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The analogy of skin in architecture revisited

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THE ANALOGY OF SKIN IN ARCHITECTURE REVISITED

A thesis submitted in partial fulfillment of the

requirements for the degree of

MASTER OF ARCHITECTURE

by

Rene Croteau

2006

To: Dean Juan Antonio Bueno
College of Architecture and the Arts

This thesis, written by Rene Croteau, and entitled The Analogy of Skin in Architecture Revisited, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this thesis and recommend that it be approved.

Nathaniel Belcher

Marilys Nepomechie

Gray Read, Major Professor

Date of Defense: July 27, 2005

The thesis of Rene Croteau is approved.

Dean Juan Antonio Bueno
College of Architecture and the Arts

Interim Dean Stephan L. Mintz
University Graduate School

Florida International University, 2006

DEDICATION

This book is dedicated to my wife, Rosanne, and my daughter, Eva for their patience and understanding.

ACKNOWLEDGMENTS

I wish to thank Nathaniel Belcher, Marilys Nepomechie, and Gray Read for their insight and encouragement, as well as my fellow students for their unending support and assistance throughout the Masters program.

ABSTRACT OF THE THESIS

THE ANALOGY OF SKIN IN ARCHITECTURE REVISITED

by

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Professor Gray Read, Major Professor

This thesis re-examines the implications of skin as an architectural analogy. The metaphor of skin has a long history of usage in architecture, particularly regarding the building enclosure system. This thesis focuses on the role of the built skin as a place of interaction between the inside and outside, rather than a simple physical barrier. Through an examination of the structure and functions of human skin and building enclosures I investigated issues of permeability in the design of a center for cartographic research in Miami Beach. I explored layering and interdigitation as strategies for controlling the passage of air, light and views across boundaries at different scales.

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The Skin Metaphor in Architecture

The metaphor of the enclosure system as the skin of a building is commonplace in architectural parlance. A result of the separation of the enclosure system from the structural system, it certainly predates the Modernist movement of the early Twentieth Century. The iron and glass exhibition halls, railway stations, and conservatories of the early to mid Nineteenth century, many of which were developed without the involvement of architects at all, were the first structures to use new technological possibilities to eliminate massive loadbearing walls.[1] In 1860 Gottfried Semper published theoretical work based on primitive structures that explicitly called for the separation of structure from cladding.[2] The development of curtain walls suspended from cantilevered slabs by members of the Chicago School in projects like Burnham and Root's Reliance building of 1890-4 was an influential expression of the new possibilities of that separation.[3]

The division of the building's elements may not have been a unique insight of the modern movement, but it was expressed more clearly than it ever had been before. The Dom-ino House proposal by Le Corbusier in 1914-15 presented a simplified structural kit that implied an independent cladding system. By 1922, glass curtain walls enclosed the twenty four towers at the center of Le Corbusier's visionary drawings for a new city, Ville Contemporaine. In the same year, Ludwig Mies van der Rohe also proposed a glass skyscraper design: the transparent curtain wall in his Friedrichstrasse Station project was a deliberate attempt to preserve the strength and clarity that the steel frame exhibited during construction.[4] These early examples of the clear delineation between structure and enclosure developed into one of the main tenets of modern architecture.

The Cultural Interpretation of Skin

The development of the skin metaphor in modern architecture was complicated in part by the complex way in which skin was understood. Human skin, on which architectural skins were modeled, was popularly viewed as a single, thin, homogenous, and impervious boundary that shields the internal body from outside hazards, such as germs, diseases, and pathogens.[5] This understanding of skin is not false, but it does not entirely reflect the composition and function of skin, either. In fact, this interpretation became popular only after the Enlightenment. Before that time, medical practitioners viewed skin as a porous and permeable surface that indicated the still mysterious inner workings of the body through the expulsion of various bodily fluids. At that time, even excretions that are now considered pathological were viewed as positive therapeutic purifications of the body. Many treatments were therefore designed to promote these excretions, and sometimes even punctured the skin as a method of increasing its permeability.[6]

The Enlightenment, as noted, created a momentous change in the popular perception of the skin. The newly accepted practice of dissection presented skin in a quite different manner. First, it became an all encompassing membrane that had to be penetrated to reveal the inner workings of the body, rather than a surface on which those workings could be read. Figure 1.A is a reproduction of a

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[1] Schittich, Christian, ed., In Detail Building Skins: Concepts, Layers, Materials, (Basel: Birkhauser, 2001), 12.

[2] Schittich, Christian, ed., In Detail Building Skins: Concepts, Layers, Materials, (Basel: Birkhauser, 2001), 10.

[3] Curtis, William J. R., Modern Architecture Since 1900, 3d ed. (London: Phaidon Press, 1982), 46.

[4] Carter, Peter, Mies van der Rohe at Work, (London: Phaidon Press, 1999), 18.

[5] Benthien, Claudia, Skin: On the Cultural Border Between Self and World, Trans. Thomas Dunlap, (New York: Columbia University Press, 2002), 62.

[6] Benthien, Claudia, Skin: On the Cultural Border Between Self and World, Trans. Thomas Dunlap, (New York: Columbia University Press, 2002), 39.

woodcut appearing in the Historia de la Composición del Cuerpo Humano, a 1556 anatomical text by Juan de Valverde de Hamusco. In it, the role of the skin is clearly expressed as a mere wrapper for the body, rather than an integral component. This was a common theme in anatomical illustrations of that period.[7] Furthermore, because dissection only examined dead tissue, the static qualities of skin were emphasized over the active qualities. Without the living processes of excretion, the number and nature of bodily orifices seemed to become less significant. Their importance was lessened even further by the introduction of germ theory in the Nineteenth Century. Because disease was now the result of outside agents rather than the result of inner imbalances, skin became viewed as a protective shield rather than a permeable membrane.[8] Healthy skin became viewed as a smooth and unblemished surface, and treatments were designed to minimize its piercing. This was essentially the common perception of skin in the early half of the twentieth century. Although research had already begun to further unravel the complexity of skin by that point, the cultural acceptance of new interpretations moved more slowly.

A More Complete Model of Human Skin

Human skin represents the largest organ of the body in terms of both surface area and mass; it typically accounts for about one-tenth of total body weight.[9] The skin is far more intricate than a simple homogenous membrane, and the complexity of its structure is one indication of the range of functions it performs. Its role as a protective covering is the most obvious, but even this task can be elaborated further. On one level, it provides a layer of insulation against mechanical harm to the inner organs. At the same time, pigmentation in the form of melatonin blocks harmful ultra-violet radiation. Similarly, specialized elements in the skin called Langerhans cells protect against bacterial and other immunological threats. This function is further enhanced by the dense, tightly woven structure of the outer skin layers, which retards the entrance of possibly toxic liquids into the body. Perhaps even more important, this feature prevents excessive fluid loss from within the body and keeps the skin moist and pliable. The vast surface area of the skin allows it to perform an important role in the thermal regulation of the body. Dilation of the extensive network of blood vessels within the skin releases some excess heat, but the evaporative cooling of sweat is more effective in extreme circumstances. The sweat glands are also instrumental in the excretion of salts, sugar, urea, ammonia, amino acids, and many toxins. The skin is also the location of a vast neurosensory network. Specialized receptor cells register sensations of touch, pain, and heat, as well as the important haptic sense that allows the body to respond to these stimuli in a precise manner. Conversely, the skin can broadcast information as well. Blushing, blanching, sweating, and goose bumps all convey a certain degree of social communication. Finally, skin performs a number of metabolic functions, notably the production of vitamin D, which requires sunlight.

Human skin is composed of several layers that are divided into two main sections, the inner dermis and the outer epidermis. Figure 1.B shows a diagrammatic section of the layers found in human skin. The dermis is by far the thicker of the two, and it consists of two further divisions. The reticular dermis is a dense layer of connective tissue. It contains a high proportion of protein fibers such as elastin, which provides the dermis with its flexibility, and collagen, which supplies strength. The reticular dermis also provides a strong base of support for elements like glands and hair follicles. There are two important groups of glands in the reticular dermis. The eccrine glands produce sweat to facilitate evaporative cooling and to excrete certain excess substances, and the sebaceous glands

[7] Connor, Steven, The Book of Skin, (Ithaca, NY: Cornell University Press, 2004), 14.

[8] Benthien, Claudia, Skin: On the Cultural Border Between Self and World, Trans. Thomas Dunlap, (New York: Columbia University Press, 2002), 38.

[9] Zuidema, George, ed., The Johns Hopkins Atlas of Human Functional Anatomy, 3d ed. (Baltimore: The Johns Hopkins University Press, 1986), 121.

excrete oils to protect and moisten both skin and hair. The excretions of both glands also act as anti-bacterial agents.

The second layer, the papillary dermis, contains a large number of blood vessels, nerve endings, and lymph channels. Although it is thinner than the reticular layer, the papillary layer has a highly uneven outer surface that consists of a number of protrusions. These protrusions, known as papillae, form a strong interlocking bond with the epidermis. They also serve to increase the surface area between the epidermis and the rich network of blood vessels and nerve receptors in the dermis. Fingerprints are formed by the thin epidermis following the contours of these papillae.

The epidermis is composed of up to five different layers, but it is much thinner than the dermis. It can range from as thick as 1 mm on the soles of the feet to only .06 mm on the eyelids.[10] The most common type of cell in the epidermis is a keratinocyte. These cells produce a protein known as keratin that both strengthens the epidermis and also helps to retard fluid loss. Keratinocyte cells are continually being formed in the innermost epidermal layer, the Stratum Basale (also known as the Stratum Germinativum). As the new cells are formed, older cells gradually migrate outward. In the next layer, the Stratum Spinosum, the cells begin to synthesize keratin, as well as elements called Desmosomes that bind the cells together strongly. Keratin production continues in the Stratum Granulosum, and at this point the cell nuclei begin to degrade. In the next layer, The Stratum Lucidum, the Keratinocyte cells begin to flatten as the cell organs continue to decay. This thin layer is only found in thickened areas of the epidermis like the palms and soles; it is considered by some to be part of the outer Stratum Corneum, which consists of entirely dead cells that are gradually worn off by friction. The spaces between the cells in these outer layers contain glycolipids that waterproof the skin. The entire process, from cell division to the eventual shedding of the dead cells, takes about one month.[11]

At first glance, skin appears to be an even, uniform covering, but this can be deceiving. There is a great deal of variation between the thickness of the eyelid and the thickness of the skin on the heel, for instance. Furthermore, there is variation in the actual composition. Although both locations contain the same basic elements, the eyelid contains a larger proportion of collagen and elastin fibers to give it flexibility, while the heel has a greater amount of keratinocytes to protect against friction.

The Architectural Interpretation of Skin

In reviewing the composition and function of the human skin, I find a number of concepts that can be interpreted architecturally. The first of these is the heterogenous nature of skin. In the same manner that the composition of the skin varies by the function of that body part, the function of the architectural space should have some effect on the enclosure system. An office, for instance, may feature operable windows to introduce natural ventilation, while a museum gallery is sealed off completely. In architecture this variation can be extrapolated further: the human body is designed as an animated object that is constantly shifting positions and locations, as opposed to the overwhelming majority of buildings that remain in the same position. Under these circumstances, it seems reasonable to conclude that the influence of unique exterior conditions like the sun path or prevailing winds should also affect the composition of the enclosure. Architectural skins, then, should be designed to accommodate variations in both the interior and exterior of the space.

The second concept that is suggested by the human skin analogy is layering. Skin is able to fulfill such a vast amount of functions in great part because the functions are addressed by different

[10] Atlas of the Human Body, (New York: Harper Collins Publishers,1994), 116.

[11] Memmler, Ruth, et al., Structure and Function of the Human Body, (Philadelphia: Lippincott-Raven Publishers, 1996), 49.

layers. The layering of the enclosure system of a building likewise provides greater opportunities for interaction than a single cladding material. The layers can be thought of as a series of filters that refine the interaction between the interior and the exterior. In addition, composite layering of the cladding system tends to thicken the wall, providing more space for insulation and shading.

The third concept that can be derived from the model of human skin is permeability. As we have seen, human skin is not an absolute barrier between the interior and the exterior of the body as much as it is a place where the two interact. It employs a number of strategies to admit, obstruct, or modify materials and phenomena that it comes into contact with. By enumerating the functions that an enclosure system should fulfill in a specific architectural instance, a list can be developed of what phenomena should be allowed to penetrate the system, what should be blocked, and what should be modulated in some way. The composition of these functions is highly individual, and varies widely with the nature of the space being enclosed.

A closely related concept is that of interdigitation. The ripples of the dermal papillae provide increased surface area between the dermis and the epidermis, in turn allowing the transfer of oxygen and nutrients from the rich vascular network of the papillary dermis to the rapidly dividing cells of the stratum basale. In architecture this same strategy can be employed to increase the transitional space between interior and exterior. This effect in human skin is further enhanced by the sebaceous and eccrine ducts that tunnel through almost the entire thickness of the tissue. In the same manner, deep apertures of varying sizes can be carved out of a building's mass to increase its interaction with its surroundings.

These concepts, taken together, represent a strategy for creating a more permeable enclosure system. By increasing the contact between the inside and the outside of the building on a number of different levels, the connection between the two will likewise be strengthened.

Recent Precedents

Jacques Herzog and Pierre de Meuron have produced a number of projects that have investigated surfaces in novel ways. The 1993 renovation of the SUVA building in Basel, Switzerland is one example. Rather than demolishing the existing offices, a stone clad building dating from the 1950s, they decided to add an additional wing and then unify the two with an overall glass wrapper (see Figure 1.D). Like the thickened skin of the heel, the extra layer introduced an interstitial space that improves both the thermal and the acoustic performance of the façade. Figure 1.E shows the three separate bands of the outer sleeve and their function. A slight shift from the perpendicular between the new and old wings of the building allowed Herzog and de Meuron to open a full height triangular area between the two façades at the location of the existing Icarus Statue. This area, part of the ground level Ikarus Café, becomes an especially appealing place of interaction between the building and the street (Figures 1.G and 1.H).

The Italian architect Renzo Piano, like Herzog and de Meuron, has investigated the use of double façades in sustainable designs. The Debis Building, a 21 story office tower in Berlin completed in 1996 is one example (Figure 2.A). By thickening the boundary line between inside and outside even further than Herzog and de Meuron, Piano gains enough space to include a number of different layers that filter and mediate the exchanges through the building envelope. Figure 1.D is a partial wall section of the Debis building, noting the different layers and their functions. The 6 story pedestal that the tower rests on also features a full height atrium. This generous interior space helps to create a new dynamic between the interior offices and the outer world, bringing daylight and views into what would otherwise be blank walls (Figure 2.F).

The architect Steven Holl used the writings of phenomenologist Maurice Merleau-Ponty in the design of Kiasma, the Finnish Museum of Contemporary Art. The museum, located in Helsinki, was

completed in 1998. The name is taken directly from Merleau-Ponty's 1964 essay "The Intertwining – The Chiasm" in which he explored the relationship between the individual and the world. Merleau-Ponty contended that, "...the thickness of flesh between the seer and the thing...is not an obstacle between them, it is their means of communication..."[12] For Holl, this powerful image of intertwining became a generator of form: lines are developed from nature, culture and the city, and their intersections regulate the overall plan, as shown in Figure 2.H. The two main gallery wings are further designed to enfold each other in both plan and section, and the path between rooms uses gently curving ramps that seem to suggest the slippage of the visitor between the differing layers of the floors. "The body," according to Holl, "becomes a living spatial measure in moving through the outstretched, overlapping perspectives."[13]

As interesting as this approach may be, it is still more about the word 'intertwining' than it is about the bodily metaphor articulated by Merleau-Ponty. The two overlapping forms are both series of galleries with similar layouts, materials, and uses, rather than a clearly expressed interior and exterior condition. Holl actually comes closer to the spirit of the original essay in the Sarphatistratt Office Building. In this project, inside and outside are delineated by a series of scaled apertures that moderate the light and views in both directions (Figures2.J-K). The repeated use of similar materials such as the identically perforated copper and birch plywood panels in the exterior and interior imply that the thick, overlapping layers form a single membrane with differing areas of permeability (Figure 2.L).

[12] Maurice Merleau-Ponty, "The Intertwining – The Chiasm" quoted in Jonathan Hale, Building Ideas: an Introduction to Architectural Theory, John Wiley and Sons, Chichester: 2000, p. 107.

[13] Holl, Steven, Parallax (New York: Princeton Architectural Press: 2000), 38.

Design Intent

This thesis proposes the design of a building that reflects the nature of skin as a place of interaction. To achieve this objective, it will provide a number of extended threshold areas between differing conditions. The chosen building typology is that of a combined research center and public exhibition space for ancient maps. This will allow zones dedicated to a number of opposing forces: the areas open to the public versus those restricted to invited researchers and staff, the areas devoted to reprints and virtual representations versus the areas containing the actual documents themselves, and even zones dictated by the major uses of display, storage, and work. By first emphasizing the differing conditions and then introducing mediating spaces, this building will express the nature of dynamic interchange that is suggested by the metaphor of skin.

Site

The selected site is a currently vacant lot at the corner of Collins Avenue and Twenty-Second Street in Miami Beach. It is a perfect site for several reasons: first, it is located on what is known as the Collins Park Cultural Campus, a collection of cultural and educational facilities including the Bass Museum, the Miami Beach Ballet, the New World Symphony, and its immediate neighbor, the public library. Second, the location features frontage along Collins Avenue, with fast vehicular traffic, as well as the slower paced Twenty-Second Street, and provides for the possibility of a pedestrian only path between the library and the research center. Third, the site provides a reasonable area to address the intended program without either towering over its neighbors or underutilizing its space and destroying the street frontage. Because the Cultural Campus neighbors have been either built or renovated recently, the chance that its context will be radically altered by development in the near future is minimal. Fifth, the location of the park ensures that the site will always have a conceptual

link to the ocean. This is appropriate for a cartographic center since so much of the history of mapmaking has been directly spurred by the exploration of the seas.

There is one final reason that I chose this site. In analyzing the relationship between the buildings comprising the cultural campus and the park, I realized that the park itself is the kind of mediating space that I envisioned within my project. The park runs from the Atlantic Ocean, the ultimate expression of the natural environment, to the lining of institutions representing the built environment without entirely belonging to either. It is a place where people walking to the beach can pause for a few minutes to admire an outdoor sculpture, or where visitors to the library can relax in the sunshine before returning inside again. Further analysis showed that many of the nearby buildings provided a kind of semi-public transitional space, typically carved out at the corners. These spaces allow a more dynamic interaction with their surroundings. Groups can assemble before entering a cultural institution, for example, or hotel guests can enjoy a meal while simultaneously watching and being watched by passersby. The site enhances the skin metaphor by repetition at differing scales.

Program

This project constitutes the design of a cartographic research center. Its main functions consist of the following:

Archives - space devoted to the storage and protection of rare maps

Climate controlled vault.....500 sq. ft.

Staff area for preservation and reproduction of original maps.....500 sq. ft.

Research Area – space reserved for officially designated guests to conduct studies

Work area for the examination of original maps .....850 sq. ft.

Study area for related activities not involving the actual documents.....1000 sq. ft.

Technical library, open to both researchers and the public.....1000 sq. ft.

Public Areas – space available to promote interest in cartography within the greater community

Entry lobby.....800 sq. ft.

Main gallery, for exhibitions of reproductions and virtual images only.....800 sq. ft.

Protected viewing room, for displaying the originals.....400 sq. ft.

Miscellaneous Areas –

Staff office space.....1000 sq. ft.

Handicapped accessible restrooms.....400 sq. ft.

Mechanical areas.....500 sq. ft.

Balconies, for relaxation breaks.....200 sq. ft.

Total Area.....7,950 sq. ft.

plus projected additional 25% for circulation.....1,987.5 sq. ft.

Total projected square footage.....9,937.5 sq. ft.

Conclusion

The goal of this thesis project is to envision new approaches to architecture from the metaphor of skin. From the analysis of skin, five conceptual strategies were derived. The first was to differentiate the skin to accommodate varying functional requirements. This is achieved in a number of ways: the zoning of real versus virtual dictates not only two separate enclosure systems, but two differing structural systems as well. On a more subtle level, the wide horizontal louvers of the upper floors are transformed into a finer dimensioned vertical system on the first floor, where the cantilevered slab above provides shade. The second strategy noted was layering. Again, this was accomplished on a number of levels. Not only were certain walls developed with a multi-layered enclosure system, but also the architectural spaces themselves served as a series of filters that gradually provided more protection from the open, sunny space of the park. The third concept derived from skin was permeability. One way this is addressed is in the zoning of user groups. An example is the difference between the wide, inviting main stair located in the center of the atrium space and the smaller stair serving researchers and employees located in the corner of the library. The final conceptual approach noted was that of interdigitation to promote exchange across boundaries. Once again, this is accomplished on a number of levels: the many open decks overlooking the atrium space help to promote interaction between user groups, for instance. The two balconies, one carved into the building and one attached, both use the process of interdigitation to create areas where occupants can momentarily escape from their routines and experience either the serenity of the park or the activity of Collins Avenue. The four conceptual underpinnings of the preliminary analysis have all been addressed, as have the uniqueness of the site, and the particularities of the program.

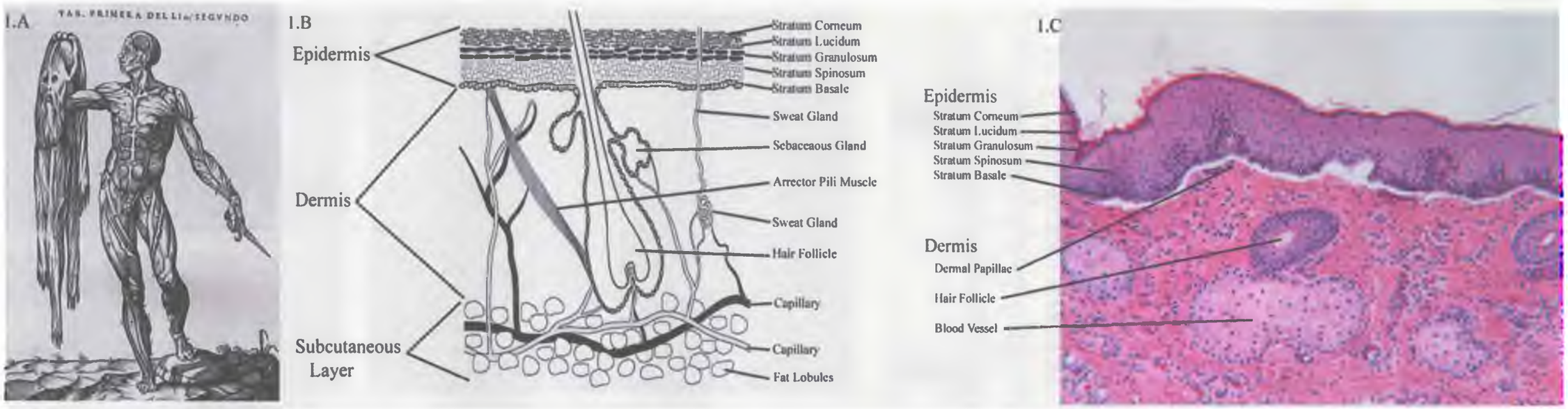
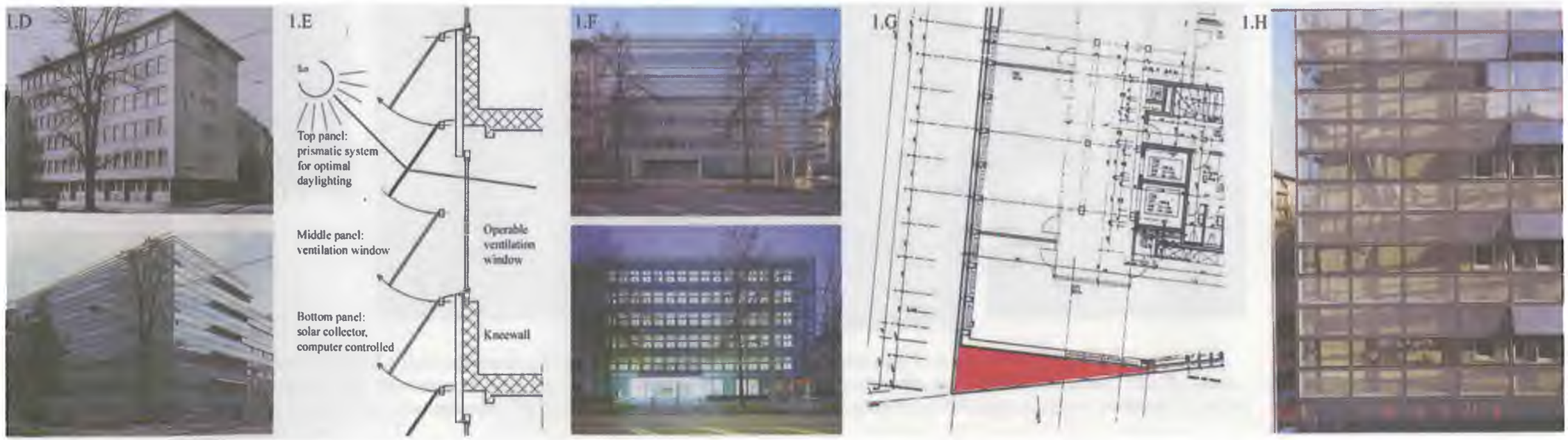
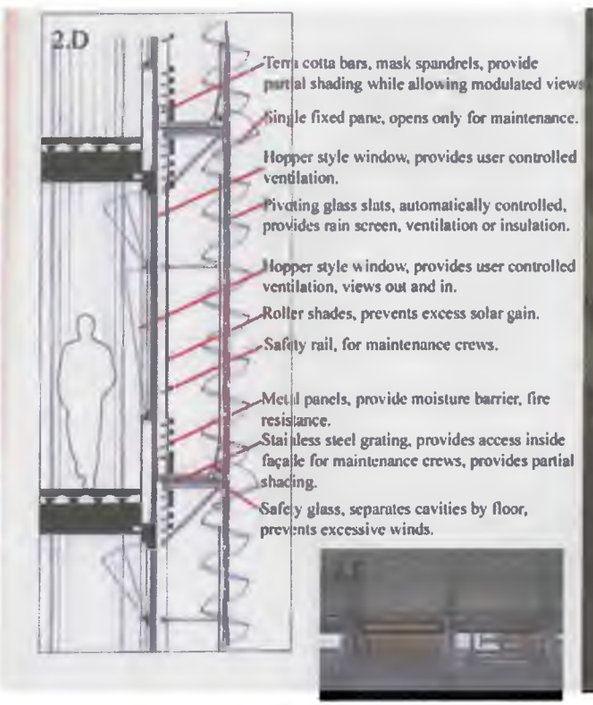
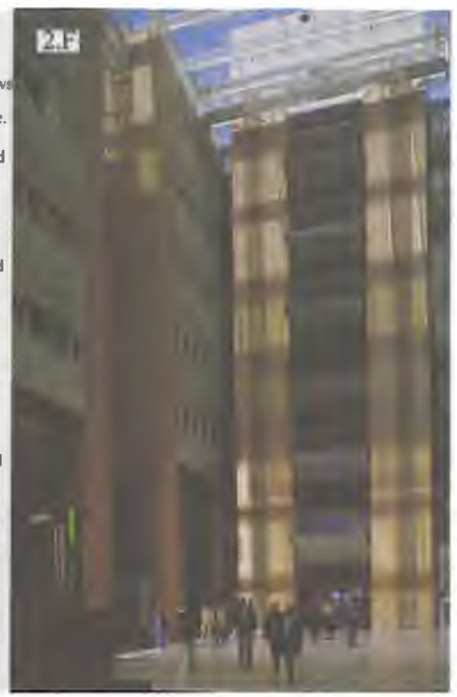


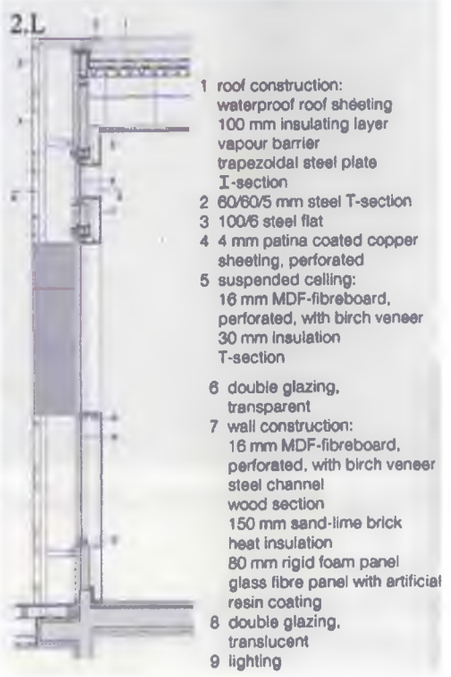
Figure 1.A: Illustration used as the frontispiece of a Sixteenth Century text on anatomy. Figure 1.B: Diagrammatic section of human skin showing not only the multiple layers, but also some of the passageways that penetrate through various layers and provide areas of interaction. Figure 1 C: Photograph of section of actual human skin (dyed purple for added clarity). This image demonstrates the uneven, non-homogeneous, and dynamic naure of actual skin. Figure 1.D: A set of photographs of the SUVA building in Basel, Switzerland, taken before and after the renovations designed by Hertzog and de Meuron. Figure 1.E: A wall section illustrating the three separate bands of glazing and their relationship to the existing sandstone envelope. Figure 1.F: A set of day and night photographs illustrating the dramatic shifts in reflectivity and transparency possible. Figure 1.G: A partial plan highlighting in red the expanded interstitial space in the southwest corner of the building, where the existing Icarus statue is attached. Figure 1.H: A photo of this corner condition. Unfortunately, it does not also show the ground level, where the Café Ikarus uses the space between the new and old envelopes for streetside seating.



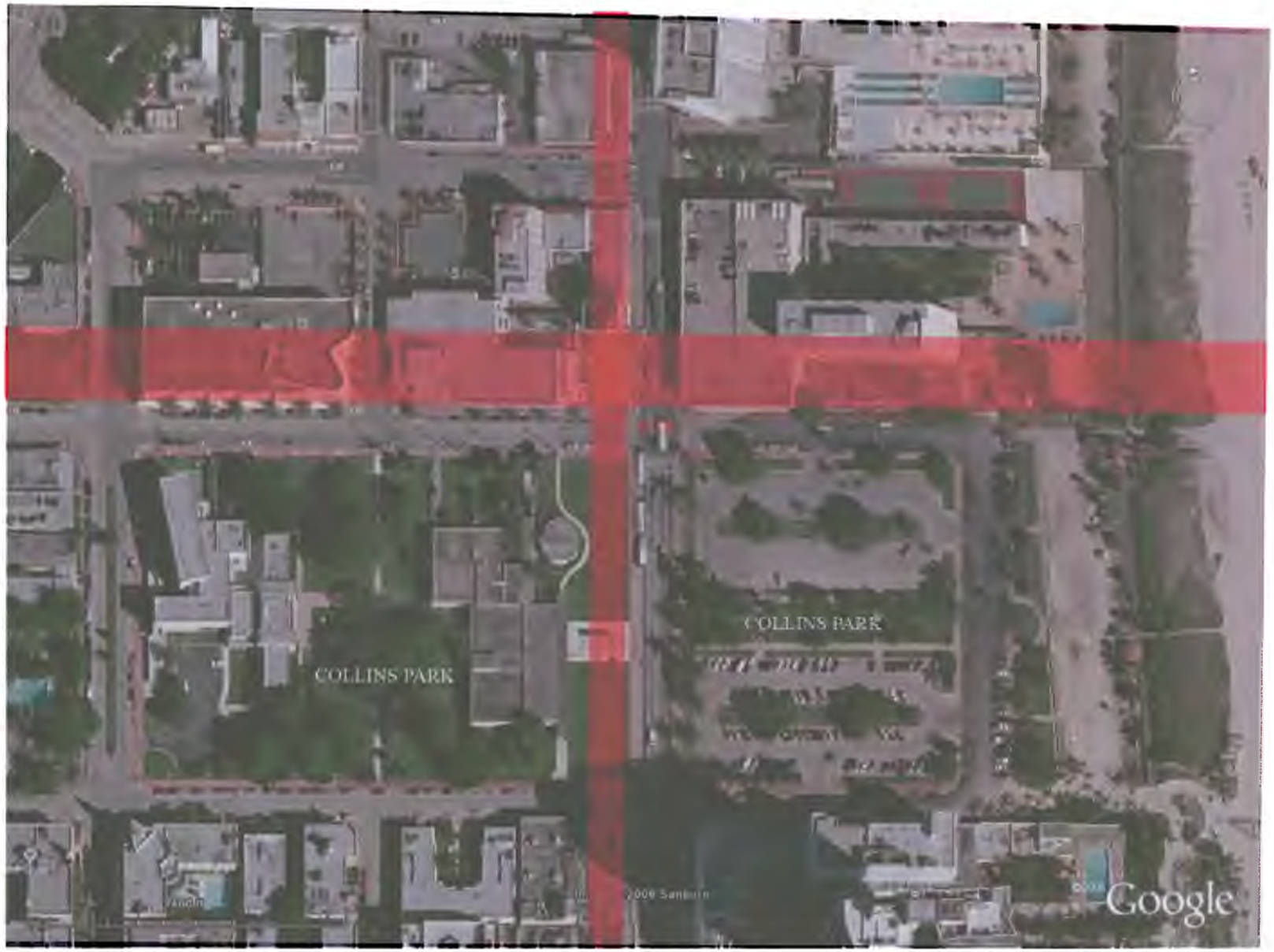




2.A - F: The Debis Building. 2.A: Exterior view of the 21 story tower and 6 story pedestal. 2.B: Ground floor plan, showing atrium highlighted in red. 2.C: Closeup of cladding on upper floors of the pedestal. The terra cotta bars are designed to blend in with the existing traditional brick facades in the area. 2.D: Wall section through one floor at this level. 2.E: Detail of interior wall facing atrium highlighted in 2.B. 2.F: Interior view of six story atrium.



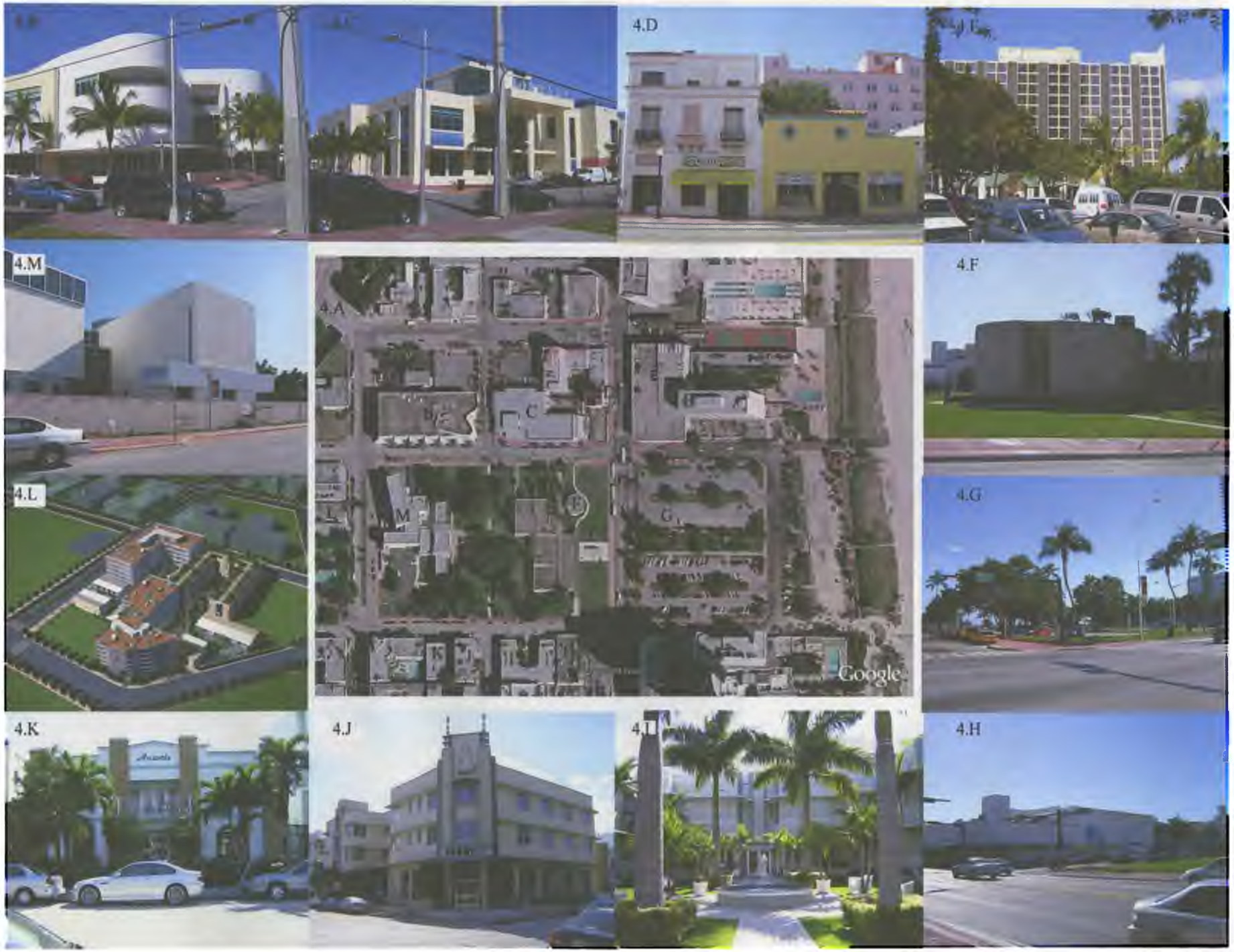
2.G: A process model of the Finnish Museum of Contemporary Art. 2.H: Site analysis showing the three interweaving lines representing culture, nature, and the city. 2.I: The sinuous curving ramps of the main entrance. 2.J: The exterior of the Saarphastratt Office Addition. 2.K: The interior, showing the varying levels of transparency. Figure 2.L: A wall section detailing the construction of the building as a series of perforated layers that link inside and out.



Figures 3.A - D: Satellite Photographs indicating site location and its proximity to the Atlantic Ocean, the beach, and Collins Park.

SITE DATA:

Address: 2200 - 14 Collins Avenue. Gross Lot Size: 90'0" x 50' 0", 4,500 Square Feet. Primary Zone: 6600 Liberal Commercial. Current Land Use: Vacant Land. Setbacks: Collins Avenue Frontage: 0, 22nd Street Frontage: 0, side on Collins Avenue: 0, side on 22nd Street: 0. Buildable Footprint: 4,500 Square Feet. Floor Area Ratio: n/a. Height Restrictions: 100'0'. Parking Requirements: none.



Figures 4.A - M: Context Photographs

4.A: Keyplan for Photographs

4.B: Miami City Ballet

4.C: Miami Beach Regional Library

4.D: Retail shops adjacent to site

4.E: Holiday Inn Hotel, slated to be replaced by the W Condo-Hotel, a 25 story, 511 unit building

4.F: Rotunda in Collins Park

4.G: View of Ocean through Park from Site

4.H: Two Untenanted Sites, including the former Wolfie's, a landmark eatery for years

4.I: The South Beach Hotel, 51 Rooms

4.J: The Abbey Hotel, 50 Rooms

4.K: The Ansonia, one of two next door properties purchased by the New World Symphony to house visiting musicians

4.L: The Artecity Residential Village, 185 condominium units in a complex of new and restored buildings including the landmark Governor's Hotel.

4.M: The Bass Museum of Art

5.A

5.B

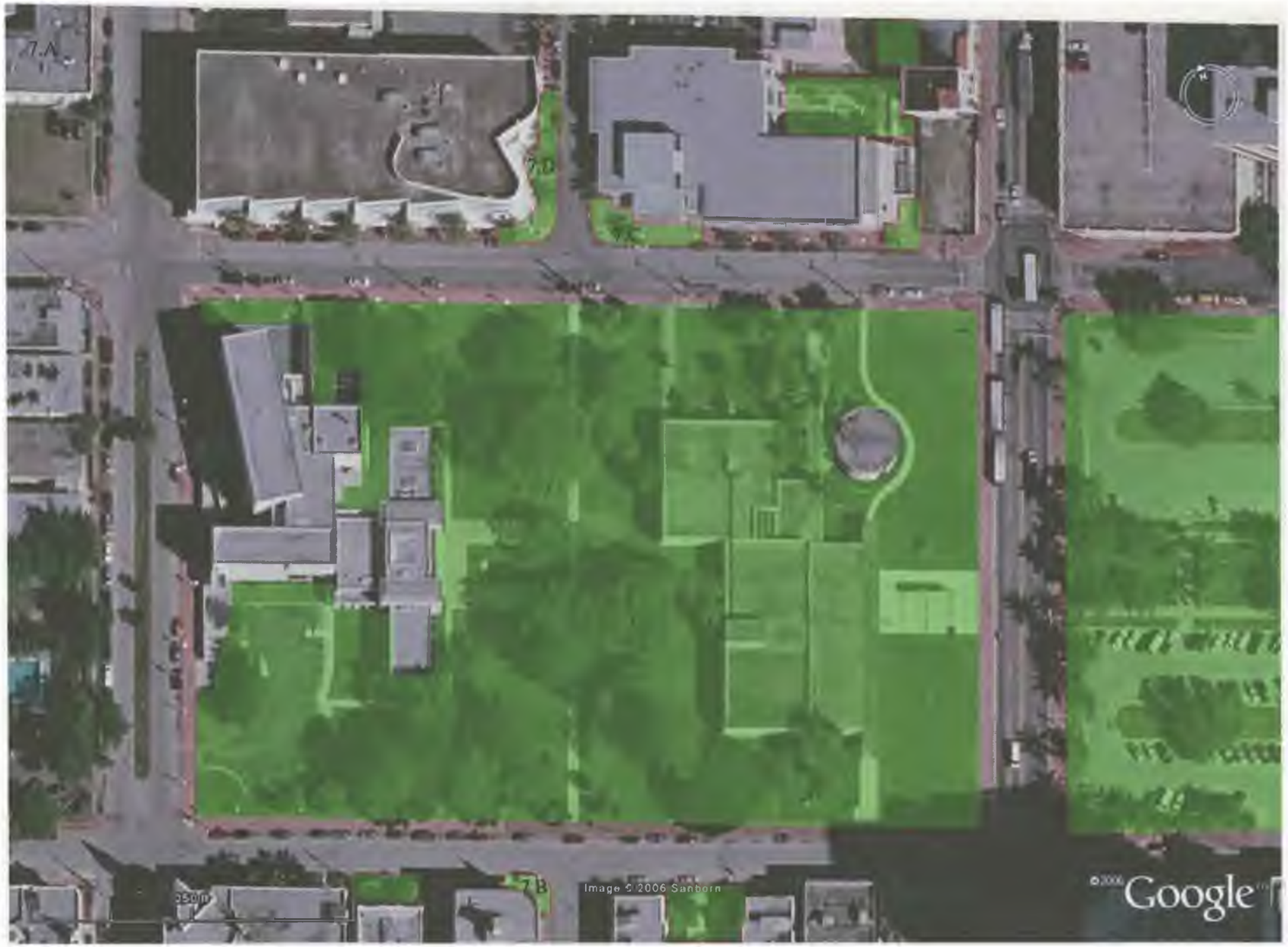
5.C

Figure 5.A : Traffic Analysis. This map shows vehicular traffic patterns in the vicinity of the site. Collins Avenue and Dade Boulevard, shown in red, experience the heaviest sustained traffic. The streets shown in orange bear a slightly lesser volume, while those colored yellow bear the least use. This analysis is based on the subjective evaluation of the author during five site visits, and may not reflect seasonal variations, or the unusual traffic sometimes produced by special events at the convention center or elsewhere.

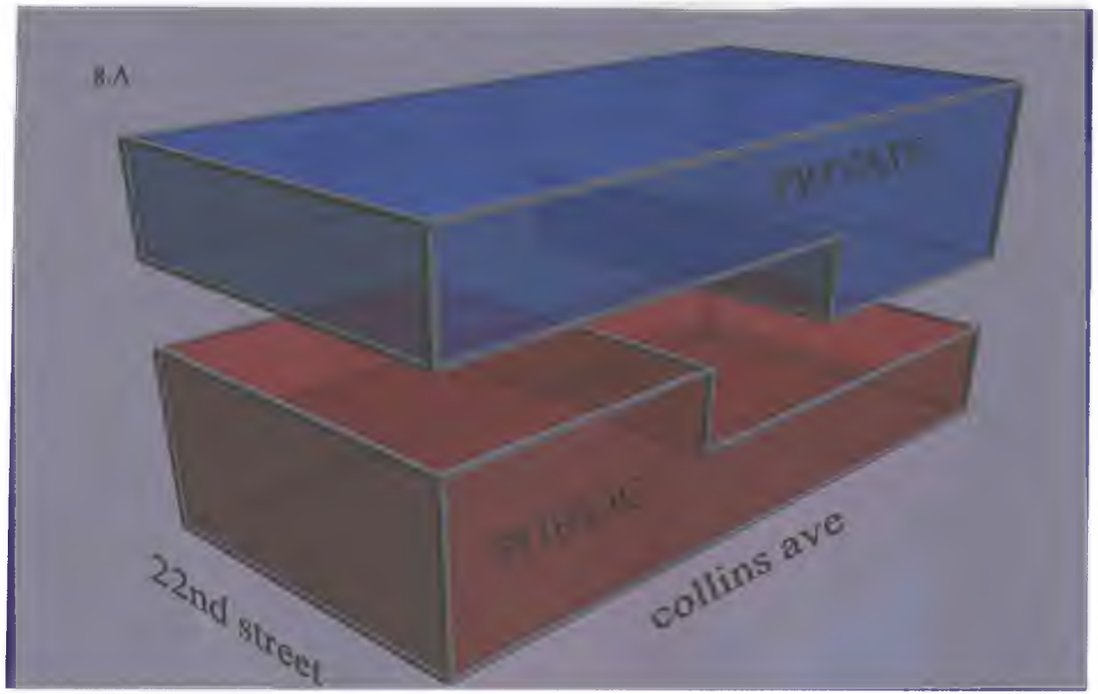
Figure 5.B : Land Use Map. This map illustrates the predominant use of the neighboring buildings. Those indicated in blue have a cultural and/or educational aspect, those in green are residential, those in yellow are hospitality- related, and those in red are retail and commercial properties.

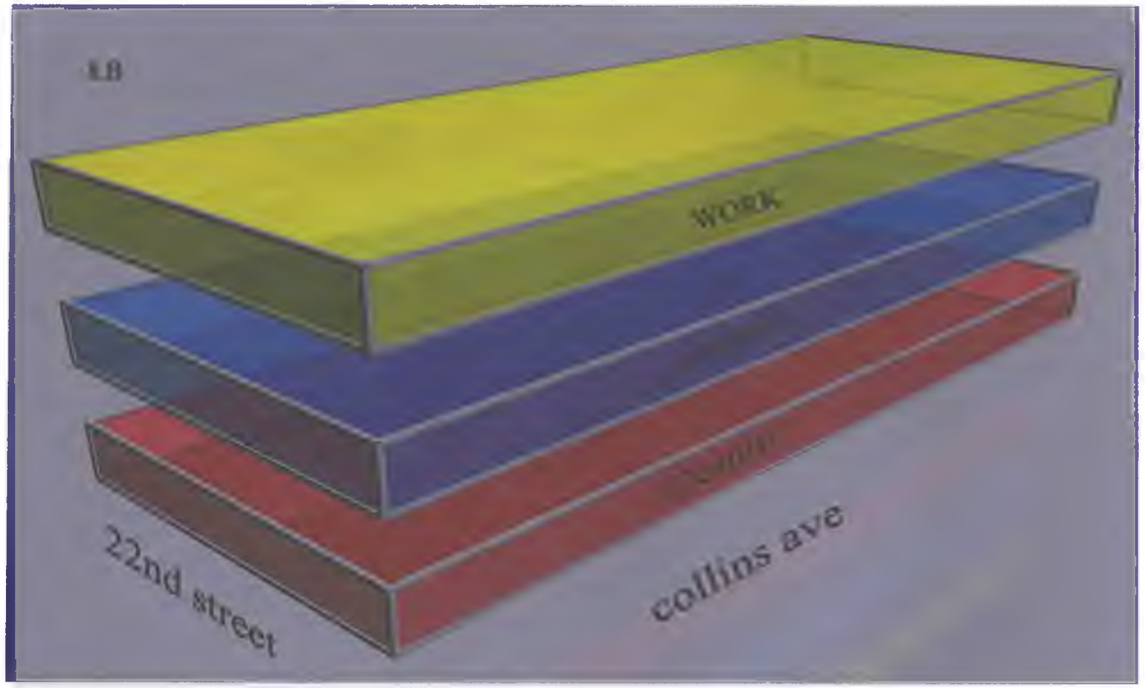
Figure 5.C : Collins Park Renovations Diagram. The replacement of the old Miami Beach Branch Library by the new Robert Stern designed facility across the street has given the city an opportunity to reinterpret the park space. Although the planning process was just beginning at the time this thesis was developed, there were a few key points that seemed likely. 1. The old library is slated for demolition. 2. The rotunda will be retained, however. 3. Parking will be eliminated, and replaced by a city parking garage to be built nearby. 4. The new area will be landscaped, and will include some performance areas.

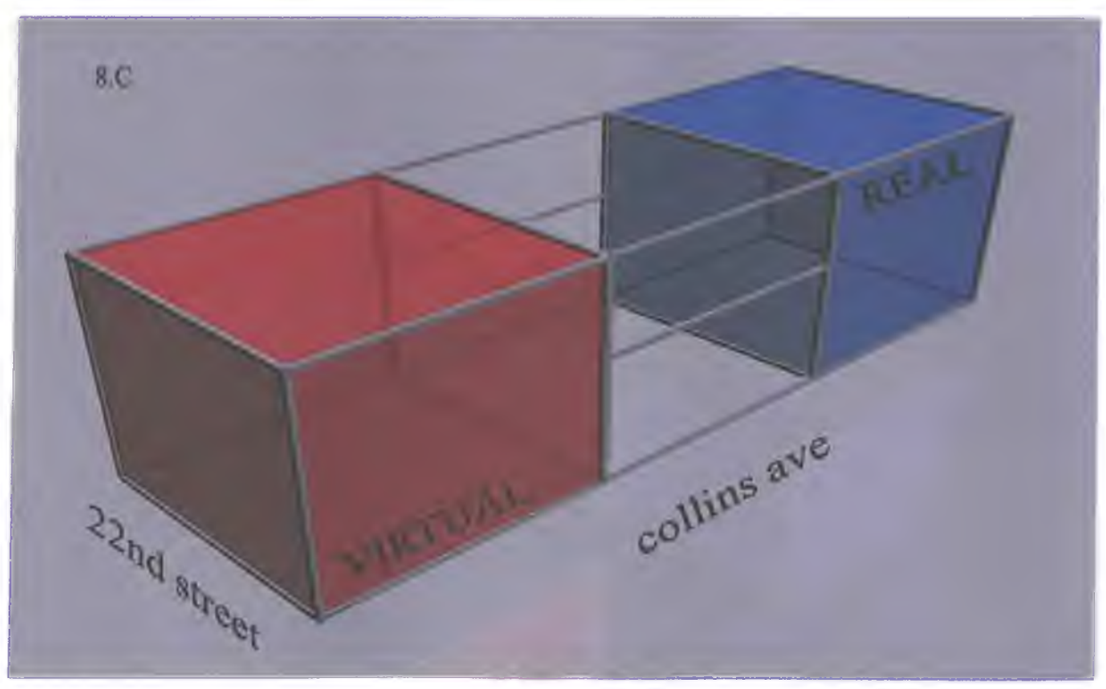
Figure 6.A : Site Analysis. The major attractions of Miami Beach consist of two fundamentally diffferent groups.The first are features of the natural environment, the sun, sand and sky of the beach itself (Figure 6.B). The second are features of the built environment, urban areas like the shops of Lincoln Road, and the restaurants, bars, and clubs of South Beach (Figure 6.C). The boardwalk acts as a boundary between the two, reinforced by the massing of high-rise hotels and condominiums. Collins Park represents a threshold condition between the two, and the planned removal of the old public library as well as the parking lot will strengthen this role. The solid block of unbuilt oceanfront provides an opportunity for interchange between the natural and the cultural, allowing library patrons, for instance, the opportunity to step outside for a break and enjoy the views while beachgoers can pause to enjoy outdoor sculpture in the park (Figure 6.D).

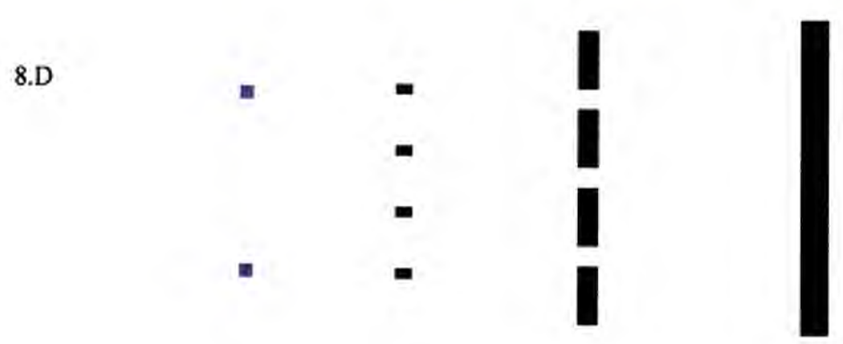


Figures 7.A - D: Site Analysis. At first glance, the boundaries of the public park space seem to be clearly demarcated by the roadways. But study of the built environment lining the park reveals a number of enhanced transitional areas. Small courtyards and greenspaces are the obvious examples, but many of the nearby buildings also feature carved out threshold areas. The Abbey Hotel, for instance, provides outdoor dining and emphasizes its corner entrance in that way (Figure 7.A). The new public library uses the same strategy for its main entrance (Figure 7.B). Likewise, the Miami Ballet provides a gathering spot for those awaiting performances (Figure 7.C). The balcony also serves to strengthen the connection to the park during breaks and intermissions.









Figures 8.A - D: Zoning diagrams representing the organizing strategy behind the project's layout. Figure 8.A depicts the division of spaces into those freely accessed by the general public and those limited to employees of the center and invited guest researchers. Figure 8.B represents the typical activities found on each floor: the ground floor is devoted primarily to display space, the second floor contains both the rare documents vault and the stacks of the small technical library, and the third floor provides work areas for the researchers as well as office space for the employees. Figure 8.C illustrates the dynamic between the carefully maintained real maps, and their reproductions and electronic facsimiles. Not only the archives, but also the exhibition space for the originals and the work areas follow this layout. Finally, Figure 8.D represents the implication of Figure 8.C: that light must be filtered by a series of increasingly impermeable layers from the direction of the park back to the shared partywall to the North.

Figure 9.A: Site Plan Showing Roof Elevations. Setbacks on all sides are 0'0", equal to the property line.

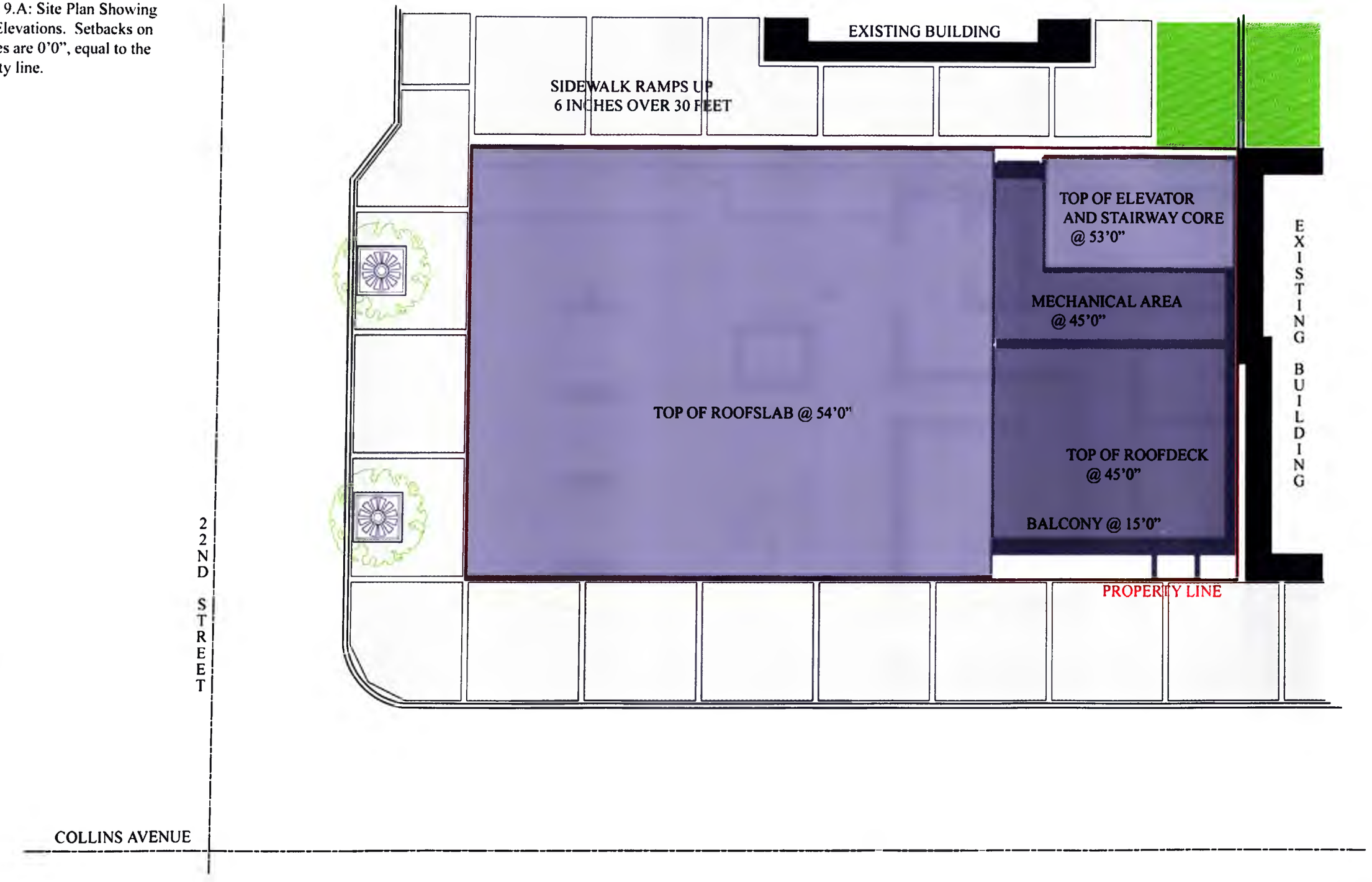


Figure 10: Ground floor plan.
1. Front gallery
2. Double height atrium with two public entrances.
3. Elevator lobby
4. Protected gallery for original documents
5. Wheelchair accessible restrooms.
6.Mechanical room.

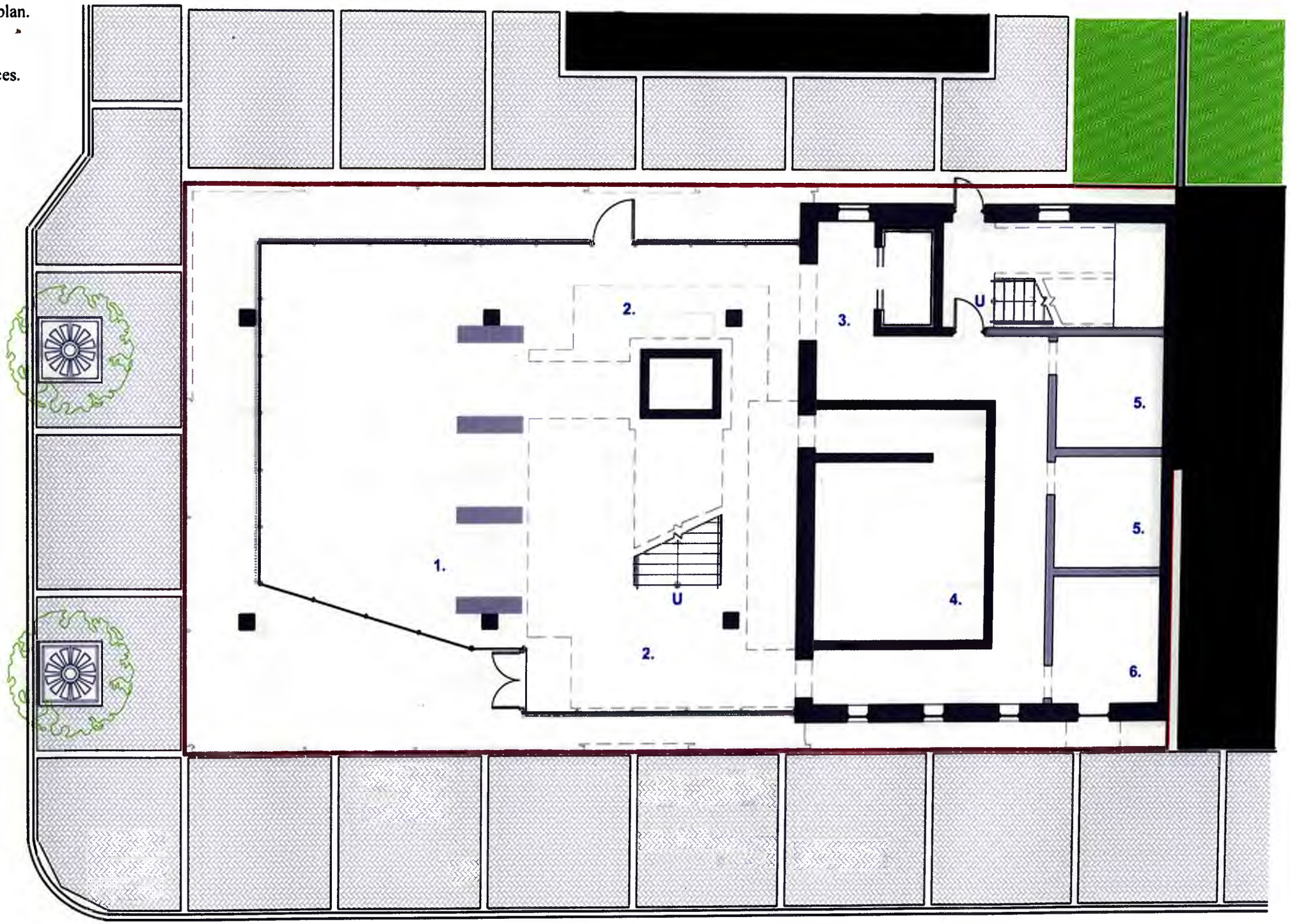


Figure 11: Second floor plan.
1. Technical Library.
2. Double height atrium,
(open to below).
3. Rare map storage vault.
4. Conditioned map drawers.
5. Elevator lobby.
6. Employee only workspace.
7. Employee only
computer stations.

Figure 12: Third Floor Plan.
1. Balcony (open to below).
2. Employee office area.
3. Opening to atrium below.
4. Conference areas and
computer stations for researchers.
5. Elevator lobby.
6. Work tables for maps.
7. Handicapped accessible restrooms.

Figure 13.A

Figure 13.A: Collins avenue elevation. This image reveals the horizontal, lightweight, and tectonic qualities of the park side and the vertical, stereotomic, and visually heavy massing of the archives side. The narrow slit windows of this portion of the building help to imply the loadbearing nature of the walls, while the varying levels of transparency in the other side reveal how all weight is suspended from six columns. The horizontal louvers on the second and third floor of the park side seem to form a suspended, horizontal rectangle of equal proportions to the shape of the stoneclad volume, further enhancing the effect of an empty, lightweight, hovering volume next to a heavy, solid mass rooted to the ground.

Figure 13.B

Figure 13.B: 22nd Street elevation. This view North from Collins Park demonstrates the layered transparency effect of the south facade. The varying distances of the planes formed by the two louver systems, the structural grid, and the glazing provide a sense of depth. Generous cutouts for the main entrance and the balcony seem to slice through these layers, increasing the feeling of interaction between inside and outside.

Figure 13.C

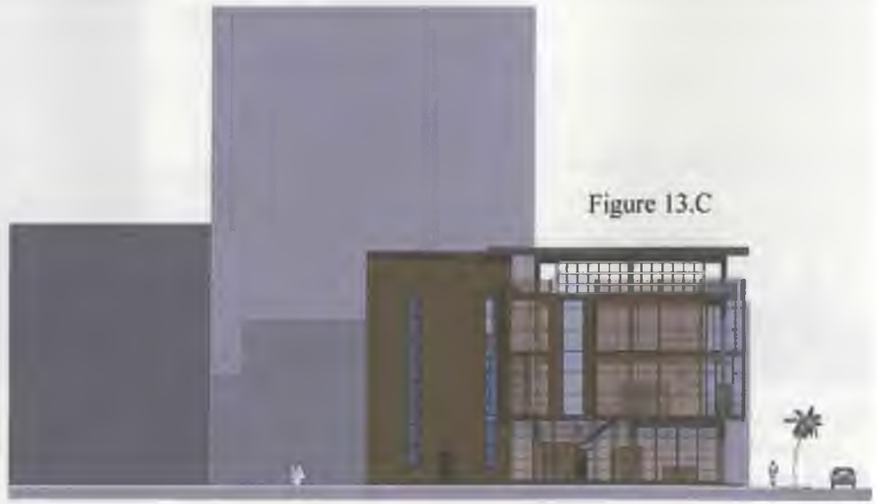
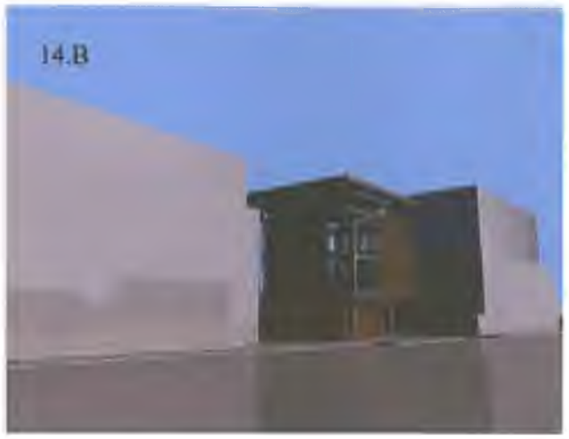
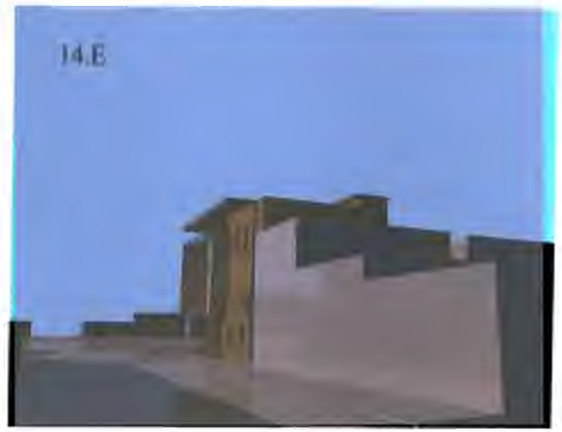


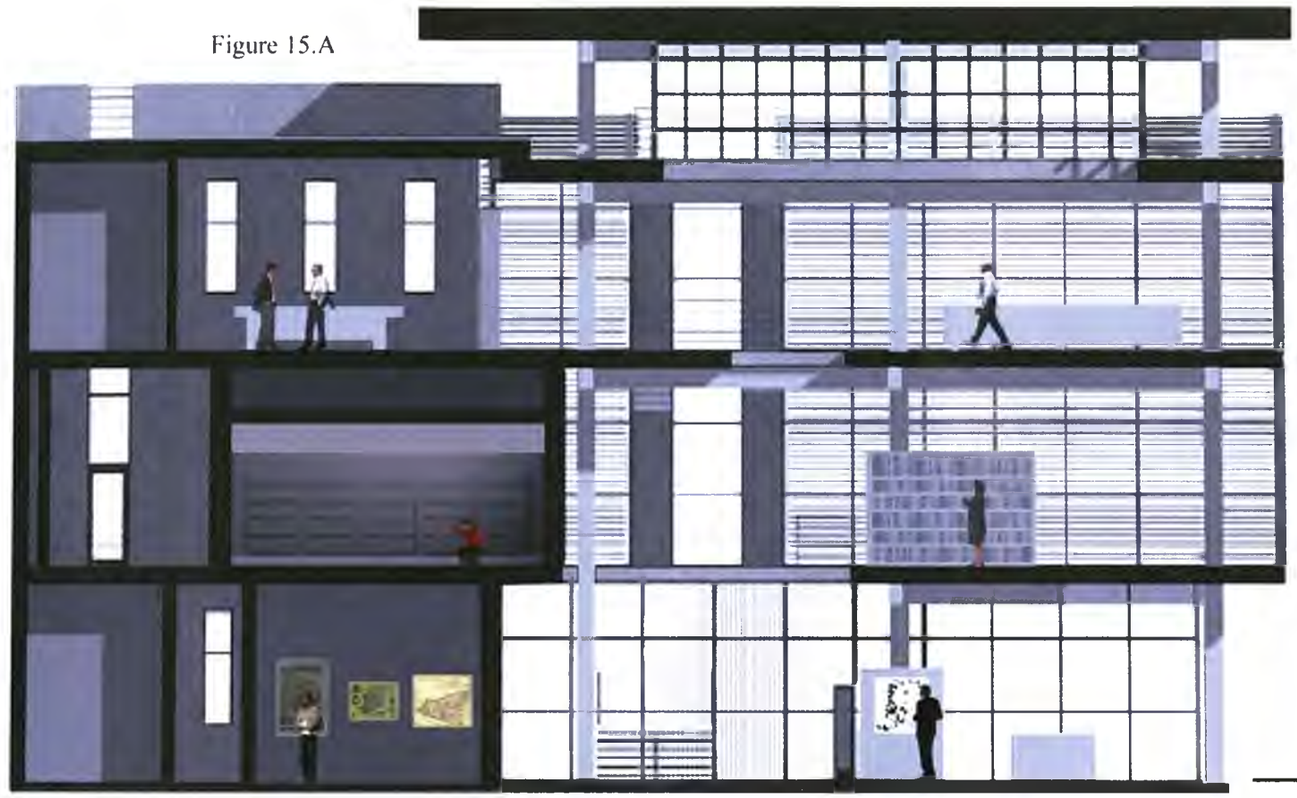
Figure 13.C: Elevation from library corridor looking East. This facade, which might normally be a non-descript service area facing a back alley, takes on special significance due to the proposal of a pedestrian corridor along this route. This facade therefore references that of Collins Avenue. The major differences are an ADA accessible entrance and modified fenestration that reflects the location of the elevator lobby and the service stairwell.

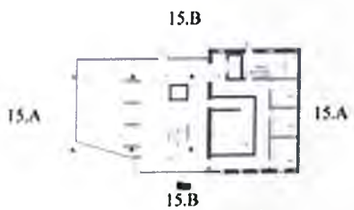




Figures 14.A - F: Massing studies. As the form of the project developed, its relationships to the surrounding buildings were analyzed. Figure 14.A is an elevation from the park looking north, showing how the project maintains a generally consistent height with the public library on the left and the hotel parking garage to the right. Figures 14.B through 14.E are a series of 3-d images created to study the form in context from the pedestrian level. Figure 14.F is an elevation drawing from Collins Avenue facing West, showing how the building serves to anchor its corner position while maintaining the upward stepping of the block to the South.

Figure 15.A





Key Plan for Sections

Figure 15.A: Longitudinal Section. This illustration is intended to show the different types of spaces encountered by the user groups. Although ceiling heights are generous throughout, the airy,expansive south side provides a strong contrast with the sheltered, introverted north side.

Figure 15.B: Transverse Section. This illustration reveals the extensive perforation of the slabs at the atrium area, as well as giving an indication of the floor levels in relation to the context.

Figure 15.B

Figure 16.A : Camera matched perspective of proposed project overlaying actual site photo by author. The perspective is from aproximately five and one-half feet above grade looking Northwest from the Southeast corner of the intersection of Collins Avenue and Twenty-Second Street. Figures 16.B through 16.D are illustrations developed during the process of fine tuning the building's composition.

Figure 17.A : Camera matched perspective of proposed project overlaying actual site photo by author. The perspective is from approximately five and one-half feet above grade looking North from the Southwest corner of the intersection of Collins Avenue and Twenty-Second Street. Figures 17.B - D are details of the balcony facing Collins Park.

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