

The Floating Marketplace of San Juan Bay

Jorge Carbonell
A.B., Princeton University 1997

Submitted to the Department of Architecture
in partial fulfillment of the requirements for
the degree of
Master of Architecture
at the Massachusetts Institute of Technology
February, 2002

Signature of Author _____

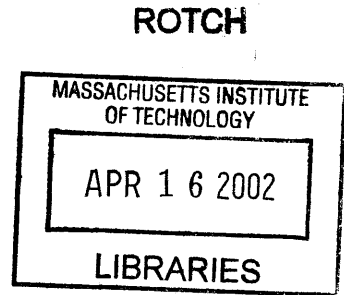
Jorge Carbonell, Department of Architecture. January 18, 2002

Certified by _____

Wellington Reiter, Associate Professor of the Practice of Architecture
Thesis Supervisor

Accepted by _____

Andrew Scott, Associate Professor of Architecture
Chairperson, Departmental Committee on Graduate Students



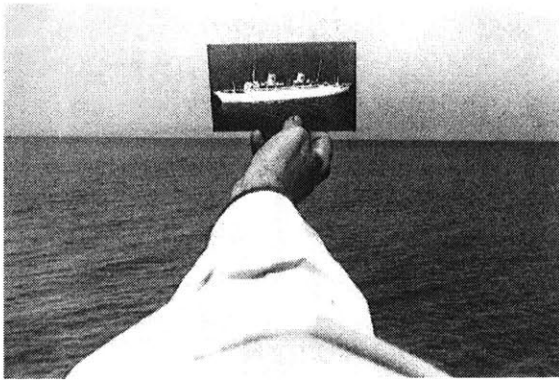
© 2002 Jorge Carbonell. All rights reserved.

The Author hereby grants to MIT permission to reproduce and to distribute publicly paper and electronic copies of this thesis document in whole or in part.

The readers of this thesis have been:

David Friedman
Associate Professor of the History of Architecture

Nasser Rabbat
Associate Professor, Aga Khan Professor of Islamic
Architecture



Abstract:

The Floating Marketplace of San Juan Bay

This thesis seeks to establish the marketplace as a temporal and spatial event that affects a city in a meaningful way.

The marketplace was the site of greatest congestion, activity and drama in many cities, often combining functions as varied as the produce it sold. It was a setting for punishment, proclamations, and entertainment as well as commerce.

Relocated to city outskirts and replaced by specialized warehouses, marketplaces have disappeared from many urban centers. A marketplace relevant to present-day cities, would be able to remain a central feature in the city, satisfy the shoppers' needs, and fulfill its traditional role as a setting of multiple public functions.

The location of this marketplace is San Juan of Puerto Rico, a metropolitan area with a rich tradition of lively marketplaces in its urban cores.

San Juan is a city dominated by a majestic bay and the city has grown around its shores and over the last five centuries, slowly at first and with great speed in the last 60 years. New and old neighborhoods share this great backyard despite some barriers like highways and mangrove forests.

The **floating marketplace of San Juan Bay** will dock on three neighborhoods along the bay and

its canals. It is an adaptable building, flexible enough to engage significantly with any of its proposed neighborhood destinations. Included in the design are the moorings at the three sites, each one a unique, particular counterpart to the "universal" market hall that visits them.

The appearance and disappearance of the market will constitute a community event that can become part of the weekly schedule of the neighbors. Its presence or absence will always bind the three sites together, emphasizing the shared geography, economy and culture of the city's inhabitants.

The precedents inspiring this proposal are not markets but rather theaters designed for festivals: the Groningen Pavillion by Fumihiko Maki (1999) and the Teatro del Mondo, designed for the 1979 Venice Biennale by Aldo Rossi. In both cases, the arrivals and departures of these buildings were events that shed an exciting new perspective on their respective cities. As they moved to and from their destinations, the travels of these floating buildings were an affirmation of the possible balance between a city and its surroundings. The traditional edges of urban and rural, man-made and natural, were re-visited with a sense of possibility.

While a marketplace is not a theater, a day at the market is an event, like a concert or a play, an "everyday" event that despite its frequency (or perhaps because of it) generates excitement in a community.

Thesis advisor:

Wellington Reiter

Title:

Associate Professor of the Practice of Architecture

Many thanks to:

Alison Alessi

Zach Kramer

Junko Nakagawa

Kavita Srinivasan

IOANA URMA

BEN REICH

Henry Chang

and *Mona Tamari*

for their help and support in the production of
this thesis.



Table of Contents

1. What is a Market?
2. Three Case Studies
3. The Market Hall in Puerto Rico
4. How a Market Hall Works
4. Three neighborhoods around the bay.
5. Floating buildings
6. The floating marketplace of San Juan Bay
7. Bibliography

This document is printed on Swarthmore white wove 25% cotton, acid-free paper.

Except where noted, all images were photographed or produced by the author.



What is a Market?

The market hall is a building type with a lively history. Developed in England and France in the 18th Century, market halls were a phenomenon of the industrial city.

They replaced the traditional open air markets where farmers from the countryside assembled to sell their produce to the inhabitants of the cities.

Open air grounds were usually located in the center of the town, within the city walls. Some markets were lineal in their arrangement lining (and progressively blocking) the town's major street (the case of Trier) or they took place in an open square of the city (such as the Campo de Fiori in Rome).

In English towns, the ground level of town halls was left open to the street, to be taken over by vendors on market day (this arrangement was also used in the Piazza del Broletto in Milan). This combination of governmental building and market space was a sign of their close relationship: both needed a central, accessible location; and it was necessary for the authority to police the market square and to collect taxes from the vendors.

Many open-air marketplaces were also the sites of the administration of justice. Many different offenses were publicly punished in the market square, from theft to selling horse meat.

As cities grew, problems arose with this market model. Greater populations needed more food and as vendors increased in number, city centres became congested, chaotic landscapes. Streets were filled with stands, produce, livestock, donkeys and shoppers.

As produce had to be carted in from farther away to fulfill the growing needs of the city, the longevity of the produce became a pressing issue. Exposure to the elements (especially to sunlight) diminished food supplies and increased their prices.

The disorderly setting also made it hard to supervise and regulate vendors. Inflated prices, bad meat and fixed scales were common enough to trigger riots in many cities. These violent incidents were sometimes tolerated by the authorities who saw them as a natural way for buyers to negotiate the prices and to check the vendors' behavior.

These were the main reasons behind the building of the great covered market halls of the 19th Century. Other advantages of this model became apparent with time: hygiene was easier to implement in the halls, gas lighting would make it possible for working people to buy their produce after work hours, storage and delivery services were concentrated and optimized.



fig. 1 Marketplace under the town-hall
Kingston-upon-Hull ca. 1810

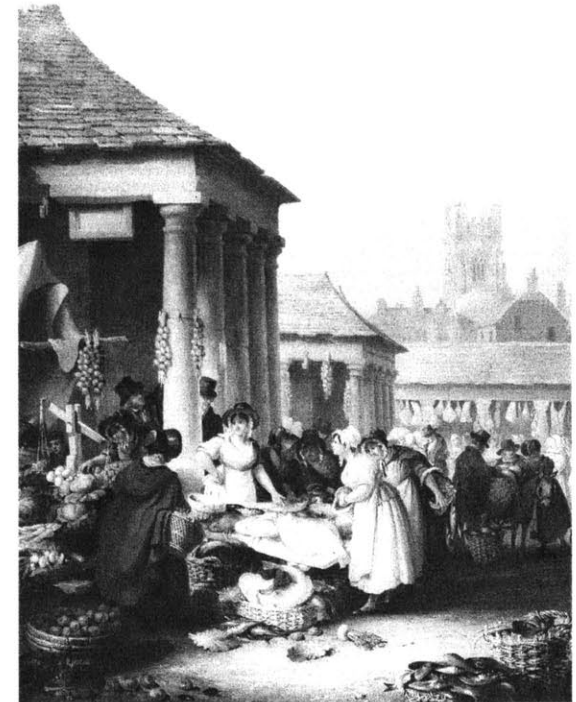


fig. 2 An enclosed (not covered) market.
Plymouth, 1807



fig. 3 View of butcher's avenue ca. 1930
Rawson Place Market Hall, Bradford

One of the most difficult issues to settle in the building of covered marketplaces was their location within the city. While in some cases it was possible to take over the existing market ground and reform it, most cases required the appropriation of a large area of land within the city. This was often unprecedented in cities' histories and for many, the building of a market was the single, largest public project undertaken in the 19th century.

Another reason for changing the site of the market was to reflect the population shifts and urban expansions characteristic of the 19th century. A market that didn't reflect the changes of the city could become irrelevant.

The building of markets was also tied with the other great infrastructure projects of the city (not unlike baseball fields in contemporary American cities): slum clearance, the construction of new bridges and new streets, and mass transportation.



fig. 4 View of butcher's market avenue
Grainger Market Hall, Newcastle-Upon-Tyne

Different strategies were tried. Some cities favored a decentralized approach: by building more than one market, authorities hoped to diminish the congestion in any one area while requiring smaller and easier to acquire parcels of land. One of the disadvantages implied by this approach is the lack of a critical mass of shoppers. It was then discovered that the congestion which was detrimental for the city was a necessity for the success of the market's economy. Decentralization also made supervision (policing, tax collection) a harder task to accomplish.

The centralized market, although a more expensive proposition, was recognized to work at the appropriate scale for the cities' growing needs.

By 1825, following the "success" of its prototypes, the centralized covered market was widely adopted as the market type of choice in most English and French cities. This type was pioneered in a massive scale in St. John's Market in Liverpool.

The characteristic of this type were

- very large floor area (20,000 sq. ft. +)
- standardized stalls arranged along aisles
- division of goods by aisles
- abundance of light (large glass windows)
- appropriate ventilation

As the century progressed, numerous innovations were applied to the basic type but without altering the basic principles. Some of these improvements were:

- iceboxes for fish and meat storage
- restaurants and snack bars
- public lavatories
- asphalt flooring for sanitary and acoustic purposes.

Three Case Studies

The following English market halls were built in the 19th Century. Each one has a different strategy for interacting with its surrounding area.

Exeter

Different typologies (the aisles, the courtyard, the agora) are used to divide the market hall area. The merchandise follows these divisions: the fish stalls are grouped in the courtyard stalls, etc.

These differences are reflected on the exterior of the building on its elevations: neo-classical affairs subdivided along their lengths.

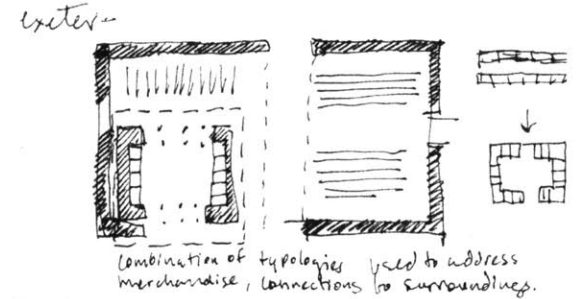


fig.5 Sketch of Exeter's market hall plan. Different typologies organize the varied merchandise

Liverpool

The market spills out to the surrounding streets through stalls and windows on its periphery. Market activity dominates the surrounding district.

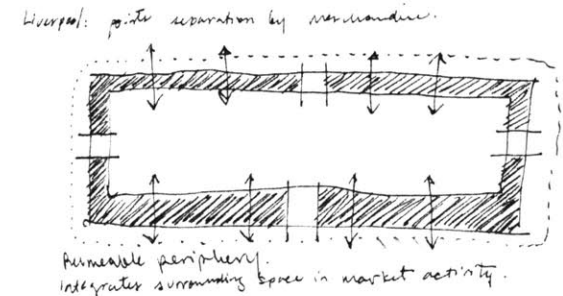


fig.6 Sketch of Liverpool's market hall plan. A permeable periphery allows market activities to spill out.

Newcastle-Upon-Tyne

The market hall is given a strong, wide boundary: a ring of shops that open to the street but not to the interior of the market. It is an impermeable barrier that confines market activity and limits movement of goods and customers to a few entrances. This market's non-market exterior elevations and activity allowed it to blend in a residential district (there were housing units on the market's upper stories).

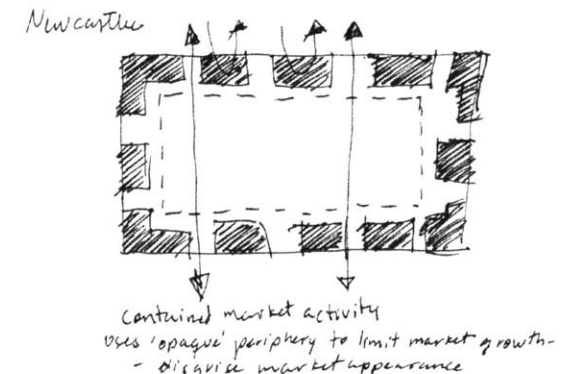


fig.7 Sketch of Newcastle's market hall plan. A thick wall contains the market and emphasizes its entryways.

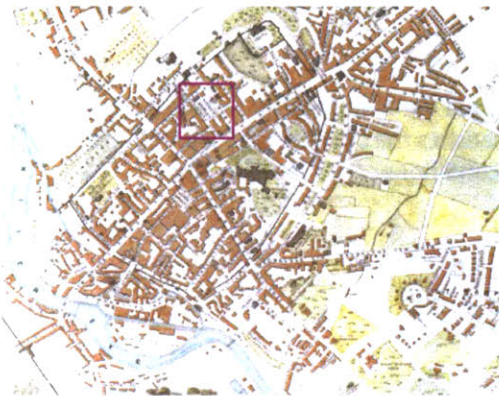


fig.8 Plan of Exeter showing market's location.
(1:20000)

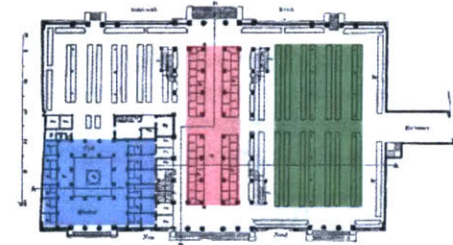


fig. 11 Plan of Exeter's Higher Market. produce grouped by color (1:500)

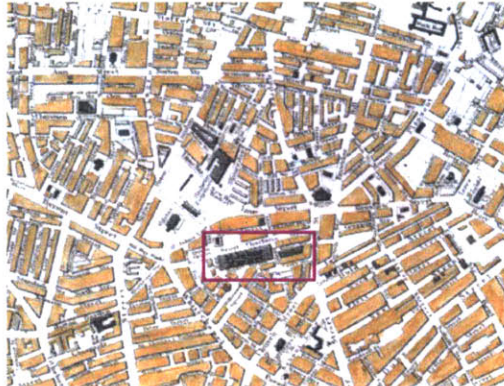


fig.9 Plan of Liverpool showing market's location.
(1:20000)

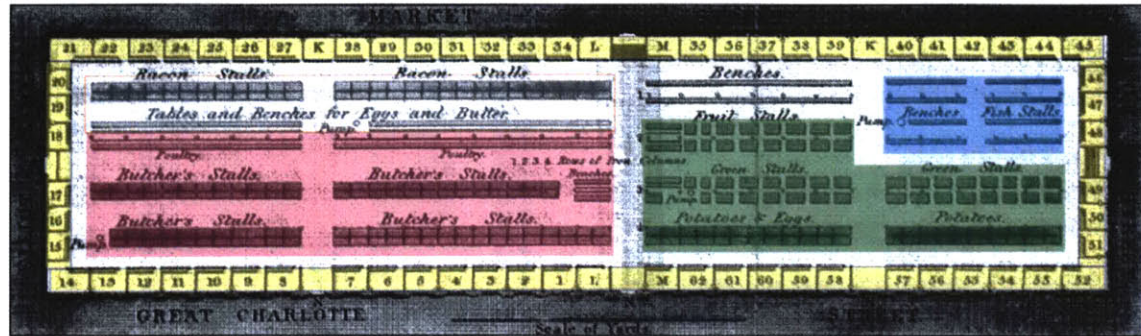


fig. 12 Plan of Liverpool's St. John's Market.
(1:500)

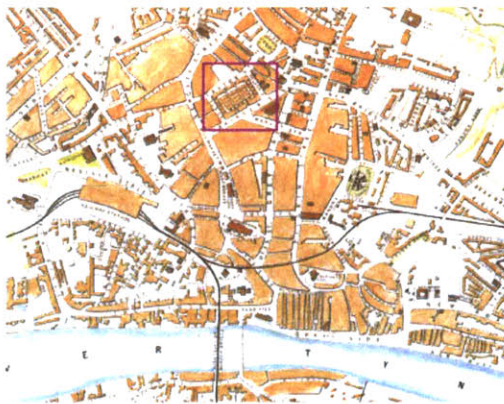


fig. 10 Plan of Newcastle showing market's location.
(1:20000)

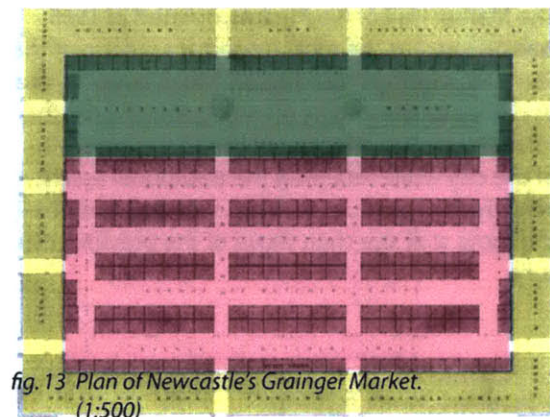


fig. 13 Plan of Newcastle's Grainger Market.
(1:500)

The Market in Puerto Rico

The first covered market of Puerto Rico was built on the walled city of San Juan, replacing the old open air market. The main requirements for selecting the site of the marketplace (according to the report of a 1853 commission) were:

- spaciousness and ventilation
- a distance from residential neighborhoods
- equidistance from the city gates
- proximity to the slaughterhouse
- drainage to the sea

The same commission defined some minimum requirements for the market building:

- facilities for fish stalls
- plenty of space for work animals
- inclusion of a small police house(1)

The covered market was built in the 1850's following this directives. It closed about 30 years ago and was recently re-opened as a museum.

The Market Hall of Rio Piedras, opened in 1965 was planned as the most important market of the San Juan metropolitan region. Much larger in size, its choice of site and its planning shows how the market type has adapted to the changing scale of the city while retaining the traditional essence of individual produce vendors with approximately the same stall size than those of the previous century.

1-Sepulveda Rivera, p.264-8

The Rio Piedras market has about 10 times the floor area as the San Juan market hall and has a lower story with warehouse and wholesale operations. Unlike the market in San Juan, which catered to a city dominated by pedestrian traffic, the market of Rio Piedras is sited to cater to a whole region: while still located in an urban core, it is easily accessible from the main highways that

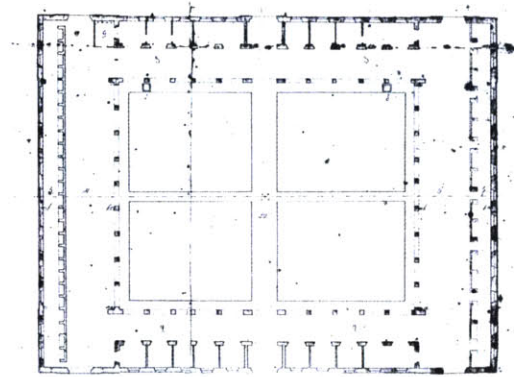


fig. 14 Plan of Market, San Juan, Puerto Rico, 1851
1:500

fig. 15 Market, San Juan. Interior view.



cut across the Metropolitan Area. It is a building that satisfies the old needs of markets and the new conditions of the modern city.

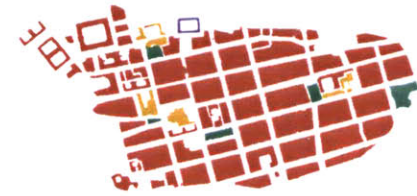


fig. 16 Plan of San Juan. Market is in purple.

fig. 17 Market, San Juan. Norzagaray Street elevation.



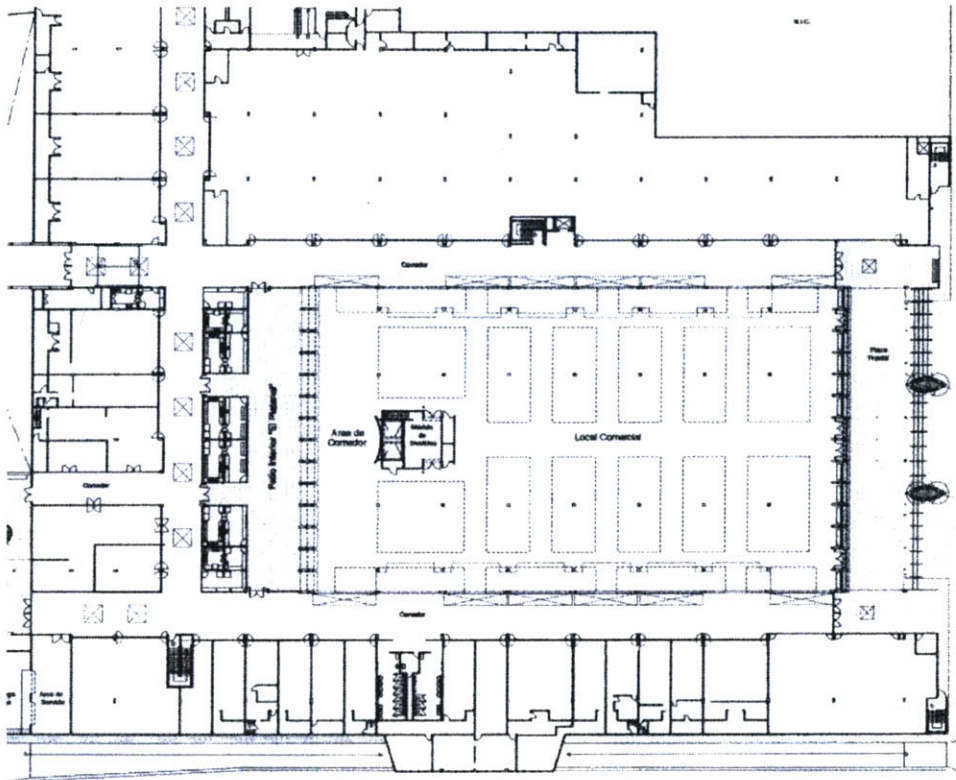


fig. 18 Plan of Market, Rio Piedras, 1999 renovation
1:500



fig. 19 Market, Rio Piedras. De Diego Street elevation



fig. 20 Plan of Rio Piedras. Market in purple.

How a Market Works

Market halls in Puerto Rico are the property of the people of the town or city, administered by its municipal government. The stalls are leased to the vendors on a year or multi-year basis. Often, the government subsidizes the operation of the marketplace to reduce the price of stall leases.

In order to preserve the market hall traditional identity and to minimize competition between vendors, the vendors or members of their immediate families must operate the stalls themselves.



fig. 21 A movable stall. When it is open, the vendor sells natural juices.

Pictures from the Markets

At present, two major covered markets are in operation in San Juan: the market of Rio Piedras and the market of Santurce. Both have been recently renovated and are the focus of urban planning projects and proposals for their districts. Besides these two markets, there are also open air markets that assemble in the plazas of the city on Sundays and holidays.



fig. 22 Children dresses.



fig. 23 A pizza stand, towed by a van.



fig. 25 Market, Rio Piedras. Candy stall.



fig. 24 A lottery vendor.



fig. 26 Market, Rio Piedras. Vegetables and fruits.

Who Shops at the Market

The principal shoppers of the market are restaurant and cafeteria owners, who go to the market every morning to buy produce. Later in the day, the market is visited by neighboring residents shopping for groceries. During the late afternoon, a social scene gathers around the market as workers from nearby offices come for drinks at the bars and liquor stores of the market hall.

The municipal market halls have a large impact on the surrounding neighborhoods, increasing pedestrian traffic and commercial activity.



fig.27 Market, Santurce. Bananas.



fig.28 Market, Rio Piedras. Fish and seafood stall



fig. 29 Market, Rio Piedras. Produce stalls.



fig. 31 Market, Rio Piedras. Vegetable stall.



fig. 30 Market, Rio Piedras. Lottery stall.



fig. 32 Market, Rio Piedras. Colmado (grocery store).

How is a Market Supplied

While some markets in Puerto Rico (like the one in Rio Piedras) have facilities for bulk storage and wholesaling, most market halls operate principally as retail operations. The stalls are supplied either by the vendor himself or by other producers, intermediaries or importers, depending on the product.

The supplying of the market is regulated by the market hall by-laws, with specific hours and traffic patterns assigned in order to minimize the congestion of the surrounding streets.

Market layout

While the main floor space of markets is still dominated by vegetable and fruit stalls, other types of products abound in the peripheral stalls. Meat and fish stalls are kept aside for ease of drainage and ventilation. Lottery tickets, candy, newsstands,



fig. 33 Market, Santurce. Market hall exterior.



fig. 34 Market, Rio Piedras. Interior view.



fig. 35 Market, Rio Piedras. Food court.



fig. 37 Old San Juan, Paseo la Princesa. Pork rind vendor.



fig. 36 Market, Santurce. Bar.



fig. 38 Old San Juan, Paseo la Princesa. Vendor's supply van.

Summary of Market Characteristics

What kind of stalls are there in the Market?

A. Stalls needing coolers, running water, ice, independent drainage:

- 1- Fish market
- 2- Butcher shop (with poultry and egg)
- 3- Cafeteria

B. Stalls needing coolers, running water, ice

- 4- Flower shop (with ornamental plants)
- 5- Candy and juices stall
- 6- Ice cream shop

C. Stalls needing horizontal displays

- 7- Fruits and vegetables stall
- 8- Artisan handcraft and souvenirs

D. Stalls needing vertical displays

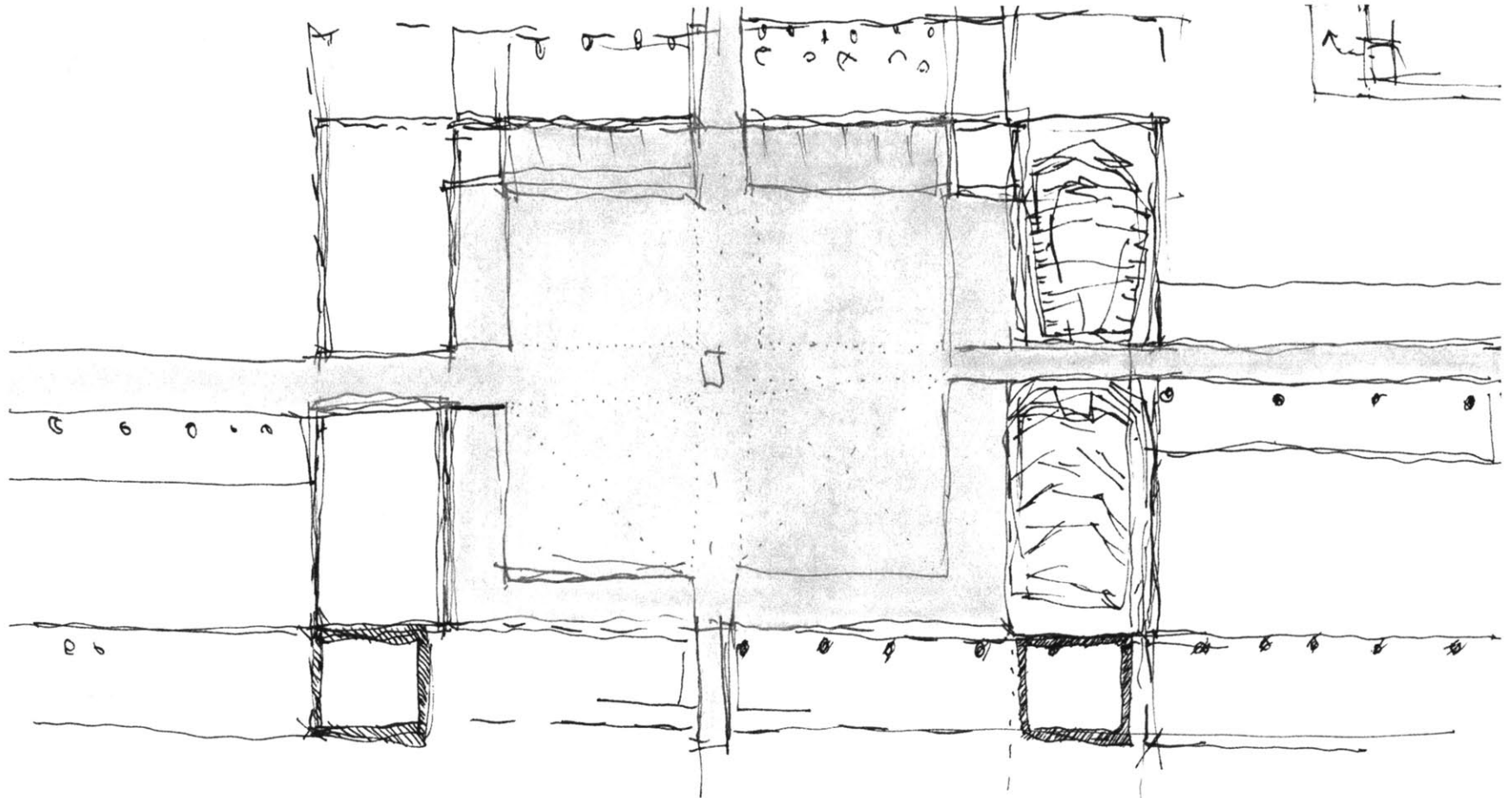
- 9- Lottery stand
- 10- Newsstand

What does the Market offer?

- 1- Fruits, vegetables, meats for residents
- 2- Fruits, vegetables, meats for restaurants
- 3- A food court
- 4- Souvenirs, natural drinks and juices for visitors
- 5- Open space for gatherings and celebration; and supporting services (bathrooms, trash disposal, etc)
- 6- Covered or shaded space for informal use by the public.
- 7- Subsidized stalls for local businesses that may not afford rent of a private space for their traditional goods or craft.
- 8- Booths providing information about the town government and community groups.

What are the Needs of the Market?

- 1- Open floor space for stalls.
- 2- Storage space for merchandise.
- 3- Receiving and wholesale facilities.
- 4- Administrator's office.
- 5- Bathrooms
- 6- Vendors' meeting room
- 7- Weights room
- 8- Accessible parking
- 9- Connections to water, drainage, electric power.
- 10- Trash disposal
- 11- Adequate temperature conditions for produce, interior must be shaded to avoid exposure of foodstuff to direct sunlight.



The Bay of San Juan

The city of San Juan was founded in 1521 in a small island at the bay's entrance. Most of the bay-shore was covered by mangrove forests and tidal marshes, difficult to clear and considered insalubrious.

During the 20th century, large areas of mangrove were cleared to make way for airports, naval bases, and ports. Slums were built right to the edge of the bay's canals felling vast tracts of the forest.

There are a few points along the bayshore where the water meets a clear landing where a mixed-use (residential or commercial) district has risen.

Three of these sites are particularly exciting places.

Old San Juan is located at the entrance of the bay and situated on a rocky promontory that descends steeply into the bay.

Cataño lies at the southern shore of the bay, very close to the ports. It is a small town barely above sea level surrounded on all sides by thick mangrove forest. Its insular character defines it to this day.

Hato Rey is connected to the bay through the long canal that links the main body of the bay with the Corozos Lagoon about 4 miles to the east. Like Catano, it is also a low site, on average rising 2 meters above sea level.

Choosing a Site for a New Market Hall in the San Juan Area

Following the example of the Market Committees of the 19th century, a proposal for a market site is formulated. Certain objectives and principles must be outlined:

- The market hall must be an important presence in the San Juan region, not just one neighborhood.

- It must be accessible to many areas and it must welcome different groups of clients throughout the day.

- The market must contribute to the commercial and urbanistic development of the surrounding areas.

- The building must be flexible to accommodate future expansions or slight program changes.

- The site and the building should be a celebration of the market tradition in Puerto Rico, generating excitement and civic pride among its users and visitors.

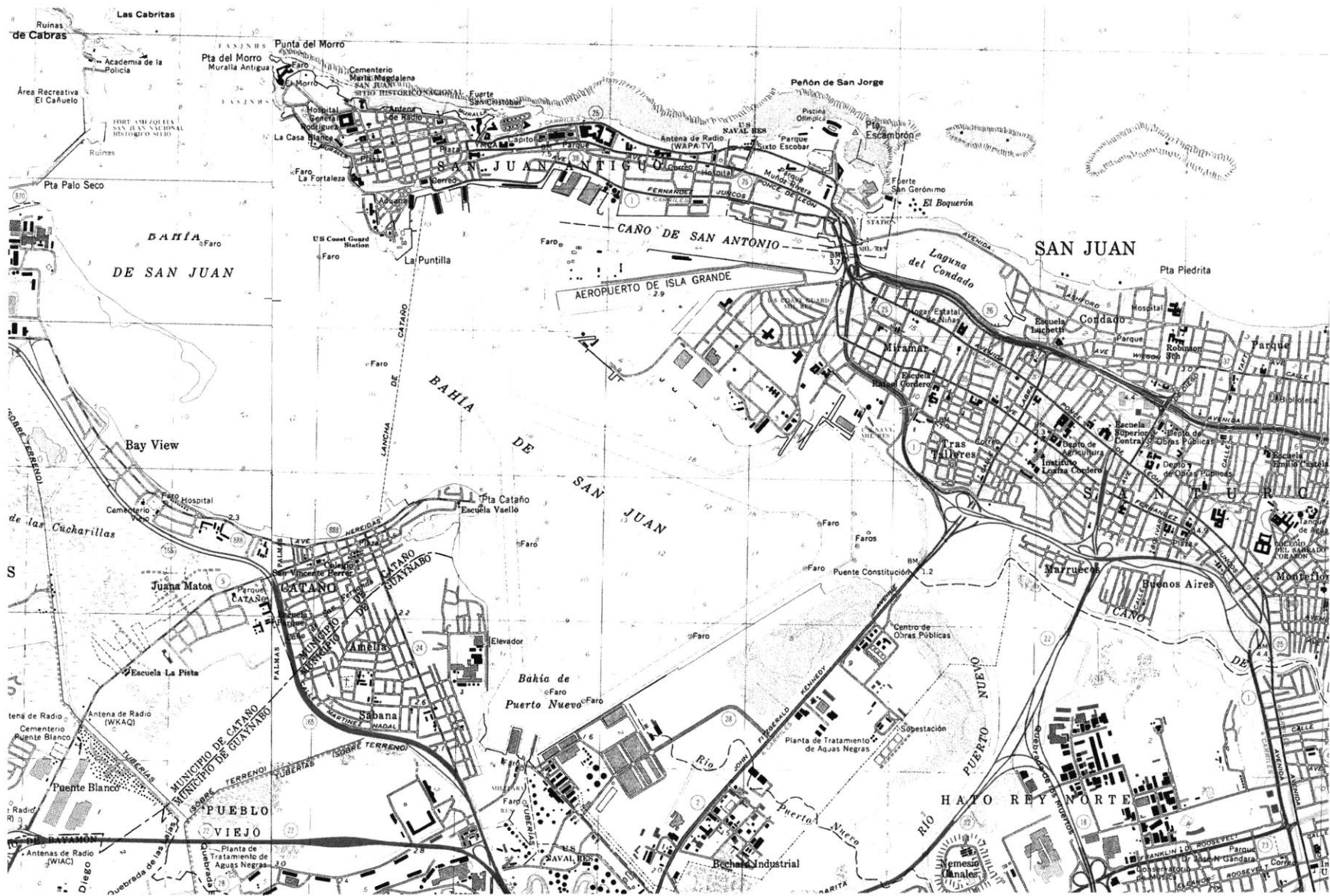


fig. 40 The San Juan Bay and the surrounding city.



fig.41 The Bay of San Juan ca. 1850's (1:40000)
mangrove forest and tidal marshes in green

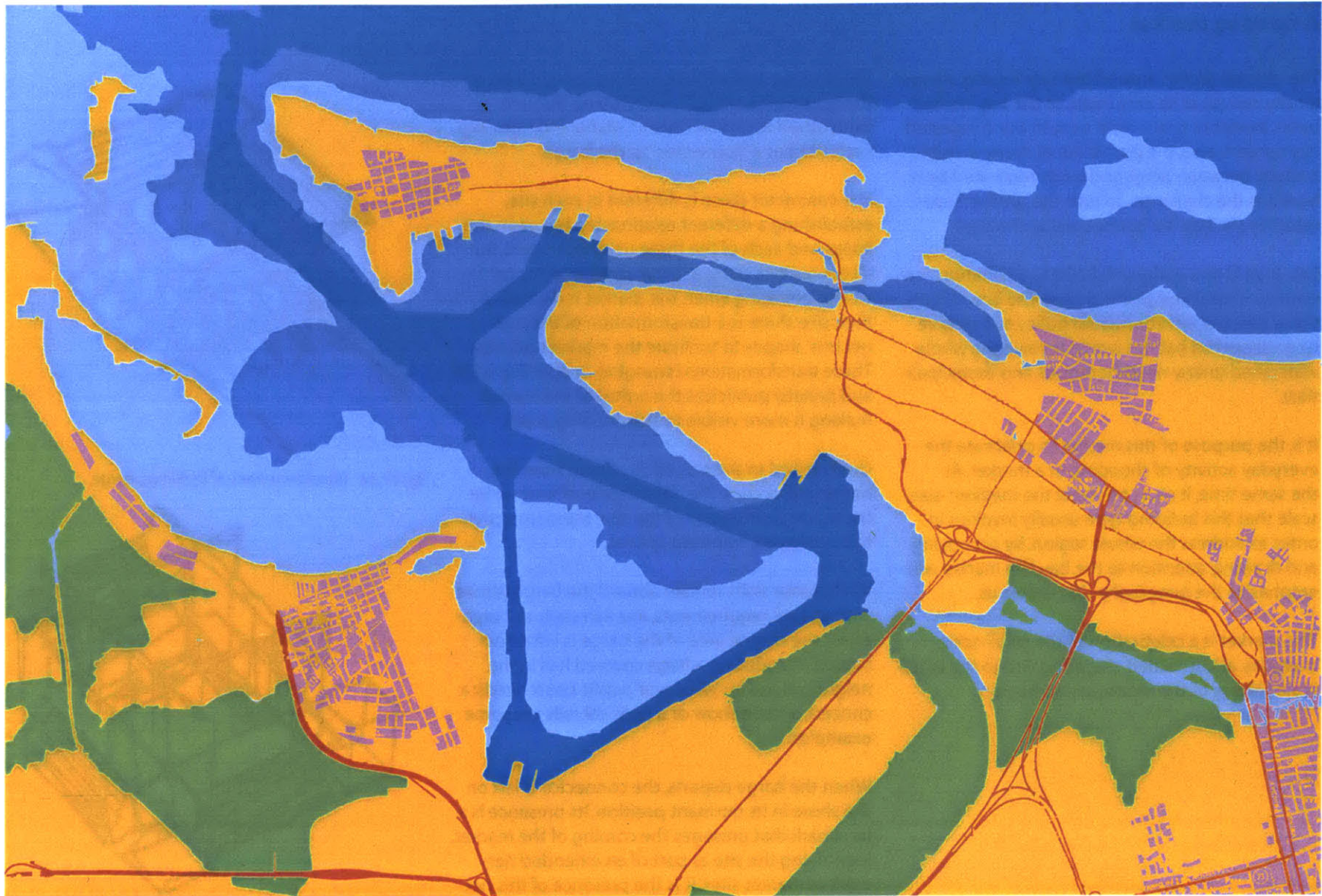


fig. 42 Present day
urban cores on purple

A floating market

The city has grown around the bay leaving a huge empty canvas at its very heart. In the bay we find open, available space right next to our congested city centers; also, the possibility of many invisible bridges between neighborhoods separated by it: here lies the challenge, to turn the phrase “separated by the bay” to “connected by the bay”.

San Juan is one entity pulsating to a common economic, cultural and political beat. The bay reflects these ties: any environmental policy to preserve its endangered habitat would involve the whole watershed (many neighborhoods and municipalities).

It is the purpose of this market to celebrate the everyday activity of shopping at a market. At the same time, it must transcend the medium-size scale that this building type usually involves in order to address the whole region. By occupying and drawing attention to the bay, the market will emphasize the geography that unites us.

This market is a celebration of the small-scale everyday act of market shopping within the large-scale setting of the Metropolitan Region.

The floating marketplace is composed of a barge that carries the stalls. Three docking sites are established at Old San Juan, Cataño and Hato Rey. Each site has a “connector” to the barge.

The connector piece is different in each site, establishing a different relationship between the barge and each of the three neighborhoods. But all connectors share a “language”; a common way of behaving when the market is docked at their site: there is a transformation of the connectors’ shapes to facilitate the market’s activity. These transformations (swinging or opening walls and panels) publicizes the arrival of the market making it more visible to surrounding areas.

Upon arrival to the site, stalls roll out from the barge and occupy the “market space” formed by these transformations of the site: transient activities occupying transient spaces.

While some stalls remain aboard the barge (those with special requirements, like fish stalls or butcheries), the central area of the barge is left unoccupied, introducing a large covered hall in the neighborhood for whatever public use it needs: a concert, a trade show or a political rally are some examples.

When the barge departs, the connector is left on the shore in its dormant position. Its presence is a landmark that presages the coming of the market, identifying the site as part of an extended network of market sites. It is the presence of this network that denotes the scale of the project to the casual observer.

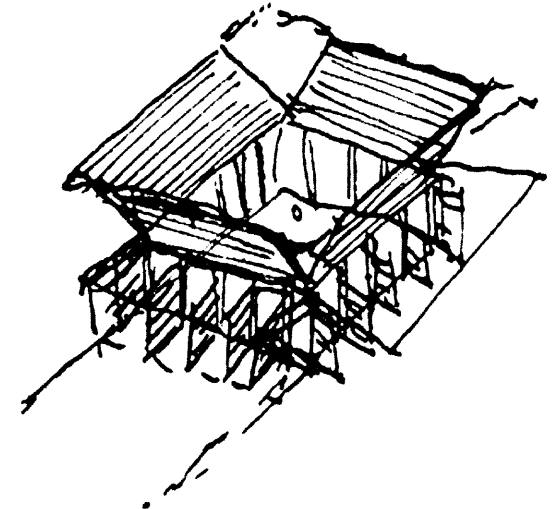
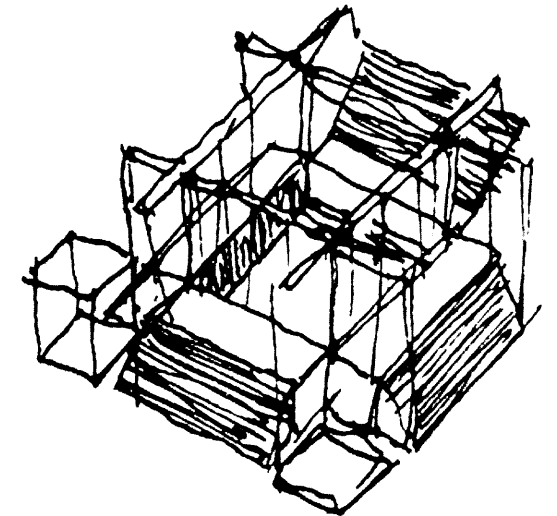


fig. 43, 44 Transformations of buildings, barge.



A schedule for the Market

This table identifies the different activities that take place in the different sites throughout the week. The market schedule aims to satisfy most of the peak demand periods of each site.

Market presence in a site is shown in red.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1. Viejo San Juan	<div style="background-color: #f08080; height: 15px; width: 100%;"></div> Restaurants re-stock Shoppers throughout day Tourists throughout day	Shoppers throughout day Tourists throughout day	Shoppers throughout day Tourists throughout day	Shoppers throughout day Tourists throughout day	<div style="background-color: #f08080; height: 15px; width: 100%;"></div> Restaurants re-stock Shoppers throughout day Tourists throughout day	Shoppers throughout day Tourists throughout day	Shoppers throughout day Tourists throughout day
2. Hato Rey	Workers' afternoon shopping Office workers' lunch Residents' shopping all day	<div style="background-color: #f08080; height: 15px; width: 100%;"></div> After work social scene Workers' afternoon shopping Office workers' lunch Residents' shopping all day	<div style="background-color: #f08080; height: 15px; width: 100%;"></div> After work social scene Workers' afternoon shopping Office workers' lunch Residents' shopping all day	After work social scene Workers' afternoon shopping Office workers' lunch Residents' shopping all day	Office workers' lunch Residents' shopping all day	Residents' shopping all day	Residents' shopping morning
3. Catano	Fondas, cafeterias re-stock Resident's shopping all day	Fondas, cafeterias re-stock Resident's shopping all day	Fondas, cafeterias re-stock Resident's shopping all day	<div style="background-color: #f08080; height: 15px; width: 100%;"></div> Community meetings Government information Fondas, cafeterias re-stock Resident's shopping all day	<div style="background-color: #f08080; height: 15px; width: 100%;"></div> After work entertainment Community meetings Government information Fondas, cafeterias re-stock Resident's shopping all day	<div style="background-color: #f08080; height: 15px; width: 100%;"></div> Afternoon entertainment Community activities Resident's shopping all day	<div style="background-color: #f08080; height: 15px; width: 100%;"></div> Resident's shopping morning



Floating Buildings

Floating buildings add a new dimension to their host cities. Impermanent by nature, they create extraordinary situations that may or may not be repeated.

Rossi's Teatro del Mondo and Maki's Groningen Pavillion changed the perception of the existing buildings around them while imbuing the canals in which they floated with the possibility of new things.

If theater or music can sail its way to the city, displacing only water and retreating without leaving other remains than memories or photographs, what other great things may sail our way?



fig. 46 Botta's floating chapel in Lugano

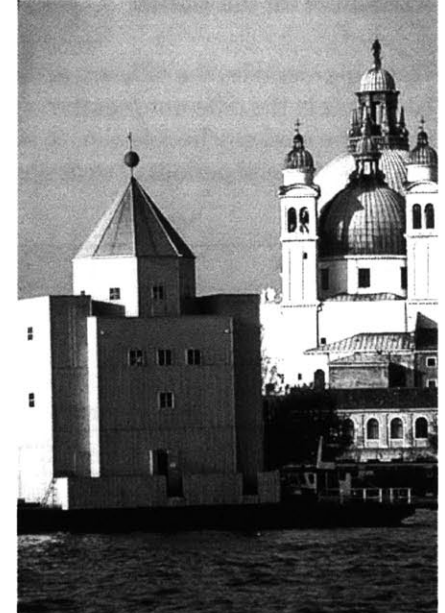
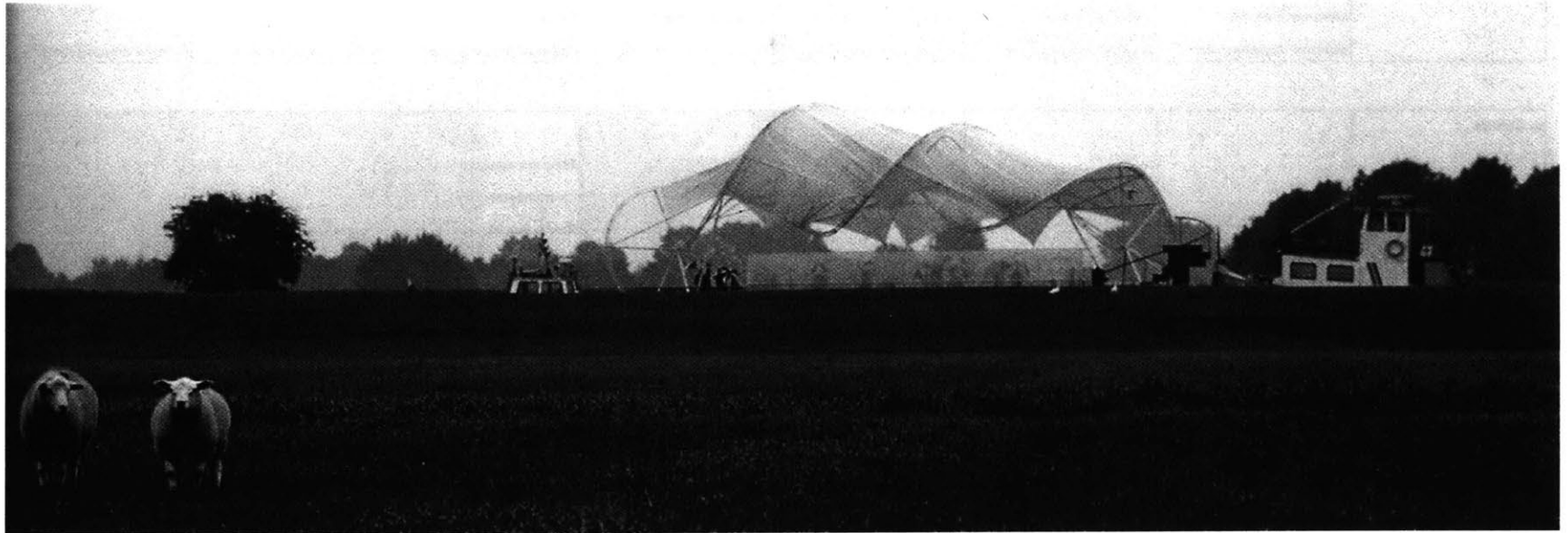


fig. 47 Rossi's Teatro del Mondo in Venice.

fig. 48 Maki's floating pavillion in a Groningen Canal.



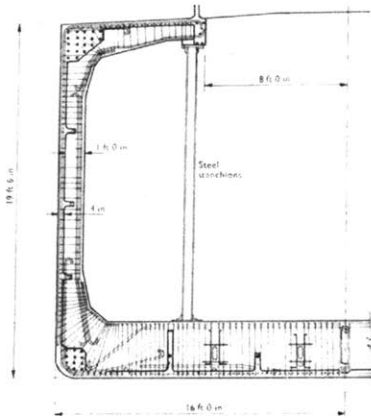


Fig. 6. Cross section of Armistice

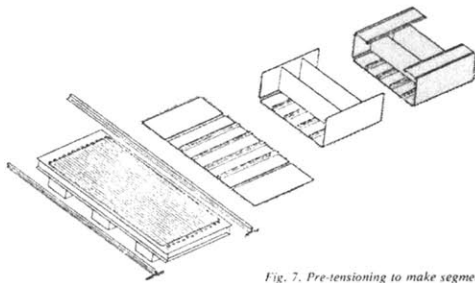


Fig. 7. Pre-tensioning to make segments

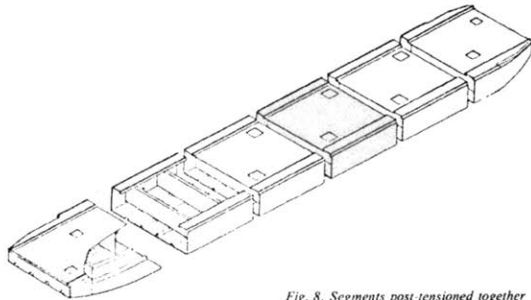


Fig. 8. Segments post-tensioned together

fig.49 Concrete barge construction.

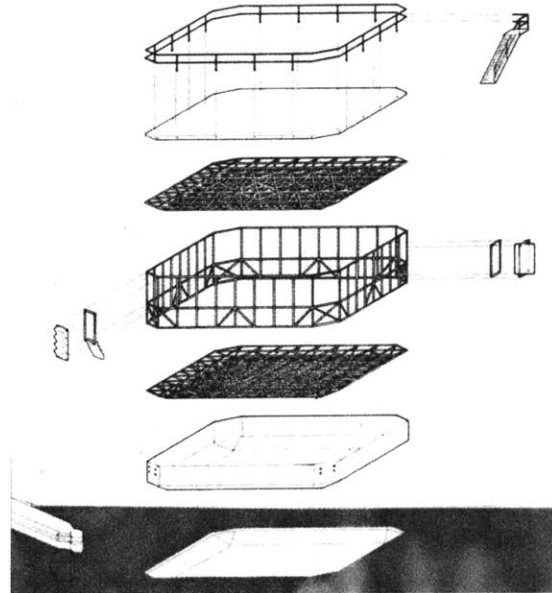


fig.50 Assembly of pre-fabricated components for a barge

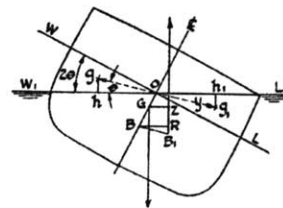


Fig. 27.
GZ. MEASURE OF STABILITY AT LARGE ANGLES OF HEEL.

fig.51 Height v. width

Nautical Principles

The construction model chosen for our floating market is the concrete barge. It can be assembled by joining precast modules and can accept several types of superstructure.

As a rule, the weight of the superstructure has been concentrated along the periphery of the barge. The height above the water line of the building has been limited to half the width of the barge.

Although a barge could be outfitted with engines, this barge relies on a tugboat for its travels across the bay.

Design of the Barge

The barge contains the vendors' stalls. It transports this core group of stalls from one site to the other. Upon arrival to a site, the movable curtains along the periphery of the barge swing upon, revealing the interior of the building and interacting with the "connectors" on the sites.

Plans

Sections

Axonometrics

Program

Stalls

Models

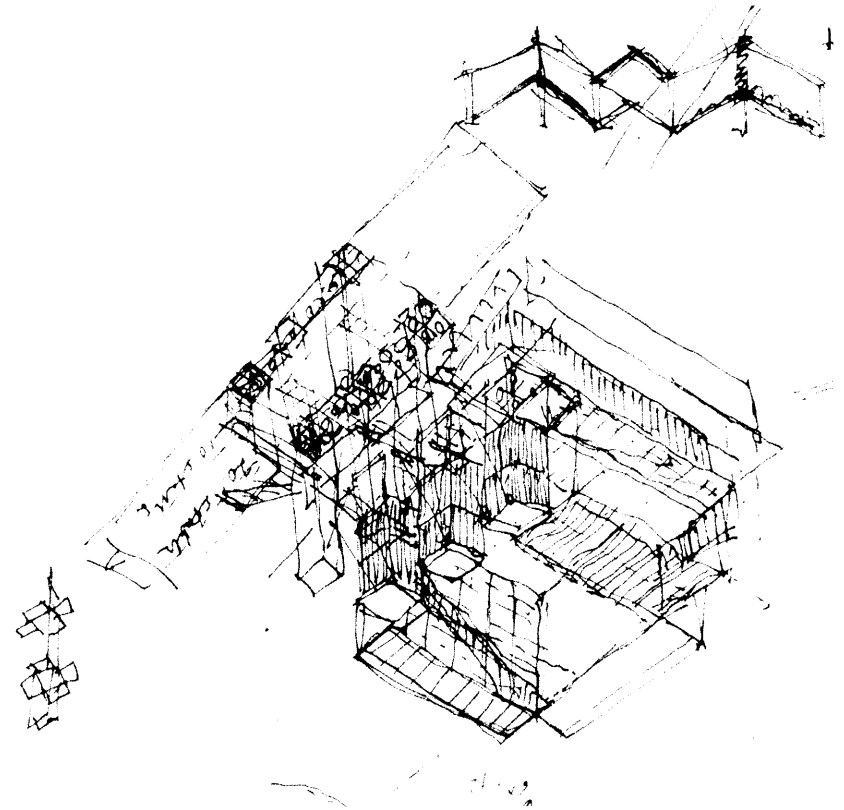
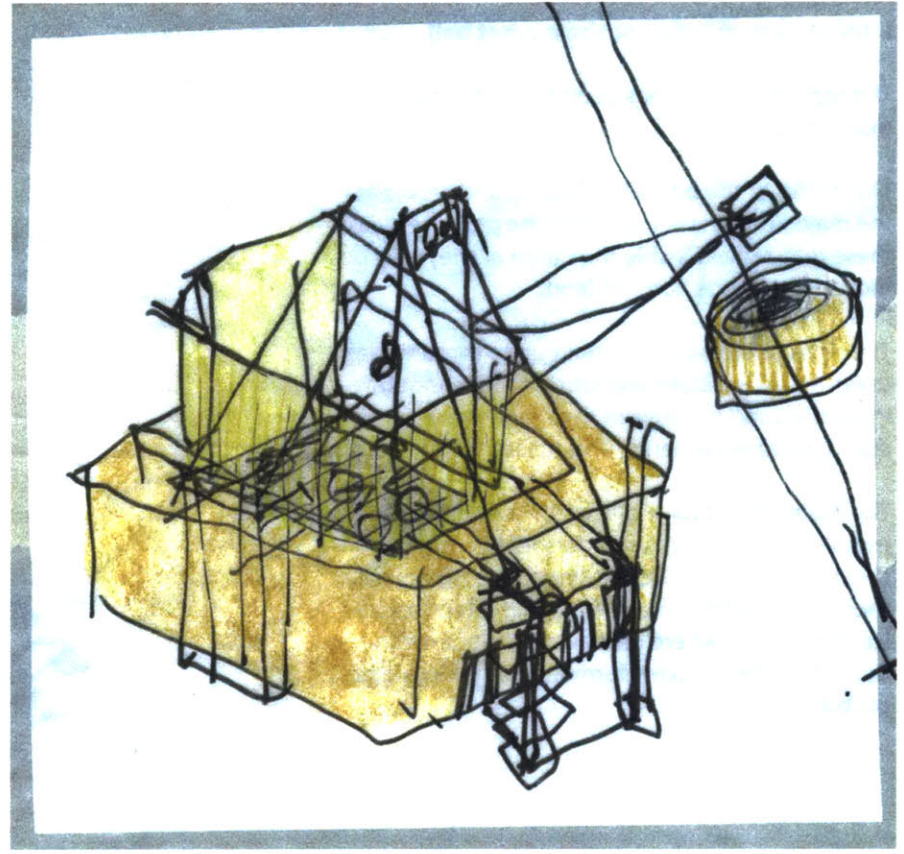
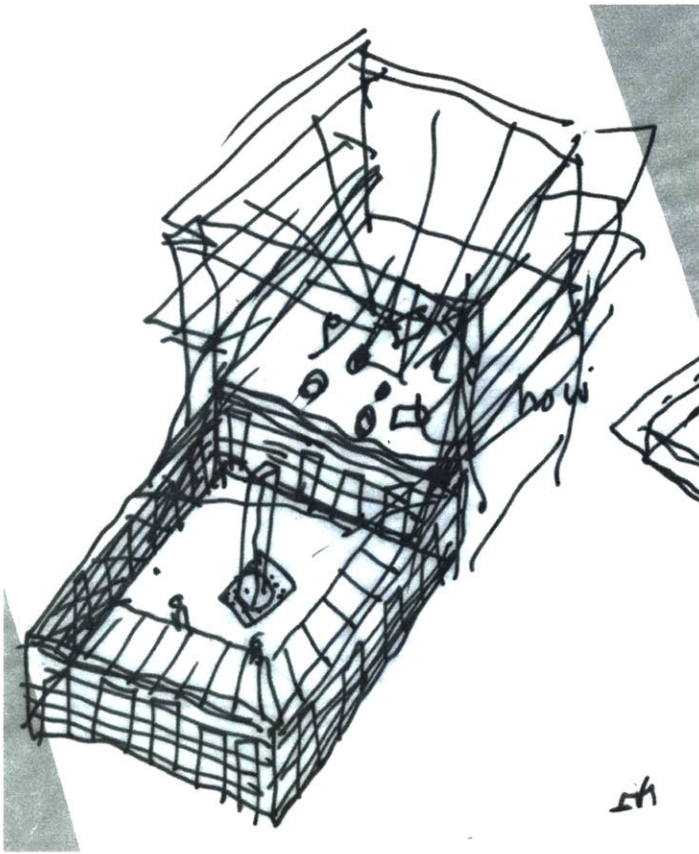


fig. 52, 53, 54 Sketches of the market arrival on the site



Internal organization of the market hall

The market hall area has been divided in two main regions.

The center of the barge is left open and serves as the main floor. It is occupied by the produce stalls: these may remain inside the barge or they may be moved out to positions on land.

The sides of the barge are built up to three stories; these house the stalls and stores that cannot be moved around because of their heavy merchandise or storage demands (like meat and fish stalls).

The higher levels have offices for the administration of the market, a vendors' locker room, a classroom and a vendors' lounge. opposite these, there are governmental offices that attend to citizen's concerns where residents from the neighborhoods can receive information or take care of problems.

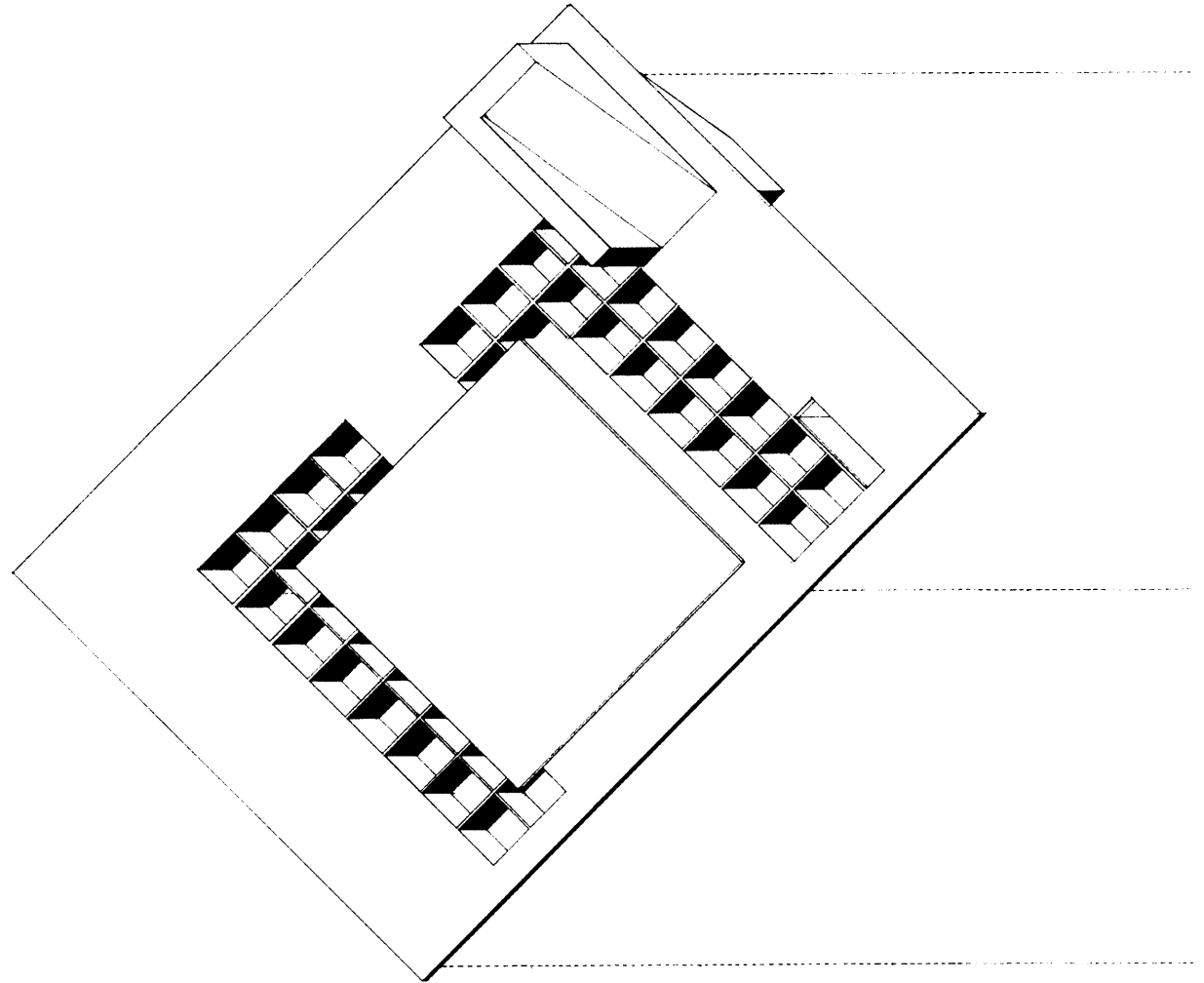
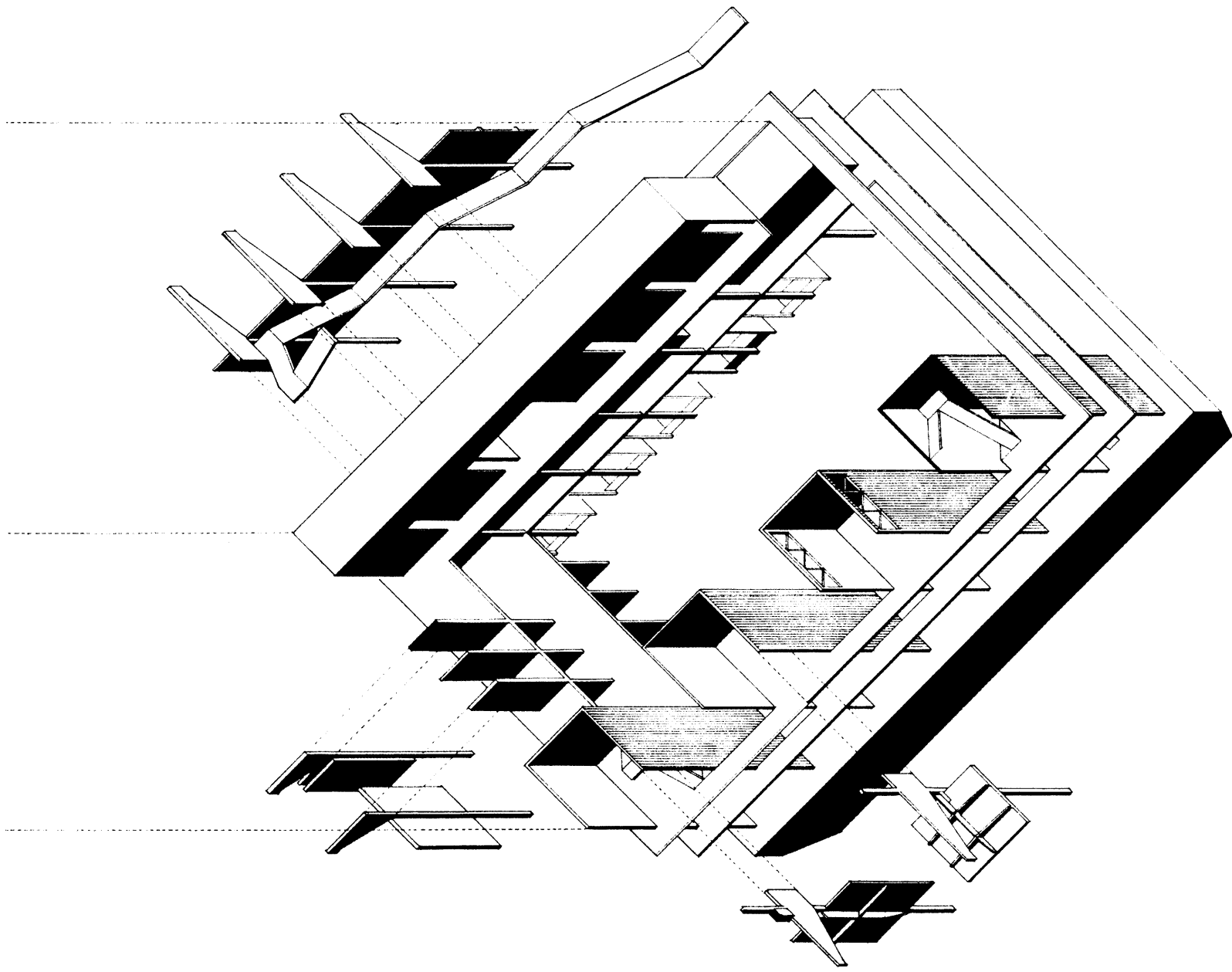


fig. 55 Market hall barge. Axonometric.

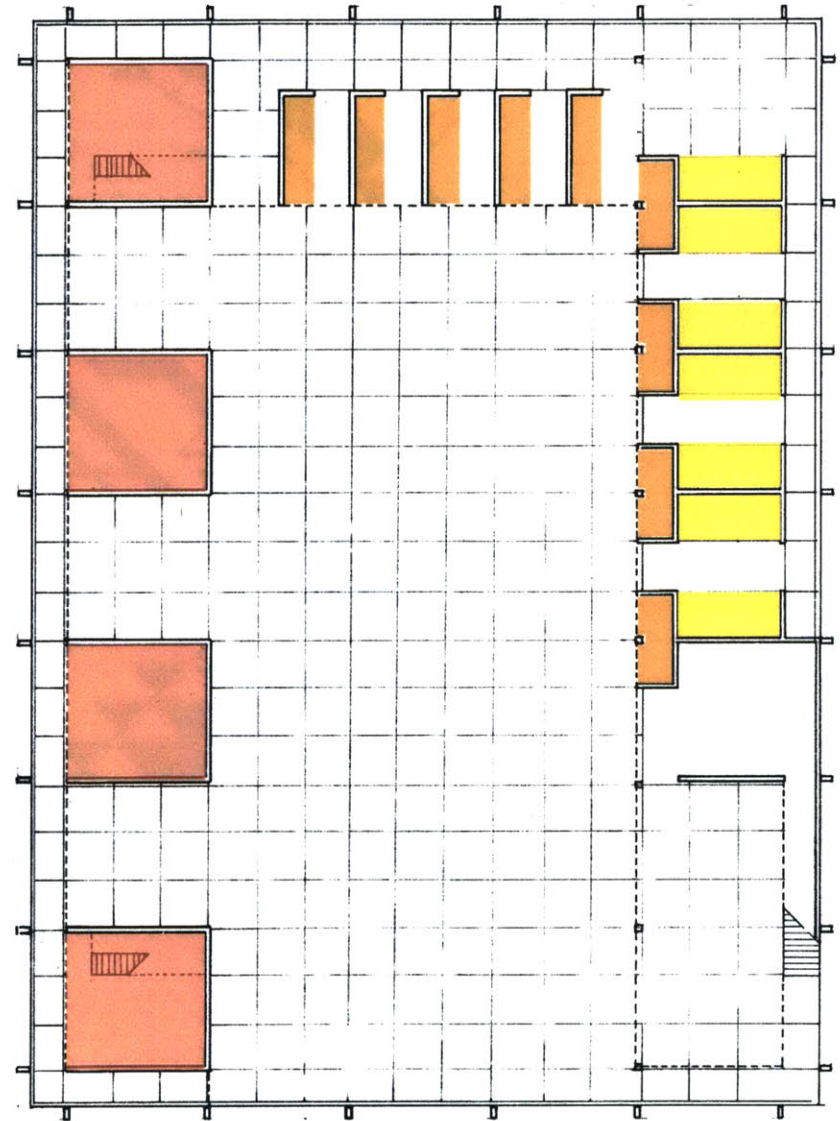
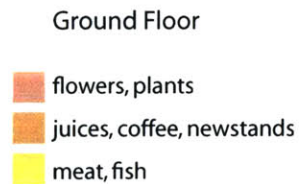


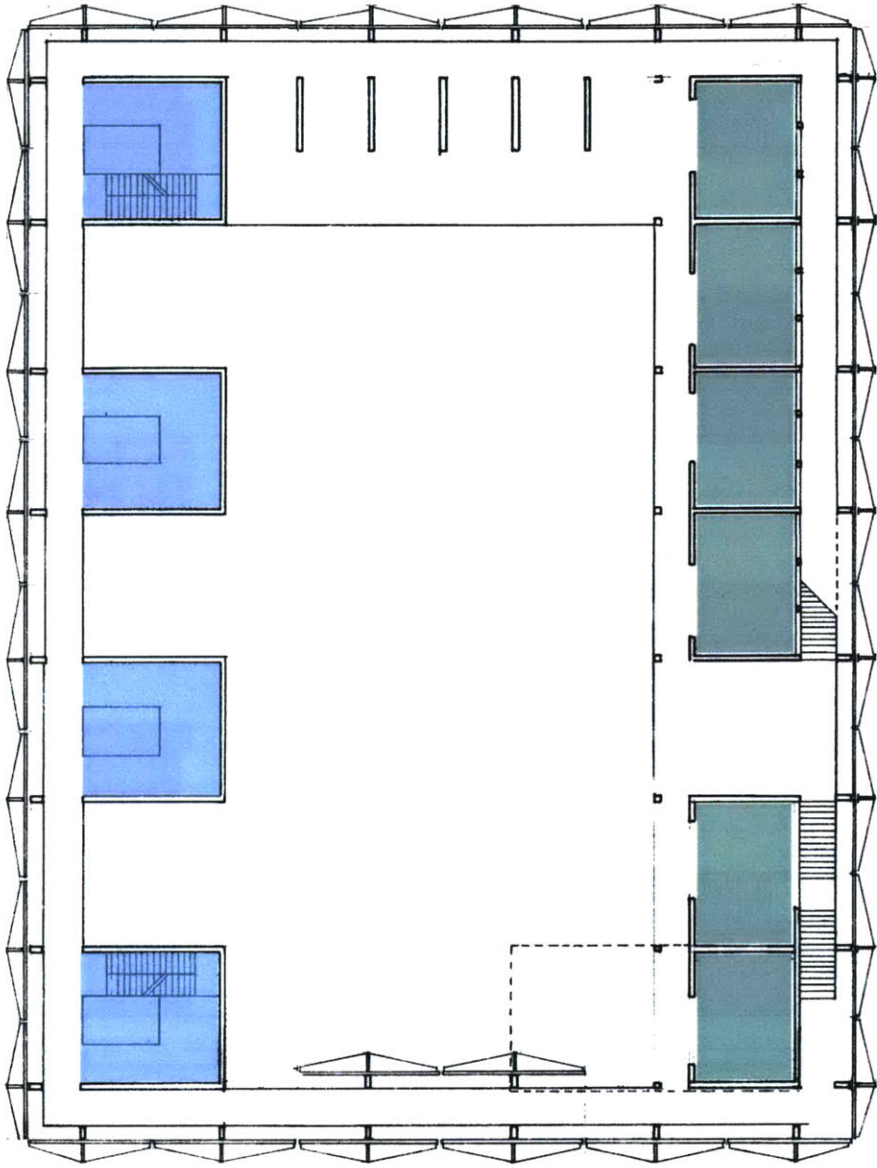
Public Spaces and Market Space

The market hall seeks to re-introduce the union of market space and public gathering space that was the norm in the early market-town hall complexes.

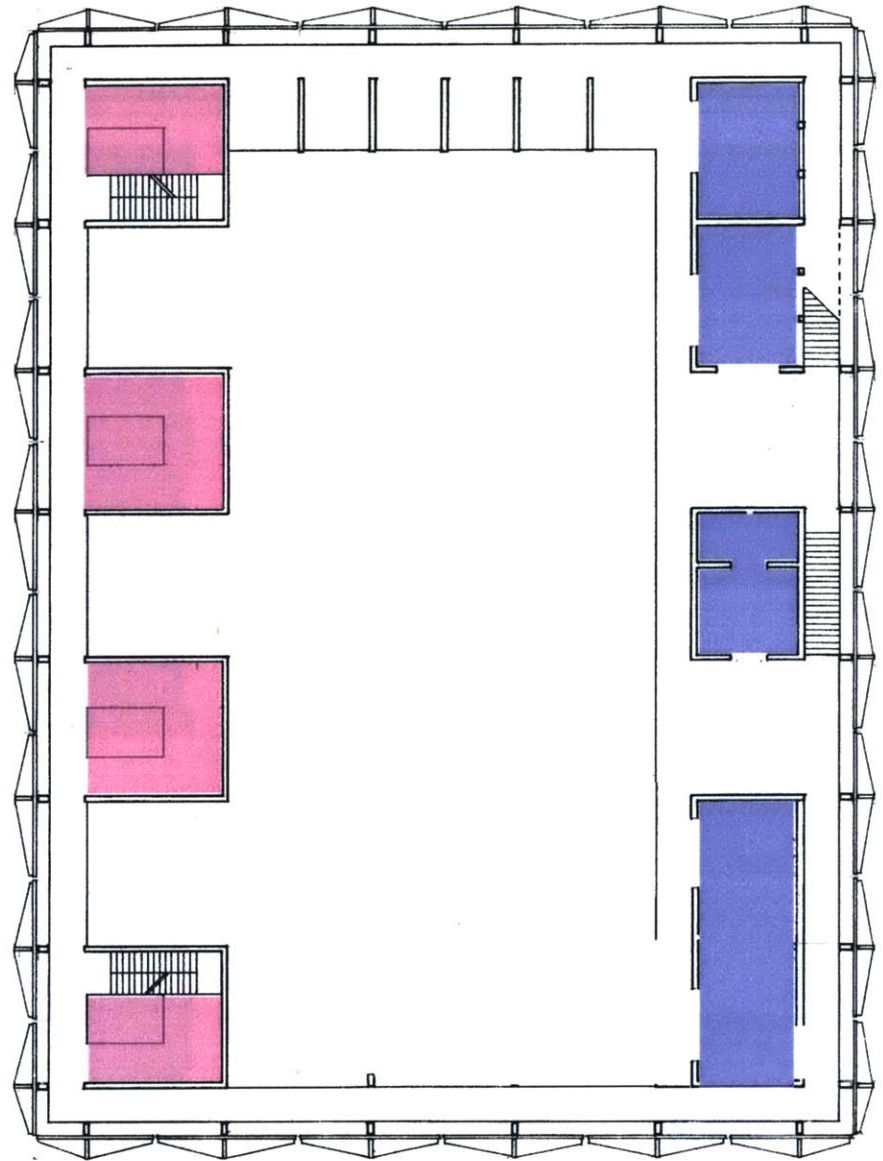
Public space is available in a variety of scales and locations: balconies and booths overlooking the bay (5-10 persons); classroom sized rooms in the market administration area (30 persons); the roof-top terrace with views to all sides (100 - 300 persons); the interior of the hall when the stalls are moved to their outside location (500 persons+).

Just as the floating market is flexible to adapt to different market and geographic needs, it also has a variety of gathering spaces to assure its adaptability to different uses.



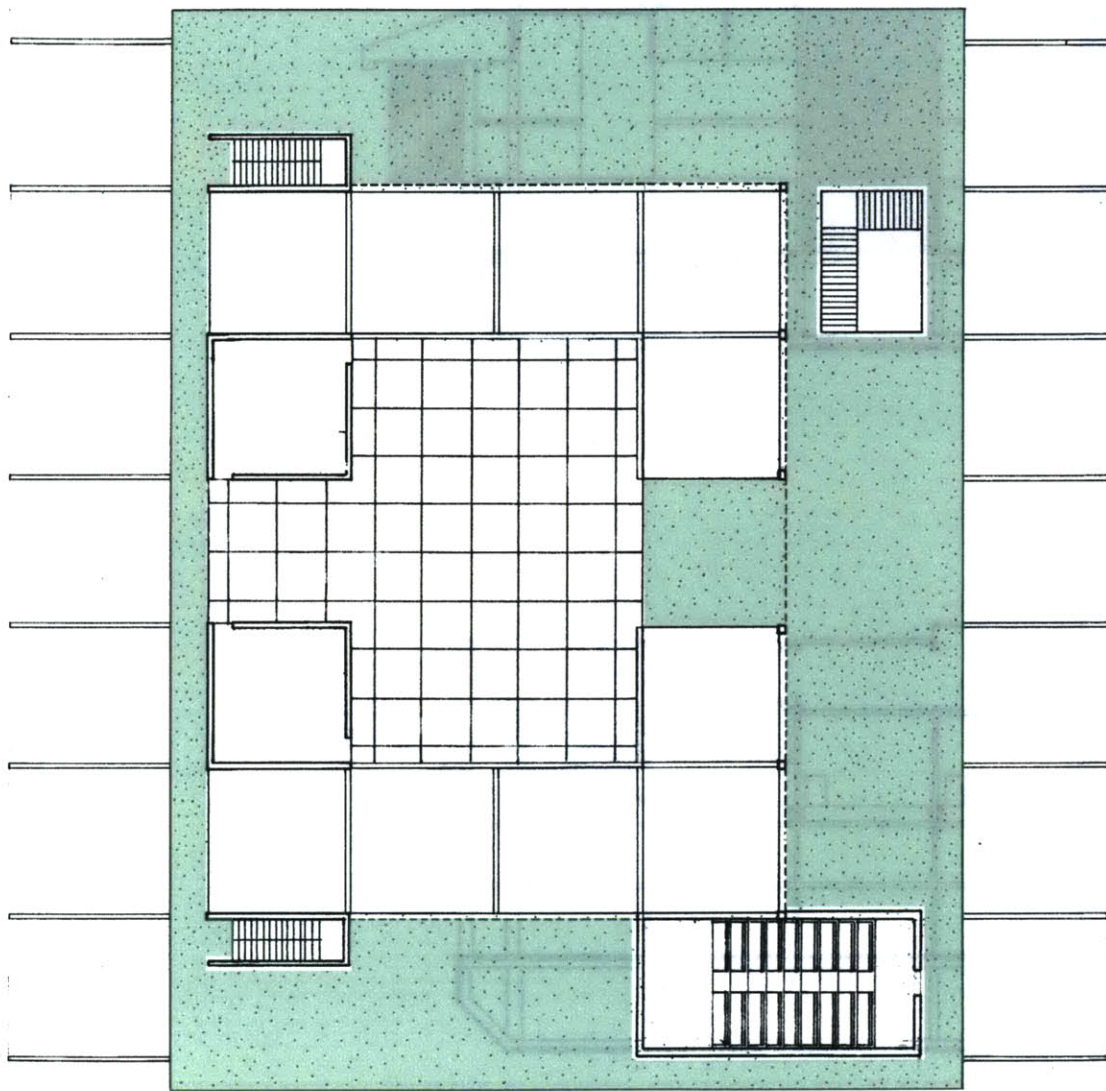


- Second Floor
- Restaurants
 - Dry Goods Stores



Third Floor

- Market administration
- Governmental offices



Roof Terrace level

 Lawn

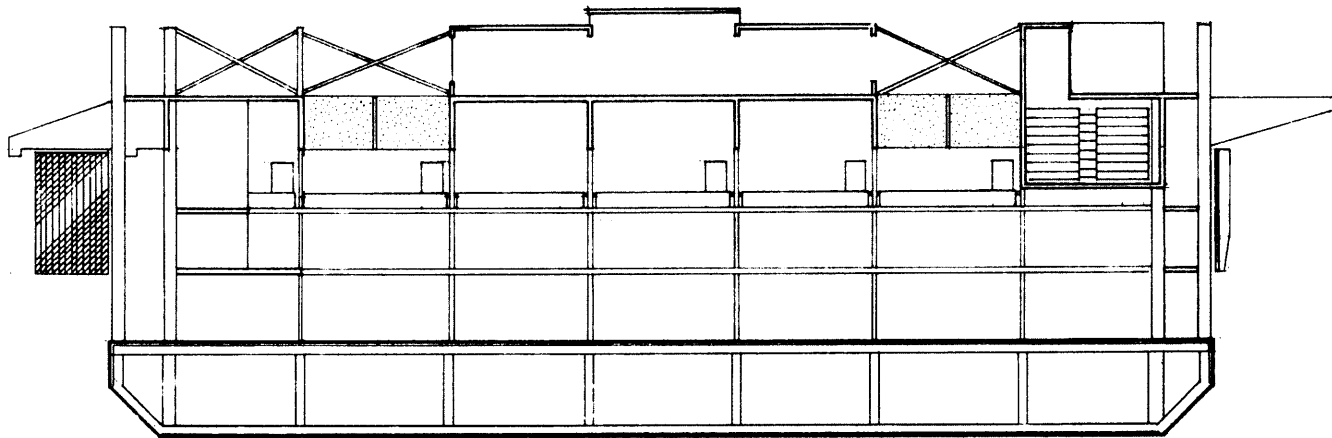
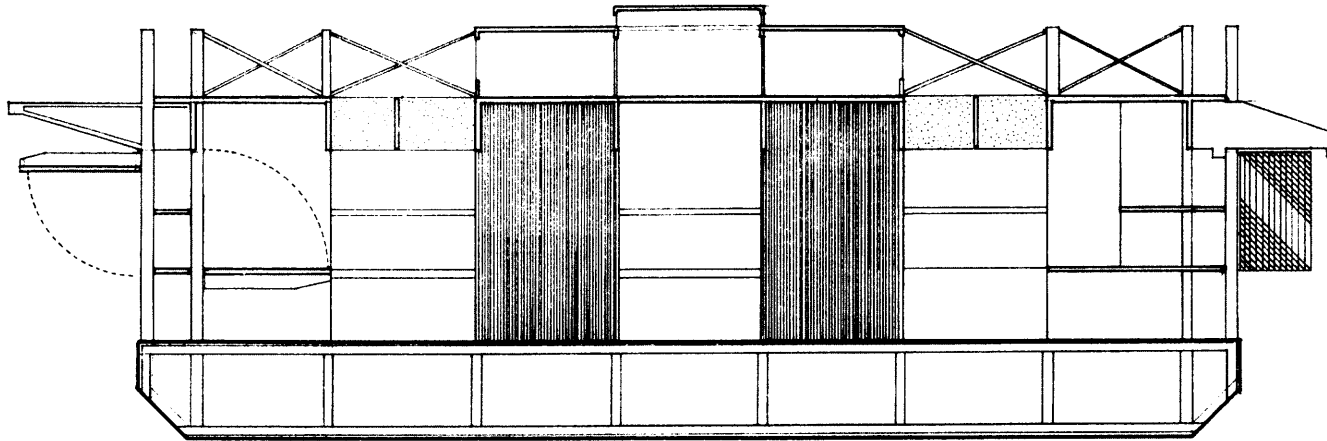


fig.60,61 Longitudinal sections of barge (1/32" = 1')

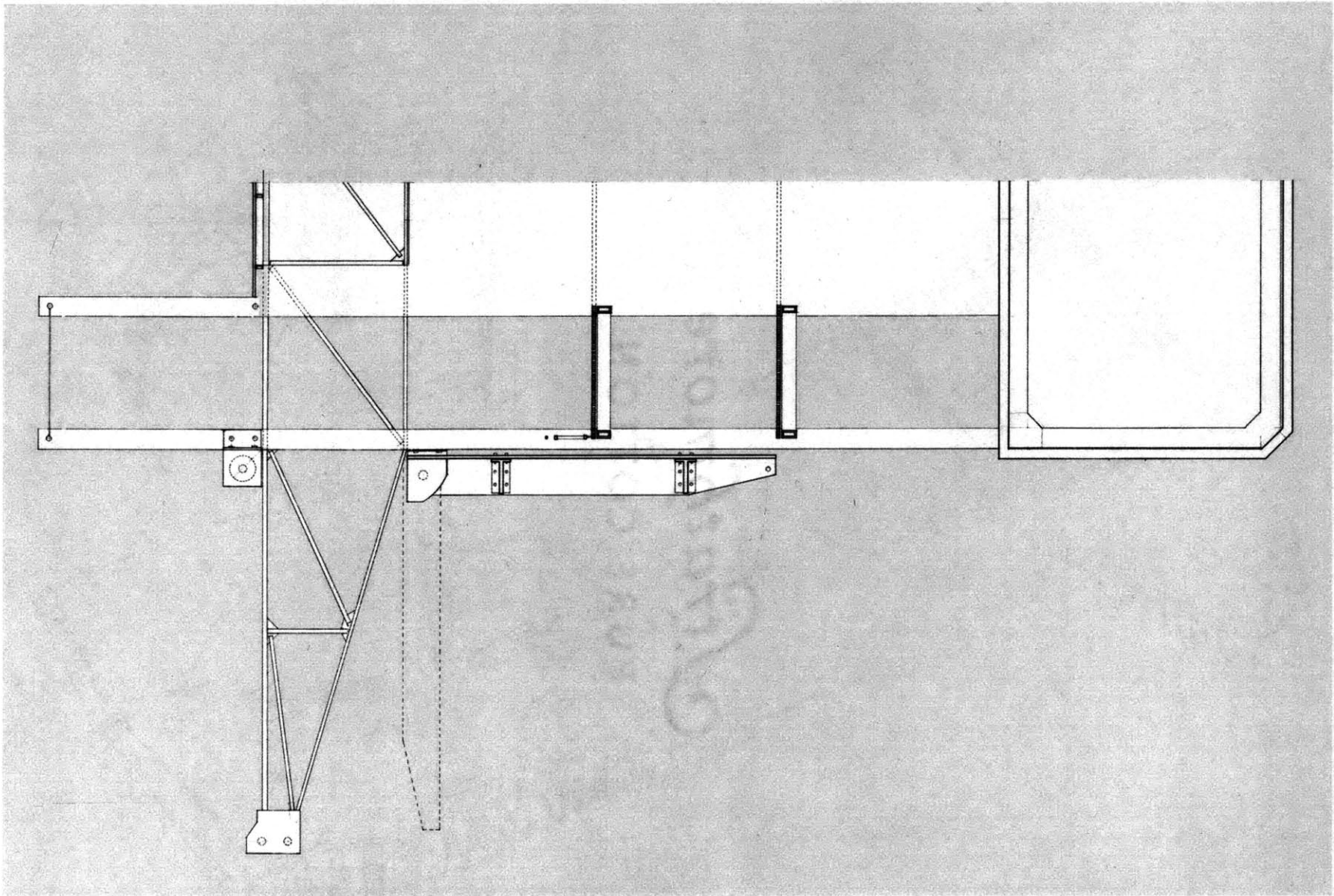


fig.62 Wall section (1/8" = 1')

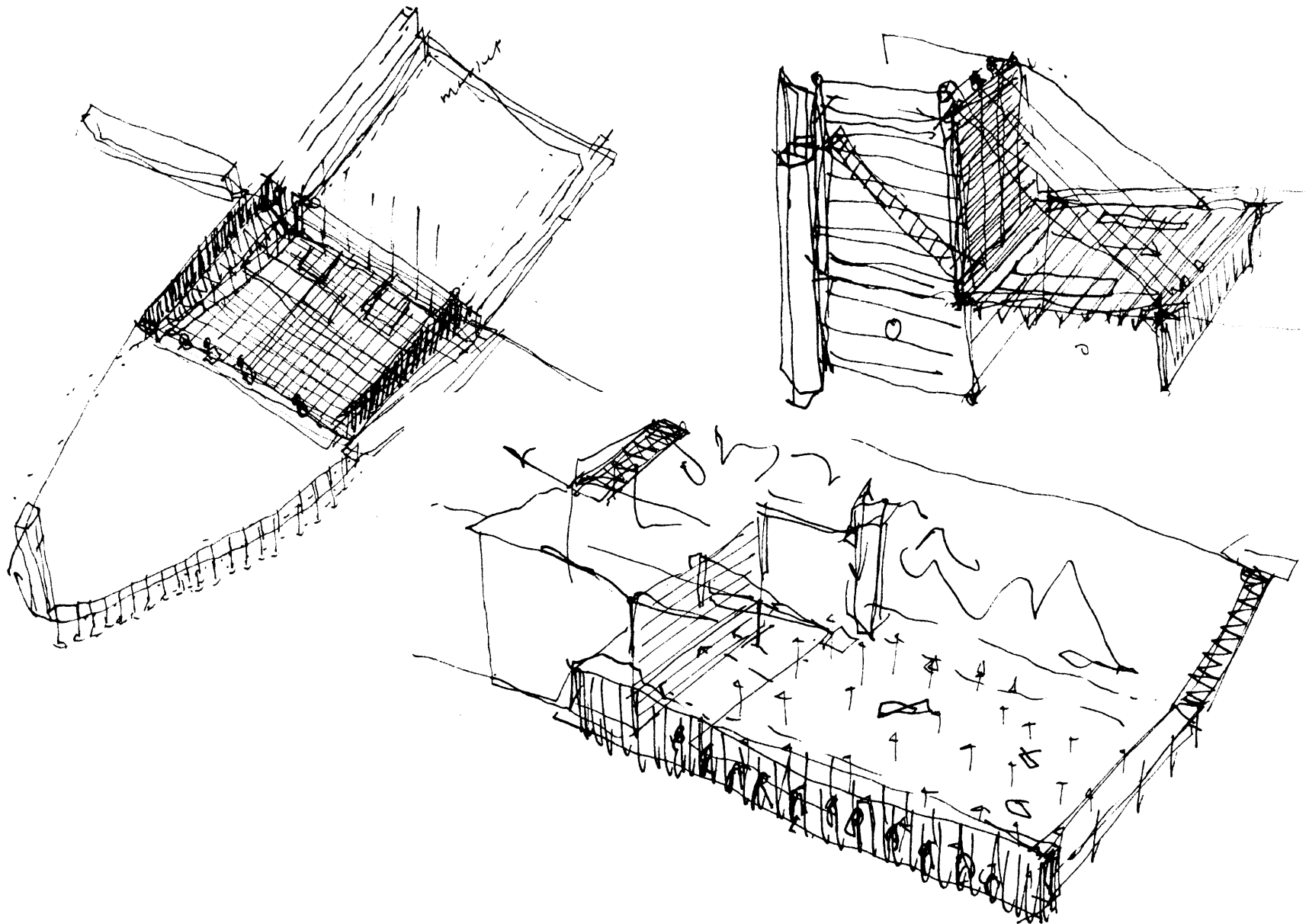
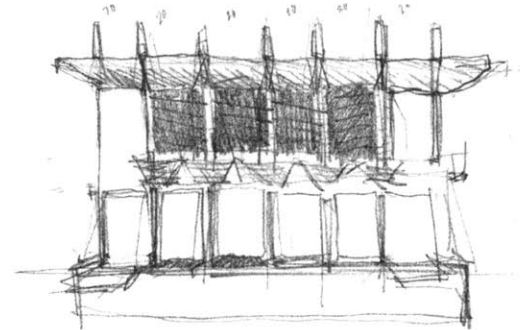
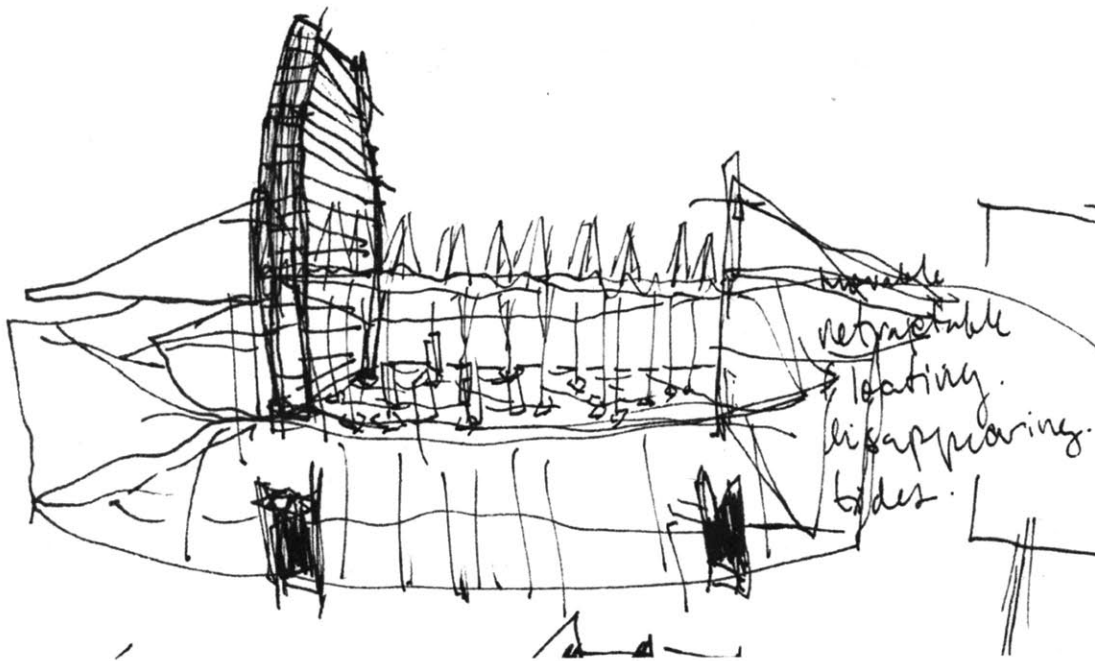
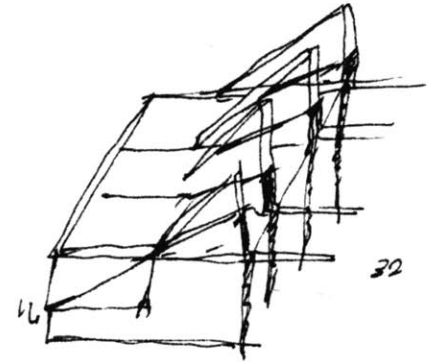
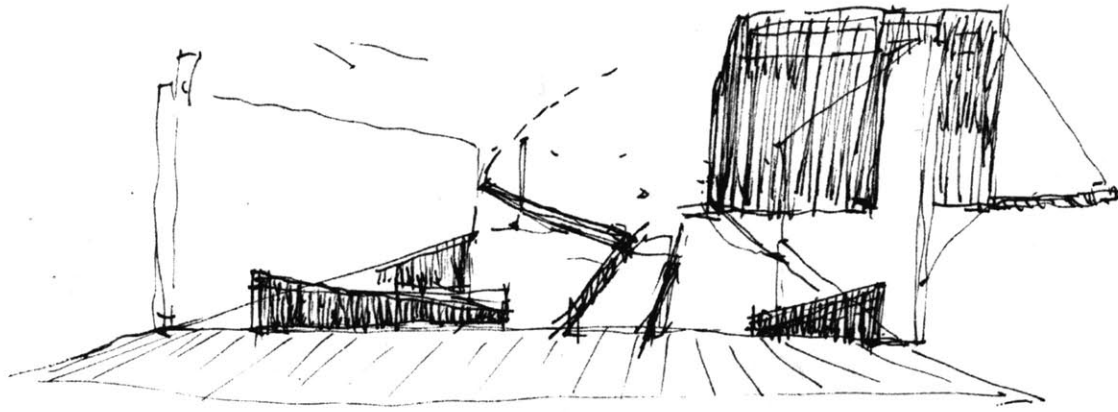


fig.63 Folding market, flexible walls, opened and closed.



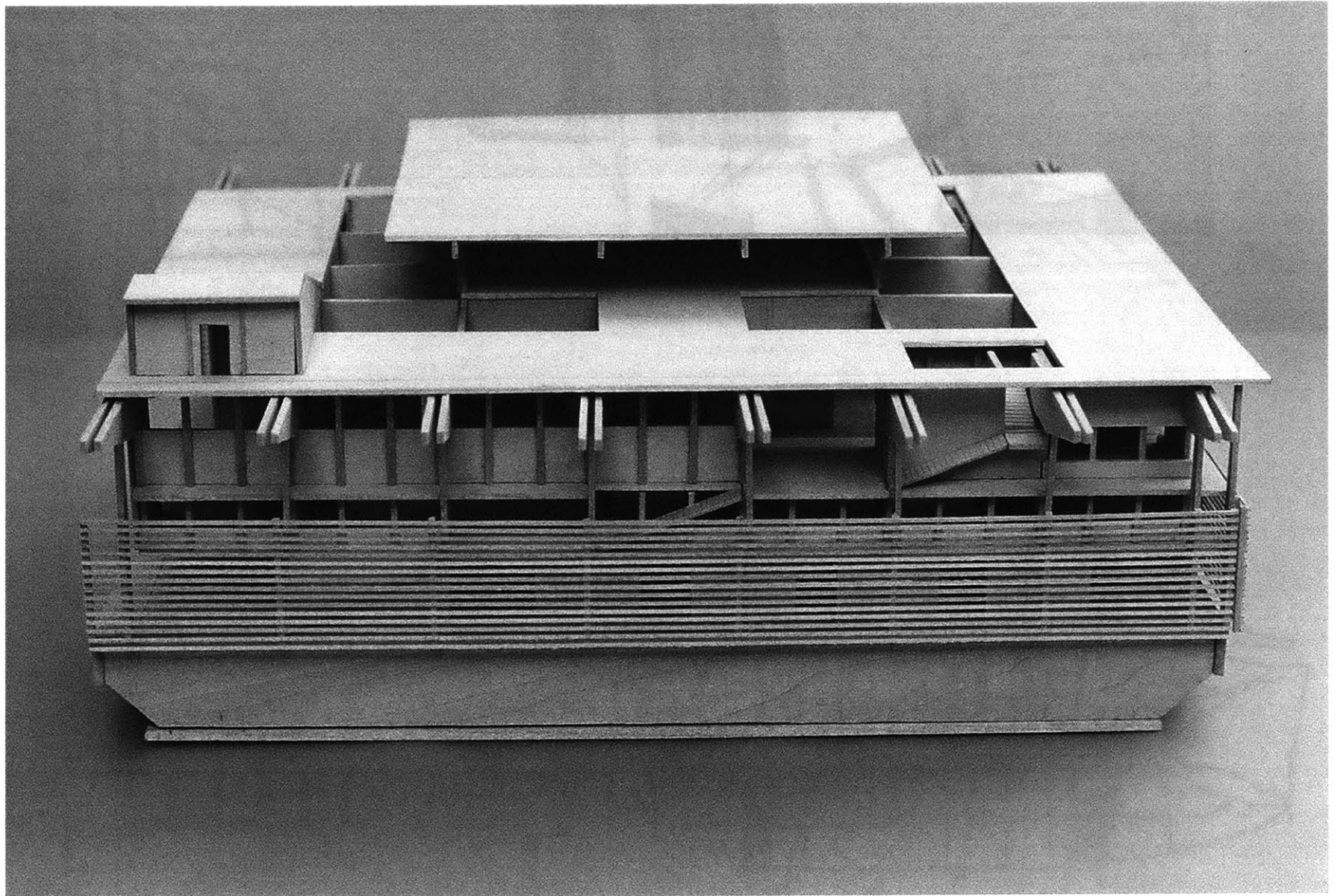
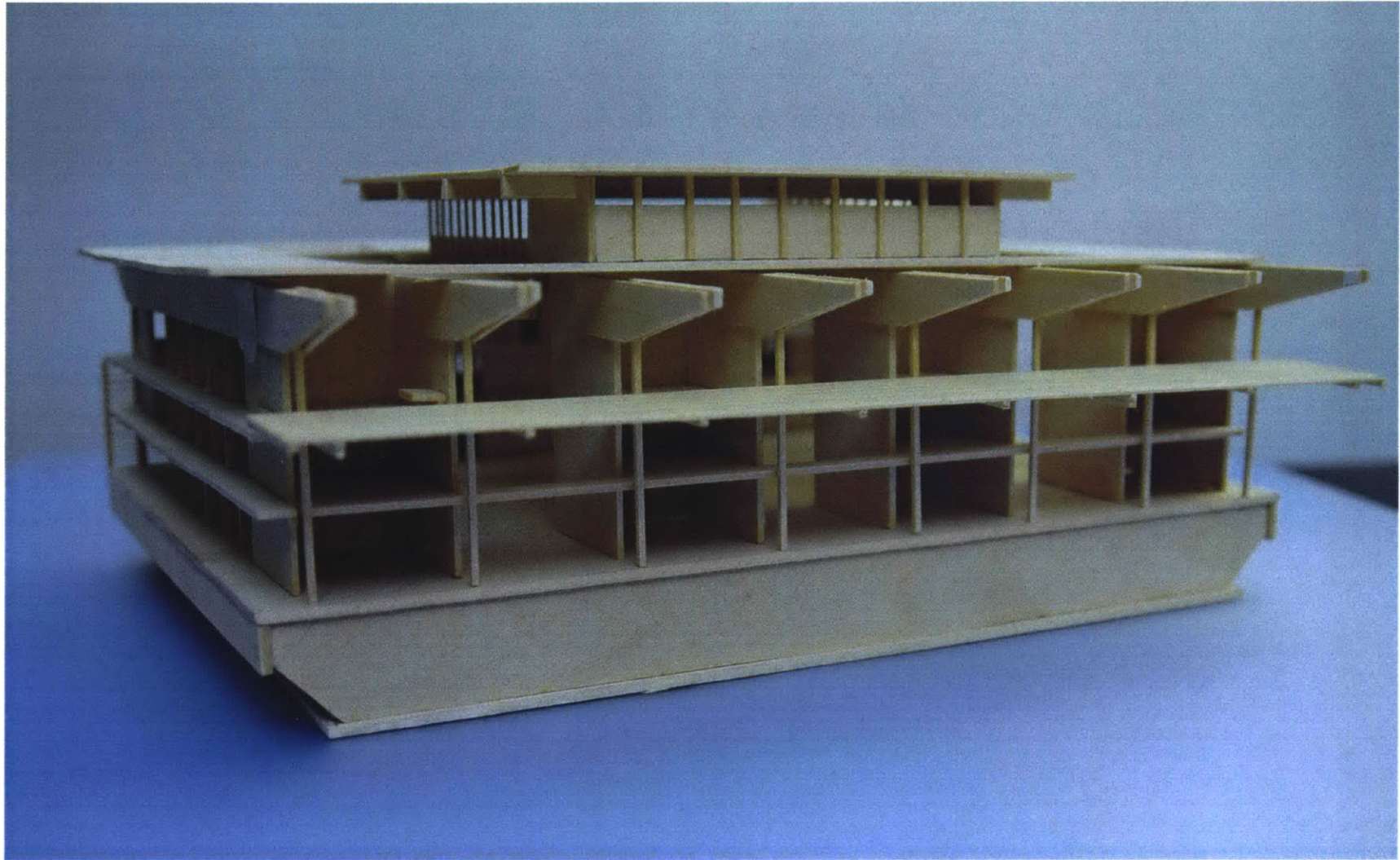
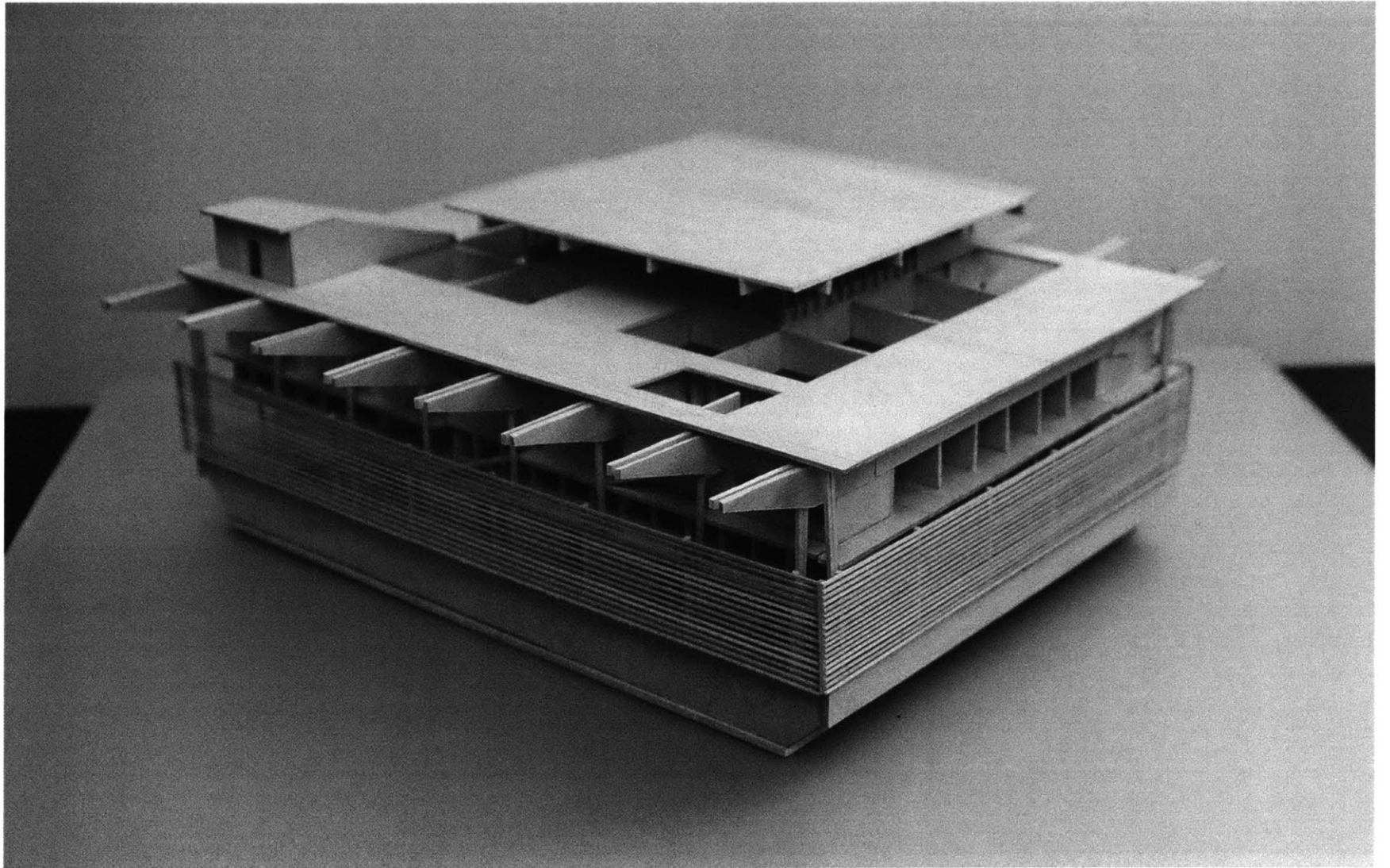
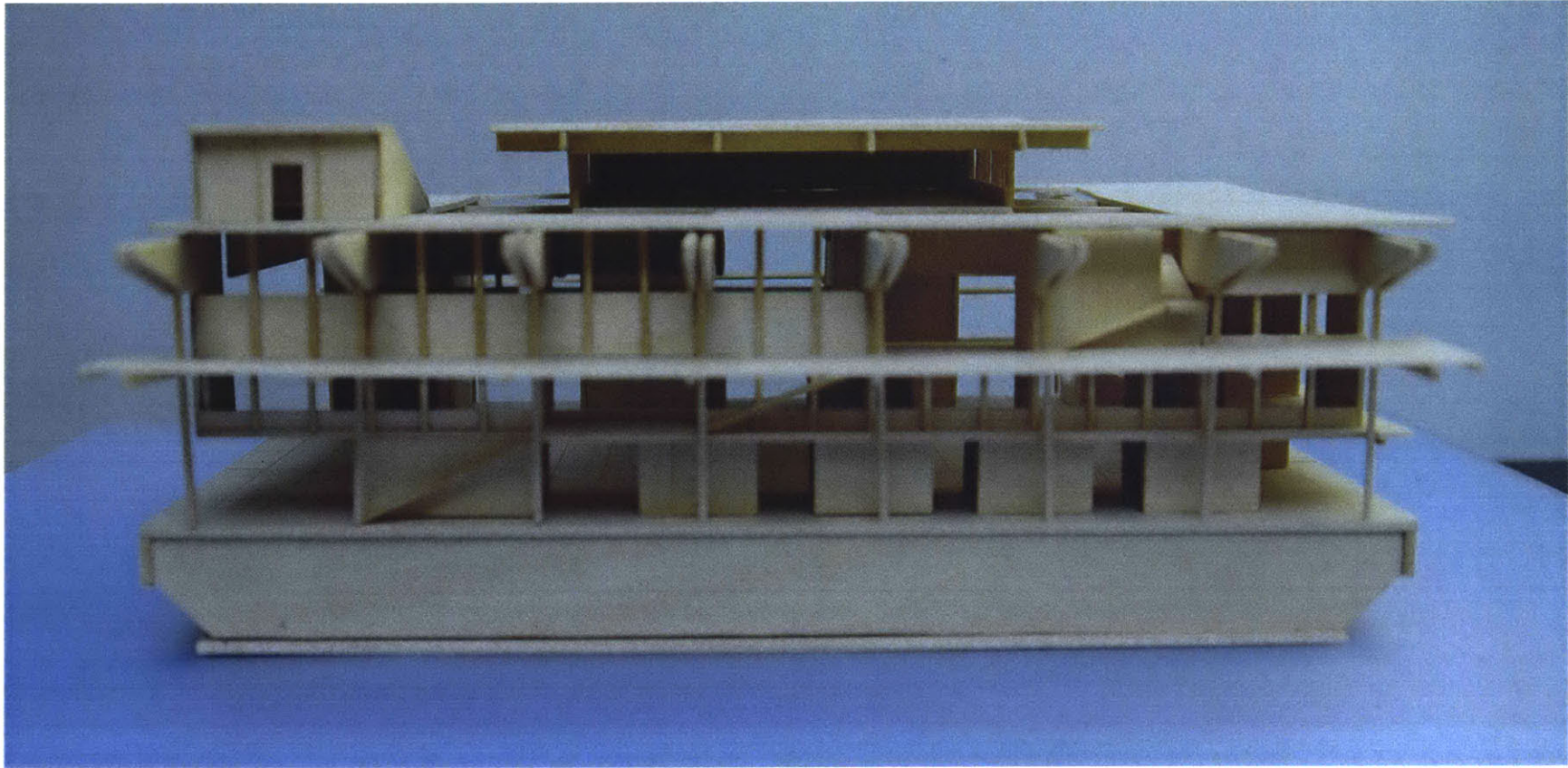
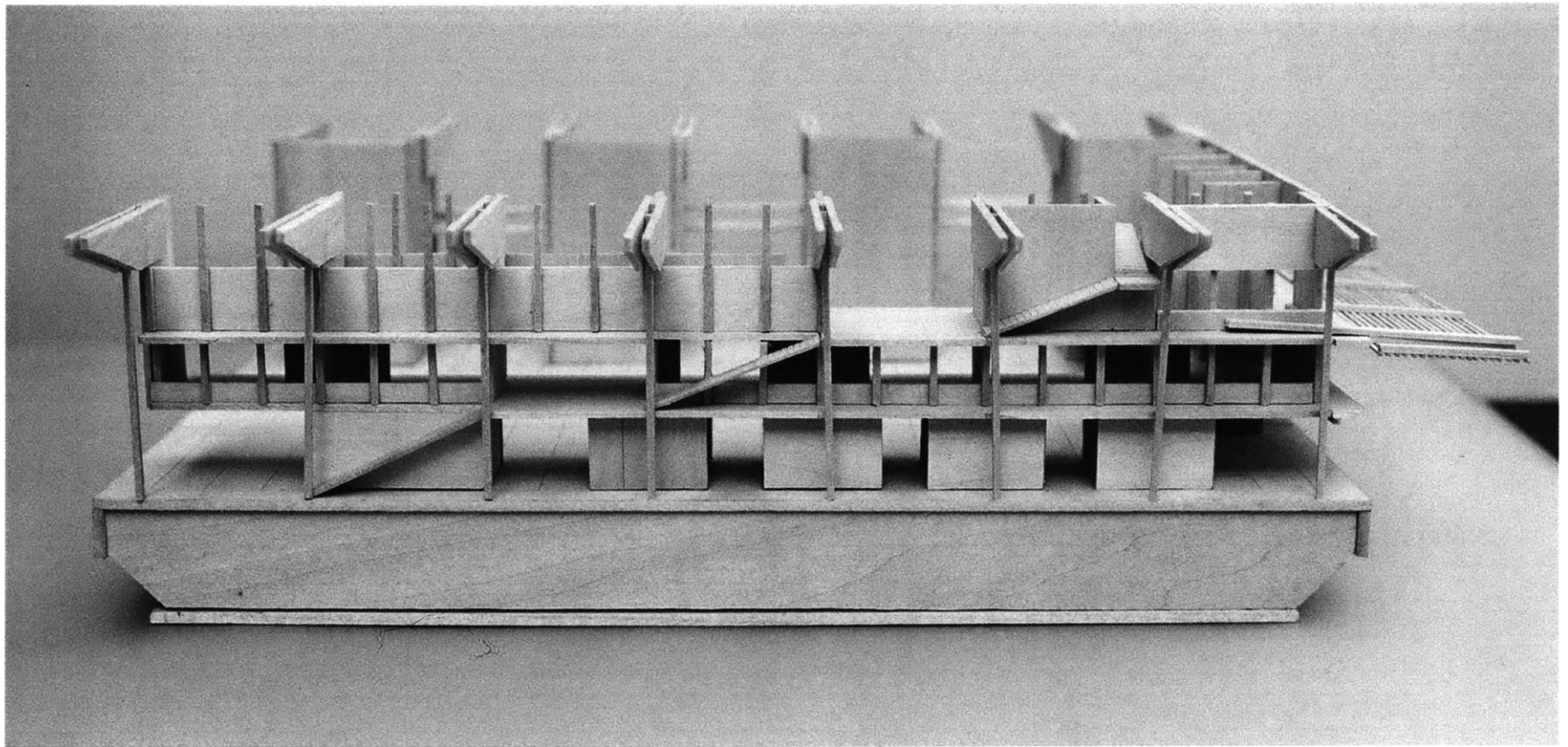


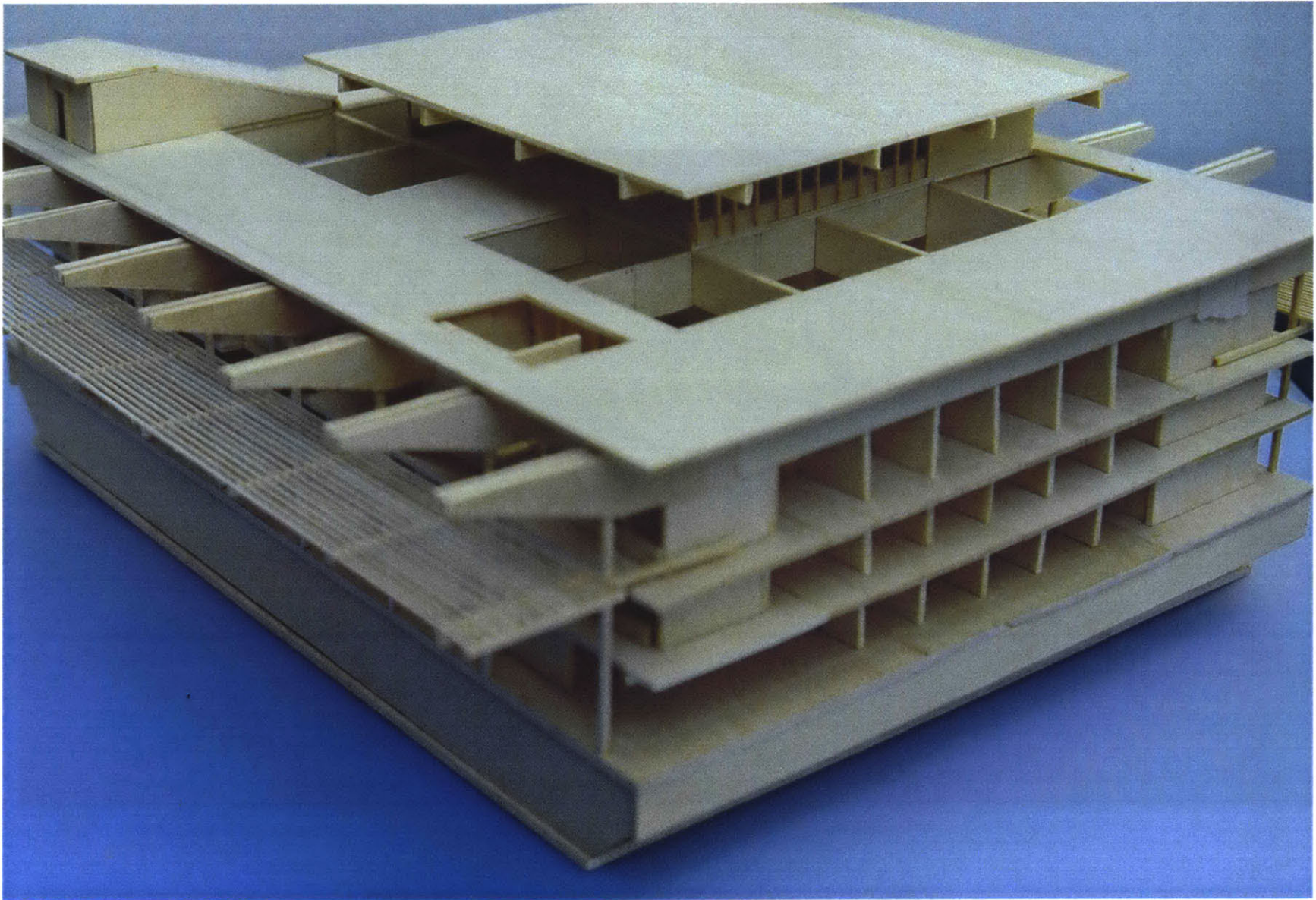
fig. 64 - 71 Market hall, model

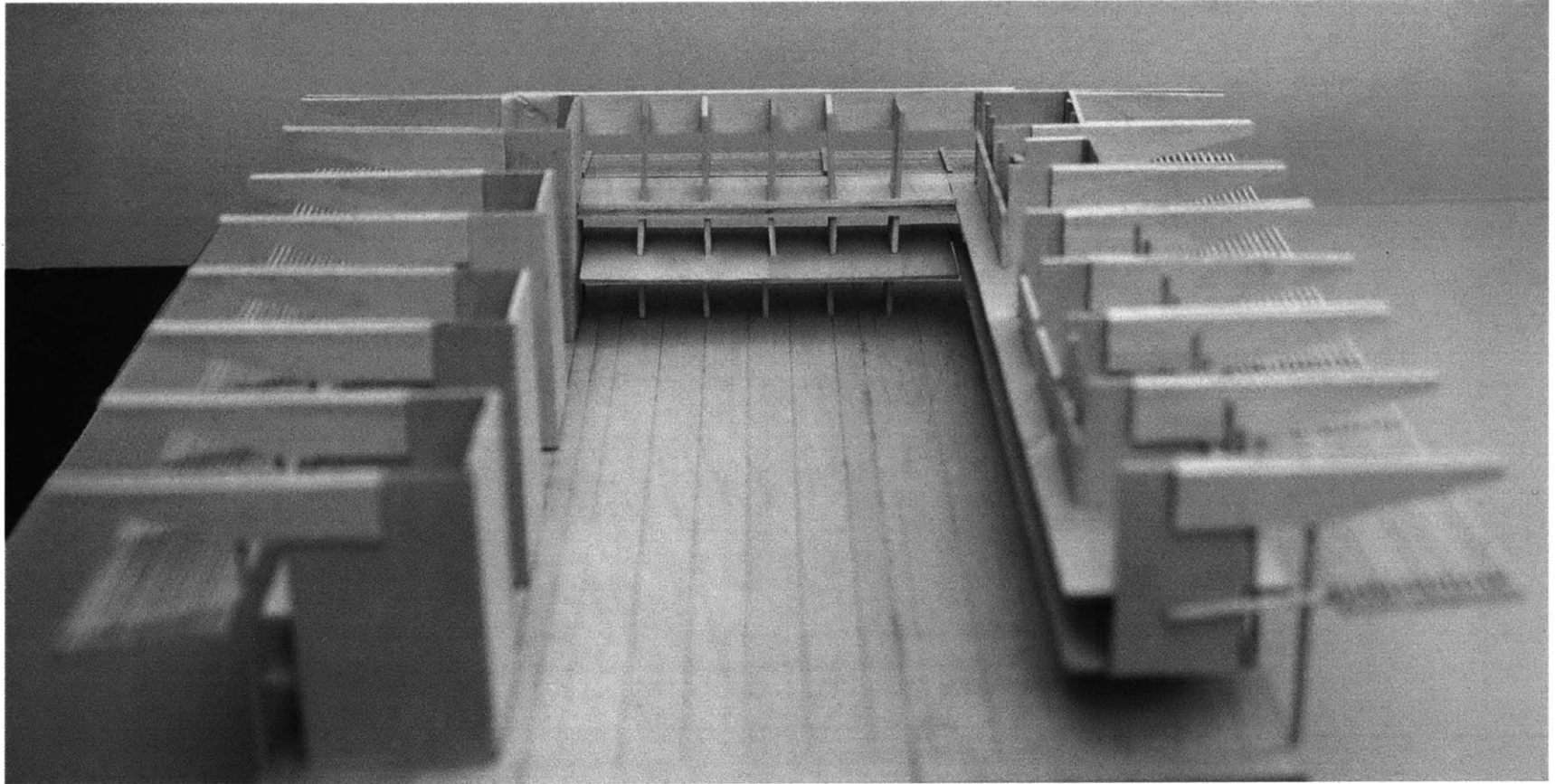


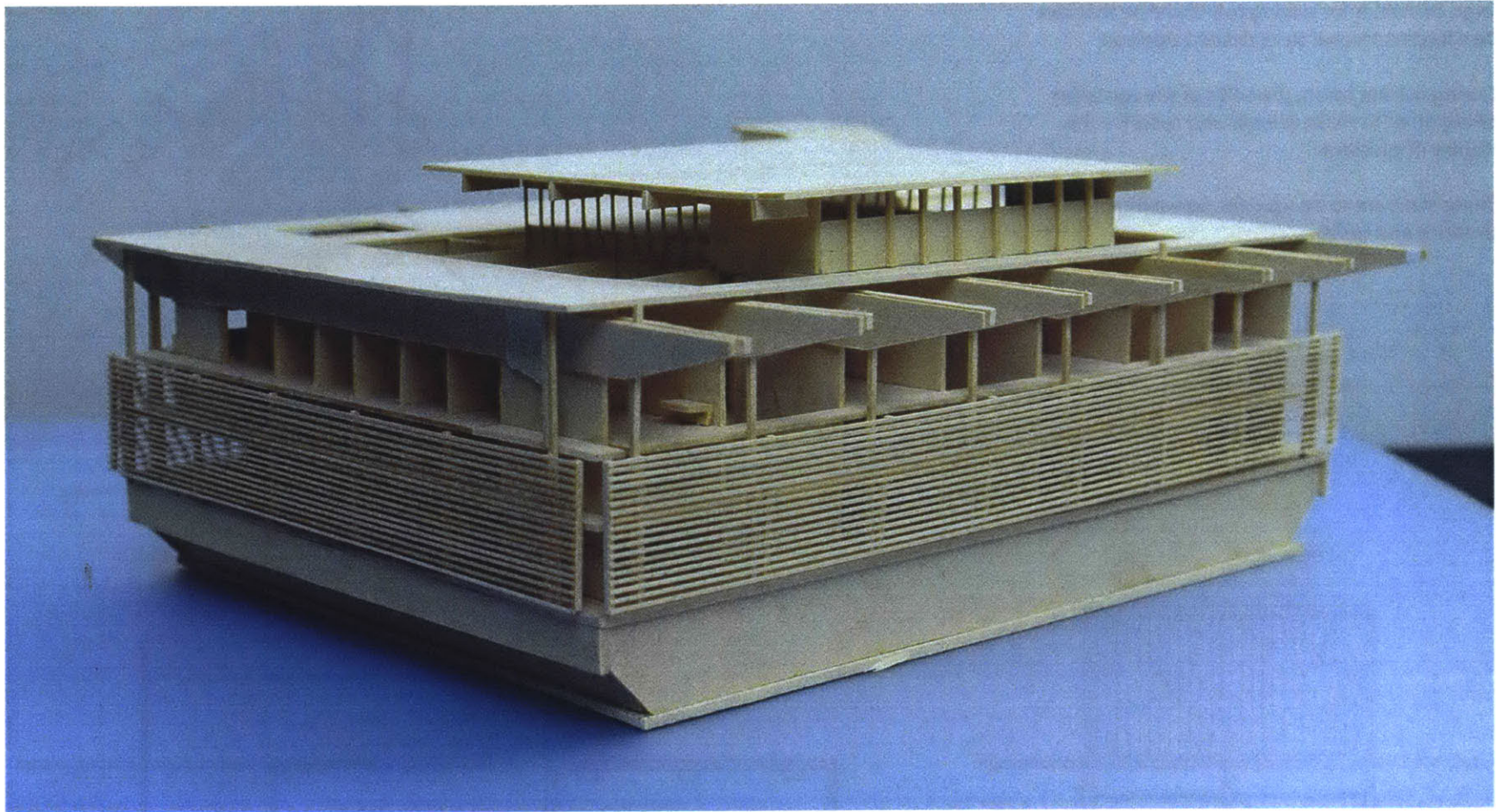












Movable Stalls

The stalls, like the barge, folds open to assume an "active position". In its dormant phase, it is a large container for storing merchandise that can be wheeled around to its desired position.

During market hours, the sides of the container swing open to make shelves and racks for the display of produce.

These stalls are to be used for non-refrigerated produce and fruits.

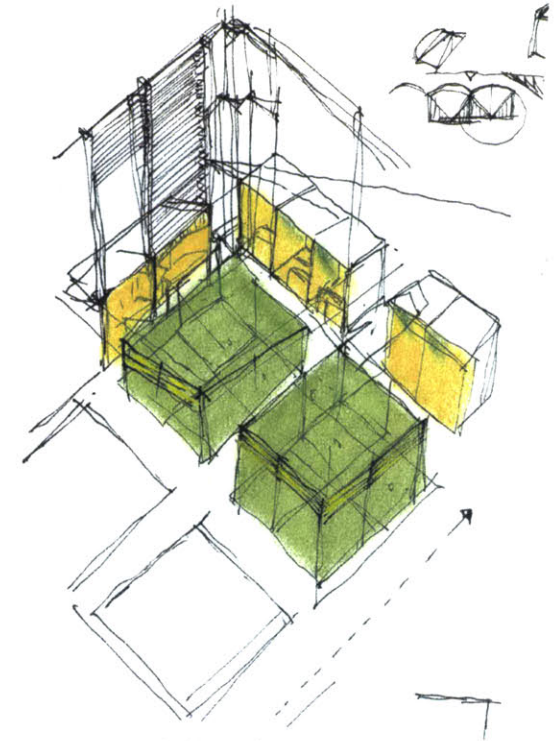


fig. 75 Stalls inside the market

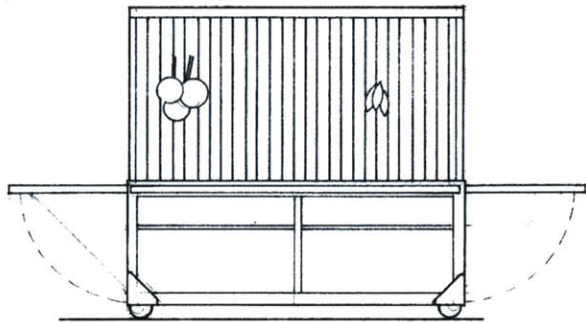


fig. 72 Stall, open position

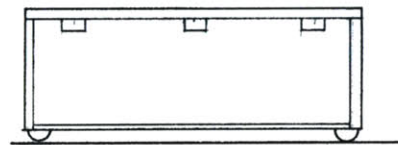


fig. 73 Stall, closed position.

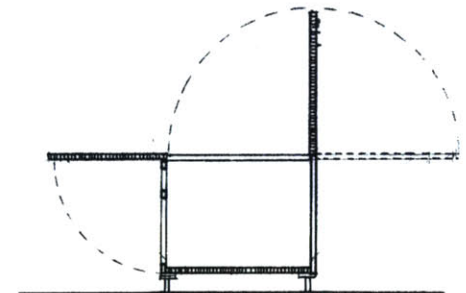


fig. 74 Stall, open position, side view.

Stall Arrangements

The movable stalls can create different patterns as they are moved about the market area. The three main arrangements are

- lineal
- bunches
- courtyard

Each one creates a different spatial effect that may fit better with the overall strategy of one site but not with another.

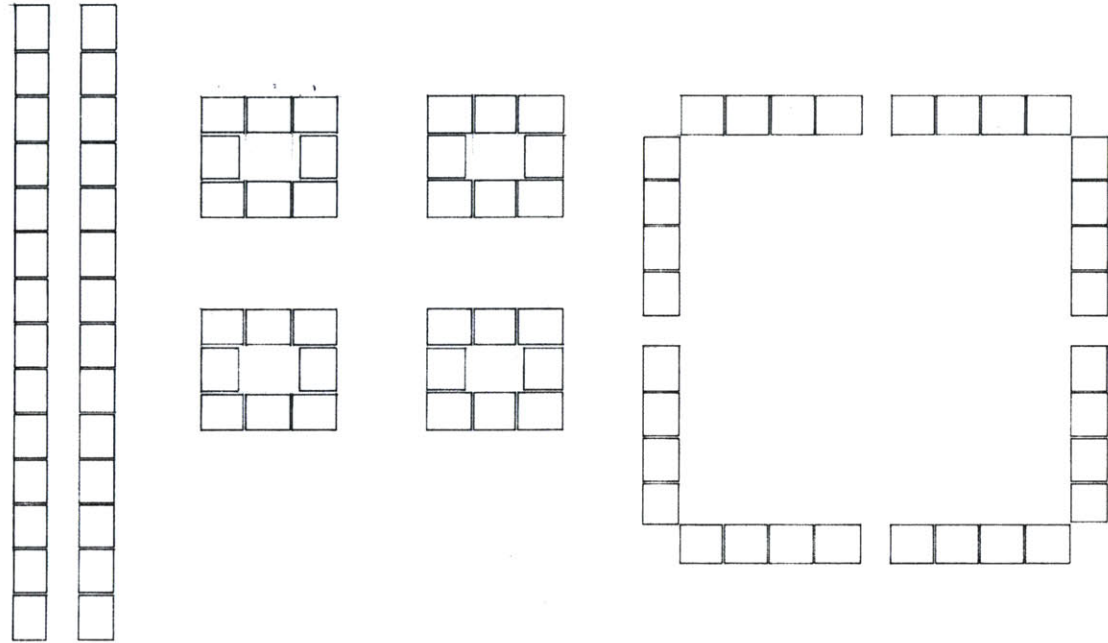


fig.77 Possible stall arrangements: lineal, bunches, courtyard

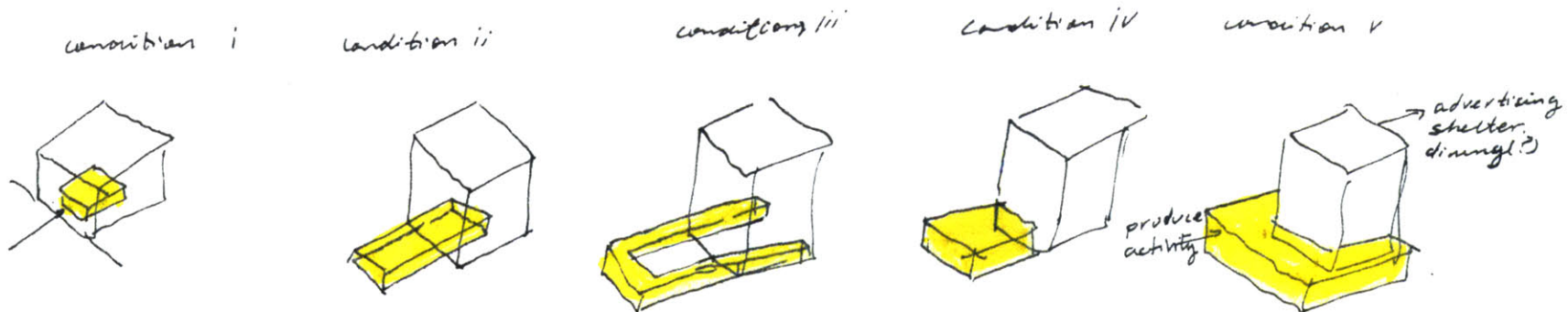


fig.76 Stalls (in yellow) in relation to the market hall building.

**Site 1:
Cataño**

The municipal government is in the midst of a vast bayfront development project. Extending over 3 miles, the project combine a boulevard, a boardwalk and docks.

The market will dock at the point at which the bayshore boulevard connects with the town square, one block to the south.

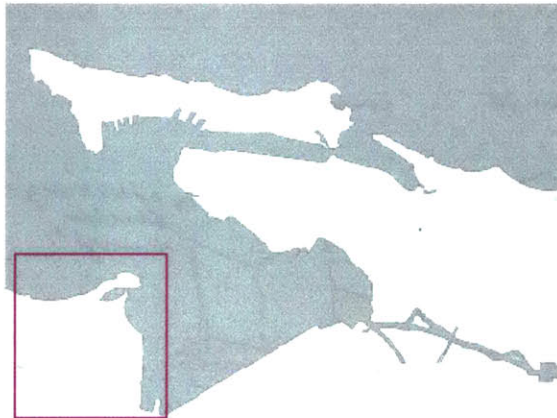


fig.78 Aereal view of Cataño.

Neighborhood
Residential and commercial
Extreme density: 30,000 people in 10 sq. miles

Socioeconomics of residents
Prevalently low-middle class. Public housing, subsidized housing are large. Average town house and lot: 300 sq. m, \$100,000. Surrounding middle class neighborhoods (\$140,000)

Age of residents
Well distributed along entire range. Some schools, hospitals.

Market facilities
One supermarket in the town square.

Restaurants
Concentration of famous seafood rest. along beachfront (Palo Seco)
Mid-range, economic eating options in town.

Nightlife
Few attractions. No movie theaters or live music.
Some sport events.

Tourism
The Bacardi Rum Refinery is a famous tourist destination (5 min. drive from town square). Town itself is not frequently visited.

Parking
On-street parking. Public parking lots by the bay shore for ferry.
Overall, parking is available, easy to find.

History
Initial settlement in 17th century supplied food to San Juan. It was the link between the walled city and the agricultural heartland (el Valle del Toa) 10 miles to the West.

fig. 79 View of the bay from the market's docking.





fig. 80-84 Views from the docking site.





fig.86 View of the town square



fig.85 View of one of the principal streets of the town.



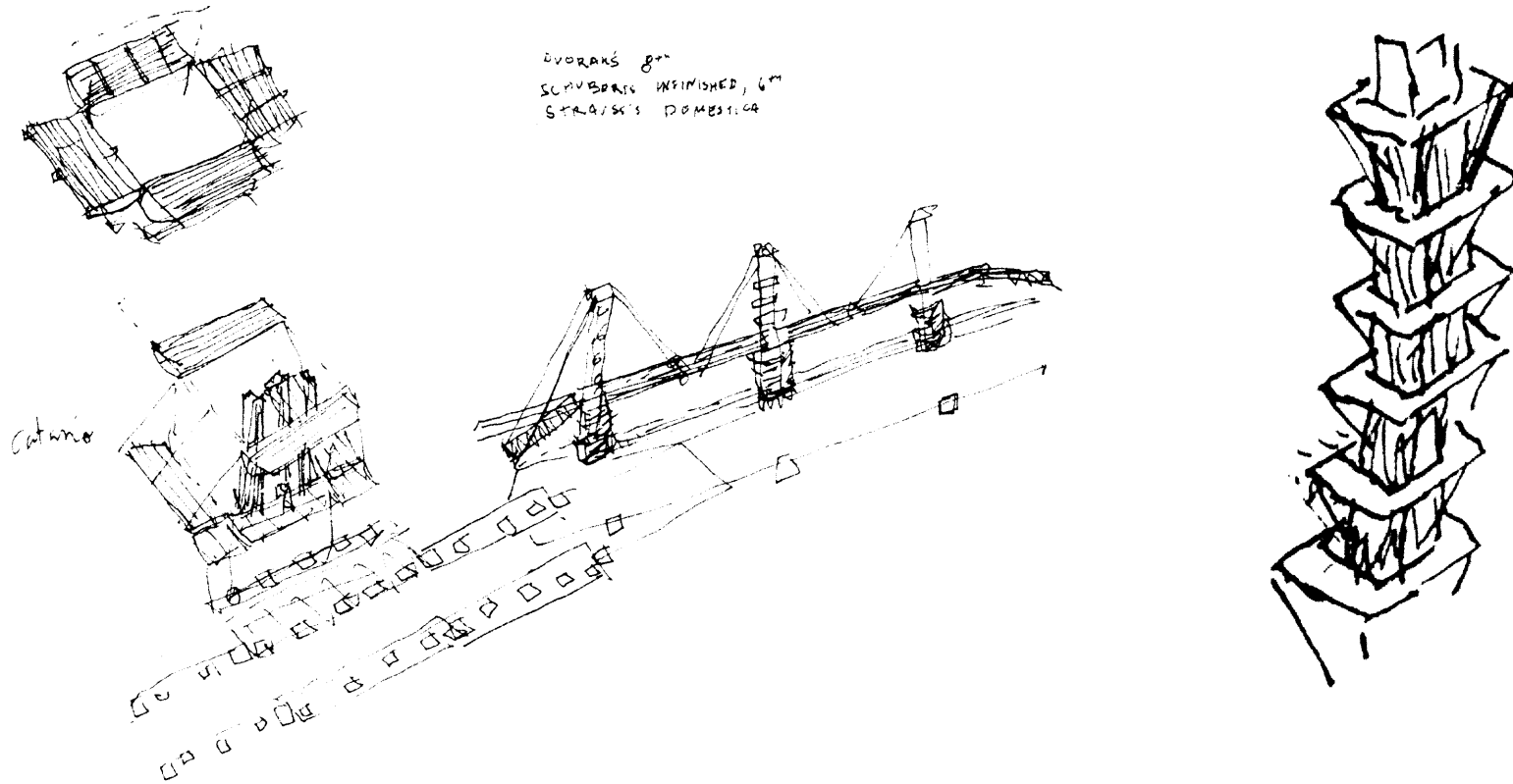
fig.87 View of the town square

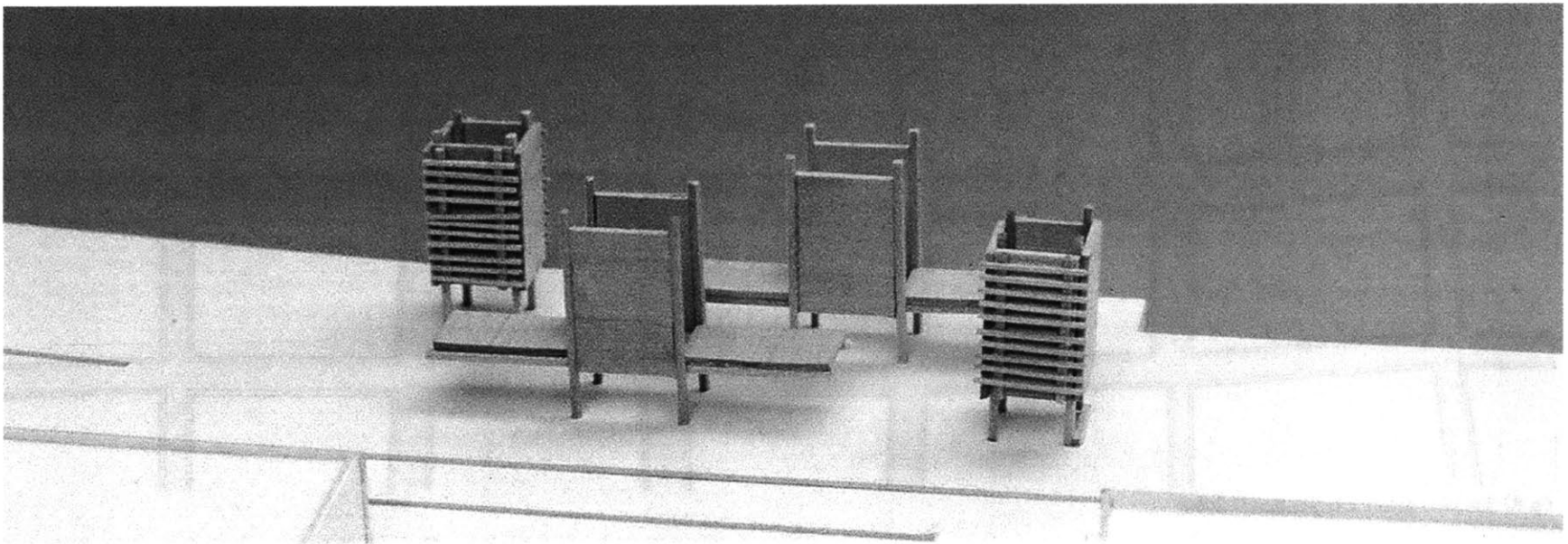
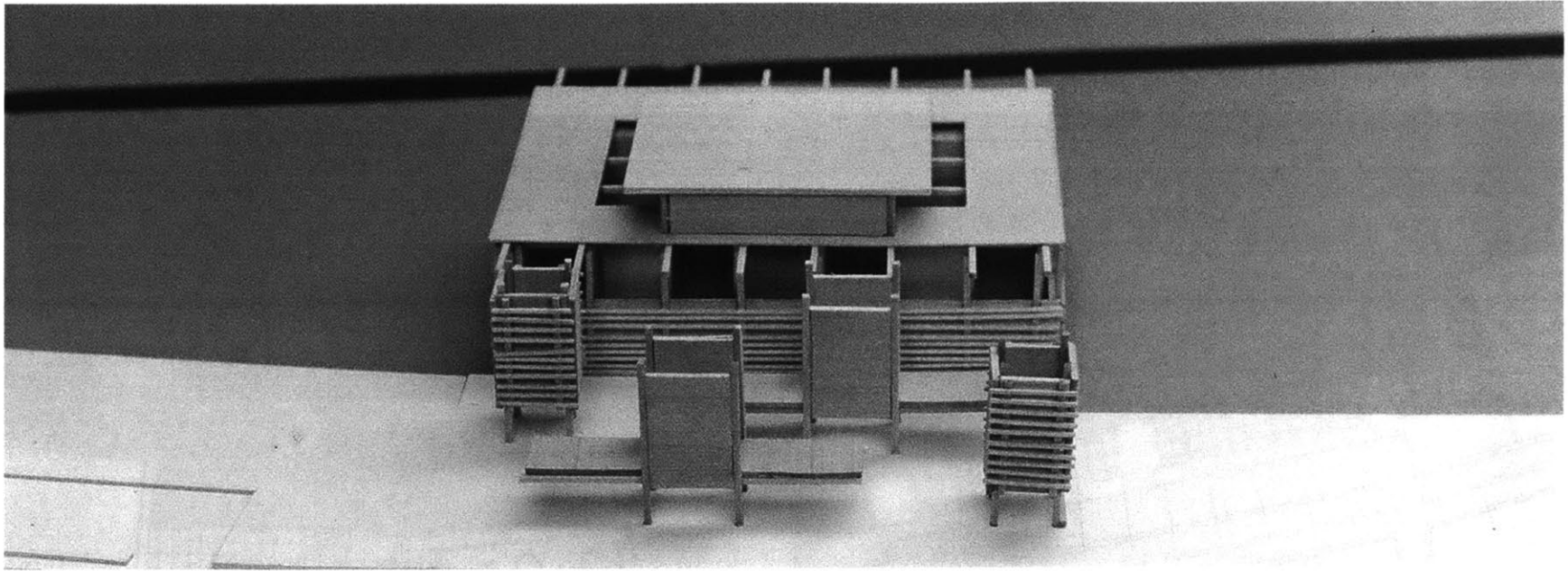
Towers in the Plaza

The wide swath of pavement, the "bayfront park" is an excellent gathering ground for vendors from the whole region. The market's presence and the tower connectors on the site serve as landmarks to give order and orientation to the independently arrived salesman. Their stalls and booths will be an addition to the ones that arrive in the barge.

The arrival of the market is the catalyst that brings about the transformation of the empty pedestrian boulevard into a crowded, active market area.

The connectors are towers which sides are lowered when the market arrives. The resulting bridges create a roof over the area that will be occupied by the stalls of the vendors from the barge. This results in a "bunches" pattern of stalls, which is an open-ended arrangement, merging with other vendors on the site.





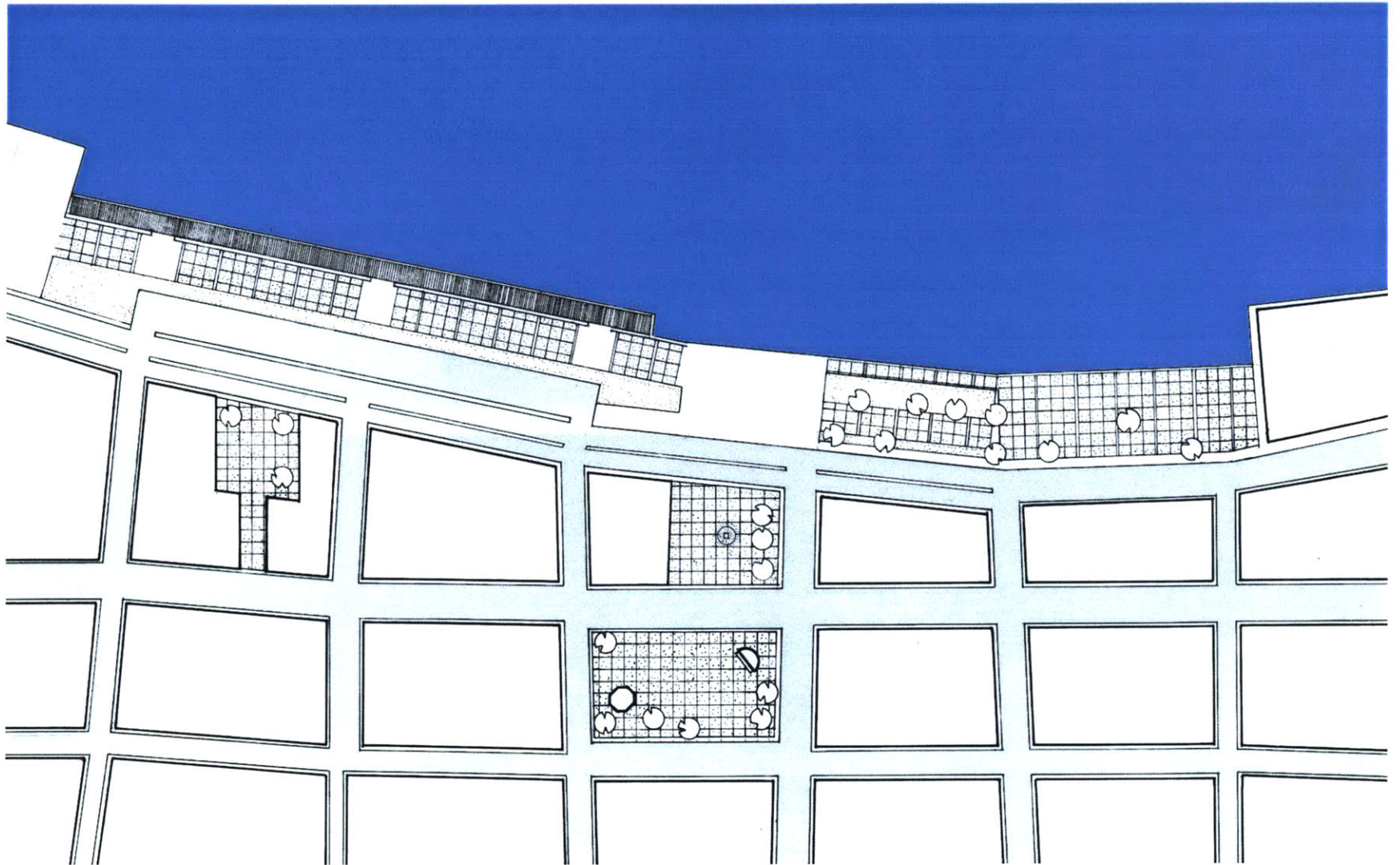


fig.92 Site plan before intervention (1:2000)

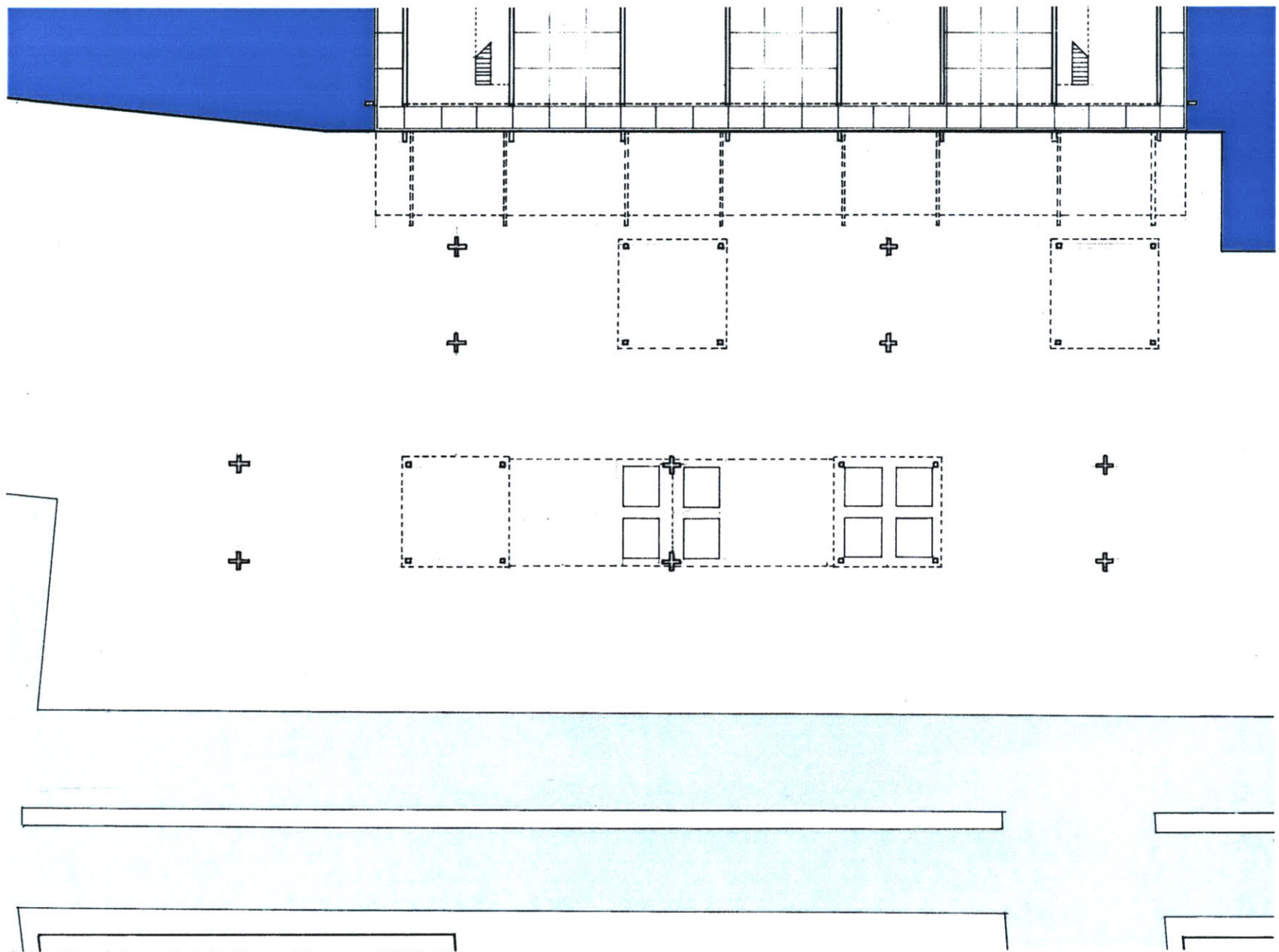


fig. 93 Plan of the market's docking and the towers (1/32" = 1')

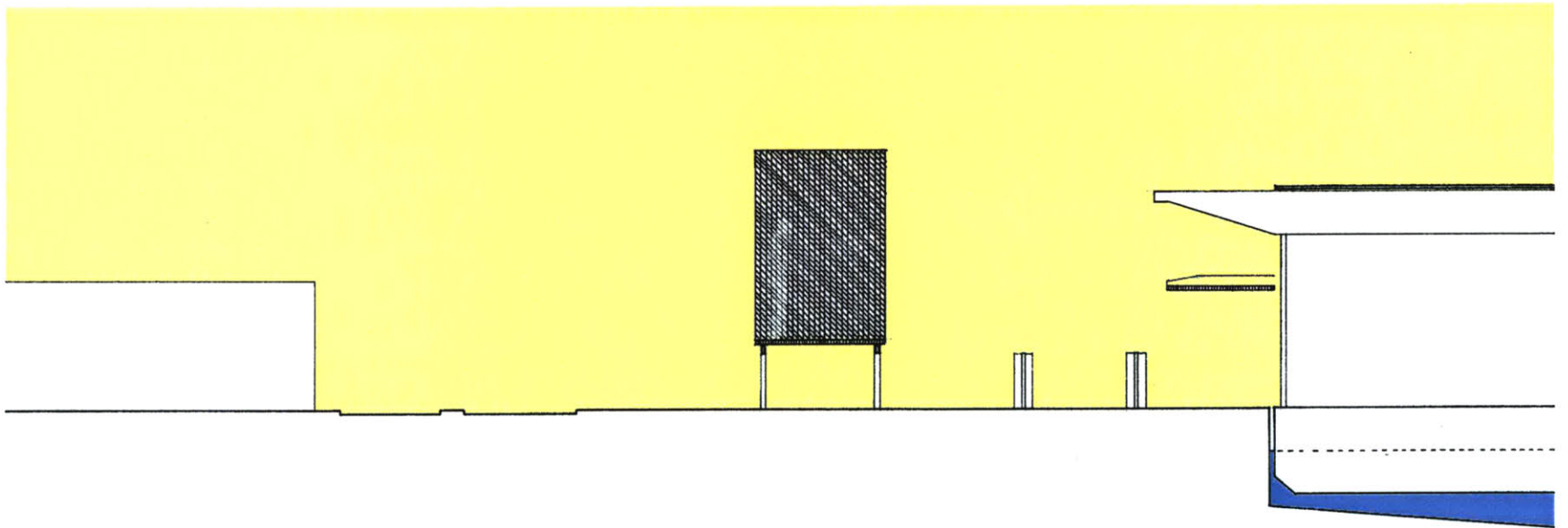
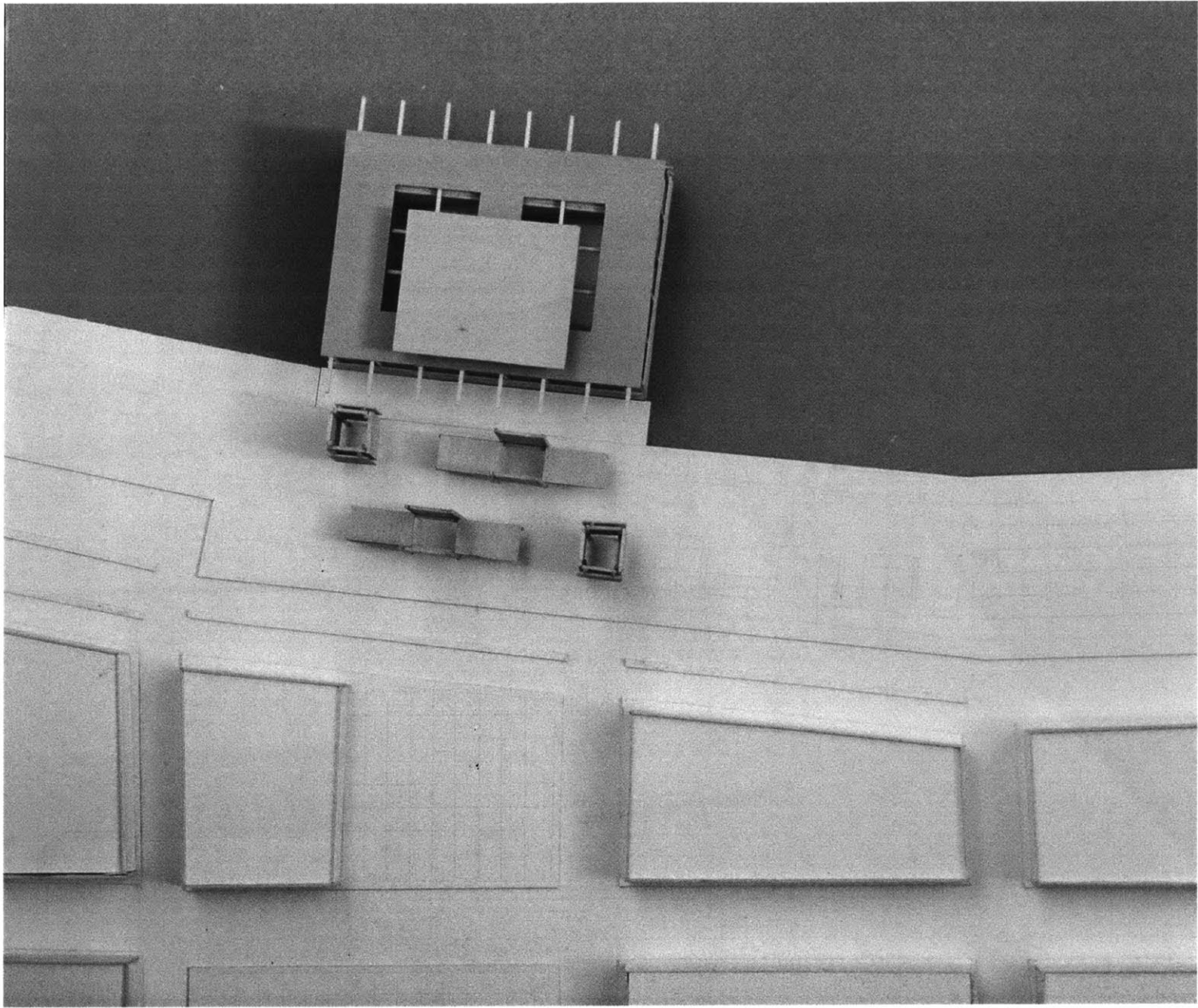
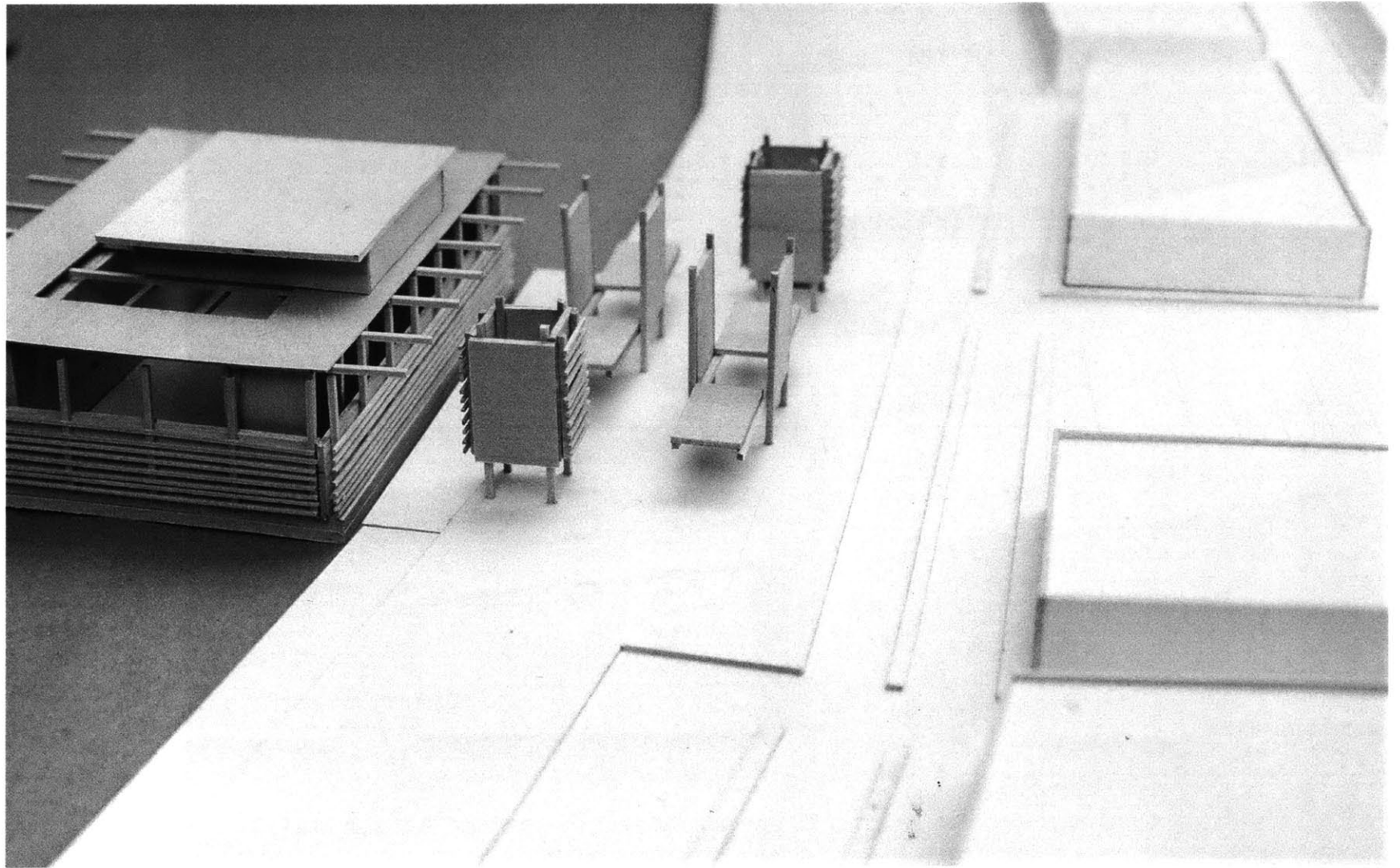


fig. 94 Section, looking towards the west. (1/32"=1')





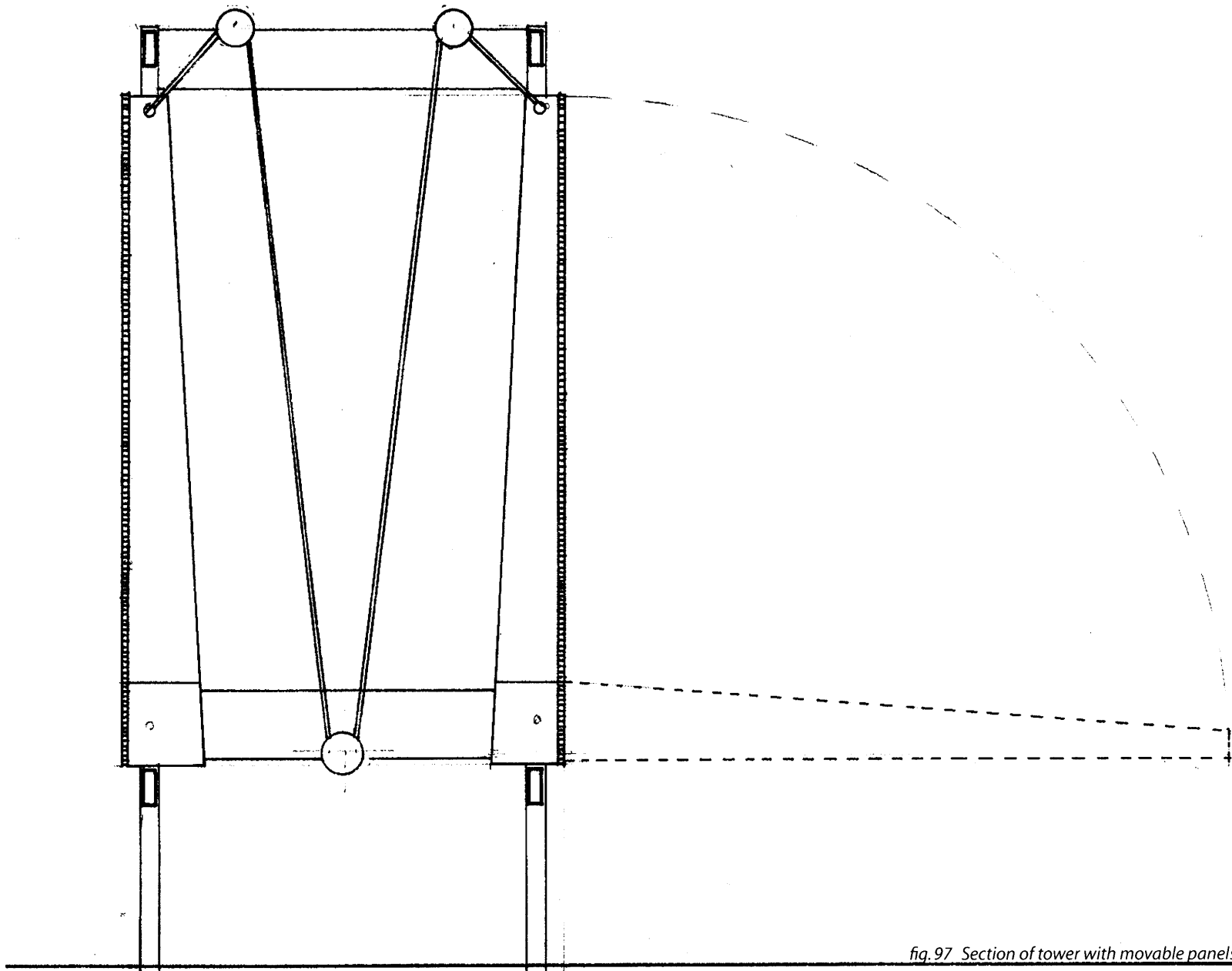


fig. 97 Section of tower with movable panels. (1/8" = 1')

**Site 2:
Hato Rey**

Hato Rey is a mixture of very tall office buildings and expanses of asphalt parking, of bank headquarters and working-class neighborhoods. The Martín Peña canal connects it with the bay. It is a navigable canal and, until recently, the route of a ferry that traveled between Hato Rey and Old San Juan. The canal is lined by a dense mangrove forest, constantly reduced in area by on-going construction projects.

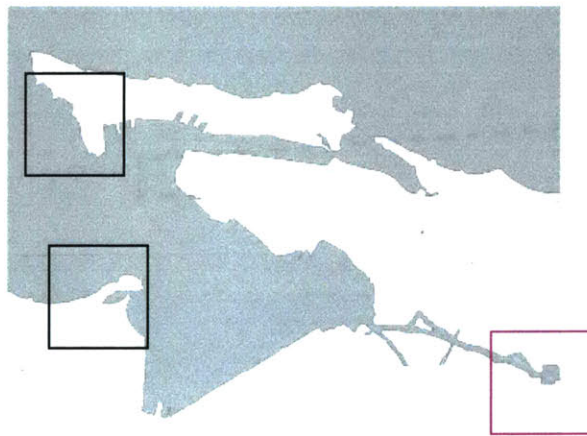


fig.98 Aerial view of Hato Rey

Neighborhood

Although predominantly known as a business district, there are many dense housing developments in this area.

Socioeconomics of residents

Mixture of middle class and lower class. Public housing and subsidized housing units are available. Newly built walk-ups next to canal cost \$200,000.

Age of residents

The working population is dominated by young professionals and office workers. Nearby high schools, 3 major hospitals within 1 mile.

Market facilities

No marketplaces or supermarkets in the vicinity.

Restaurants

There are limited eating options in the area. Many of them open only until 5pm.

Nightlife

Some nightclubs. Movie theaters located at Plaza las Americas (2km south), new Coliseum will host sport, entertainment events.

Tourism

Not a tourist destination. No hotels.

Parking

Many public parking lots for office workers. Overall, parking is available, easy to find but it might be costly.

Pastures for cattle grazing at the turn of the century, developed into the banking district in the 1960's. It lies at the intersection of the principal roads and highways of the metropolitan area.

fig. 105 Market's approach to the site.



The Tren Urbano

A light-rail mass transportation project will connect some of the urban centers of the San Juan region by 2003. The train passes through Hato Rey, where it has two stops. Another project of note in the area is a new arena for 10,000 spectators.

Market docking

The market will dock at the grounds of the old ferry terminal. The Tren Urbano Station and the new arena are within 400 meters of the landing site.

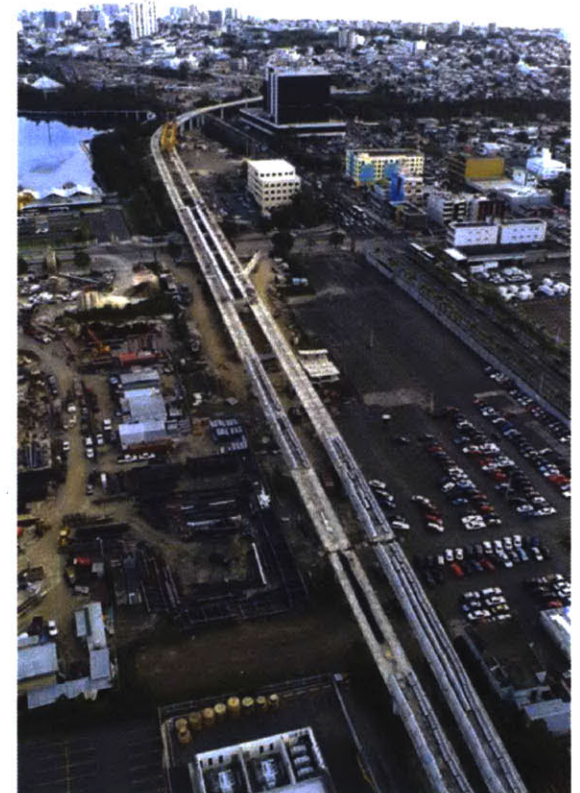


fig. 106 - 107 Views of Hato Rey area and Tren Urbano construction.



fig. 105 View of site. Landing area framed in purple.

A building that opens

The “connector piece” for this site is a building, a long three-story structure that reaches from the avenue to the edge of the canal. When the market arrives, it is complemented by the building, sharing the same rhythm of structural elements and height.

With the arrival of the market, the connector building opens its long facade (250ft), lowering the walls to reveal the interior of the building to the outside. This long, linear changing element will act as a billboard, calling attention to the market's presence to people driving by and to the passengers of the train.

The billboard strategy is a good match for this site: although the site is close to densely built areas, the main approaches to this market site will be by car and train.

fig. 106 Sketch of walls in the lowered position.

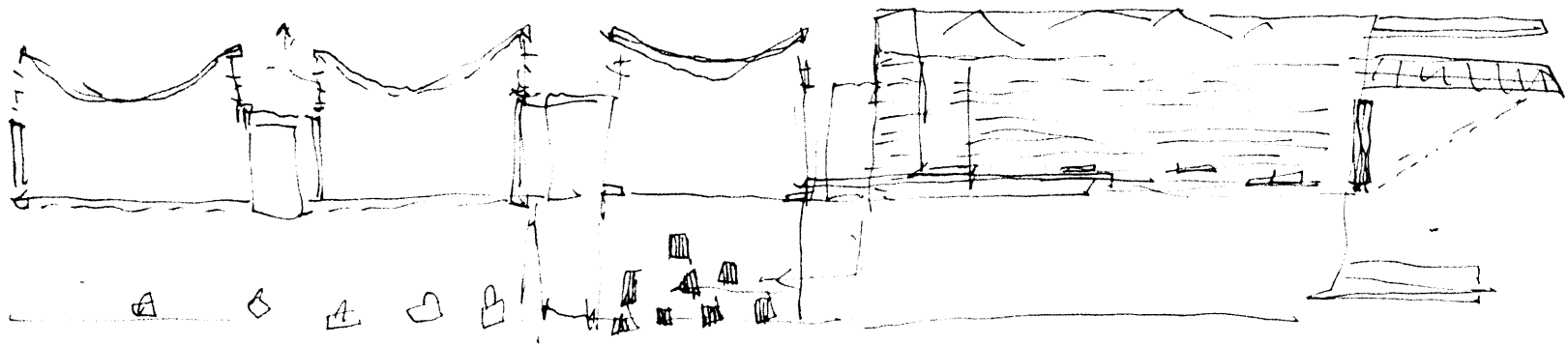
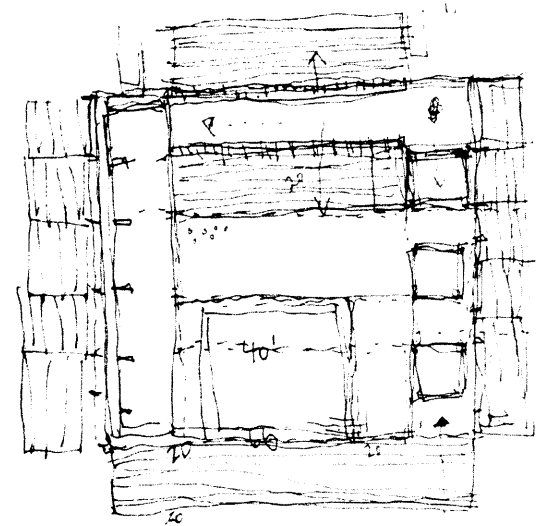
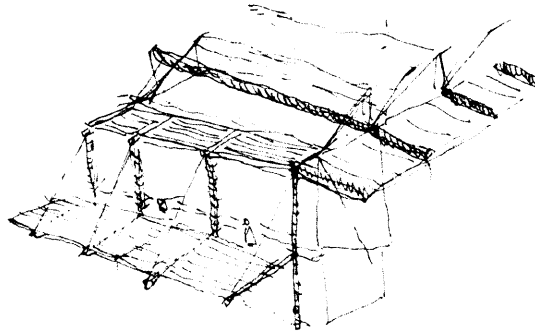


fig. 107 Sketch of section of building with market present. The building is divided in 3 parts each, each organized around a courtyard open to the sky.

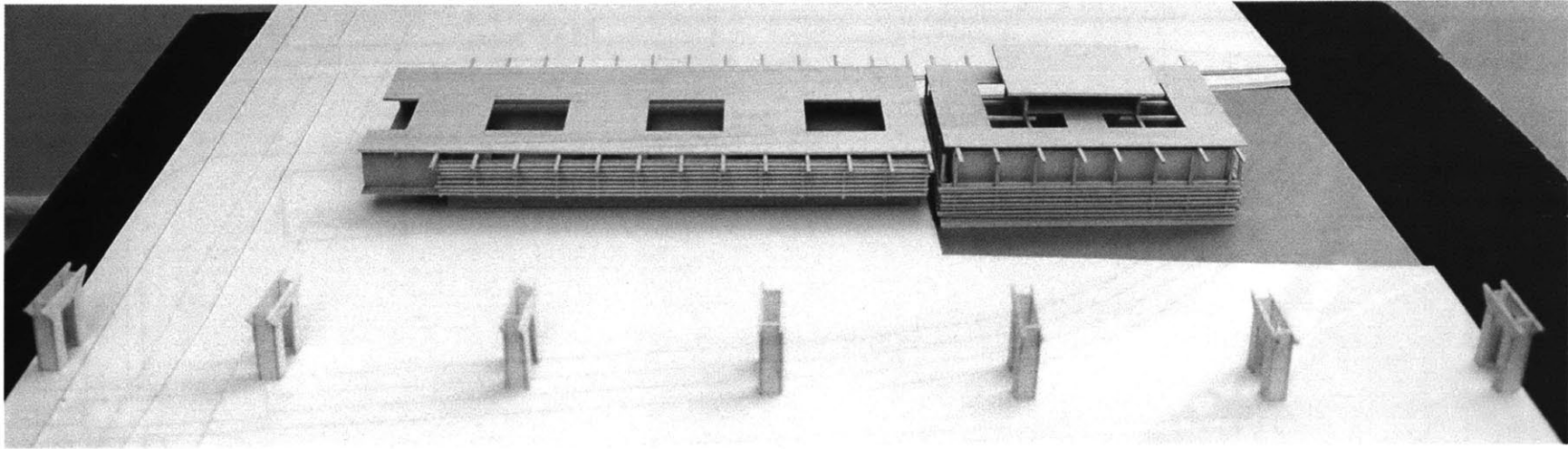
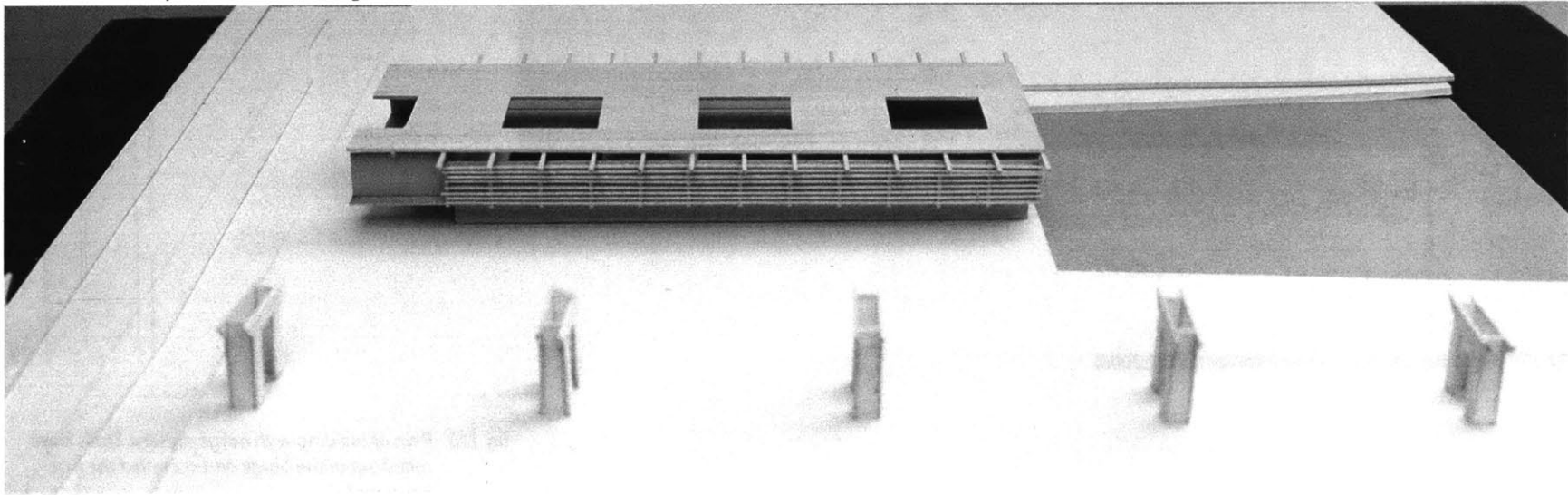


fig. 108,109 Site with, without market. The Tren Urbano runs parallel to the building.



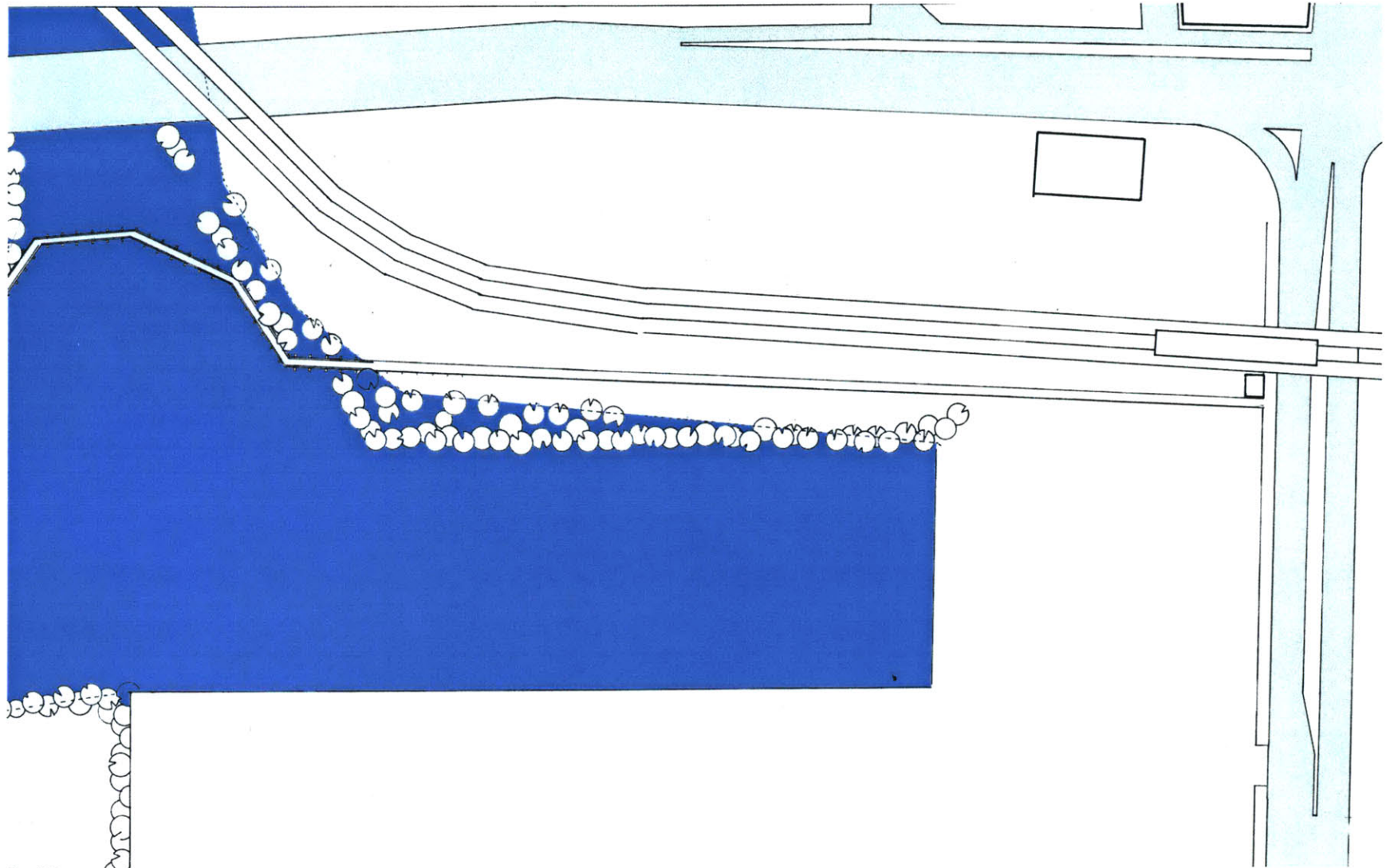
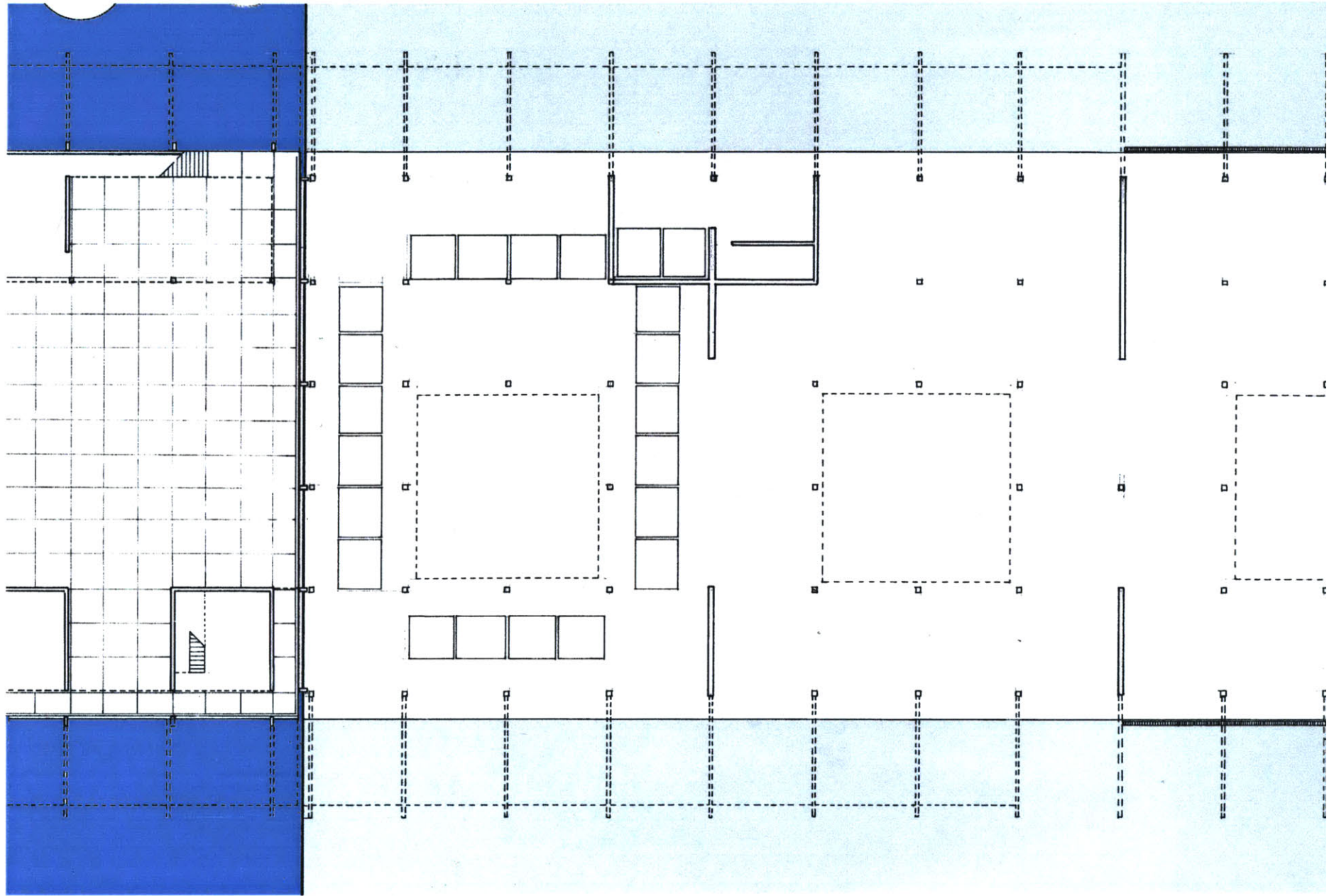


fig. 109 Hato Rey site plan before intervention. (1:2000)

fig. 110 Plan of building with barge present. Stalls have rolled out of the barge and occupied the first courtyard.



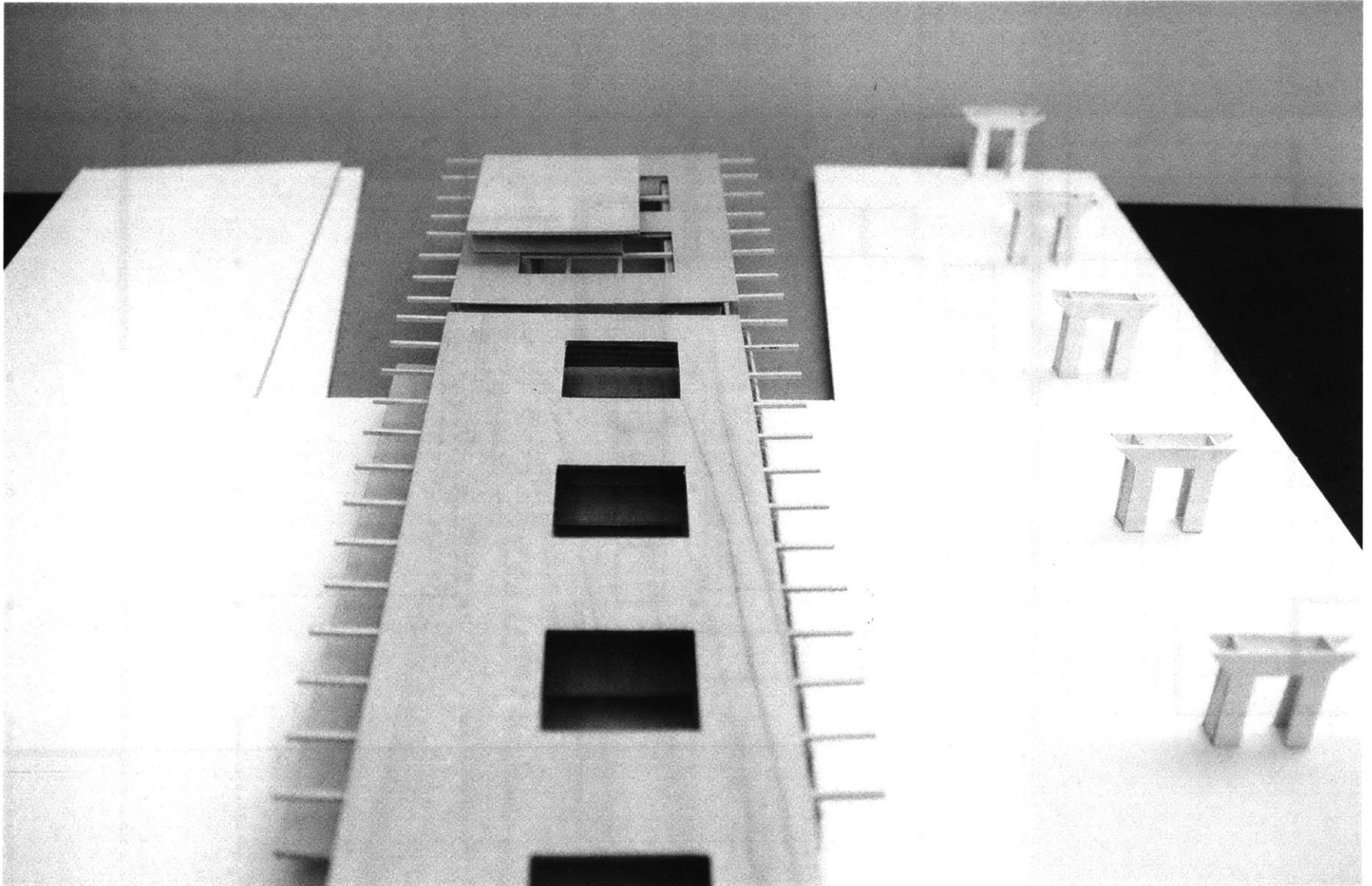


fig. 111 *View looking towards the canal.*

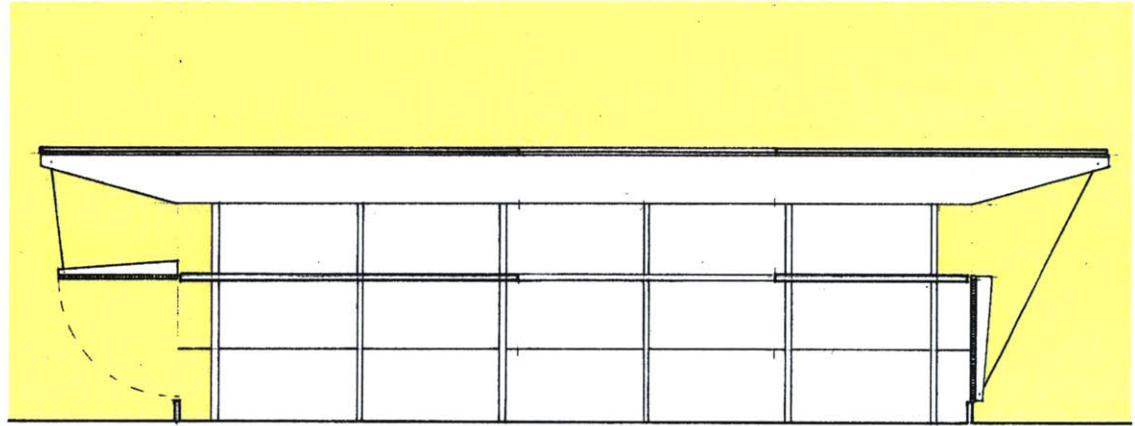
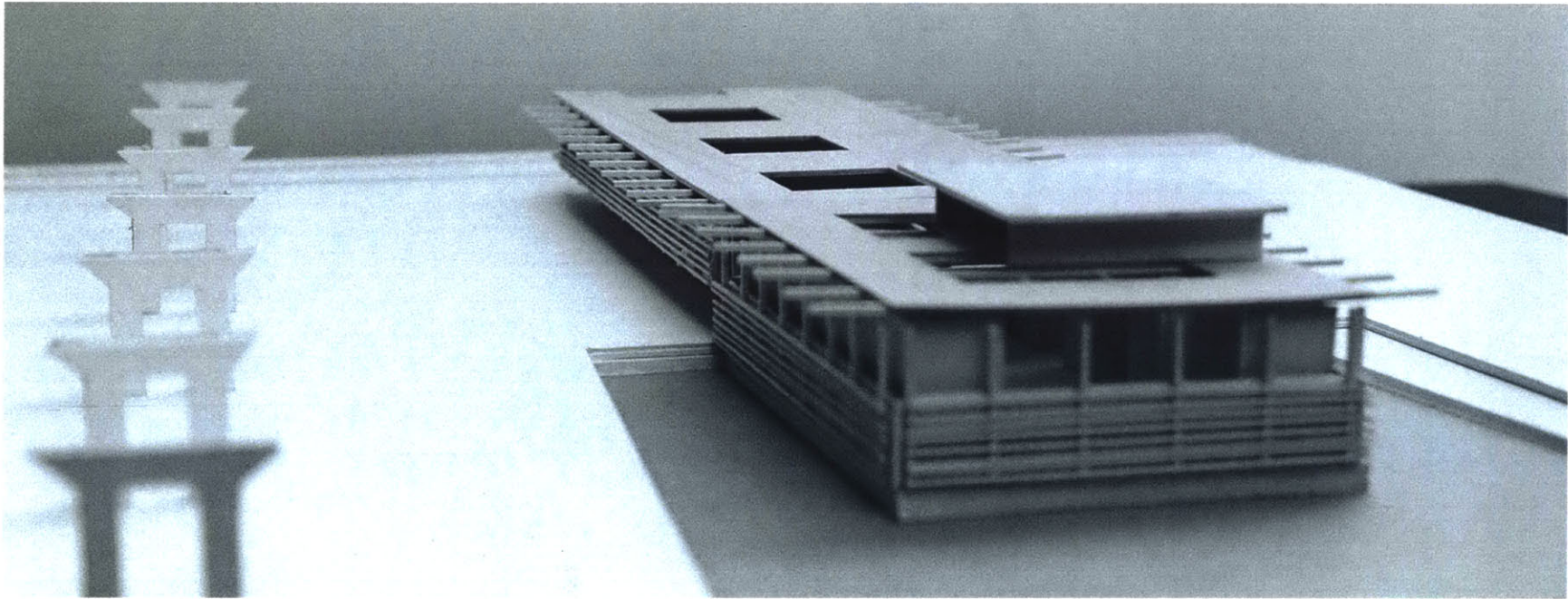


fig. 113 Section across the "connector building".(1/32=1')

fig. 112 View from the canal.



**Site 3:
San Juan**

The Old City of San Juan is defined urbanistically by its grid street pattern and the massive city walls that surround it. Its defensive character is complemented by a network of fortresses, batteries and ramparts, built by the Spanish Empire to safeguard its shipping lines to the rest of its possessions.



fig. 114 Aerial view of San Juan.



Neighborhood

Residential (15,000 residents) and commercial
High concentration of government offices

Socioeconomics of residents

Mixture of high-income housing (\$500,000 - 600,000 for 3 bedroom townhouse) and subsidized housing (\$300 a month apartments).

Age of residents

Many elderly persons, as well as middle aged professionals. Few children.

Market facilities

Existing marketplace is now a museum.
One supermarket.

Restaurants

Very high density of restaurants, perhaps 100 per sq. km. All types of options (high-end to fast food).

Nightlife

Besides restaurants, many bars, cafes, live music performances. on weekends. Art gallery events every Tuesday. Celebrations and public concerts in plazas for holidays.

Tourism

Thousands of tourists in cruise ships.
3 high end hotels (300 rooms plus)

Parking

Restricted on-street parking. 4 central parking lots. Overall, parking is available but not distributed.

History

Initial settlement in 1521 became a principal bastion for the Spanish Empire's defense system. It is the capital of the country and holds great symbolic importance for Puerto Ricans.

fig. 115 View of city streets within the walls. Gate to the city is in red. The Governor's mansion is above it.



Market docking

The market site is located at the end of a long boulevard called "Paseo la Princesa" that runs on the outside of the city wall, parallel to the southern flank. It is one of the principal open grounds of the city, used for concerts, holiday celebrations and occasional marketfairs.

fig. 117 View from the Paseo towards the city.

fig. 118 View from the end of the Paseo away from the city.

fig. 116 View along the Paseo la Princesa, looking towards the bay.





A bridge to meet the market

The connector piece in this site is a bridge: the market hall meets the city at a distance (the bridge's length), minimizing the impact to its shore and emphasizing the object-like quality of the walled quarter.

The bridge, upon the arrival of the market, lowers its side panels, cantilevering these over the water. The vendors from the market place their stalls along the bridge in a lineal arrangement.

This arrangement is closed-end, appropriate to contain the market within the limits of the bridge and keeping market activity from spilling over to the adjoining park. This separation of activities is the desirable for this particular site, given the prominent uses to which the Paseo la Princesa is put and its established identity as a recreational passive area.

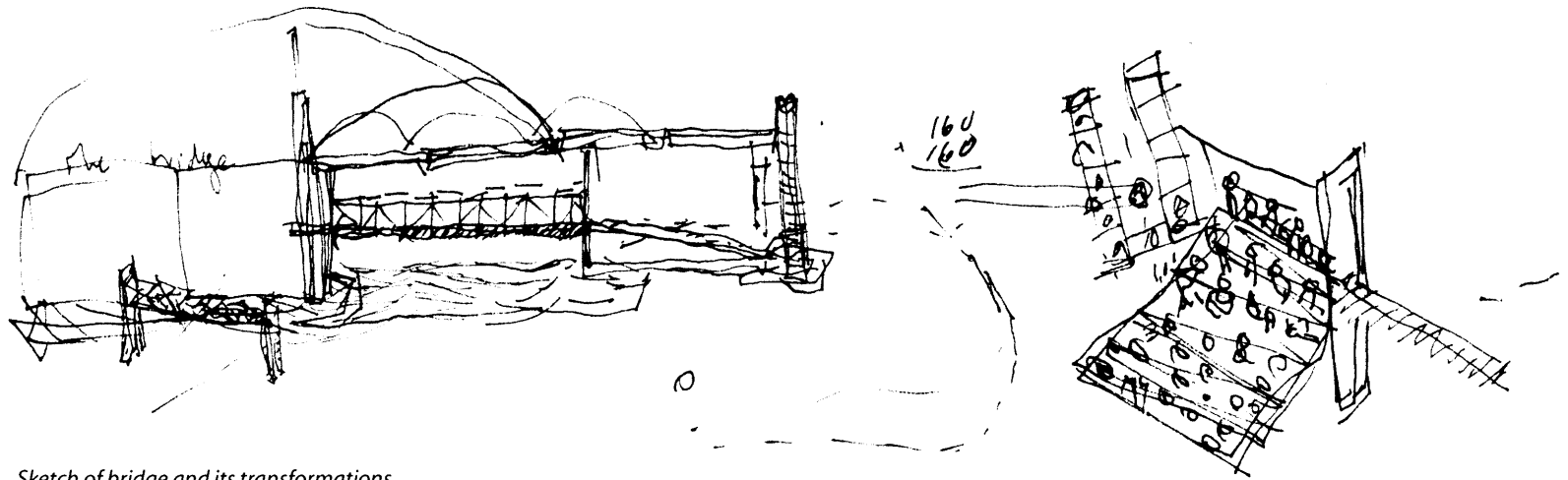


fig. 119 Sketch of bridge and its transformations.

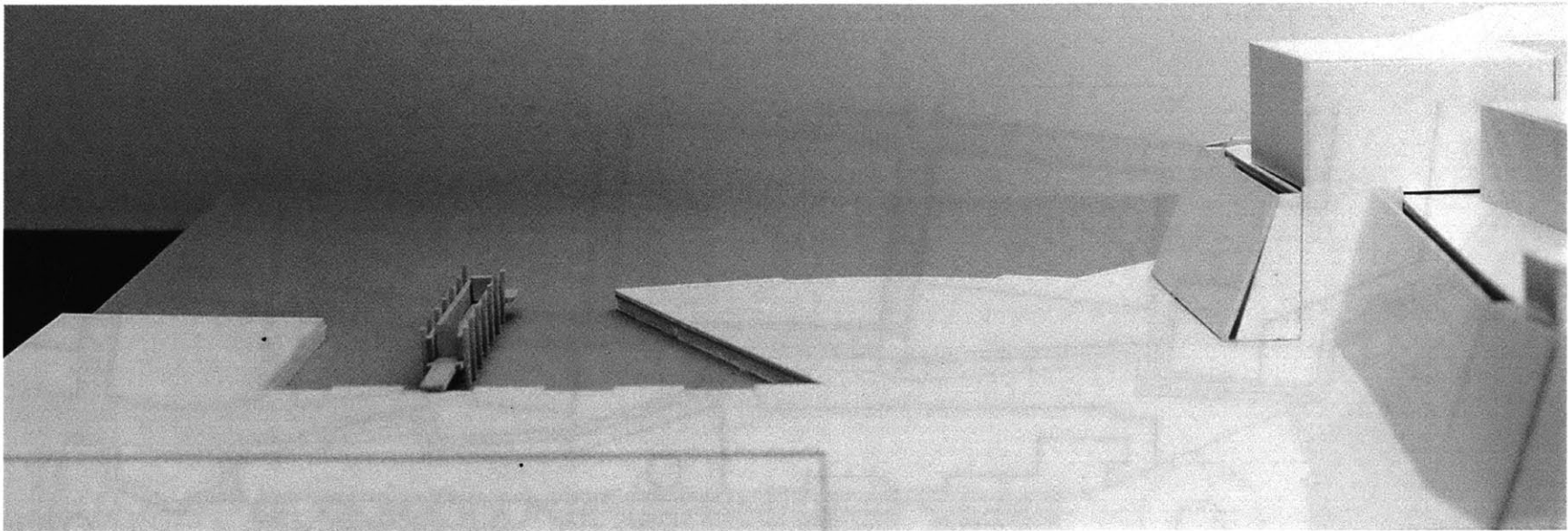
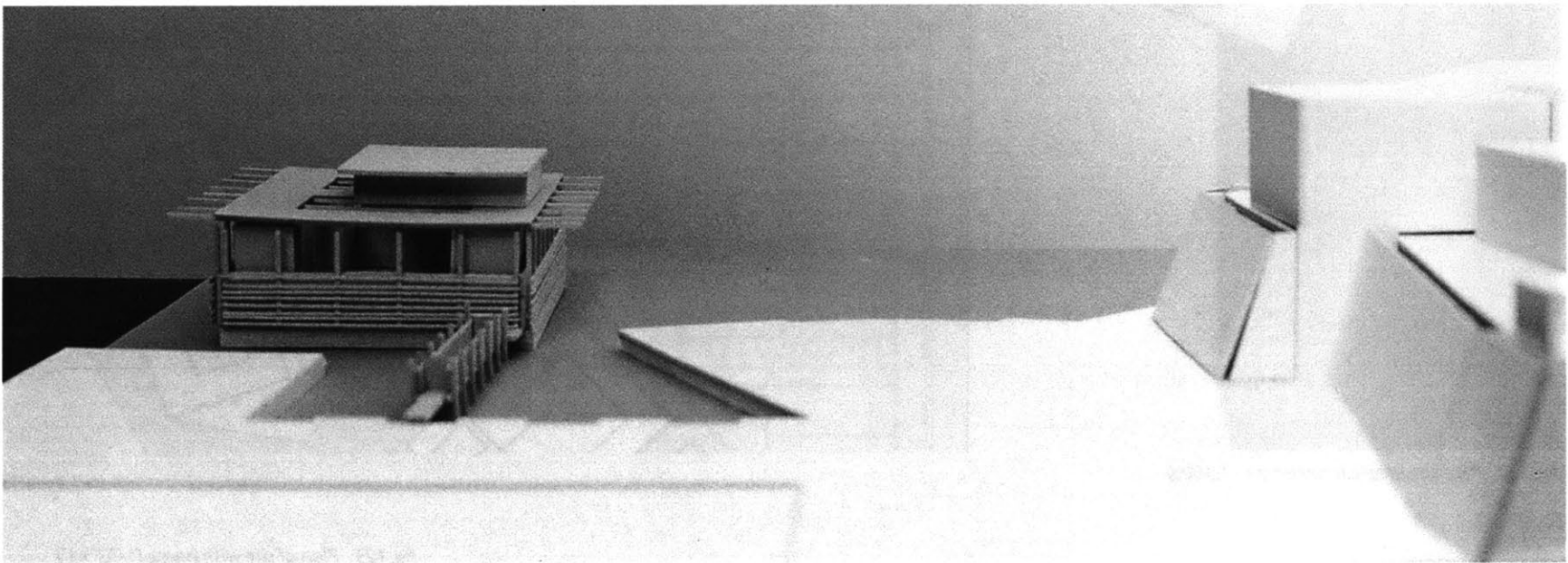


fig. 120-121 View from the Paseo la Princesa without, with market..



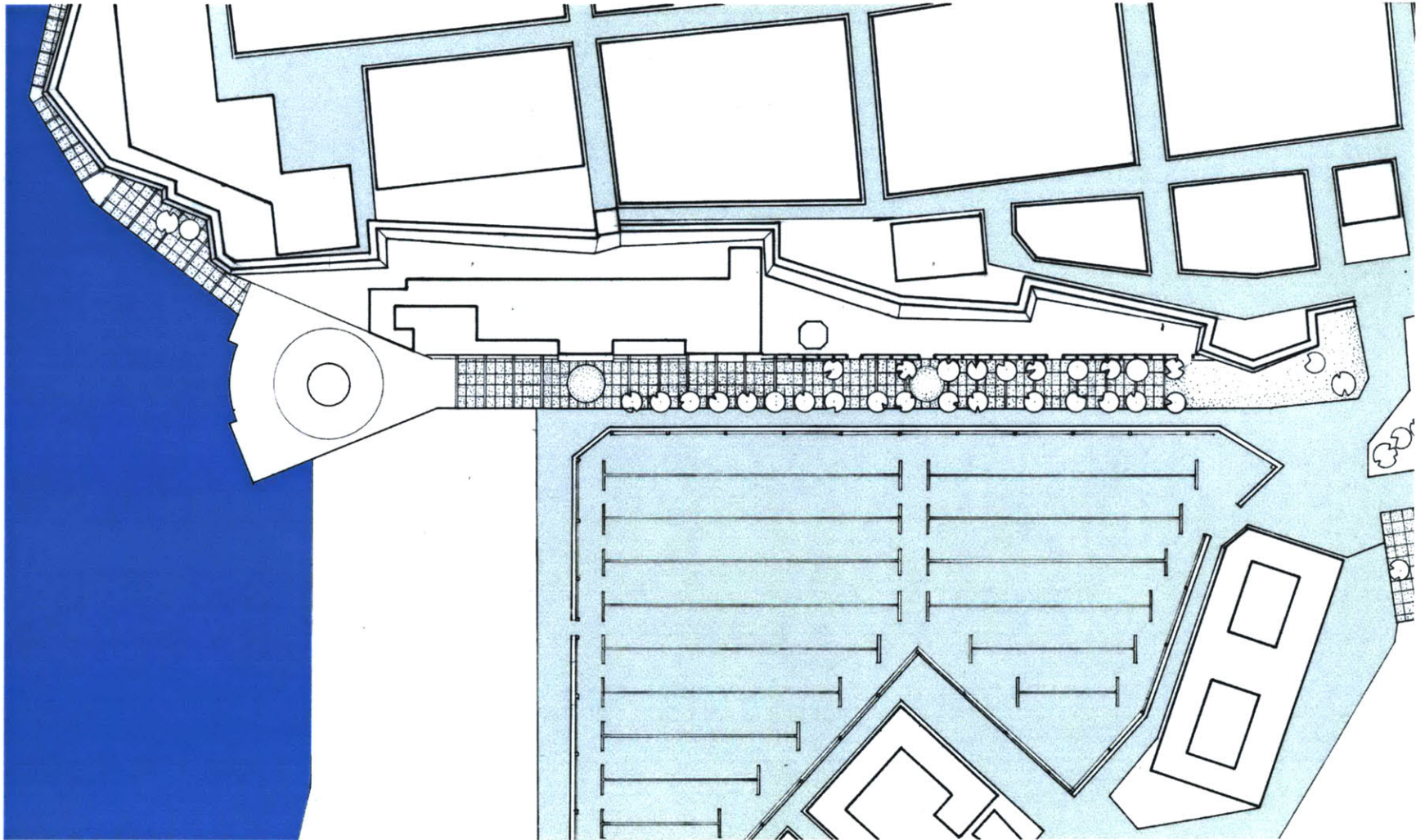


fig. 122 Plan site before intervention (1:2000)

fig. 123 Plan of site with barge.(1/32"=1')

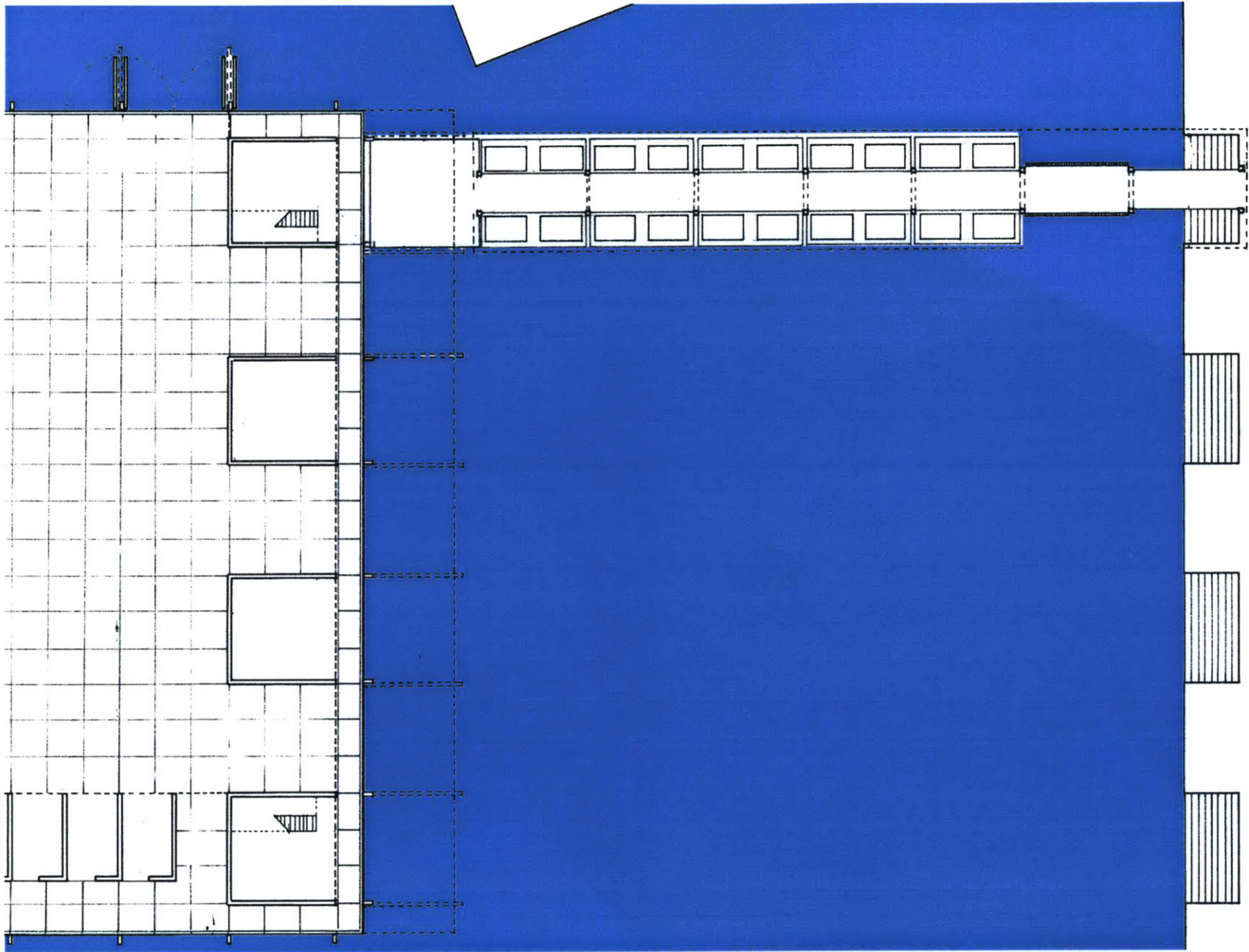


fig. 124 *View of site with the market.*

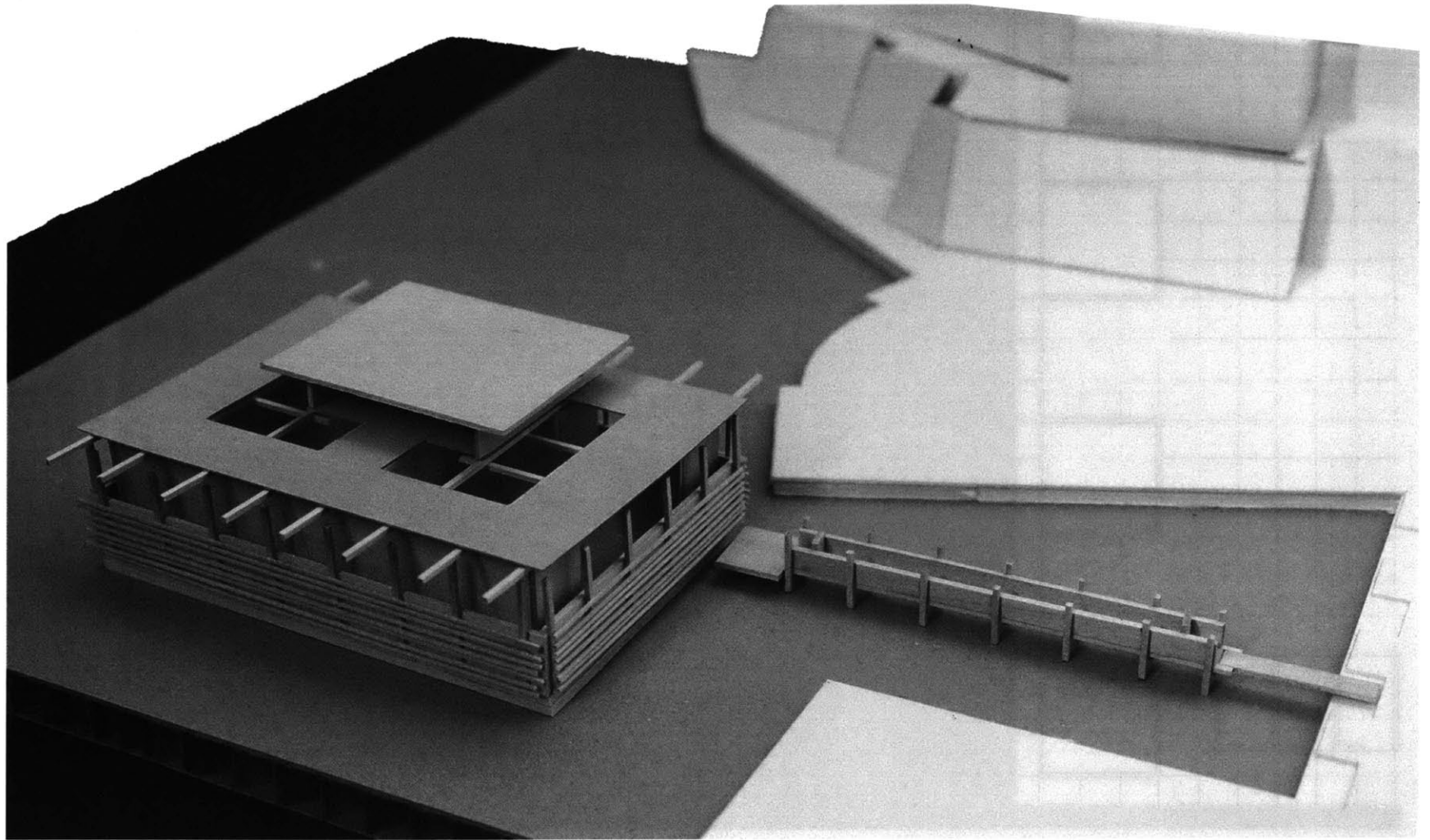


fig. 125 View of site waiting for the market's arrival. The bridge works with the city walls to frame the view of the bay from the Paseo la Princesa.

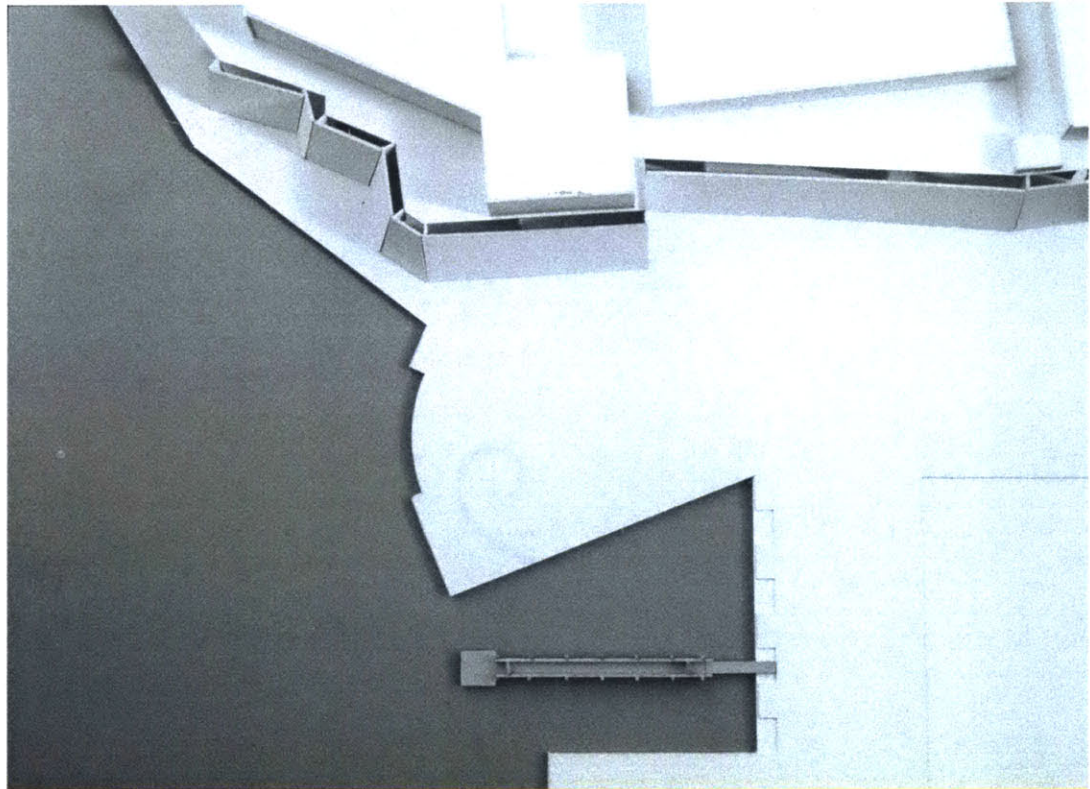
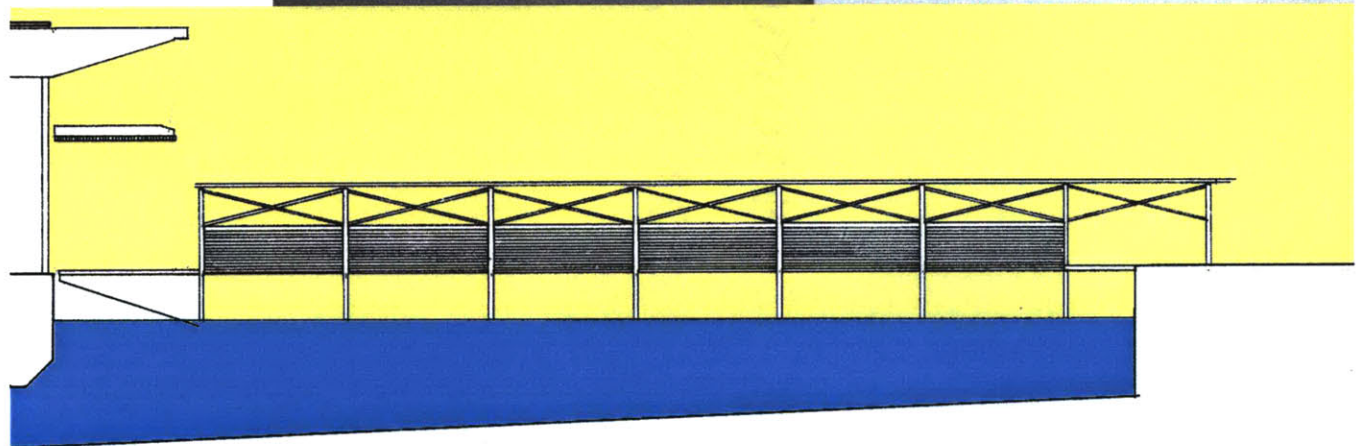


fig. 126 Section (1/32"=1')



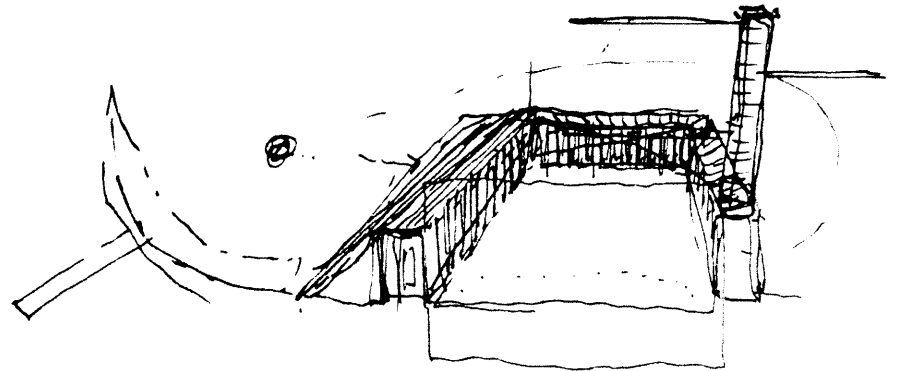
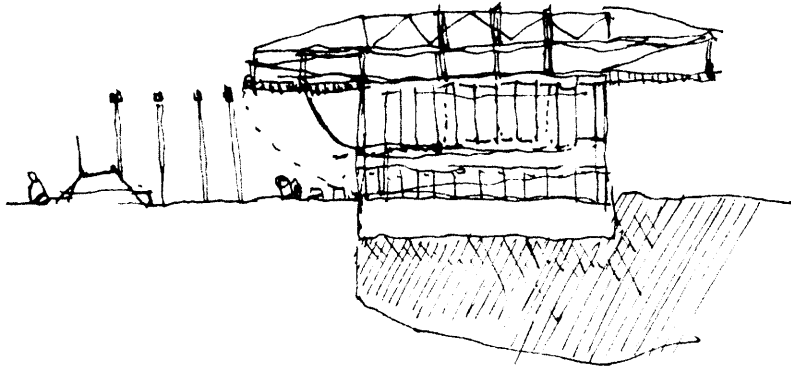
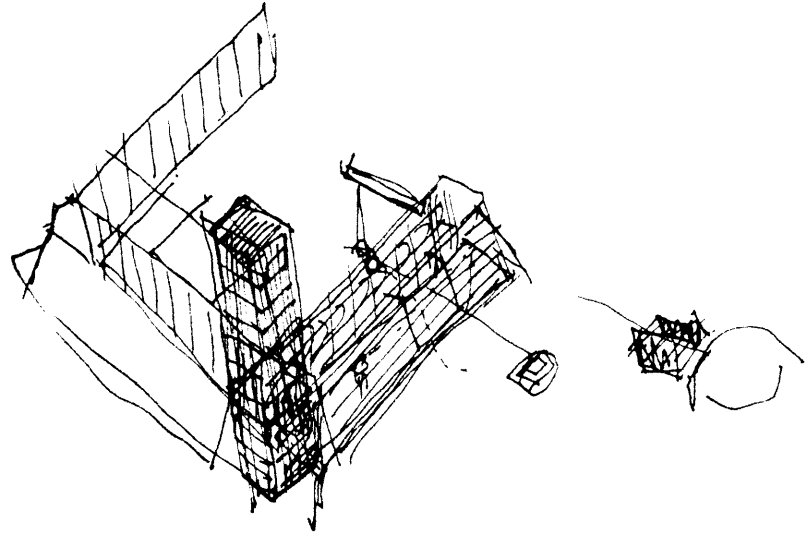
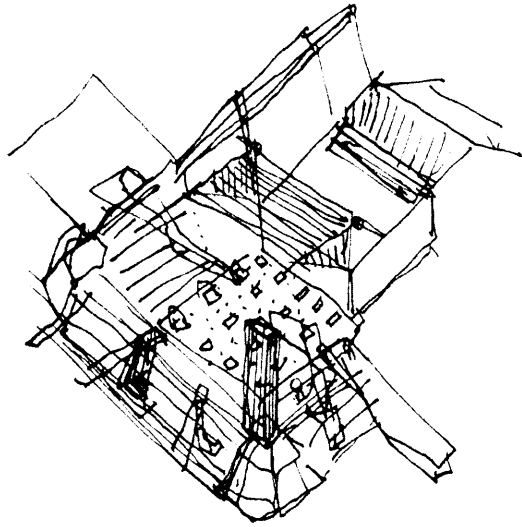


Figure Credits

1-4, 11-13: Sciemechen and Carls, *The British Market Hall*. p.10, 30, 136, 73, 76, 72, 73

8-10: Baynton-Williams, ed. *Town and City Maps of the British Isles* p. 106, 82, 114

18: Vivoni, ed. *San Juan siempre nuevo*, AACUPR, 2000, San Juan. p. 152

40: U.S. Department of Interior, Geological Service

46: A+U, 2000: 3, number 336, p. 110

47: www.hotwire.co.jp/ilmonte/rossi_e

48: Japan Architect, Winter 1994, number 16, p. 14

49, 51: *Concrete Afloat*, p.68

50: Domus, February 1976 number 555, p. 30

78, 98, 114: Department of Transportation, Puerto Rico

101, 102, 105: www.dtop.gov.pr/TU/

Bibliography

Barge construction

1- **Concrete Society, The**. *Structural lightweight-aggregate concrete for marine and offshore applications. Report of a Concrete Society Working Party*. Concrete Society Technical Report No. 16; May 1978

2- **Concrete Society, The**, *Concrete Afloat*. London, Thomas Telford Ltd. 1977

Market history

1- **Schiemechen**, James and Kenneth Carls, *The British Market Hall: A Social and Architectural History*. Yale University Press, New Haven 1999.

2- **Calabi**, Donatella, editor, *Fabbriche, Piazze, Mercati*. Officina Edizioni, Roma, 1997

3- **Weiss**, Walter, *The Bazaar: Markets and Merchants of the Islamic World*. Thames and Hudson, London 1994

4- **Lemoine**, Bertrand, *Les Halles de Paris*. L'Equerre editeur, Paris, 1980

San Juan, history and geography

1- **Sepúlveda Rivera**, Aníbal, *San Juan: Historia ilustrada de su desarrollo urbano: 1508-1898* Centro de Investigaciones Carimar, San Juan, 1989

2- **Sepúlveda**, Aníbal and Jorge Carbonell (no relation), *Cangrejos - Santurce: Historia ilustrada de su desarrollo urbano (1519-1950)* Centro de Investigaciones Carimar, San Juan, 1987

3- **Vivoni Farage**, Enrique, editor, *San Juan siempre nuevo: Arquitectura y modernización en el siglo XX*. AACUPR, San Juan, 2000

Mangrove Forests

1- **Chapman, V.J.**, editor *Ecosystems of the World: Wet Coastal Ecosystems* Elsevier Scientific Publishing Company; Amsterdam, Oxford, New York, 1977

City Maps

1- **Baynton-Williams**, Ashley, *Town and City Maps of the British Isles 1800-1855* Studio Editions, London, 1992

2- United States Department of the Interior Geological Survey, 1977

Floating Buildings

1- **Fumihiko Maki**: *Floating Pavillion*, Japan Architect, number 16, Winter 1994, p. 14-19

2- **Emilio Ambasz**: *Floating Units in Peru*, Domus, February 1976, number 555. p. 30

3- **Mario Botta**: *Wooden Model of San Carlo alla Quattro Fontana*; A+U, 2001:03, number 336, p. 110

Background Information

1- Municipio de San Juan, Ordinance #26 Approved on March 16, 1999 Rio Piedras Market Hall regulations.

2- Municipio de San Juan, Ordinance #41, Approved on November 10, 2000 Santurce Market Hall regulations.

3- Environmental Impact Report, Frente marítimo de Cataño. Prepared by Pedro Panzardi and Associates, November 1995

