4-1978

A Maritime Office Center for the Charleston, S.C. Waterfront

Eric Clifford Aichele
Clemson University

Follow this and additional works at: https://tigerprints.clemson.edu/arch_tp

Recommended Citation
https://tigerprints.clemson.edu/arch_tp/127

This Terminal Project is brought to you for free and open access by the Non-thesis final projects at TigerPrints. It has been accepted for inclusion in Master of Architecture Terminal Projects by an authorized administrator of TigerPrints. For more information, please contact kokeefe@clemson.edu.
A MARITIME OFFICE CENTER
A MARITIME OFFICE CENTER
for the Charleston, S. C. Waterfront

by Eric Clifford Aichele

A terminal project submitted to the faculty of the College of Architecture, Clemson University, in partial fulfillment of the requirements for the degree of Master of Architecture.

APPROVED: April, 1978

Committee Chairman

Major Advisor

Head, Dept. of Architectural Studies

Dean, College of Architecture
## CONTENTS

Dedication

Acknowledgements

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0. Problem Statement</td>
<td>1</td>
</tr>
<tr>
<td>2.0. Background Data</td>
<td>3</td>
</tr>
<tr>
<td>2.1. Maritime Activity</td>
<td>4</td>
</tr>
<tr>
<td>2.2. Market for Office Space</td>
<td>6</td>
</tr>
<tr>
<td>3.0. Site Data</td>
<td>9</td>
</tr>
<tr>
<td>3.1. Port Relationships</td>
<td>10</td>
</tr>
<tr>
<td>3.2. City Relationships</td>
<td>10</td>
</tr>
<tr>
<td>3.3. Buildable Site</td>
<td>13</td>
</tr>
<tr>
<td>3.4. Site Analysis</td>
<td>14</td>
</tr>
<tr>
<td>4.0. Analysis</td>
<td>15</td>
</tr>
<tr>
<td>4.1.0 Historic Context Analysis</td>
<td>16</td>
</tr>
<tr>
<td>4.1.1. Theory</td>
<td>16</td>
</tr>
<tr>
<td>4.1.2. Design Criteria for Historic Areas</td>
<td>18</td>
</tr>
<tr>
<td>4.1.3. Case Study Analysis</td>
<td>20</td>
</tr>
<tr>
<td>4.1.4. Synthesis</td>
<td>29</td>
</tr>
<tr>
<td>4.1.5. Historic Analysis</td>
<td>31</td>
</tr>
<tr>
<td>4.2.0 Parking Facilities Analysis</td>
<td>32</td>
</tr>
<tr>
<td>4.2.1. Theory</td>
<td>33</td>
</tr>
<tr>
<td>4.2.2. City Relationships</td>
<td>35</td>
</tr>
<tr>
<td>4.2.3. Types of Parking Garages</td>
<td>37</td>
</tr>
<tr>
<td>4.2.4. Design Considerations</td>
<td>39</td>
</tr>
<tr>
<td>4.2.5. Case Study Analysis</td>
<td>42</td>
</tr>
<tr>
<td>4.2.6. Synthesis</td>
<td>47</td>
</tr>
<tr>
<td>4.2.7. Functional Analysis</td>
<td>54</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>4.3.0</td>
<td>Office Building Analysis</td>
</tr>
<tr>
<td>4.3.1.</td>
<td>Theory</td>
</tr>
<tr>
<td>4.3.2.</td>
<td>Site Relationships</td>
</tr>
<tr>
<td>4.3.3.</td>
<td>Function and Form</td>
</tr>
<tr>
<td>4.3.4.</td>
<td>Office Building Components</td>
</tr>
<tr>
<td>4.3.5.</td>
<td>Plan Configurations</td>
</tr>
<tr>
<td>4.3.6.</td>
<td>Modular Dimensioning</td>
</tr>
<tr>
<td>4.3.7.</td>
<td>Flexibility</td>
</tr>
<tr>
<td>4.3.8.</td>
<td>Efficiency</td>
</tr>
<tr>
<td>4.3.9.</td>
<td>Case Study Analysis</td>
</tr>
<tr>
<td>4.3.10.</td>
<td>Synthesis</td>
</tr>
<tr>
<td>5.0.</td>
<td>Program</td>
</tr>
<tr>
<td>6.0.</td>
<td>Concept</td>
</tr>
<tr>
<td>7.0.</td>
<td>Visual Presentation</td>
</tr>
<tr>
<td>8.0.</td>
<td>Footnotes</td>
</tr>
<tr>
<td>9.0.</td>
<td>Bibliography</td>
</tr>
</tbody>
</table>
To my parents and family, for their unending support and guidance.
I would like to express my appreciation and gratitude to the following persons for their help during the course of this project:

Dean Harlan McClure, for the outstanding educational opportunities which he has made available at Clemson.

Professor Robert Eflin, committee chairman,

Professors Donald Collins and Edward Falk, committee members,

Professors Fritz Roth and John Jacques, for their enthusiasm, optimism, and help.

Fellow students Frank Powell, Mike Taylor, Dwayne Vernon, Randy Guy, Bob Brenner, Earl Swisher, and Jack Blake, for their advice and encouragement.

Mr. Greg Prior, South Carolina State Ports Authority,

Pat Durham, my typist.
1.0. PROBLEM STATEMENT
The subject of this Terminal Project is the design of a Maritime Office Center for the Charleston, S. C. waterfront. The project site is located in the heart of the maritime business area in the historic district on the Charleston peninsula. This complex, initiated by the South Carolina State Ports Authority and in conjunction with the City of Charleston, will involve a general office building to be rented to maritime-related businesses and an accompanying parking facility.
2.0. BACKGROUND DATA
2.1 MARITIME ACTIVITY

The basic economy of the city of Charleston is largely dependent upon waterfront activities, and those activities located on the peninsula itself contribute greatly to this economic base.\(^1\) In the past 20 years, the port of Charleston has experienced a 95% increase in tonnage handled, from 4.0 to 7.8 million tons. Charleston has become one of the top 20 port areas in the United States, as measured by tonnage. In the value of goods handled, Charleston has consistently rated near the 15th position nationally.

It has been predicted that tonnage through the port of Charleston will grow by more than 75% between 1970 and 1980, with a straight line average of 7.5% per year. An additional 50% increase in tonnage is expected between 1980 and 1990. The total tonnage for the port for the next 20 years, then, will increase 205%, tripling the 1970 tonnages.
To meet these increased cargo-handling requirements, the S.C. State Ports Authority (S.P.A.) has taken steps to improve the efficiency of its internal operations and to plan for this future expected growth. It is estimated that approximately $150,000,000 will be required between 1975 and 1990 for up-to-date equipment and other capital investments. Over the past few years, the S.P.A. has constructed both a modern headquarters office building and a new passenger service terminal on the historic Charleston peninsula.

To maintain and improve upon its performance, however, the port of Charleston must depend not only upon S.P.A. capital investments, but also upon improvements in the efficiency of on-shore, port-supporting, private office operations. Services such as those of freight forwarders, custom house brokers, steamship agents, chandlers, stevedores, financial institutions, consulates, leasing agents, sales,
labor organizations, transportation and travel services and others must be provided by privately-owned companies in their own offices. The Maritime Office Center project was initiated by the S.P.A., in conjunction with the city of Charleston planning policies, to satisfy this need.

2.2 MARKET FOR OFFICE SPACE

As stated previously, the purpose of the Maritime Office Center is to provide office space for public agencies and private firms who have port related interests. To determine the more specific maritime office demand, a marketability and feasibility study was conducted by the S.P.A. This study also included an evaluation of the existing general office space potential in the city of Charleston.

According to the survey, the existing port-supporting services have located themselves in several scattered, small buildings surrounding the project site at the foot of Broad Street.
This area has traditionally been Charleston's financial, legal, and related professional office district. With port tonnages and cargo value both expected to triple by 1990, the survey identified a future demand for more new, expanded and efficient office space located within the closest proximity to the Port Authority's centralized functions. All port-related activities are expected to grow in size and space demands, and even the smallest increases in customer visits and employment will create further difficulties in already inadequate traffic circulation and parking conditions.

Through evaluation of demand and supply, it has been determined that there is also a very strong market for general office space in the city of Charleston. This market will remain strong even after the construction of new market rental space. Currently, Class A (excellent) and Class B (good) space make up less than 30% of the 240,000 square feet inventoried in the
peninsula city. It is believed that the Maritime Office Center, located in close proximity to the Broad Street financial and legal center and the S.P.A. headquarters building, will be an attractive location not only for maritime businesses but also for general office rentals. This general office space need and use of the Center will permit the Center to be profitably constructed now to meet future expanding maritime needs.
3.0. SITE DATA
3.1 PORT RELATIONSHIPS

The site selected for the Maritime Office Center and parking facility by the S.P.A. and the city of Charleston is closely related to most of the existing port activities. It is within one short block of the Cooper River waterfront, 2 blocks from the U.S. Customs House, across the street from S.P.A. headquarters building, and within one block of the new passenger ship terminal. Almost all non-industrial, private, port businesses are located within 2 blocks of the site. Waterfront and warehousing activities are located 3 blocks to the north of the site. The interstate highway system, which relates the site to its multi-state port service area, is 1-3/4 miles distant.

3.2 CITY RELATIONSHIPS

The relationship of the site to the surrounding urban area is unique in the city of Charleston. The historic site area is projected
to become part of the Broad Street Office-Financial District. To the east of the site, the city of Charleston plans to develop a waterfront park. Some of the eastern seaboard's finest restaurants are located in close proximity to the site area.

The physical environment of the surrounding area, however, leaves much to be desired. A report on this specific area conducted by the city of Charleston in 1973 states:

"The general condition of the study area is bad. Streets and public rights of way are poorly paved and in some instances, not paved at all. Sidewalks are lacking, and badly needed along many streets. Drainage is inadequate and needs better maintenance, with the obvious result that water frequently collects in low spots. The area serves as a primary parking opportunity for hundreds of people who work on Broad Street, but there is no parking system or regulation. Traffic is often con-
fused and congested and constitutes a possible fire hazard....some public owned properties are ill kept and are not being used for the best public purposes. Property lines are ill-defined and there are some obvious encroachments into public streets.6

Although many of these problems still plague the area, it has greatly improved in recent years, mainly as a result of renovation of the old warehouses in the area. Several renovation projects are currently under way and new offices and other services have opened recently. The historic and natural mixture of these functions provides an interaction and convenience which many communities strive to create. With these locational characteristics, the site has an initial and continuing absorption potential for both maritime and general office space accompanied by unmatched atmosphere and livability.7
3.3 BUILDABLE SITE

The S.P.A. has deed and title to the 1.5 acre buildable site located on the Cooper River waterfront. The site is bounded and dimensioned as shown in the site analysis. The construction of the Maritime Office Center is in keeping with surrounding development and the area's zoning status (limited business) and future plans for the area.

Presently, approximately 90% of the underutilized site is leased for ground level parking. A deteriorated 2 story office building of no historic or architectural value is the only structure on the site and will be demolished to permit orderly development. Otherwise, only a few minor obstructions must be removed. Development may necessitate the vacation and closing of North Atlantic Wharf between Prioleau and Concord Streets.
climatic conditions:

winter winds
summer winds
winter sunrise
summer sunrise

north

site section:

EAST BAY STREET
PRIOLEAU STREET
CONCORD STREET
MARS
PROPOSED WATERFRONT PARK
COOPER RIVER

climatic conditions:
winter winds
summer winds
winter sunrise
summer sunrise

SITE ANALYSIS
4.0. ANALYSIS
4.1 HISTORIC CONTEXT ANALYSIS

Tradition and aesthetics are very current and real factors in Charleston's architectural development, and for this reason, this section will analyze in general the different elements involved in the design of any new building in a historic area.

4.1.1 THEORY

To understand the problem of the design of a new building in a historic district, one must resolve the question of architectural and historic integrity. While maintaining the architectural and historic integrity of old buildings under restoration is a problem in itself, an even greater problem arises when decisions must be made in relating new construction to neighboring historic structures. The easy way out, which is taken in most cases, is to imitate the style, proportion, materials, color and all the elements of the historic buildings and areas. The result is a copy, and
after a few years of weathering, it becomes impossible to differentiate between the old and the new.

Proof of this approach to the problem of architectural compatibility can be found in any city. Grocery stores, gas stations, office buildings, hotels, funeral homes, churches and houses are all wrapped in antiqued packages. Designed in all sentimental appeal, the past has been applied as a pastiche on the present. The building industry, in conforming to the wishes of the designers, mass produces Georgian or American Colonial details, windows, doors, mantels, hardware and the rest. The industrialization of history has become a big business.

On the other hand, there are just as many contemporary buildings located in historic areas which pay no regard to their surroundings. Designs which disregard the scale, texture,
materials, and other relevant considerations for harmonizing with the old are detrimental to both the old and the new. In any environment, one must decide what will be foreground and what will be background architecture. In historic districts, the mold has been cast in the past, and the very predominance of the old requires that the new fit into the background and relinquish the foreground to the old.

"Since architecture is a living art, it is a great mistake to believe that the architects of today cannot build on the past without copying it - and by copying it they play a dirty trick on a dead civilization, and a living one." Good new architecture which relates and harmonizes with old surroundings is feasible, but there is no easy or set answer to this problem.

4.1.2 DESIGN CRITERIA FOR HISTORIC AREAS

The following design criteria for historic areas in different parts of the United States
are included to illustrate the different approaches taken by different historic areas. It must be realized that these criteria are set up for specific locations and cannot therefore be universally applied to this specific historic area. Those criteria which relate specifically to the Maritime Office Center will be analyzed at the end of this section.
The Criteria

1. Height. This is a mandatory criteria that new buildings be constructed to a height within 10 percent of the average height of existing adjacent buildings.

2. Proportion of buildings' front facades. The relationship between the width and height of the front elevation of the building.

3. Proportion of openings within the facade. The relationship of width to height of windows and doors.
4. Rhythm of solids to voids in front facade. Rhythm being an ordered recurrent alternation of strong and weak elements. Moving past an individual building, one experiences a rhythm of masses to openings.

5. Rhythm of spacing of buildings on streets. Moving past a sequence of buildings, one experiences a rhythm of recurrent building masses to spaces between them.

6. Rhythm of entrance and/or porch projections. The relationships of entrances to sidewalks. Moving past a sequence of structures, one experiences a rhythm of entrances or porch projections at an intimate scale.
7. **Relationship of materials.**
Within an area, the predominant material may be brick, stone, stucco, wood siding or other material.

8. **Relationship of textures.** The predominant texture may be smooth (stucco), rough (brick with tooled joints), horizontal wood siding or other textures.

9. **Relationship of color.** The predominant color may be that of a natural material, a painted one or a patina colored by time. Accent or blending colors of trim is also a factor.

10. **Relationship of architectural details.** Details may include cornices, lintel, arches, quoins, balustrades, wrought iron work, chimneys, etc.

11. **Relationship of roof shapes.** The majority of buildings may have gable, mansard, hip, flat roofs or others.

12. **Walls of continuity.** Physical ingredients such as brick walls, wrought iron fences, evergreen landscape masses, building facades or combination of these, form continuous, cohesive walls of enclosure along the street.
13. Relationship of landscaping. There may be a predominance of a particular quality and quantity of landscaping. This concern is more with mass and continuity.

14. Ground cover. There may be a predominance in the use of brick pavers, cobble stones, granite blocks, tabby or other materials.

15. Scale. Scale is created by the size of units of construction and architectural detail that relate to the size of man. Scale is also determined by building mass and how it relates to open space. The predominant element of scale may be brick or stone units, windows or door openings, porches and balconies, etc.

16. Directional expression of front elevation. Structural shape, placement of openings and architectural details may give a predominantly vertical, horizontal or non-directional character to the building's front facade.
Development Criteria TUCSON, ARIZONA

**1. Height**

New structures must be constructed no higher than the tallest building located within the development zone.

**2. Setback**

New structures must maintain the prevailing setback existing within the development zone.

---

Figure 1: Most of Tucson's early buildings were no more than 15 or 20 feet high, exclusive of the roof. Although most were single-story structures, modern buildings of that height can accommodate 2 stories.

Figure 2: These buildings on North Meyer Street have no front setback at all - their front facades are all located on their front property lines. This effect could be achieved in a number of ways - a high wall, a fence, or a dense hedge might be located on the property line, allowing the building, itself, to be set farther back.
3 PROPORTION

The idea of proportion refers to the relationship between the height and width of the front elevation of a building. The buildings shown in Figures 3 and 4 are about twice as wide as they are high - a proportion of 2 to 1. This proportion holds true for many of the buildings in the El Presidio and Barrio Libre areas. When most of the buildings in a development zone have similar proportions, whatever they may be, it would be destructive of the character of the zone for a new building to be constructed which had very different proportions.

Figure 3

Figure 4

Figure 5

Figure 5 shows a group of five buildings which have different heights, but which have the same proportions, and one which has different proportions. The odd building represents a new structure which does not relate well to the others because of its markedly different proportions.
4. PATTERN/RHYTHM

The recurrent alternation of solids and voids (wall to windows and doors) in the front facade of a building establishes a pattern which is sensed by a person observing the building from a distance. A person passing by the building experiences this pattern as a rhythm. By incorporating a similar rhythmic pattern in a new building, a sympathetic relationship between new and old may be achieved.

Figure 6

5. ROOF TYPE

The relationship of a new building to historic buildings in its development zone may be strengthened by repeating a roof type which is dominant within the zone.

Figure 7
SURFACE TEXTURE

Most of the buildings in Tucson constructed before 1890 were of mud adobe. In almost all cases, the adobe was subsequently covered with stucco. Thus, the buildings shared the common texture of their stucco surfaces. Many of the houses in the Armory Park and University Areas are built of brick, the texture of which is quite different from that of stucco. The suitability of new development in any of these areas would be enhanced by the use of building materials which possess a texture which is appropriate in the context of the other buildings within its development zone.

COLOR

Color is both an intrinsic quality of a building material, such as stucco, brick, wood, or metal, and an applied treatment which covers up the natural color of a material. The exterior surfaces of Tucson's early buildings were generally left without the addition of paint or stain. The natural colors of brick, native stone, and unpainted stucco dominate in the historic areas discussed in this report. Any new buildings or renovations should respect this tradition, as it is manifested in each development zone.

SITE UTILIZATION

The space between buildings is an important factor which contributes to the character of the entire group of buildings. Figure 10 shows a block face in the University area. The generous side yards visually separate each house from its neighbors. Figure 11 depicts a block in an older part of town where the spacing between buildings is either very narrow or non-existent. A new building should observe the appropriate spacing for its development zone.
9 PROJECTIONS

Buildings of the Spanish-Mexican period, for example, the Verdugo House (Figure 12), usually had no projections beyond the facade. As the influence of the Anglo immigrants to Tucson was felt, front porches began to appear on residential structures (Figure 13). The design of remodelings and new buildings in an historic district should take into account the presence or absence of such projections as porches, awnings, and overhangs on other buildings within a development zone.

10 ARCHITECTURAL DETAILS

Repetition of architectural details is another way of achieving an harmonious relationship between new and old buildings. But, it is not intended that the details of old buildings be duplicated with exact precision. Rather, they should be regarded as suggestive of the extent and scale of detail that would be appropriate on a new building or remodeling within a development zone.
TARBORO, NORTH CAROLINA
GUIDELINES FOR ARCHITECTURAL REVIEW

The historic district ordinance specifies that new construction in the historic district should be architecturally compatible with existing structures. "New" construction includes new buildings as well as additions or exterior alterations to existing structures. The Historic District Commission has the function of reviewing applications for new construction in the district. A set of design standards will be useful to the commission in evaluating architectural appropriateness. These standards must be comprehensive and as fair as possible. They should be equally applicable to all good examples of any architectural style so that bias towards one particular style does not occur. Thus, for example, a new building of modern design which meets the standards should be acceptable to the commission.

The following list is an attempt to informally define three related groups of guidelines: Basic Zoning Regulations, Architectural Design Components, and Environmental Relationships. It should be noted that some discussions of these guidelines will reiterate the descriptions of map data, since some map data were collected for the expressed purpose of assisting the Historic District Commission in making objective decisions based on these guidelines. It is very necessary for commission members to realize that the more they base their decisions on the data, the less arbitrary their decisions will appear (a factor which will be especially important if their decisions are ever appealed).

I. Basic Zoning Regulations

These regulations are primarily dimensional considerations which are also addressed, directly or indirectly, in the dimensional requirements of Tarboro's Zoning Ordinance. Whereas the zoning regulations are designed to establish minimum standards for the health, safety, and welfare of the town's citizens, the Historic District Commission must consider many of the same factors to determine the visual compatibility of new construction.
or alterations in the historic district. The Commission will not be dealing so much with predetermined minimums or maximums, but rather their decisions on dimensional considerations will be based on the existing characteristics of a lot's visually relevant environment. Land use, which of course is not a dimensional characteristic, must also be considered to establish a use's compatibility in the historic district.

**Lot Coverage**

Lot coverage is the percentage of lot area covered by the primary structure; building to lot coverage provides an important component of building spacing by being a measure of the density of developed land along each block front and on each lot. New construction should have a lot coverage similar to those of existing buildings in the area. For example, compare:
Setback

Setback is the distance from the edge of the right-of-way to the building front. Uniformity of front yard setback establishes a framework of order and coherence, and insures a strong and continuous streetscape. Consistency of setback is an especially important unifying factor where building styles vary. For example:

![Diagram showing setback examples (YES and NO)]

Height

Building height is the distance from the average finished grade at its intersection with the front of the building to the highest point of the building. Consistency of height is an important factor contributing to the scale and character of an area. Buildings quite different in height from the predominant pattern of an area will disrupt the area's structural relatedness. It should be realized that the perceived height frequently differs from actual height. The perceived height is a product of the number of stories, the relationship of height and width, the height of porches, and other visual
factors. The actual height depends mainly on the height of each story and the pitch of the roof. Both measurements of height should be considered. Compare:

---

**Land Use Type**

Land use type should follow that defined in the zoning ordinance for each area. Uses incompatible with a residential neighborhood should be avoided, such as off-street parking. It should be noted that certain non-residential uses which are compatible (such as lawyers' or architects' offices) may well work to the neighborhood's advantage by ensuring the upkeep of large homes which most single families would find prohibitively expensive.

**Spacing of Buildings**

Spacing refers to the distance between adjacent buildings. Closely spaced buildings have a strong spatial tension, or attraction, between them,
while buildings distant from each other have little force of attraction. Additionally, regular patterns of spacing convey a sense of order and cohesion; regularity of rhythm adds strength and continuity to the streetscape for an observer moving along a street. The spacing of buildings will be affected by the minimum side yard requirements in the zoning ordinance. Consider:

II. Architectural Design Components

Architectural design components refer to aspects of the design of each individual building. These components must be compatible within the building as a unit as well as with the building's surroundings. Design components help provide a sense of unity and coherence within the historic area.
**Exterior Building Materials and Roofing Materials**

The dominant building material of a particular streetscape may be brick or wood siding, for example; or, the dominant roofing material may be asbestos shingles or tin. A mixture of materials adds variety to an area, but a degree of variety which becomes chaotic should be avoided. Ideally, materials used in new construction should exhibit an affinity with existing materials in the area. Additionally, some building and roofing materials (such as artificial brick or stone siding) may be inappropriate for the style or character of existing buildings; the use of such materials in remodeling should be discouraged.

**Roof Form and Pitch in Relation to the Facade**

Roof forms in a given streetscape may be gable, hip, gambrel, mansard, or flat, and pitches may vary. Roof forms and pitches should be in harmony with the predominant type in the neighborhood. Consider:

![Diagram of roof forms and pitches](yes/no)
Shape and Form of the Building

The basic shape and form of the facades of new structures or additions should be compatible with facade shapes and forms already existing in the area. Facades with highly unusual or unorthodox shapes and forms may not be in harmony with existing structures, and they may call undue amounts of attention to themselves. Similar consideration should likewise be given to the shape and form of the building as a whole. Construction of additions and appendages should follow the guidelines under "Architectural Design Components" so that they will respect the original design in the use of materials and details, as well as in the shape and form. (However, it must be recognized that "Victorian" architecture delighted in unusual shapes and forms and in asymmetry. Victorian houses may have polygonal bays, turrets, unusual gables, and oddly placed windows. "Unusual" additions to such structures may be entirely compatible with the original design and may fit well in the neighborhood, if they are thoughtfully designed.)

Expression of Architectural Detailing

Details such as lintels, cornices, stained glass, foundation materials, and chimneys give a building or set of buildings an identity and a distinctive character. Older buildings in particular tend to display a very fine level of detail. New construction should seek to reflect the level of detail in an area; blank facades introduced into an area of detailed buildings will disrupt the quality of design.

III. Environmental Relationships

These guidelines refer to the relation of each building in its surrounding environment. Considering the area of a district with its many inter-relationships, rather than as a collection of unrelated buildings, is vital. Guidelines for environmental relationships require such consideration.
Orientation of Buildings to the Street

Consideration should be given to the orientation of new construction to the street in relation to existing dominant pattern. For example:

![Diagram showing orientation of buildings to the street](image)

Scale

Scale refers to the size of units of construction and architectural details in relation to the size of man; the elements of scale may be brick or stone units, windows or door openings, and porches. Human-scaled units are most appropriate to a historic district environment, since they are conceived in proportion to man. Scale is also determined by the relationship of the building mass to open space. A human scale is once again desirable,
creating a sense of livable comfort and security. More massive scales and volumes are threatening to man, since it is difficult to identify with them. Consider:

Units of Scale

![Diagram of proportions]

Proportion of Width to Height of Total Building Facade

The proportion of width to height of the total building facade should be considered in relation to the proportions of the existing buildings in the area. Buildings out of keeping with their surroundings with regard to their proportions are apt to disrupt the rhythm of the streetscape and to call undue amounts of attention to themselves. Consider:
Surface Textures

Texture effects result from the nature of the materials used, such as the horizontal regularity of wood siding, or the roughness of brick with tooled joints. Texture may also result from the repetition of architectural details, such as porch balustrades. New buildings using textured materials or details are less obtrusive in old areas of finely-scaled detail.

Proportion of Width to Height of Openings

This proportion of width to height applies to openings within the facade, such as doors and windows. In a sequence of buildings, the use of similarly proportioned openings will help establish the relatedness of structures. Openings which vary significantly within a given facade, or openings which vary significantly from that which exists in surrounding buildings, may have a disruptive effect on the character of an area. For example:
Utilization of Regional Architectural Traditions

Use of forms which are especially indigenous to the area, such as porches or cupolas, should be encouraged in order to enhance the elements which contribute to the distinctive character of the district. Motifs in detailing which are prevalent in the district, such as certain stained-glass forms or types of bracketing, should be retained wherever possible for their continued contribution to the area’s unique qualities.
4.1.3 CASE STUDY ANALYSIS

Each historic district is unique and, therefore, each attempt to marry new architecture with old should be regarded differently. There are, however, several basic design criteria common to all works of architecture, be they old or new, which when analyzed may enable the designer to successfully blend new architecture into a historic district. Listed below in declining order of importance, the following criteria will be used to analyze the case studies which follow.

1. The mass of the buildings (height to the cornice line and relation of the set back to its surroundings),
2. the color, texture, and materials of the building,
3. the scale of the building, and much the least important,
4. the style of the building.15
New York State Bar Center
Albany, New York (1971)
James Stewart Polshek and Associates

Rather than tear down a row of mid-19th century townhouses for the building, the architects saved the facades and the first 30 feet of the old structures and built the new structures behind the old buildings. The new structure, which houses a reception area, library, offices, and conference rooms for the state bar association, is linked to the old buildings, which house executive offices, by a corridor through one of the old structures.

Mass relationship: The new work is larger in volume than the old work saved, but it is fragmented into 3 simple masses on the exterior which cascade downward toward the large simple rectangle of the old structures.

Color, texture and material relationship:
Major materials used are limestone and brick which relate to the surrounding
residential and governmental building. The limestone is carried around the corner and used on the side facade of the old building to give a material connection.

Scale relationship: The 3 stepped elements were scaled to harmonize with the surrounding residences and not necessarily to the structures in front of them.

Style relationship: The new addition has been described as being "semi-brutalistic," while the old structures are typical mid-19th century townhouses.\textsuperscript{16}
Jehovah's Witnesses Headquarters
Brooklyn Heights, N. Y. (1970)
Ulrich Franzen and Associates, Architects

The final design for this complex climaxed a long series of attempts to harmonize the old with the new. The first 5 attempts (by another architect) had been described as 1.) "Historic, therefore Georgian," 2.) "Bleak and bland," 3.) "Federal variations on the Grand Concourse style," 4.) "Berlage and Richardsonian," and 5.) "Times Square variations on the new brutalism." Franzen was called in as a consultant at the request of the New York Landmarks Commission who believed that "if you want good architecture, hire good architects."

Mass relationship: The parapet of the new building was aligned with that of the old.

Color, texture and material relationship:
Brick was used that closely resembles the brick used elsewhere on the street.
Scale: The facade of the new structure was broken up with 3 "bay window" elements which echo those of the neighboring buildings and provide a recognizable element of scale.

Style: The attempt at a certain "style" in the 5 earlier designs and the lack of compromise in the style of the final design illustrates that style is the least important of the criteria.
John Carl Warnecke and Associates, Architects

Two large office buildings were designed as a backdrop for the square, with one building on each side. Warnecke tried to keep the continuity of the old structures lining the square by placing the new, larger buildings behind the old. The architects believed that bulk and silhouette were the primary determinants of fitness.

Mass relationship: Part of the complex was designed as a low infill building of the same cornice height to maintain the consistent row of facades. The large mass of the new construction was set behind the old.

Color, texture, and material relationship:
Warnecke chose a dark brick harmonious in color with the brick of the surrounding houses because he believed that darker buildings tended to recede and become less
obvious. The buildings, however, have been criticized as quite prominent, since most of the major buildings in Washington are light-colored.

Scale relationship: The buildings have been criticized as "scaleless" because colored mortar was used with counteracts the scale of the brick, making the buildings appear monolithic.

Style relationship: The buildings have been criticized as having an "empty character" because they are too large to settle into the background without a character of their own.
The architects' solution was to create a backdrop building so that the historic Octagon House at the focus of the triangular site could dominate the complex.

Mass relationship: The building was designed to maximum height allowable (90 ft.) to block out adjoining buildings and form a continuous backdrop for the older structure. The diagonal masses of the old building are linked to the corresponding diagonal masses of the new building.

Color, texture, and material relationship:

The original brick walls of the Octagon House garden have been extended and refurbished. Brick paving, similar in color to that of the Octagon House, has been used on the connecting plaza and extended into the new building to integrate the old spaces and materials with the new.
Scale relationship: As much space as possible was given to the Octagon House and its garden to create a successful scale relationship between the old and the new. Elements of the new building which were smaller in scale than the Octagon House have been emphasized for contrast and balance. The top floor of the building was set back so that from all vantage points close to the building, there appear to be 6 rather than 7 floors to the building.

Style relationship: The competition program for the project demanded "a building of special architectural significance, establishing a symbol of the creative genius of our time, yet complementary, protecting, and preserving a cherished symbol of another time, the Octagon House."
4.1.4 SYNTHESIS

Recognizing the historic context in which this project will be placed, certain goals and objectives have been defined:

Massing Relationship

- The complex must and should conform to the height limitation of 50 feet as suggested by the City of Charleston Zoning Ordinances.

- The complex should be located as close to the property line as possible in order to maintain the dense vertical massing which is predominant in the surrounding area.

Color, Texture, and Material Relationship:

- The complex should acknowledge the color, texture and materials found in the surrounding area (mainly brick and stucco) and void any conflicts with the existing.

Scale Relationship:

- The complex should recognize the vertical and horizontal dimensional qualities of the neighboring buildings and attempt to maintain this scale and proportion.

- The complex should recognize the urban street scale surrounding the site and be located in such a manner as to strengthen this scale around the given site.
The complex should emphasize the street scale rather than the unit scale and take into consideration what is across the street.

General:

- The complex should recognize the historic wharves which have evolved into streets and the views down these streets to the water.
vertical proportions:

<table>
<thead>
<tr>
<th>primary</th>
<th>secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>window openings</td>
<td>shop or entry level</td>
</tr>
<tr>
<td>location of 17th-18th century wharves</td>
<td>property with buildings of good architectural design quality which should be preserved</td>
</tr>
</tbody>
</table>

horizontal proportions:

- property with buildings of exceptional architectural design quality which should be preserved at all costs
- property which may have little architectural significance but which are in scale with the neighborhood
- property which can be developed to further architectural or historical objectives

HISTORICAL ANALYSIS
4.2.0 PARKING FACILITY ANALYSIS

The most critical auxiliary use to the development of the Maritime Office Center, according to the marketability and feasibility study conducted by the S.P.A., was that of employee and customer parking. This, along with the fact that the actual building site and the general study area are both presently overcrowded with cars, is the reason why this section will analyze in general the various solutions to urban parking problems.
4.2.1 Theory

The following considerations concerning the accommodation of automobiles in urban areas are based on the assumption that, with the high degree of car ownership in the U.S. today, it will no longer be possible for the motorist to leave his car anywhere at the curb in urban areas. This assumption can be further illustrated graphically (see drawing). Assuming an average of one car for every 350 sq. ft. of office floor area, the amount of space necessary for parking at ground level would cover an area that could easily accommodate another office building. This area comparison clearly shows that parking in urban areas can only be accommodated in multi-story facilities.  

The parking facility, besides performing its role as a reservoir for stationary automobiles, has another function within the urban area—that of a mediator between the motorist and the pedestrian. While in an automobile, the
motorist's world is governed by the laws of dynamics, and he requires facilities designed for high speed motion. But, as soon as he leaves his automobile, he becomes a pedestrian, and his world is governed by laws of statics. His main concerns now are congenial and safe surroundings and a place where he can unbend and relax. 21

In many urban areas, however, urban pedestrian areas have had to yield to facilities for the motorist. Parking facilities, however, if properly designed, can help to solve this problem by serving as a transition zone between the world of the motorist and the world of the pedestrian. These facilities should be well lit and provide safe and easy orientation for motorists as well as pedestrians. Motorists, once they leave their cars, should not have to walk extremely long distances to elevators or stairs, and walkways should be clearly marked with paint along the pedestrian aisles. Outside,
the entrances and exits to the parking facility should be located so as to minimize the conflict between pedestrians and motorists. In many facilities, the ground floor is devoted to display or merchandising purposes to further the transition between motorists and pedestrians.\textsuperscript{22}

4.2.2 CITY RELATIONSHIPS

In the areas where parking demands are greatest, the downtowns of major urban areas, economics usually demand that real estate be set aside for more important uses, such as for offices, apartments, or retail businesses. Past examples have shown, however, that if these urban areas are to survive, automobiles must be accommodated to a certain degree and these automobiles must be able to come to rest. "In cities of the future, parking structures will therefore be just as important as the facilities for moving traffic."\textsuperscript{23}
It is no longer a question of whether parking facilities should be built, but how they can be built to better co-exist with existing urban environments. Several things can be done to better integrate these parking facilities with the urban environment. First, parking facilities should be located so that they compliment the existing or proposed traffic arteries. The implementation of this concept can range from particular types of roads which tie into particular types of facilities to single facilities which are laid out to conform with existing street patterns. These existing street patterns may determine the entrances and exits to the parking facility and the directional flow inside the garage. Secondly, as stated previously, parking facilities should be related to pedestrian zones and open spaces. And lastly, since parking garages must be located in urban areas on valuable pieces of real
estate, thought should be given to using part of the parking facility for more economical uses, such as apartments, offices, or retail businesses which can return a higher revenue. To this end, parking facilities have been built with these types of uses located both above and below the parking decks.25

4.2.3 TYPES OF PARKING GARAGES

Basically, a parking garage is a fairly simple building with only a few components: decks, columns, balustrades, ramps or lifts for cars, and stairs and elevators for people. These different components, however, have been combined in a variety of ways so that several different types of garages have evolved.26 The four types of garages are:

Straight ramps (between full-level floors):

Straight ramps are the easiest for the motorist to negotiate. When ramps are placed along the side of the parking
decks, the layout becomes clear and easy to follow. Automobiles can enter and exit easily from this type of garage.

Straight ramps (between split-level floors): This type of garage is more economical in space than ramps between full-level floors. The ramps are located within the garage and may be of steeper grade. Garages with only one set of staggered floors provide easier orientation for motorists than garages with more than one set of staggered floors.

Helical ramps: For this type of garage, the ramps must not give the impression of steepness and must be well lit and oriented so that the lane can be recognized far ahead. Helical ramps may be used up to heights of 10 levels.
Ramped floors: When the actual floors of the garage are sloped at approximately 5 to 6%, the motorist hardly notices the slope, and this type of garage becomes one of the optimum solutions to the parking garage. One way traffic is easy to achieve. This solution is very efficient as ramp space and parking space are one in the same.

With ramped floor garages, however, problems arise in trying to relate the exterior to surroundings, as the incline of the ramps will always contrast with the horizontal and vertical orientation of adjacent buildings. 27

4.2.4 DESIGN CONSIDERATIONS

In the design of parking facilities, there are certain basic concepts which have become standard.

1.) "A parking deck should be built with clear span construction." This means
that the parking deck should span 50 to 56 feet between supports, perpendicular to the flow of traffic. Although clear-span construction may result in a 15% higher construction cost in most designs, it is advisable in parking garages for 2 reasons: 1.) flexibility - if automobile dimensions change drastically, then stall sizes and parking angles can easily be changed to coincide with these new dimensions; 2.) safety - cars are less likely to hit columns which are spaced further apart.

2.) "Parking stalls should be laid out at an angle between 45 and 60 degrees." In this range of angular parking, motorist can usually park an automobile with one maneuver rather than the 2 or three maneuvers it usually takes with 90 degree parking.
3.) "Decks should be laid out with a clearly defined one way traffic flow." With this type of system, if a motorist follows the defined traffic flow, he can then find the first space without having to choose which aisle to take. This type of circulation system should not be used with garages of more than 500 or 600 cars.

4.) "A parking deck should have some sort of express exit ramp." A motorist should not have to pass 500 to 600 spaces in order to exit a garage.

5.) "The elevators should be situated as close as possible to the customer's destination." In small garages, where walking distances will not exceed approximately 300 ft., elevators should be located in relation to the traffic generator. The reason for this is that walking distances inside a garage seem
much less than the walking distance from the elevator to the destination once outside the garage. The number of elevators depends on the number of parking spaces in the garage, with 1 elevator for 250 cars an average figure.  

4.2.5 CASE STUDY ANALYSIS

The following case studies were selected to illustrate the various types of parking facilities. When possible, garages were selected which were located in historic areas of the city.
Zublin Multi-Story Car Park
Stuttgart, Germany (1961)
Heinz Moritz, Architect
Type: Ramped floor garage
Capacity: 570 cars

Pedestrian relationship: Since the main vertical circulation elements are located in the center of the garage, pedestrians must cross traffic inside the garage to exit.

Traffic flow: One way flow.

Relation to Streets: Short spur roads connect the garage to major arteries.

Entrance and exit is at centrally located control point.

Auxiliary uses: Service station is located in front of structure.

Construction: The structure is formed by two rows of two columned cantilevered reinforced concrete frames. The column spacing is 18 feet with a span of 33 feet plus an 11 foot cantilever.
Victor Hugo Parking Garage
Toulouse, France (1958)
Cabinet Genard, Architects
Type: Helical ramp garage
Capacity: 650 cars

Pedestrian relationship: Pedestrian access is located at each end of the structure and opens onto the side streets of the block.

Traffic flow: On each floor one of the helical ramps is for going up while the other is for going down. Parking stalls are laid out to encourage one way flow.

Relation to streets: The entrances and exits are adapted to the one-way traffic on the streets which flank the garage.

Auxilliary uses: A market hall occupies the entire ground floor with a mezzanine floor above used for offices and restaurants.

Construction: The reinforced concrete columns are spaced on a 19 ft. - 6 in. module.
Grottenau Parking Garage
Augsburg, Germany (1957)
Gerd Wiegard and Heinrich Hanusch, Architects
Type: Straight ramps between staggered floors (split level type)
Capacity: 330 cars

Pedestrian relationship: Since the garage was located in the center of a historic city block, new pedestrian passageways were cut through the block to link the garage with other parts of the city.

Traffic flow: Two-way traffic on both ramps and decks.

Relation to streets: Entrances and exits are provided to the center of the block off of main streets by narrow passageways.

Auxiliary uses: Service station is provided near both entrances and exits.

Construction: The cantilevered reinforced concrete frames are on a 24 ft.-7" by 28 ft-10 in. module. The intervals between these frames are spanned by ribbed floors.
Parking Garage for Farmer's Trading Company
Auckland, New Zealand (1955)
McKay, Gerbic, and Partners, Architects
Type: Straight ramp between full-story floors
Capacity: 550 cars

Pedestrian relationship: The stairs are located in the center of the garage. There is a pedestrian bridge across a street which connects the garage to a department store. There is, however, no direct link between the stairs and the bridge.

Traffic flow: One way traffic-loop.

Relation to Streets: Entrance is from one major street at mid-level while exit is to the same street but on the opposite side of the garage from entrance.

Auxiliary uses: The lowest level contains a service station.

Construction: Structural grid of 34 ft. by 34 ft. with a 13 ft.-9 in. cantilever on each side.32
4.2.6 SYNTHESIS

The parking requirements for the Maritime Office Center (approximately 500-600 cars) will necessitate that a multi-story structure be included as part of this complex. The most important considerations, outside the normal design requirements for this type of structure, will be concerned with design relationships: the relation of the parking facility to:

1.) the existing surrounding buildings,
2.) the existing and proposed pedestrian ways, 3.) the existing and proposed traffic arteries, and 4.) the proposed office building.

Several different locations for the parking structure will be analyzed in terms of these 4 relationships.
Location A (property not owned by S.P.A.):

1.) Relationship to surrounding buildings:
   With this location, the parking facility would relate directly to the Broad Street generator and indirectly to the surrounding office buildings and restaurants. This location would be the most distant from the S.P.A. headquarters building.

2.) Relationship to pedestrian ways: Assuming that entrances and exits can be provided off of East Bay and Concord Streets, then either North Atlantic or Mid-Atlantic Wharf could become pedestrian links to the Broad Street generator.

3.) Relationship to existing and proposed traffic arteries: Entrances and exits could be accomplished directly off of East Bay and Concord Streets, both major arteries.

4.) Relationship to proposed office building:
With the parking facility located on additionally acquired property, the office building, as proposed, would not completely occupy the rest of the S.P.A. owned building site. This would allow the proposed office building to be located at the northern end of the site or directly adjacent to the parking facility with the remaining land put to another purpose.

Location B:

1.) Relationship to surrounding buildings:

With this location, the parking facility would relate more directly to the Broad Street generator than to the S.P.A. headquarters building. It would still relate to the surrounding offices and restaurants also.

2.) Relationship to pedestrian ways:

North Atlantic Wharf, which is the existing major pedestrian way to
Broad Street, or middle Atlantic Wharf, which is tree shaded and intimately scaled, could be converted into pedestrian ways.

3.) Relationship to existing and proposed traffic arteries: Concord Street and Prioleau Street would have to serve as the major arteries feeding the garage as both North Atlantic and Mid-Atlantic Wharves would be too narrow for major automobile traffic.

4.) Relationship to proposed office building: This location of the parking facility would require that the office building be located at the northern end of the S.P.A. owned building site.

Location C:

1.) Relationship to surrounding buildings: With this location, the parking facility would still relate to the S.P.A. headquarters building to a large degree, but
it would also now relate more to the surrounding office buildings and restaurants.

2.) Relationship to pedestrian ways:
Gendron and/or Cordes Streets, both narrow, pedestrian-scaled streets, could be converted into pedestrian ways to link the parking facility to East Bay Street and the Broad Street generator.

3.) Relationship to existing and proposed traffic arteries: Entrances and exits to and from Vendue Range at the midpoint of the block or from Concord or Prioleau Streets would all be possible with this location.

4.) Relationship to proposed office building:
With this parking garage location, the proposed office building would be located at the southern end of the S.P.A. owned building site, and the office building would therefore relate more
directly to the Broad Street office center than to the S.P.A. headquarters building.

Location D:

1.) Relationship to surrounding buildings:
With this location, on the S.P.A. headquarters building parking lot, the parking structure would relate directly to the headquarters building across Concord Street and to office buildings in the immediate surrounding area. This would be the best location from the "historic context" point of view, as the facility would be hidden behind existing historic structures to the south and west. It would face the contemporarily-designed S.P.A. headquarters building on the east and non-historic office buildings on the north.

2.) Relationship to pedestrian ways:
A human-scaled pedestrian link could be
created between the existing historic buildings to connect the parking facility to the actual building site.

3.) Relationship to existing and proposed traffic arteries: Entrances and exits to and from the garage would be provided from Concord Street and East Bay Street, both major arteries north of the site area.

4.) Relationship to proposed office building: With the parking facility located here, the office building would have to be located at the extreme northern end of the building site.
4.3.0 OFFICE BUILDING ANALYSIS

As the market studies have indicated, there is a large demand for general and maritime office space in the city of Charleston. The purpose of this project is to design an office building to meet this demand, and for this reason, this section will deal with the design and planning of office buildings in general.
4.3.1 THEORY

The one feature which differentiates a modern office building from any other type of architecture is the use to which it is put. The modern office building is the ultimate symbol of the machine age—a building built as planning and administrative center for a machine society in which machines play an insignificant role. "For that is the most important fact about modern office buildings: They are the largest and most complex structures ever built solely for human beings and to answer human needs."³³

The human element must be predominant in office building design because office functions are carried out primarily by people rather than by machines. The needs and requirements of office buildings vary even more than those of a factory because a business office does not have the assembly-line work flow of a factory. For this reason, an office building must be
broken down into separate work units which must eventually come together into a cohesive whole. It must also be flexible enough to encompass the widely varying groupings and needs of the people who work in it.

In the years after World War II, the office building underwent a major change as businesses grew and their organizations became more and more complex. Not only was more space required, but also more individualized design and layout of that space. The large, open plan, flexible office space has become widely accepted, and new factors must be considered by the designer. Designers must consider the fact that office workers, much more so than factory workers, must have a sense of identity with their organization in order to do their best possible work. The designers, therefore, must realize that each office worker is an individual, and the office environment must stress the importance of the
individual qualities of the worker. Since offices have increased in size and complexity, designers must strive to develop a human scale to prevent the individual from becoming submerged in a great mass of fellow workers.\textsuperscript{34}

4.3.2 SITE RELATIONSHIPS

There are certain site considerations which must be included in the design of an office building on an urban site. The first of these considerations deals with size. Obviously, the site must be large enough to accommodate the proposed structure and any preplanned wings or additions to the structure. In addition to the actual building requirements, space for automobile parking and site landscaping should be considered in the size of the office building site.

Another important consideration deals with the site's relationship to services such as banking, shopping, and public transportation.
These should be nearby and easily accessible. Access to power, steam, gas, plumbing and sewerage, and telephone services should also be available.

The area surrounding the site should also offer certain amenities. The office building should be located in an area where land use is compatible with the office building development and the area should show promise for the future. The site should not, if possible, be bordered by structures which will limit the amount of natural light available to the offices. If pleasant views or vistas are available from the site, they should be considered in the location of offices within the building.\(^\text{35}\)

4.3.3 FUNCTION AND FORM

In the development of office buildings, certain types of floor plans and vertical functional compositions have evolved for office buildings. As early as the end of the
19th Century, Louis Sullivan devised a 3-fold division in the vertical arrangement of multi-story office buildings. In his concept, the ground floor was reserved as a zone for large rooms or halls for public purposes. The next zone started above this ground floor level and consisted of several floors of offices with more closely spaced columns. The uppermost zone, at the top of the building, was set aside for the mechanical equipment necessary for the building. This concept, although modified over the years, has proved to be very sound, since it was based on a correct analysis of the actual conditions.

With rented office buildings located in the business center of a city, the use of the ground floor for shops, banks, and etc... is logical. With this use, the ground floor will differ functionally as well as structurally from the office floors above. If the top floor is recessed or set aside for residential pur-
poses, then Sullivan's 3-part vertical division will still be obtained. Even when shops are not located on the lower level, it is usually differentiated from the upper levels of offices to give it an impressive appearance or so that it can be used for display purposes.  

4.3.4 OFFICE BUILDING COMPONENTS

Private offices are necessary for reasons of security, visitor traffic, and the nature of the work. They are needed to provide privacy for confidential conversations and should only be large enough for the occupant to conduct his everyday affairs with a reasonable amount of dignity. They should be no smaller than 100 sq. ft. and no larger than 300 sq. ft.

Semi-private offices are used when it is necessary to house members of a work team or other groups of employees assigned to a common task. This type of office is assigned
to 2 or more people and can be enclosed by ceiling height, 3/4 height, or bank-type partitions. They should be no smaller than 300 sq. ft. and no larger than 400 sq. ft.

General or open plan offices are large open spaces which include room for employees, supervisors, furnishing, equipment, and circulation space. The advantages to this type of layout include more flexibility, more efficient space utilization, better office communications, better lighting and ventilation, better flow of work, better supervision of employees, and elimination of partition costs. This type of space should be sub-divided if it is for more than 50 people.

Conference rooms designed specifically for conferences, assemblies, and meetings, should be provided so that the large private offices do not have to serve for that purpose.
They should be centrally located within the interior sections of the office building to prevent distraction and the need for window coverings during visual presentations. They should be accessible from corridors or through reception areas. Conference rooms should be designed for average attendance and not maximum attendance (in which case chairs can be used to provide additional seating.)

Circulation aisles should serve only for ingress and egress requirements and should be sized according to the amount of traffic each aisle must carry. Main aisles from heavy traffic areas which lead to exits should be approximately 5 ft. wide, moderate traffic aisles should be approximately 4 ft. wide, while aisles between rows of desks should be approximately 3 ft. Circulation in elevator lobbies should be 6 to 9 ft. wide if elevators are on one side only;
10 to 12 ft. if elevators are on both sides. Main building corridors are usually 5 to 6 ft. wide, wider if very long, narrower if very short.

Lobby or reception space should be carefully designed since it is the visitor's first impression of an office building. It should be aesthetically pleasing, easily maintained, "professional-looking," and most importantly, large enough to accommodate expected visitor traffic. Approximately 10 sq. ft. of lobby or reception space per expected visitor should be provided. 37

Building core must contain basic office services which are either required by law, necessary for the building to function, or included as a convenience.

1.) Building stairs function primarily in carrying traffic between 2 adjoining floors. They should be easily accessible
and no more than 100 to 150 ft apart in order to establish convenient traffic patterns.

2.) Fire stairs, exits, vestibules, hoses, extinguishers, and shafts must be included in any office building layout and approved by the local building inspector.

3.) Toilets, and in some cases powder rooms for women, as well as plumbing space and ventilation shafts should always be located in the building service core.

4.) Elevators must be provided to supplement stairways and transport the handicapped.

5.) Janitor's closets are necessary to house the janitor's mops, pails, cleaning machinery, supplies and clothing. They should also include a utility sink and space for storage of paper towels, soaps, toilet tissues, etc...

6.) Freight elevators should be located either near the passenger elevators or
near the loading platform. In small office buildings, passenger elevators may serve as freight elevators in the early morning or evening hours.  

4.3.5 PLAN CONFIGURATIONS

The plan arrangement of an office building should be based on 2 factors: 1.) the location of the core, and 2.) how the various components of building are reached once one leaves the core.

Core location:

Central (interior) location of the core has several advantages. First, all the exterior window space can be utilized for naturally lit rented offices, which depending on the plan configuration, can vary in depth. Centrally located cores also provide convenient access to all parts of the building for both people and utilities. This arrangement also allows for flexible tenant distribution and sim-
plifies the division of the floor area. When used with a square building plan, with exterior bearing and the core as supports, extremely flexible, column-free office space can result. The major disadvantage to this location is that floor-area-consuming circulation space must be provided around the perimeter of the core.

Off-center (interior) core locations also offer the advantage of all building window space being used for rental offices. It provides more flexibility in the depth of office space, however, than a centrally-located core since large open spaces can be accommodated on one side of the core while private offices are placed on the opposite side. The major disadvantage to this core location is the problem of access. Since the core is off-center, long corridors will be necessary
to reach extreme offices on multiple tenant floors. The corridor surrounding the core is also still required.

Split (interior) cores do not require a peripheral corridor surrounding the core since access is from between the split core elements and from the areas around the edge of the core. With this arrangement, the area immediately adjacent to the core on upper levels can be used for offices rather than circulation space, while on the lowest level, this space can be used for a lobby or reception area.

Exterior core locations provide maximum use and flexibility on office floors in rented buildings. With this arrangement, the core does not complicate the floor plan structurally or functionally. The exterior-located core can be used as a transition element between a building of another scale or as a buffer between the
office block and an objectionable neighboring structure. The major disadvantage to this type of layout is that with multiple tenant floors, long corridors will be necessary.\textsuperscript{39}

Access to Offices:

The single-zone layout is based on the principle of one zone of offices located along one side of a corridor. This is the least economical type of system and is used primarily in buildings such as schools where the requirements of hygiene are more important than economic considerations.

The double-zone layout is the typical solution for medium-sized office buildings. It is twice as economical as the single zone layout because offices are located on both sides of a central corridor. Offices located along this corridor should be oriented with east-west exposure for the best light. Access to the central corridor in a double zone layout
can be provided from a main or secondary stair-case, a centrally-located utility core, two utility cores of equal importance, or one central utility core in a connecting unit of the building. In each case, the core is located within the office zone.

Triple zone layouts are used primarily in high office buildings. Double zone layouts are not used in this situation because as the height of the building increases, so do the space requirements for the core, and too much of the office is taken up by the core. For this reason, triple zone arrangements have evolved in which all the circulation and sanitary requirements are located in a central zone, flanked by a corridor on each side which serves offices located along the exterior of the building. This type of system is not advised for low structures since the utility requirements of a low building will not fill up the central core space.
In open plan layouts, access to the work area is provided directly from the core itself. Private offices located in primarily open plan layouts are accessible from the open work area.

4.3.6 MODULAR DIMENSIONING

The office building layout is determined by a dimensional modular unit which is based on the amount of space required for an individual who is seated in a chair at a desk.

In open plan offices, this module is about 5 ft. by 6 ft. Since this dimension of 5 ft. can also be used for aisle layout, the module can be used to form a grid for the layout of the entire office building.

In a private office layout, the determining factors are the minimum practical space requirements for an office within the module of the exterior wall and window design. A module of 4 to 5 ft. works well with this type of layout since 2 modules (8 to 10 ft.) would be enough.
for a small office. Several other office arrangements can be arrived at with multiples of this module. If the exterior wall consists of only windows with the mullions worked into a module, the layout is confined to multiples of the module. If, however, the exterior wall consists of windows alternating with wall sections, then the module may vary and different width offices are possible.

The planning module and the exterior wall module must take into account the structural module or the column spacing. If these modules are the same, then the modular unit adjacent to the column will be smaller than those between the columns. If all the modular units are kept the same, then the planning module is interrupted by the column width. If the columns are set inside walls, then the exterior wall module stays the same, but the column located here will limit the flexibility of private office layout. And lastly, if the column is

---

Note: all plans drawn with outside at bottom

Fig. 12 Relation of planning module and wall module to column spacing and location.
placed outside the exterior wall, then there is no conflict with the planning or wall module.

The structural module used in office buildings is usually about 25 ft., center to center. Recent trends, however, have increased this module to approximately 30 to 35 ft. so that these modules are not uncommon. Since interior flexibility is of such importance in office building design, some structures have been built with clear spans of 60 to 70 ft. in order to eliminate all interior columns.

4.3.7 FLEXIBILITY

The office building, probably more than any other type of building, must be designed as a dynamic building which can be adapted to interior change. The number of personnel, the type of equipment they require, and the organizational set up of an office building may change drastically over a period of time. The office building, therefore, must allow for extreme
flexibility within its walls if it is to answer the needs of modern day office requirements. 42

The solution to the problem of flexibility in office building layouts may be found with movable partitions which separate offices on each floor. The use of movable partitions is more expensive than standard, fixed, plasterboard construction, but this is the only way to accommodate room changes because of expansion, contraction, or re-organization of office activities. Partitions may be made from wood, sheet steel, or light metal and they are attached to ceilings and floors by spring locking action or by bolts.

Adequate sound insulation must be considered in the choice of these movable partitions. An insulation value of at least 40 decibels should be provided. Rooms with very different noise levels (such as a typing room or an executive office) should not be located adjacent to each
other when movable partiitons are used. In open plan layouts, it is advisable that all noise producing equipment be located in one, separate room.

4.3.8 EFFICIENCY

The efficiency of an office building is determined by a ratio of rentable area to total area. The 1975 Office Building Experience Exchange Report states that:

"The Net Rentable Area of a multiple tenancy floor, whether above or below grade, shall be the sum of all rentable areas on that floor.

The rentable area of an office on a multiple tenancy floor shall be computed by measuring to the inside finish of permanent outer building walls, or to the glass line, if at least 50% of the outer building wall is glass, to the office side of corridors and/or other permanent partitions that separate the premises from adjoining rental areas."
No deduction shall be made for columns and projections necessary to the building.\textsuperscript{144}

The non-rentable area of an office floor consists of elevators, stairs, toilets, and lobbies associated with these areas, corridors, janitor closets, and pipe and duct shafts.

The average efficiency of an office building is about 70\% while the maximum possible is about 85\%.

4.3.9 CASE STUDY ANALYSIS

The following case studies were chosen to illustrate the various types of office layouts. It must be realized that many of these office buildings are of a different scale than the Maritime Office Center.
Mile High Center
Denver, Colorado (1955)
I. M. Pei and Associates, Architects
Type: Open plan layout

The only purpose for this office building is to provide rental office space. Two factors, therefore, dominate the layout of the building. First, all circulation elements are located in the center of the building so that it functions as a public thoroughfare. Secondly, a high utilization factor results in 91% rentable use of lower floors and 93% on upper floors. The utility core is offset in plan which makes possible small private offices on one side of the core and large open plan space on the opposite side of the core. 45
Chase Manhattan Bank Building
New York, New York (1960)
Skidmore, Owings and Merrill, Architects
Type: Triple-zone layout

The central core of this building is interrupted only by narrow passages. The 2 office zones are free of columns since the outside row of columns are actually outside the building while the interior row of columns is located in the mass of the core. This allows for a large degree of flexibility in the office arrangements. Both open layout offices and small private offices with space for secretaries can be accommodated on one floor.
Ministry of Labour and Social Welfare Building  
Mexico (1953)  
Vazquez and Mijares, Architects  
Type: Single-zone layout

The main circulation elements in this 7 story office building are located at the junction of the two wings. Secondary stairs are located at the end of both wings. In this particular building, the single-zone layout, which is usually the least economical, is made somewhat more economical by using large deep offices (over 30 ft. deep) on wide hallways. This type of layout requires a large amount of artificial lighting and air conditioning equipment.  

43. A typical floor. Scale 1 : 600.
Olivetti Building
Milan, Italy (1954)
Bernasconi, Fiocchi, and Mizzoli
Type: Double-zone layout

With this double-zone layout, access is from a main utility core at one end of the building which is connected by a corridor to a secondary utility core at the opposite end. The minor utility core is located within the office zone while the major utility core is located at the end of the office zone. Movable partitions provide flexibility within the office zone. This is the typical arrangement for a medium sized office building.\textsuperscript{48}
4.3.10 SYNTHESIS

The following goals and objectives relate specifically to the conditions established by the Maritime Office Center:

Human considerations:

- The office building should be laid out by the location of the core and offices to allow for a variety of spaces and office types so that the individual will not become submerged in a mass of fellow workers.

Site considerations:

- The office building should be located on the site in such a manner that the spaces between and around the proposed and existing buildings can be useful and attractively landscaped.

- The office building should be located in such a manner that its relationship with the existing surrounding uses and services and with the proposed parking facility is
the most convenient and compatible.
- The office building should take into consideration the excellent views available to the harbor and river and the views down the narrow streets in the location of the actual offices themselves.
- The office building should also take into consideration the climatic (especially sun) conditions which will exist at the site.

Function and form considerations:
- The office building should recognize its urban location by differentiating the ground floor level in height and usage (i.e. coffee shop, exhibition, etc...) 

Office Building Component considerations:
- The office building should recognize the fact that since this building will be rented to a variety of tenants, it will be necessary that a variety of office types and sizes be available.
-The office building should recognize that since this building will be rented to companies with a substantial amount of public contact, circulation from the street to any particular office and visa versa will be important and the core(s) and stairs will have to be located in such a manner that they become part of the public highway.

-The office building should recognize the advantages of the double-zone layout over the single or triple zone layouts in this particular case, especially in terms of economy, access, and core location.

-The office building should provide both open plan as well as closed plan, individualized offices since they may be required by different tenants.

Modular dimensioning considerations:
- The office building should be laid out on an efficient modular grid which works
well with the layout of offices and
desks, the structural system, and the
exterior fenestration.

Flexibility considerations:
- The office building, since it is to
be rented to a variety of types and
sizes of tenants which may be period­
ically expanding or contracting in
size, should be designed with the maxi­
mum amount of flexibility possible.

Efficiency considerations:
- Since the office building is to be
built as a profiting venture, it should
strive for maximum efficiency.
5.0. PROGRAM
5.0 PROGRAMATIC REQUIREMENTS

Parking facility:

City of Charleston Zoning Ordinance:
1 space for every 200 sq. ft. of office space - from conceptual standpoint

@ 390 spaces

Additional requirements: parking spaces to replace those existing on site

@ 145 spaces

Total @ 535 spaces

Office building:

Market studies justify a building with approximately: 62,500 to 90,000 sq. ft.
The design of a parking facility or of an office building is not an overly difficult problem; at the most, it involves following established requirements and repeating the solution a certain number of times. The concept, then, for the design of the Maritime Office Center revolves around the idea of a building responding to its particular context, and this has been the generating principle behind the design of this project.

Therefore, in response to its context, the building's design has attempted to maintain "view corridors" through the site for historical as well as aesthetic reasons. These view corridors also encourage pedestrian movement through the site to the proposed waterfront park. The use of these "view corridors" also allows the building to be broken down into smaller masses which are proportional to the surrounding area. Additional property to the south of the given site was acquired to fulfill programmatic, historical, and
architectural objectives. The location of the majority of the office space, on the eastern side of the site, was determined by the views to the water available along this side of the site. The core elements were placed between the offices and parking to aid in circulation between parking and offices and to act as a buffer between these two functions. The lower massing of the parking garage was located on the western side of the site to relate in height to the surrounding buildings. Since it was necessary that the first occupied floor of the building be raised to 12 feet above sea level for flood plain requirements, a sub-grade level was created to provide for parking for visitors and guests to the center. The upper levels of parking are to be rented out on a monthly basis to patrons of the building or to people who work in the surrounding area.

As stated previously, the design of the Maritime Office Center was primarily an attempt
to design a building for a specific site and context. For this reason, the standard office building and parking garage designs could not be applied to this problem. However, whenever possible, the basic requirements and guidelines stated previously have been adapted to this problem without compromising the functioning of the design.
CONCEPT

massing

key:

section

EXCHANGE BUILDING

PROPOSED WATERFRONT PARK

CONCORD STREET

MARSH

CONGRESS STREET

EAST BAY STREET

EAST ELLIOTT STREET

GILSON STREET

PROLEAU STREET

property acquired to fulfill programmatic, historic, and architectural objectives

existing

proposed

proleau street looking north

parking

pedestrian movement

parking - office movement

major auto movement

minor auto movement

views

parking garage relates to adjacent buildings

lower massing of parking garage at 12' 0" above sea level for flood protection

overhang for eastern heat gain

view to water

pedestrian way

pilings to foundation bearing soil
7.0. VISUAL PRESENTATION
A MARITIME OFFICE CENTER
for the charleston, south carolina, waterfront

eric clifford aichele

a terminal project submitted to the faculty of
the college of architecture, clemson university,
in partial fulfillment of the requirements for the
degree of master of architecture

april 19, 1978
TYPICAL PLANS

109 parking spaces

rental 5025 sq ft 80% eff

total 6300 sq ft

rental 2250 sq ft 71% eff

total 3150 sq ft

rental 4300 sq ft 80% eff

total 5400 sq ft

typical floor plan

structural

mechanical

structural

typical office layout

structural

TYPICAL PLANS

109 parking spaces

rental 5025 sq ft 80% eff

total 6300 sq ft

rental 2250 sq ft 71% eff

total 3150 sq ft

rental 4300 sq ft 80% eff

total 5400 sq ft

typical floor plan

structural

mechanical

structural

typical office layout

structural

TYPICAL PLANS
west elevation

north elevation

section a-a

section b-b

east elevation

ELEVATIONS, SECTIONS
8.0. FOOTNOTES
FOOTNOTES


3. Ibid.

4. Ibid.


7. Lyles, Bissett, Carlisle, and Wolff, p. 7.

8. Ibid., p. 4.


10. Ibid.

11. Ibid., p. 55.

13 City of Tucson Department of Community Development, Planning Division, Tucson's Historic Districts: Criteria for Preservation and Development, pp. 30-34.

14 J. Myrick Howard and the Town Planning Department, Tarboro, N. C., Tarboro Historic District Study.


20 Dietrich Klose, Metropolitan Parking Structures, p. 11.


23 Klose, p. 15.


26 Klose, p. 41.
27 Ibid., p. 34-36.
29 Klose, p. 165.
30 Ibid., p. 146.
31 Ibid., p. 123.
32 Ibid., p. 92
34 Ibid., pp. 1-4.
35 Ibid., pp. 74-78.
38 Ripnen, pp. 71-73.
39 Memoli, p. 636.
40 Joedicke, p. 10, 17.
41 Memoli, p. 653.
42 Ripnen, p. 2.
43 Joedicke, pp. 20-21.
45 Joedicke, p. 168.
46 Joedicke, p. 176
47 Joedicke, p. 28.
48 Joedicke, p. 194.
9.0. BIBLIOGRAPHY
BIBLIOGRAPHY


City of Tucson, Department of Community Development, Planning Division, Tucson's Historic Districts: Criteria for Preservation and Development. Tucson: Department of Community Development, 1971 (Third Printing, 1974).


