

ENCRUSTING THE ROCKS:

DESIGN FOR INDUSTRIAL USE, GLOUCESTER HARBOR

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Signature of Author

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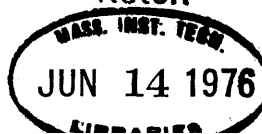
Certified by

Michael Underhill, Thesis Supervisor
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Accepted by

Michael Underhill, Chairman,
Departmental Committee on
Graduate Students

Rotch



Eyes,
 & polis,
 fishermen,
 & poets

or in every human head I've known is
 busy

both:
 the attention, and
 the care

however much each of us
 chooses our own
 kin and
 concentration

2

And the few--that goes, even inside the major
 economics. It is not true that the many,
 even in fishing, say, Gloucester,
 are the gauge

(where Ferrini, as so many,
 go wrong

so few
 have the polis
 in their eye

The brilliant Portuguese owners,
 they do. They pour the money back
 into engines, into their ships,
 whole families do, put it back
 in. They are but extensions of their own careers
 as mastheadsmen--as Burkes

Charles Olson
 Letter 6.

TABLE OF CONTENTS

List of Figures	4
Introduction	5
I. Economic and Social Issues: A Theoretical Framework	
A. Structures for People	10
B. Tools for a Human Workplace	12
II. The Community Fish Pier: A Case Study in Workplace Design	13
III. Design Methodology	
A. Site and Community: Planning Assumptions	16
B. Activities of the Workplace: Programatic Diagrams	23
C. Aspects of the Design Process:	
Networks	24
Formal References	27
The Built Ground	29
The Framework	29
IV. Documentation: Model and Drawings.	34
V. Bibliography.	43

LIST OF FIGURES	PAGE
1. Gloucester, Massachusetts (U.S.G.S., 1960).	17
2. Gloucester Harbor and Annisquam River (U.S.D.C., 1975)	18
3. Gloucester, 1831 (Courtesy Gloucester City Hall)	19
4. Second Waterfront Project (Gloucester, URBAN RENEWAL PLAN, 1971)	20
5. Aerial Photograph, Gloucester Harbor and State Fish Pier	21
6. Aerial Photograph, Waterfront II site	22
7. "The fishery harbour: chain of activities" (F.A.O., FISHING PORTS AND MARKETS, p. 41)	25
8. Distribution diagram	26
9. Encrusted rock, Vancouver, British Columbia	28
10. Alvar Aalto, Malm, Main plan with funeral chapels, (Fleig, ALVAR AALTO, p. 162)	31
11. Les Halles Centrales, Paris: Section (Hennig-Schefold, TRANSPARENZ UND MASSE, p. 149)	32
12. Japanese domestic form: Gokonosho (Kenchiku-Bunka, No. 9/1969)	33
13. Photograph of Model, Overhead view	34
14. Photograph of Model, Harbor view	35
15. Photograph of Model, Closeup of Auction.	36
16. Drawing 1: Site Plan and Growth Projections	37
17. Drawing 2: Plan at +6 Feet	38
18. Drawing 3: Plan at +20 Feet	39
19. Drawing 4: Section A-A, through Auction	40
20. Drawing 5: Section B-B, through Fish Processing	41
21. Drawing 6: Section C-C, longitudinal	42
22. Drawing 7: Details, Steel Framework.	43

INTRODUCTION

The design of a built framework for the Gloucester Community Fish Pier, as shown in drawings and model form, is the end product of this thesis. The physical framework, if it has been well designed, will be immediately useful, given present-time activities, without the dimensions of past or future. However, I am including some general discussions of a number of related issues in an effort to clarify the process of creating that physical structure and to allude to some of the specific well-tested references from which I drew.

It is important to establish that a guiding motivation in this project is an interest in working on a use-form which seems very worthy of attention but has not been traditionally considered by architects. People spend one third to one half of their lives at work yet little conscious thought/attention/care is given to this environment.

I also saw a number of formal reasons for considering the work environment an untapped but fertile territory. The vernacular tradition--from barns to grain silos to stone crushers--is rich with forms which are landmarks in the built landscape. The functional demand of work architecture allows it a sculptural quality which is to my mind rarely if ever justified in purely residentially-generated use forms. Moreover, assuming that a prerequisite of good architecture is its ability to be useful, then the stringently functional requirements of a working/production process are a good lesson in

creating responsive physical form.

The architecture of the workplace embodies the cultural values of a given society in a particularly transparent manner. In other societies/civilizations where life-giving activities are not as alienated, the differences in the built landscape between workplace and home are not abrupt and both use-forms are in direct and positive association with nature. In examining modern Western cultures, we need to look at specific "monuments" for statements of operating culture values. A current example of positive explorations of workplace architecture is Hertzberger's office building in Apeldoorn which he said he hoped would "contribute to the reconciliation of work and house, of public and private, of building and street".¹ On the other hand, Romaldo Guirguolo has recently designed prototypes for the Olivetti Company which are meant to be "read" as an image-able consumer package which can be plugged into any site, the flatter the better.

In an effort to establish the broader context for the architecture of this thesis, I have included three discussions on 1) economic and social issues, 2) the specific case study of a community workplace, and 3) the planning and design process.

¹Herman Hertzberger, in Architecture Plus, Sept./Oct., 1974

I. ECONOMIC & SOCIAL ISSUES:
The Theoretical Framework.

The process of designing a workplace involves substantive issues of political organization and social structure, and also raises questions of energy use and technology. It is as important to be aware of the values with which the architect designs as it is to understand how to use the tee square and triangle. Good values do not necessarily make good design, but they are a prerequisite. Small Is Beautiful, by E. F. Schummaker, and Labor and Monopoly Capital, by Harry Breverman, are two references from which I will draw to establish the theoretical context or value framework which supports the built place.

A. Structures for People

The way in which a society is organized to get its work done profoundly influences the people who are involved. The principle thesis of Small Is Beautiful: Economics As If People Mattered, is that the science of economics has been given too much importance in people's lives, and moreover, that in countries where economics and advanced technologies are dominant, giantism is rampant. To Schummaker, the social and economic order needs to be reorganized:

We need the freedom of lots and lots of small, autonomous units, and at the same time, the orderliness of large scale, possibly global, unity and coordination. When it comes to action, we obviously need small units, because action is a highly personalized affair, and one cannot be in touch with more than a very limited number of persons at any one time. But when it comes to the world of ideas, to principles or to ethics, to the indivisibility of peace and also of ecology, we need to recognize the unity of mankind and base our actions upon this recognition...What I wish to emphasize

is the duality of the human requirement when it comes to the question of size: there is no single answer. For his (her) purposes man (people) needs many different structures, both small ones and large ones, some exclusive and some comprehensive.²

What is necessary is a political/economic/social structure which responds to human-scale requirements, which implies that it be built up of small community groups which add together in ways that enable them to benefit from large-scale transportation and communication. Thus there needs to be the range of sizes from small to large, depending on the activity, but based on the fact that people need comprehensible groups to work within, and the fact that as humans we're all dependent upon and must work within the bounds of nature.

If the economic order is to be responsive to people, another important manner other than scale which is presently deficient is its treatment of certain earmarked people, i.e. women and minorities. When discussing freedom and order, it is important to clarify that the benefits are meant to be applied to all people. Again, the working world expresses the dominant social order very clearly: in terms of average earnings, the range from high to low is: white men, black men, white women, black women. Recently women have been entering the work force at a higher rate.³ It is interesting to note that this improvement in economic position can be corollated with the period of political activism of the late 1960s which was organized according to principals discussed by Schummaker. Women got together in small groups, and from those groups worked on breaking down sexism in situations ranging from very immediate, e.g. housework, to national conditions, e.g. abortion rights. One spokesperson of the movement

²E. F. Schummaker, Small Is Beautiful.

³H. Breverman, Labor and Monopoly Capital.

repeats Schummaker's call for living within the dual nature of things, and speaks for the humanizing influence which the increased role of women might bring:

...The either/or dichotomy is inherently, classically patriarchal. It is that puerile insistence on compartmentalization (art vs. science, intelligence vs. passion, etc.) that I abhor. We needn't settle for such impoverished choices. Reason without emotion is fascistic; emotion without reason is sentimental (and therefore also fascistic). Science and art budded from the same stem--the alchemist poets, the Wiccan herbalists, the Minaon and Druidic astrologer--mystics and mathematician-musicians. The integration of such crafts was assumed we now know, in the early matriarchal cultures, but the love of excellence, a devotion to skill, a thirst for wisdom, and a sense of humor are still great unifiers, capable of overcoming the current binary pigeonholing of people, ideas, vocations.⁴

In suggesting new social/political/or economic structures, Schummaker's book does not get very specific. What will be necessary is the reestablishment of community or regionally-based organization/structures/institutions. The idea of "community" means a group of people, bonded by common landscape, working within and benefitting from that landscape. It implies a degree of shared responsibility to a group of people and a set of natural resources. Even though the fact that a group of people inhabit a given region means that they share something, the existing economic structure inhibits identification with and commitment to that specific landscape. As fossil fuel and energy in general become more limited, people will probably return to a greater degree of dependency on the land. In most European countries this means a closer, more symbiotic relationship with the landscape. According to a critique which shares the viewpoint of Small Is Beautiful:

⁴Robin Morgan, "Rights of Passage", Ms. Magazine, September, 1975 p. 100.

We have become so dependent on massive resource use that most Americans cannot conceive of operating on a smaller scale of consumption, although such technologically-advanced countries as New Zealand, Switzerland, Japan and France operate quite well on about one third the energy per person that we use.⁵

B. Tools for a Human Environment

If it is assumed that people and nature take precedence, the theory which deals with economics from the point of view of people will be most useful. It is my assumption that people are very fundamentally affected by the way in which they maintain themselves economically. Labor and Monopoly Capital is a reference which shares this assumption, and attempts to describe and analyse the role of the people who are workers in modern American industry.

Given the capitalist structure of the economy of this country, Breverman sees modern industry and work as a function of the capitalists to expand their capital; since the profit motive is given highest priority,

labor power has become a commodity. Its uses are no longer organized according to the needs and desires of those who sell it, but rather according to the needs of the purchasers, who are, primarily, employers seeking to expand the value of their capital. And it is the special and permanent interest of these purchasers to cheapen this commodity.⁶

Of immediate importance in assessing work processes and their degree of alienation or meaningfulness is the relationship of the worker to the tools of production. In terms of the

⁵"Sharing Smaller Pies", New Age Journal, p. 34.

⁶Breverman, op. cit., p. 82.

historical development of technology,

an evolution (occurred) which may be described as an increase in human control over the action of tools. The evolution of machinery represents an expansion of human capacities, an increase of human control over the environment through the ability to elicit from instruments of production an increasing range and exactitude of response. But it is in the nature of machinery, and a corollary of technical development, that the control over the machine need no longer be vested in its immediate operator. This possibility is seized upon by the capitalist mode of production and utilized to the fullest extent.⁷

It is this loss of control and hence responsibility which creates the meaninglessness of so many jobs. Thus, any system then which simply asserts increases in productivity at whatever the human cost must be criticized. It is Breverman's hypothesis that the unlimited growth attitude is a function of a profit-seeking structure. Schummaker, on the other hand, asserts that it is technology itself which pulls us behind its own insatiable expansion:

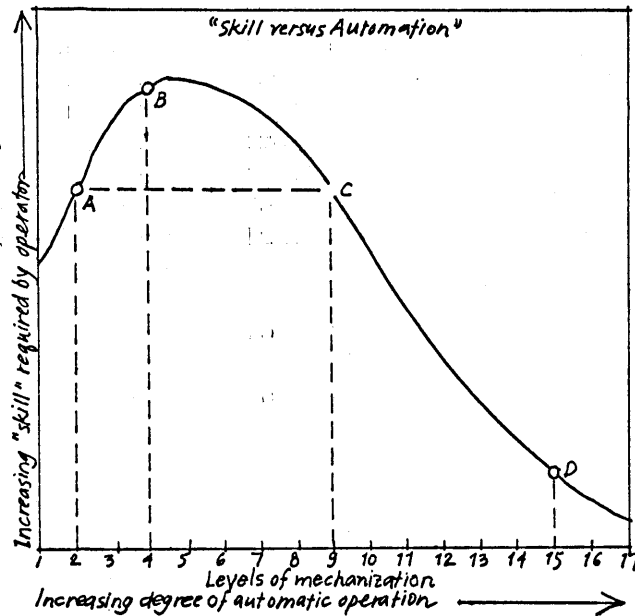
Technology, although of course the product of man, tends to develop by its own laws and principles, and these are very different from human nature or living nature in general. Nature always, so to speak, knows where and when to stop...and tends to be self-balancing, self-adjusting, self-cleansing. Not so with technology.⁸

Breverman points out a key characteristic of technology. He quotes a study by Bright at Harvard Business School which shows that when production is mechanized to an advanced extent, the human skill requirements are diminished:

⁷Breverman, op. cit.

⁸Breverman, op. cit., P. 146

Why Advances in Automation Can Have
Contrary Effects on Skill Requirements



At the business level, this implies that what seems bigger and better technically should not necessarily be sought if work is to maintain any challenge and meaningfulness. On the larger scale, Breverman asserts that the replacement of people by machines is leading to an increase in the percentage of people in the service sector of the economy, i.e. people who are not directly productive. Without restating his lengthy analysis, suffice it to say that the average pay for the service worker is going down, thus indicating that machines do not always truly upgrade our standard of living; more selectivity in their application is in order.

II. THE GLOUCESTER FISH PIER:
A Case Study in Community Architecture

I have chosen as a case study of work environments a program for a community fishery facility with public uses, to be sited on the Gloucester inner harbor. One operating assumption of this thesis is that the economy will become more and more decentralized. For this reason I have focussed on an industry which is primary, and a city which is far enough away from Boston to have and need an economic life of its own.

I have to some extent worked with actual clients: the Gloucester Community Fish Pier, Inc., the Overall Economic Development Commission of Cape Ann, and a loose-knit group of environmentally-active citizens. The Community Fish Pier, Inc. is the non-profit governing body of the State Fish Pier, now dedicated to supporting the fishing industry, which means primarily providing docking berths for medium and small fishing boat owners and the services of ice and fuel which they need to operate their businesses. To expand the existing facilities, the Fish Pier has collaborated with the Overall Economic Development Commission of Cape Ann, a federally-funded regional agency, and submitted a proposal to the Commerce Department for Economic Development Act funds. The following space needs program was taken from that proposal:

Cold (Freezer) Storage	20,000 sq. ft.
Fish Processing	5,000 " "
Coop Dealer	5,000 " "
Coop Supplier	5,000 " "
Auction	2,500 " "
Retail Market	2,000 " "

Fish Restaurant	2,000 sq. ft.
Mech	2,000 " "
Flash Freezer	2,500 " "
Plate Freezer	2,500 " "
Ice Making	<u>2,500</u> " "

TOTAL 51,000 sq. ft.

The proposed new buildings constitute a support facility for the small and medium-sized boat owners of Gloucester and can be considered a "structure for people", as described in the previous discussion. The boats are small businesses, owned and operated by local residents, fishing on one to seven day trips in nearby waters. Currently, the "giantism" of the international economic structure is catching these small operators in a "cost-price squeeze" which is increasingly forcing them out of business, as the frozen fish industry takes over the national market and bigger boats deplete the fish supply. It seems quite likely that there is room for a range of fish operations, from the mega-scale factory boats and 2,000,000 cubic foot frozen fish storage facilities, to the small independent operator who sells his/her fresh fish to local markets. This fresh fish market has not been fully developed, and will probably be enlarged when the local fish supply increases (due to the passage of the 200-mile limit) and considerations of energy and nutritional value foster a return to more regional resources. The formation of a fishers' cooperative and auction are exactly the type of organizations which are formed from the bottom up; they develop out of the need to improve the base price paid for the fish "crops" and the need to procure gear and materials at lower cost.⁹ The desirability of a Fisheries Cooperative has been well documented

⁹Marcus, Henry S. et al., Using Cooperatives to Aid the New England Fishing Industry, Cambridge; M.I.T. Sea Grant Program, 1974.

as it would achieve economies of scale while maintaining local and individual autonomy.

When designing a specific workplace, the issue of technology can be very difficult to deal with. In regards to the local fishing economy of Gloucester, the vessels, unloading mechanisms, processing equipment, freezing mechanisms, warehousing systems, and transport equipment are all subject to gradations of advanced technology. To participate in decisions regarding which levels of technology would be most appropriate and most human for each operation is beyond the scope of this thesis, and it raises a question regarding the architect's role in the design of the workplace. Although I had serious questions about the sizes and required warehousing efficiencies, for the sake of getting on to the physical form I accepted what seemed to be a reasonable program in this regard. However, it is worth noting that certain aspects of the business remain a craft, such as the skill of filleting fish, as filleting machinery requires too high a level of productivity for the local processors. For this reason, the fish and the people remain in close proximity, and it becomes a question of providing an efficient environment for dealing with the fish, creating places for people wherever possible within that working environment, and keeping the harbor and its activities accessible to the community at large.

III. DESIGN METHODOLOGY

A. Site & Community: Planning Assumptions

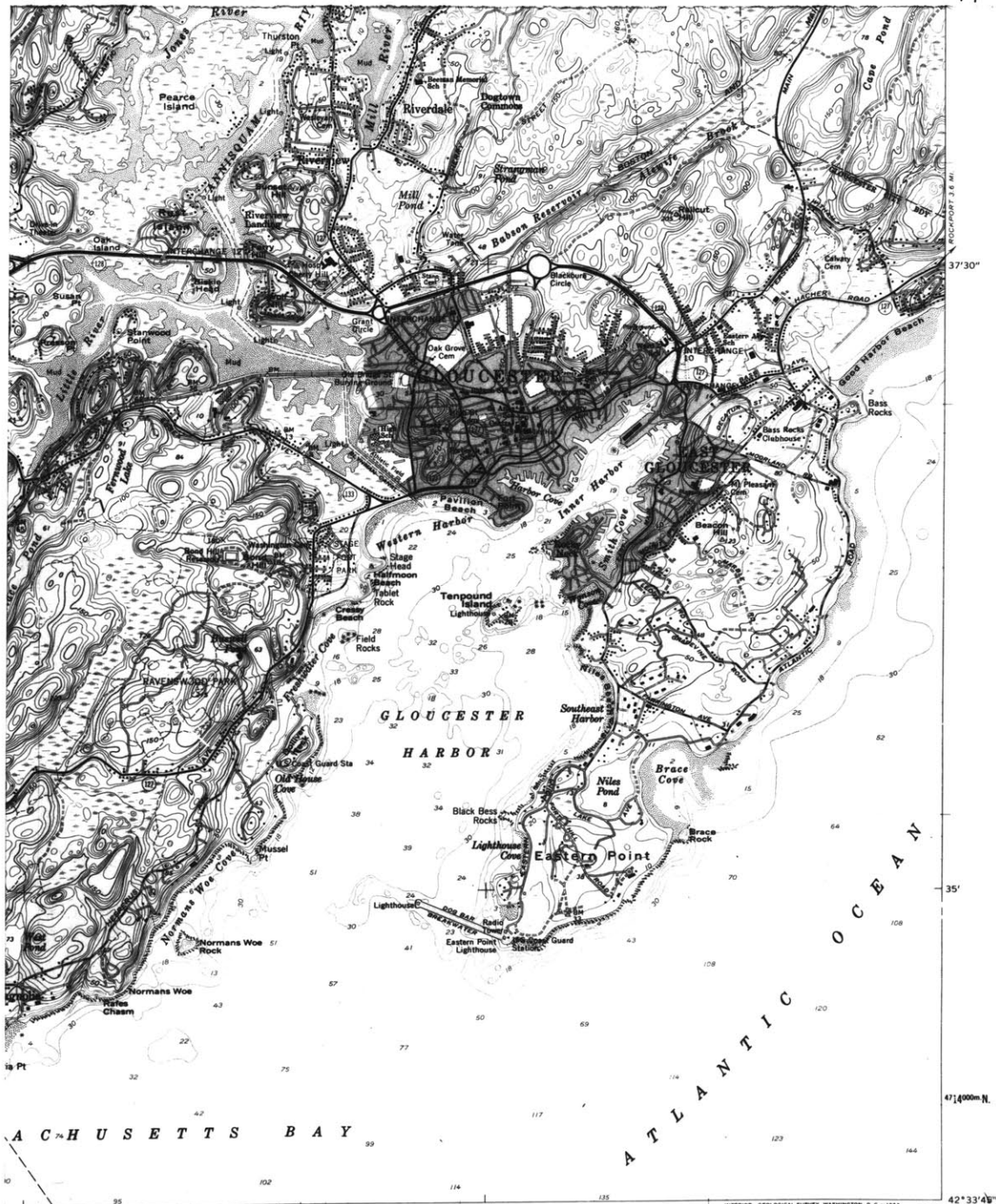
Gloucester is a city of 28,000 located on Cape Ann, approximately one hour north of Boston. The site of the Gloucester Community Fish Pier is at the outer edge of the downtown district of Gloucester, located at the end of Route 128, a major transportation route for the Boston region. The Fish Pier was built with WPA funds by land-filling between Five Pound Island and the mainland. Adjacent to the Fish Pier is a parcel of land assembled by eminent domain by Urban Renewal, referred to as the Second Waterfront Project. Formerly occupied by marginal operations of various sorts, the land has been cleared and remains vacant until a final agreement is reached on the reuse of the valuable territory currently zoned for industrial use. One proposal accepted by the governing city agency but disputed by environmental groups and others, has been to fill in the inner bay and build a privately-owned and operated cold storage facility, restaurant and parking lot. The dotted line on Figure 6 indicates the extent of the proposed fill. It was my assumption that planning for the proposed expansion of the Community Fish Pier and the development of the Urban Renewal land ought to be continuous and reciprocal. However, the political situation in Gloucester is such that both parcels are run by city agencies which have no recognized way of talking to each other.

FIGURE 1

FIGURE 3

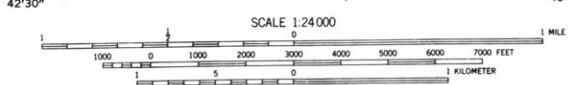
FIGURE 4

FIGURE 6



MASSACHUSETTS BAY

ATLANTIC OCEAN



CONTOUR INTERVAL 10 FEET
 DATUM IS MEAN SEA LEVEL
 DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
 SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
 THE MEAN RANGE OF TIDE IS APPROXIMATELY 8.6 FEET

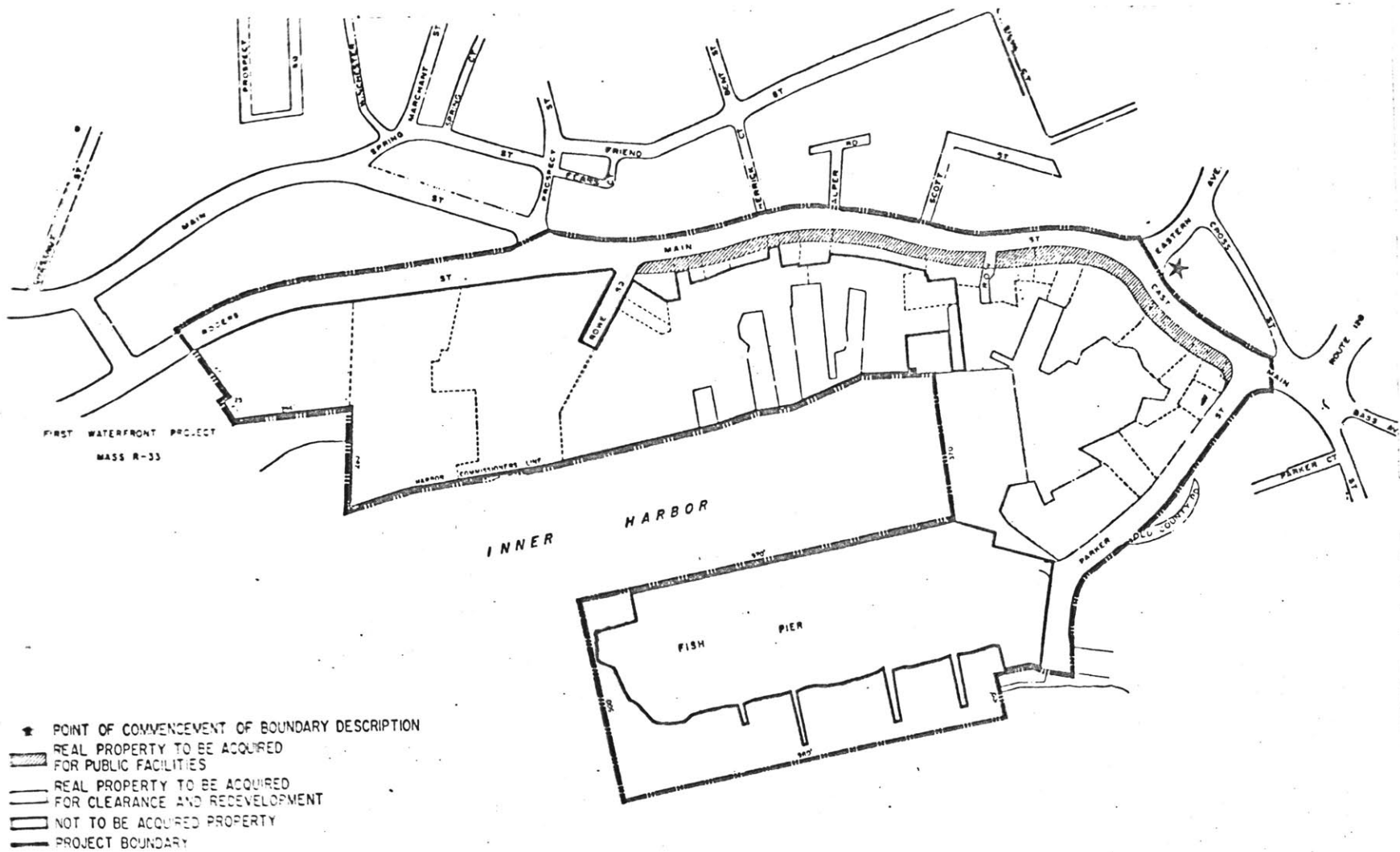
ROAD CLASSIFICATION
 Heavy-duty ——— Light-duty ———
 Medium-duty ——— Unimproved dirt ———
 State Route ○



GLoucester, MASS.
 N4233.75—W7037.5/8X7.5
 1960

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
 FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON 25, D. C.
 A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

FIGURE 1



NOTE: ALL PROPERTIES ARE TO BE ACQUIRED AND REDEVELOPED EXCEPT THOSE SHOWN AS "NOT TO BE ACQUIRED." ALL PROPERTIES WHICH ARE NOT TO BE CLEARED AND REDEVELOPED WILL BE SUBJECT TO RENOVATION.

[Small, illegible text block]

FIGURE 4

PROJECT BOUNDARY & LAND ACQUISITION MAP

CODE NO. R-213 1



SECOND WATERFRONT PROJECT
GLOUCESTER HOUSING AUTHORITY
GLOUCESTER MASSACHUSETTS

PLANNING CONSULTANT: CSM-172 FLETCHER AND ASSOCIATES

APRIL, 1971



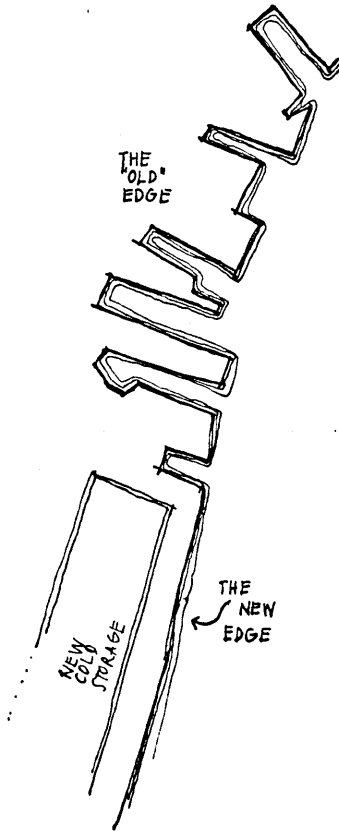
FIGURE 5



FIGURE 6

Bill Lane photo

FIGURE 5



The harbor today, via private corporations and earlier Urban Renewal efforts, is being filled and straightened for faster, more efficient operations. Finger piers are giving way to runway-like docks and the total amount of harbor edge and definition is diminishing. Very large cold storage facilities have been built on the abrupt edge, effectively walling off the harbor from the main street of the city. It has been my assumption from the start that these important and useful forms could be built in such a way as to add to, rather than prohibit, association with the activities at the water's edge.

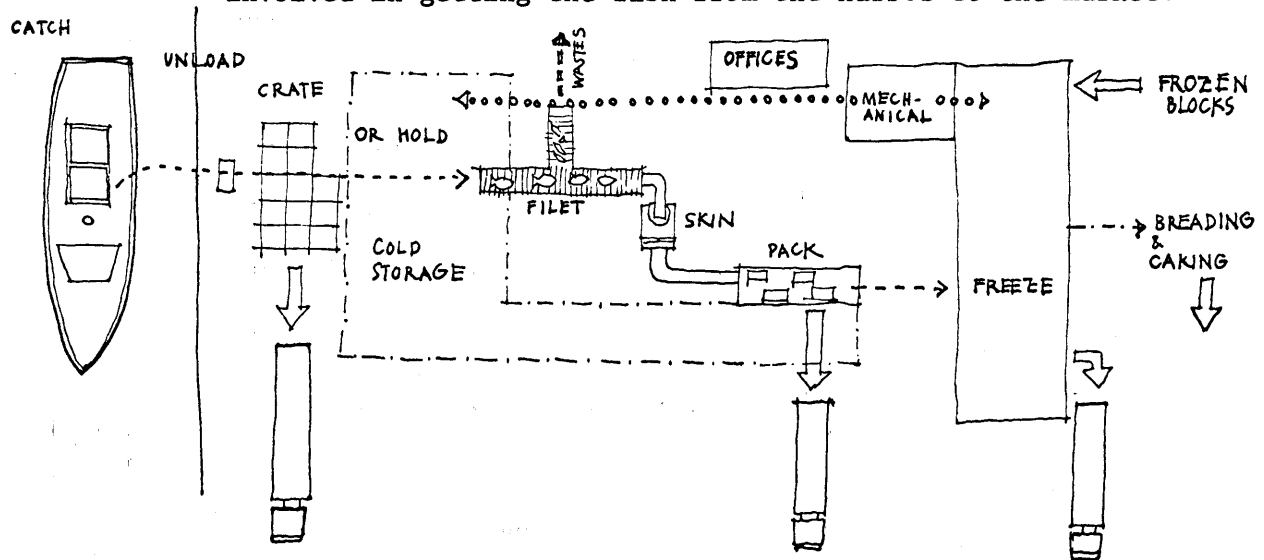
This project assumes the position that the Gloucester Community Fish Pier Inc., as a public-minded agency, ought to be granted an adjacent portion of the Waterfront II site. This would eliminate the possibility of constructing redundant facilities and would guarantee that such facilities would be operated for the benefit of the greatest number of fishing operations. Also, rather than giving up more of the harbor edge, the polluted water could be cleaned up, a job which would be facilitated by the reopening of a stream which used to connect to Good Harbor beach.

FIGURE 3

B. Activities of the Workplace: Programmatic Diagrams

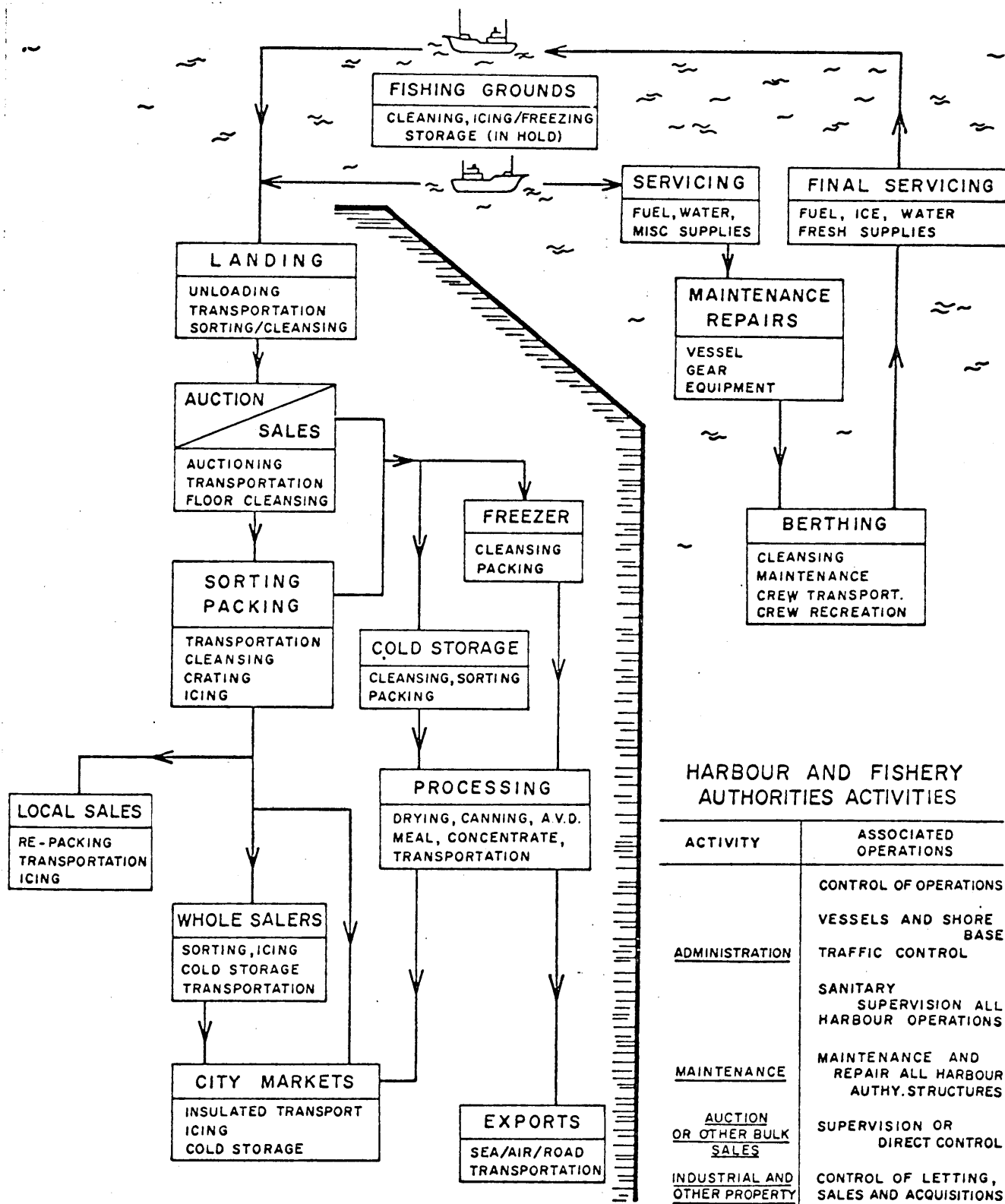
Designing a workplace involves understanding the work process which is to take place within the stated space requirements. The fishing industry is complex: new methods are continually being developed, yet the basic activity remains

an ancient and fundamental livelihood. The richness of the harbor edge is generated from the network shown in Figure 7. A number of first hand visits to fishing facilities in Gloucester, Boston, New Bedford and Martha's Vineyard afforded the following understanding of the work process involved in getting the fish from the harbor to the market:



C. Aspects of the Design Process: Networks.

At the community or urban design scale it was necessary to establish a network--how the goods and the people get in and out--which can transcend time and use (e.g. the streets of Back Bay). This is the public, very active region which is not necessarily built. In residential architecture, this part of the design process simply involves understanding present and projecting future car and pedestrian traffic, with some consideration of service networks. These projections imply a diagram of the range from public to private places. However in an industrial workplace design, the service region is dominant, and in this case rather complicated due to the range



HARBOUR AND FISHERY AUTHORITIES ACTIVITIES

ACTIVITY	ASSOCIATED OPERATIONS
	CONTROL OF OPERATIONS
	VESSELS AND SHORE BASE
<u>ADMINISTRATION</u>	TRAFFIC CONTROL
	SANITARY SUPERVISION ALL HARBOUR OPERATIONS
<u>MAINTENANCE</u>	MAINTENANCE AND REPAIR ALL HARBOUR AUTHY. STRUCTURES
<u>AUCTION OR OTHER BULK SALES</u>	SUPERVISION OR DIRECT CONTROL
<u>INDUSTRIAL AND OTHER PROPERTY</u>	CONTROL OF LETTING, SALES AND ACQUISITIONS
<u>TAXES/DUTIES</u>	COLLECTION ALL DUES
<u>NEW DEVELOPMENT</u>	CONTROL OF INDUSTRIAL GROWTH IN HARBOUR AREA AND RFOCOMMENDATIONS FOR NEW WORKS

KEY:

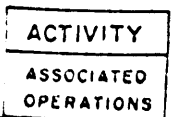


FIGURE 7

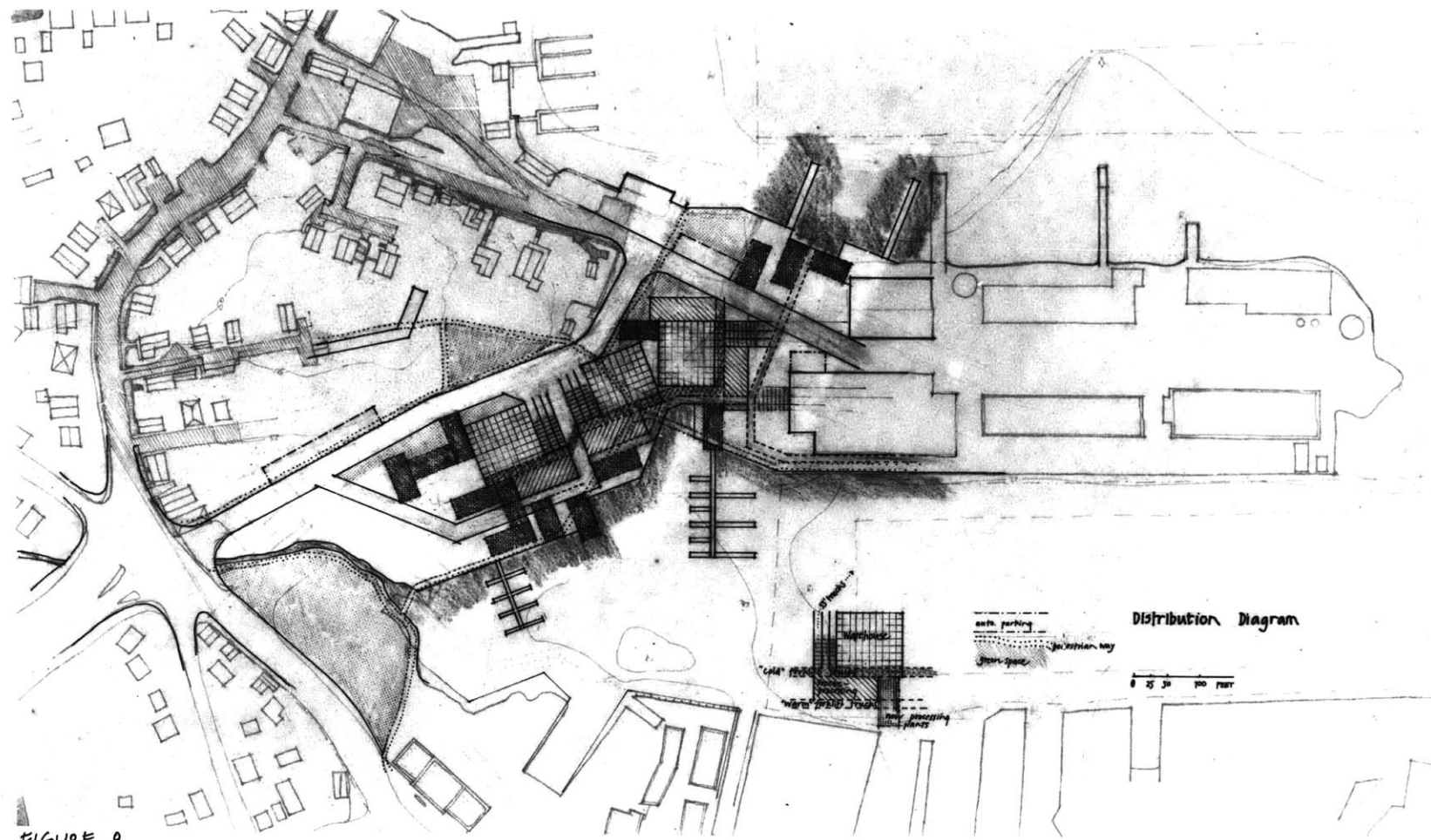


FIGURE 8

of vehicles--boats, automobiles (workers and public), fork-lift trucks and tractor trailers--which are used. One important organizing theme which emerged was the idea that the goods could be kept on and in the ground, and the people, both the workers and the public, associated with a second level at approximately +14 feet. Figure 8 shows the 100th scale distribution network, which incorporates the planning assumptions described earlier. Of note is the green areas which would guarantee the visual access of the harbor to the community.

Formal References.

A second order of the design process was to research visual images of forms and places appropriate to the design project. This step involved putting together a collection of visual references from natural forms, existing industrial forms, vernacular harbor architecture with comparable geography, and workplace architecture by architects whose work is exemplary. A few of those references most important from the beginning were: the universal harbor encrustation of large, dense forms (rocks, piers) by (starfish, lichen, mussels) lighter forms; the harbor edges in cities like Dubrovnik and Amsterdam where industrial and public uses are mixed and compatible, and the heavy walled forms become very habitable; Aalto's Sawmill at Sunila; and Hertzberger's Linmij Laundry in Amsterdam. The use of formal references is, of course, continuous throughout the design process.

FIGURE 9

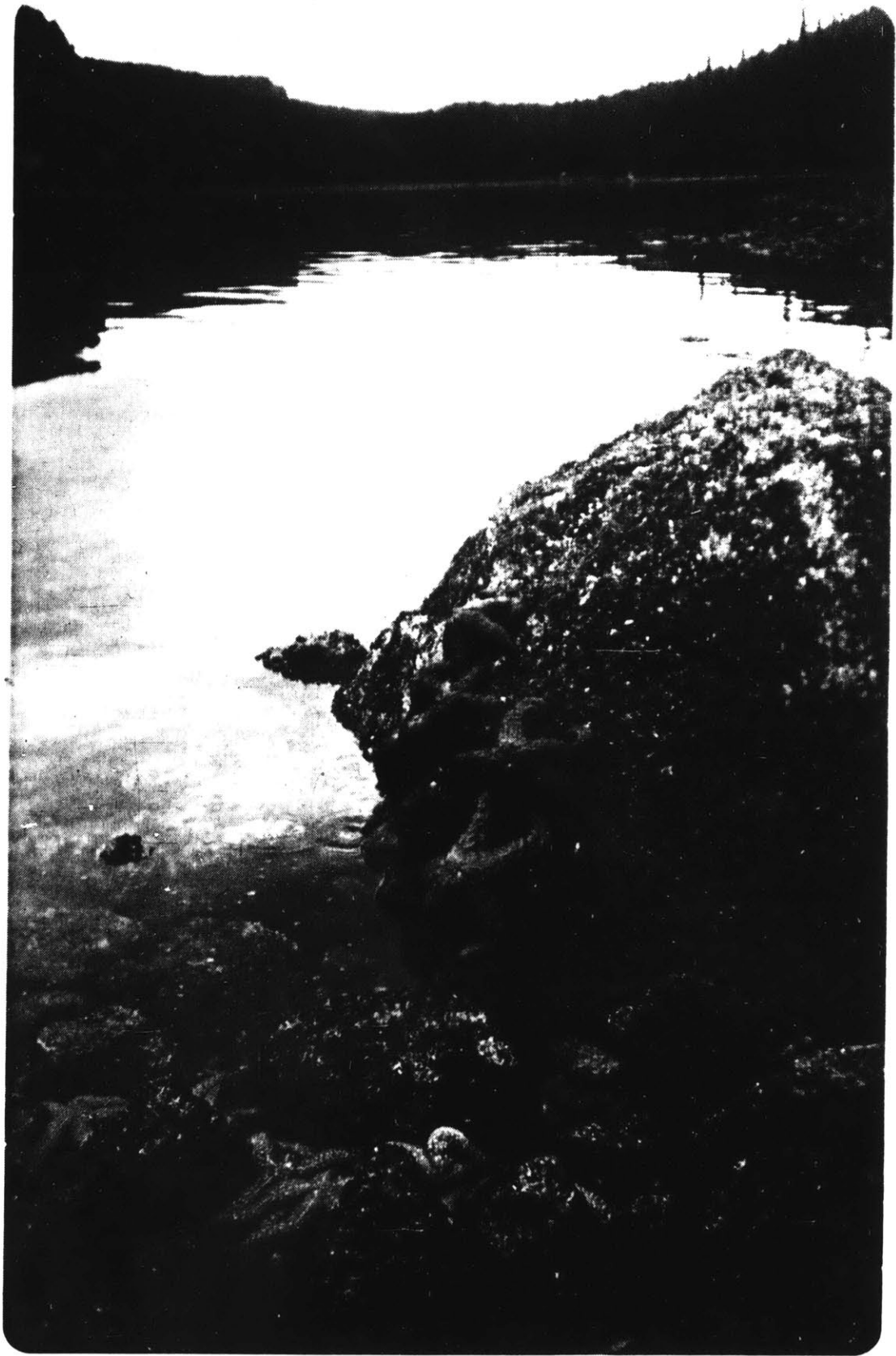
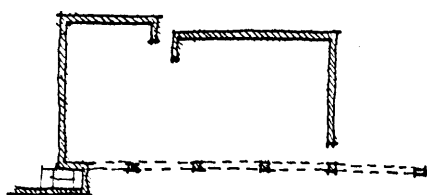
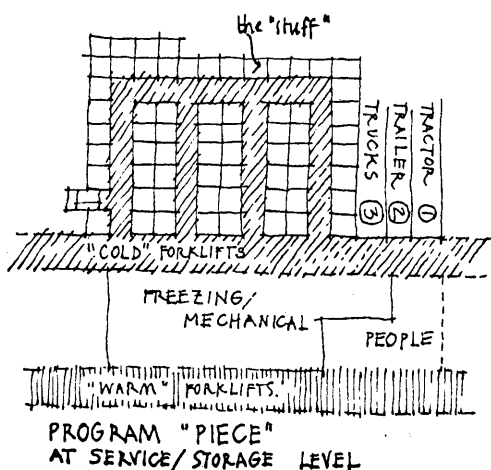


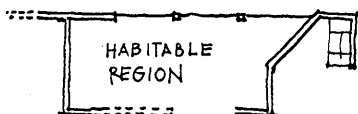
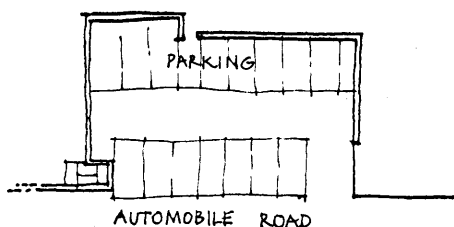
FIGURE 9

The Built Ground.

A vocabulary of built form was established by choosing an appropriate structural and building system, and then working with the families of form chosen, in this case primarily ground form with a steel framework. The industrial scale definitely influenced these considerations. A concrete bay which was fairly wide was selected to work together with a heavy, well-insulated concrete wall. In this design problem, the warehousing function lent itself to be treated as a piece, or a rock: the processing and other activities would encrust onto these heavy forms and the horizontal surface could be used for parking. The repeatable piece was then arranged on the landscape as in Figure 8. The actual physical definition of the piece was established at 40th scale, making modifications according to local conditions in the network and the need to establish the "rocks" at different levels. Also at work here was the use of Aalto as a reference, specifically his chapel design at Malm.



THE BUILT PROTOTYPE (THE "ROCK")



"PIECE" AT PARKING/PEDESTRIAN LEVEL

FIGURE 10

The Framework.

The design of the steel framework brought to focus the human requirements and hence became primarily a 20th scale decision problem. At this

FIGURE 11

point the references used were les Halles in Paris, chosen for its changeable, large-scale quality which seemed especially suitable for the auction-place. The form of the secondary reference level above the working level seemed to be akin to the pedestrian distribution in traditional domestic Japanese architecture, with also an obvious reference to other sea-side boardwalks. The framework itself, with its linear nature and directional bay, was the most powerful form generator when dealt with directly in model form. The design of the closure of the framework is most well defined by the use of the metal roofing. The degree of closure, ranging from simply covered sheds to very finished offices, would be generated by the specific inhabitants. Drawing 4 suggests such closure, consisting of unit masonry, metal casement and fixed sash, glass block, and exterior panels.

FIGURE 12

point the references used were les Halles in Paris, chosen for its changeable, large-scale quality which seemed especially suitable for the auction-place. The form of the secondary reference level above the working level seemed to be akin to the pedestrian distribution in traditional domestic Japanese architecture, with also an obvious reference to other sea-side boardwalks. The framework itself, with its linear nature and directional bay, was the most powerful form generator when dealt with directly in model form. The design of the closure of the framework is most well defined by the use of the metal roofing. The degree of closure, ranging from simply covered sheds to very finished offices, would be generated by the specific inhabitants. Drawing 4 suggests such closure, consisting of unit masonry, metal casement and fixed sash, glass block, and exterior panels.

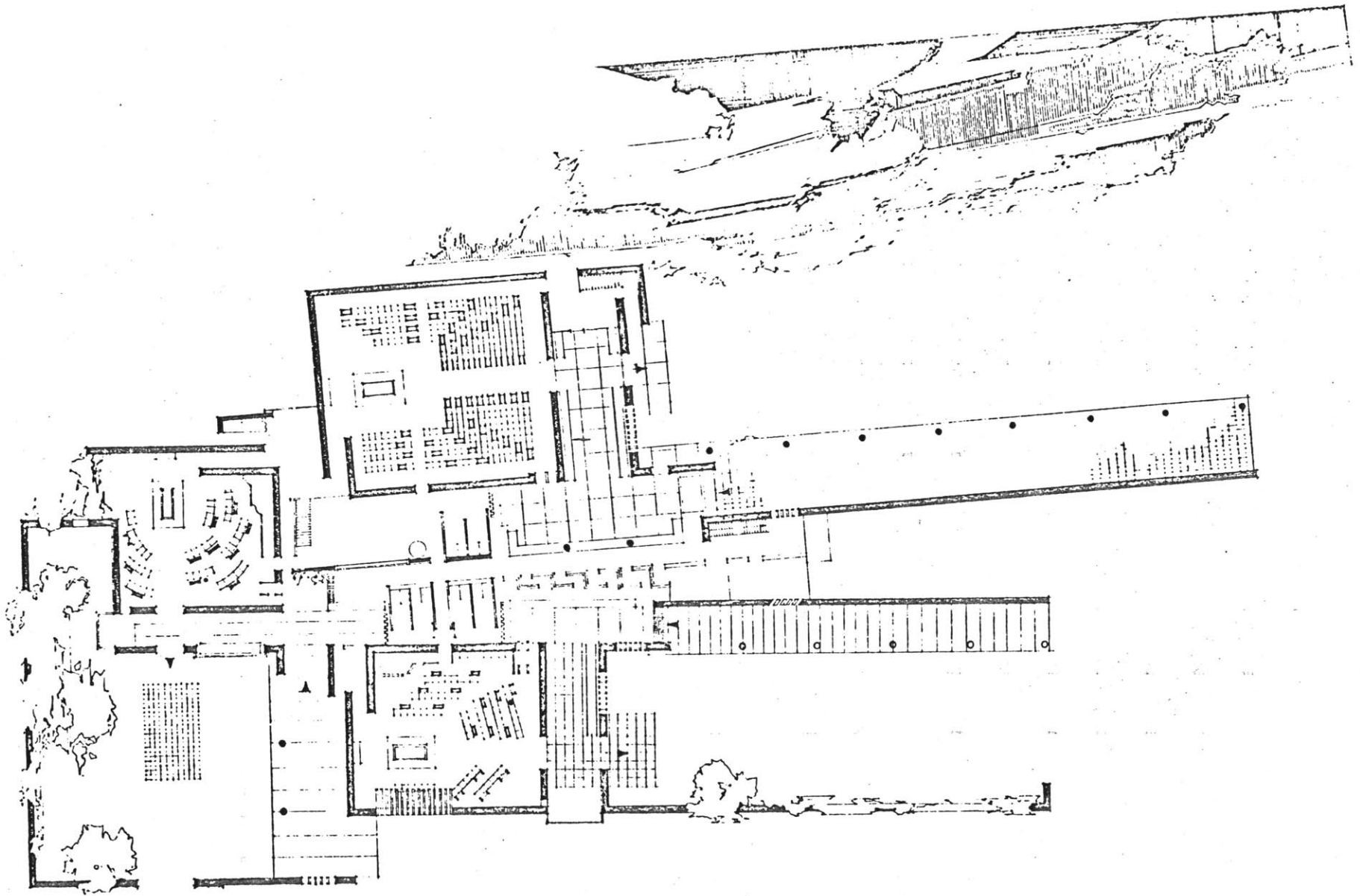


FIGURE 10

Les Halles Centrales, Paris 1851-59, Architekten: V. Baltard und F. E. Callet (zu Abb. 47-49), Schnitt durch einen Pavillon und Verbindungsstraße M. 1 : 200 (Quelle: Baltard, Monographie des Halles Centrales)

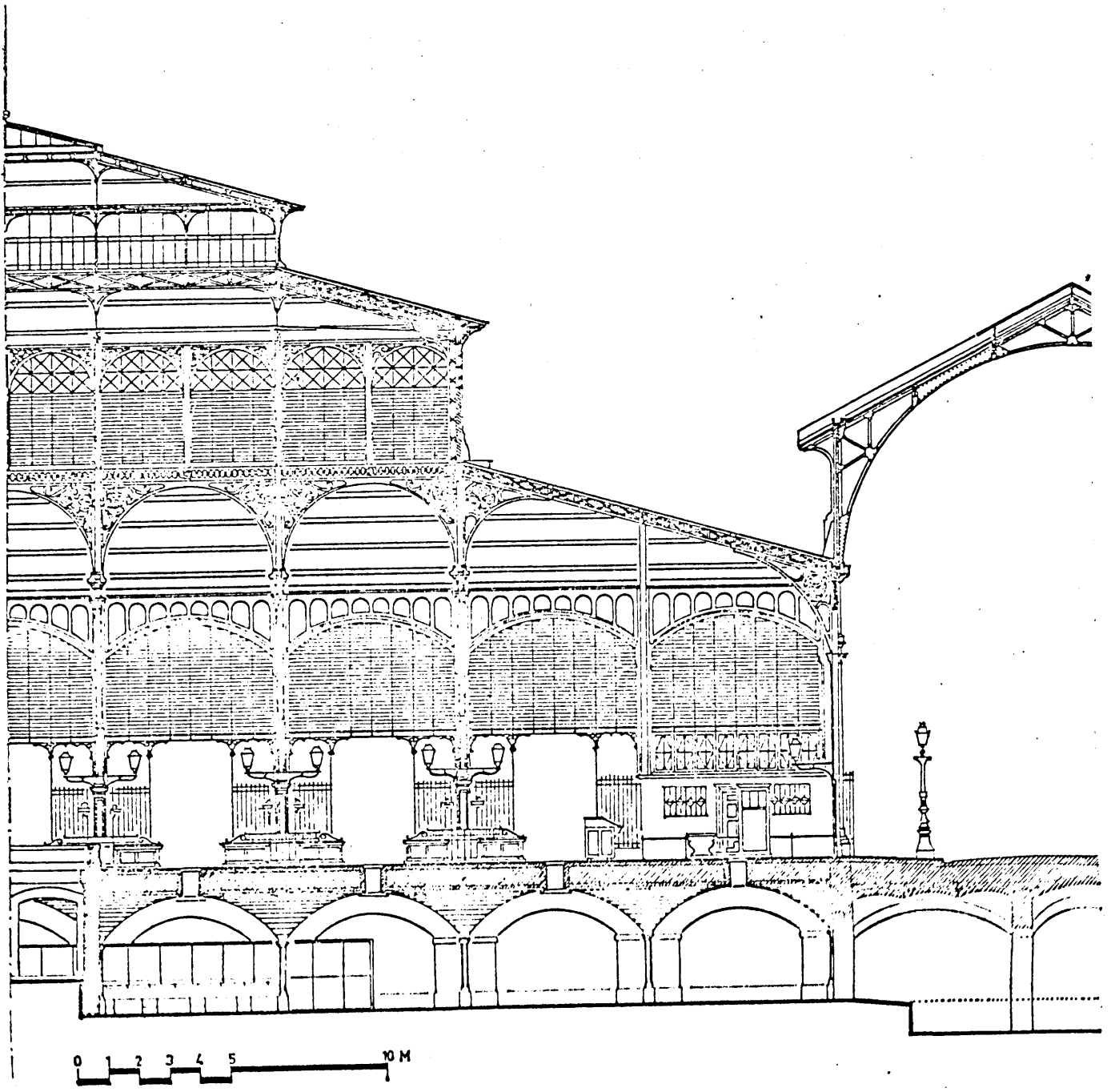


FIGURE 17

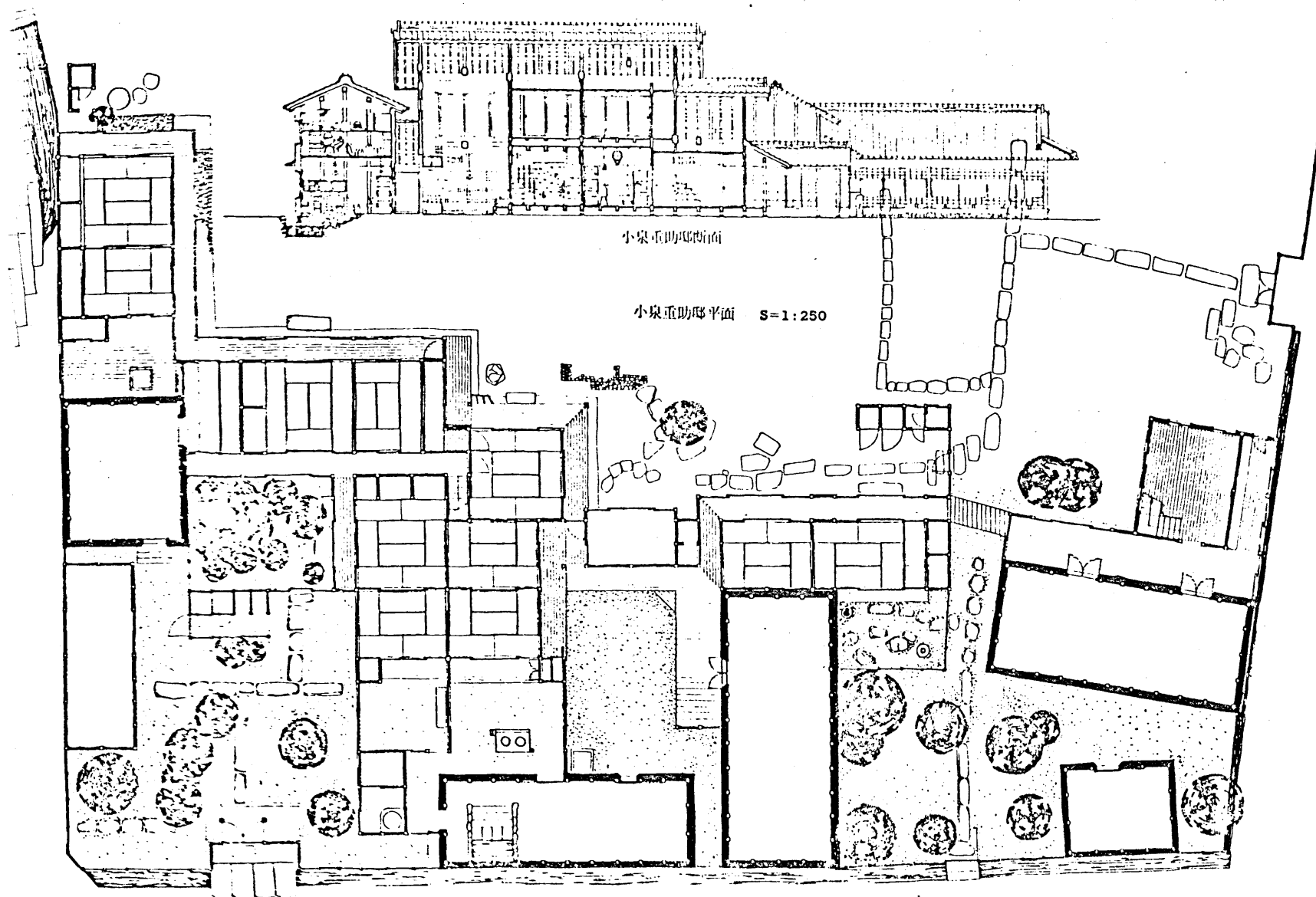


FIGURE 12

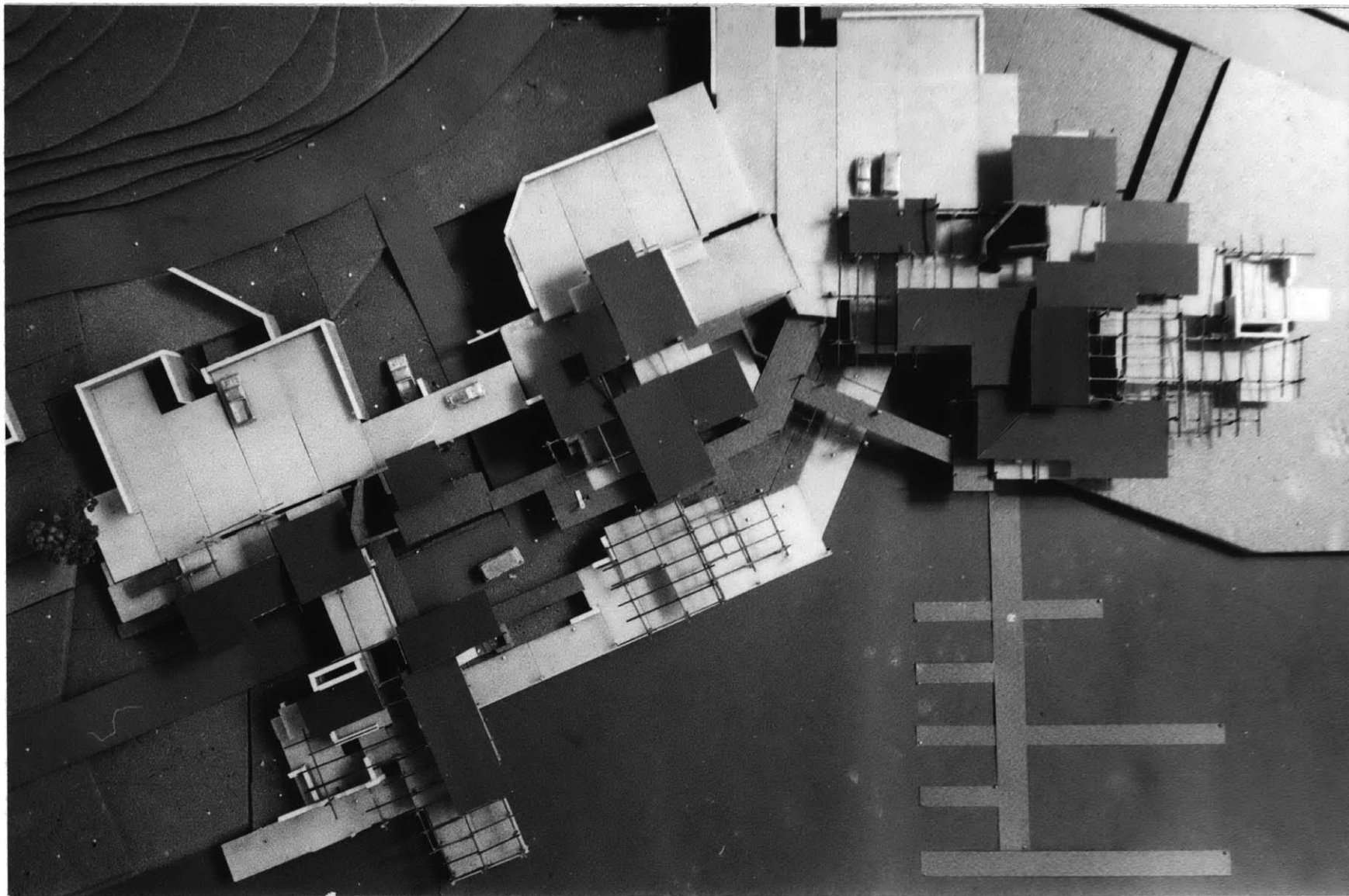


FIGURE 13

ORIGINAL MODEL at 1"=20'

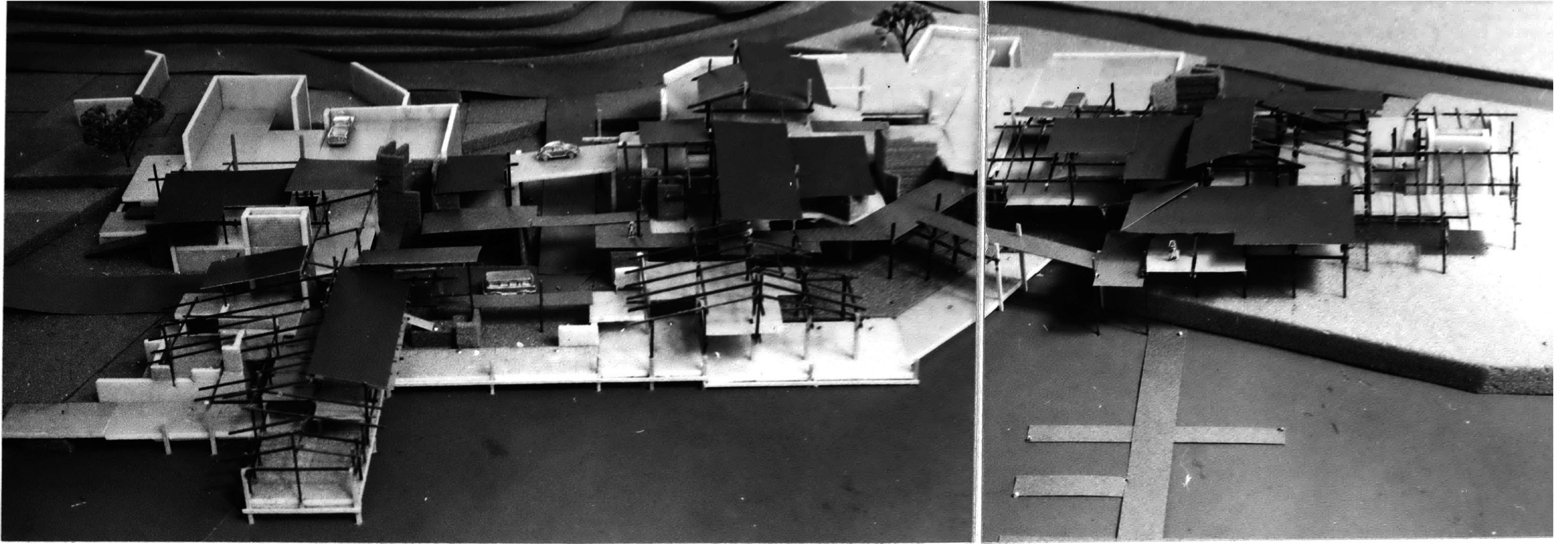


FIGURE 14

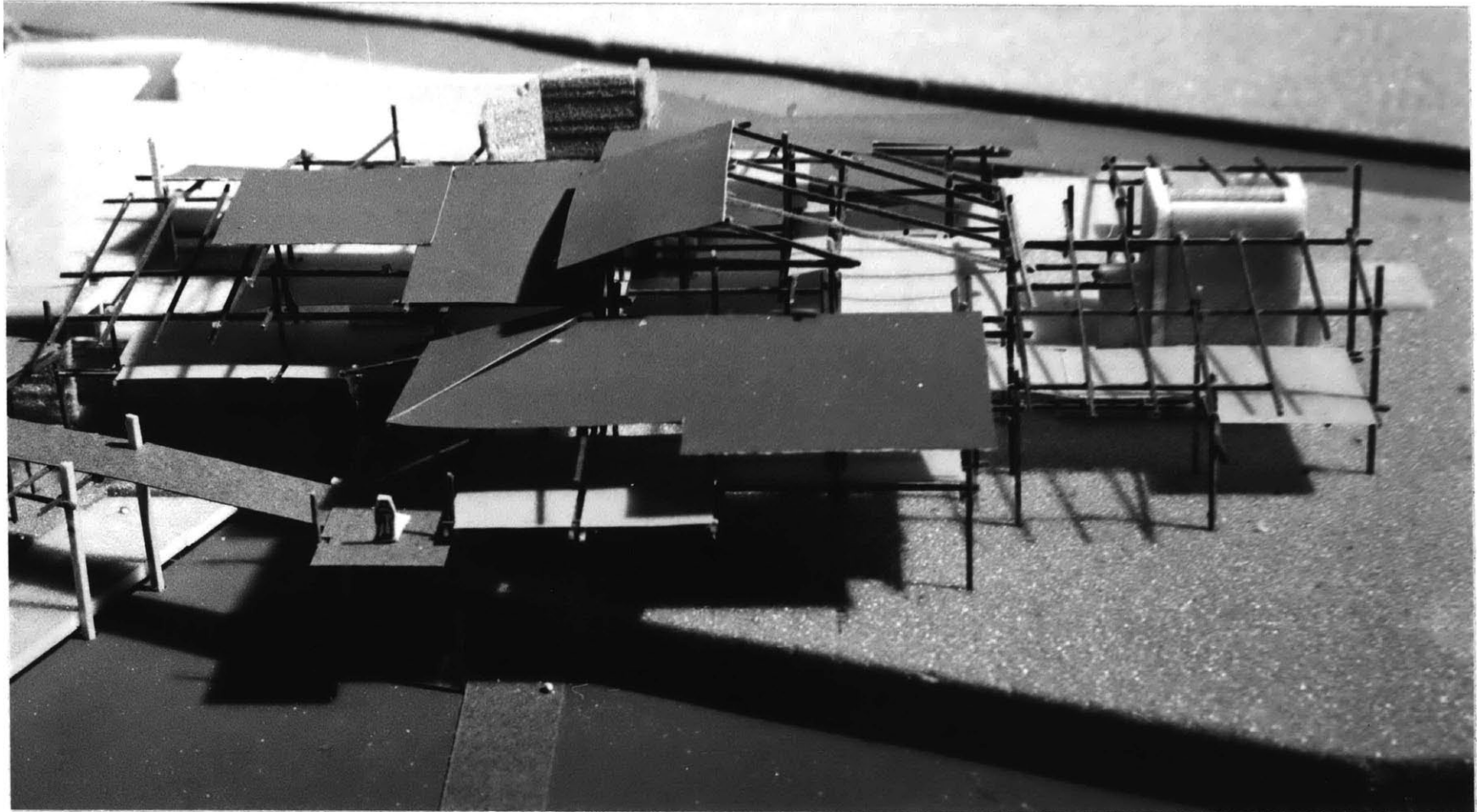


FIGURE 15

DESIGN FOR
INDUSTRIAL
USE,
GLOUCESTER
HARBOR



1
SITE
PLAN
& GROWTH
PROJECTION

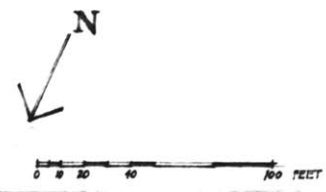


FIGURE 16

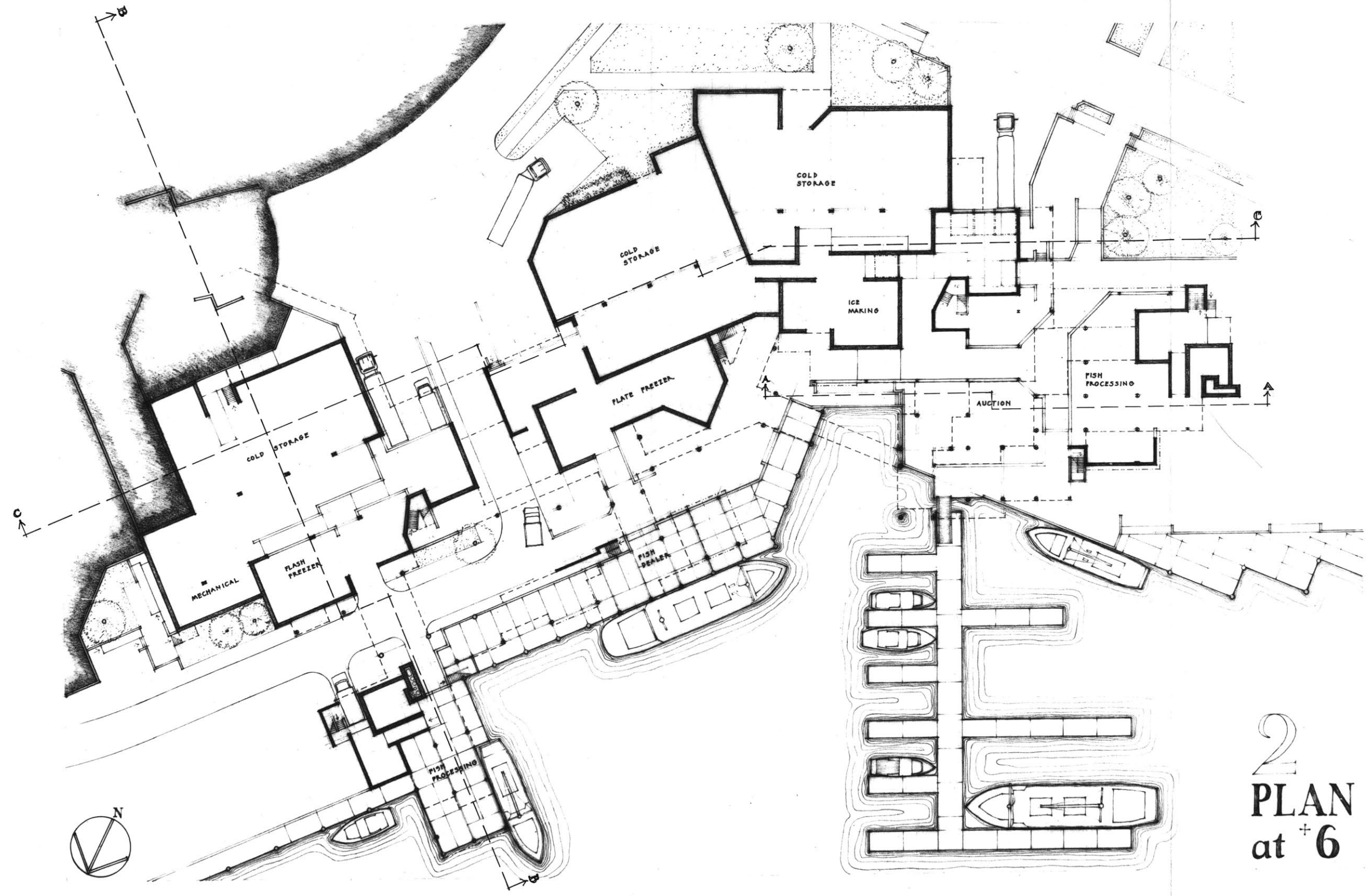


FIGURE 17

2
PLAN
at +6

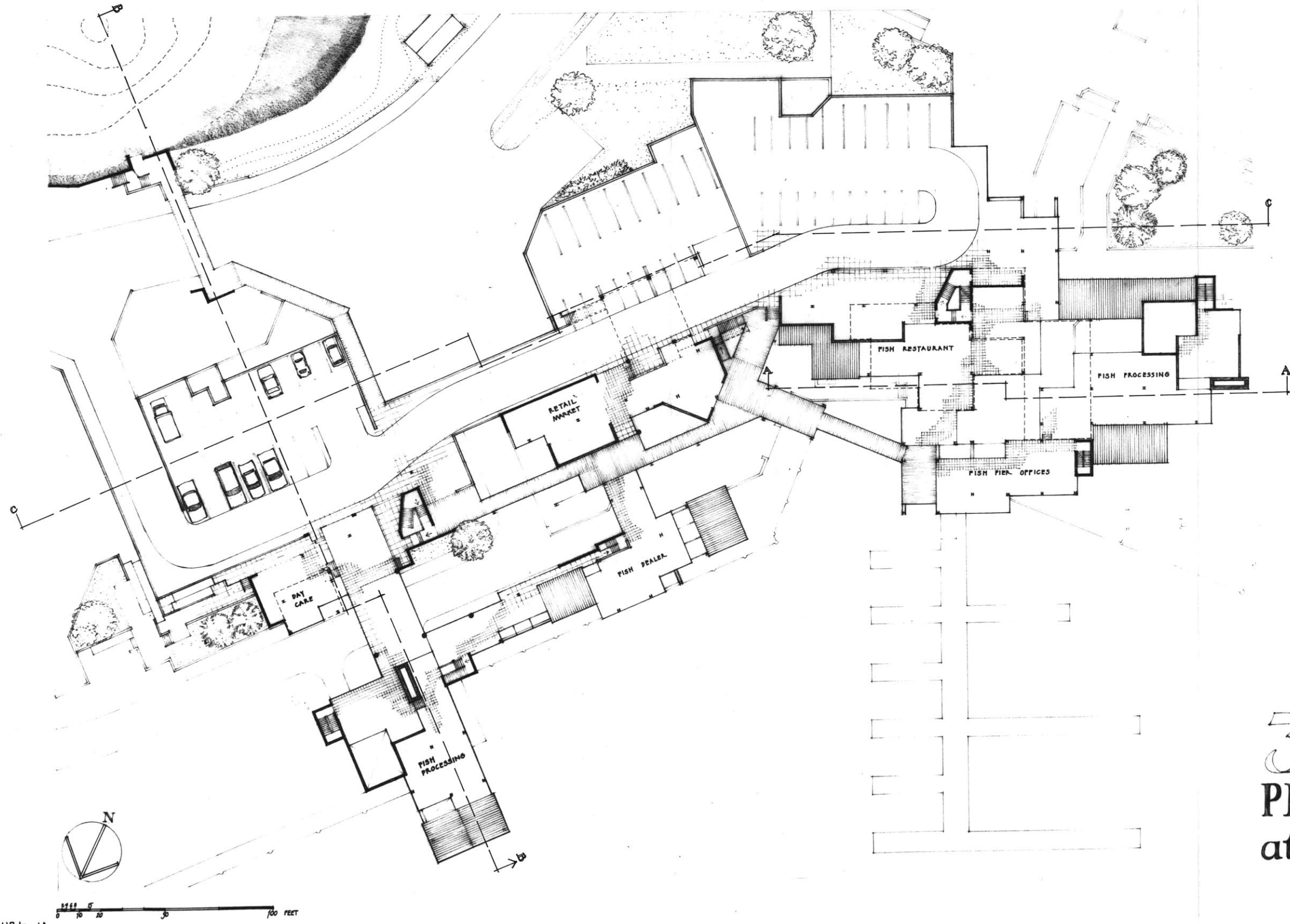
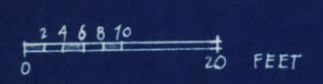
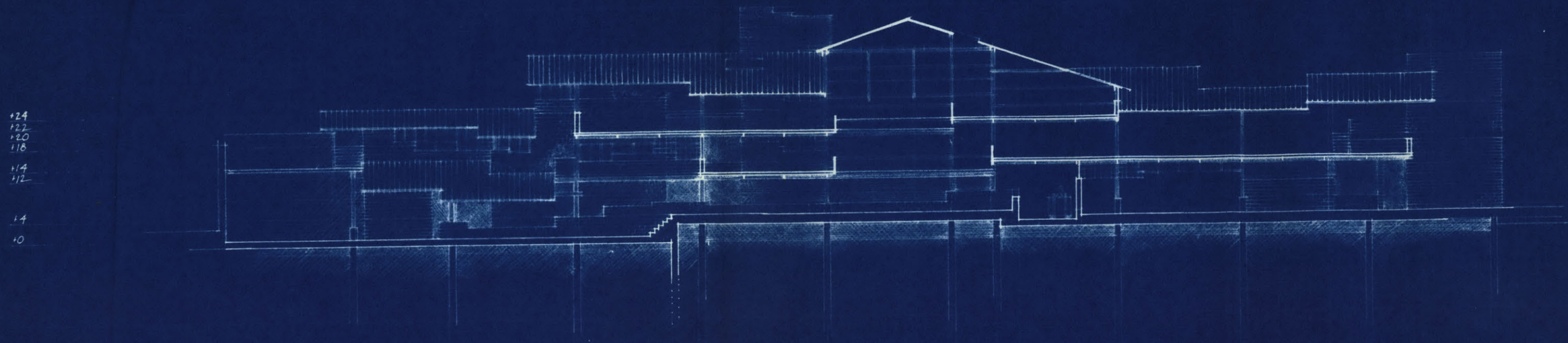


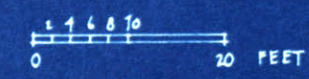
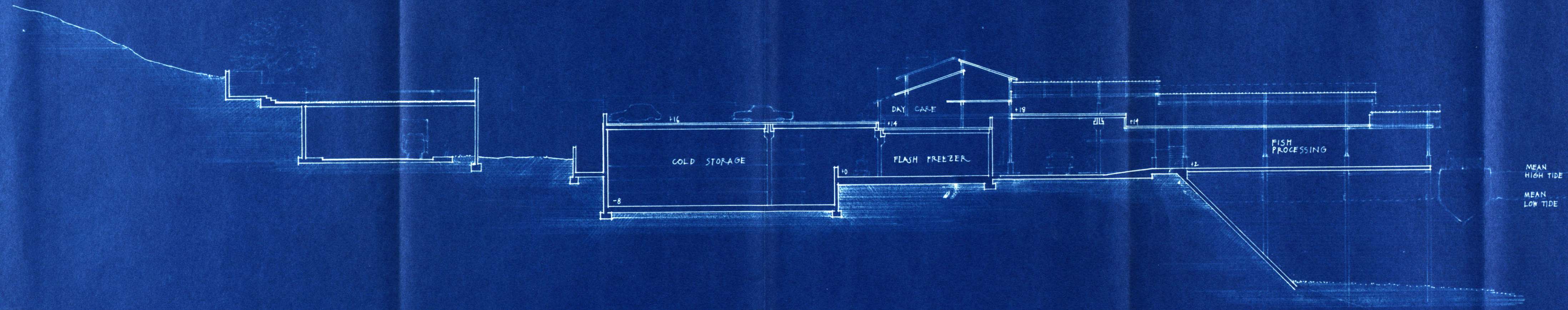
FIGURE 18

3
PLAN
at +20



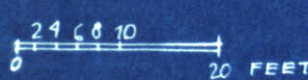
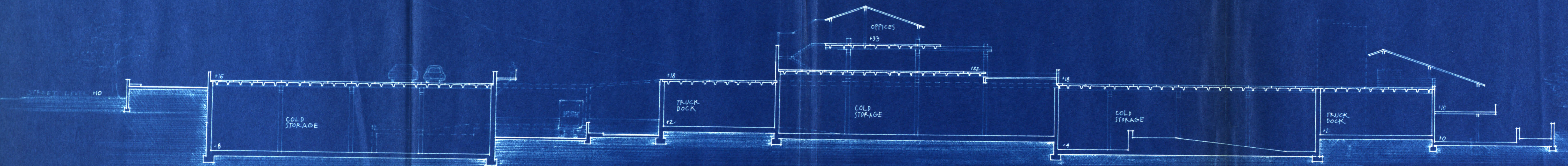
A
SECTION
A-A
through AUCTION

FIGURE 19



5
SECTION
B-B

FIGURE 20



6
SECTION
C-C

DATE 21

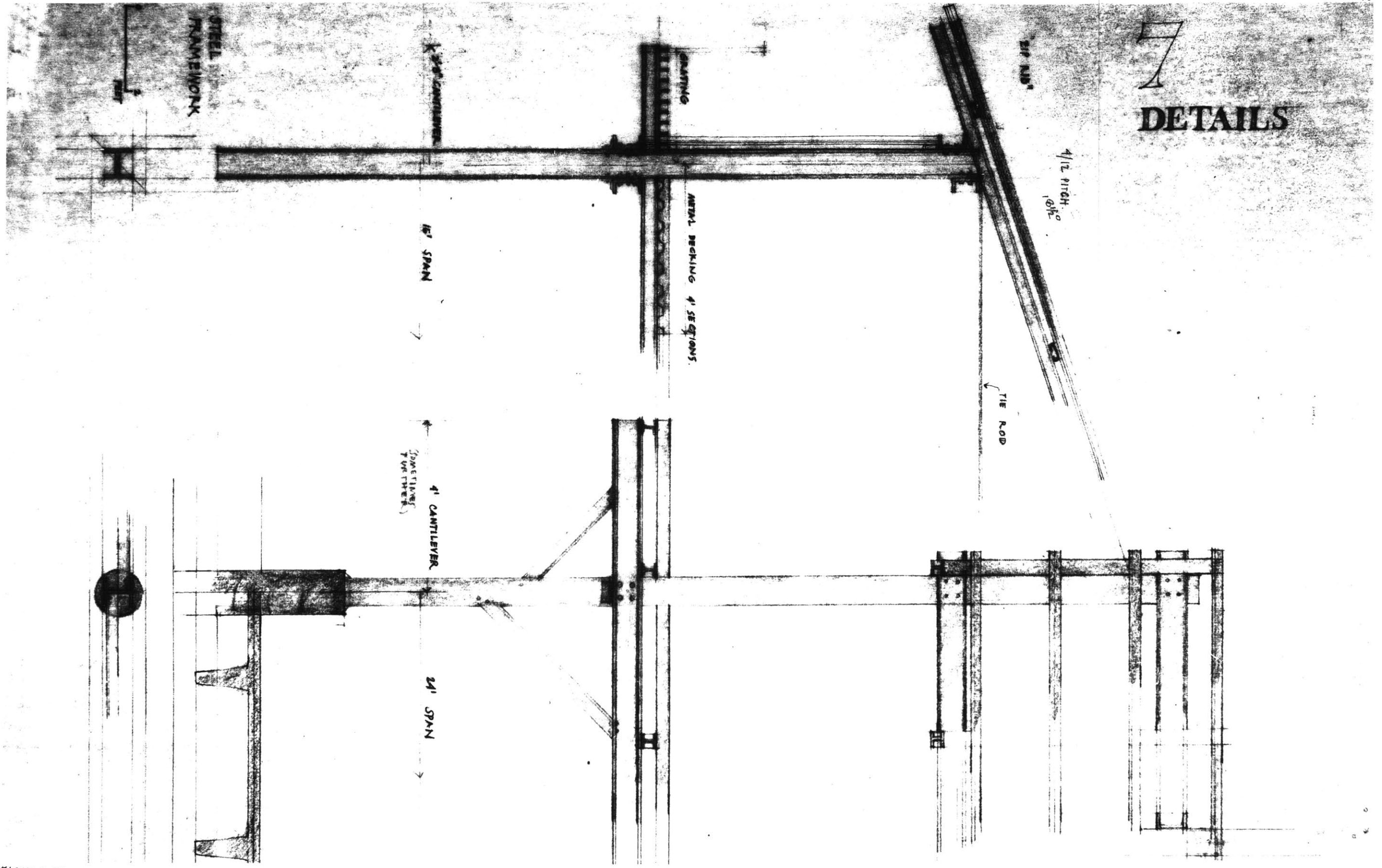


FIGURE 22

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It is undone business
I speak of, this morning,
with the sea
stretching out
from my feet

Charles Olson
MAXIMUS, TO HIMSELF