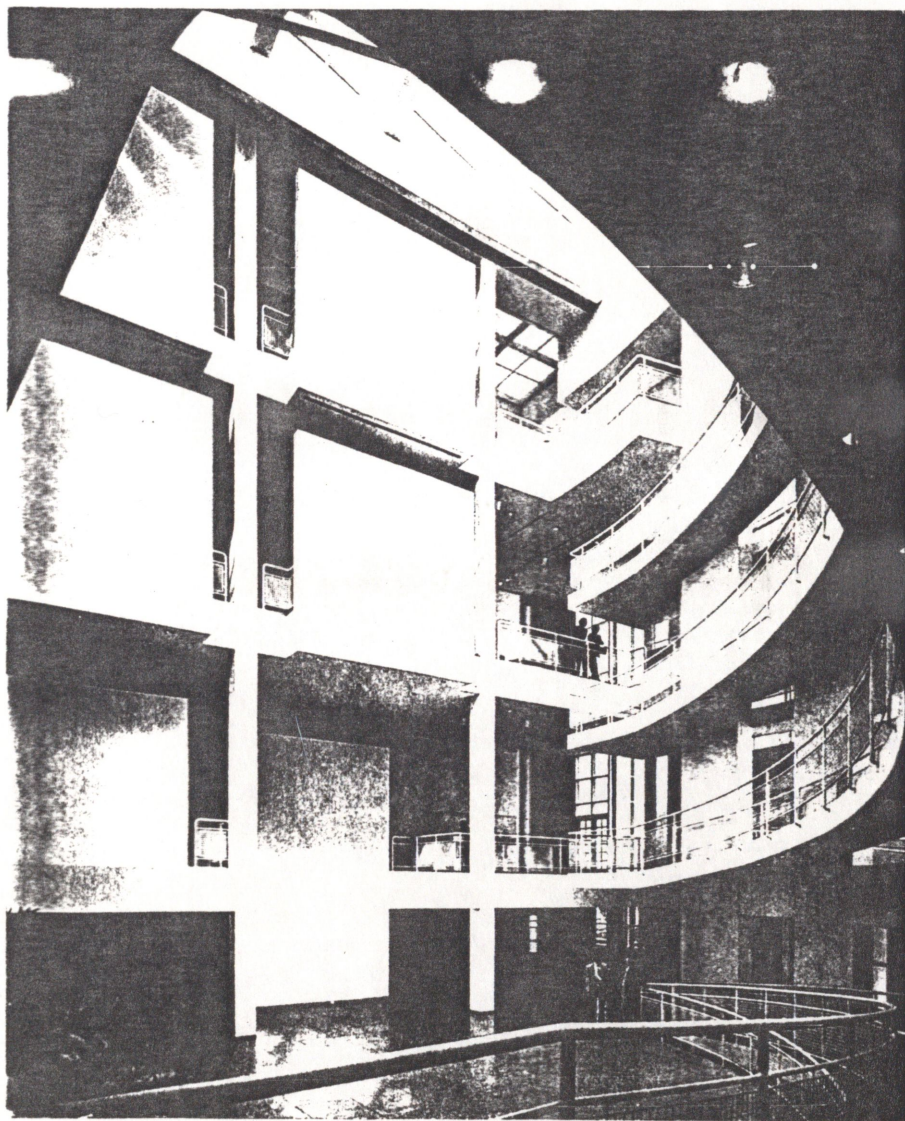


In presenting the design for the High Museum to its board of directors, architect Meier emphasized that the building "is not intended to awe or overwhelm" but "to welcome the visitor and to evoke a desire to enter." To this end, in addition to opening the transparent facade wide, he has made of the entry experience from the street a celebratory processional via a long sloping ramp, along a side wall, through a freestanding portico, past the revetments of the auditorium, and on to a curved porch and the reception lobby leading into the great skylit atrium. The welcoming ramp, a gesture to street and city, also anticipates the quarter-circular interior ramp that is the museum's principal formal and circulatory element.



Although the reference to the Guggenheim Museum is obvious in its focus on a monumental central space and curved-ramp circulation, Meier's scheme for the High Museum overcomes the original's shortcomings as a place for the display and viewing of art by making a clear distinction between path (the ramp) and destination (the galleries). The singular qualities of the Guggenheim—the experience of viewing art from long range as well as close up and from constantly changing vantages, and the pervasive presence of the atrium as referent—are recaptured in the High, however, and enhanced by the opening of the atrium wall to permit outdoor views and admit natural light. The sense of event that accompanies upward movement through the building is further heightened by the enticement of yet-unseen art glimpsed around the only-partial screening of the gallery walls overlooking the atrium.





THE PROGRAM



All spaces to be considered for project shall be categorized as Public, Semi-Private, or Private :

PUBLIC

SQ. FEET

Exhibition Spaces -	• Mathematics	1 100
	• Forces	1 200
	• Microcosm	1 200
	• Waves	1 500
	• Body Human	1 000
	• Exhibit Workshop	550
Entry / Foyer	• coat check / information / ticket booth	2 500
Theatrette	• 30 Person	250
Restaurant / Café		500
Gift Shop		480
Restrooms		400

SEMI-PRIVATE

Theatre	• 150 Person	1 800
Restaurant		1 625
Kitchen		900
Restrooms		400

PRIVATE

Offices	• Director	200
	• Reception / Business Department	300
	• Operations / Exhibits	300
	• Public Relations	150

Conference Room

375

Custodial

• 2 x 100

200

SUBTOTAL

~ 17,000

Mechanical

7% of subtotal

1 190

Circulation

15% of subtotal

2 550

TOTAL SQ. FEET

20,740

Parking

200 cars

80,000

ZONING

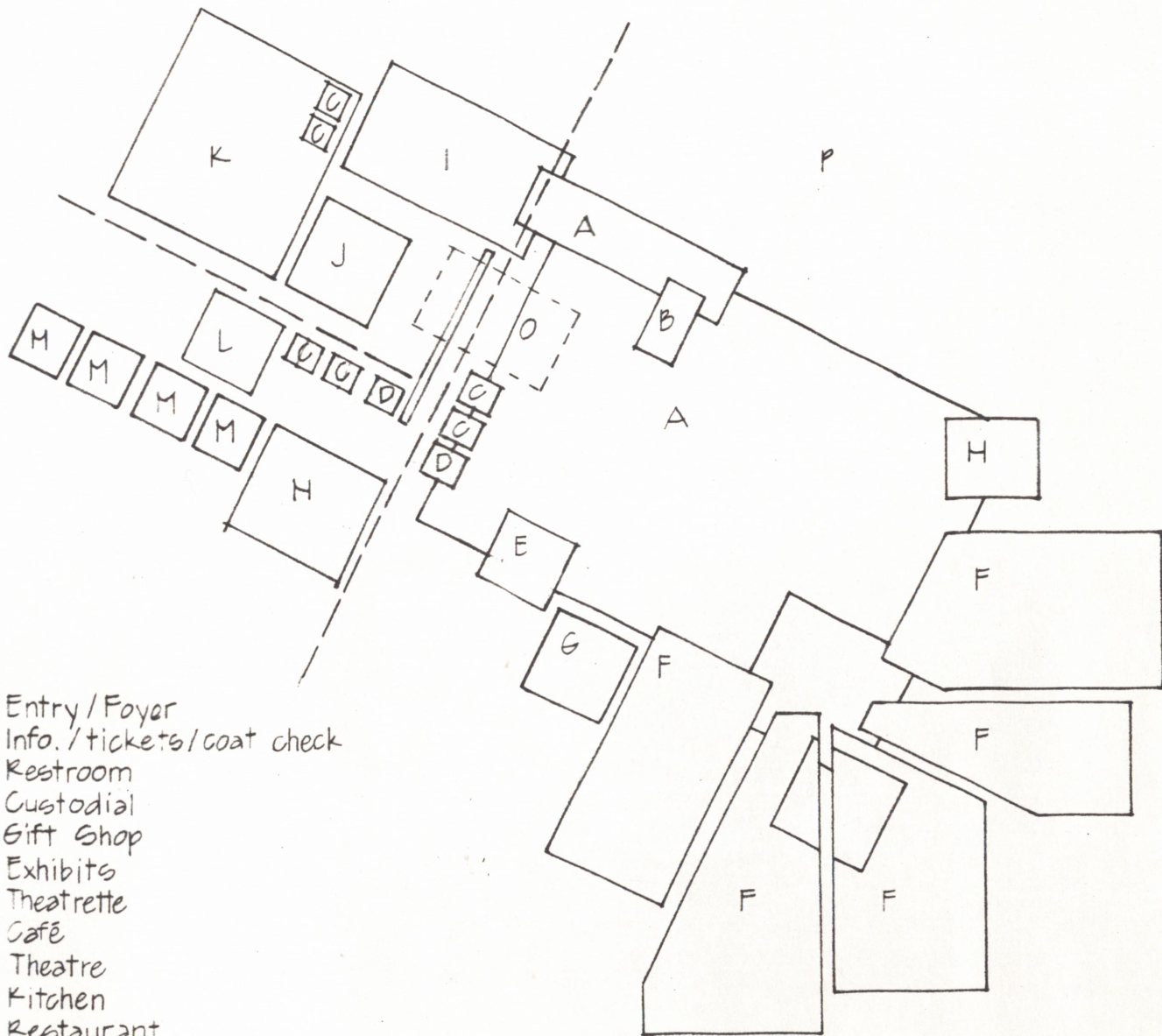


This section of the document shall describe the spaces previously outlined in the program with regard to its zoning or, where each should occur on the site, and which spaces should be adjacent. See zoning diagram (p)

- The entry should address pedestrian and vehicular approach from the northeast.
- Parking should also remain to the northeast to keep vehicles out of view from main roads around the site
- The entry to foyer area shall have several adjacencies:
 - the transition into public and private spaces
 - the coat check, information and admission
- There will be a division between the public area and the semi-private and private areas.
- Develop a well-distinguished central circulation spine that coherently leads a visitor past all exhibits and theaterette - it should be central so that there is an identifiable core - it should be oriented so that it can make use of overhead lighting
- Within the exhibition spaces, there will be an exhibition workshop where visitors can watch displays etc are being constructed (no exterior exposure)
- Exhibition spaces should rotate around the circulation core to the south - this exposes each space to a progressive, changing view of the river valley, as well as changing but strong exposure to southern sun. These spaces should be somewhat inwardly focused, so the views should be limited, and southern light should become indirect in places.
- After completing the tour, the gift shop should be adjacent to the circulation spine
- Restroom are to be located adjacent to the foyer.
- The café should also be within the foyer, but should have the potential to receive some southern exposure and southern view (deck?)
- There will be an adjacency between the entry and the separate, semi-private and private spaces. This is for security as well as the different operational hours of these spaces.
- The theatre will be closely accessible from the public space due to its potential adaptability for a number of presentations for different groups. It shall be placed to the north as it is an inwardly focused space and does not require a view. There is, potential to explore the use of northern light.
- The restaurant, for use by the general public will be located to the west to maximize view of the mountains, and the late-day sun.
- Support spaces shall be closely adjacent (kitchen, bathrooms)

- The private spaces should be able to be completely separate from the semi-private spaces.
- Offices are south-facing to maximize potential views and southern exposure
- Offices are to be adjacent to conference room, which also takes advantage of south-west views.
- Support spaces for offices to be adjacent (small lounge and bathrooms)
- A secondary drive should be located for service vehicles that facilitates loading and unloading
- Mechanical space to be centrally located below major public space.
- Custodial should be located adjacent to restrooms (both in public and private).

ZONING DIAGRAM



Entry / Foyer
Info. / tickets / coat check
Restroom
Custodial
Gift Shop
Exhibits
Theatrette
Café
Theatre
Kitchen
Restaurant
Office Lounge
Offices
Conference Room
Mechanical
Parking

FOOTNOTES

¹Anne C. Roark, "The Playground of the Museum World," The Chronicle of Higher Education 17 (1979): 8

²Victor J. Danilov, "Science and Technology Centers," Cambridge, Mass.: MIT Press, 1982, p. 29.

³"Recommendations on a Museum of Science and Technology for Hong Kong," Association of Science-Technology Centers, Washington, D.C., 1978, p. 11.

BIBLIOGRAPHY

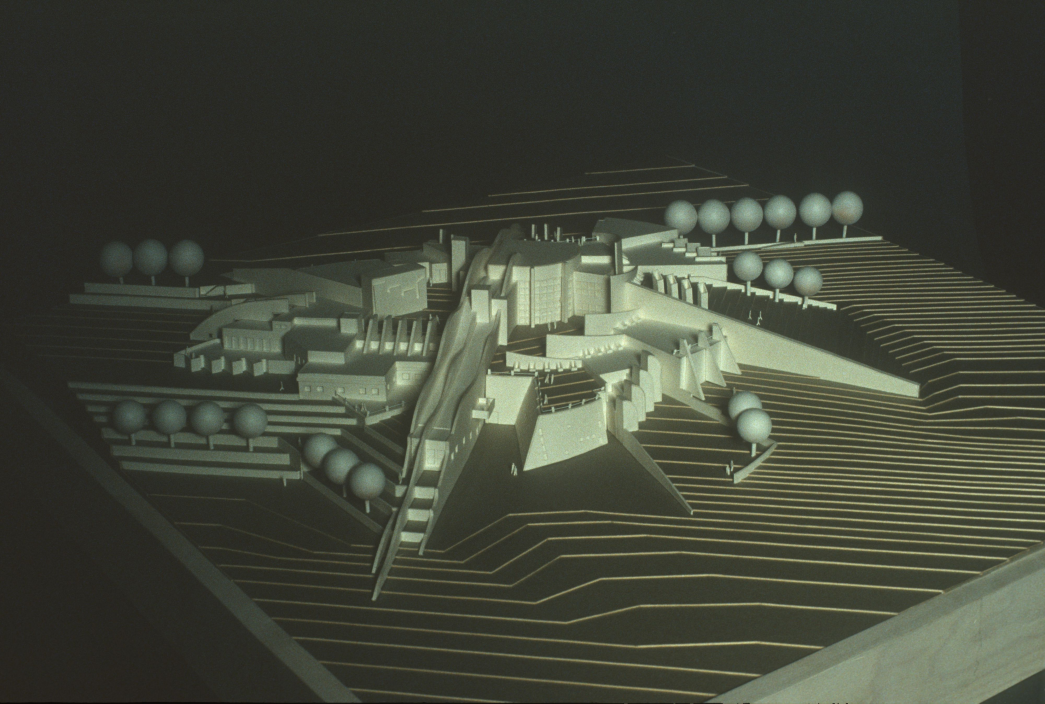
Atlanta High. Architectural Record, January 1984, pp. 118-131

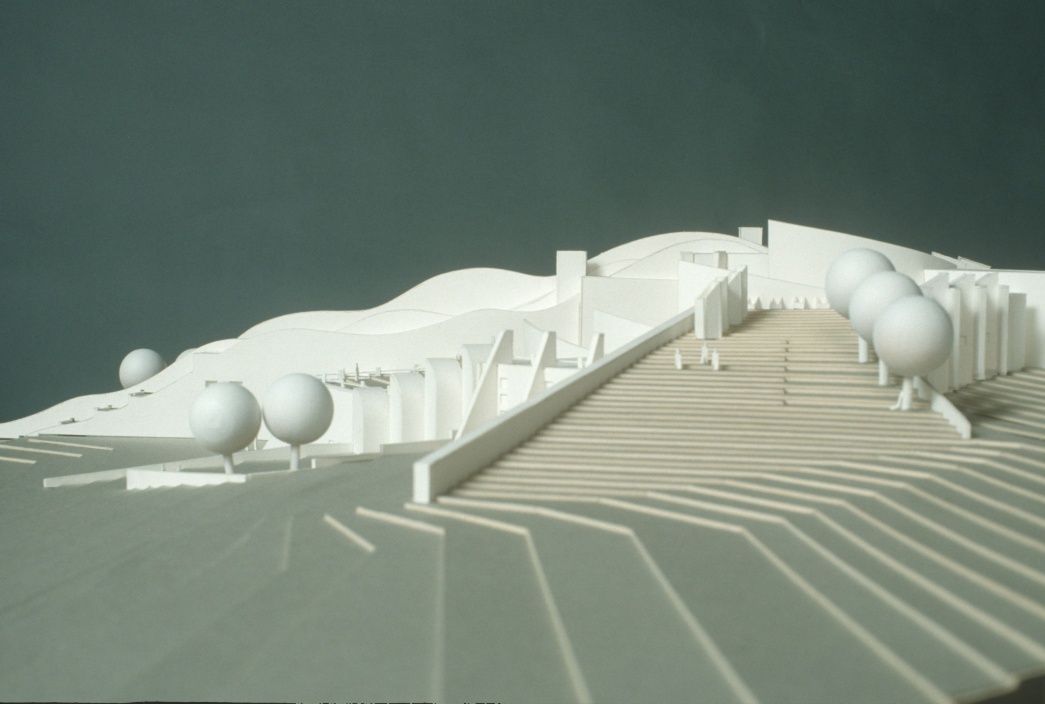
Atlanta High. Architecture Review, February 1984, pp. 20-27

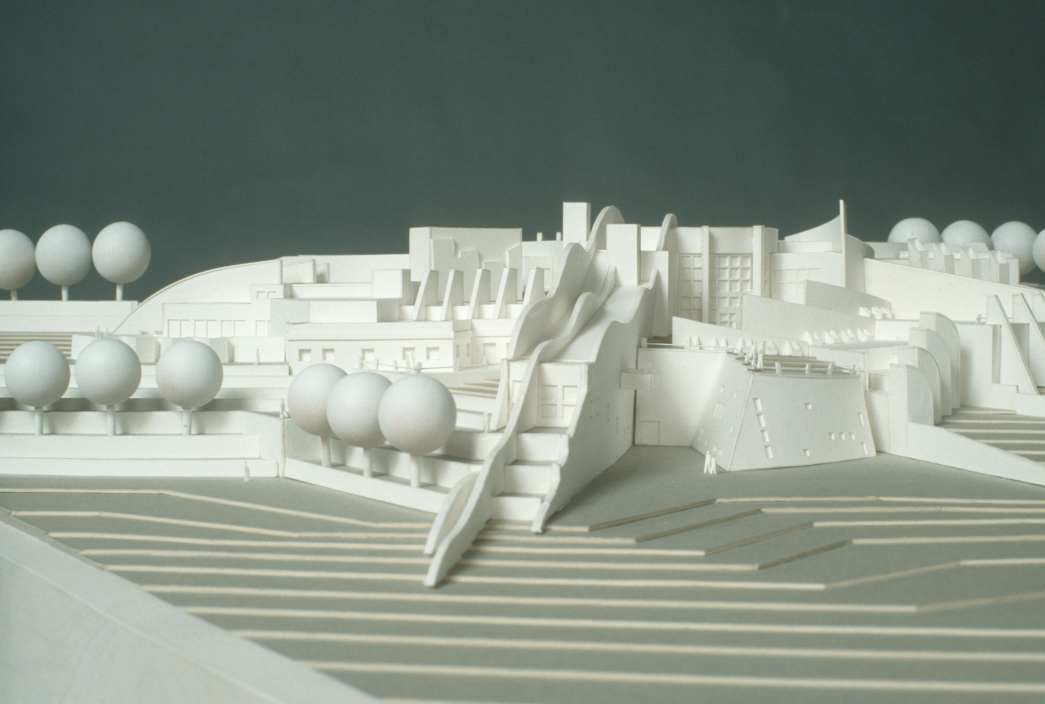
Danilov, Victor, Science and Technology Centers, London:
MIT Press, 1982

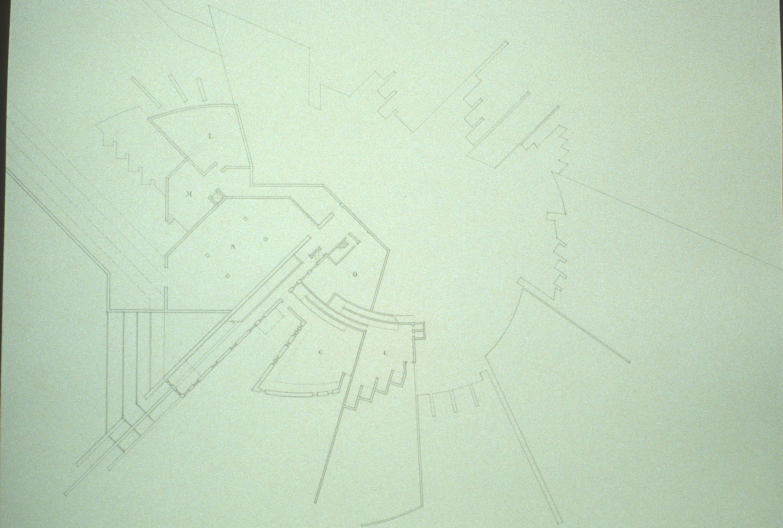
Ching, Francis, Architecture: Form, Space and Order,
Van Nostrand Reinhold Company, New York, 1979

Supplement to the National Building Code of Canada. Ottawa, Canada:
National Research Council of Canada, 1985







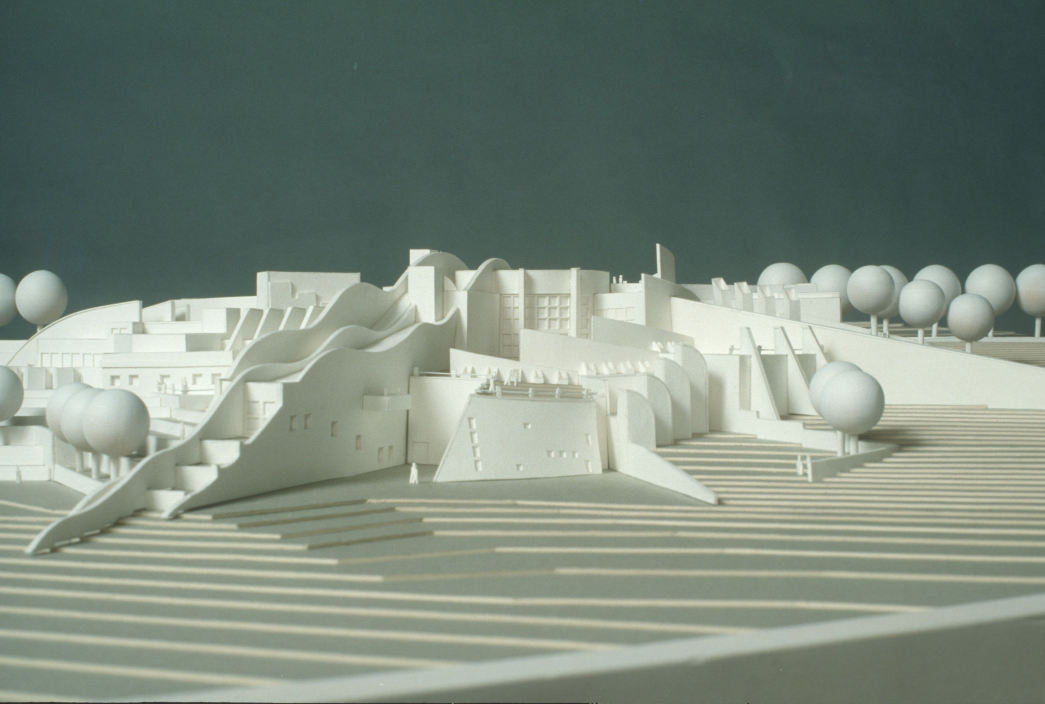


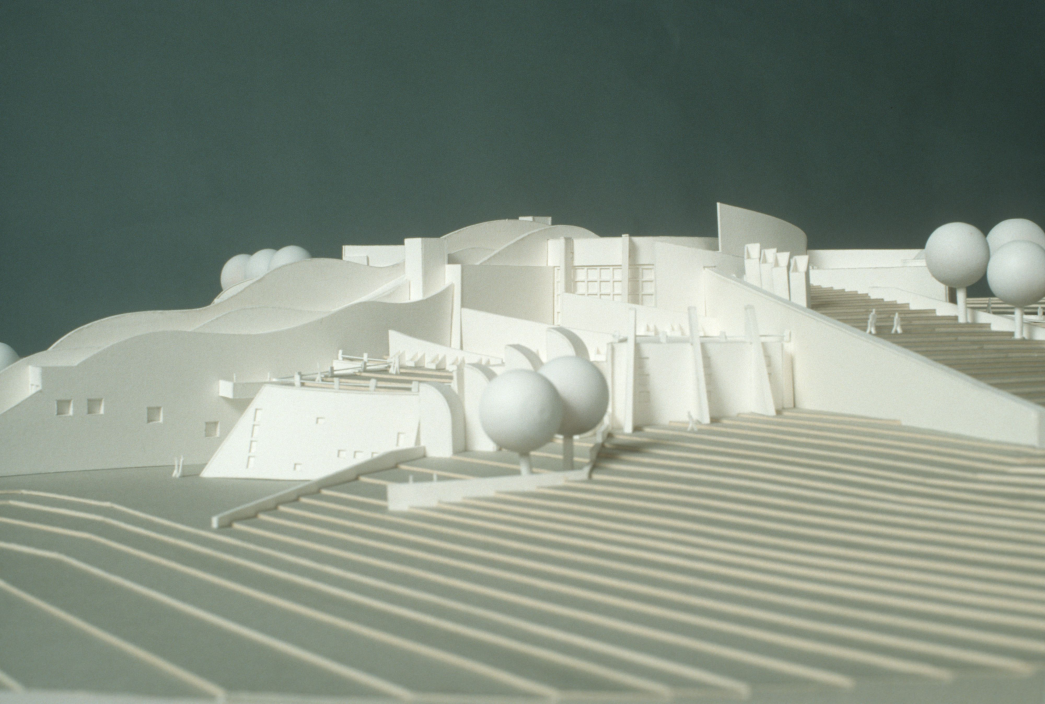
L. MECHANICAL
M. SERVICE
N. EMPLOYEE PARKING
O. VEHICLE

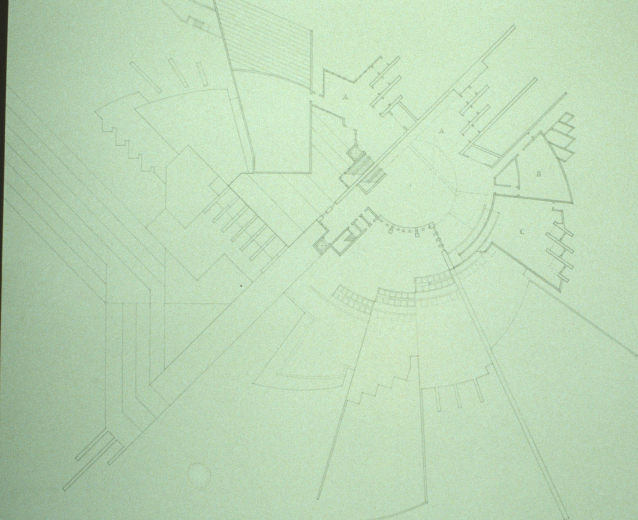


NORTH
1 - 20

LEVEL -2 PLAN





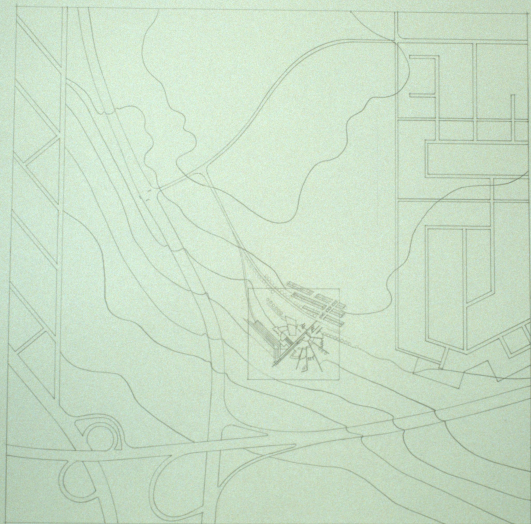


- A. ENTRY FOYER
- B. THÉÂTRE
- C. EXHIBITION



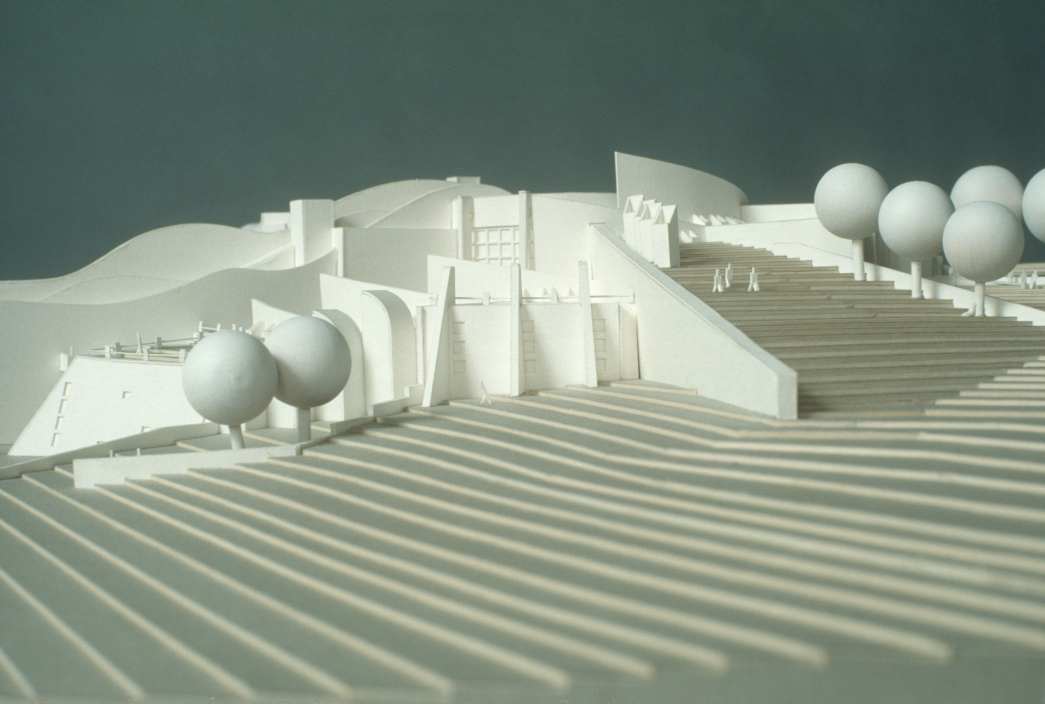
NORTH
4 30

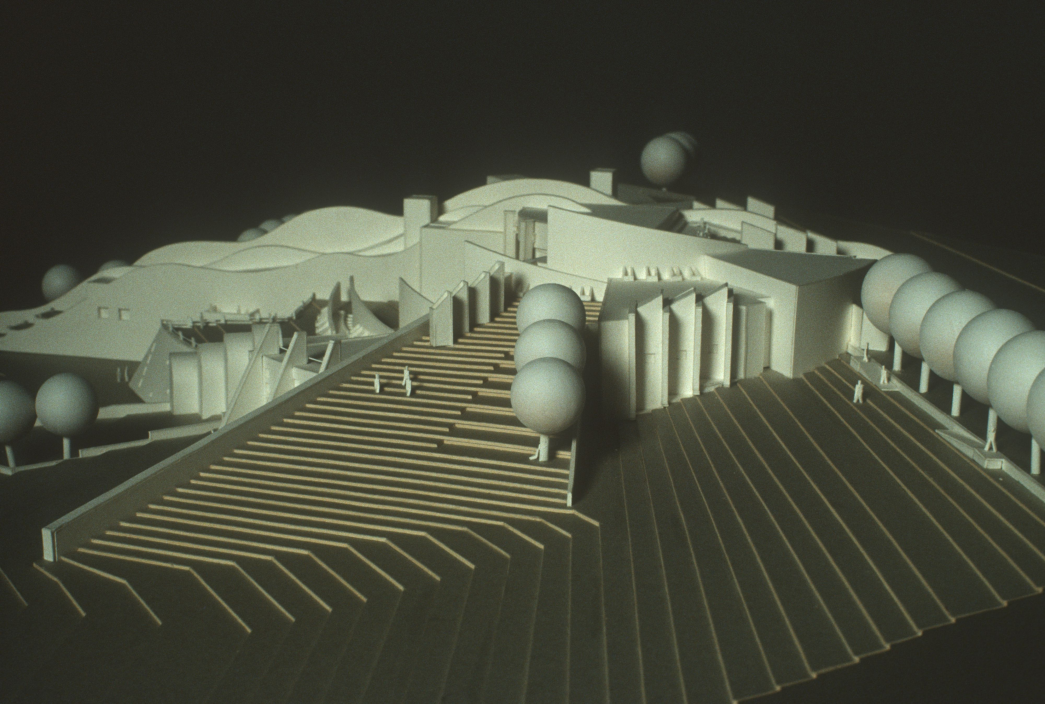
LEVEL 0 PLAN

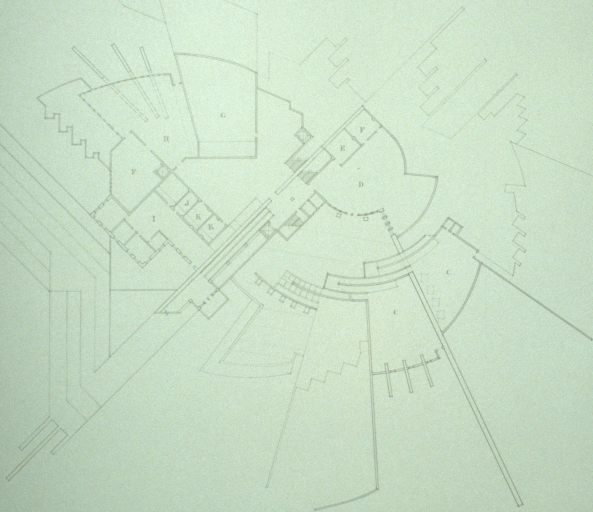


NORTH
1 / 200

SITE PLAN





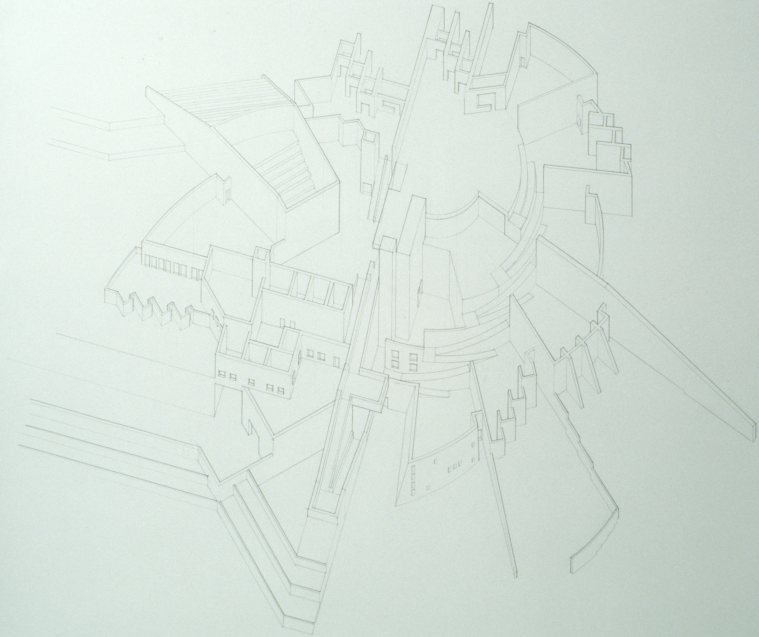


- B CAFE
- E GIFT SHOP
- F KITCHEN
- G THEATRE
- H RESTAURANT
- I ADMIN
- J CINEMA
- K RESTROOM



NORTH
1 20

LEVEL 4 PLAN



MONTANA STATE UNIVERSITY LIBRARIES



3 1762 10076238 2

