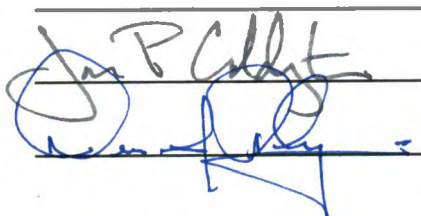


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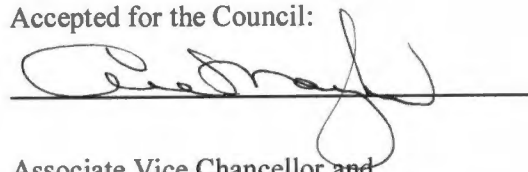
I am submitting herewith a dissertation written by Linda Gail Snodgrass entitled "Using Historic Foundations As The Catalyst For New Growth: An Industrial Incubator for Vestal, Tennessee." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Architecture with a major in Architecture.


Tracy Moir-McClean, Major Professor

We have read this dissertation
And recommend its acceptance:



Accepted for the Council:



Associate Vice Chancellor and
Dean of The Graduate School

**USING HISTORIC FOUNDATIONS AS THE CATALYST FOR NEW GROWTH:
AN INDUSTRIAL INCUBATOR FOR VESTAL, TENNESSEE**

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

Linda Gail Snodgrass
August, 2000

DEDICATION

This thesis is dedicated to the Master of Architecture Class of 1996

Andrew Bellew, Ellen Cathey, Eunice Chen, DeDe Christopher, Eric Dooley,
Brett Ragsdale, Jenny Shugart, and Gail Snodgrass

ACKNOWLEDGEMENTS

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ABSTRACT

This thesis proposes that a community is made up of the interactions of its inhabitants. In order for a civic structure to function successfully, it must be a part of daily life and support the beliefs of those it serves. A secondary goal of the thesis is to demonstrate how linkage between old and new uses in civic design allows for the creation of new space based on an appreciation for what has come before. A civic structure is developed for the community of Vestal, Tennessee in the form of an industrial incubator. In keeping with the thesis premise, the incubator is meant to provide a backdrop for the residents of Vestal to carry on with their daily lives. The Community of Vestal was founded by those skilled at quarrying, cutting, and finishing marble, which is an abundant resource in the area. The incubator is meant to be used as a catalyst to bring back jobs involved in skilled labor and craft to Vestal. The employment rate and home ownership have declined in the area after the major industrial employers left. The incubator is placed within the structure of an existing industrial building previously used for finishing marble, within Vestal's now abandoned industrial corridor. The new building is meant to address the present day needs for employment training and opportunity in the area while drawing on the historic value of its site. The new structure acts literally as a bridge to the local inhabitants of Vestal between the past and present, providing a sense of place to the community and a focal point for activity.

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CHAPTER I

INTRODUCTION

"Come back first happiness of mine
joy lives in strange cities
New enchantments have fallen on the earth
City of demons built by saints
It is of you I will sing"-Giorgio Chirico

Thesis Statement

Genuine community is developed through shared history and daily interactions. The architecture of a community becomes a relic of the everyday when public space and buildings reinforce a sense of commonalty by acting as the stage and backdrop of activity, marking a place in time (figure 1). When civic buildings, squares, streets, and green spaces embody and renew attachments to a community's origins, daily life fuels its vitality. The built environment of a society tells about those who created it and the circumstances under which it evolved (figure 2). In particular, the ordinary structures of industry and the workplace, reflect the practices and principals of their users in that they are molded by demands for production of goods and services that can be provided only through the concentrated efforts of many individuals working toward a common purpose.

The primary goal of this thesis is to portray the unique characteristics of a community through the creation of a civic structure that embodies the past and present aspirations of its residents. The secondary goal

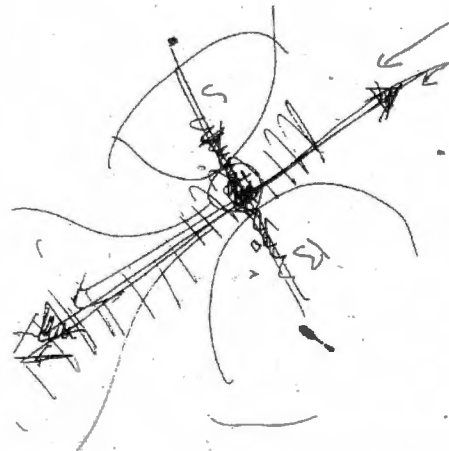


figure 1-Diagram of interactions of a community.



figure 2-Entrance to the Candoro Marbleworks site.

of the thesis will be to demonstrate how linkage between old and new uses in civic design create space which facilitates appreciation of what has come before.

An existing structure will be taken and modified to accommodate present needs. To achieve the goal of creating a structure relating to present-day demands while preserving the character of place of the chosen site, the following issues should be addressed (figures 3-5).

1. How will the new building come to represent the community's origins and its goals for the future?
2. Treatment of the existing building, -will it be preserved or will it be changed?
3. How does the new structure weave itself into the existing landscape and urban grid?
4. What statement will the building make about its time and place and those who built it?

Project Rationale

Many neighborhoods today do not have enough cohesion to be called communities. Populations are more transient than in previous generations, leaving individuals with fewer ties to their location and to each other. Today, one must travel outside of the residential neighborhood to work and shop, limiting interaction with physical neighbors. To address the need for interactions within neighborhoods and to help create cohesion, I am proposing a civic structure that will be used by the majority of residents on a daily basis. This building will



figure 3-Industrial warehouse building, Vestal, Tennessee



figure 4-Marble quarry in South Knoxville, Tennessee, 1947.



figure 5-Marble quarry in South Knoxville, Tennessee, 1998.

house a facility addressing specific needs of the chosen neighborhood of Vestal, Tennessee.

Assessment of the Community

The foundation of Vestal rests upon the industry and craft of marble quarrying and finishing (figures 3-5). Those who built and lived in Vestal worked within its industrial corridor (figure 6). Through this work Vestal was physically and sociologically linked to its surrounding communities, cities, and states. Workshops and the goods they produced in Vestal formed the community's identity (figure 7). Because of this heritage, I have chosen to give its central civic building the form of an industrial incubator to be located between two neighborhoods within Vestal on a site that was previously a nucleus of activity and growth.

Treatment of the Existing Building

The existing building on the chosen site is a long span structure built of steel, concrete and glass. The size of the building is unmatched by architecture in the area and its interior space with repetitive bays and one-point perspective is cathedral-like (figure 8). It would seem inappropriate to destroy the awe inspiring space of the structure, yet the size and orientation of the building is not entirely adaptable for an industrial incubator. The new structure will be established within the existing building's framework redefining its spaces and volume.

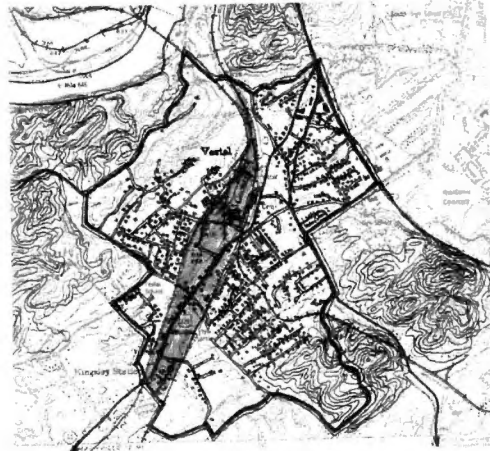


figure 6-Map of Vestal showing the distribution of its population around the industrial corridor.



figure 7-Legend from 1948 map of Knoxville.

Careful manipulation of connections and penetrations through existing elements will be used to make new connections through the building while respecting the grandeur of the central hall.

Fitting the New Building into the Urban Fabric

The new structure must literally act as a bridge between old and new identities for Vestal. The building's placement in a valley below the surrounding residential areas separates it from the community it will serve. By linking the functions of the building with its different levels and adjacencies, the building will connect to both the industrial corridor along its lower level traveling north to south and the community from east to west. The incubator will be visually connected with the urban grid and topography as well as physically tied to its surroundings.

The Building's Statement

As well as providing spaces for light industry, the incubator will have administrative offices, meeting rooms, and retail spaces for the goods produced. As businesses prosper, they will relocate within the industrially zoned areas surrounding the site. The incubator can help reestablish Vestal's industrial heritage and economic strength while centralizing activity by bringing back jobs to the area. Most importantly, the incubator and its products can redefine Vestal's identity (figures 9&10).

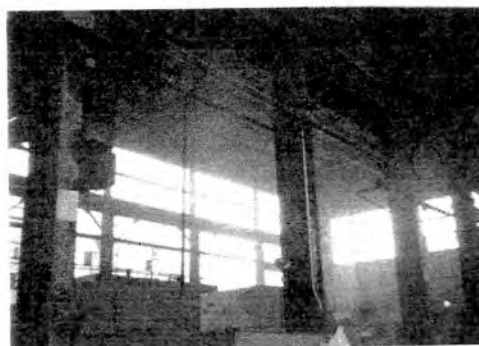


figure 8-Interior of existing building showing repetitive bays.

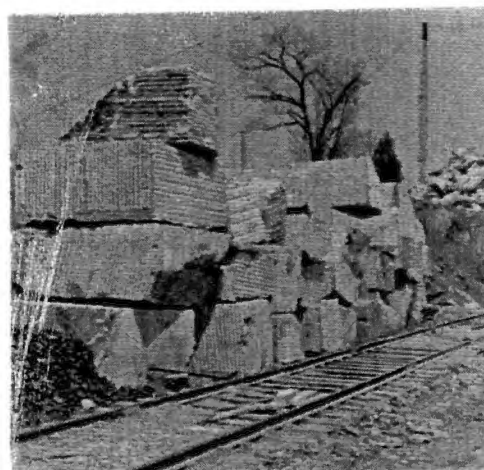


figure 9-Vestal Marbleworks, 1948.



figure 10-Vestal Marbleworks, 1998.

CHAPTER II

SITE SELECTION

“It is a decision coming from communality that you choose a place out of places to build, a place where others can settle....”

-Louis Kahn

Region

The site chosen for an industrial incubator is within the Vestal neighborhood in South Knoxville, Tennessee. South Knoxville is defined as the area south of Henley Street Bridge within the city limits of Knoxville. The northern boundary, the Tennessee River, creates a distinctive edge that breaks from Knoxville’s downtown. Just below the southern boundary is Brown Mountain, which separates South Knoxville from Knox County.

South Knoxville has been an area that, although it is within yards of the downtown area, is isolated by topography. Landforms are South Knoxville’s most distinctive natural feature. Integration of hillsides, ridges, and valleys gives a unique texture to the region. The pattern of development is a modified grid to accommodate geologic features (figure 13). Three distinct communities once thrived in this area: Vestal, Scottish Pike, and Sevier Avenue. These were vital communities with mixed residential, commercial, and industrial zones (figures 11&12). The result is a lush, green, urban environment. This area has always been zoned



figure 11-Abandoned marble incinerator in Vestal, Tennessee



figure 12-Neighborhood in Vestal, Tennessee

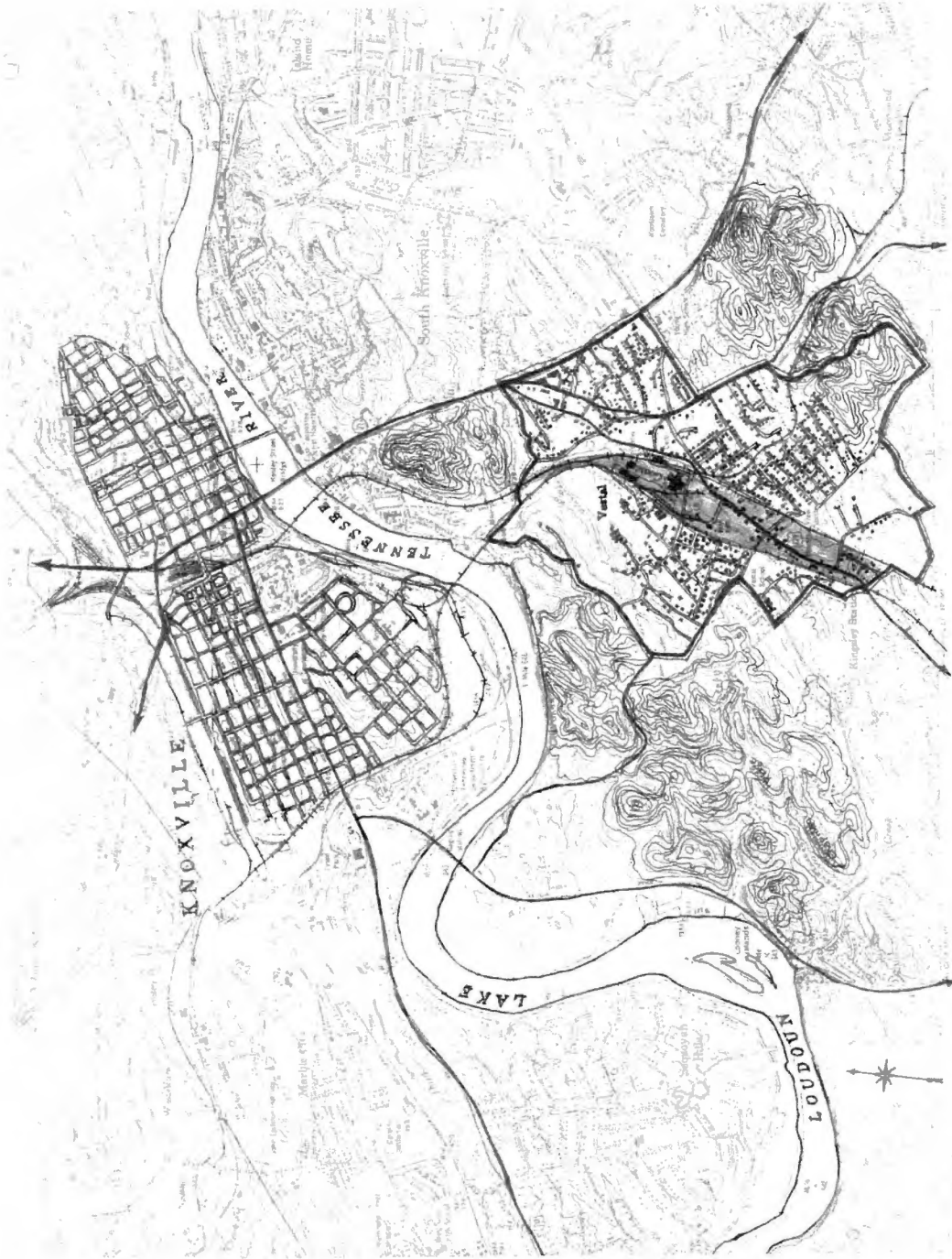


figure 13- Map of Vestal Showing patterns of development around the industrial corridor, boundaries, and natural topography of the area.

industrial according to available information. After 1924, sites along the river are shown to be used as major manufacturers of wool, marble finishing, oil storage facilities, and lumber yards. A natural abundance in this area of forestland and marble deposits promoted the establishment of lumber yards and marble businesses. South Knoxville became recognized nationally for its production of quality timber and finished marble. The region continued to thrive until the major lumber yards and quarries began closing in the 1960's. By the 1970's most of the industrial employers for the area had disappeared and the communities dependent upon them began to decline in number and stability. Public agencies have in recent years attempted to improve conditions by constructing parks and community centers, and several grants have been awarded for rehabilitation (figure 14).

The south sector of Knoxville had the largest decline rate in inhabitants for all city sectors in 1995 and is in dramatic contrast to the expected healthy growth rate projected for Knox County (South Sector Plan 1995, Metropolitan Planning Commission). This is due largely to the rise in single parent households and elderly residents. Presently more of the homes are rented than owned in the area (figure 15).



figure 14-Neighborhood park in Vestal, Tennessee.



figure 15-Rental home in Vestal, Tennessee.

Community

The Vestal Community of South Knoxville is bounded by Chapman Highway to the east and the railroad to the west. Its northern boundary is created by the intersection of Chapman Highway and Maryville Pike (figure 13). To the south of Vestal is Rodgers Ridge. Vestal is identified as a community in decline. In community planning meetings, the residents identified their priorities for living in Vestal and what they would like to change. They determined that they would like their tax money to be spent first for roads, sidewalks, bridge repair, and job creation. They were in favor of any additional money spent on greenways/ walking trails, tourism, and affordable housing. Top complaints about the area were problems with traffic, poor roads, poor bus service, no sidewalks, litter, lack of passive recreation, and lack of community organization (figures 16&17). The reasons given for living in Vestal were friendliness, low crime rates, scenic beauty, convenient access, and the history of the area.

Vestal was established and grew along the rail lines of an industrial corridor. As industry moved out of the area, the corridor became abandoned. Because of this, the settlements on either side are isolated from each other, fragmenting the community (figure 21).

Site

The historic Candoro Marble Works in



figure 16-Vestal's downtown at the intersection of Martin Mill Pike and Maryville Pike.



figure 17-Low railroad bridge at a major thoroughfare in Vestal, Tennessee.

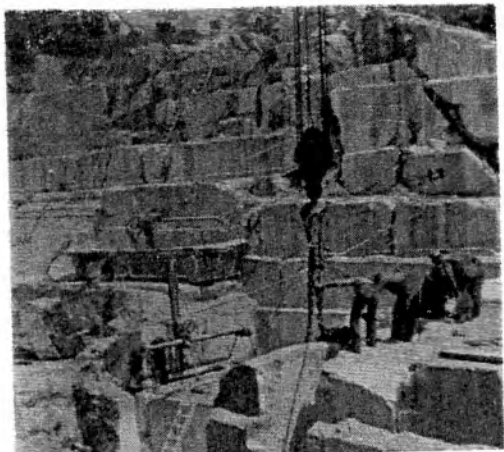


figure 18-Marble quarry in South Knoxville, 1947.

Vestal is the chosen location for the proposed industrial incubator. The company was a marble manufacturing plant, sawing and finishing marble blocks from quarries in Knox, Blount, and Loudon Counties and imported stone from all over the world (figure 18). Candoro Marble Works, located on Maryville Pike was established in 1914 by the J.J. Craig Company and is located within Vestal's industrial area, bounded by railroad tracks (figure 19). The site of the Marble Works abuts the Vestal Lumber Company, the namesake and historic employer in the community. The Marble Works became the nation's foremost producer of Tennessee pink marble, as well as one of the largest importers of marble in the United States. Local buildings using marble from Candoro include the U.S. Post Office at 501 Main Street, the State office building at 627 Cumberland Avenue, and interior finishes for some of the University of Tennessee buildings, all in downtown Knoxville (figure 20). Other buildings finished with marble from the Craig quarries and fabricated at the Candoro site include the Smithsonian Museum of History and Technology, the American Federation of Labor, Congress of Industrial Organizations Headquarters, the Australian Chancery, and New York's Grand Central Station. Candoro's polishing machinery was used for the last time in the mid 1970's to finish marble for the National Gallery of the Art's addition under the

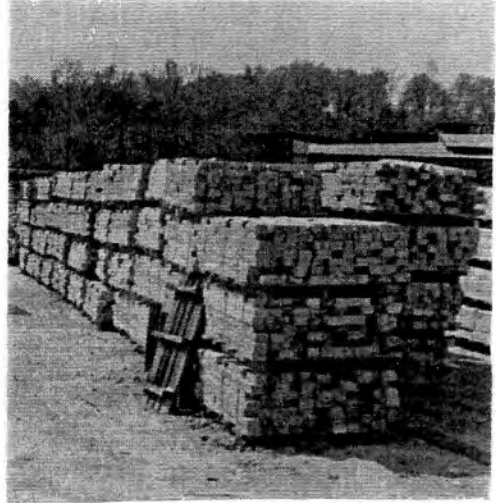
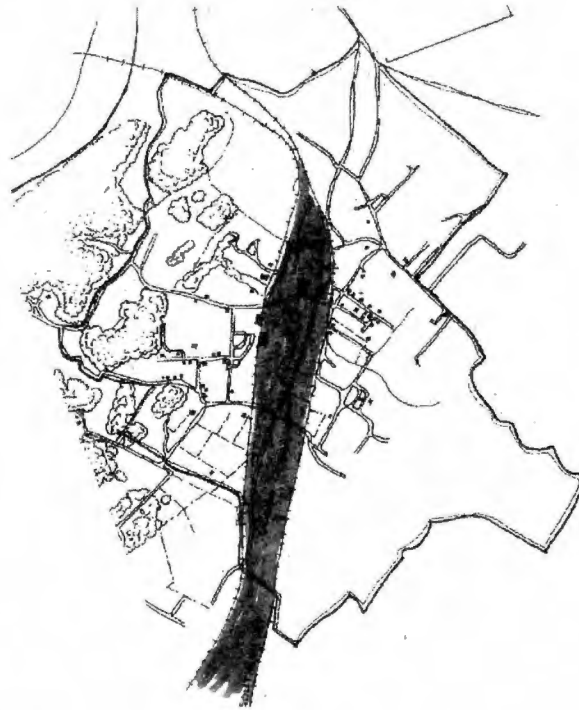


figure 19-Marble block at the Candoro Marbleworks, 1947.



figure 20-U.S. Post Office building at 501 Main Street, Knoxville, Tennessee.



(a)



(b)

figure 21-Maps of Vestal in 1928 (a) and 1990 (b) show growth patterns along the industrial corridor. Without the centralized activity within the corridor, the communities on either side are isolated from each other.

direction of architect I.M. Pei, who opened an office near the site during this time to supervise the marble finishing. At its most productive, Candoro employed 140 people, many of whom lived near the marble works (figures 24&25). At present, several marble finishing craftspeople continue to work at the facility.

On the site stand two buildings that first appeared on a Sanborne Insurance Map in 1924 (figure 22). One is a sawtooth roof building where marble was polished. It has 10" thick walls that are ten feet tall constructed of concrete with a roof of concrete over expanded metal.

The building next to the sawtooth, where marble was cut, has a clerestory running its full length and a structure of concrete piers supporting walls of heavy glass between metal frames (figure 23). The roof is made of a steel truss system with wooden roof boards supported on steel columns. The structure is designed with extra lateral support from the piers to enable movement of a large crane used to lift and transport marble block through the central space of the building to the saws used for cutting slabs of stone.

The industrial buildings were built with an orientation that is north to south. The two main buildings on the site are parallel to each other and their structures are ordered on similar grids (figure 31). The larger structure, used for sawing marble is made up of nineteen, fifteen

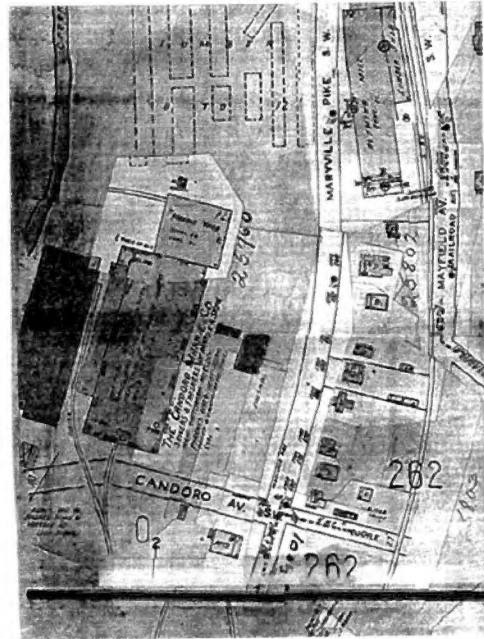


figure 22-Sanbourne Insurance map from 1924 showing the Marbleworks buildings next to Vestal Lumber Yard.

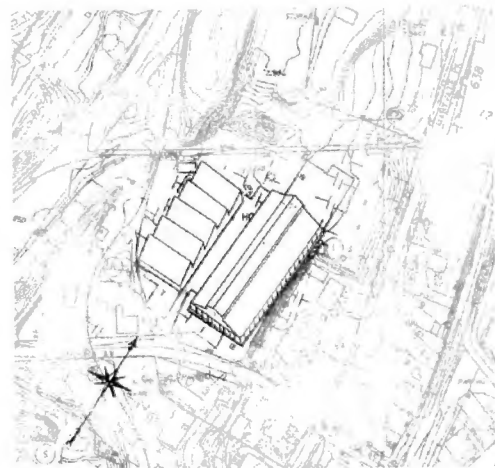


figure 23-Axonometric showing the relationship of the sawtooth and clerestory buildings

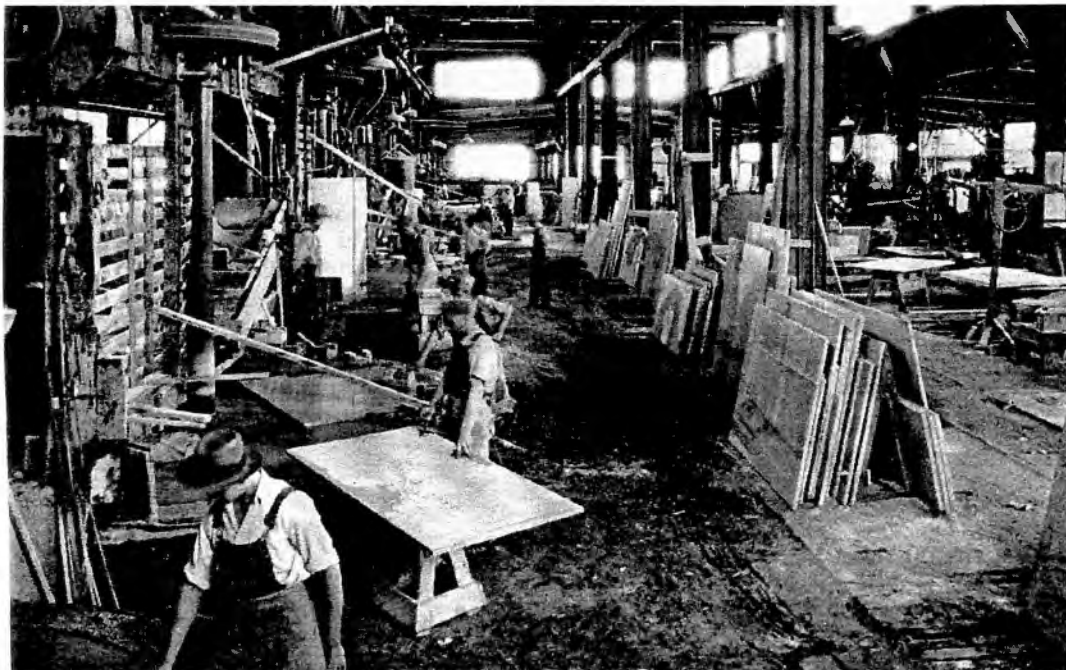


figure 24-Interior of the marble cutting facility at Candoro Marbleworks, 1947.



figure 25-Interior of the marble cutting facility at Candoro Marbleworks, 1998.

foot bays and the sawtooth building is made up of eight, thirty-foot bays. Also on the site are several small buildings, one of which is currently occupied by a custom marble finisher. This building sits across Candora Road on what was the marble storage yard facing the fabrication buildings (figure 26). An abandoned railway spur once used to convey the marble block connects this building to the others across Candora Road (figures 29&30). Adjacent to these buildings is the Candoro Marble Showroom building. It is placed next to the larger industrial building on the site, separated by a twelve foot grade change which elevates the showroom above the industrial corridor (figures 27&28). Stairways lead from the showroom to the site. The building showcases the various marbles and finish treatments used at the mableworks. It acts as an archive of the marble working techniques previous inhabitants of Vestal practiced (figure 32).

Site/Program Fit

A feeling of belonging within a community comes from sharing daily experience with others. Vestal was once an area in which industrial, commercial, and residential areas overlapped to create a unique urban environment. After the industrial and commercial elements of the area declined, the residential areas also suffered. An industrial incubator for Vestal on the site of the Candoro



figure 26-Marble finishing workshop presently in use.



figure 27-Grade change next to the clere-story building, leading to the showroom building at Candoro Marbleworks.



figure 28-Front elevation of the showroom building.



figure 29-View from the marble storage yard to the fabrication buildings, 1947.

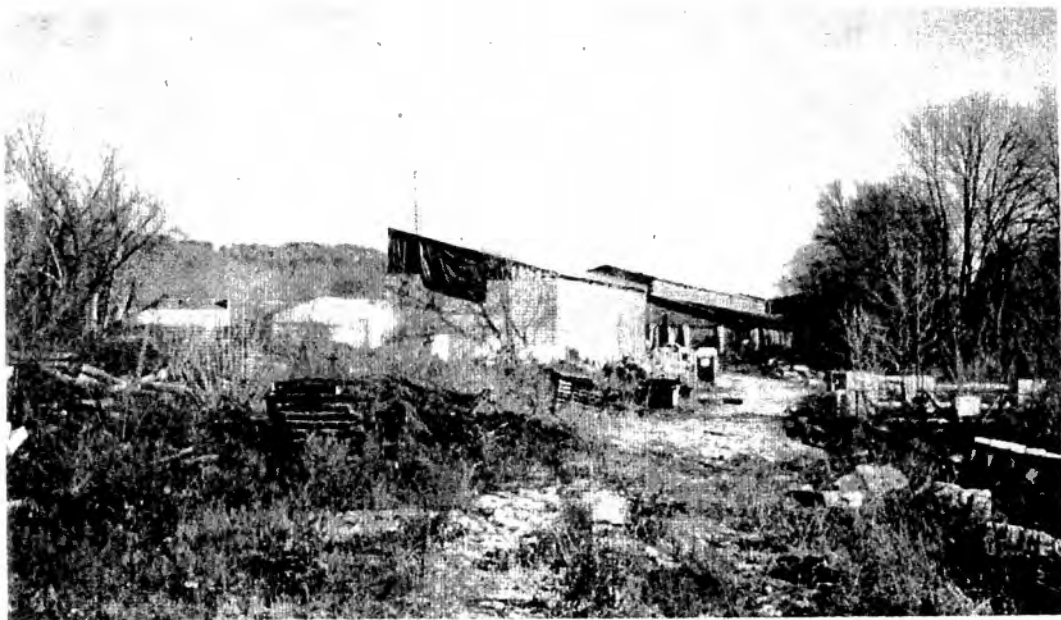
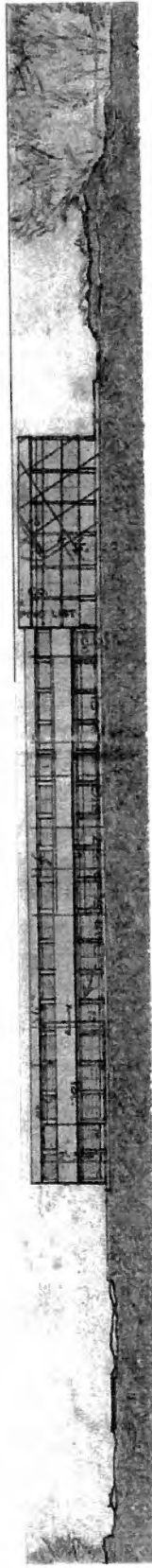


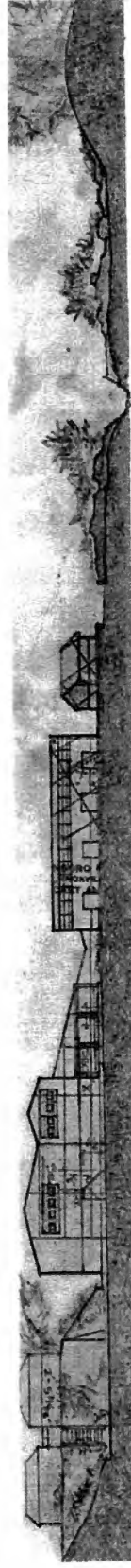
figure 30-View from the marble storage yard to the fabrication buildings, 1998. The new building in the foreground is used presently for marble finishing.



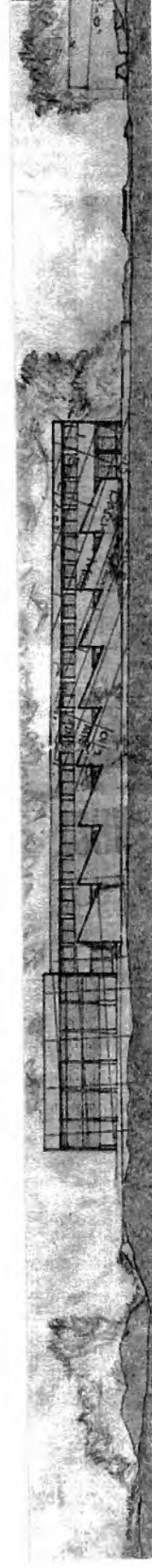
(a)



(b)



(c)



(d)

figure 31-Cross section of Candoro Marbleworks site showing existing conditions (a) South elevation, (b) East elevation, (c) North elevation, (d) West elevation.

Marble Works provides a historic setting for residents and visitors. This is the center for the community in that it was a productive area that played a large role in the development of the region. While the marble works defined Vestal's economic impact on its surrounding areas, it also gave the residents of Vestal an identity as craftspeople skilled in trades using resources near their homes.

The site is situated at a strategic point between two neighborhoods that once may have been unified when the marble works was in business. The site is between two active railroad tracks leading from the Smoky Mountains and into downtown Knoxville (figure 13).

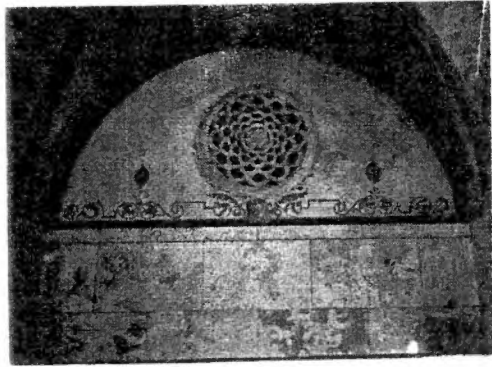


figure 32-Marble grille in the Marbleworks showroom.

CHAPTER III

PROGRAM SELECTION

Definition of an Industrial Incubator

Small business and industrial incubators are usually funded with grants or donations. This enables the facility to avoid debt service and increases its ability to thrive. Facilities for housing incubators are often donated and then renovated for business use. This practice helps to utilize old, and in this case, historic structures that are in need of repair but still very functional. Saving or rehabilitating old structures can have an appeal which helps in fund raising. In many cases, the incubator is allied with the city, economic development organizations, or a college. This allows the incubator to draw resources from its partner and cut costs. Economic development groups are the most common partners, but many colleges and universities may also perform technical assistance.

Most incubators have an on-site manager or executive director. The on-site manager becomes directly involved with the needs of the tenants. Incubators provide at least some tenant services. Office machines, conference rooms, mail service, clerical services, computers and audiovisual equipment, parking, and security are the most common.

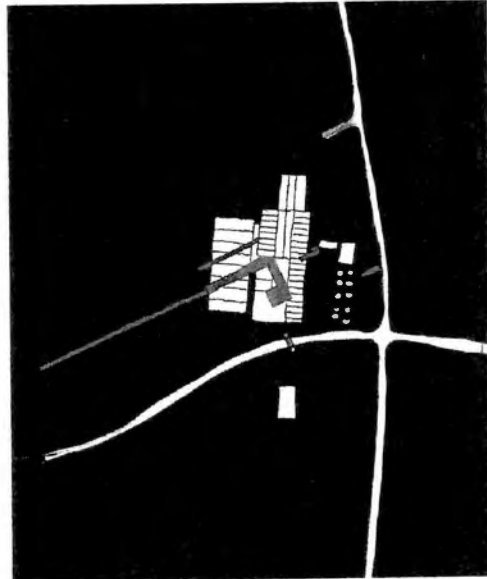


figure 33-Diagram of the new structure intersecting with the existing buildings.

Program Selection for an Industrial Incubator for Vestal

An industrial incubator on the thesis site can provide a beginning for economic rebirth for Vestal. The incubator can prove to be an engine for growth and cohesion if it provides accessibility to every day amenities as well as functioning as a vestige of greater community goals.

Small businesses and craftspeople will rent spaces in the building. Outdoor areas will be used by the businesses and public equally, therefore, the outdoor courts will house different functions at different times. Parking for patrons as well as parking for employees will be provided. The incubator will be a new structure built within or using parts of the two existing industrial buildings on the site (figure 33). Combined, the two structures equal approximately 50,000 feet square. The site is approximately 101,200 square feet. Spaces provided will be as listed in table 1.

Positioning of the components making up the incubator buildings is designed to define the role of the civic structure as a unifying factor between the two settlements on either side of the valley of the industrial corridor (figure 34). It is necessary to allow work to be performed and outside visitors to use the building without interruption of each function. The more public spaces such as retail, café and classroom areas should be accessible while allowing work to go

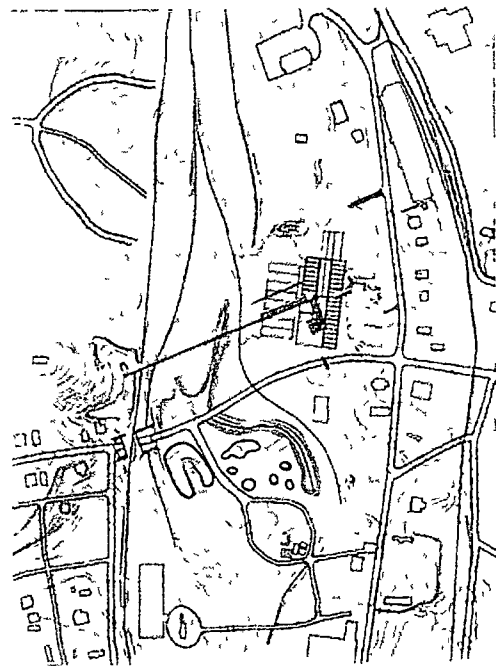


figure 34-Diagram of the new incubator building and its components connecting the two sides of the site

should be accessible while allowing work to go on unimpeded. Because of the changes in topography and the different functions of the buildings, the incubator will intersect with existing structure and landforms on the site not just in plan, but also volumetrically. Areas will be defined as public, workshop, and private.

At the ground level, the building functions as a portal to the site and it is where the most intense activity takes place. The main entry to the building facing Candora Road will connect visitors to the public areas of the café and retail areas. These spaces will be 1 ½ stories in volume and accessible primarily from the industrial corridor on the valley floor. Approximately 50 parking spaces will be provided across Candora Road for office workers and visitors. The classrooms and stairway leading to the mezzanine level of the building will act as buffers between the public and the more restricted areas of the building, of the workshops and loading areas (figure 35). Views to the workshop will be possible through a glass wall separating the entry and retail and café from the production area. The classrooms are accessible to the visitors coming to the incubator for classes and conducting business on site. Exits through the north wall of the classrooms allow access to an open work area for vocational instruction. A crane from the open work area behind the classrooms moves from the workshop, allowing movement of

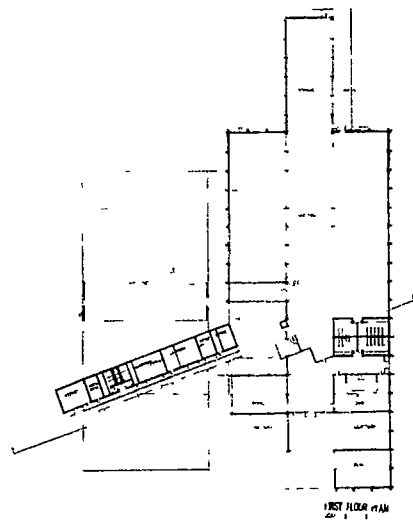


figure 35— Ground floor plan of the incubator building

heavy materials. A greenway following the bed of an abandoned railway spur on the Marble Work's yard will allow workers and visitors a passage through the site to other businesses in the industrial corridor without entering the incubator building.

The mezzanine level of the building is the point of connection for all elements making up the incubator (figure 36). The pedestrian bridge leads across the site from east to west. To the west of the site, at the end of the pedestrian bridge, will be additional parking within the residential area on a promontory overlooking the valley below (figure 38). The bridge will pass over the tram tracks and through the yard of the incubator building. A stairway and elevator attached to the existing structure of the clerestory building allow vertical movement to the ground level and the meeting room on the top level. From the bridge, restricted access is gained to the control booth of the crane. This space is suspended over the workshop from the existing structure of the columns and the channel that connects them. The control room will house the operating system for the crane and will allow observation of the production area without being in the way of workers. The bridge will pass through the incubator building to the east side of the site, connecting the Candoro Marble Works showroom with the building. The showroom building will remain, with the bridge landing at its entrance. At Maryville Pike will be a bus

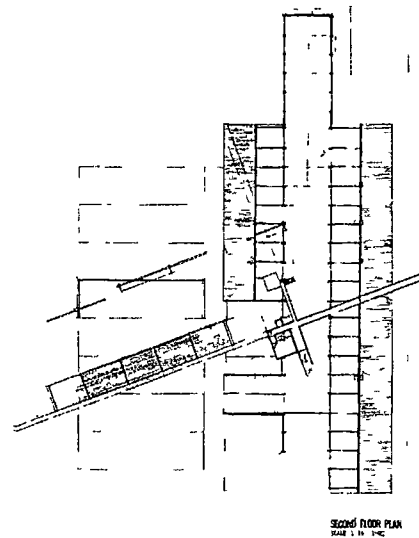


figure 36-Second level of the incubator building

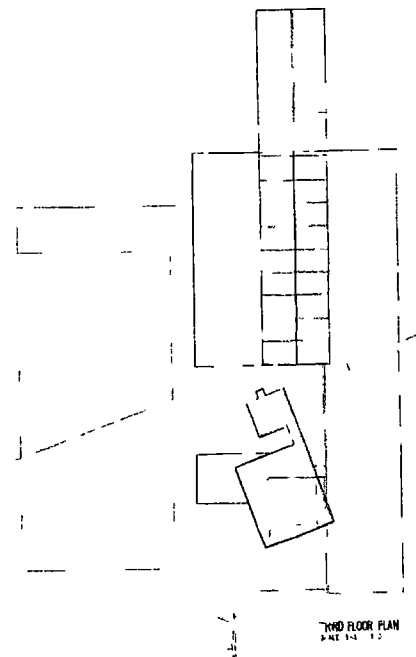


figure 37- Third level of the incubator building

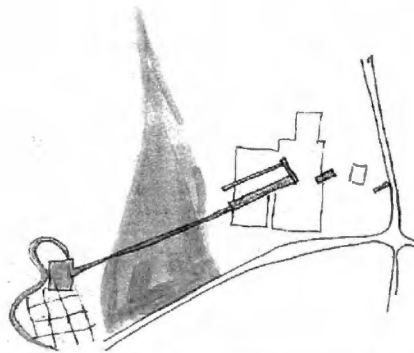


figure 38-Diagram of the connection of the elements on the mezzanine level of the incubator building within the existing grid of the neighborhood.

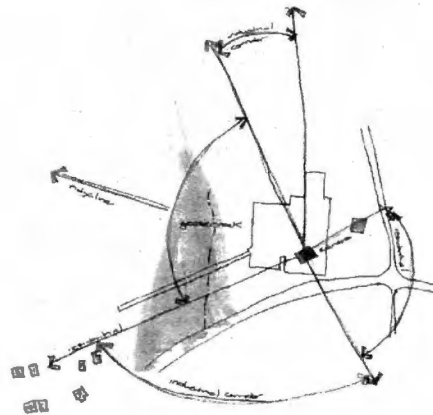


figure 39-Visual connections to the surrounding areas from the incubator building's meeting room.



figure 40-Diagram of visual connection from Martin Mill Pike to the incubator building's vertical cooling tower and sign.

stop where visitors and workers using public transportation can access the incubator and industrial corridor. The bridge passing through the clerestory building physically links the two neighborhoods to the east and west of the valley.

The top level of the structure is the beacon to the surrounding areas (figures 37&39). It is the part of the new structure that will be visible from the areas above the valley and provide views across the community from the incubator. On this level will be a public meeting room and open deck accessible by the stairs or elevator at the interior of the building. The area will be open to all during business hours and for special occasions and community meetings after hours. Also on this level will be a sign identifying the incubator and the cooling tower (figure 40).

table 1– Adjacencies and area of building components

Use	Square Footage	Quantity	Adjacency
Community Room	500	1	Stairs, Elevator, pedestrian bridge
Offices	200	3	Classrooms Entrance, Outdoor Workshop
Classrooms	300	2	Offices, Outdoor Work Areas, Entrance
Outdoor Workspace	varies		Classrooms, Control Room, Workshops
Retail	2,000	2	Entrance, Visitor Parking, Café, Pedestrian Bridge
Restaurant	2,000	1	Entrance, Retail, Pedestrian Bridge, Parking
Main Entry	500	1	Workshop, Retail, Restaurant, Offices, Parking
Workshops	2,000 to 4,000	4 to 6	Entrance/Offices/Loading Dock/Outdoor Workshop
Control Room	150	1	Workshops, elevator and stairs, Outdoor Workshops
Loading	800	1	Workshops
Pedestrian Bridge	n/a	1	Entrance, Residential Parking, Bus Stop
Parking Lot	15,000	2	Entrance, Pedestrian Bridge, Classrooms
Greenway	n/a	1	Pedestrian Bridge, Main Entrance, Parking

CHAPTER IV

PRESEDENT STUDIES

Precedent studies provide background information on projects similar in nature to that of the industrial incubator. The primary focus is on reuse of existing buildings and the relation of old versus new structure. The projects studied were used initially for industry or public enterprise. This genre of building is of interest in the design of the incubator building in that the locus of this type of design is on activity. The passages through the buildings are manipulated to control interactions, first for production and in their reincarnated forms, for the society of a specific community.

In giving the new structure form, I have taken from the work of Josef Albers and his theories of design. His melding of voids and solids to create a single whole form can relate to the spaces created when the new and existing structures intersect (figure 41).

Recreation Center, San Paulo, Brazil
Architect: Lina Bo Bardi

Project Design

This project transforms an abandoned factory that is part of an industrial city into a recreation center for workers and city dwellers. The program uses long-span construction and open spaces to house a theater, library, restaurant, and workshops. The form of the

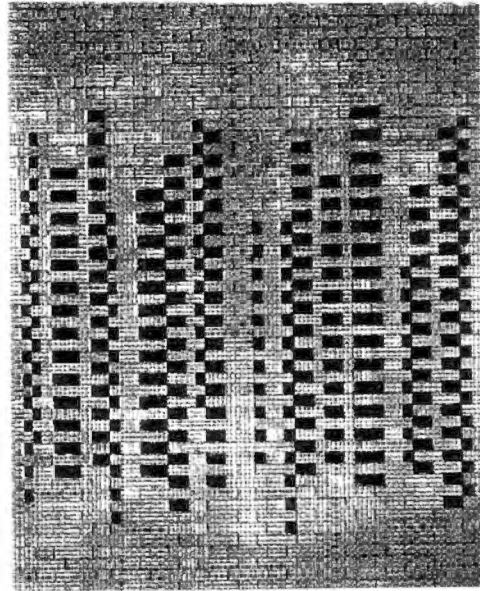


figure 41-Wall mural, America, Josef Albers, artist.

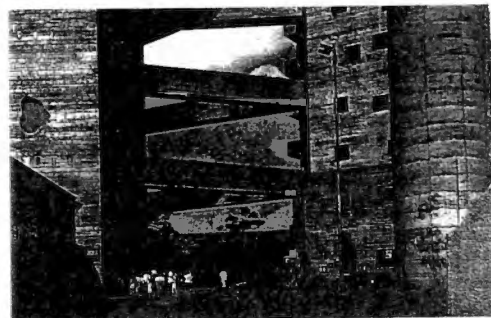


figure 42-Recreation center, San Paulo, Brazil, Lina Bo Bardi, architect.

buildings is left intact and the programmed spaces of the center are placed within. To provide additional light and air in the interiors some walls have been punched through (figure 42). Other than this minor deconstruction, there is no further exploration of the building's structure. The character of the industrial city is preserved and appreciated while the building adapts to new uses.

Relation to Thesis

The recreation center has adapted to the needs of those it serves. The new use of the building allows varied interactions. The industrial landscape around the recreation center still functions and is productive, but makes room for an integration of new growth. This project is similar to the industrial incubator for Vestal in that both provide a backdrop for interaction within the fabric of work areas. The cohesiveness is preserved in the working community while integrating differing uses. Work, education, and recreation are all important factors of a community and centralizing these activities creates a vibrant texture within an urban context.

Sloss Furnace Company, Montgomery, Alabama
Architect: Jim Waters, Jr.
Landscape Architect: Edah Glover

Project Design

The Sloss Furnaces project is unique in its approach to creating a civic structure in that



figure 43-Sloss Furnace Factory when in use

the machinery of the furnaces has been left whole as a reminder of the former function of the space (figure 43). The area is recognized a historic piece of the community's past, marking the growth of Birmingham. The outdoor spaces are an integral part of the design and become the focus of the project. These spaces are unprogrammed and left open for public use. This allows the plazas to become stages for observation of the industrial landscape (figure 44). The factory buildings remain unchanged; therefore, exploration of the site remains superficial. Rather than acting as a functioning part of the community's daily life, the project is an artifact within the fabric of the city.

Relation to Thesis

The place of an industry within a society tells a story of the part it has played in making a community. Commerce almost always is the predecessor to settled areas. A concentration of growth around industry and trade have until recent generations been the rule. With more easily accessed transportation this has been reversed. The Sloss Furnaces project, while it does not program most of its spaces, is a reminder of the foundation of its city's growth. The Marble-works site and the surrounding industrial corridor in Vestal is much the same in that viewing the site as it is now, with its buildings and remnants of marble, is a reminder of Vestal's past. Preserving a part of the history of Vestal's

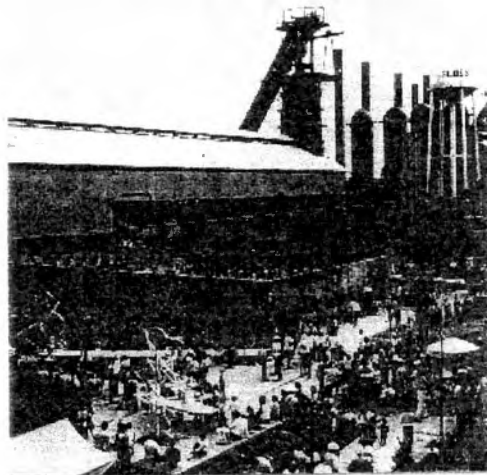


figure 44-Sloss Furnace Factory after its renovation.

growth can remind current residents of their community's history

LeFresnoy National Studio for Contemporary Arts, Tourcoiny, France
Architect: Bernard Tschumi

Project Design

This project undertakes the reuse of a leisure complex from the 1920's for an international center for contemporary arts. Rather than completely gut or painstakingly preserve the existing buildings on the site, the architect sheltered the damaged buildings with a long-span roof system. The design of the project is focused on the "in-between" spaces under the new roof and outside of the existing structures (figure 45). It is not the old or the new structures that make up this project, but the spaces created by the intersection of the two (figure 46). New appreciation of the older structures is gained not by archiving them, but by putting them back to use in a transformed setting.

Relation to Thesis

The LeFresnoy project addresses past and present uses of an existing public building through spatial manipulation. While the exact preservation of the buildings at LeFresnoy would have little purpose for its present use, the creation of new spaces by interlocking new and old structures makes a powerful statement about

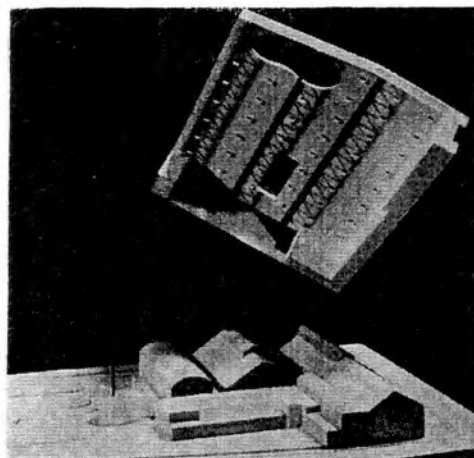


figure 45-LeFresnoy National Studio for Contemporary Arts, Tourcoiny, France, Bernard Tschumi, architect.

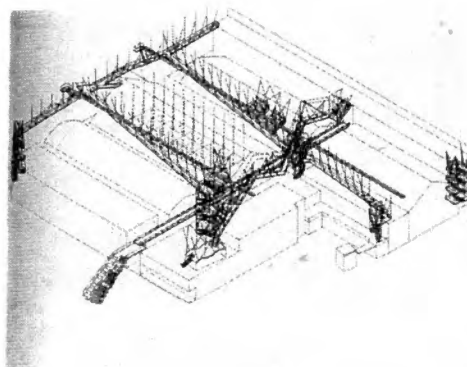


figure 46-Structure of the new passageways through LeFresnoy.

the purpose of the building. New appreciation of the older buildings is created by framing them under a new roof and the connecting structure becomes highlighted when seen against a backdrop of the previous buildings. The components of the structures work together to become greater than they would be separately. The use of the new structure in Vestal's incubator building is manipulated to work in a similar manner. The colossal spaces are bridged over to allow free movement across the site and existing structures. By using the central columns and channels that once hauled marble through the space to support the new bridge, the past and present co-exist.

America: Wall Mural, Harvard University, Cambridge Massachusetts
Artist: Josef Albers

Project Design

The wall design of America is an example of Josef Albers work exploring the use of lines in definition of space. Albers attempts to create plastic space from straight lines in many of his works, creating the illusion of solid and void, light and heavy, ascending and descending (figure 47). As an art student in the time of cubist and expressionist experimentation, Albers learned to take artwork beyond the use of perspective views (Eugen Gomringer, Josef Albers). Cubist teachings allow for fragmenting and abbreviation of the perspective to create movement in two-

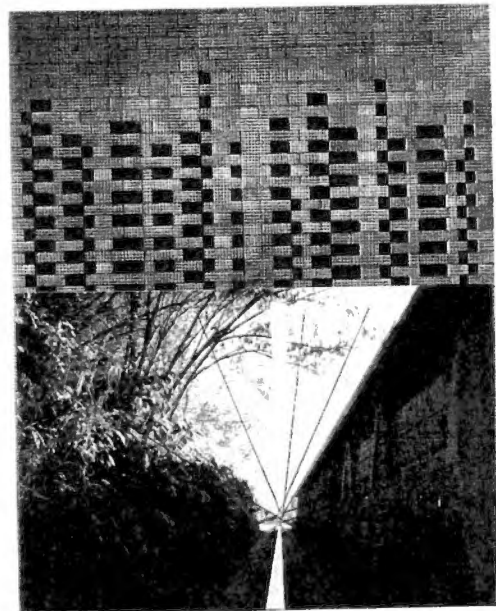


figure 47-Josef Alber's wall mural, America, showing solids and voids created by shifting forms in contrast to the one-point perspective of the clerestory building.

dimensional works

Relation to Thesis

The idea of interlocking spaces and dynamic linear elements versus the one-point perspective created by the repetitive structure on the long spanning buildings can be played upon by the new structure, setting up an interplay between old and new ideas and uses in physical form

CHAPTER V

SITE ANALYSIS

More or Less
Easy to know
that Diamonds are expensive
good to learn
that rubies have depth
but more to see
that pebbles are miraculous
Josef Albers

Topography

The physical topography of the Candoro Marble Works site is that of a valley between two railroad beds. On the west side of the site, the land rises rapidly to a ridge line and on the east the ground slopes up twelve feet to meet Martin Mill Pike. The site is typical of much of the industrial corridor which runs along Goose Creek within a flood plain. On the site, Goose Creek has been covered by a culvert and fill dirt at some point to enable the movement of machinery. The creek remains uncovered at the edges of the Marble Works property (figure 49). The natural topography has been altered over the years by large deposits of marble chips produced as waste from the fabrication of finished stone. Over fifty years of production created enough byproduct to reshape the contours of the area around the fabrication buildings. What was originally flat flood plain, has become an area

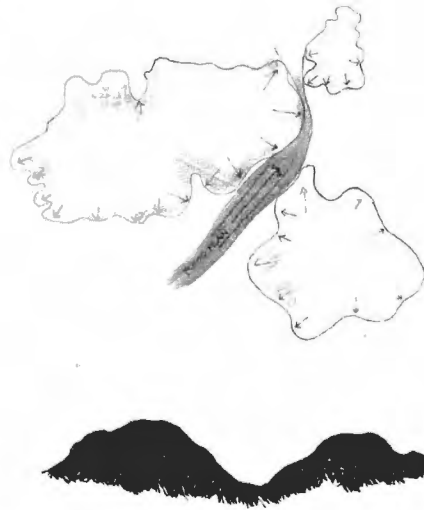


figure 48-Diagram of the topography of Vestal and the industrial corridor.



figure 49-Culvert at the edge of the site where Goose Creek re-emerges.

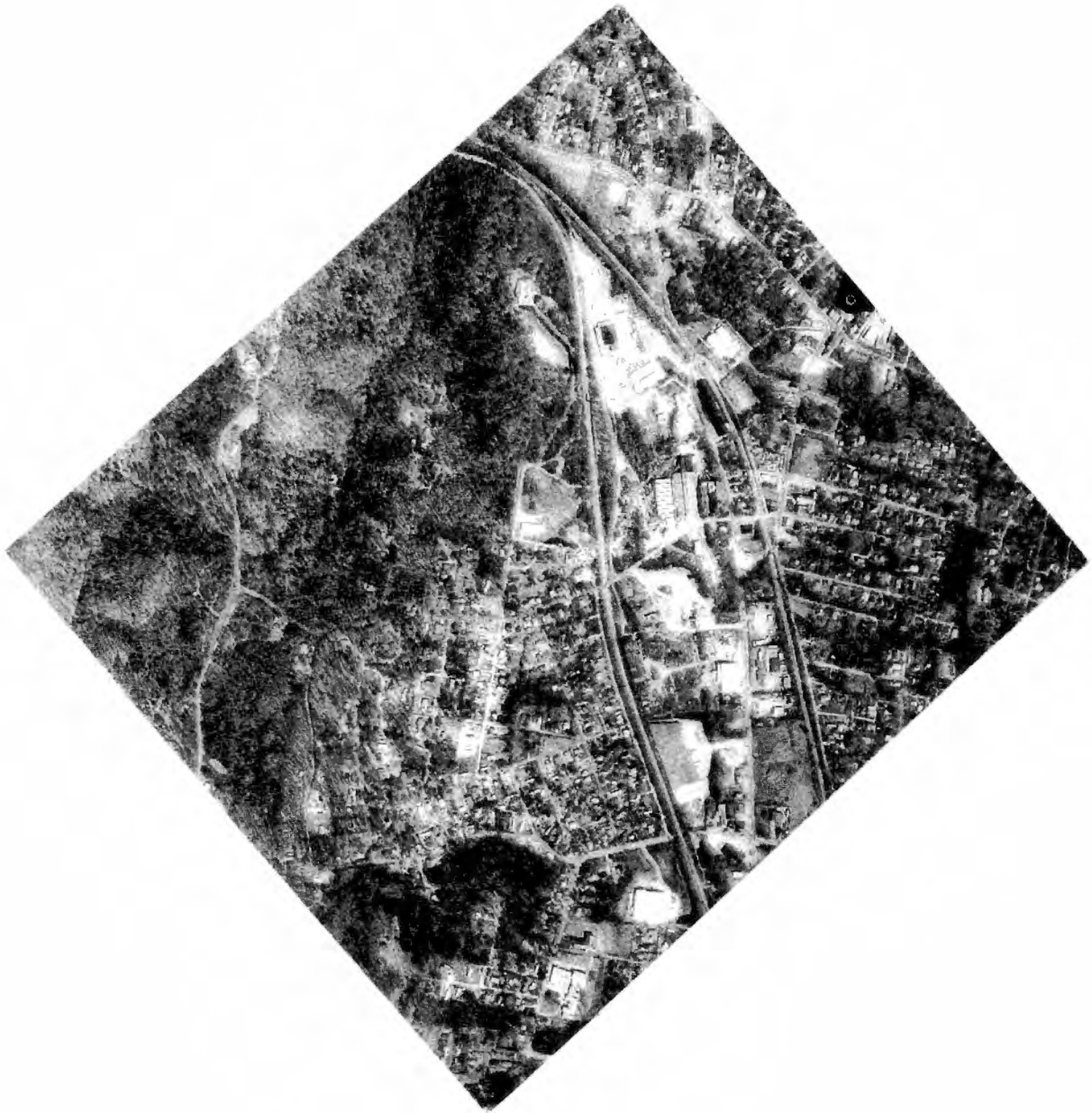


Figure 50-Aerial photograph of the Marbleworks showing the surrounding topography as well as the mounds of marble covering the site.

with small hills and valleys (figure 50). The landform of the area connects the site with the rest of the industrial corridor, hile isolating it from the residential neighborhoods to the east and west. Reinforced retaining walls around the Marble Works showroom building at the eastern boundary of the property place it at the level of Martin Mill Pike and above the rest of the buildings (figure 51). Stairs have been built into the hillside to allow some connection between the showroom and production areas. The rooflines of the two fabrication buildings are all that is visible from Martin Mill Pike, although just a glimpse of the building has a strong visual impact upon passersby because of its colossal scale in contrast to the surrounding residential buildings (figure 52). Descent into the industrial corridor from the west on Candoro Road reveals panoramic views of the buildings as one approaches. The structures from this side of come as a surprise because bends in the road hide the Marble Works until one is almost upon them (figure 53).

Climatic Conditions

Because Goose Creek runs through the site and the region is low-lying, cooler air and humidity tend to collect in this area. Fog on cool mornings and after rainfall will develop more quickly along the industrial corridor than in higher land around it. The existing buildings are oriented north to south with their greatest

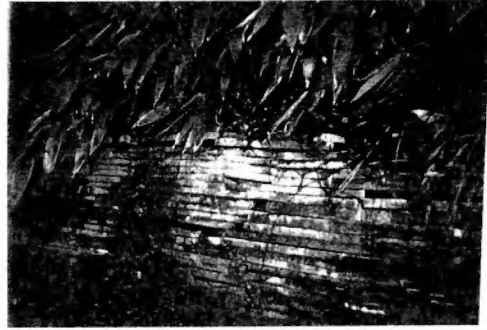


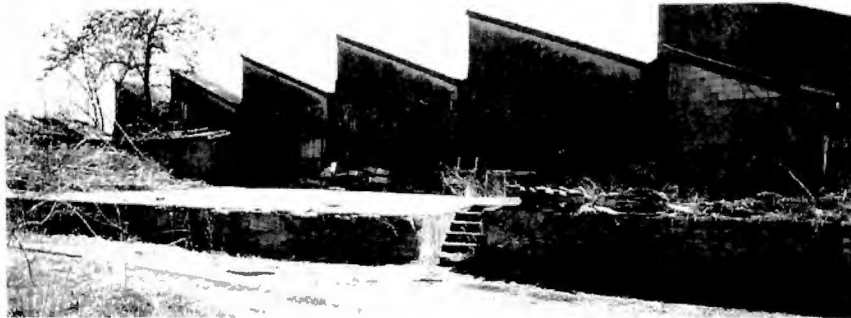
figure 51-A low retaining wall made of pieces of rejected marble next to the Marble-works showroom.



figure 52-The front elevation of the clere-story building, showing the building's twelve foot pilasters.



(a)



(b)



(c)



(d)

Figure 53-(a) North elevation of the clerestory building. (b) West elevation of the sawtooth building. (c) View of the site as approaching traveling east. (d) View of the site as traveling through the industrial corridor.

surface area on the east and west sides. The windows provided for natural light and ventilation are also on the east and west sides of the larger industrial building and on the northern face of the sawtooth building. This arrangement does not allow for optimum air exchange or uniform lighting as the prevailing winds in the region come mainly from the Southeast and maximum sun exposure is to the South where the buildings have the least surface area (figure 54). A deficit in air exchange can be felt in the buildings' interiors where the air is cooler and damper than on the exterior.

Contamination of the Site

The Candoro Marble Works site has been used as a storage facility for a salvage yard in the years after its closure. The present owner has been charged by the Environmental Protection Agency with responsibility for contamination of this site and Goose Creek due to leakage from some the salvage stored on the yard and also upstream from some the owner's other property holdings. The EPA has attempted to isolate and remove as much of the contaminants as possible from the Marble Works and it is not considered a high risk area, although residential zoning of the site would not be possible and contact with the water of Goose Creek would not be advisable under any circumstance. It is possible that additional funding for an industrial incubator could be

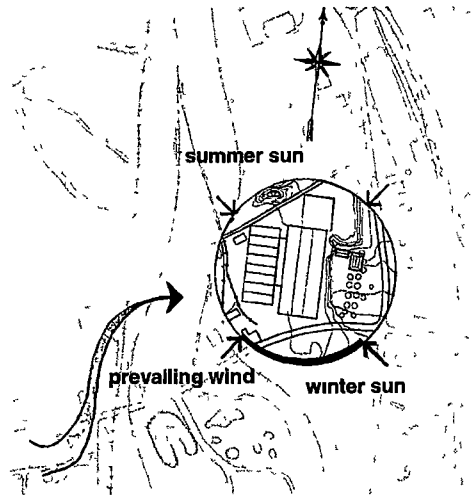


figure 54-Climatic conditions as the buildings are currently oriented.

supplied from a Brownfields Reclamation Grant through the government.

Connections to Surrounding Areas

Physical

The site of the Candoro Marble Works is linked to Vestal by Candoro Road. This road passes through the site and connects to the west to Cherokee Trail which is an access road to Highway 129 and Interstate 40 and Martin Mill Pike to the East (figure 55). Candoro Road is a thoroughfare for residents of the regions surrounding the industrial corridor of Vestal. Traffic is limited to passenger vehicles traveling west on Candoro Road because of a steep incline crossing of an at-grade railroad. A resolution for this situation is needed to allow access to the interstate from the site. Connection of Candoro Road to Martin Mill Pike is significant in that this road is a major access road into South Knoxville and Maryville, Tennessee. A small service road to the north end of the site intersects with Martin Mill Pike allowing heavy trucks direct access to loading areas behind the fabrication buildings. The L&N Railroad connecting downtown Knoxville with the Smoky Mountains borders the west and is heavily used for shipping (figure 56). At the eastern border lies a less frequently used, but still active Southern Pacific Railroad line. Both of these railroads were instrumental in the growth of the Candoro Marble Works and

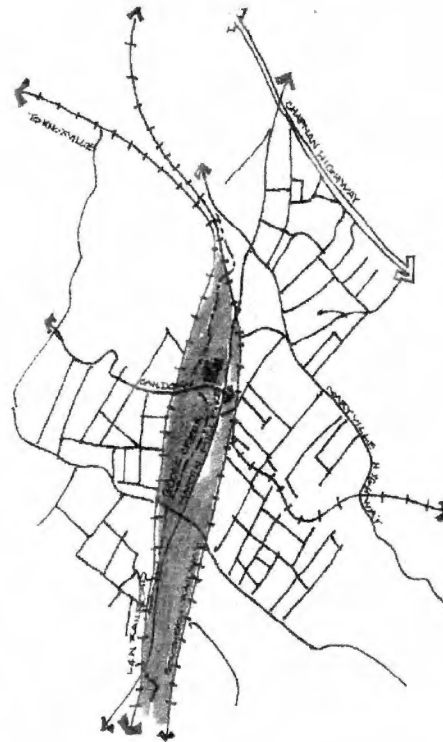


figure 55-Map showing the physical connections of the Marbleworks site to major access roads and railways.



figure 56-L&N railway as it passes the western border of the site.

surrounding industries. Quarried marble was brought in and finished and cut, polished stone was shipped out along these railways. Spurs from the L&N line cross the site where train cars were loaded and unloaded with marble. Use of the railway for transport of cargo and passengers could be revived as a way of further connecting Vestal and South Knoxville to downtown and the mountains.

Visual

Because the site within the industrial corridor is lower than surrounding areas, its visual impact on its surroundings is limited to views of the long-spanning roofs and clerestories that are in contrast with the more residential areas of Vestal. The overlay of small wooden houses in front of massive structures blending into green hillsides is compelling in that it is an unexpected combination of images (figure 53c).

Within the site, in the valley below the subdivided neighborhoods, one is able to view the elements of Vestal that make it unique. Superimposed on the industrial landscape of the Marble Works is the lush greenery and ridgelines surrounding the region (figure 57). Light and shadow are cast into the industrial corridor not by the large structures that inhabit it, but by the upland surrounding it. Other industries are visible further down the valley providing vertical punctuation where buildings



figure 57-View of the ridgeline to the West of the Marbleworks.



figure 58-An asphalt plant at the southwest corner of the site. Marble pieces from past production at the Marbleworks can be seen in the foreground.

emerge above low-lying greenery (figure 58).

Esthetic

Connections of the site to its surrounding areas include the sound of water from Goose Creek that can be heard although it is submerged through most of the site. Also, it is possible to hear the sounds of daily life from the residential areas of Vestal. It is not unusual to hear singing from one of the local churches on Sunday. Sounds from the industries still in operation can be heard also on workdays and these mix with the noise of dogs barking and car radios. The tangible sounds of production and daily life co-mingle within the community of Vestal.

Layering of the Site

Through time and use, a build up of layers have imposed themselves upon the site. The initial layer of natural landscape including Goose Creek and flat flood plains have been covered first by the manmade structures and landscaping, followed by industrial waste as a byproduct of marble fabrication (figure 59). The distribution of marble around the site reflects the process of manufacturing that took place when the marble works was in operation. Large blocks set next to the railway spurs crossing the site show where bar drills were used to split the stone from the quarry bed. Also on the site are rejected stacked, polished stone (figure 60). The



figure 59-View between the sawtooth and clerestory buildings.



figure 60-Rejected polished stone on the site.

most abundant industrial waste is that of the marble chips deposited over the entire site (figure 61). The chips vary in size from approximately one to two feet in diameter to grains of silica underfoot. The chips have been heaped into small hills along Goose Creek and used as fill in low-lying areas. In some places, enough time has passed that small trees and shrubs have grown into these mounds and begun to stabilize them as somewhat more permanent landscape (figure 62). This layer is more malleable than the previous two. The marble can be shifted and shaped easily to suit new uses on the site. It would be a huge feat to completely remove the marble and not a favorable idea due to the fact that the presence of a product from a by-gone era gives an immediate history lesson of Vestal's past.

Over all of the forms, including the built structures, a layer of lacy, green opportunistic growth has firmly incorporated its presence. Because of disuse, native shrubs, vines and grasses have taken root. Groves of Sumac grow out of marble chip hills and Virginia Creeper climbs the concrete, metal and glass buildings (figure 63). The new growth is in contrast to the planned landscaping around the Marble Works showroom building. Neatly planted Hemlock trees set up a one-point perspective along the path leading to the showroom while to the left of this Mimosa and wild Bamboo canopy over the retaining walls asymmetrically (figure 64). At



figure 61-View of the site covered with marble chips



figure 62-New growth overtaking a hill made of marble chips.

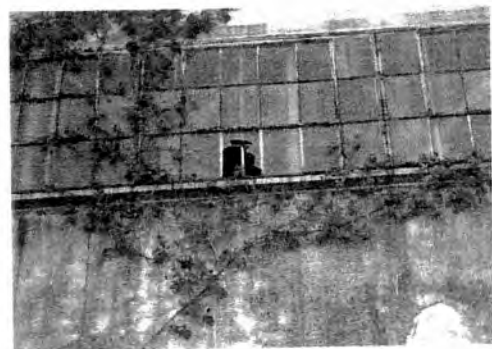


figure 63-Virginia Creeper climbing the face of the sawtooth building.

present, a tenuous balance between manmade and natural growth exists. This creates an atmosphere on the site that feels like a passage through the ruins of an ancient civilization.

The final layer is that of a proposed grid of subdivided lots. At some point following the closure of Candoro Marble Works a survey of the land was performed and developers planned for residential areas to be established on the site. This subdivision was to be named Geyland Heights. The lot lines and roads proposed by this survey match in orientation with the residential neighborhoods on either side of the industrial corridor. (figure 65). This orientation addresses frontage on Martin Mill Pike and Candoro Road. The new grid is in contrast to the existing buildings that follow the north to south alignment of the railroads. The new alignment shows a shift in use that has gone from primarily rail transport to a greater emphasis on road access.

Materials

The materials found on the site warrant some mention in that they give a visual texture to this area that is not typically found in either urban or residential settings. First would be the use of concrete on the site. The concrete alone is not so significant. What makes it notable is the effect of time and climate upon it. The concrete walls of the sawtooth building and the piers supporting the clerestory building have become

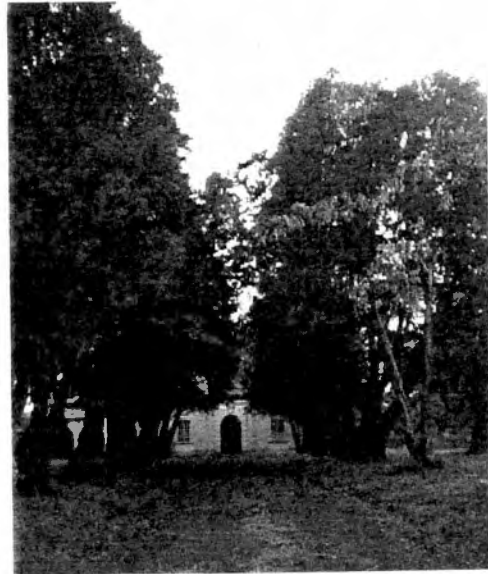


figure 64-Hemlocks lining the entrance path to the showroom building.



figure 65-Map of the site showing proposed lot divisions for Geyland Heights Subdivision.

organic in that its disintegration has allowed new growth to overtake it (figure 63).

The massive steel columns in the clerestory building have also taken on a secondary finish. They have rusted slightly and the soft brown color of the rust makes them seem less machine made (figure 66).

The marble mentioned before, also becomes part of the fabric of the landscape. It seems to be the most changeable and can be seen in several forms on the site. It can be pale gravel underfoot or shiny slivers protruding from moss and leaves on the ground, or as seen in the Marble Works showroom, bookended, polished, and shaped into paneling, tiles, or grilles.

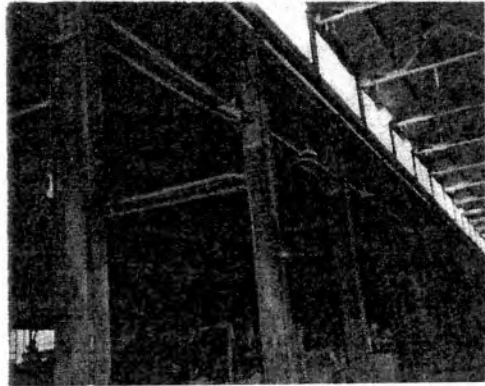


figure 66-Columns in the clerestory building covered with rust.

CHAPTER VI

DESIGN INVESTIGATION

Design Direction in Relation to Thesis

The design approach for an industrial incubator in Vestal relates back to the thesis statement that a sense of community comes from shared experiences through daily existence. The structure of the industrial incubator building for Vestal, Tennessee can become a civic building that embodies the ideals of those it represents. The incubator is to be situated within the ruins of the Candoro Marbleworks, the agora of Vestal culture. An incubator would bring back commerce to the community. It will house light manufacturing rather than heavy industrial applications to serve present needs for employment without causing further disturbance to residential areas. The incubator can work with its neighbors without creating unwanted byproducts of noise and traffic. It will be an engine for growth unifying the area by creating centralized productivity absent now in the partially vacated industrial corridor (figure 67).

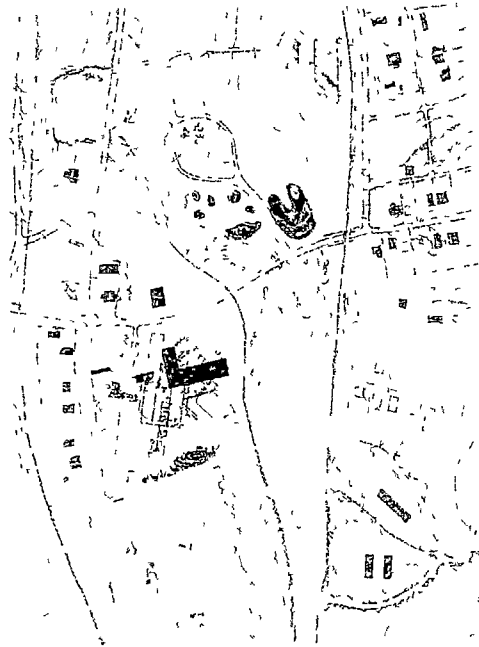


Figure 67-Site plan showing the incubator building and its connections to the surrounding neighborhoods

Design Issues

To achieve the thesis goal of designing a new building using an existing structure to

create a civic building for everyday community use on this site, the following design strategies are used

- 1 The old and new structures are to be linked together in such a way that the combination of the two creates a whole. The two structures are to act as one in function
- 2 The character of the Candoro Marbleworks must be preserved. The reuse of the site cannot sacrifice the unique nature of industrial buildings in the midst of residential settlements and natural growth
- 3 The building and the elements defining it bridge the gap between two neighborhoods, making it a fundamental part of the physical community
4. The site itself and the abandoned marble yard are a part of the overall implementation of the design. The new structure creates a final layer of topography over the marble debris

Design Strategy

The new structure of the industrial incubator will intersect the existing structures on the site. Use of the long-span clerestory building's open space will allow programmatically for workshops and manufacturing. The sawtooth structure is in an advanced state of decline and requires extensive rehabilitation

to bring it back to use for production. However, some of its walls and concrete floor slab can be used as open work space and outdoor plazas. From the area of the sawtooth, panoramic views to the ridges bounding Vestal give an opportunity for observation of the unique character of the area as a diverse environment of combined uses.

Rotation of the New Structure

The new structure will align with the proposed grid of Geyland Heights (figure 70). This addresses the new orientation of the building towards the residential neighborhoods and street accesses. Also, the rotation of the new building provides an opportunity to ventilate and light the building passively (figures 68& 69) The rotation of the building 20 degrees from true south allows more sun exposure and airflow from prevailing winds from the southeast. The intersection of the two grids creates in-between spaces amid the old and new structures. The spaces become the defining elements of the building. The new entrance to the building is made up of a portico created by the concrete slab of the clerestory building , protected by the cantilevered second floor of the new public meeting room above (figure 71). A new stairway through the building linking the upper street level of Martin Mill Pike and the Marbleworks showroom brings workers and visitors into the

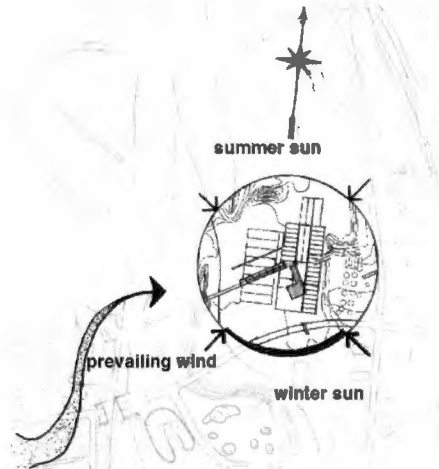


figure 68— Climatic conditions and the new building alignment.

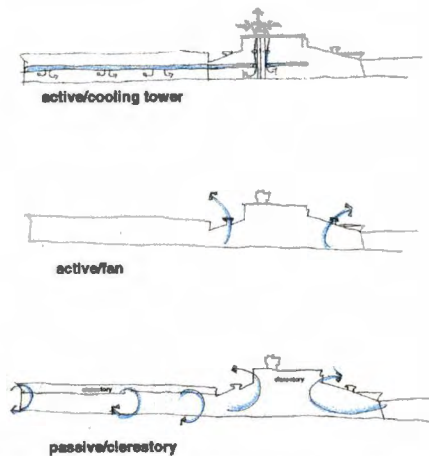


figure 69— Diagrams of the heating and cooling of the new structure.

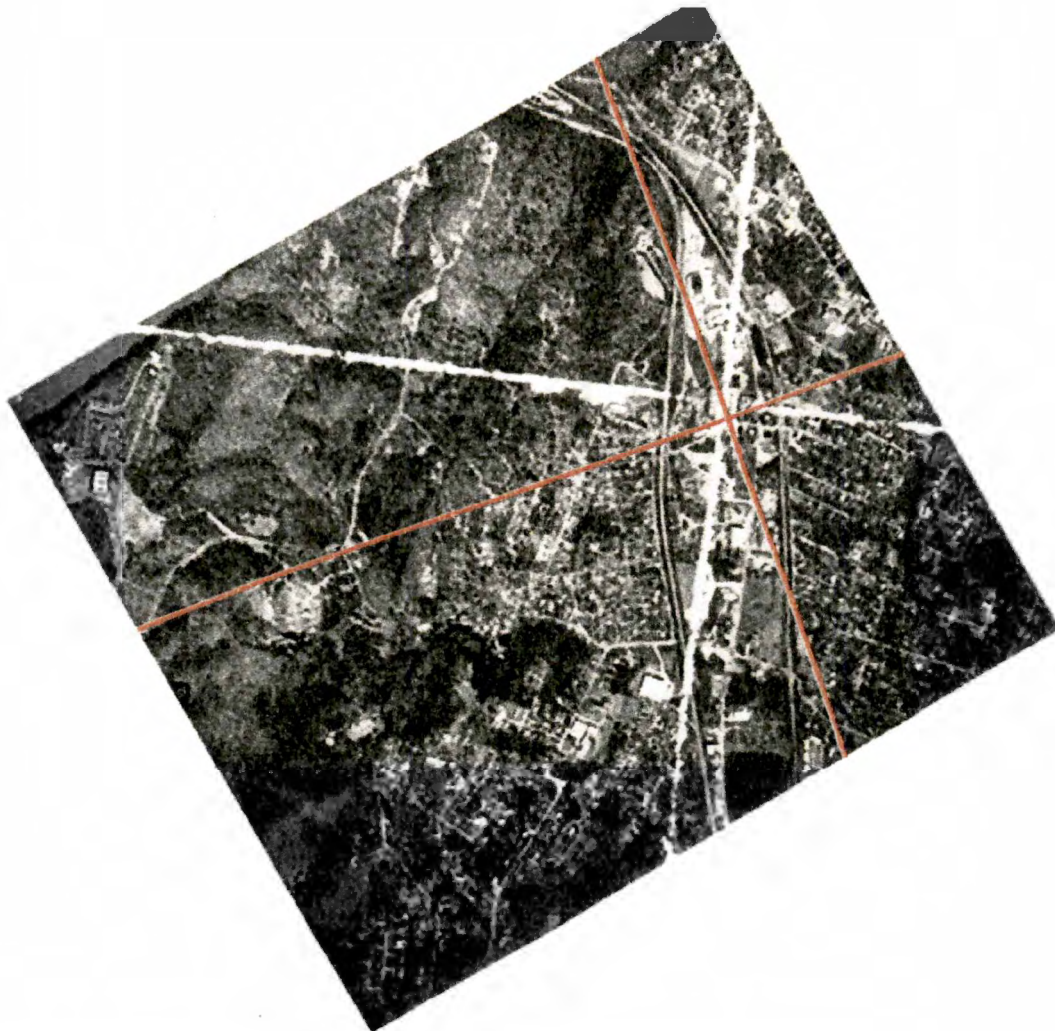


figure 68-Aerial photograph and diagram showing the new building alignment.

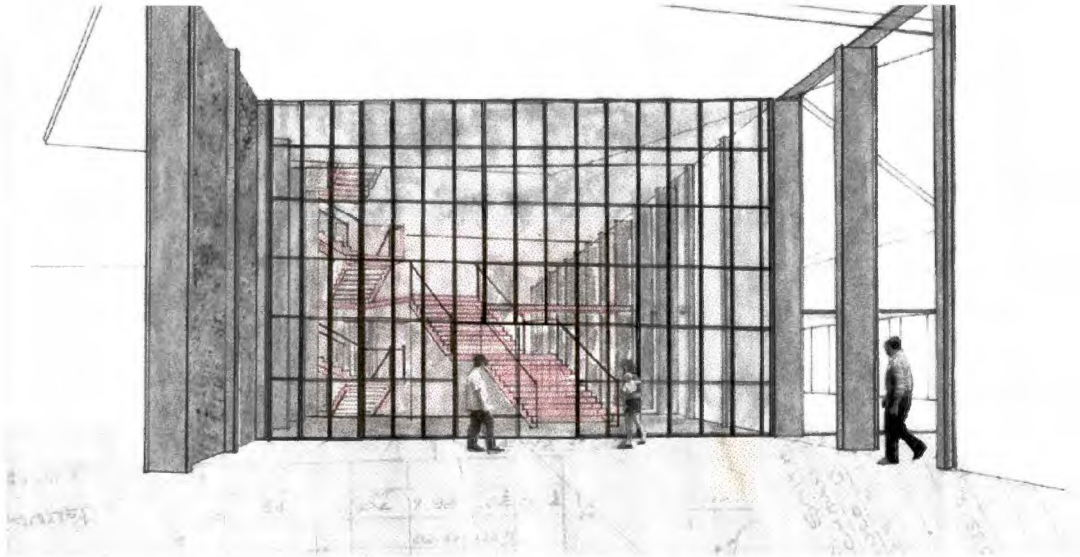


figure 70— Perspective view of the front entrance to the new incubator building.

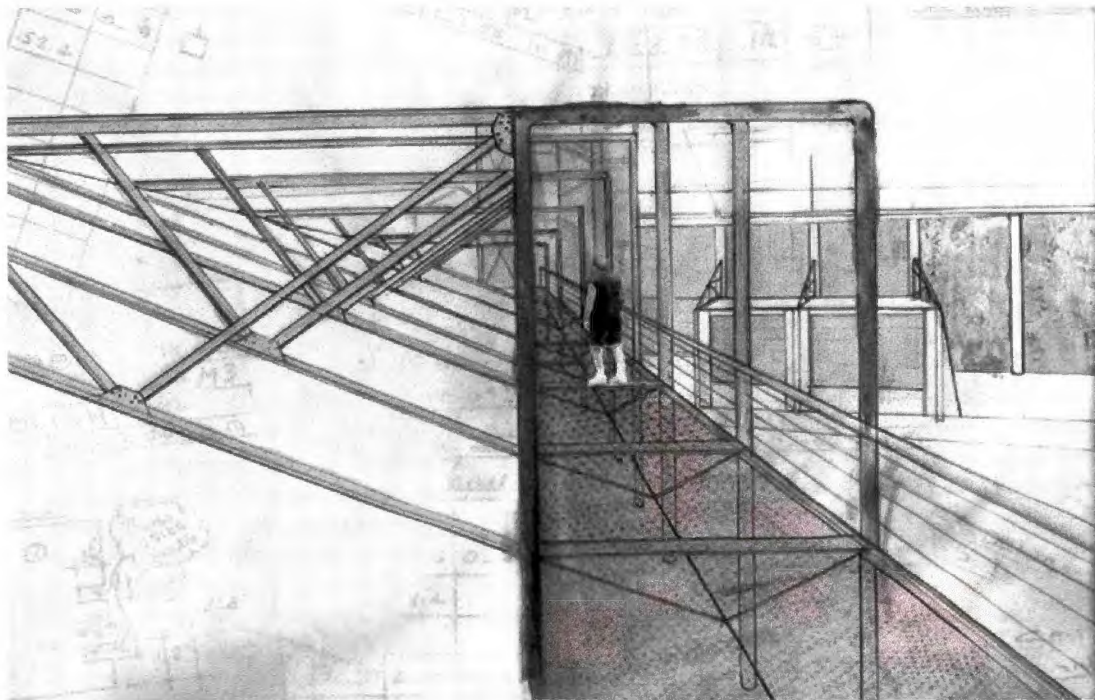


Figure 71-Perspective view of the entrance from the pedestrian bridge to the incubator building.

building and allows passage into the industrial corridor (figures 72 & 73). Cantilevered roof structures over the slab and partial walls of the sawtooth building create outdoor work space connected to the existing clerestory building and new classrooms and offices (figure 74). The rotated grid pays homage to the history of the site while appreciating new directions in growth.

Physical Links

A concern in rediscovering the Marbleworks site as a catalyst for growth is the reconnection of the settlements on either side of the corridor. Accessibility to the site is limited because of grade changes and at-grade railway crossings. Both pedestrian and vehicular traffic have difficulty crossing the site from east to west because of these impediments. To resolve this, the design creates a pedestrian bridge reconnect the industrial corridor with workers and visitors from the community (figures 75 & 76). A bridge with a parking area for commuters traverses the L&N Railroad line from the neighborhood to the west of the site. This allows access to the corridor from the incubator building to the Marbleworks showroom. The bridges allow foot traffic across the valley and stairways and an elevator into the incubator building give access into the industrial corridor (figures 77 & 78).



figure 73— Diagram of stairway from the pedestrian bridge to the yard of the Marbleworks.

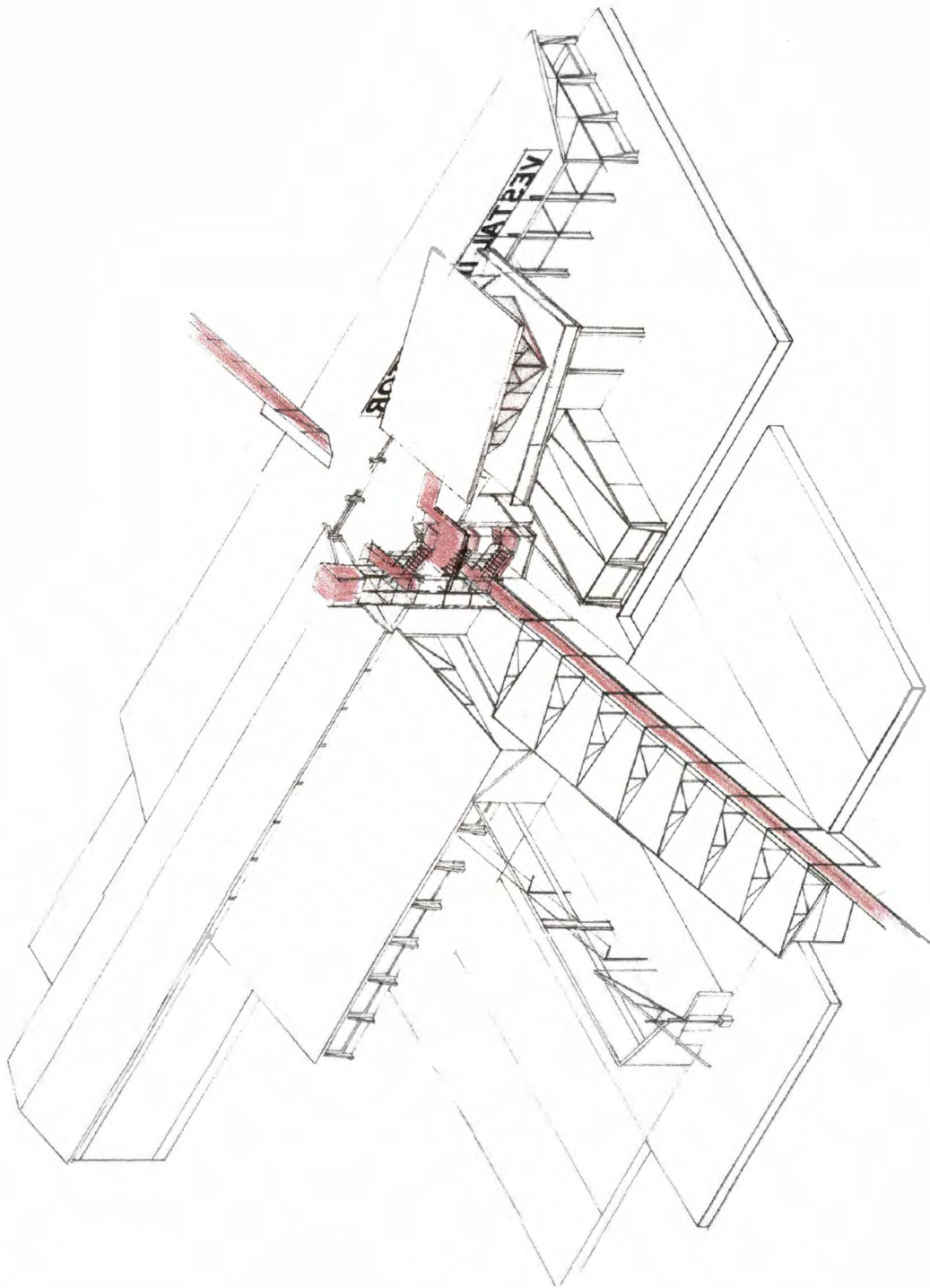


figure 74— Axonometric drawing of the new incubator building.

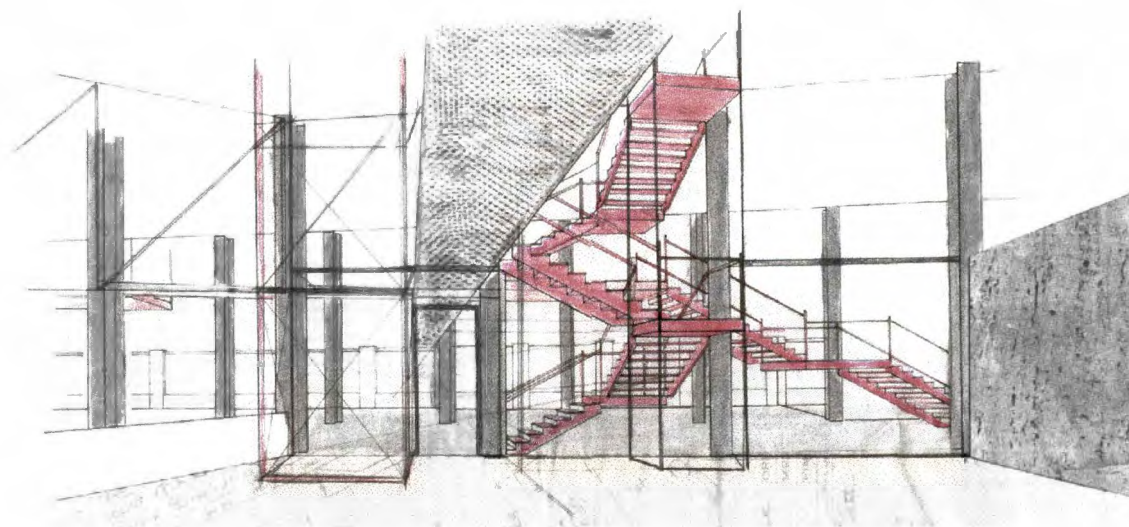


figure 75— Perspective view of the entrance from the ground level of the pedestrian bridge.

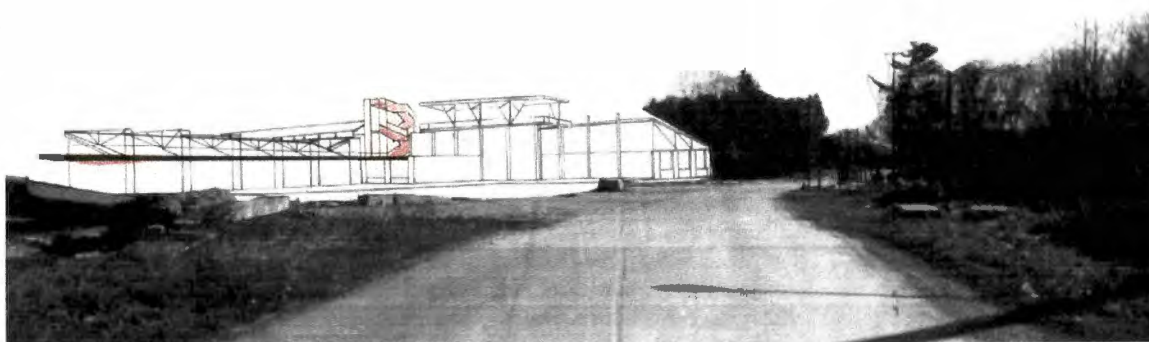


figure 76— Perspective view of the incubator building as approaching traveling east.



(a)



(b)

figure 77-Cross section of the site (a) from east to west in showing the incubator building in relation to the neighborhood, (b) north to south showing the incubator building in relation to the industrial corridor.



Figure 78— Site plan of the incubator building.

To allow for truck and mass transit access, the proposal includes a tunnel under the rail line at the Candora Road railway crossing. Enough grade change (24 feet) exists for a tunnel to ease connection to roads leading to the interstate (figure 78)

Cantilevering of the New Structure

The existing structure of the clerestory building is of steel columns and trusses. The columns line the interior space of the building and have a channel attaching them to each other. The channel supported a mobile crane for hauling large blocks of marble to the gangsaws used to cut the block into slabs before polishing. The structure is designed to carry an extreme amount of weight and shifting loads and appears to be in sound condition. The new structures of the stair, control booth, and meeting room can be cantilevered off the existing structure's steel columns and beams (figures 79 & 80). The new structure attaches like a vine over the old structure. It will be of lighter weight steel and the cantilevering will allow open arrangement of spaces that permit visual and physical interaction between work spaces, meeting rooms and circulation space. Supporting the bridge as it crosses the site are columns emerging from the landscape

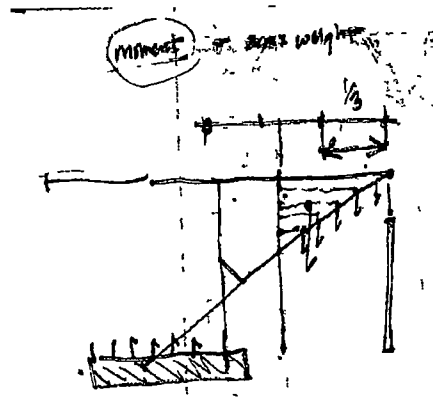


Figure 79— Moment diagram of the loading of the new structure supporting the bridge as it passes over the site

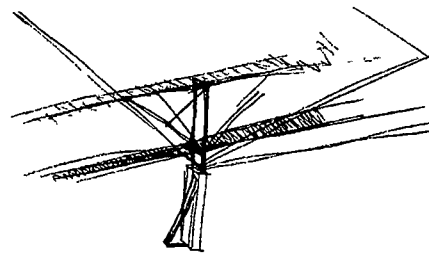


figure 80— Diagram of the cantilevering of the bridge as it leaves the east side of the building

Treatment of the Site Landscaping

The landscaping of the site is a key factor to the design approach. Across the yard of the Marbleworks, relics of marble production mark the process of bringing in marble from the quarries, finishing the stone, and shipping it out. As the bridges traverse the site, this can be observed from above. The bridge decking is of expanded metal mesh. As one crosses the bridge, the mesh seems solid in the distance, but is open enough to allow views through looking down directly in one's path of travel. The bridge is a straight horizontal plane passing over the undulating topography created by the mounds of marble pieces below. The columns supporting the bridge drive through the malleable upper layer to the ground beneath for support. Where the new program touches old, the landscaping is manipulated for reuse. Parking areas are sculpted where marble blocks once were stored and orient along the new grid. Where the stairway touches down on the site, a pathway is constructed using retaining walls of marble chips. The coincidence of old and new uses creates spaces that house new interpretation.

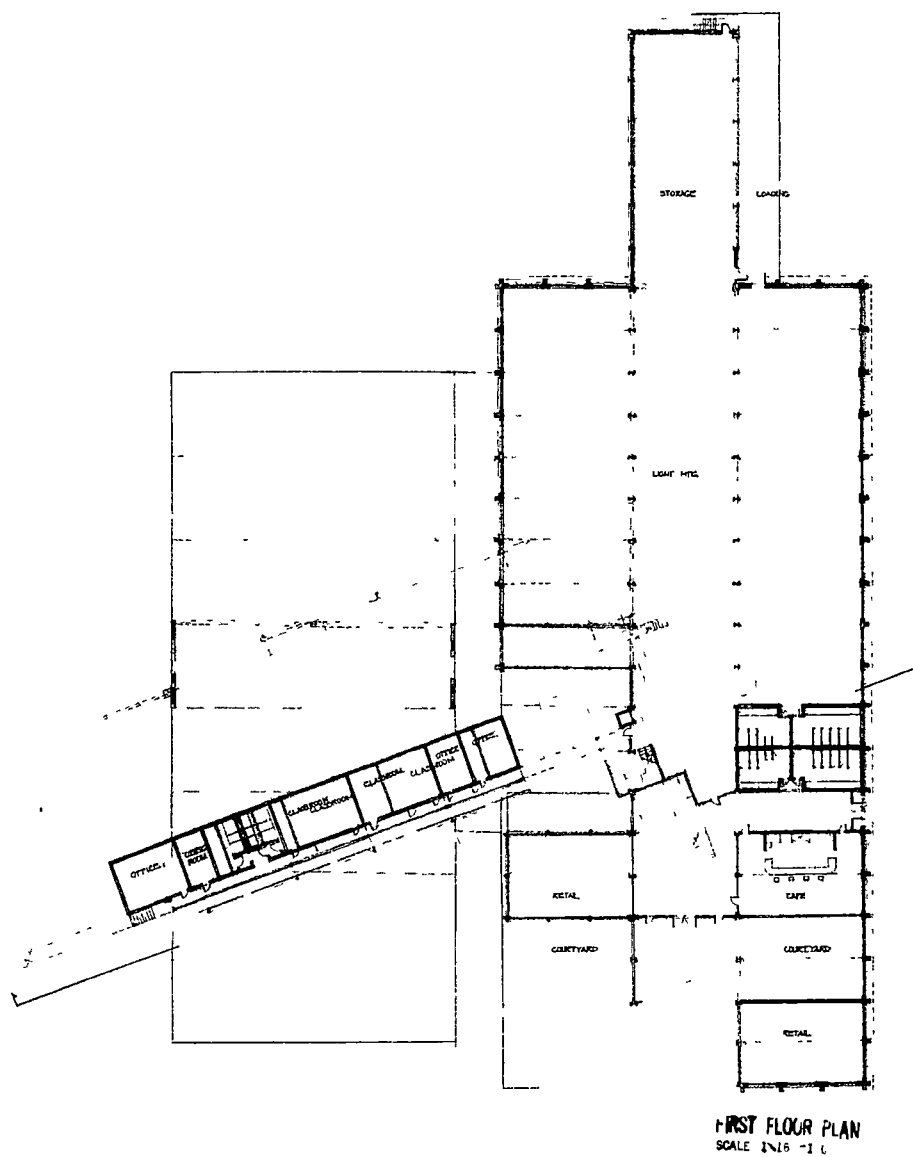


figure 81-First floor plan of the incubator building

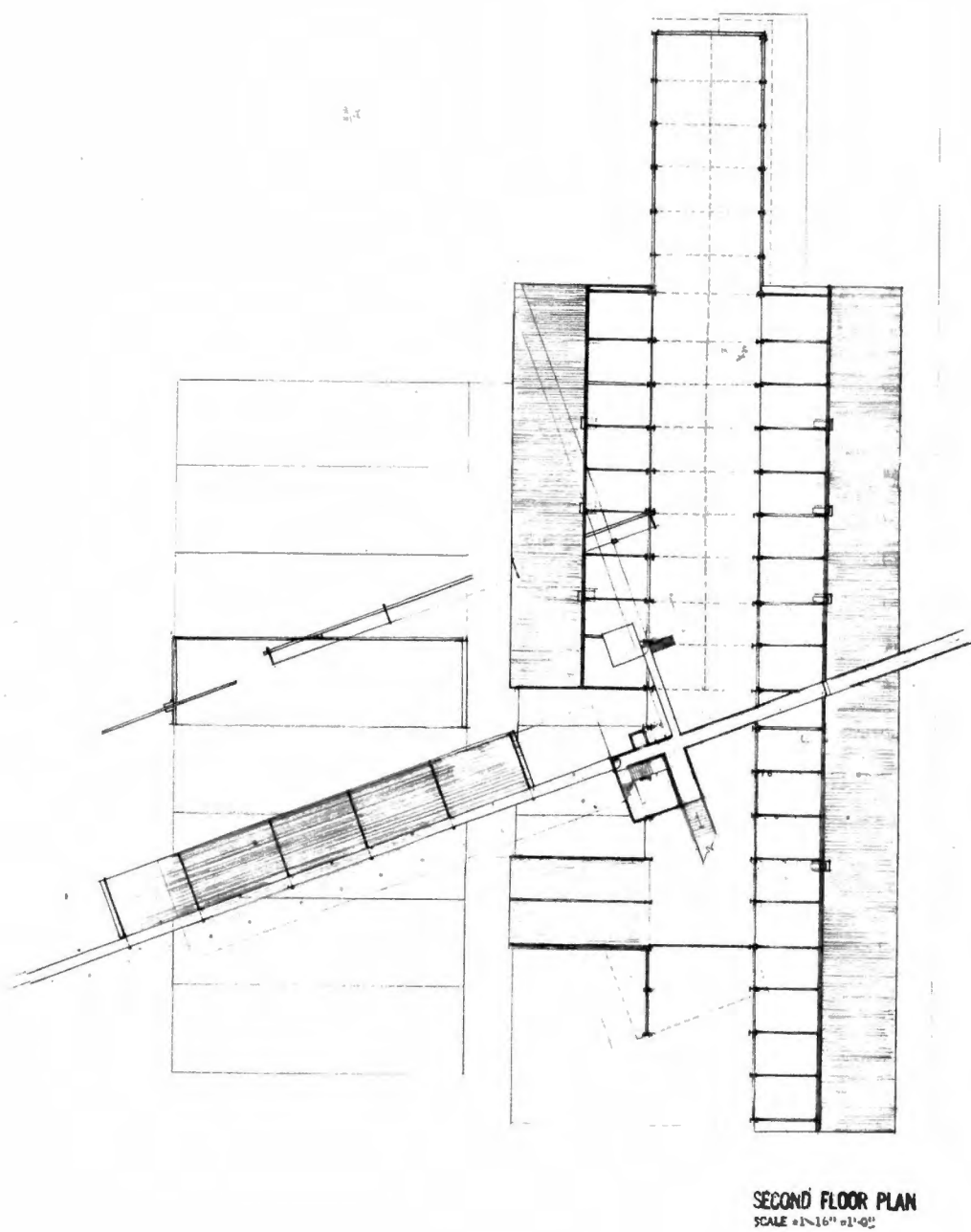


figure 82- Second floor plan of the incubator building.

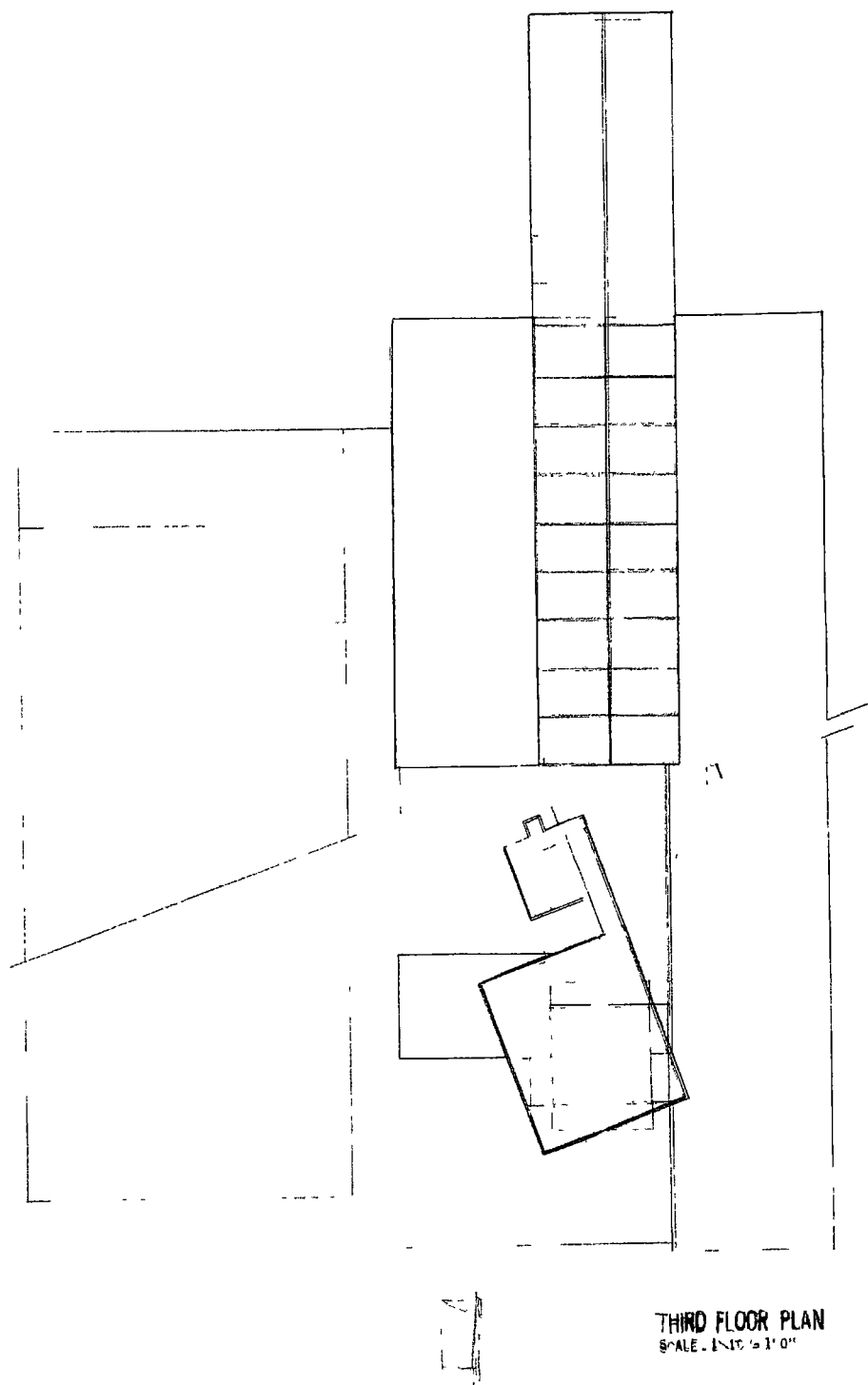


Figure 83— Thrd floor plan of the incubator building,

Creation of Space From Intersecting Structures.

The intersecting forms of the incubator building's structure and that of the clerestory building's steel frame allow for the reinterpretation of the existing building (figures 81-85). The roof is peeled back on the clerestory building to allow positioning of the incubator building. By opening parts of the existing modular grid, a contrasting series of voids are created. The opening at the west side of the building for the cooling tower, stairway, and elevator sets up a hierarchy between public and private areas where previously, the function of the building was that of linear production. The entry from Candoro Road is formed when the floor slab of the meeting room pushes out over its supporting structure of existing steel columns. The entry is thus defined by its sheltering form given shape by the juxtaposition of old and new structure. At every point where the new structure connects to the building and site the dichotomy restates the purpose of the building for the present while bringing attention to its past.



figure 84- Fron view of structural model of the industrial incubator .



figure 85-Side view of structural model of the incubator building.

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VITA

Gail Snodgrass was born in Knoxville, Tennessee on June 9, 1965. She attended grade school in Jonesboro, Tennessee where her family has resided for the last thirty years. She entered the University of Tennessee in the fall of 1983 and graduated with a Bachelor of Arts with a major of research psychology in the summer of 1987. After spending time working as a counselor and probation officer with state and local agencies, she returned to the University of Tennessee, Knoxville to pursue a degree in Architecture in the fall of 1994.

She is presently working as an intern architect for the firm of Zagrodnik and Thomas Architects in San Diego, California.