

HARBORWORKS

by
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of requirements for the
degree of Master of Architecture
at the

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Signature of Author

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May 19, 1977

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*Unless otherwise indicated, all photographs are my own.

ABSTRACT

Harborworks

Kathleen Leahy Born

Submitted to the Department of Architecture
on May 19, 1977 in partial fulfillment
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This is a design projection for a large site on the Boston Waterfront. The program included as much reasonable housing as it was possible to fit on the site excluding high rises (more than ten stories), while maintaining a maximum amount of land for truly public uses.

My feelings about the site stemmed from several seemingly diverse preconceptions/ inclinations/ memories. First my preconceptions about the current Boston Waterfront revitalization and how often it happens that with renovation comes exclusivity. Second, my memories about riverfronts and harbors from a trip I took last summer to look at industrial landscapes. Third, some other memories of the Waterfront environments, boardwalks, promenades, some urban water edges.

The result is a design which is admittedly unabashedly futuristic, but which I offer as a stimulus to our thinking about ways to preserve the prime sites and most precious pieces of ground in our urban context, while making built use of it as well.

Thesis Supervisor: Maurice K. Smith
Professor of Architecture

REFERENCES/MEMORIES/INCLINATIONS

WATERFRONT ATTITUDES

ACCESS AND ACTIVITY

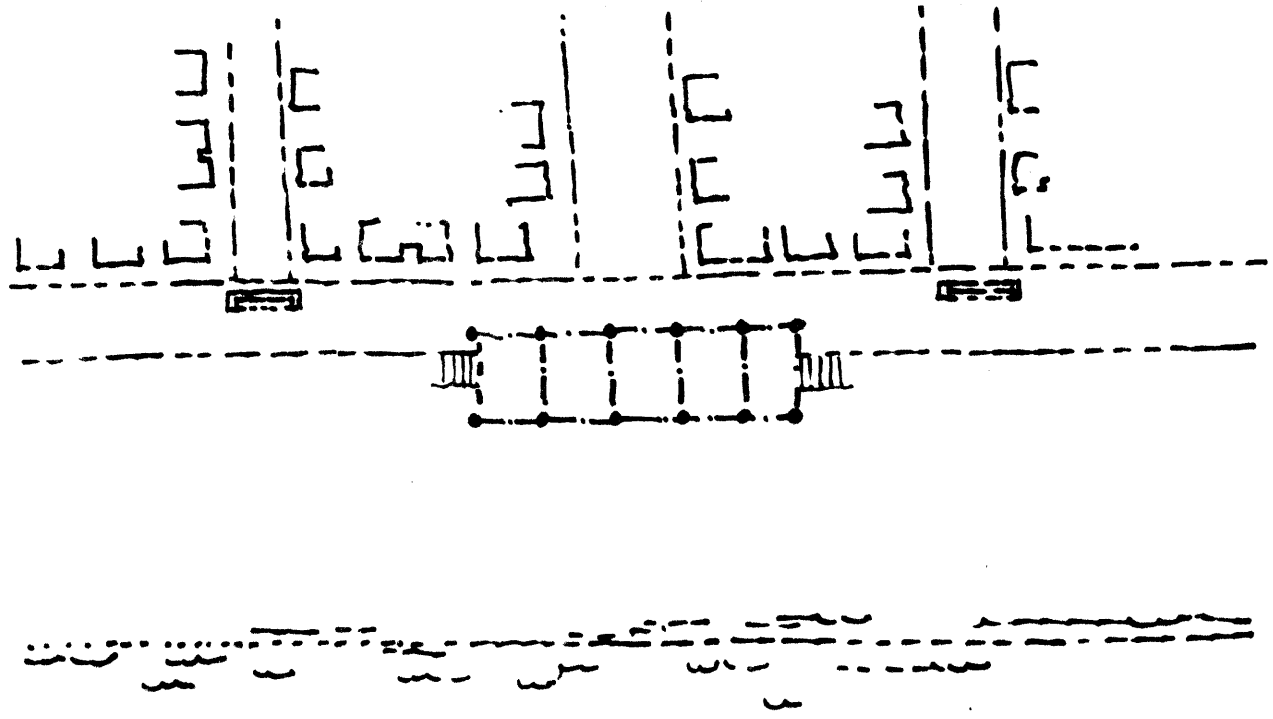
I would like to begin by explaining what has been in the back of my mind these last few months...by talking about some of the references with which I have tried to work. This may seem backwards as one most often finds references in the back of theses with the design put forward, justifiably so, to speak for itself. I have chosen to do differently because I would rather my intentions and hopes be clear at the outset so that the design can be discussed in their context. While some of these observations may seem overridingly personal, I am trying to draw from them generalizable conclusions about the physical form of the reference-places, conclusions which can be applied in some sense to a design, be it partial or complete. It is my belief that the design process must be rooted in personal subjective experience, and that the product of the process (having grown from this cumulative experience) must have objective credibility, be of collective use, imply generalized (good for, or understandable, or usable, by all or most) form conclusions.

As a child, I spent summers next to the water, by the beach... not in the sense that most New Englanders might imagine summers by the water, with quaint fishing boats and little winding roads... nor in the sense that most of my schoolmates might have imagined

summers by the water, by Long Island bound with a private beach club on a dead end road every half mile or so. No, it was a simple, solidly middle-class "Jersey Shore" resort. The most distinguishing thing about this place was its simple lineal pedestrian organization, specifically, the boardwalk.

It wasn't a grand boardwalk replete with stores and hotels like Atlantic City. It didn't even have any fun rides or wheels of chance or vendors like some other nearby towns. It was simply a wooden walkway on piers. It was about 20 feet wide, its height varying along its length of perhaps 1½ miles from being flush with the sandy beach to being as much as 8 or 10 feet above it. This depended upon the year as sometimes hard winters would wash the sand away from underneath. The distance of the boardwalk from the water also varied with the severity of the winter. Some years the water even came up under the boards at high tide, but usually the beach was 200 feet wide.

All cross streets in the town dead-ended at the boardwalk and there you would find several benches. Every four or five streets, the boardwalk widened for a simple covered wooden pavillion.

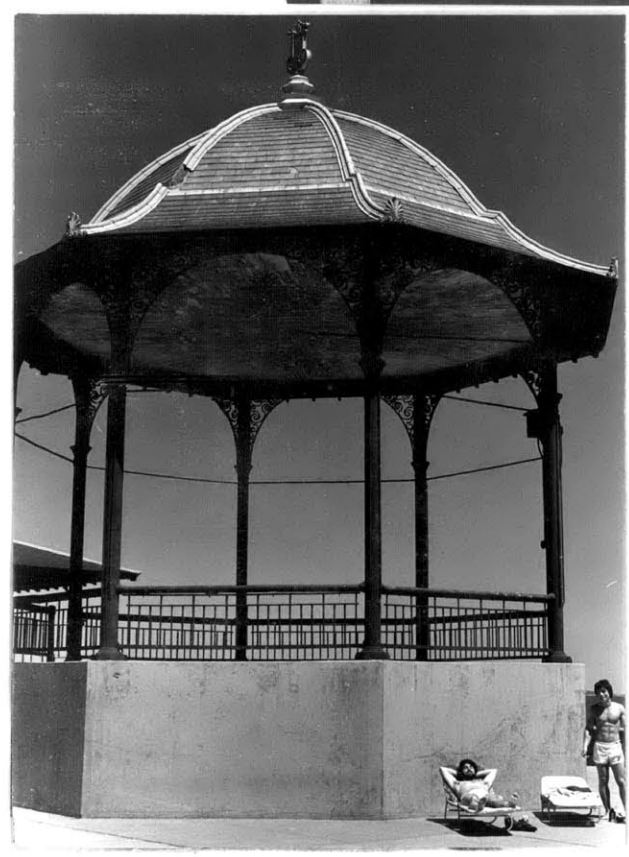
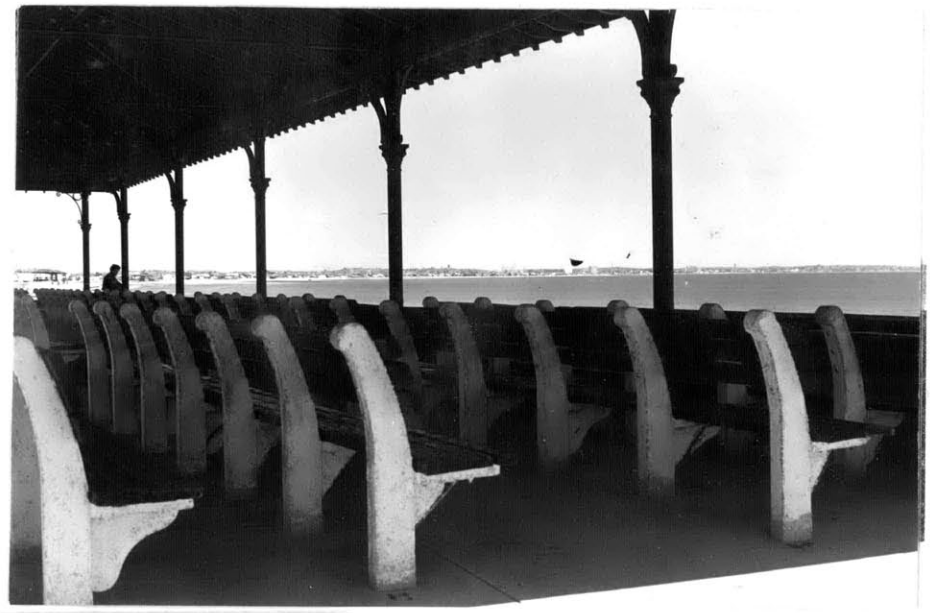


During the day, the actual beach and the water's edge were the scenes of the most intense activities with swimming, fishing, and picnicing in rather crowded quarters. But at about 6:30, just after supper, the boardwalk came alive. Everyone came out to "walk the boards." Old people strolled arm in arm. Kids shot up and down the boards on their trikes. Mothers and fathers pushed their babies in carriages, listening to the clacking of the wheels on the boards. Teenagers hung about in clusters on the benches. Every few streets there was a specific crowd so named...the "Brown Avenue Kids," the "Kerr Avenue Crowd." On some streets there might be a regular group of older folks who occupied the benches.



Illustrated in these photographs is another, slightly more elaborate water's edge nearby in Revere Beach. As you can see in the old picture, similar to my boardwalk memories, walking along the very strong edge of the water (the path need not be literally at the edge, just in continuity with it) in a social context was a

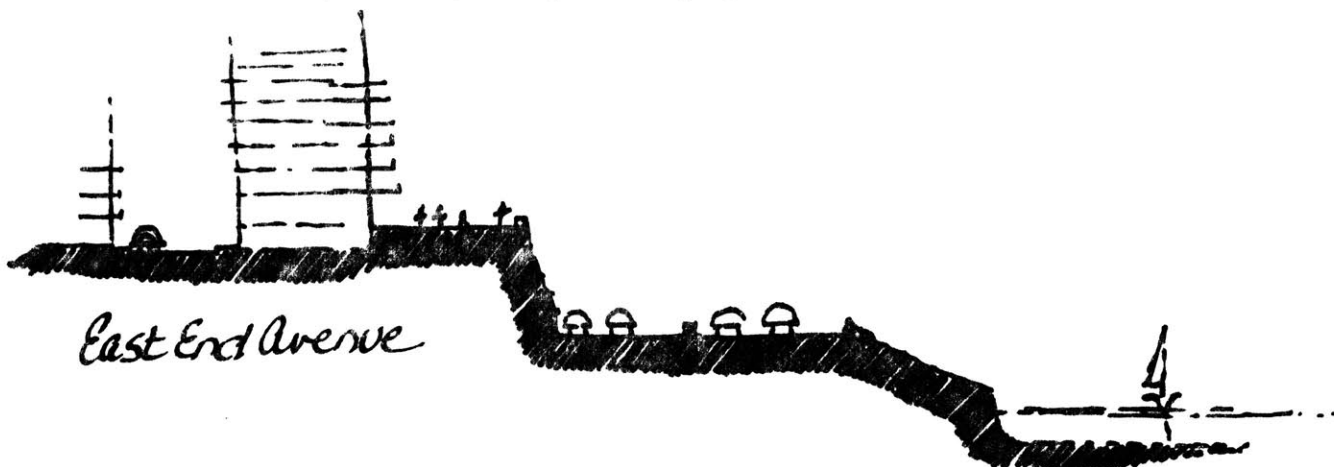
pleasurable, relaxing, even sensual (visually - looking at the sea, audially - listening to the gulls, the chattering and laughter of the other strollers, and smelling the salt air). These simple pleasures were celebrated in the architecture (the built circulation as well as the pavillions).



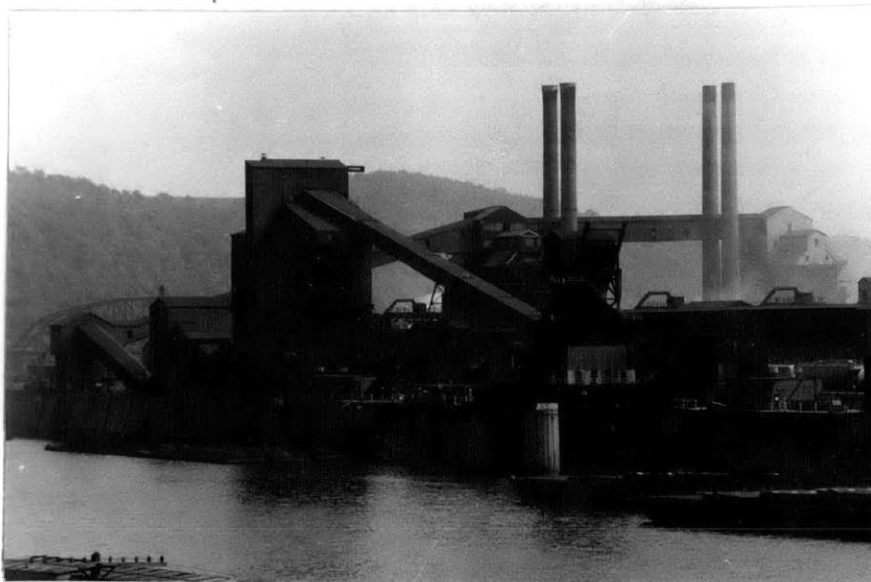
At this point you may be wondering what this has to do with a city like Boston, with a curving harbor, complicated street organization, and big city ambiance. I hope the connection will be evident as I go on.

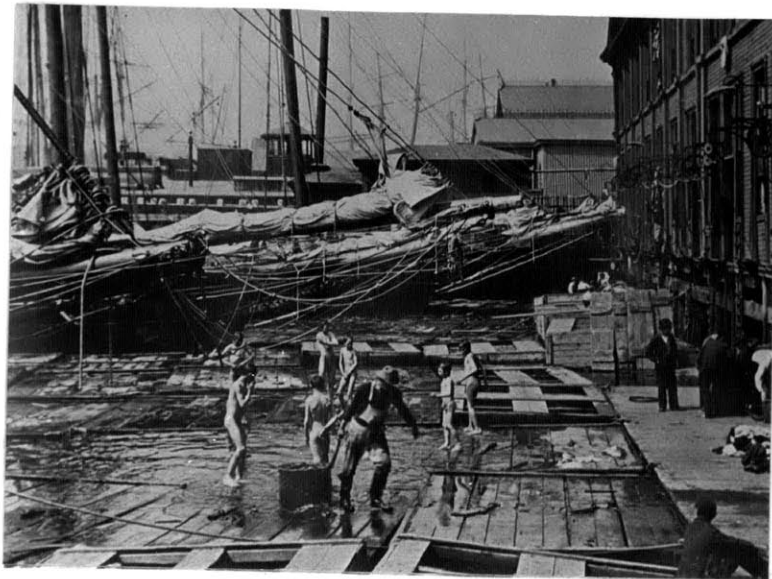
My grandmother grew up near the East River in New York City. There were 13 children in the family. All the boys learned to swim in the river, jumping off piers amidst the cargo ships while the girls, who were forbidden to do the same by social mores, watched. In the evening, families strolled along East End Avenue, along the docks, seeing what boats had come in bearing what cargo, taking in the sea breeze and the hustle and the bustle of the commerce just across the street from their places of residence. I would like to think of it as an old-fashioned urban version of the New Jersey boardwalk, for again all the crosstown streets dead-ended at the river and there was a lineal walk following the water's edge.

Surprisingly, it still exists today, although much changed in ambiance and social context. There is a promenade or pedestrian path of 1/2 mile or so from 79th Street to 88th Street going between some buildings, a highway, and the river ending at Carl Schurtz Park. And on summer evenings at about 6:30 you can find people of all ages walking up and down, kids on trikes, parents pushing carriages, old folks....

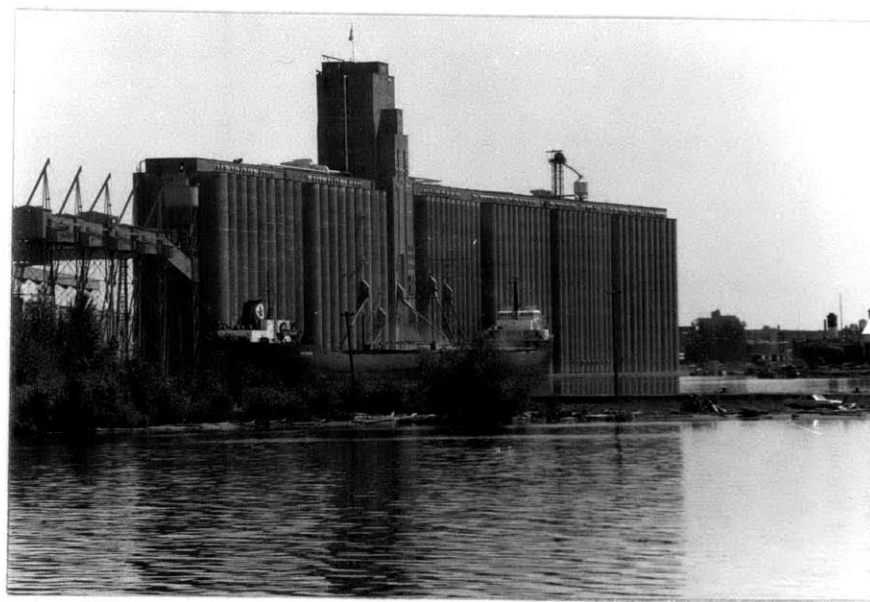


The other kinds of environments I've been thinking about are industrial ones, specifically the steel mills and grain elevators I visited on a trip last summer. There are many reasons I like to be around these environments and to look at them and it was the physical form of some that I have tried to work with in my design, but now I would like to talk about watching them. Often I sat for hours, watching the barges of coal and ore pulling into the steel mills, the railroad cars rolling along slowly, endlessly. In Duluth the ore was dumped down great chutes into waiting boats, and other ships took in grain from the elevators amidst clouds of airborne grain. You could listen to the moaning and groaning of the steel mills and almost believe they were great living creatures. This movement and activity seemed in a very primitive sense intrinsic to life and survival. It felt like a heart-beat of the land. Watching it had me spellbound. Our everyday life ought to include opportunities for this kind of watching.





2.



I think about my grandmother and her brothers watching the boats and swimming among them...and I also think about this couple I met in Johnstown, Pennsylvania. There is a small residential community called Franklin-Conemaugh, right at the gate of the steel mill there. Most of the houses are rickety, wood-frame houses, well-kept. Everyone sits on his front porch and waves to passers-by. The front porch of the couple in the photograph virtually overlooked the blast furnace - no more than a few hundred yards away. I asked them if they minded it, its constant red, glowing presence. "Oh, no, we would never want to move. We like to watch it. There are five pours a day. We always know what time it is when we see or hear a pour. We sit here every evening. Our daughter, she just loves to come back here from Chicago and sit on the porch." The man speaking had worked at the mill 40 years before retiring.



I am not suggesting that we all have a blast furnace in our backyards. Rather I would like to suggest that it is stimulating and healthy, "good for the soul," if you will, to be in an environment where you can be aware of things being made, materials being moved about, .. where you can see first-hand what collective human effort can produce, where you can measure cycles of the day, week, month of season by the movement and activity around you. In a rural context, this happens with the growing season, the changes in climate and foliage being more conspicuous in the country than in the city. But in the city you can also gauge cycles by human activity - the container ship which comes every month, the tanker every other day. I think something very basic to life is missing from an existence in which the only transitions are from the suburban circular driveway to the fluorescent high-rise office building.

So initially, it was both access (unabashed, unrestrained public access to the waterfront) and activity (including observation of activities involving collective making and moving) references which I tried to apply to my vision of the Boston waterfront.

City Scale Imagery

Although in concept I wholeheartedly support the revitalization of the Boston Waterfront, I have some misgivings about some of the uses which it is being given and especially about the tone or ambiance which often ensues.

It seems that for redevelopment or revitalization to occur, a profitable use must be found - most often high-income housing. And of course, the more prime the location on the site, the higher the profit. The same is true for some commercial uses, most notably high-priced restaurants.





Waterfront Scenes



The result is that not only are the more public uses and walkways apt to occur back from the most prime locales or water edges, but that the atmosphere of the waterfront areas changes as they become exclusive enclaves. Commercial uses tend to be oriented to the upper income residents: expensive restaurants and exclusive shops.

I am sure that in many instances the owners and developers of these renovated wharf buildings could make good cases that there is public land around them (small gardens and walks) but there still seems a real gulf between the sorts of activity which occurs there and across the street in the North End, which has a welcoming tone for resident and visitor alike.

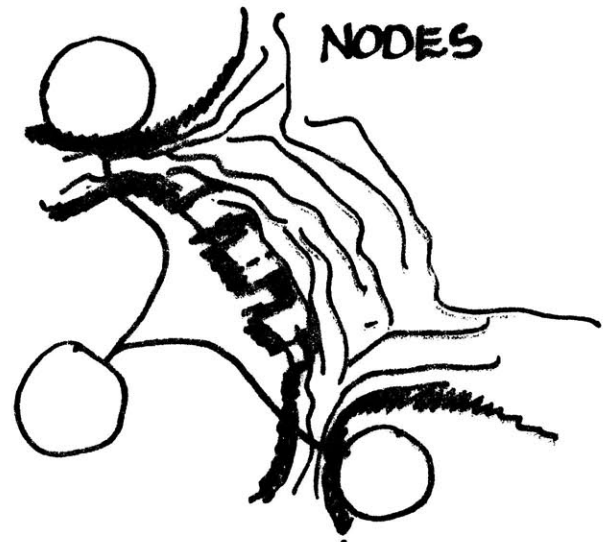
I would like to see all future development, at least on lower floors, along the Waterfront that side of Commercial Street/Atlantic Avenue/Northern Avenue, from the North End to South Boston, be limited to truly public uses, unimposing and welcoming in tone, open and festive in nature: markets, parks, exhibitions (for example a Coast Guard exhibit), museums (an industrial museum, a maritime museum perhaps in addition to the U.S.S. Constitution, the Aquarium, the Childrens' Museum, and the Transportation Museum). There shall be, in addition, light industrial uses which must remain visible to the public eye (boat building and repair, fishing, shipping). Great care should be taken that no further building or changes in tone obscure the connection between the city and the feeling of the movement of ships and goods up and down the harbor. The tone of parks and buildings near the water should be urban, built, with some hard edges, in sympathy with the docks and wharves there, not soft and rural or pastoral.



I have conceived of an image for the whole Boston Waterfront, with Commercial Street/Atlantic Avenue/Northern Avenue acting as a grand lineal recreation track (as indicated by the slashed line), a sort of large-scale promenade or boardwalk. As much waterfront as is at all possible is given to the previously mentioned public uses.

There are three nodes of intensified activity along the route, one at either end and one in the center. At the northern end, the renovated

Charlestown Navy Yard becomes a National Park with the U.S.S. Constitution among other historical exhibits and the Mass. College of Art with open workshops and displays. In the center the rebuilt Quincy Market area is opened up to the water as the Expressway goes underground (indicated by the dotted line.)



And at the southern end, the site I have chosen to develop, there is a large lineal waterfront park or promenade, and public swimming facilities at its end in a commanding position with a sweeping view of the harbor. With the rerouting of Northern Avenue (as planned by the Mayor's Economic Development and Industry Committee in conjunction with the industrial redevelopment of the South Boston Navy Yard), its trussed bridge over



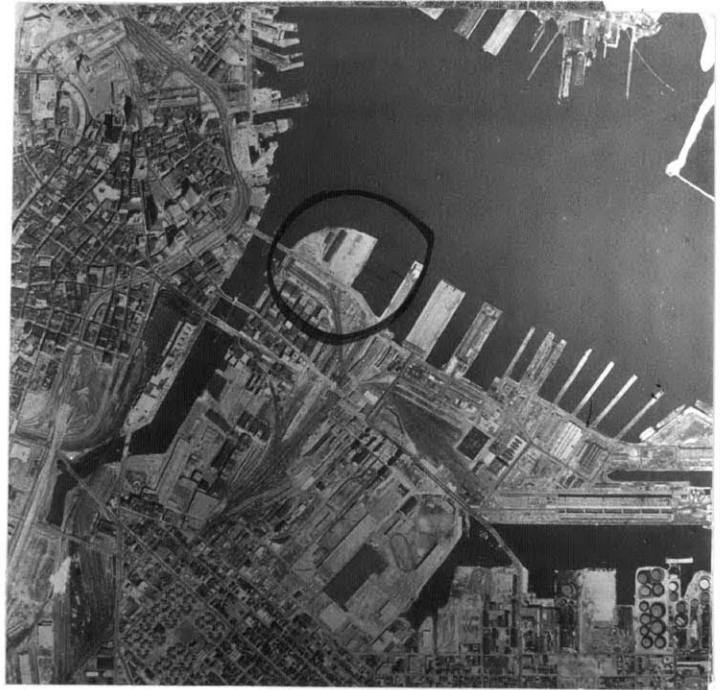
Northern Avenue Bridge.

the Fort Point Channel becomes unused and becomes inhabited with infill (see living truss discussion in following section) to act as a grand pavillion for this promenade. There would be as well a small craft boat building and repair facility, serving not only pleasure boats but fishing craft from the nearby Fish Pier. Further on is Commonwealth Pier with a large ocean liner permanently moored as a convention hotel and entertainment facility. And just to the south would be the Children's and Transportation Museums.

This whole route would be readily identifiable as a special thoroughfare fringing the water with special lighting and paving to distinguish it. I would hope that it would in its entirety become a waterfront promenade (a shore version of Commonwealth Avenue) where people would stroll on warm days, stopping at many small parks or pockets of sun. For those less ambulatory souls, a light rail system would serve the route. It would be rather old-fashioned and mechanical in tone. Perhaps it would even run restored or reproduction street cars in conjunction with the Transportation Museum. At any rate it would feel wooden, rickety, and local.

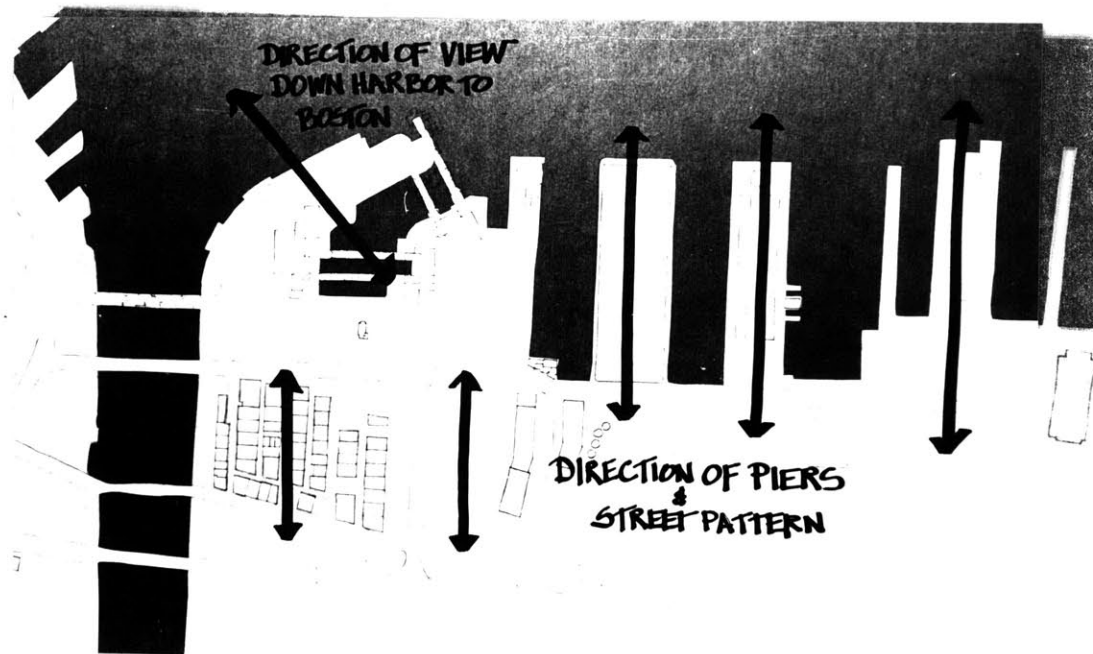
Site Conditions

I chose to develop a site which forms a part of what I referred to previously as the southern node in my waterfront image. Presently owned by Anthony Athanas, whose Pier 4 restaurant is beside it, the site has been suggested for high-income, high-rise housing with some adjunctive commercial uses, possibly including a hotel. It makes me shudder to think of another Harbor Towers going up there. It is somewhat of a wasteland at present, a large parking lot used by those commuters willing to make the short trek to the downtown financial district. Remnants of railroad cars sit on tracks submerged in puddles, reminiscences of the pre-trucking days when goods moved from ship to train to market. But it is, by its natural endowments, a beautiful site with magnificent views, to the north down the harbor to the Mystic River, to the west back to the tall buildings of the city, and to the east, across Logan Airport out to sea. From the water's edge, formed by a massive granite bulkhead, one has an unobstructed view of the big ships heading up and down the harbor.



The major directions one feels are shown in the following diagram,

one being a continuation of the piers and the avenue direction normal to it, the other being down the harbor.



Plans to revitalize other parts of this section are already underway. The Fish Pier is slated for modernization, as is Commonwealth Pier. With my proposed transportation system, these would become a more integral and accessible part of the urban scene. And the end of the area, formerly the South Boston Naval Yard, has been proposed as a free trade zone as well as a major ship-building repair center.



*Crane in operation at South Boston
Navy Yard site*

BUILDING SYSTEM

LIVING TRUSSES

While utmost in my mind was the necessity to keep the ground near the water's edge public and accessible, I realized that profit is essential to the private development of any site, and much of the land along the Water-front, including the site I chose, is indeed privately owned. The most profitable use for this kind of site condition is, as discussed in the last chapter, high income housing occupying the primest portions of the site.

One way to reap maximum profit, to fit a maximum number of units on a site with minimum coverage, but not in this case in order to leave the ground public, is illustrated by Harbor Towers. Clearly, this is a failure in its definition of the space around it and in its living spaces as well, I believe. This is a simple and singular interpretation of a high rise on such a site, and I do not doubt that a much better development of the high rise diagram might be possible.

However, I have instead decided to keep the same constraints and program (maximum reasonable housing with prime views, ventilation, connection to the harbor activity while adding open space) and to explore the radical alternative of keeping the people up, but building the tall building on its side, with its major circulation instead of primarily vertical, largely horizontal like a street, much more useful for walking, biking, etc. The space beneath is left open, in this case for a marina.

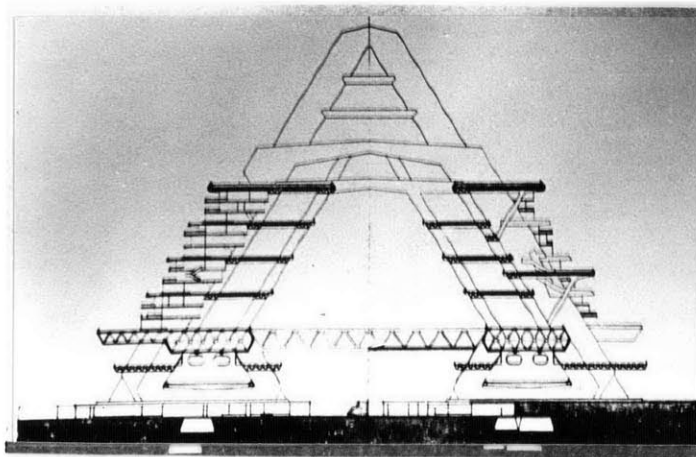
I thought of this as a series of lineal frameworks or trusses, partially infilled and inhabitable, stretching over water. (In another case, they could span over land). I took inspiration from Tange's project for housing



HARBORWORKS

PLAN VIEW

SCALE : 1" = 40'



3.

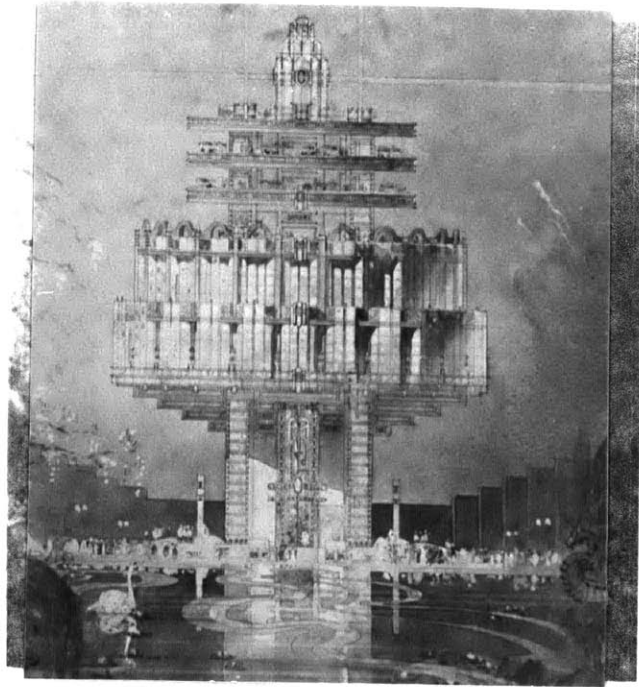
HOUSING IN BOSTON HARBOR

WORK OF
KENZO TANGE

PLAN FOR
TOKYO HARBOR

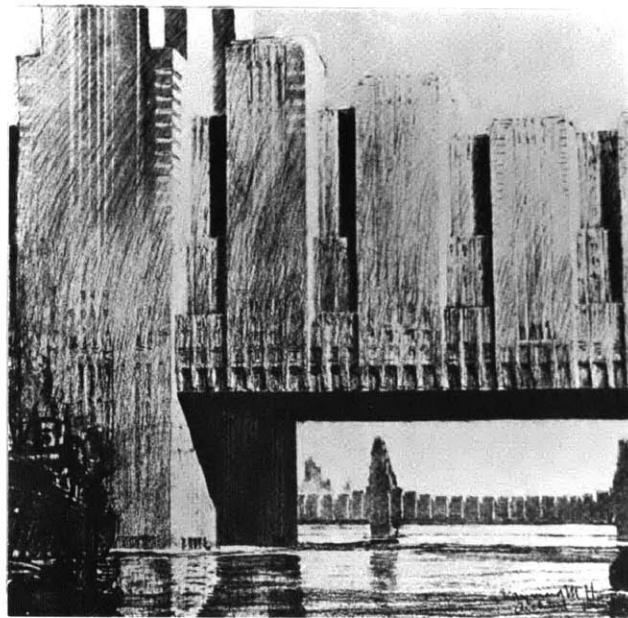


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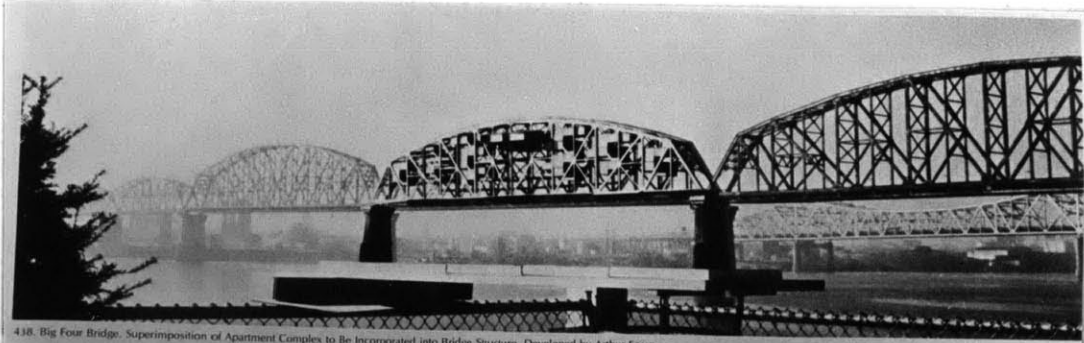


5.

PROJECT FOR A RESTAURANT IN THE AIR
JOSEPH MURPHY 1929



PROJECT FOR A BRIDGE WITH APARTMENTS
RAYMOND HOOD 1929



438. Big Four Bridge. Superimposition of Apartment Complex to Be Incorporated into Bridge Structure. Developed by Arthur Foran.

Jasper D. Ward (New Jersey 1921—)
Residence: Louisville, Kentucky.
Education: 1943, B Arch., Massachusetts Institute of Technology.
Among Major Works: 1963, Neighborhood House (settlement house), Louisville, Ky.; 1964, University of Louisville Radiation Center, Ky.; 1968, Portland Elementary School, Louisville; 1971, Doctors Office Building, Louisville; 1971, Alice Lloyd College Science Building, Pippa Passes, Ky.

Big Four Bridge—1968

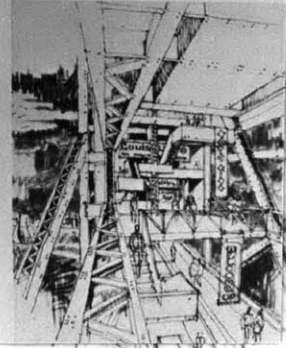
Location: Crosses the Ohio River between Louisville, Ky., and Jeffersonville, Ind.
Status: The bridge approaches on both sides of the river have been torn down, and the span now stands alone over the river with no access.
Additional Credit: Arthur J. Foran III, Ronald Gascoyne, Day Johnston, Fred DeSanto, Robert Kingsley.

The Big Four Bridge was constructed in 1893 under a franchise granted to the Louisville and Jefferson Bridge Company. It was taken over by

the Cleveland, Cincinnati, Chicago and St. Louis Railway Company, the "Big-Four," and eventually acquired by the New York Central. When the New York Central and the Pennsylvania Railroads merged it was decided that the Pennsylvania Railroad Bridge would be used, and the Big Four Bridge was abandoned. The bridge is a historical tribute to Louisville's importance as a rail center and the role this has played in the commercial development of the city.

Early in 1968 theatrical producer Richard Block suggested that the Big Four Bridge should be "turned into a Ponte Vecchio type structure and bring fame and fortune to Louisville," and the firm then proceeded to develop a number of possibilities.

A proposal evolved by Arthur Foran incorporated 160 apartment units, a restaurant, shops, cafes and a small marina into the bridge structure. The multi-level apartments (one, two,



439. Interior of Converted Bridge. Ill. A. Foran

7.

ADDITIONAL PROPOSALS FOR INHABITING BRIDGES



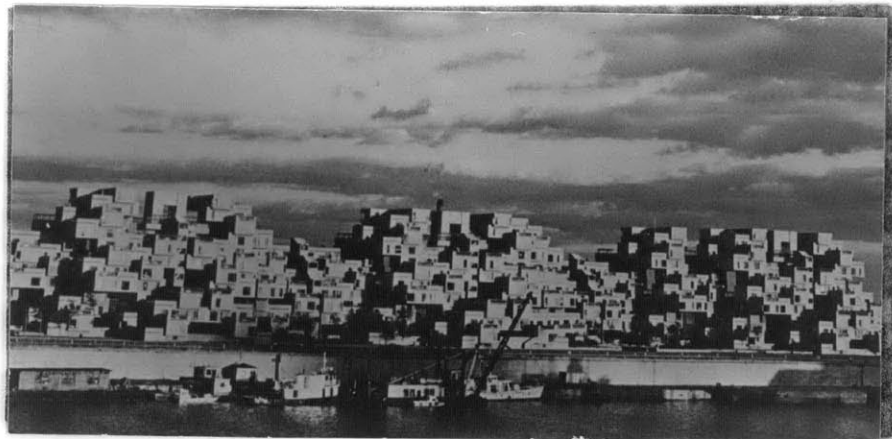
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9.

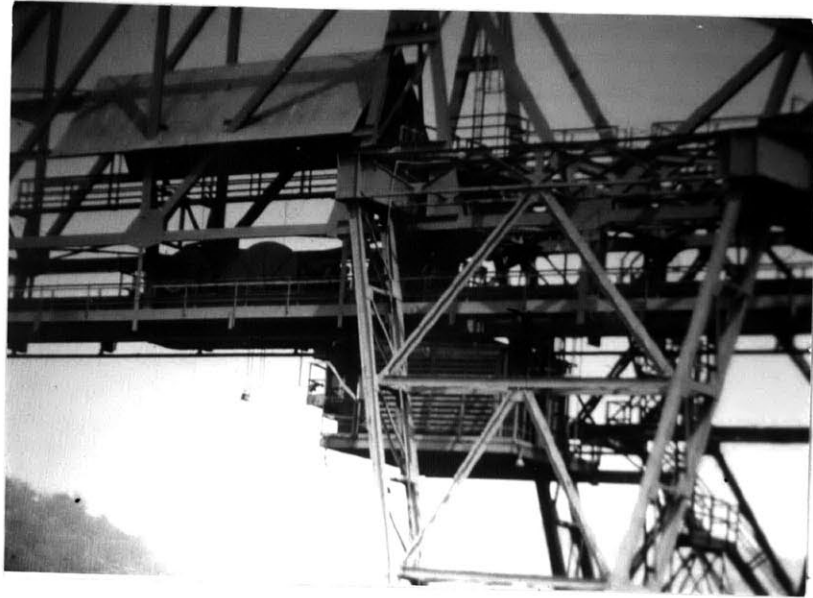
HABITAT

MOSHE SAFDIE

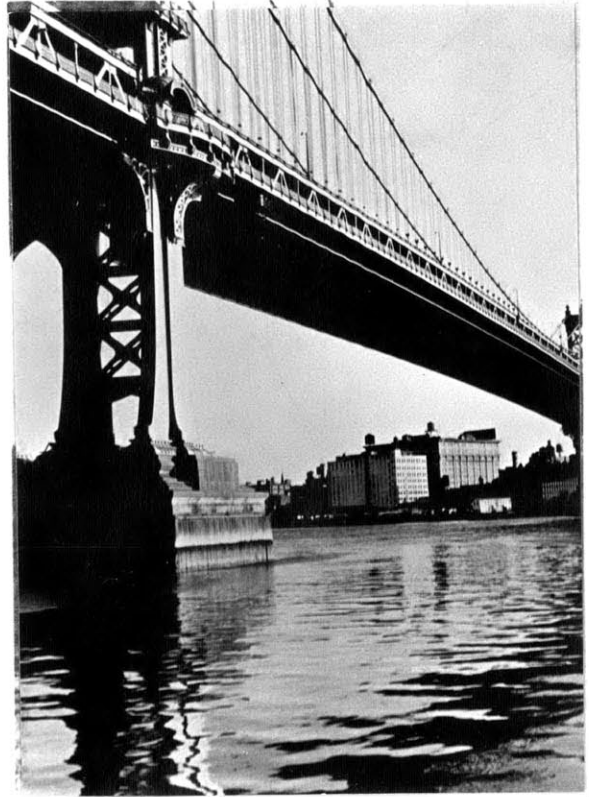


10.





REFERENCES FOR
ABUTMENTS



12.



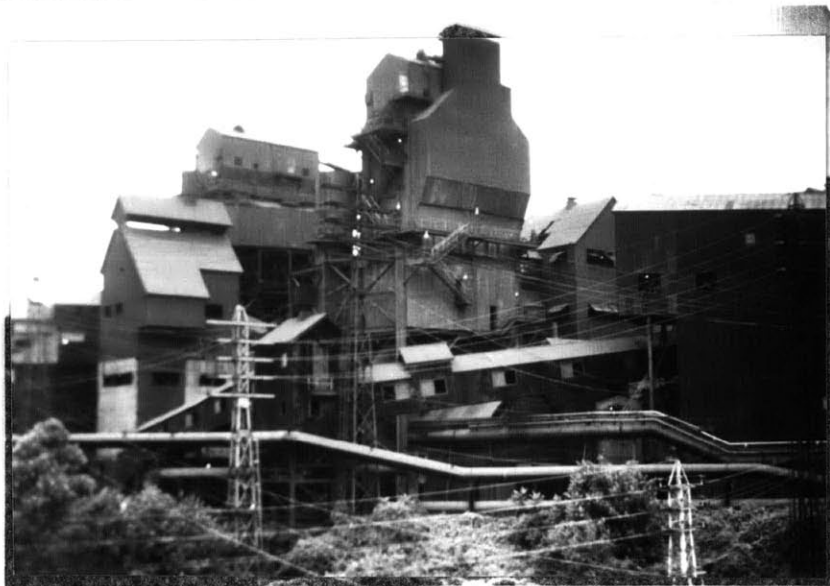
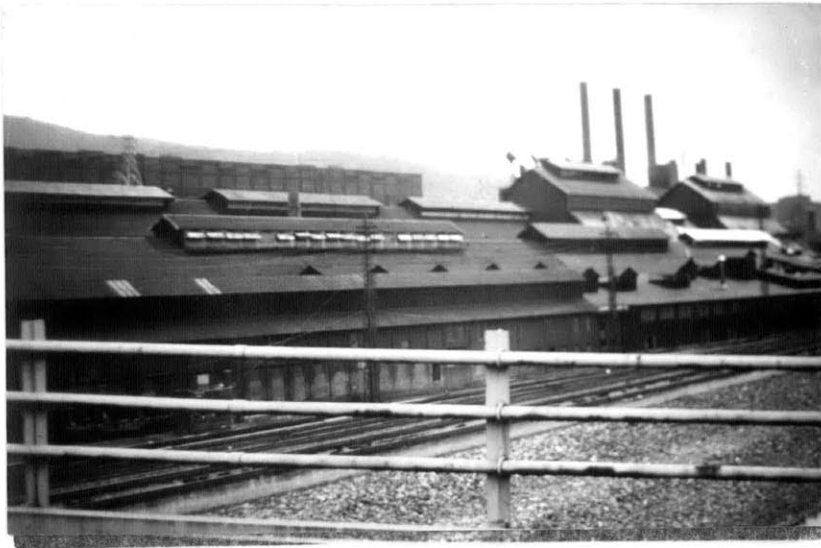
13.

over Tokyo Harbor and another project he did while at M.I.T. for housing in Boston Harbor. Several other projects illustrated here dealt with housing in bridges of one sort or another. I suppose that these in turn took inspiration from the Ponte Vecchio. But it was not simply the notion of living over water which interested me. The wonderful cranes and frameworks I saw in industrial environments inspired me to think of inhabiting them with additive forms imaged a bit like Safdie's Habitat.

For this site I decided that four large pairs of trusses of 500-600 feet in length would span a large inlet containing a marina and small-craft building facility, as I was eager to incorporate some "real", hands-on uses into the environment. Two of the truss pairs are used at one end for a lifting hoist for the boats. Each pair of trusses would have a gantry crane on rails on top for use during construction, for hoisting up the prefabricated units.

The trusses span from abutments on either side of the inlet which are somewhat like bridge piers, but climbable as natural ledges, usable as found terraces above and down next to the water.

At the end of each truss would be vertical circulation (an elevator), a large space for mechanical supply and ample parking. In this instance, because the view, the exposure and the activity is superb, the buildings at the ends of the trusses contain housing themselves as well. These buildings are like the large steel sheds, like rolling mills or warves. Instead of being symmetrical they are cut back on one side, this void space usually being the sheltered public way along the water's edge. Although the buildings are of steel framing, this lower portion is faced with masonry, brick or stone, and has the feeling of having been eroded away by storm water. Upper



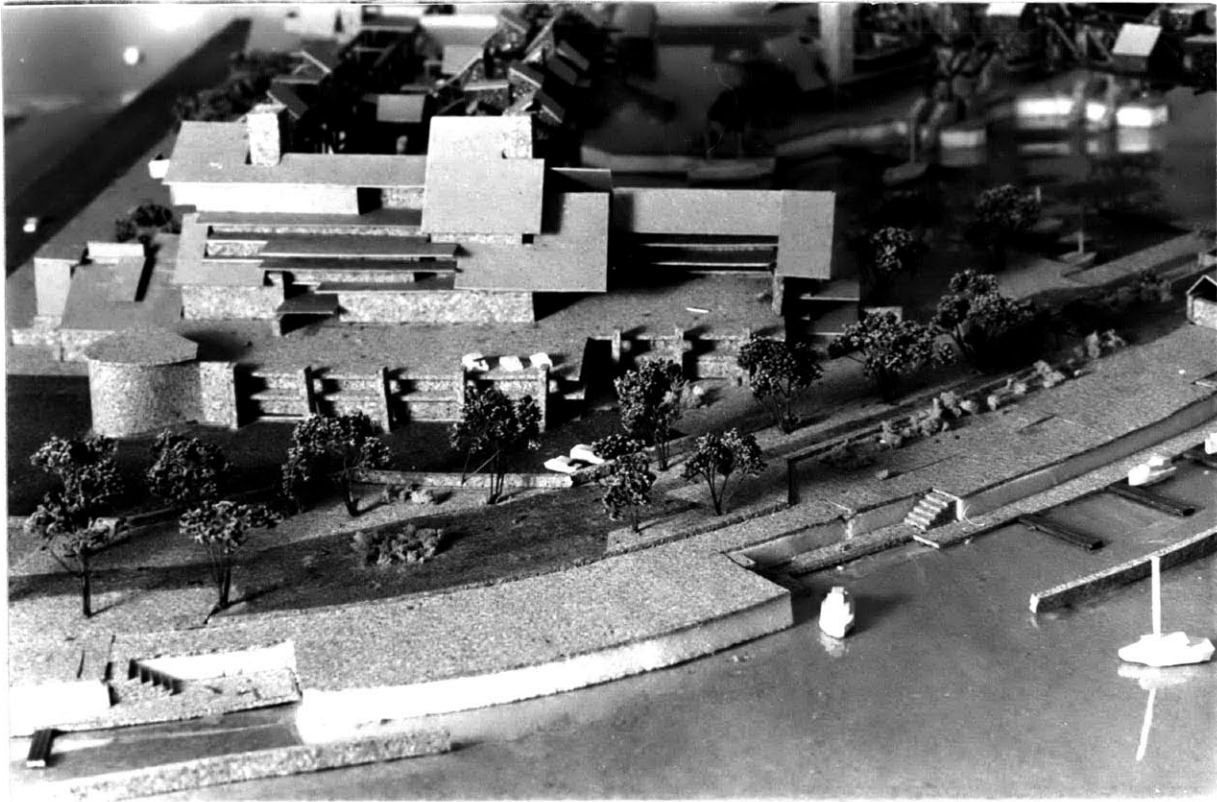


HARBORWORKS

REAR VIEW, SHOWING PARKING

AND SOUTHERN CORE

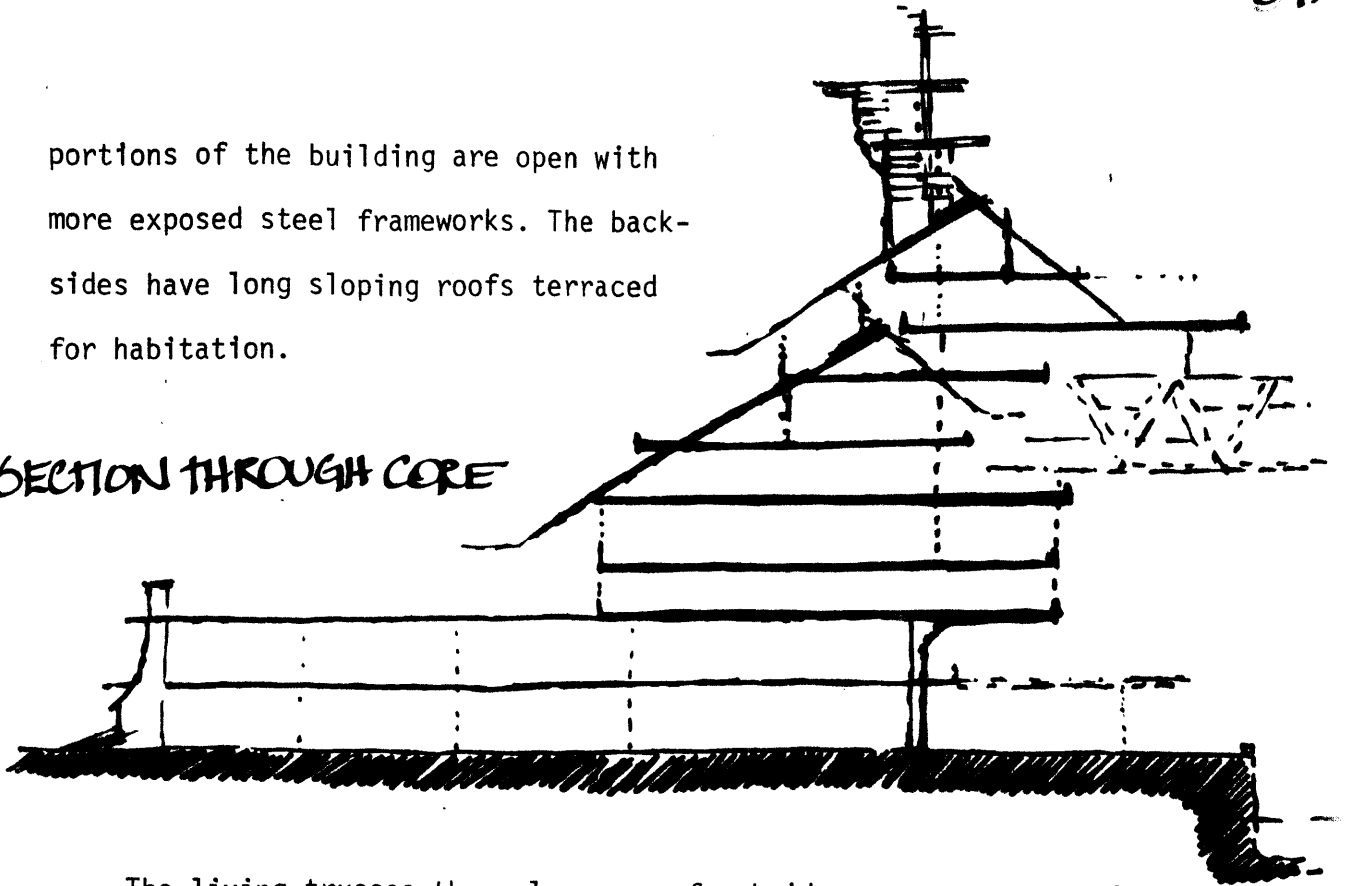
BUILDING



REAR VIEW OF NORTHERN
CORE BUILDING, SHOWING
PROMENADE

portions of the building are open with more exposed steel frameworks. The back-sides have long sloping roofs terraced for habitation.

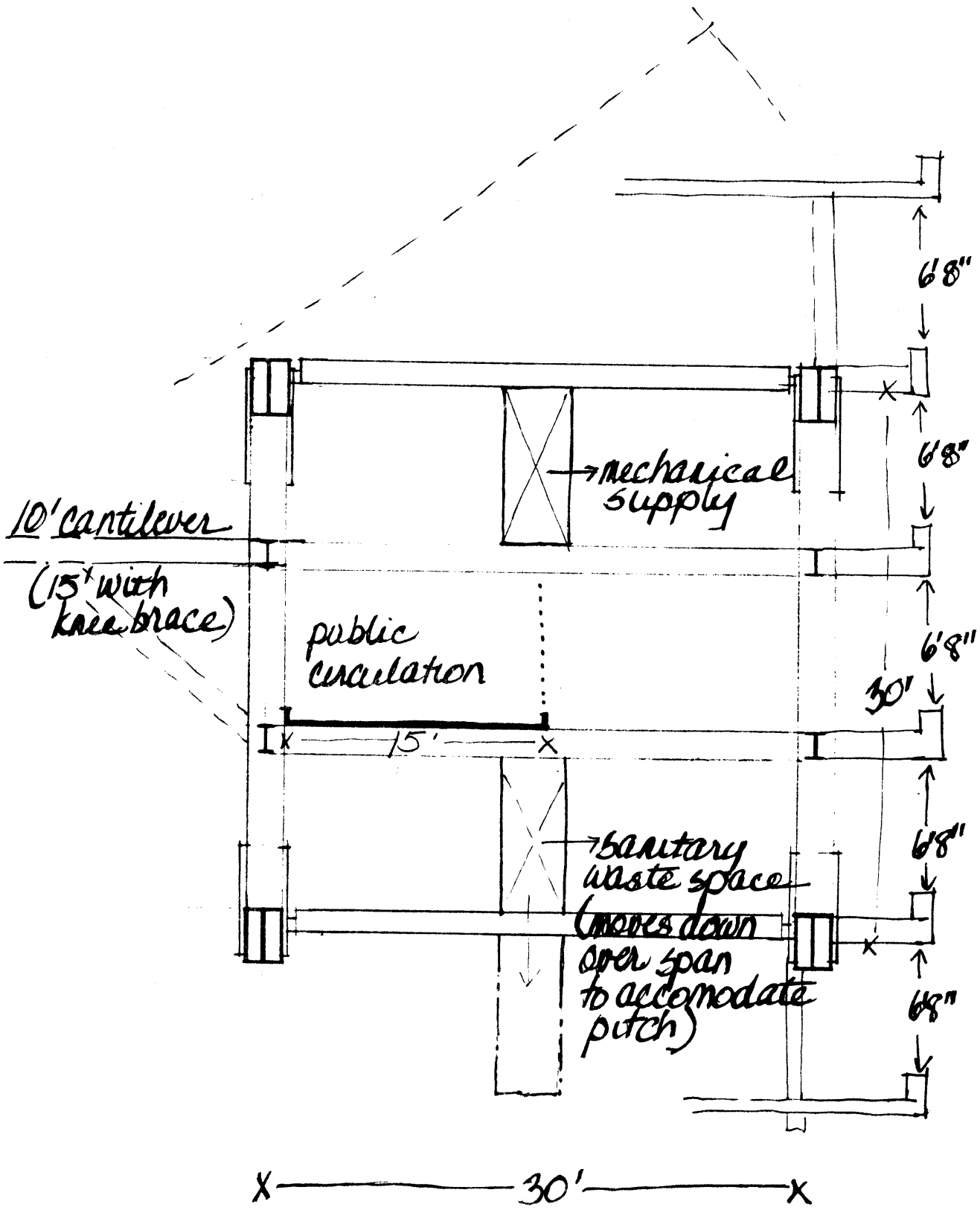
SECTION THROUGH CORE

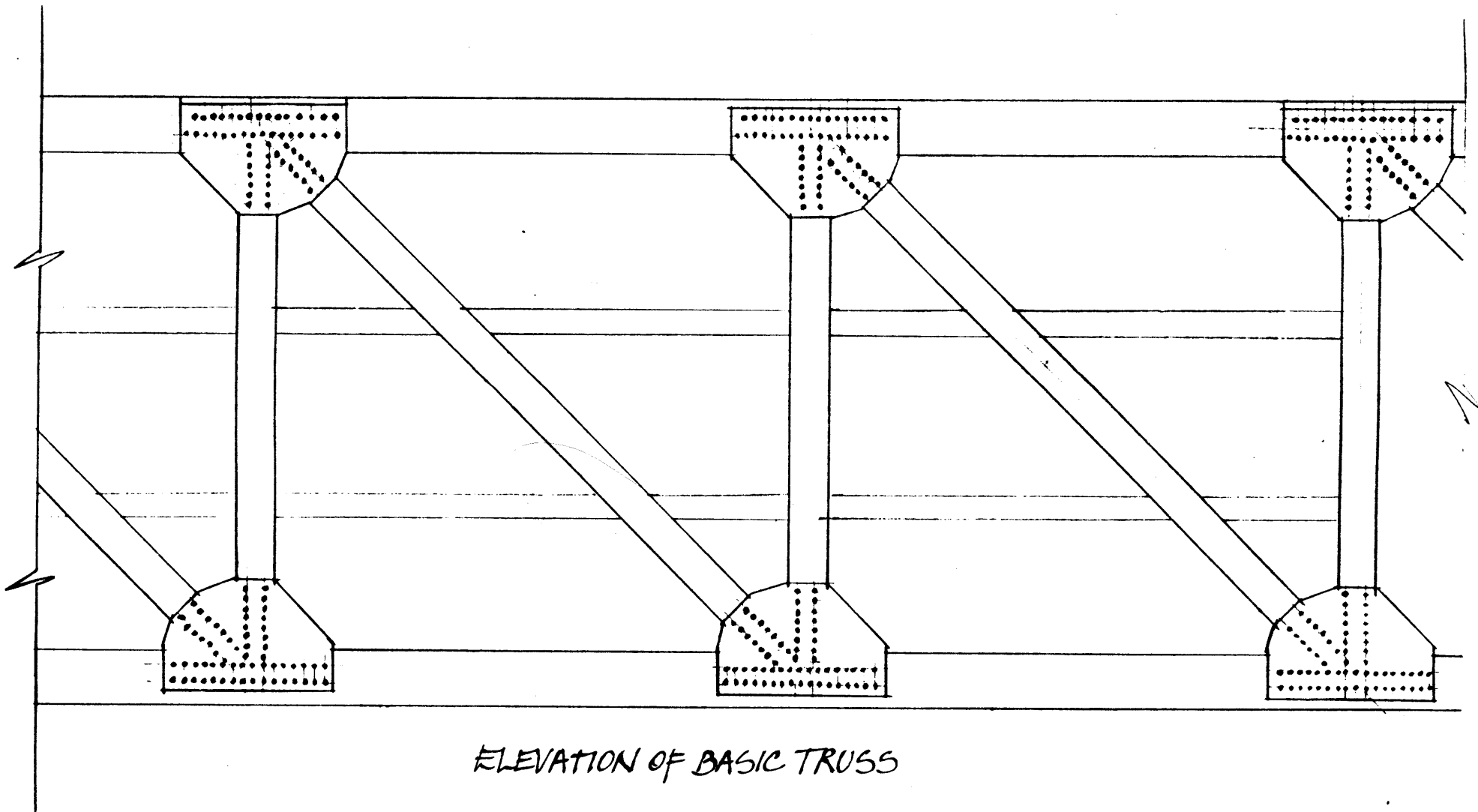


The living trusses themselves are of a bridge or crane type of construction or scale. They span in pairs, the distance from each other being thirty feet. This seemed a good dimension as it was just wide enough to allow two units to become double loaded at some points, if you include a ten foot cantilever to either side (15 ft. or so with a knee-brace). This leaves 25 feet depth for each unit. The height was determined at 30 feet, for co-incident reasons. This was just enough room for five levels, three inside the truss area, one on top, and one hanging beneath..

Constant through each truss in section is a circulation piece near the center. It is a full 15 feet wide to allow for biking, strolling and perhaps even a small trolley (2 or 3 persons) on rubber wheels to serve as a sort of horizontal elevator. Off this circulation, stairs at regular intervals reach units up or down.

Also constant is a mechanical supply where drinking water as well as hot water for heating would come through. A constant waste source space, also a





ELEVATION OF BASIC TRUSS

D.K.

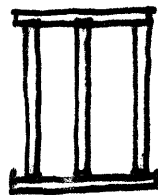
full 8 feet high has adequate pitch over its run so that an electric pump is not necessary. Both of these mechanical spaces are located near the truss section center and kitchen/baths tend to be located towards the center, above and below these spaces, rather than at the peripheries.

The trusses of these dimensions span about 600 feet without intermediary supports with individual members sized as in the diagram. To figure this, I assumed a full load of four levels (In fact such a constant density over the length never occurs.

Including its own weight, each truss in a pair can support about 12 Kips per foot. Into this I figured 40 PSF live load for residential areas, 60 PSF for circulation, 30 PSF for roofs, 20 PSF for a partition wall allowance and for exterior walls consisting of insulated metal panels, 60 PSF for 6" lightweight concrete floors, totalling up to about

10 Kips per foot plus another 2 Kips for the dead weight of each truss. By way of comparison a highway bridge is usually designed to carry 3 Kips per foot per lane (assume in this case that 6 lanes could fit within the truss configuration).

Plugging into this framework are two different sizes of modules combined in a variety of ways. The larger is approximately 20 feet by 30 feet

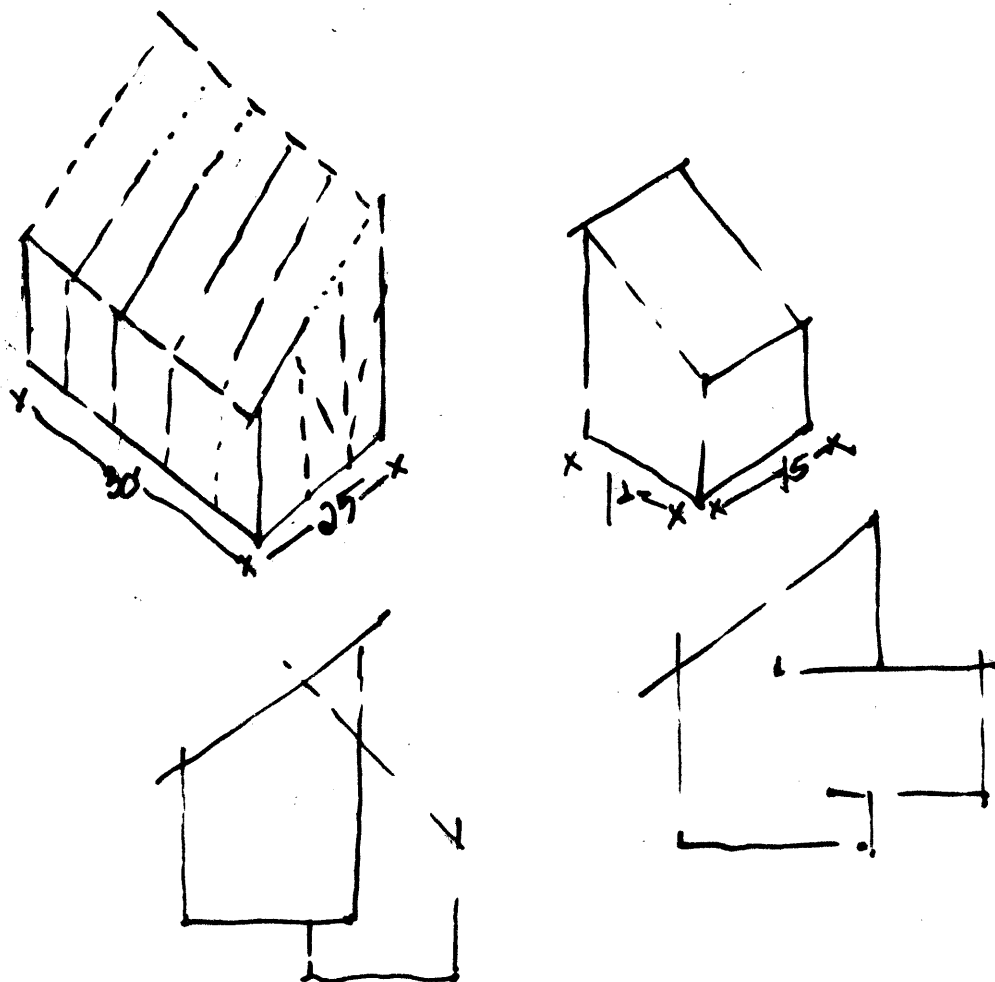


- WELDED
3" HIGH
STRENGTH
STEEL PLATE
FOR TOP & BOTTOM
CORDS.



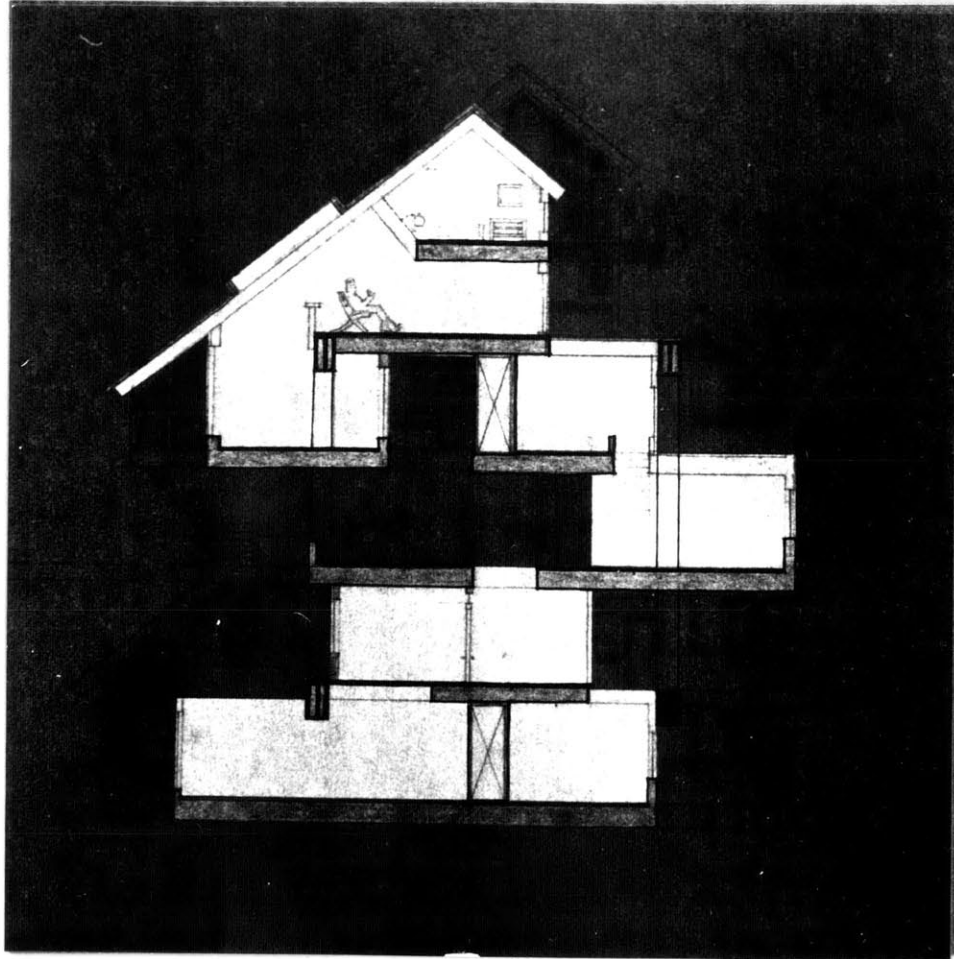
- WIDE FLANGE
SECTION WITH
COVER PLATE
CONNECTIONS FOR
VERTICAL AND DIAG-
ONAL MEMBERS.

to fit in between two vertical members of the truss. It can have a 45 deg. roof extending all the way over it or part way, or it can be flat-roofed.



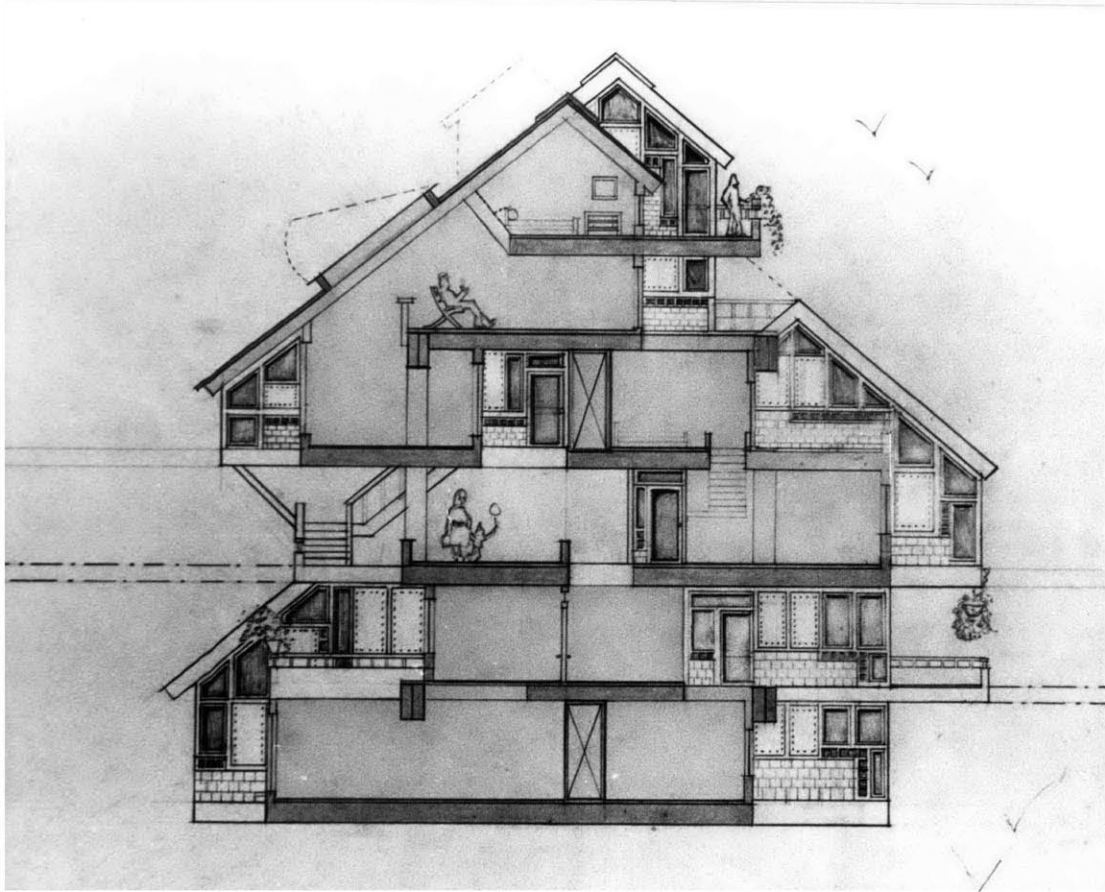
It comes prefabricated with steel framing on three sides so it can penetrate into the truss without interference from the truss's diagonal members. Temporary diagonal bracing holds the module rigid while it is being hoisted into place by a gantry crane which rides on tracks on top of the truss. Its place is actually a "lot" formed by the main framing within and extending out of the truss. The smaller module is 12 feet by 15 feet. The modules can scab onto each other or penetrate each other.

These modules are made of light steel framing 3 feet on center to allow



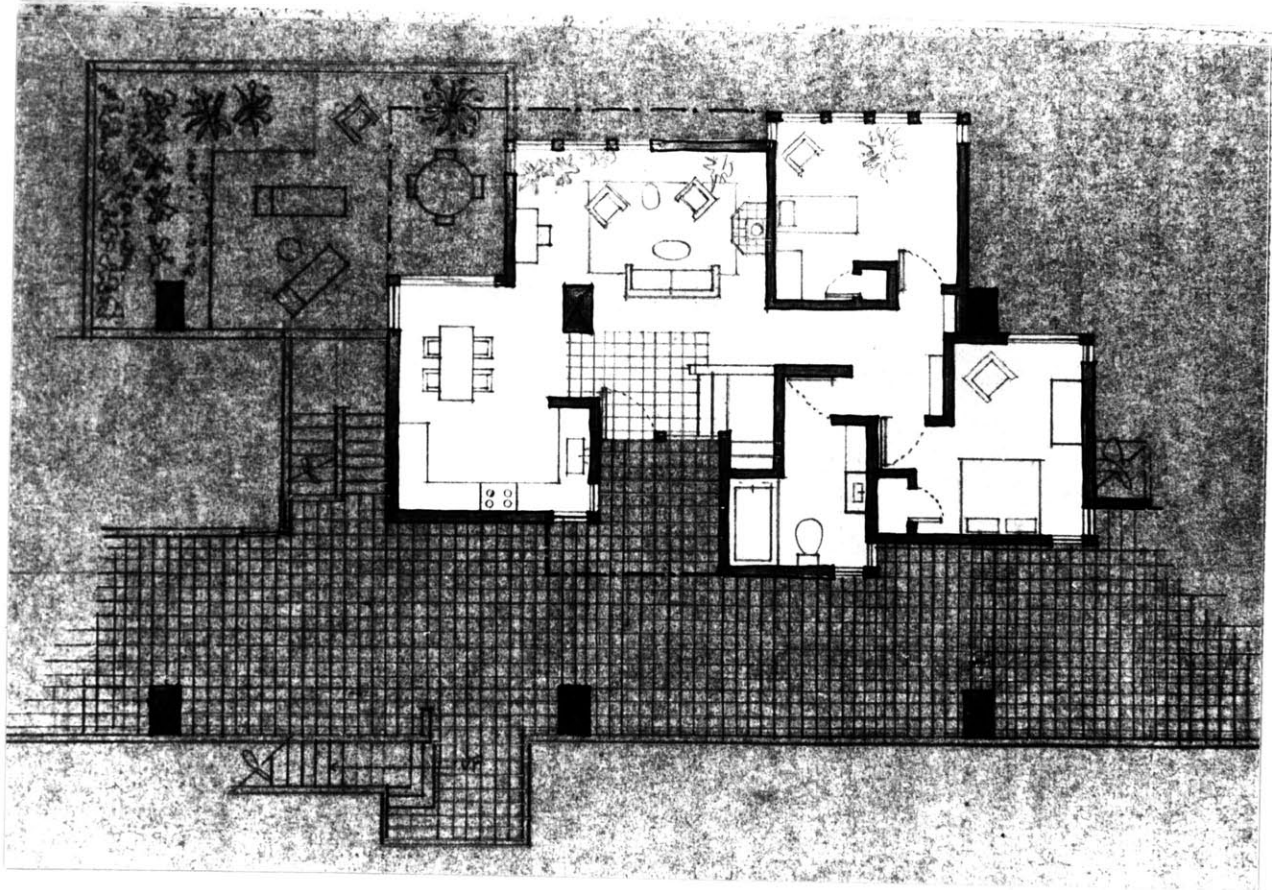
SECTION THROUGH TRUSS

SHOWING LIVING SPACES



COMPOSITE SECTION

THROUGH TRUSS



UNIT PLAN AT

CIRCULATION LEVEL

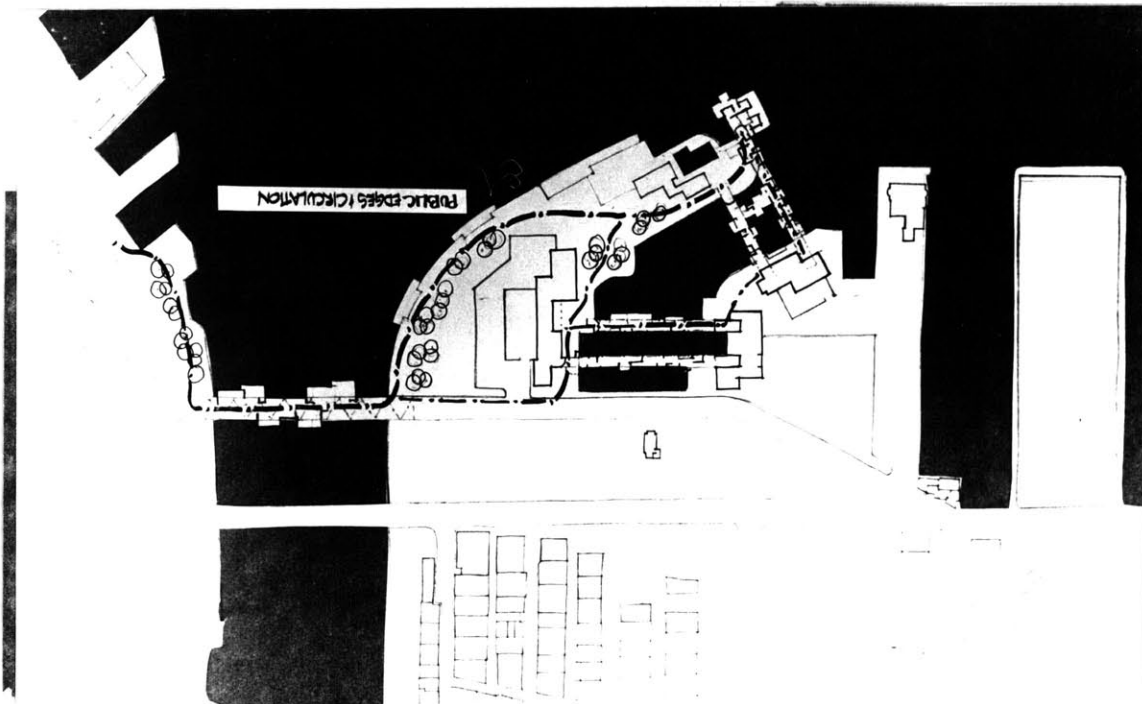
for passageways and are infilled with lighter steel framing for fastening finishes and for framing windows. The exterior skin is primarily lightweight pumice concrete block cavity walls, glass block, and insulated metal panels.

Development of these frameworks occurs in standard clusters of four units shown in this composite section and is most likely to occur in greatest density at the prime spots in the frameworks (where the views or exposure is the most desirable.) Sub spans (like side streets) can occur between trusses and these maybe sloped and stepped for each unit to have maximal view and stepped for each unit to have maximal view and ventilation. Some units might even have translucent panels in the floor (of plexiglas or heavy colored glass) through which you might catches glimpses of the water and reflections of the sun on it.

The plan illustrated is one at main circulation level. It is a family unit, five bedrooms (three up and two down) but can easily be converted to a few lower stairs towards the exterior entry and climbing them there. All units have an entry area off the main circulation as well as one or more private outdoor spaces. All units have some through ventilation as they are staggered in part along the truss.

SITE ORGANIZATION

In holding my wish for public accessibility and remembering my references of places to walk, stroll, picnic, or just watch, I planned a public promenade along both sides of the channel with the renovated Northern Avenue bridge serving as a kind of pavillion. It would have some informal restaurants and vendors, possibly some houses of offices on top (with construction similar to that of the "living truss" infill).



The wooden dock beneath it would be rebuilt as a place to sit down close to the water in a commanding position in the center of the channel. This promenade would continue (as illustrated in the photo) along the curving water edge. In several places, stone steps would lead down to an intermediary level closer to the water from which you could board boats moored there or just sit tucked away from the passersby above.



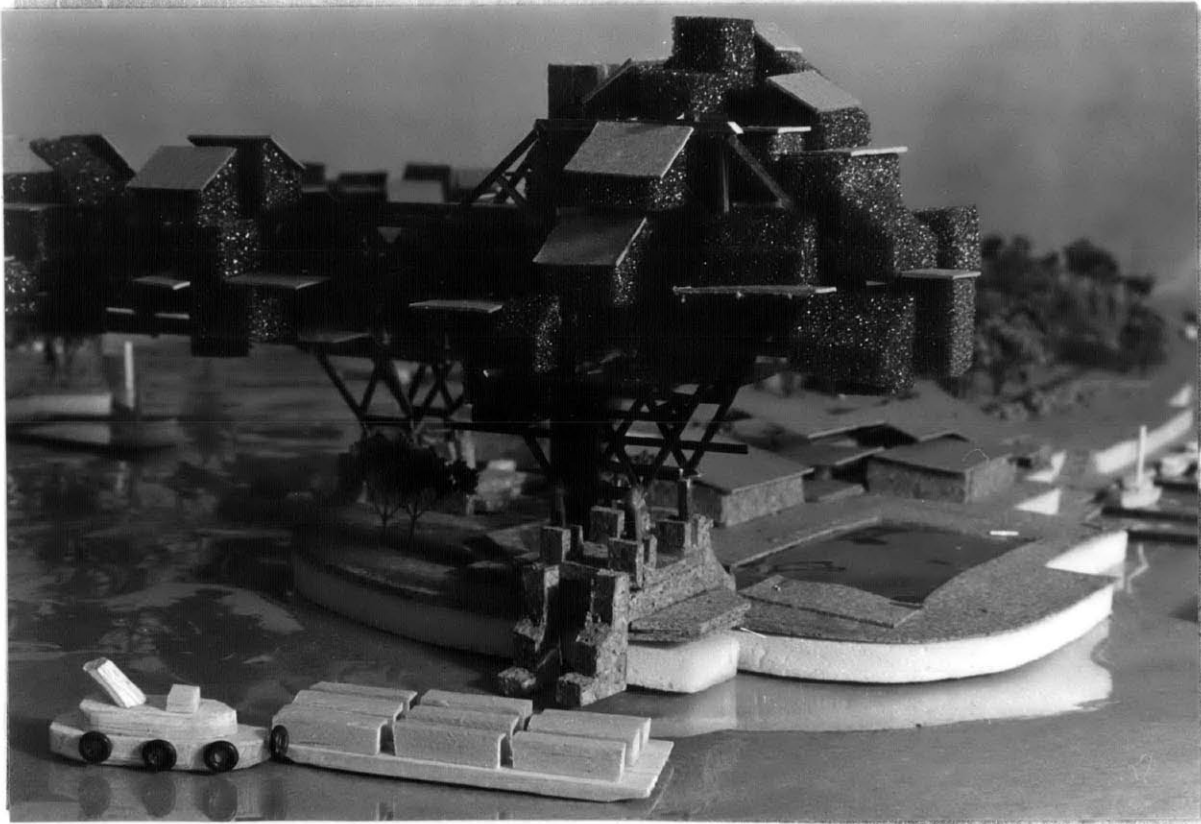
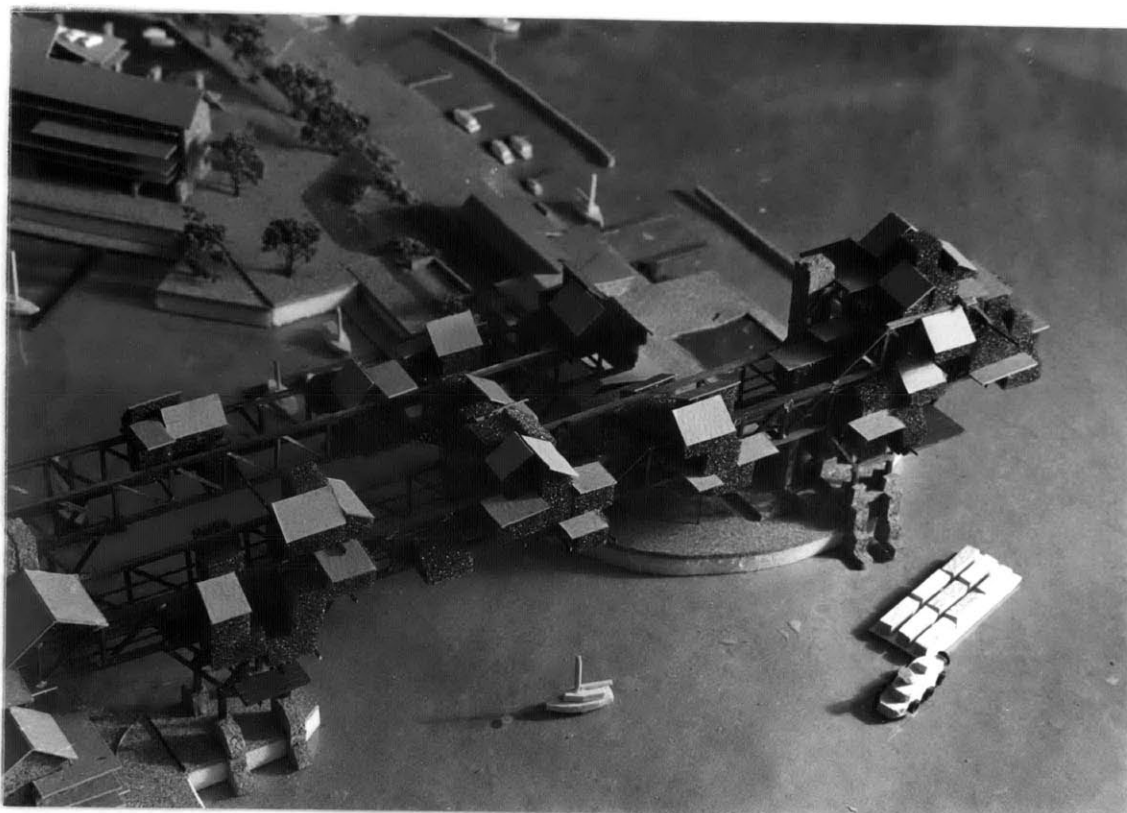
It is rather like a small version of the circulation along the Seine in Paris where the booksellers have set out their stalls above where the street runs, and a lower level goes along below, under the bridges, next to the river for slow strollers, those wanting to sit quietly or board river boats.

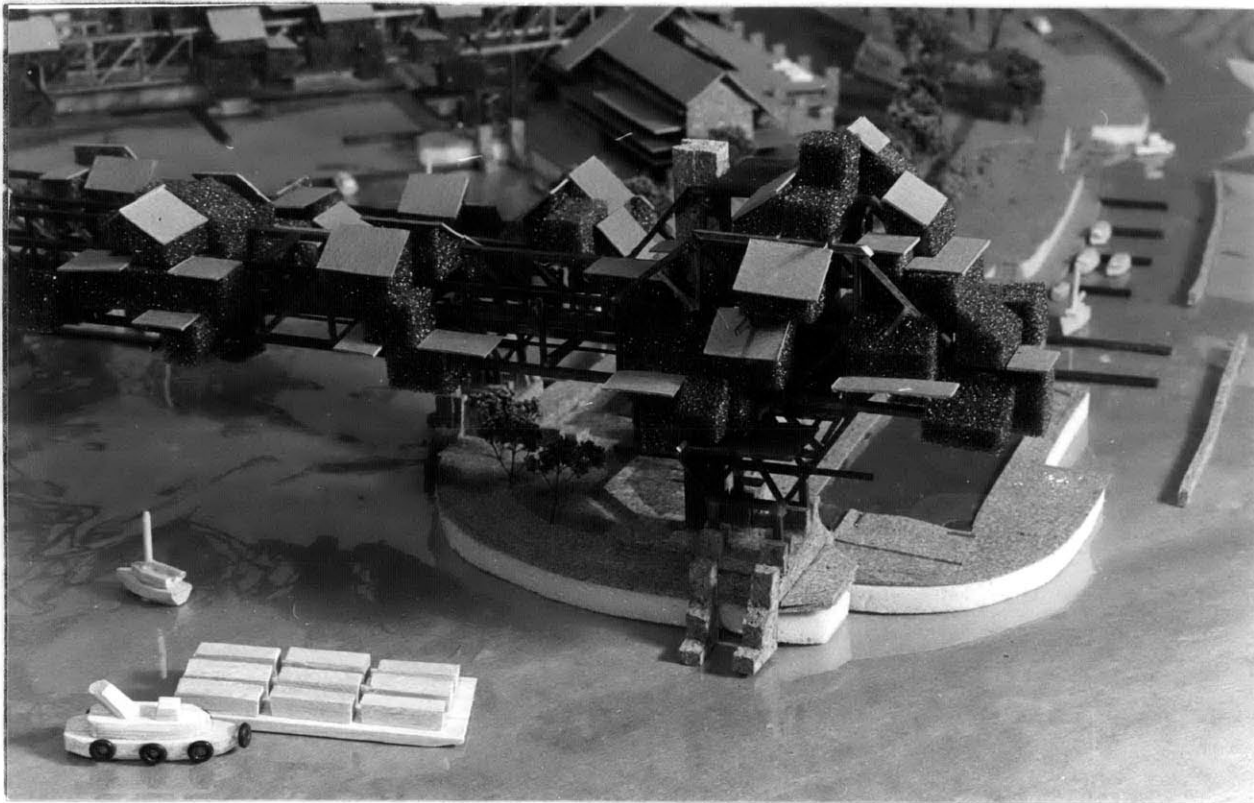
This walkway extends out onto a pier-like jut of land, reaching out to the open sea. From the end of the land you can take an open glass and iron elevator up onto the end of one of the living trusses. This elevator is

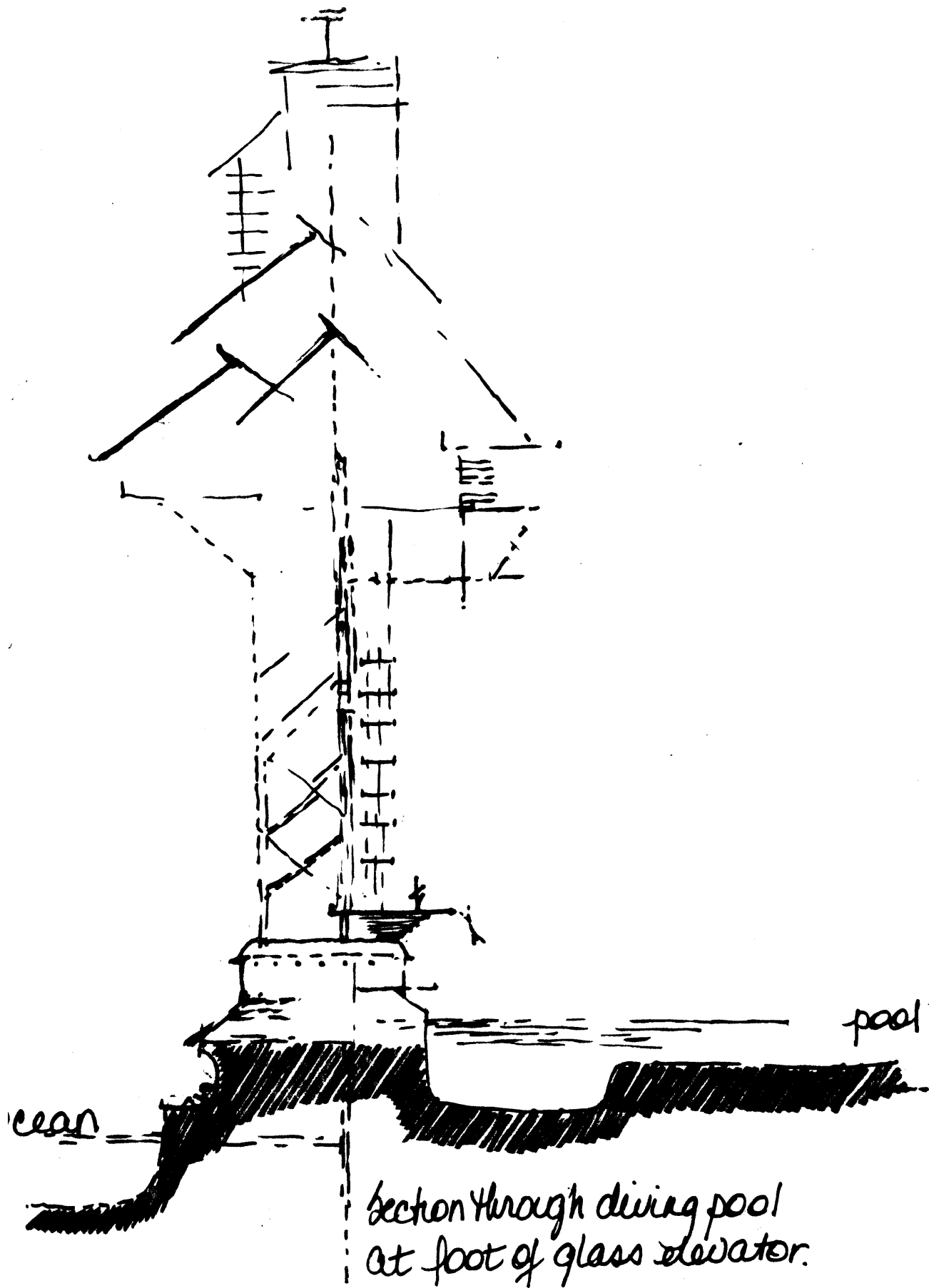


brightly lit so you can see its lights busily moving up and down. From there you might walk along its pedestrian circulation to the other side of the inlet and then down again. From this side of the inlet you might stop to watch the welding or sailmaking in the boatworks. The other edge of the inlet is a two-level galleria, a sort of winter version of the open promenade.

Instead of taking the "high road" and crossing the inlet via the truss you might instead stop at the large public swimming facility and swim while feeling a part of the harbor activity as the massive container-ships and tankers glide by. The bath-houses feel cool and are enclosed with glazed dark tiles inside out of the sun. There are sundecks or terraces on the upper levels. The diving pool is located just at the foot of one of the trusses where you can dive off its massive pier in the shadow of the upwards vertical extension of the open elevator.







Section through diving pool
at foot of glass elevator.

CONCLUSION

This is only a beginning and frankly a fantasy. I wanted to see if I could capture some of the richness and variety of industrial environments and if I could think about ways to keep the Waterfront open to all to make it an exciting and stimulating place for visitors, residents, and those who work there-----a new sort of urban amusement park given to a variety of uses for a variety of people.

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