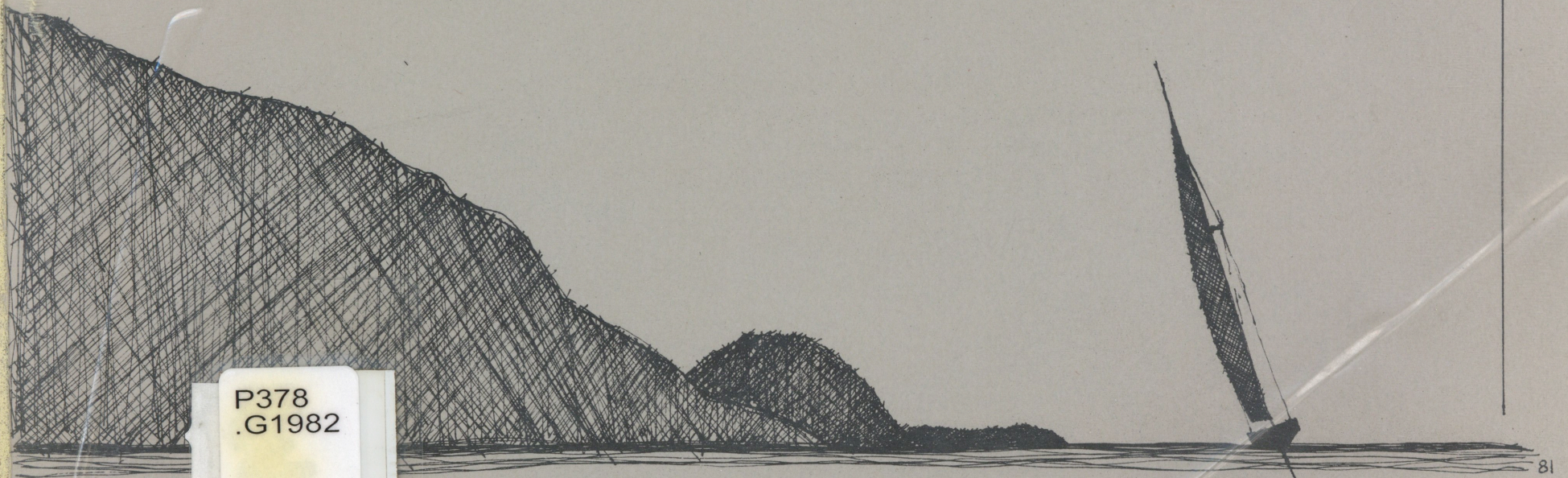


Port San Luis Harbor

by james gartner



P378
.G1982

LIBRARY
MONTANA STATE UNIVERSITY
BOZEMAN

STATEMENT OF PERMISSION TO COPY

In presenting this thesis in partial fulfillment of the requirements for an advanced degree at Montana State University, I agree that the Library shall make it freely available for inspection. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by my major professor, or, in his absence, by the Director of Libraries. It is understood that any copying or publication of this thesis for financial gain shall not be allowed without my written permission.

Signature

James R. Hartner

Date

June 13, 1981

Port San Luis Harbor

by

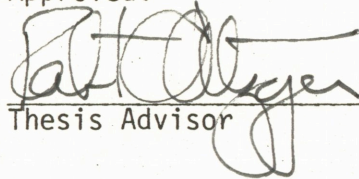
James Roman Gartner

A thesis submitted in partial fulfillment
of the requirements for the degree

of

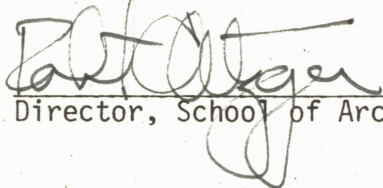
BACHELOR OF ARCHITECTURE

Approved:



Thesis Advisor

Chairman, Thesis Committee



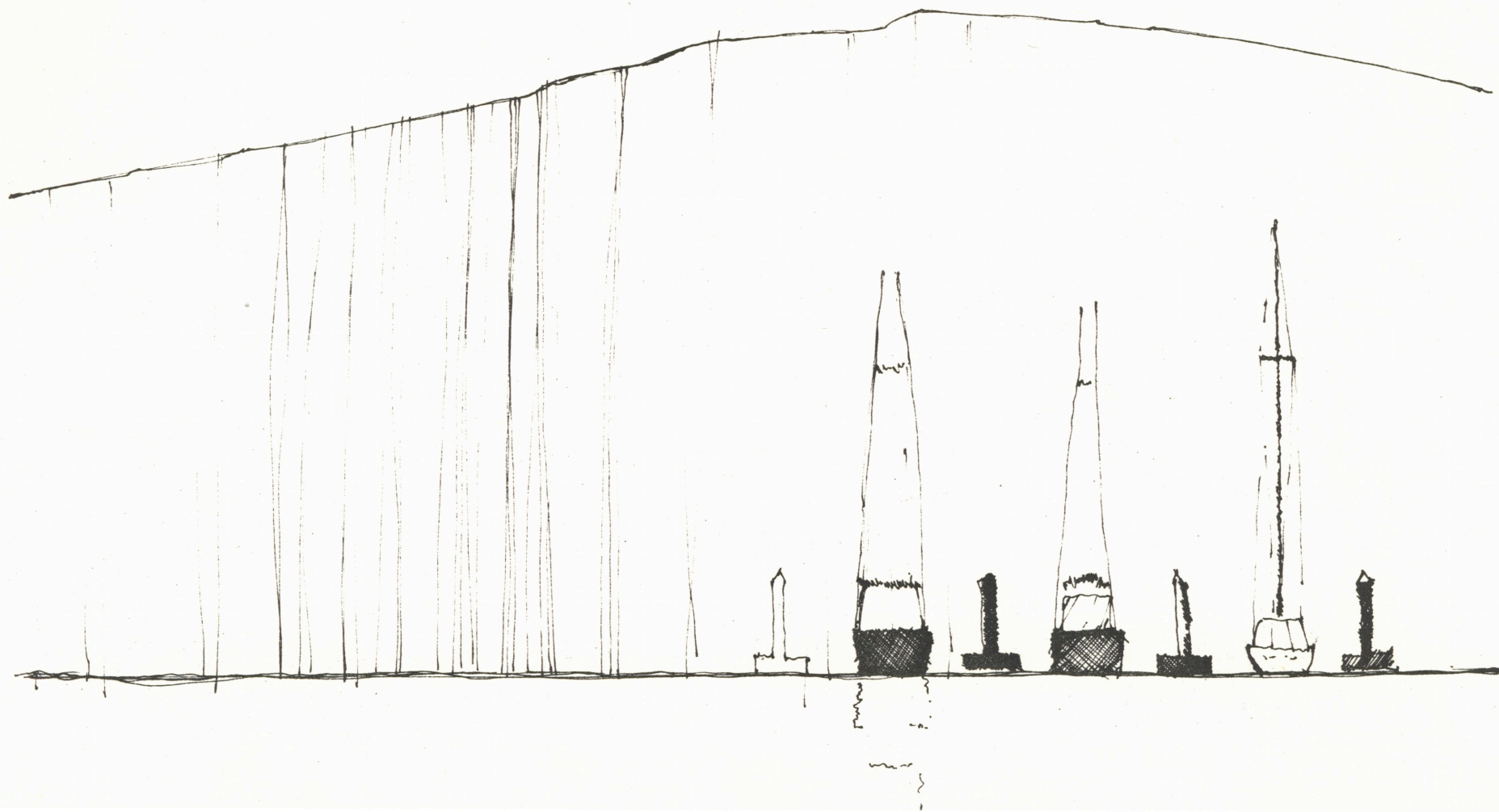
Director, School of Architecture

MONTANA STATE UNIVERSITY
Bozeman, Montana

June 8, 1981

~~720.6~~ ~~NA 2540~~
476
G1111
P378
61982

This book is dedicated to my parents. Without their support and encouragement the first and most important step toward becoming an architect would have been an impossible dream.



To pursue the development of an environment,
within an existing natural context, suitable for
the harboring of small craft.

A marina in Port San Luis Bay

TABLE OF CONTENTS

Introduction	1
Site/Environmental	9
Program	25
Waterside Installations	28
Landside Facilities	40
Boat Handling	59
Guidelines and Codes	62
Preliminary Design	68
Design	72A
Footnotes	73
Illustrations	75
Bibliography	76

introduction

Introduction

This thesis involves the interaction of man within a sensitive natural environment, the sea coast. The sea contains the secrets of man's beginnings and may, as well, contain his future. The vastness of the ocean has intrigued man for centuries. It was, and still is, man's road to far away lands, and his welcome mat from places distant from our own planet.

The ocean possesses characteristics that are not duplicated in many inland environments. Movement and change constantly take place, both seen and unseen. One may visit the coast on a calm, clear day, only to return the next to witness a huge boiling turmoil shrouded in fog and mist.

The oceans are part of our world; we share space with them and the inner world within. Man needs to respect the sea yet be able to coexist along its edge, an edge well defined as the border between two different worlds, an edge that needs to be recognized and understood. The thin edge of sea coast where land meets ocean requires a unique approach to planning as continual growth takes

place. This planning requires sensitivity, understanding of its forces, and knowledge of the reactions caused by interference. The character of a previously untouched coast will forever be changed when development takes place along its edge.

Humanity continually seems drawn to the oceans and their vastness, continually attempting to tame and clutter their shores. The attraction to the sea has brought with it the problem of providing for the influx of coastal populations. The popularity of water related recreational activity has been growing in recent years and there is an ever increasing demand for places to store, service and launch recreational boats.¹ The need for new marine facilities is hard felt along the west coast.

Architecture along the coast brings with it the problems of site, location within the site, materials, and character in keeping with the coastal environment. The architect along with his engineers is able to create a site that in many cases never truly existed. He is able to create an environment unique to the intended use, in this case, the harboring of small craft. A harbor is an architectural statement that may or may not blend well with its surrounding context.

A harbor is defined as "a water area partially enclosed and so protected from storms as to provide safe and suitable accommodation for vessels seeking refuge, supplies, refueling, repairs, or the transfer of cargo."²

There are several functions a harbor can serve, depending on its clientele. The types of facilities are: storm or emergency haven, convenience harbor, fishing boat moorage, commercial venture, recreation center and yacht club. It is unlikely that any one of these facilities will in itself comprise a small craft harbor. Most harbors will combine some, if not all, of these functions.

My personal interest in the sea and its edge has led me to study and to pursue the development of an environment, within an existing natural and man-made context, suitable for the harboring of small craft. The site I have chosen for a harbor development is located in central California in San Luis Obispo County. It is presently the location of approximately 200 fishing boats and recreational yachts. I am proposing a future marina development for the presently inadequate Port San Luis Harbor.

"The word marina is defined as meaning a modern waterfront facility for recreational boats."³ The term may further be described as, "a facility offering services which have come to be part of modern boating: a place where boatmen may berth, launch, repair, fuel and provision their craft conveniently, be able to have a hot shower, dine ashore, be within easy reach of shops, communications, and transport."⁴ A marina facility at Port San Luis can fulfill a need for recreational boaters and commercial fishermen alike.

Images and Elements

The marina is often separate from any other built context, not always dependent on services beyond its created boundaries. One can look at it as an autonomous place, a place self sufficient, divided into three major elements of breakwater, berths, and quay wall. All three elements working together in order to form the necessary foundation of a marina. Within these elements are three types of provisions: "that which serves the boats, that which serves the owners, and that which, whilst it may be within the boundary of the harbour, is only remotely connected with boating or perhaps not connected at all."⁵

Images within the harbor are dominated by the everpresent forests of masts and rigging. Between all of this visual activity is a network of circulation systems, such as the channels and the walkways leading to the berths. The berths are looked upon as protective elements that are meshed between the boats, surrounding and protecting them from the movements of wind and tide. Berths, along with boats, are floating, rising and falling together as the tide rolls in and out. Moving as a unit, interlocked with one another, they form the core and the whole purpose

of a marina.

The quay wall is a line of tension, defining the edge of land and the beginning of water. A design element in itself, the quay frames the inner network of landside activities situated within its boundaries. The activities that take place serve the boaters, yet may be only remotely connected with boating. The buildings situated within the boundaries of the quay are spaces within a space. They relate with each other as adjacent spaces interlocked in an organizational pattern so as to create their own micro climates.

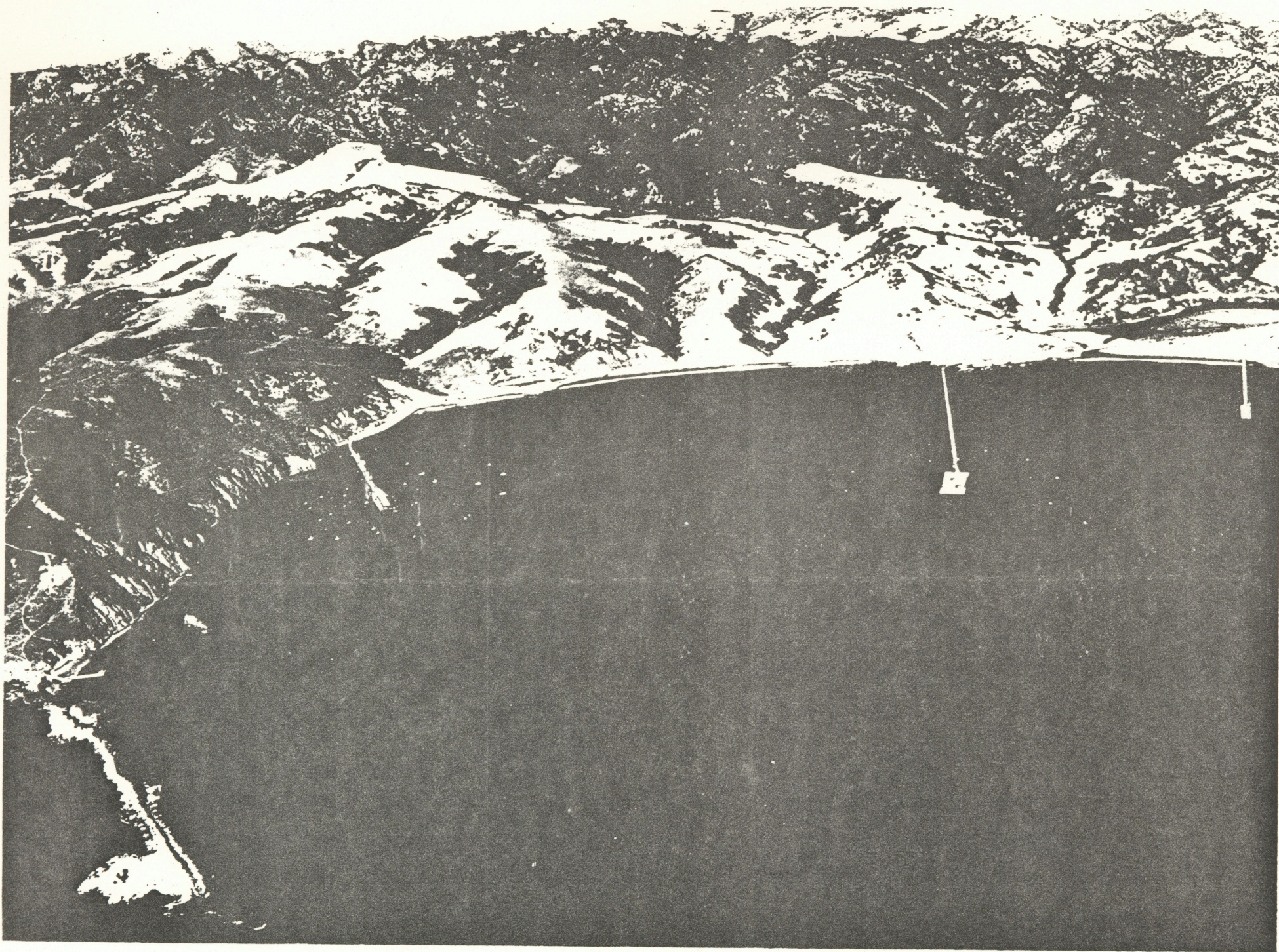
Equally as important as the pedestrian movement within the marina, is that of the auto. The auto requires a pattern of movement through the marina that must coincide and compliment the pedestrian pathways. The auto parking and circulation represents a zone, a zone that requires sensitive treatment in order to integrate itself as a part that belongs and not just force fitted because of necessity.

The overall image of a harbor is that of boats and water. Boats resting within the protective breakwater that resists the thrashing of the sea. A breakwater that sweeps the horizon, a line that gives the

harbor a sense of place. A place for boats and a place for people.



site / environment



The Site

The site chosen to study for the Port San Luis Marina is located twelve miles southwest of San Luis Obispo, California, within the boundaries of San Luis Obispo County. San Luis Obispo Bay is situated 190 miles north of Los Angeles and 245 miles south of San Francisco. The area is deficient in modern marina facilities for small craft. Along with a continual increase in population the interest in recreational boating facilities is also increasing. Port San Luis is referred to as a harbor. It does partially qualify under the definition of harbor, providing refuge, supplies, refueling, some repairs and the transfer of cargo. A major concern at Port San Luis is the lack of protection from storms. It presently cannot be considered a safe refuge on a year round basis. The winter storms from the south-southwest swamp the bay with waves as high as 19 feet. The boating season at this location is reduced to about eight months because of these harsh winter storms.

The bay presently has mooring capabilities for 390 small recreational and fishing craft. Approximately 40 of the boats are commercial fishing boats. The fishing boats which load and unload at the end of



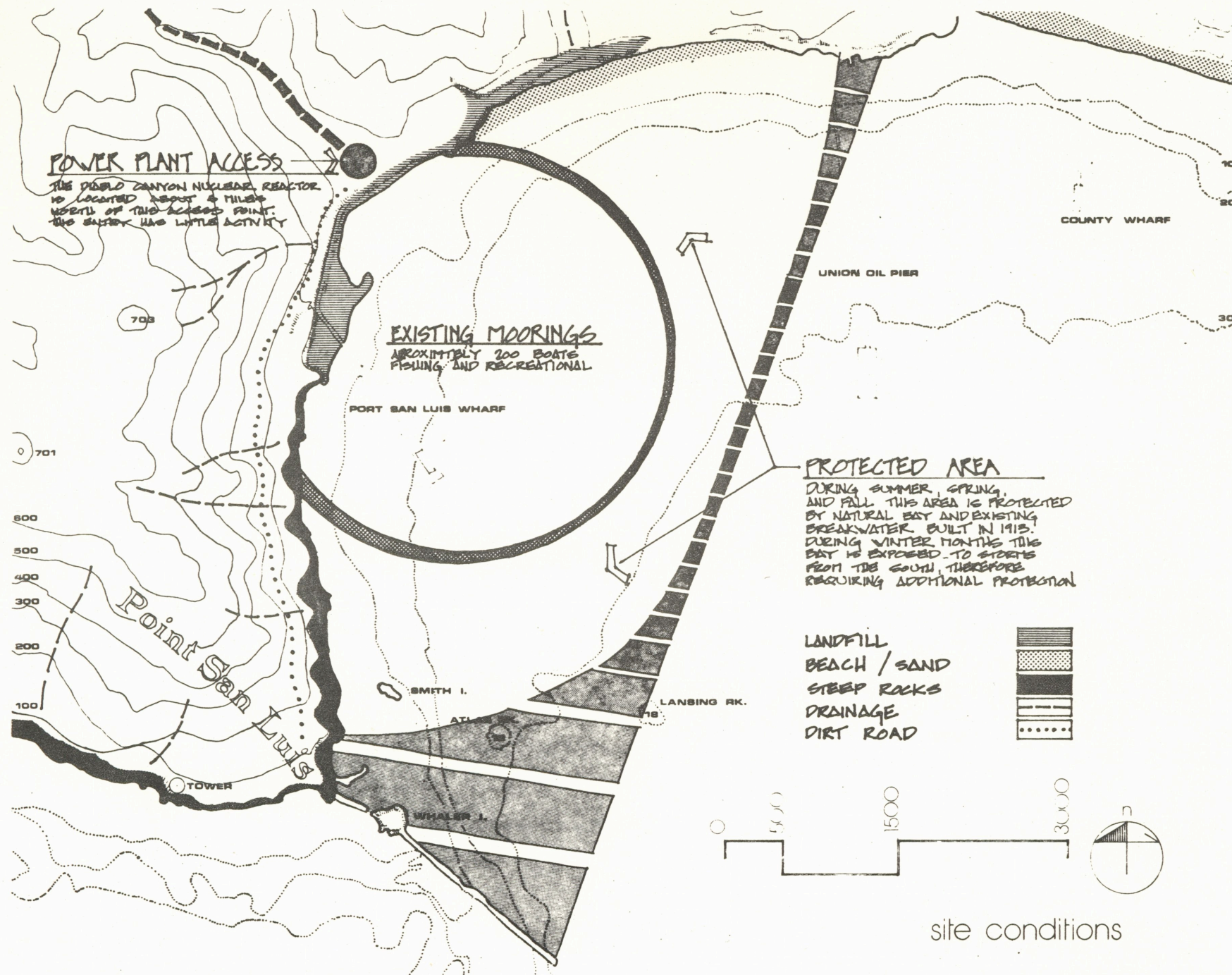
California

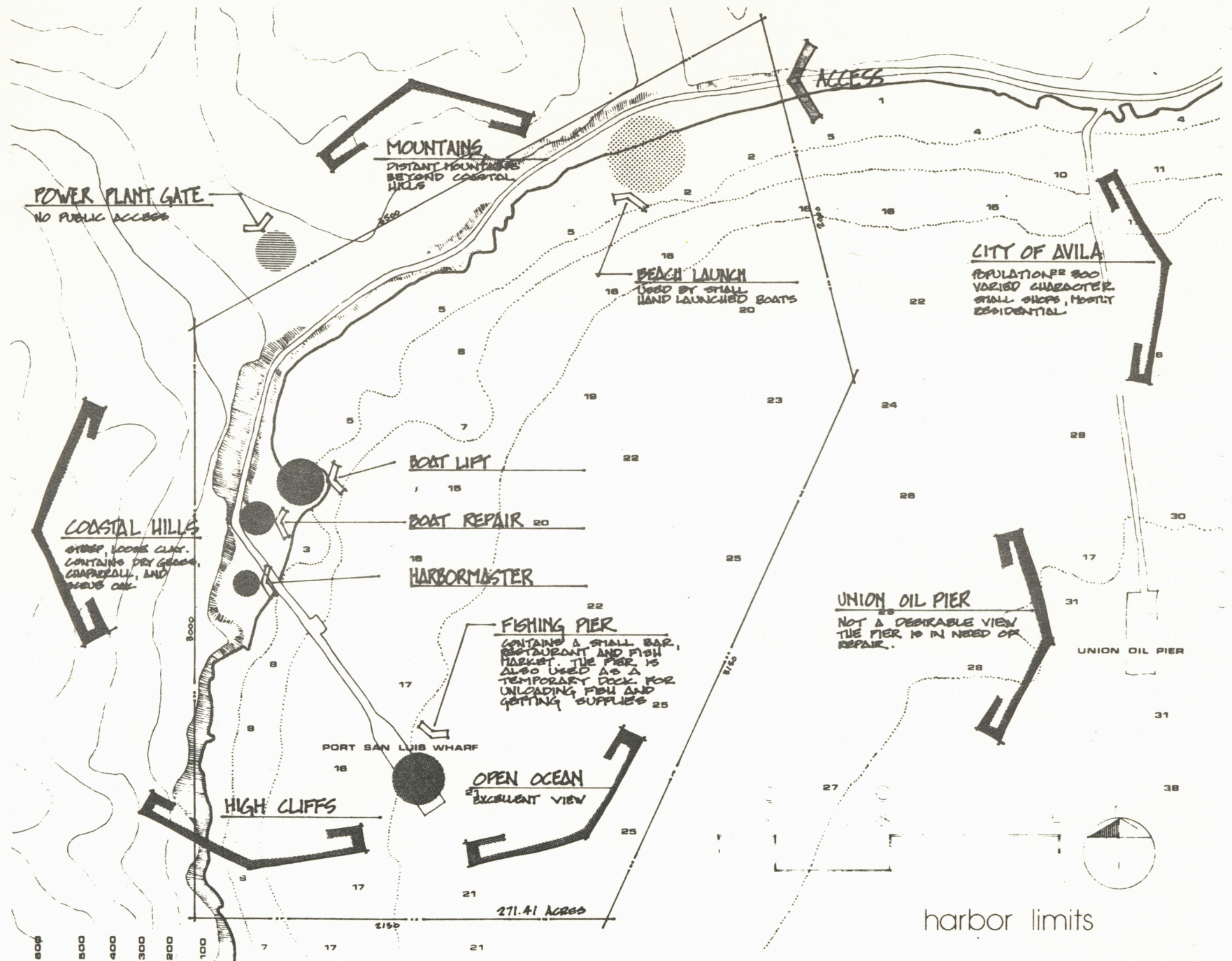
a wharf that extends 500 yards offshore into deeper water. The activity at the pier tends to be geared toward the recreational and commercial fishermen. A fishing port that has a minority of recreational boats is located about 12 miles north at Morro Bay. This seems to be the preferred location for fishing activities. Port San Luis lends itself better to the recreational boater. The area is close to major beaches, such as Pismo Beach and Shell Beach. The bay is easily accessible from U. S. 101, the major coastal route between San Francisco and Los Angeles. The city of San Luis Obispo, only 12 miles away, has a population of 35,620 people and contains a popular state university, California Polytechnic State University.

The county of San Luis Obispo is experiencing continual growth because of the major populations of urban San Francisco and Los Angeles all seeking fresh air, peace, and quiet. The present population within the county is 140,000 persons. By the year 2000, 224,000 persons are estimated to occupy the county.⁶

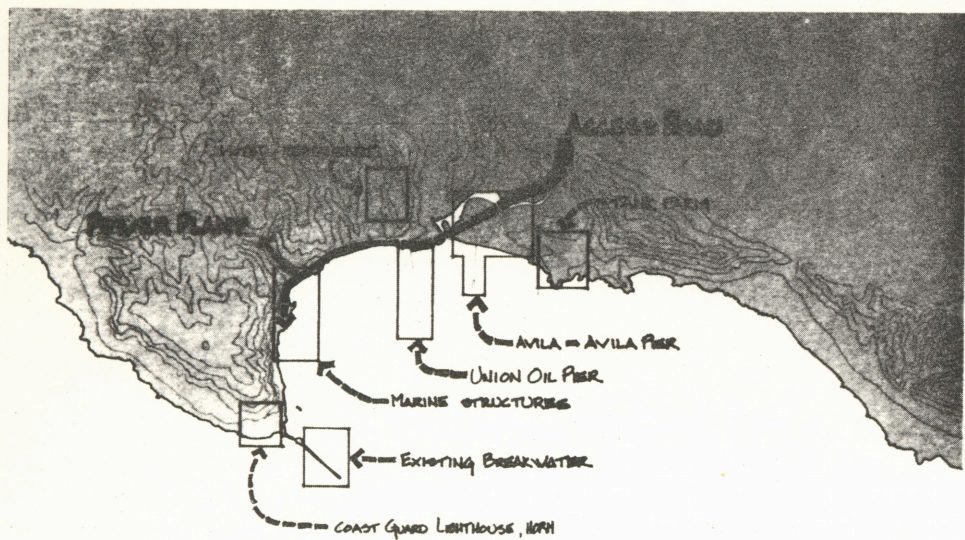
Awareness of the movement in population led me to look at this area for potential marina development. Port San Luis contains the basic

requirements. The bay is partially protected from three sides, easily accessible from both land and sea, and situated in close proximity to population areas. With these necessary needs satisfied I decided to pursue the study of the bay as a potential site of a marina.

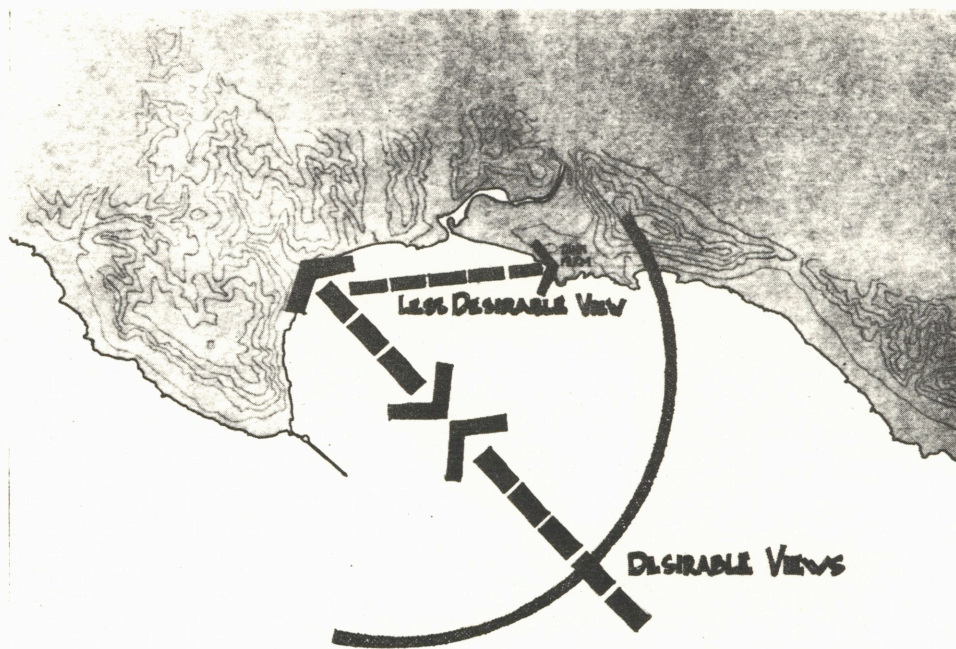








PORT SAN LUIS
structures



PORT SAN LUIS
views

Population Projections by Census Division

	1978	%Change/yr	1979	%Change	1980	%Change	1985	%Change	1990	%Change	1995	%Change	2000
North Coast	24,300	5.64	25,670	5.65	27,100	4.07	33,100	2.43	37,300	2.07	41,340	2.10	45,840
Morro Bay	8,960	3.80	9,300	3.80	9,650	3.80	11,630	2.00	12,840	1.79	14,030	1.79	15,330
Baywood	9,010	8.21	9,750	8.21	10,540	5.00	13,470	2.40	15,160	2.00	16,740	2.00	18,480
Cambria	2,810	6.05	2,980	6.04	3,150	2.60	3,590	2.60	4,080	2.45	4,610	2.45	5,200
Cayucos	2,170	3.68	2,250	3.68	2,330	2.00	3,570	1.86	2,820	1.58	3,050	1.58	3,300
Rural	1,350	3.00	1,390	3.00	1,430	5.32	1,850	5.32	2,400	3.95	2,910	3.95	3,530
Atascadero	19,740	4.05	20,540	4.04	21,370	3.20	25,090	2.00	27,690	1.79	30,260	1.79	33,060
Atascadero	13,710	3.70	14,220	3.70	14,750	3.69	17,610	2.00	19,420	1.79	21,220	1.79	23,180
Templeton	880	2.10	900	2.10	920	2.29	1,030	2.29	1,150	1.86	1,260	1.86	1,390
Santa Margarita	790	1.27	800	1.25	810	1.90	890	1.90	980	1.70	1,070	1.70	1,160
Rural	4,360	5.96	4,620	5.84	4,890	2.62	5,560	2.00	6,140	1.79	6,710	1.79	7,330
Arroyo Grande	33,020	3.33	34,120	3.02	35,150	2.38	39,530	2.19	44,020	1.67	47,810	1.70	52,260
Arroyo Grande	10,100	3.20	10,420	3.20	10,740	2.10	11,910	2.00	13,450	1.81	14,390	1.81	15,740
Grover City	7,850	2.20	8,020	2.20	8,190	2.19	9,130	2.19	10,170	1.81	11,130	1.81	12,160
Nipomo	5,070	3.75	5,260	3.61	5,450	2.58	6,190	2.00	6,830	1.81	7,460	1.81	8,150
Oceano	3,610	4.00	3,750	4.00	3,900	2.45	4,490	1.98	4,950	1.81	5,410	1.81	5,920
Rural	6,390	4.38	6,670	3.00	6,870	2.58	7,810	2.00	8,620	1.81	9,420	1.81	10,290
Paso Robles	13,670	2.85	14,060	2.84	14,460	1.33	15,410	1.12	16,350	1.07	17,260	1.09	18,230
Paso Robles	8,110	2.84	8,340	2.76	8,570	1.26	9,120	1.26	9,700	1.09	10,240	1.09	10,800
San Miguel	750	1.33	760	1.32	760	0.26	770	0.26	780	0.26	790	0.26	800
Lake Nacimiento	280	Ø	280	3.57	290	Ø	290	0.67	300	Ø	300	0.67	310
Rural	4,530	3.31	4,680	3.42	4,840	1.56	5,230	1.28	5,570	1.28	5,950	1.28	6,320
San Luis Bay	7,210	4.16	7,510	4.13	7,820	2.14	8,690	1.69	9,500	1.51	10,290	1.51	11,140
Pismo Beach	5,150	4.40	5,380	4.40	5,610	2.35	6,300	2.09	6,990	1.58	7,650	1.58	8,370
Avila Beach	340	Ø	340	2.94	350	1.12	370	1.07	390	1.00	410	0.95	430
Rural	1,720	4.07	1,790	3.91	1,860	1.67	2,020	0.98	2,120	0.98	2,230	0.98	2,340
San Luis Obispo	42,060	2.62	43,160	2.59	44,280	2.29	49,550	1.79	54,140	1.56	58,720	1.65	63,730
San Luis Obispo	35,620	3.00	36,730	2.99	37,830	2.58	42,980	2.00	47,460	1.81	51,910	1.81	56,800
Rural	6,400	0.47	6,430	0.58	6,450	0.37	6,570	0.33	6,680	0.40	6,810	0.35	6,930
Total County	140,000	3.72	145,060	3.61	150,180	2.71	171,380	1.93	189,000	1.72	205,680	1.74	224,260

based on trends in building permit data from April 1970 to April 1978

The Environment

Port San Luis Bay is situated at 35° North Latitude, in a temperate climate zone, with a mean temperature of 59°F. The mean water temperature is 13.8° c. or 56.8°F.⁷

"San Luis Obispo Bay is a broad bight extending about 3.6 miles eastward from Point San Luis, with a north south width of about one mile. The shore consists of high rocky bluffs west and north of the bay about 0.5 mile of sand beach at the mouth of San Luis Obispo Creek, and irregular cliffs and tableland on the east. Depths in the bay range from about 18 feet at the Port San Luis fishing pier to about fifty feet at the approach from the ocean."⁸

In the summer the weather is cool, damp and foggy, in winter it becomes mild and wet. "The dominant weather feature is the semi-permanent Pacific High. This high covers the entire region in summer. Storms and fronts are forced to move along the north side, so few affect this coast. In winter the high weakens and retreats southeast. This allows storms or frontal systems to pass through the area about every seven to ten days, on the average. Sometimes a series of these systems may result in a pro-

longed period of strong winds and heavy rains along the central and southern California coast. This situation is seldom and occurs about every two to three years."

The summer breeze flows from the west-northwest, reaching 20 knots during the afternoon and continuing at lower speeds until midnight. Temperatures in the summer usually climb to 70⁰ and drop to the 50⁰s at night. An occasional hot flow will push the temperatures into the 90⁰s." The winds blowing across the cold California current produce low clouds and sea fog. These conditions are prevalent close to the coast in the early morning hours. They improve during the day, particularly close to and on the shore. August and September are the worst months; fog reduces visibilities to below 0.5 mile on more than fifteen days per month at some locations."¹⁰

The winds are variable, often from the northwest in winter, becoming west-northwest in mid-winter. Occasionally weak east winds occur when a warm high centers itself over the great basin to the northeast. Clear skies are the result and land fog is encouraged to creep out over coastal waters." Occasionally following a passage of a cold front, a

cold type high will move into the Great Basin. This can result in a foehn wind, over central and southern California, known as a Santa Ana."¹¹

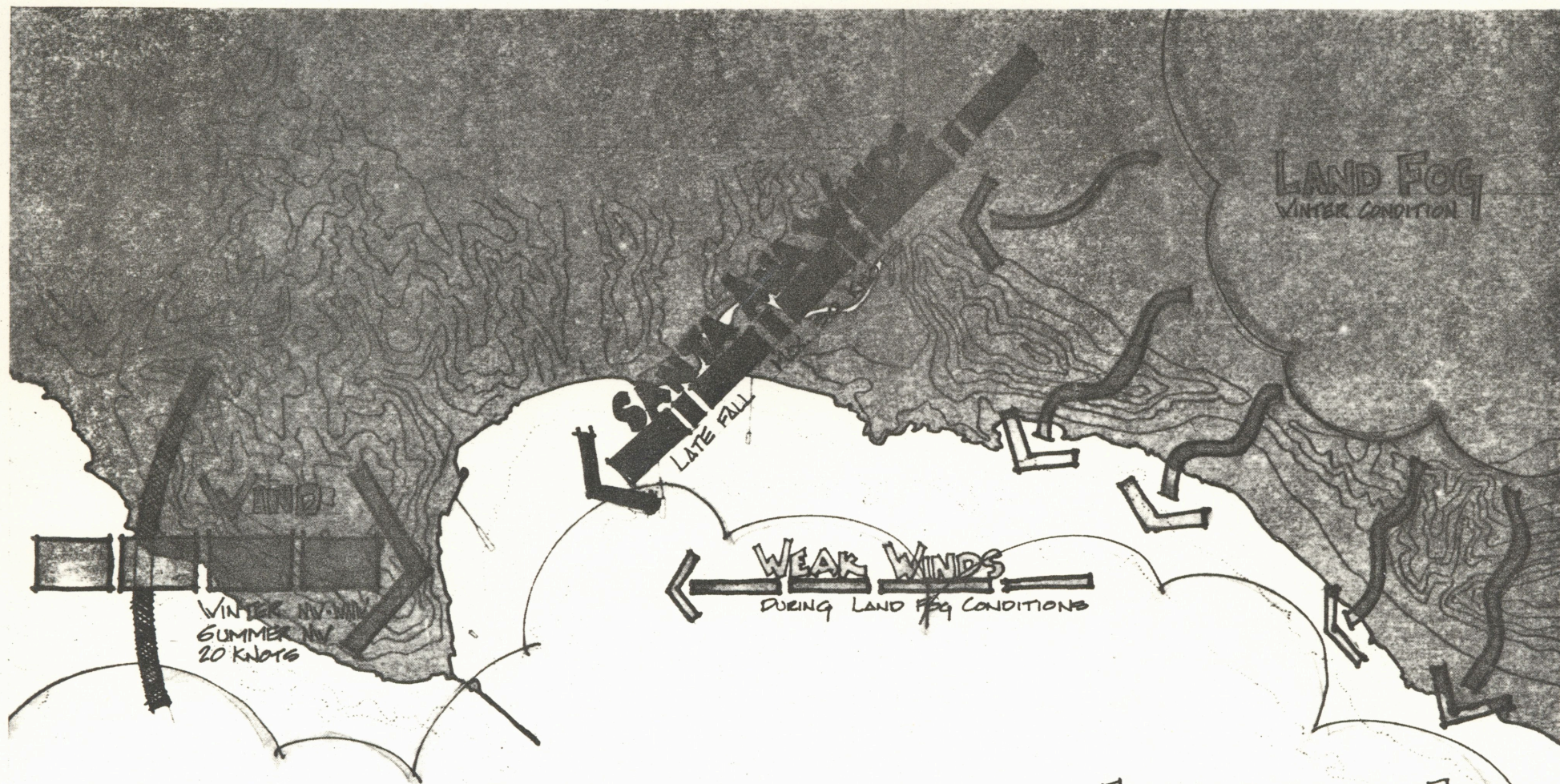
The Santa Ana condition occurs in the late fall. The effects vary between different locations, but speeds of 50 miles an hour are not uncommon. The mountains and hills surrounding the bay will afford some protection from the Santa Ana winds.

35° North Latitude

	AM	PM	AZIMUTH	ALTITUDE
Win Dec 22		NOON	180°-0'	31°-30'
		10:00-2:00	149°-30'	25°-0'
		8:00-4:00	126°-30'	8°-30'
		7:10-4:50	119°-0'	0°-0'

	AM	PM	AZIMUTH	ALTITUDE
Fall-Spr Sept 23 March 21		NOON	180°-0'	55°-0'
		10:00-2:00	135°-0'	45°-0'
		8:00-4:00	108°-30'	24°-0'
		6:00-6:00	90°-0'	0°-0'

	AM	PM	AZIMUTH	ALTITUDE
Summer June 22		NOON	180°-0'	78°-30'
		11:00-1:00	127°-30'	62°-30'
		10:00-2:00	105°-30'	61°-30'
		8:00-4:00	85°-30'	37°-0'
		4:50-7:10	61°-0'	0°-0'



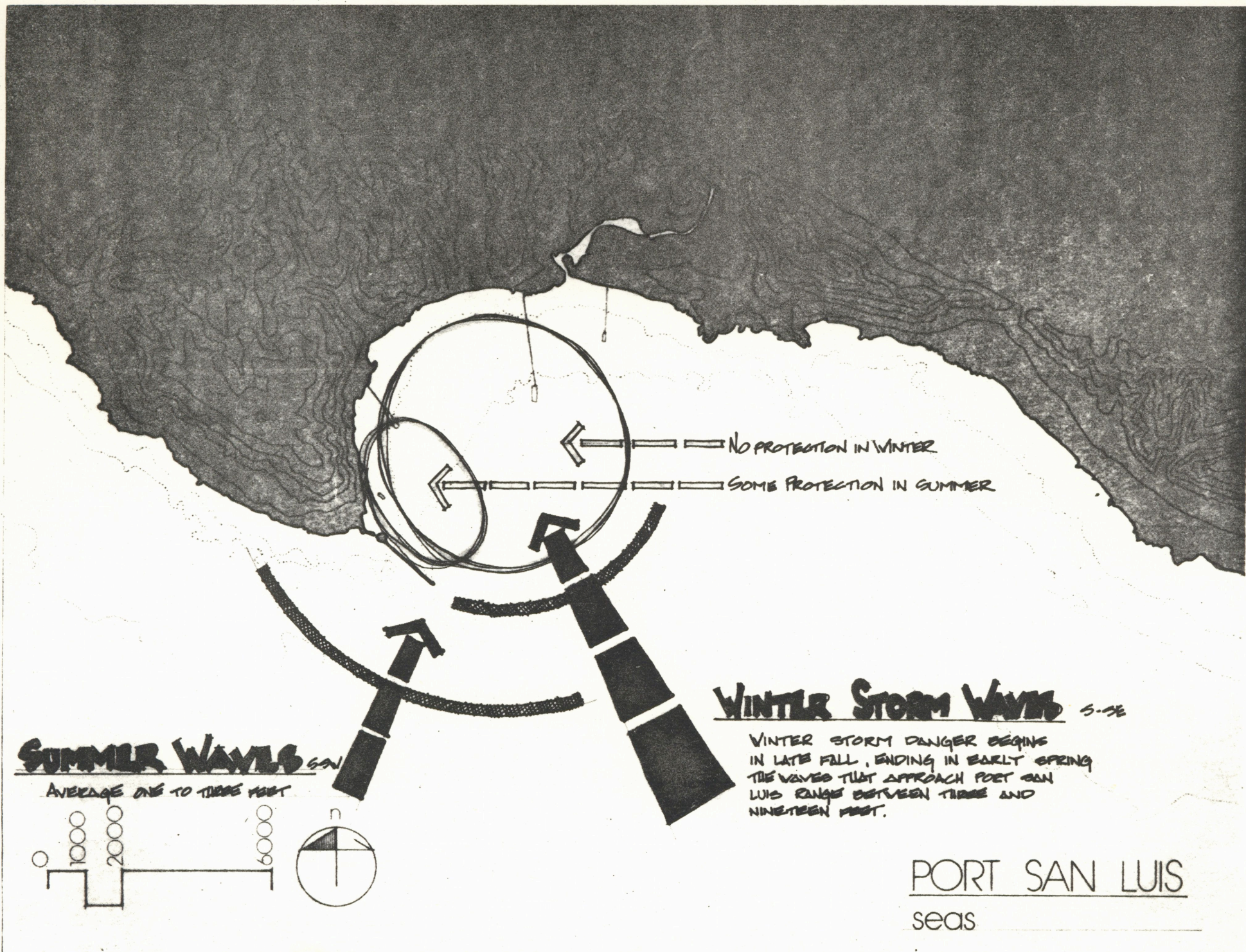
RAIN

NOVEMBER - APRIL
6 - 12 DAYS PER MONTH

EARLY MORNING FOG

AUGUST THROUGH SEPTEMBER
VISIBILITY 0.5 MILES

PORT SAN LUIS
the weather



program

Program Introduction

The objective of primary concern for this thesis is the creation of a marina at Port San Luis Bay. In order to reach this goal the proposal needs to be looked at in its entirety then broken down into its major elements. These three elements are as follows:

Breakwater
Quay wall
Berths

Within these foundation elements there are support facilities that enable the marina to function as an autonomous development. These elements may also be categorized into three elements with their functions. These elements and functions are as follows:

Waterside Installations

Protection	(as required)
Navigation	(as required)
Compass Boxing	(as required)
Marine service station	1
Berths	500 - 600

Boat Handling Equipment

Launching Ramps	1
Winch	1
Gantry	1
Drydocks/Repair yard	(as required)

Landside Facilities

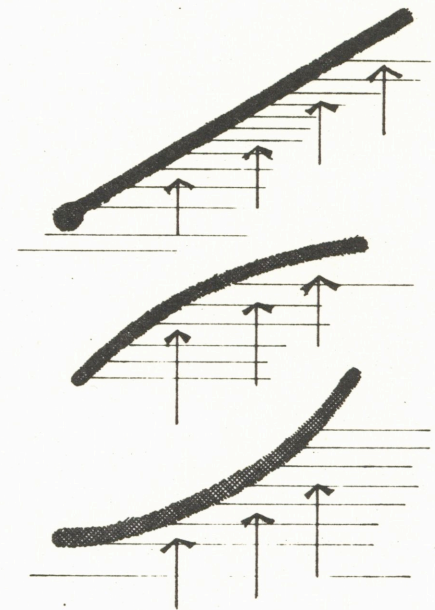
Yacht club/restaurant/bar	1
Harbor Masters office	1
Marine supply/machine shop	1
General store/shops	(as required)
Public toilets/showers/laundries	4-5
Auto/trailer parking	(as required)
Commercial fishing work space	(as required)
Miscellaneous concessions	(as required)
Park/picnic areas	(as required)
Landscaping	(as required)

waterside installations

Breakwater

The natural protection is not provided at all times of the year and during storm conditions a breakwater is required. "The word 'breakwater' is a generic term which can describe many different structures or promontories whose purpose lessens the effect of the elements and provides more sheltered conditions for craft and marina facilities. Generally speaking breakwaters are constructions of a linear nature which have water on either side of them. Except for floating types, breakwaters rise from the bed of the sea or water system and are visible above the surface at all times."¹²

A breakwater is a man-made creation, a new form brought into a domain that man is attempting to alter and defy. By proper placement of a breakwater a hostile sea can be reduced to the energy of a ripple in a pond. The architect is creating an environment within an already existing environment. The creation of this environment can be compared to that of a roof that keeps falling rain from entering the domain under it. The breakwater is acting in the same way, it is protecting the domain within from the forces of the sea.

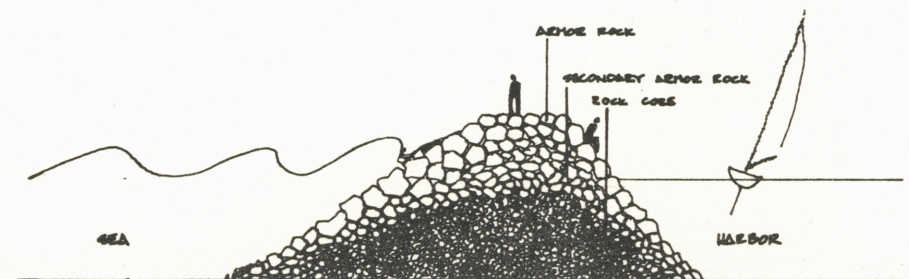
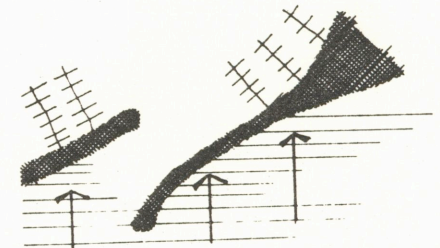
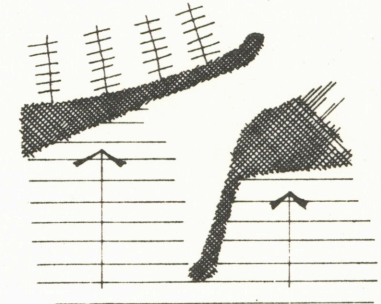


In plan the breakwater is seen as a major element that gives the harbor its shape and character. Besides being viewed in plan it must be studied from shore, the sea, and from within the marina. A breakwater needs to be slightly higher than the highest expected storm waves. As in the case of Port San Luis a breakwater of between 16 and 18 feet above mean sea level is required. When viewed from within the marina the breakwater will dominate the horizon. A person standing on the quay wall will almost be at eye level with the top of the breakwater, the view being softened by the masts and rigging of the docked boats. The clear view out to sea will require additional design considerations when dealing with visual connection, (e.g., harbormasters office).

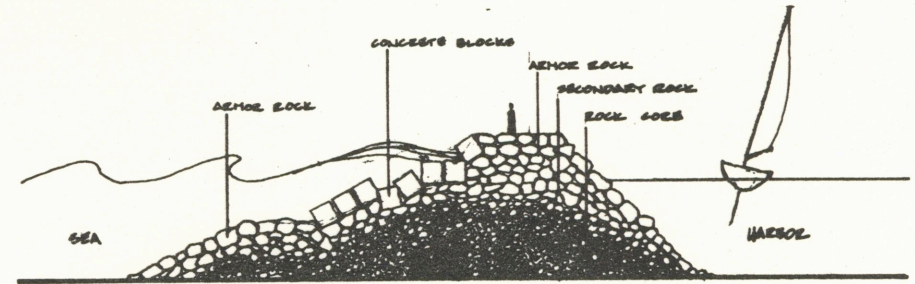
Pedestrians generally appreciate the right to walk onto and along the length of the breakwater.¹³ It can become an extension of the land reaching out to sea and encourage movement along its relatively small surface visible above the water.

There are numerous types of breakwaters used in modern harbors:

- Rip-rap or rubble mound
- Single or double row piling
- Timber crib or gabion
- Vertical face breakwater



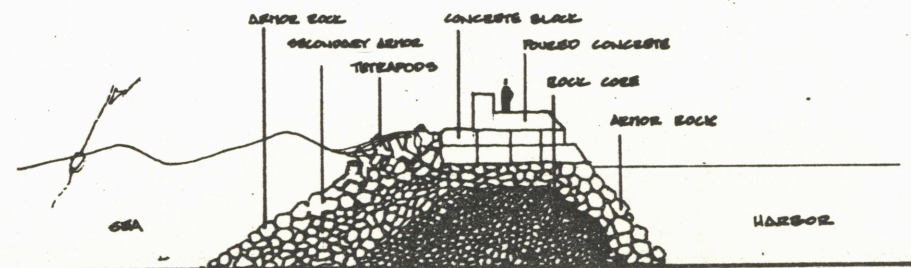
Precast cylinders
Hydraulic fill
Ice breaker
Composite types
Diaphragm breakwater
Floating breakwaters¹⁴



In areas of low tidal range, (e.g., Port San Luis, nine feet maximum), the rip rap or rubble mound breakwater is the most widely accepted. The breakwater is constructed of, "loose heaps of large rocks or concrete blocks tipped from barges to form a (usually) continuous and rough-textured barrier of triangular section. A hopper is often used for laying rubble breakwaters in which rock loaded on deck is pushed overboard by hydraulic rams. This type is used almost exclusively in coastal areas with a small tidal range. The material used may be natural quarry or sea shore rock or concrete blocks molded to one of many shapes."¹⁵

There are many factors that effect the siting of breakwaters that go beyond aesthetics. Such factors are:

Depth of water
Bed conditions
Tidal range
Wave height reduction
Materials
Construction methods
Permanence



Height and form
Appearance and cost¹⁶

At Port San Luis the tidal range is low, the maximum waves expected are 19 feet, and the bottom is mostly mud and sand. The water depths are between 15-30 feet. A rubble mound breakwater has been used in water depths of 140 feet, as in the south breakwater at Matarani, Peru. The cap is 16 feet wide and the base is over 400 feet wide. This case demonstrates the flexibility of the rubble mound breakwater. Port San Luis is relatively shallow and such an extreme breakwater will not be necessary.

The scope of this thesis will not allow me to investigate in detail the science of coastal hydraulics, yet will allow me to study the breakwater as an aesthetic architectural element. The resulting design will be looked at as a recommendation for the breakwater at Port San Luis. Once recommended, a rigid analysis by a coastal hydraulics engineer would be required. Model tests are the most common method for testing a breakwater.

The final design of a breakwater will result in the success or failure of a marina. The desired result should be the safe harboring of small craft with a minimum environmental impact.

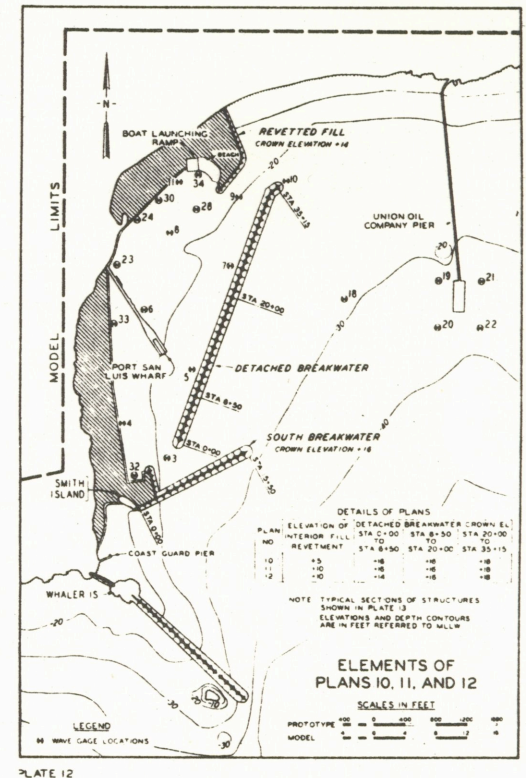
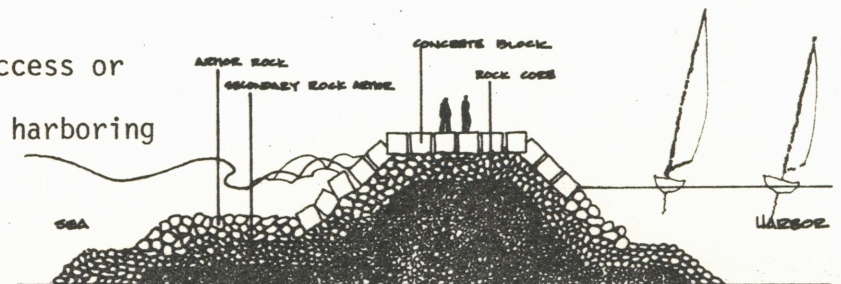


PLATE 12

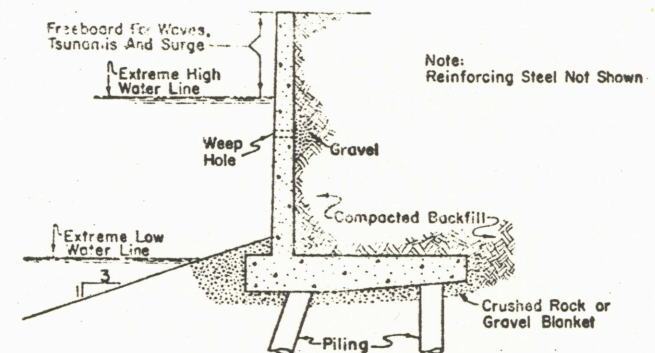
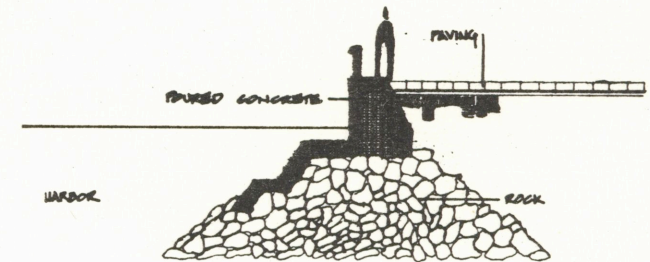


Quay Wall

The quay wall (or bulkhead wall) is the line where the inner harbor land fill or land retainment meets the water. This line generally marks the boundary of all the landside activities that take place within the marina. The wall is somewhat higher than the highest tide therefore affording a good view of the inner harbor. If the quay wall is high enough it may allow viewing over the breakwater.

Pedestrian movement along the quay wall is usually heavier than in any other area in the marina. Railings and benches along the wall are frequently well used. The most recent craze in California is roller skating. The walkways along the quay wall have become popular skate routes for many weekend marina visitors. Unfortunately, these fast moving pedestrians on wheels do not always mix well with the otherwise tranquil setting of the harbor. Of course, skating can be encouraged or discouraged by specific selection of paving materials.

The quay wall should be recognized as a major element in the design of a marina. The line created by the quay wall is a line of tension. Water is a fluid, moving material, while the wall is a hard and stable



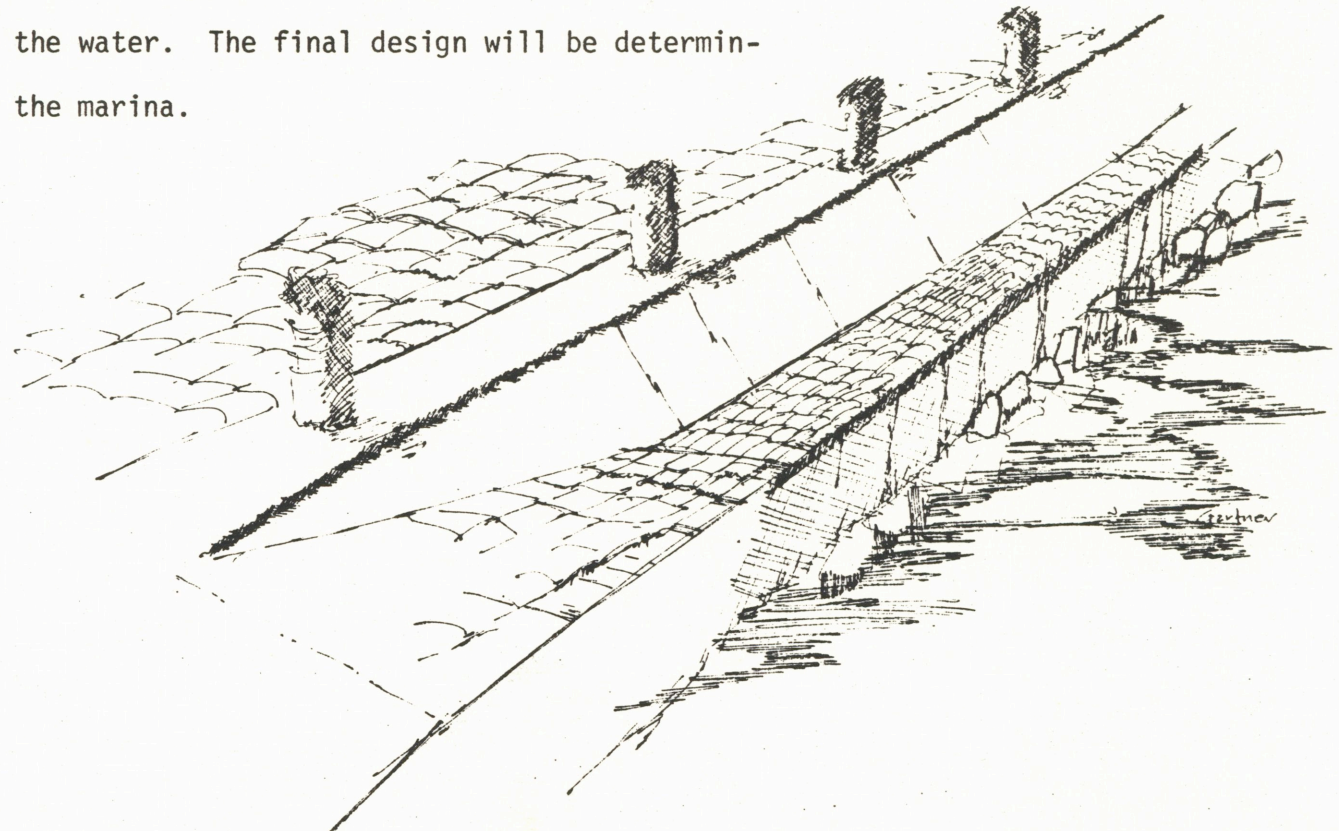
structure retaining land on one side and holding water on the other.

There are two principal methods used in the construction of the quay wall:

The sheet type: Driven into the ground or bed and braced back by piles, shoring or deadmen.

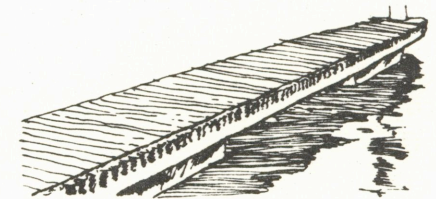
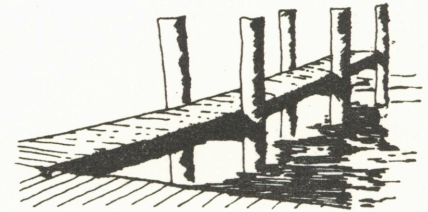
The gravity type: Retains soil by its weight and shape.²⁰

Quay walls may take on various shapes and give character to an otherwise potentially blank wall. Some may not really be walls at all, but slopes that gradually enter the water. The final design will be determined by the specific needs of the marina.



Berths

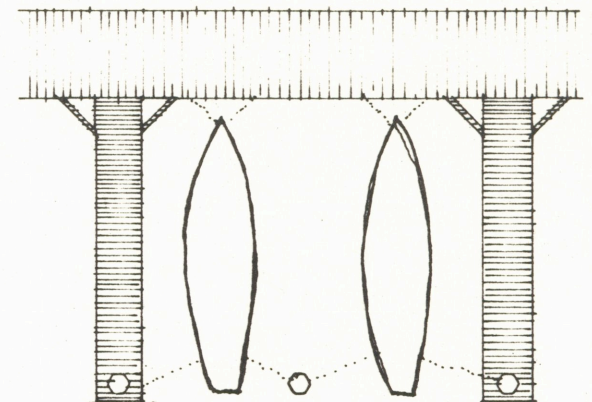
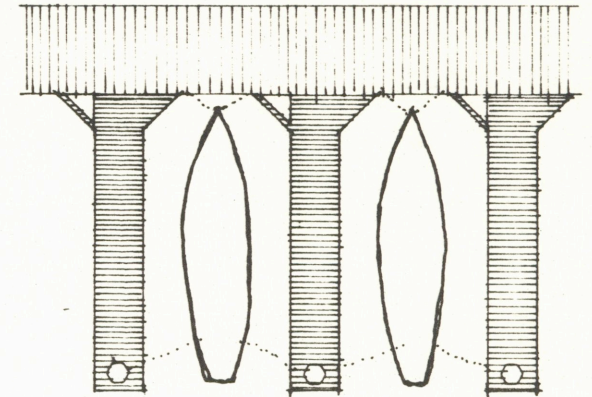
The safe berthing of a recreational boat is the ultimate purpose of a marina. The berthing system must be designed to secure a vessel while not being used, and to provide access to and from shore.¹⁷ Depending on the location of the proposed marina the berth may be fixed or floating. The fixed pier is best suited to areas of no tide such as lakes or flowing rivers. For tidal areas, such as Port San Luis, a floating berth (or dock) is the preferred solution. Besides the fixed pier and floating berth there are harbors that utilize a combination of floating walkways and piles, walkways and anchors, and mooring systems. Moorings require a water taxi in order to reach the boats. A mooring system is mostly used in areas where waves are not controlled by breakwaters, (the present Port San Luis Harbor). Moorings are not regarded as very practical solutions to modern harbor design. A large swing area is required for each individual vessel so it will not bump another one. On the other hand, the floating pier can economically berth many craft in close groups allowing access directly from the quay wall. The most desirable floating berth arrangement is a walkway system flanked, usually on both



sides, by finger floats. These finger floats may utilize a double-banked arrangement, or single slip per boat. The single slip allows the most convenience and best protection for individual boats. The double banked system has two boats per slip, and is somewhat less expensive to install. Protection and individuality suffers with this system.

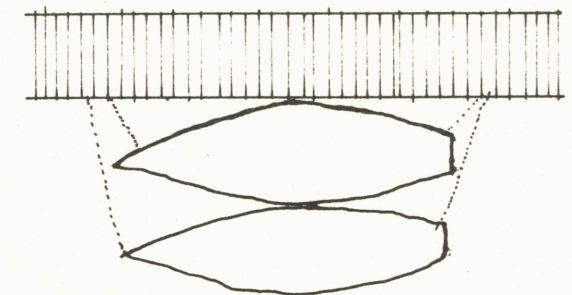
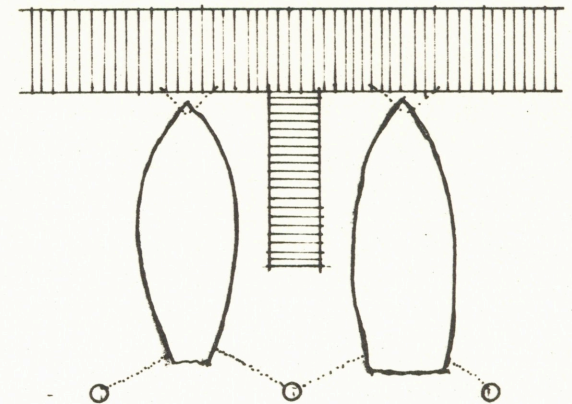
Just as dominant as with the breakwater, the berths are a major design element contributing to the creation of a marina. When laying out the berths a considerable amount of concern must be given to circulation public and private zones. The berths must be located so as to facilitate the boats entering and leaving the harbor, allowing them to maneuver with ease. "An early decision on the relationship of the mooring pattern to the basic harbor shape will pay dividends later. Too often the engineering shell is totally fixed and the mooring system fitted as best it may."¹⁸ "A marina is like a pub; in that people don't mind its size provided there is a sense of intimacy and character in their area."¹⁹

Flotation of the walkways and fingers may be accomplished through the use of one of several available floats. These floats are manufac-



tured from steel, fiberglass, fiber reinforced concrete, expanded polystyrene encased in fiber reinforced concrete, polystyrene coated with plastic. Selection of a float depends largely on the type of water and the desired stability of the berth. It is quite an uncomfortable feeling to be walking on a dock that quivers with every step, or bounces violently with each passing boat wake. Fiberglass floats are generally less expensive to produce and install, but stability suffers from its lack of weight. Steel pontoon floats are not suitable for saltwater applications because of rust. Decking materials are available in rubber, steel, wood, and lightweight reinforced concrete. Wood is the most natural, affecting the overall character of the marina by giving a soft and subdued appearance to the berths. Concrete is a bit more durable than wood and is easier to keep clean and maintain. Steel decking is cold and rusts easily. Rubber decking renders a functional appearance, yet does not seem to maintain as attractive or long lasting an appearance as wood or concrete does.

Each berth can and should be supplied with fresh water and electricity. The berths should be well lighted and are usually only accessible



to boat owners.

The correct berthing method, its layout and choice of materials, will play a major role in the success or failure of a marina.

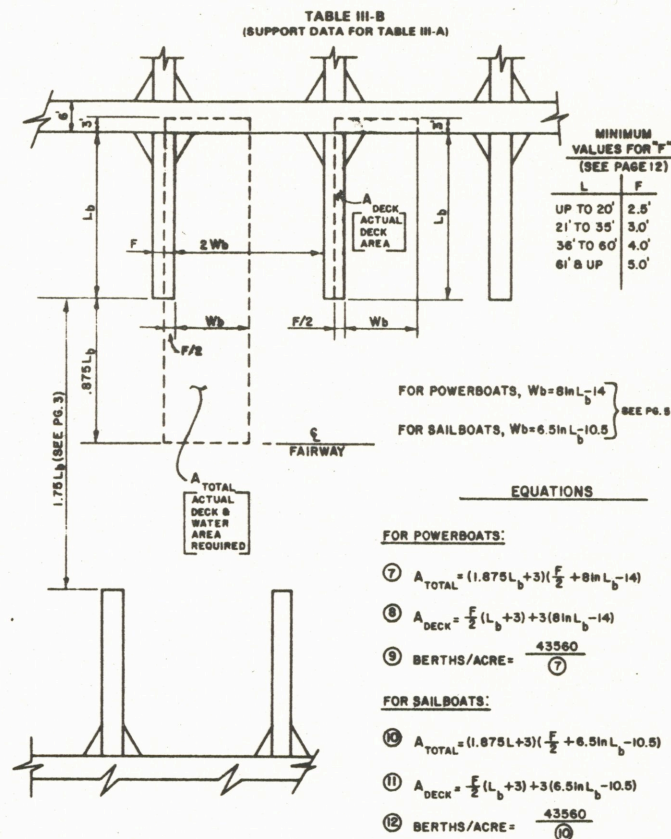
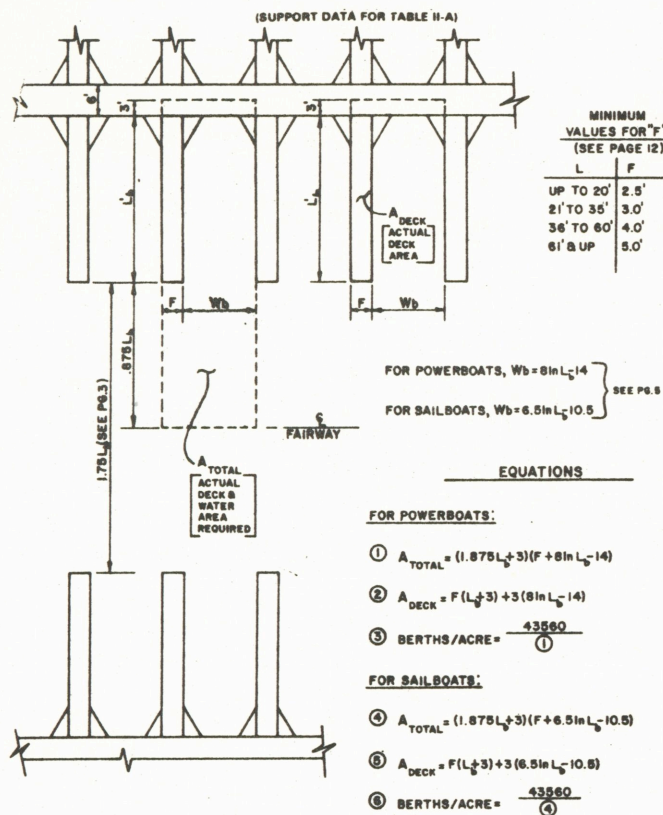


TABLE I
RECOMMENDED SINGLE BERTH WIDTHS*

"L" Berth Length (Feet)	ln L	POWERBOATS		SAILBOATS	
		$W_b = 8 \ln L - 14$ ** (Feet)	Recommended Widths *** (Feet)	$W_b = 6.5 \ln L - 10.5$ ** (Feet)	Recommended Widths *** (Feet)
16	2.77	8.2	8.5	7.5	7.5
18	2.89	9.1	9.5	8.3	8.5
20	3.00	10.0	10.0	9.0	9.0
22	3.09	10.7	11.0	9.6	10.0
24	3.18	11.4	11.5	10.2	10.5
26	3.26	12.1	12.5	10.7	11.0
28	3.33	12.7	13.0	11.2	11.5
30	3.40	13.2	13.5	11.6	12.0
32	3.47	13.7	14.0	12.0	12.0
34	3.53	14.2	14.5	12.4	12.5
36	3.58	14.7	15.0	12.8	13.0
38	3.64	15.1	15.5	13.1	13.5
40	3.69	15.5	15.5	13.5	13.5
42	3.74	15.9	16.0	13.8	14.0
44	3.78	16.3	16.5	14.1	14.5
46	3.83	16.6	17.0	14.4	14.5
48	3.87	17.0	17.0	14.7	15.0
50	3.91	17.3	17.5	14.9	15.0
52	3.95	17.6	18.0	15.2	15.5
54	3.99	17.9	18.0	15.4	15.5
56	4.03	18.2	18.5	15.7	16.0
58	4.06	18.5	18.5	15.9	16.0
60	4.09	18.8	19.0	16.1	16.5
62	4.13	19.0	19.0	16.3	16.5
64	4.16	19.3	19.5	16.5	16.5
66	4.19	19.5	19.5	16.7	17.0
68	4.22	19.8	20.0	16.9	17.0
70	4.25	20.0	20.0	17.1	17.5
72	4.28	20.2	20.5	17.3	17.5
74	4.30	20.4	20.5	17.5	17.5
76	4.33	20.6	21.0	17.6	18.0
78	4.36	20.9	21.0	17.8	18.0
80	4.38	21.1	21.5	18.0	18.0

* For double berth widths, multiply by two.

** These equations were developed by Cal Boating on an empirical basis via field observation and measurements, and review of boat manufacturers specifications on length and beam of power and sailboats typically found in California marinas and harbors.

*** Recommended widths are rounded "up" to the nearest half foot.

Note: To convert feet to meters, multiply by 0.3048.

TABLE II-A
BERTHING LAYOUT PLANNING DATA FOR SINGLE BERTHS

Fingerfloat Width (Feet)	"L _b " Length of Berth (Feet)	POWERBOATS			SAILBOATS		
		① Total Berth Area (Ft ²)	② Actual Deck Area (Ft ²)	③ Berths per Acre	④ Total Berth Area (Ft ²)	⑤ Actual Deck Area (Ft ²)	⑥ Berths per Acre
F = 2.5'	16	352.5	72.0	123.6	330.7	70.1	131.7
	18	427.1	79.9	102.0	396.4	77.4	109.9
	20	504.9	87.4	86.3	464.6	84.4	93.6
F = 3.0'	22	607.5	107.2	71.7	557.2	103.8	78.2
	24	692.4	115.3	62.9	631.6	111.5	69.0
	26	779.6	123.2	55.9	707.8	119.0	61.5
	28	869.0	131.0	50.1	785.8	126.5	55.4
	30	960.4	138.6	45.4	865.5	133.8	50.3
	32	1053.7	146.2	41.3	946.7	141.1	46.0
	34	1148.8	153.6	37.9	1029.4	148.3	42.3
F = 4.0'	36	1316.1	200.0	33.1	1183.9	194.4	36.8
	38	1418.2	209.3	30.7	1273.0	203.4	34.2
	40	1521.9	218.5	28.6	1363.3	212.4	32.0
	42	1626.9	227.7	26.8	1454.7	221.4	29.9
	44	1733.4	236.8	25.1	1547.3	230.3	28.2
	46	1841.1	245.9	23.7	1641.0	239.2	26.5
	48	1950.2	254.9	22.3	1735.6	248.0	25.1
	50	2060.4	263.9	21.1	1831.3	256.8	23.8
	52	2171.8	272.8	20.1	1927.9	265.5	22.6
	54	2284.3	281.7	19.1	2025.4	274.3	21.5
F = 5.0'	56	2397.9	290.6	18.2	2123.8	283.0	20.5
	58	2512.5	299.5	17.3	2223.0	291.7	19.6
	60	2628.2	308.3	16.6	2323.1	300.3	18.6
	62	2864.0	382.1	15.2	2543.2	374.0	17.1
	64	2985.3	392.8	14.6	2648.5	384.6	16.4
	66	3107.6	403.6	14.0	2754.6	395.2	15.8
	68	3230.7	414.3	13.5	2861.4	405.8	15.2
	70	3354.6	425.0	13.0	2969.0	416.3	14.7
	72	3479.4	435.6	12.5	3077.2	426.9	14.2
	74	3605.1	446.3	12.1	3186.0	437.4	13.7

Note: Numbers in circles refer to equations on page 7.

TABLE III-A
BERTHING LAYOUT PLANNING DATA FOR DOUBLE BERTHS

Fingerfloat Width (Feet)	"L _b " Length of Berth (Feet)	POWERBOATS			SAILBOATS		
		⑦ Total Berth Area (Ft ²)	⑧ Actual Deck Area (Ft ²)	⑨ Berths per Acre	⑩ Total Berth Area (Ft ²)	⑪ Actual Deck Area (Ft ²)	⑫ Berths per Acre
F = 2.5'	16	311.2	48.3	140.0	289.5	46.3	150.5
	18	381.2	53.6	114.3	350.5	51.1	124.3
	20	454.2	58.6	95.9	414.0	55.7	105.2
F = 3.0'	22	541.1	69.7	80.5	490.8	66.3	88.8
	24	620.4	74.8	70.2	559.6	71.0	77.8
	26	702.0	79.7	62.1	630.2	75.5	69.1
	28	785.7	84.5	55.4	702.6	80.0	62.0
	30	871.5	89.1	50.0	776.6	84.3	56.1
	32	959.2	93.7	45.4	852.2	88.6	51.1
	34	1048.7	98.1	41.5	929.2	92.8	46.9
F = 4.0'	36	1175.1	122.0	37.1	1042.9	116.4	41.8
	38	1269.7	127.3	34.3	1124.5	121.4	38.7
	40	1365.9	132.5	31.9	1207.3	126.4	36.1
	42	1463.4	137.7	29.8	1291.2	131.4	33.7
	44	1562.4	142.8	27.9	1376.3	136.3	31.6
	46	1662.6	147.9	26.2	1462.5	141.2	29.8
	48	1764.2	152.9	24.7	1549.6	146.0	28.1
	50	1866.9	157.9	23.3	1637.8	150.8	26.6
	52	1970.8	162.8	22.1	1726.9	155.5	25.2
	54	2075.8	167.7	21.0	1816.9	160.3	24.0
F = 5.0'	56	2181.9	172.6	20.0	1907.8	165.0	22.8
	58	2289.0	177.5	19.0	1999.5	169.7	21.8
	60	2397.2	182.3	18.2	2092.1	174.3	20.8
	62	2565.9	219.6	17.0	2245.0	211.5	19.4
	64	2677.8	225.3	16.3	2341.0	217.1	18.6
	66	2790.7	231.1	15.6	2437.8	222.7	17.9
	68	2904.4	236.8	15.0	2535.2	228.3	17.2
	70	3019.0	242.5	14.4	2633.3	233.8	16.5
	72	3134.4	248.1	13.9	2732.2	239.4	15.9
	74	3250.7	253.8	13.4	2831.7	244.9	15.4

Note: Numbers in circles refer to equations on page 9.

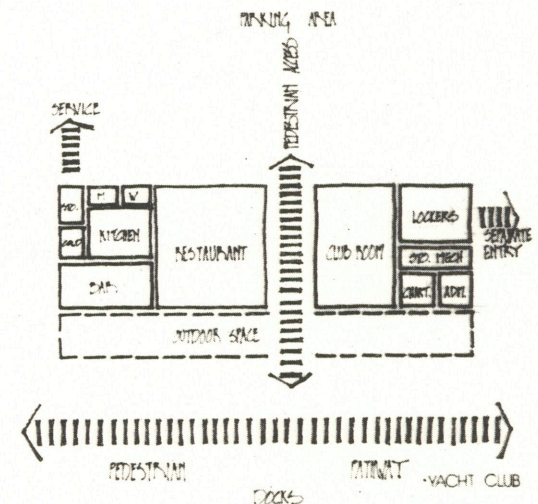
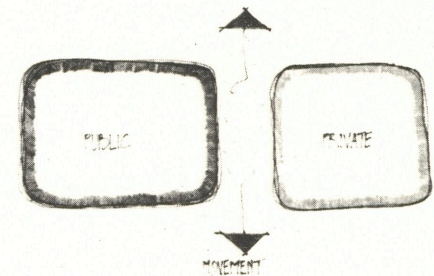
landside facilities

Yacht Club

A yacht club is a building designed for the gathering together of boating enthusiasts. Yacht clubs generally are private in nature requiring dues of their members in order to maintain the facilities. Some clubs may choose to allow public access to the bar and restaurant facilities within the club building or buildings. By opening the club doors to the public additional memberships may be encouraged. The proposed yacht club for Port San Luis is to be a private club yet allow public access to the bar and restaurant. The club will be situated so as to be a focal point within the marina and attract the general public to patronize its bar and restaurant.

The main function of the club building, is to have a place for members to organize regattas, lectures, workshops, films, and monthly meetings. Outdoor, as well as interior spaces are very important. California weather lends itself well to extensive outdoor activities. Club activities may include many barbecues as well as other party related picnic activities.

The yacht club needs to have direct relationship with the water.

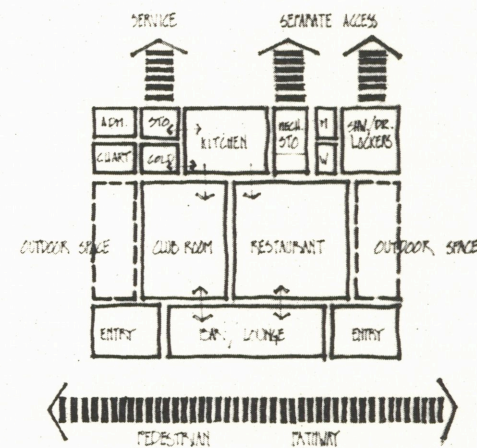
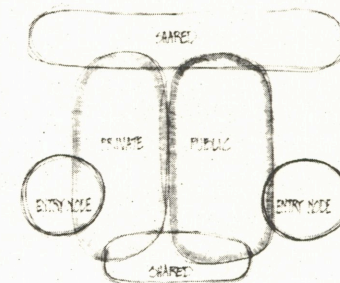


Therefore, locating the building directly with the water is imperative. The club building, especially in small recreational harbors, is a building of central focus. This focus is not only important to yachtsmen coming into the harbor from the sea, but pedestrians and vehicles as well. The pedestrian and vehicular access should be encouraged.

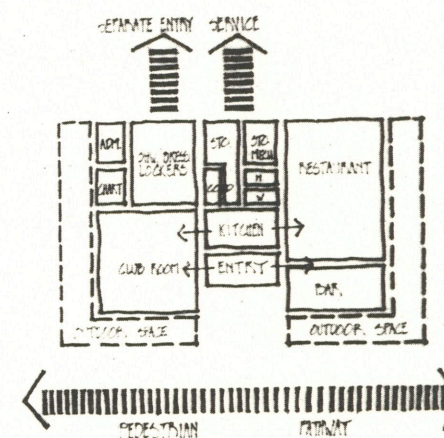
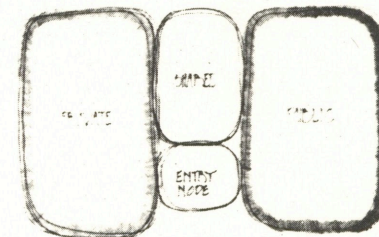
The yacht club must have direct access to the guest docks, permanent berths, harbor master's office, shops, and parking. "It is important in their accommodation that they are not cut off from the main harbor but keep in contact with it in both a physical and social context, thus providing for boat owners with a secondary interest and other sporting enthusiasts with the opportunity of becoming boat owners."²¹

The proposed yacht club premises will include:

- Clubroom
- Restaurant/bar
- Kitchen
- Restrooms
- Showers
- Dressing room/lockers
- Administrative office/secretary
- Conference/chart room
- Storage
- Mechanical/service
- Outdoor dining/bar



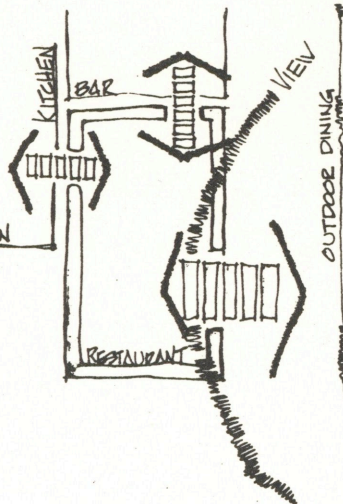
The clubroom, restaurant, bar, and kitchen should be adjacent spaces because their function requires the occasional use of the neighboring space. The administrative office, receptionist/secretary, conference, and chart room, are all directly club related spaces. A storage room will need to be located to store racing buoys and other boat related equipment and its adjacency to the water is important. The locker rooms are for club members and require an outside entrance adjacent to the docks.



YACHT CLUB

area RESTAURANT DINING RM.
 use TO SERVE FOOD
 character NAUTICAL
 view DIRECT VIEW TO DOCKS AND SEA
 ventilation IMPORTANT
 acoustic QUIET / SUITABLE FOR CONVERSATION
 floor SOFT / HARD @ ENTRY
 illumination INTIMATE @ NIGHT / NATURAL

PUBLIC ACCESS, FOR USE BY CLUB.

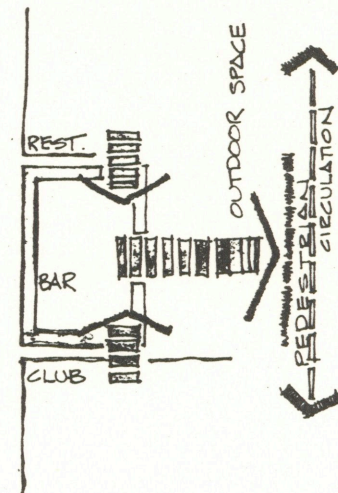


special requirements

sq. ft. 3000 15¢/person 200 persons study

area BAR
 use SERVING ALCOHOLIC AND NON ALCOHOLIC BEVERAGES
 character SOCIAL / SUBTLED
 view WATER / DOCKS
 ventilation IMPORTANT
 acoustic SUITABLE FOR BANDS
 floor SOFT / HARD @ DANCE
 illumination SOFT / SPOT @ DANCE / BAND

THE SPACE SHOULD BE ACCESSIBLE TO THE PUBLIC YET SERVE AS THE CLUB BAR.

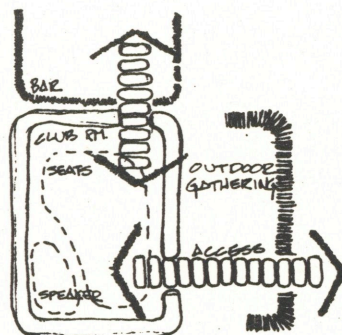


special requirements

sq. ft. 750-900 study

area CLUBROOM
 use MEETINGS AND INFORMAL GATHERINGS, USED MOSTLY TO DISCUSS CLUB ACTIVITIES
 character INFORMAL / GROUP
 view VISUAL CONTACT W/ WATER
 ventilation IMPORTANT FOR SMOKE REMOVAL
 acoustic SPEAKER / DIRECTIONAL NATURAL / SPOT / GENERAL ATTN.
 floor SOFT @ SEAT. / HARD @ ENTRY
 illumination NATURAL / SPOT / GENERAL

SPACE SHOULD BE VISIBLE TO PUBLIC YET NOT ACCESSIBLE KITCHEN ACCESS

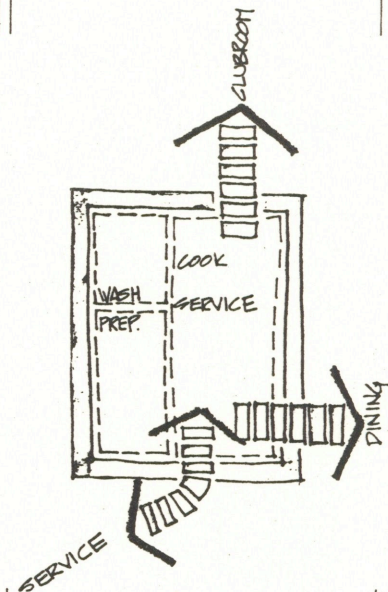


special requirements

sq. ft. 900-1000 200 persons 5¢/person study

area KITCHEN
 use TO PREPARE FOOD
 character FUNCTIONAL
 view DINING ROOM
 ventilation ESSENTIAL STOVES / DISHES
 acoustic ABSORB COOKING SOUNDS
 floor HARD / FUNCTIONAL
 illumination FUNCTIONAL TOOL / INDIRECT / NATURAL

THIS SPACE USED BOTH BY PRIVATE CLUBROOM AND BY PUBLIC DINING ROOM COOKS.



special requirements

sq. ft. 400 study

area ADMINISTRATIVE OFFICE

use TO OPERATE RESTAURANT/BAE

character PLEASANT

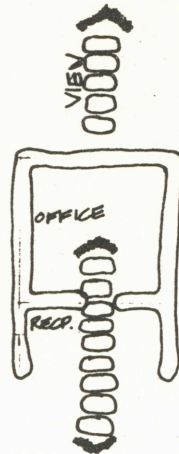
view WINDOW

ventilation NATURAL

acoustic QUIET / WORK ENVIRONMENT

floor SOFT

illumination SOFT TASK / NATURAL



ADJACENT SECRETARY

special requirements

sq. ft. 100-125

study

area CLUBROOM

use CLUBS / SMALL CONFERENCE

character INTIMATE / RESTFUL

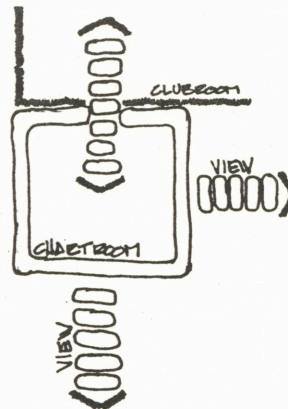
view WINDOW

ventilation NATURAL

acoustic QUIET

floor SOFT

illumination TASK / INTIMATE



ACCESS TO CLUB MEMBERS

special requirements

sq. ft. 125

study

area RESTROOMS

use FOR GROOMING/RESTAURANT

character PLEASANT / FUNCTIONAL

view NOT REQUIRED

ventilation REQUIRED / 1 AIR CHANGE / 15 MIN.

acoustic ABSORBS ECHO OF HARD SURFACES

floor HARD DURABLE

illumination NATURAL / INDIRECT / INCANDESCENT

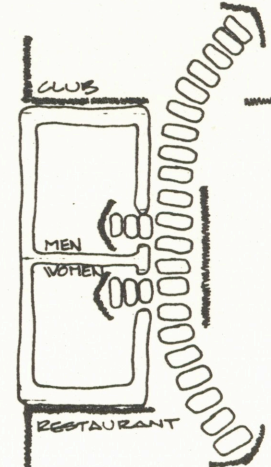
M. 2 W. 1 OR 2 LAV.
W. 3 W. 2 LAV.

ACCESS FROM RESTAURANT
REQUIRED. CLUBROOM MAY HAVE
ACCESS ALSO.

special requirements

sq. ft. 150 each

study



area STORAGE LOCKERS

use STORAGE OF SPECIAL SAILING GEAR, RACING EQUIP., ACTIVITY EQUIP.

character FUNCTIONAL

view NOT REQUIRED

ventilation ESSENTIAL / NATURAL / MECH. MUST DRY SAILS

acoustic FUNCTIONAL

floor HARD DURABLE

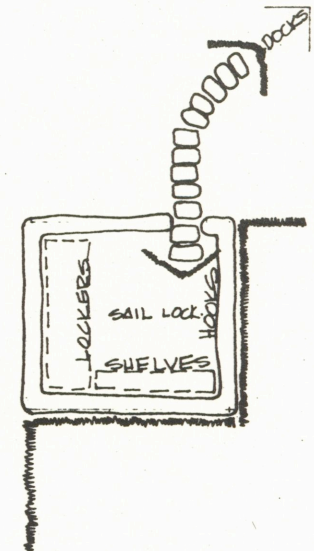
illumination NATURAL / ARTIF. FUNCTIONAL

EXTERIOR ACCESS PREFERRED
WET MATERIALS STORED

special requirements

sq. ft. 300

study



area LOCKERS / LAVATORIES / SHOWERS

use FOR USE BY CLUB MEMBERS

character FUNCTIONAL

view NOT REQUIRED

ventilation REQUIRED / 1 AIR CHANGE / 15 MIN

acoustic REDUCTION IN ECHO

floor WHD / UTILITY

illumination NATURAL / SKYLIGHTS / GENERAL

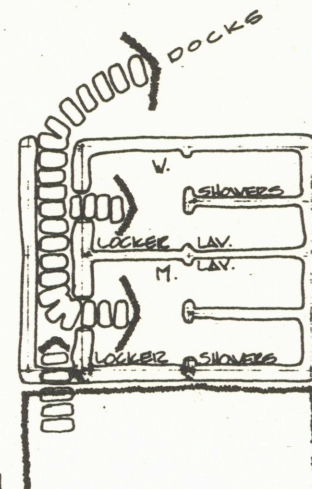
M. 3 SH. 2 WC. 2 E. 2 LAV.
W. 3 SH. 3 VC. 2 LAV.

PLACED IN PROXIMITY TO
DOCKS. EXTERIOR ACCESS
ESSENTIAL. INT. ACCESS OPTION
50 SMALL LOCKERS EA.

special requirements

sq. ft. 300-400 each

study



Harbor Master's Office

The harbor master is the overseer of the entire marina. The harbor master's office provides the necessary security that a modern marina demands. The office, at least in large marinas, is in operation twenty four hours a day, seven days a week. The office serves as the nerve center for the marina. It receives radio communication from craft at sea needing assistance, weather information or navigation assistance. The harbor master is responsible for maintaining weather flags that may warn of heavy seas or high winds. Small craft advisory flags, gale flags, etc., will even be raised higher than the national flag in order to make sure they are noted. Along with the weather flags are sensitive weather monitoring instruments continually recording the weather conditions. The weather conditions are made available to ships at sea at all times.

The office serves as an information center for guests to the marina, either arriving by land or by sea. The harbor master assigns guest slips to visiting yachts, and also maintains accurate records of permanent slip assignments. The harbor master could be considered a policeman. A harbor patrol officer may issue tickets to boat owners that violate marina

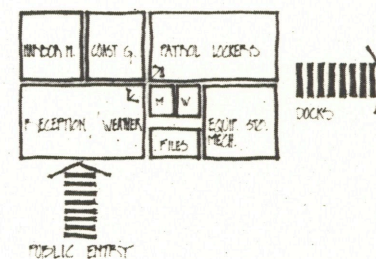
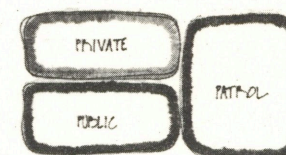
speed limits, sanitary requirements, etc. In most cases the harbor master has several officers who continuously monitor the harbor, patrolling by foot or by boat.

The building should be located within the marina so as to have the most advantageous view of the entire harbor, entry channel, and out to sea. This building should be the first building a yachtsman sees when entering the harbor. It should be readily identifiable as the harbor master's office, especially to a new yacht visiting the harbor for the first time. People towing in their boats from landside should be able to see the weather flags easily from the launch ramp, as the wind direction becomes critical, especially when launching a sailboat.

The harbormaster's office will contain:

- Receptionist's desk
- Harbor master's office
- Coast guard/customs office
- Office storage/files
- Equipment storage
- Patrol lockers/lounge
- Restrooms

The duties of the receptionist include serving as secretary, radio operator, and weather monitor. All general information coming into or



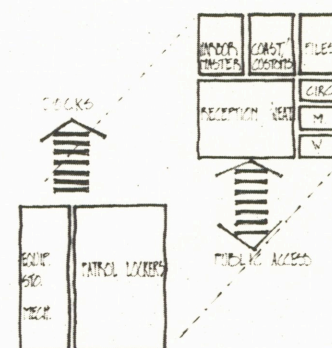
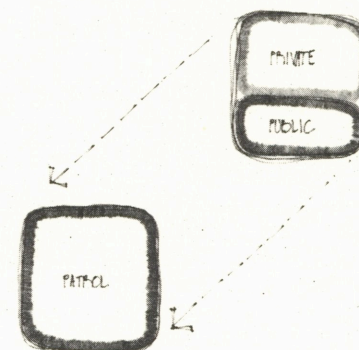
leaving this office goes through this person.

The harbor master has a private office generally accessible only to him or to others by appointment. He generally has several patrol officers who work under his command. An extra office is also provided for a Customs/Coast guard officer. Port San Luis has a coast guard pier near the old breakwater.

The storage room should be located conveniently adjacent to the secretary/receptionist space.

Located within easy reach of the patrol docks is the equipment locker; this is also adjacent to the patrol persons' locker/lounge. Patrol persons report to their locker/lounge at the beginning or end of their shifts.

The mechanical room is located to best suit the H.V.A.C. needs of the building. Cooling is easily available through natural ventilation. Heat becomes necessary on cool winter nights and mornings.



HARBOR MASTER

HARBOR MASTER

area HARBOR MASTERS OFFICE

use PRIVATE OFFICE FOR HARBOR MASTER

character PLEASANT

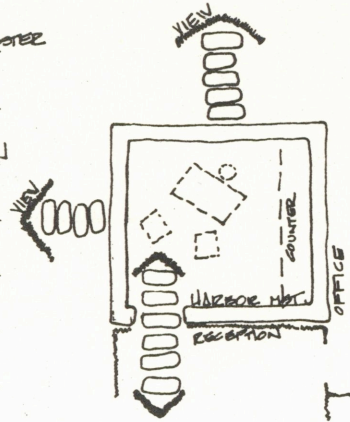
view VIEW OUT TO BERTHS AND SEA
NOT ESSENTIAL AS IN RECEPTION

ventilation NATURAL

acoustic QUIET / WORK ENVIRONMENT

floor SOFT

illumination SOFT TASK / NATURAL



NEED A DESK, CHAIRS, AND
COFFEE COUNTER.

special requirements

sq. ft. 125-150

study

area RECEPTION / WEATHER

use RECEIVE PUBLIC / WEATHER / CUSTOMS
MONITOR RADIO

character OPEN / WELCOME ATTITUDE

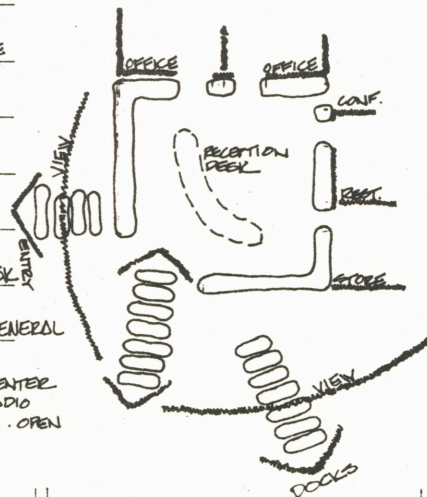
view ENTIRE HARBOR AREA

ventilation NATURAL / MECH. (SOME)

acoustic QUIET / ABSORB

floor HARD @ ENTRY / SOFT @ DESK

illumination NATURAL / SOFT TASK / GENERAL



THE OFFICE IS THE NERVE CENTER
FOR HARBOR SECURITY, RADIO
CONTACT, AND U.S. CUSTOMS. OPEN
ON A 24 HOUR BASIS.

special requirements

sq. ft. 300

study

area COAST GUARD / U.S. CUSTOMS

use COAST GUARD OFFICER / CUSTOMS

character PLEASANT

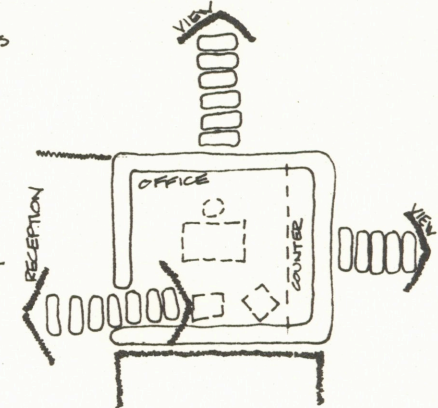
view VIEW OUT TO SEA, BERTHS

ventilation NATURAL

acoustic QUIET / WORK ENVIRONMENT

floor SOFT

illumination SOFT TASK / NATURAL



NEEDS A DESK, CHAIRS, AND
COFFEE COUNTER.

special requirements

sq. ft. 125-150

study

area STORAGE / FILES

use STORAGE OF RECORDS / MISC.

character FUNCTIONAL

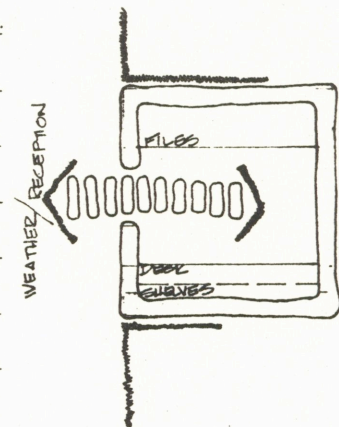
view NONE REQ.

ventilation MECH / NATURAL

acoustic FUNCTIONAL

floor SOFT

illumination TASK / GENERAL



SPACE FOR LAYOUT / FILE CAB.

special requirements

sq. ft. 15-100

study

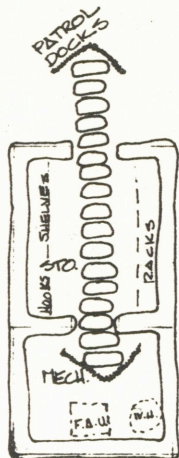
area EQUIPMENT STORAGE/MECH.
 use MECH.
 LOCK UP FOR PATROL EQUIP.
 character FUNCTIONAL
 view PATROL BERTHS
 ventilation ESSENTIAL TO DRY WET EQUIP.
 acoustic SOME ABSORPTION BETWEEN SPACES
 floor HARD/UTILITY
 illumination FUNCTIONAL

FLOORING AND VENTILATION MUST BE ABLE TO HANDLE DIESEL AND GASOLINE SPILLAGE. STORAGE RACKS FOR OOPS/OUTBOARD MOTORS. EASY ACCESS TO PATROL DOCKS.

special requirements

sq. ft. 150-175 (STORAGE) 75 (MECH.)

study

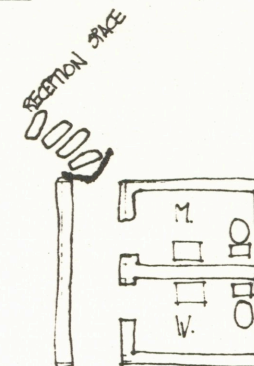


area RESTROOMS
 use PUBLIC/OFFICE USE
 character FUNCTIONAL
 view NOT REQ.
 ventilation 1 AIR CHANGE/15 MIN.
 acoustic FUNCTIONAL
 floor HARD DURABLE
 illumination GENERAL/TASK & MIRRORS

special requirements

sq. ft. 35 EA.

study



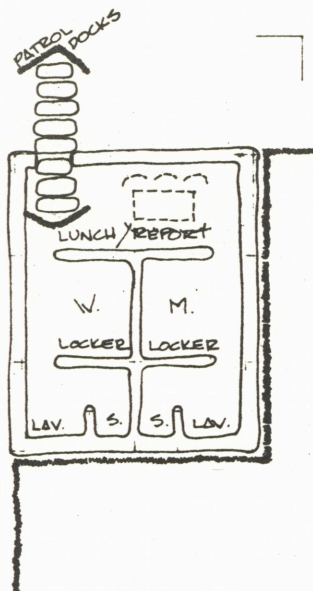
area PATROL PERSONS LOCKER
 use AREA WHERE PATROL PERSON REPORTS TO WORK CHANGE ROOM
 character FUNCTIONAL YET PLEASANT
 view DOCKS/PATROL PARKING
 ventilation 1 AIR CHANGE/15 MIN.
 acoustic FUNCTIONAL
 floor HARD/UTILITY
 illumination FUNCTIONAL

PROVIDE FOR CHECK-IN AND CHECK-OUT. CHANGE AREA, LAV. & SHOWNERS.

special requirements

sq. ft. 600

study





Shops

Recreational harbors generally contain a variety of shops that cater to boat owners and visitors alike. The shops provide convenience services that eliminate the need to leave the harbor for general essentials. The location within the overall marina plan should allow the shops to have visual connection with the docks, especially the guest docks, and easy access to visitors entering the harbor from landside. "The traditional harbour plan often places the shopping and market area just behind the quay wall. It is unusual to find shops that front the water firstly, because single-sided shopping is rarely successful and, secondly, for reasons of exposure. Nevertheless, the relationship between a marina and a shopping area presents exciting possibilities both physically and financially."²²

The types of shops that are appropriate to a marina at Port San Luis may include:

- Marine hardware
- Machine Shop
- Food and General Store
- Chandlery/Clothes
- Boat Sales
- Fish Store

Dive Shop
Book Shop
Art Gallery

The shop space at Port San Luis will be designed so as to be flexible and not restricted to one type of use. The spaces will be leased units that can be adapted to various businesses. The only exception being the marine hardware/machine shop, as the service provided is essential in a modern marina.

Pedestrian movement and interaction is an important ingredient in order for shops to become a successful part of the marina. The building or buildings need to encourage the pedestrian to pass through and not pass around them. The building(s) needs to be obvious and to express itself as a retail establishment.

RETAIL

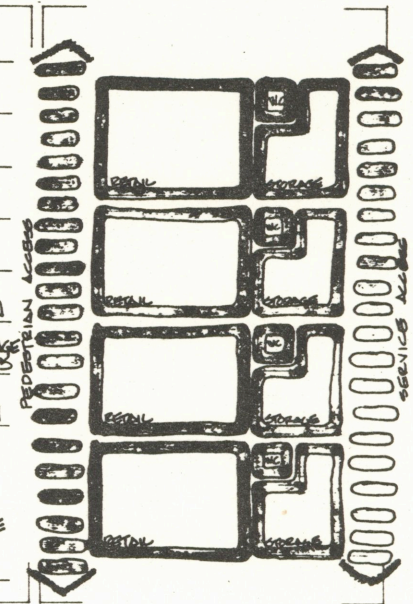
area	RETAIL SHOPS / SALES
use	VARIABLE USE SPACES
character	TENANT IMPROVE RENTABLE SPACE
view	WATER RELATIONSHIP ACCESS TO PEDESTRIANS
ventilation	NATURAL / SOME MECH.
acoustic	SOUND ABSORPTION BETWEEN
floor	SOFT & RETAIL / HARD & SHOPS
illumination	SPOT / GENERAL / TENANT OPTION

SIZES OF SHOPS WILL VARY
IN ORDER TO OFFER A CHOICE
FOR RENTAL.

special requirements

sq. ft. 3000

study



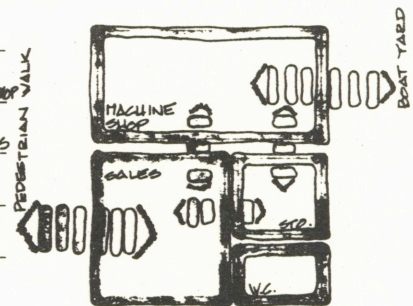
area	MARINE HARDWARE / MACHINE
use	TO SUPPLY RECREATIONAL BOATERS / FISHERMEN W/ MARINE HARDWARE
character	FUNCTIONAL SHOP AREA BRIGHT / ORGANIZED SALES
view	ADJACENT TO WALKWAYS
ventilation	NATURAL & SALES / SOME MECH. SHOP
acoustic	SEPARATION BETWEEN SHOP / SALES
floor	SOFT & SALES / HARD & SHOP
illumination	FUNCTIONAL & SHOP SPOT / INCANDESCENT & SALES

SHOP MUST HAVE ACCESS TO
BOAT YARD. SALES MUST
HAVE EASY ACCESS TO DOCKS.

special requirements

sq. ft. 3500

study



Sanitary Facilities

Public restrooms will be required at various locations throughout the marina. They will also provide boat owners with the opportunity to shower and wash cloths. The maximum distance from any berth to a restroom should be 1000 feet. A general rule of thumb for toilet fixtures is: one toilet fixture per sex for every 25 berths and one lavatory per sex for every 50 berths.

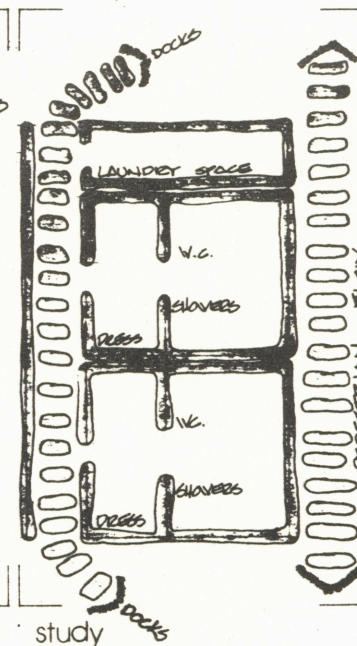
RESTROOMS

area	WASHROOMS / SHOWERS / LAUNDRY
use	CONVENIENCE USE FOR BOATERS
character	FUNCTIONAL
view	CLOSE TO DOCKS
ventilation	1 AIR CHANGE / 15 MIN.
acoustic	ABSORB EXCESS SOUND
floor	WOOD / UTILITY
illumination	FUNCTIONAL

FOR USE BY BOAT OWNERS.
OPEN KEY HOLDERS ONLY.

special requirements

sq. ft. 700



Service Station/Launch Supervision

A marine service station should be located so as to easily serve boats afloat and on trailers. The landside pumps should contain gasoline for autos, diesel, and motor boat mix. The pumps at dock level will supply diesel and fuel mix to boats in the water. Ease of access is critical with both the landside and dock pumps.

Besides selling fuel the service station will also monitor the use of the launch ramp and hoists. A marine mechanic should be available for aid to boaters.

FUEL

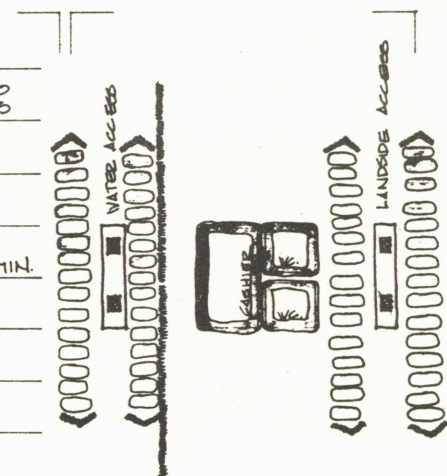
area	GASOLINE SALES
use	SALE OF GASOLINE TO CARS/TRAILERS/BOATS
character	LOW/SMALL BUILDING
view	WATER
ventilation	N.C./1 AIR CHANGE/15 MIN.
acoustic	FUNCTIONAL
floor	UTILITY
illumination	LIGHTS & PUMPS GENERAL/NATURAL

special requirements

sq. ft. 250

study

CRITICAL ACCESS REQUIREMENTS
EDGE OF FUELING
GASOLINE/DIESEL/FUEL MIX



Parking

Parking will be required at various locations throughout the marina. It should have a direct relationship with the functions being served. The transition from car to waters edge will need to be buffered so as not to infringe on the pedestrian zone. Parking in a marina development may tend to overpower the site planning of the land areas. The parking areas will require softening and sculpturing so as to best suit the needs of the marina, and fit well within the environment.

The types of parking that are recommended:

Car Parking	0.6 spaces/berth 0.2 spaces/fishing berth Space: 9 x 20
Car/trailer launch	75 spaces Space: 49' x 12'
Harbor master	3 spaces-patrol 2 spaces-patrol cars 1 spaces-harbormaster 4 spaces total
Shops	1 space/300 sq.ft. retail 1 space/600 sq.ft. storage
Yachtclub/restaurant/bar .	1 space/patrontable 1 space/2 counter stools
Repair Yard	10 large boats Space: 15' x 45'

boat handling

Boat Launching Facilities

Unless a boat is sailed into Port San Luis from another harbor, it will have to be launched from its drydock or trailer. There are numerous types of equipment available for just this purpose, such as:

- Winches
- Gantries
- Railways
- Platforms and Lifts
- Hoists
- Cranes
- Derricks and Shearlegs
- Davits
- Forklifts
- Tractors and Trailers
- Launching Ramps

The Port San Luis marina will require a launch ramp capable of allowing the launching of four boats simultaneously. Hose bibs with fresh water should be located at a reasonable distance from the launch ramp. These are to facilitate immediate removal of salt water from boats and engines. Launch ramps are usually constructed of concrete, grooved so that care tires will have the added traction needed to pull a boat and trailer from the water. "The degree of slope in fixed ramps is generally 5°-15°."²⁴

A winch should be located near the boat launch area. This winch can be operated by the boat owners single handedly. The winch is recommended for small boats that one or two persons can handle.

A gantry or hoist is a necessary piece of equipment in a marina. The hoist is preferred over the gantry because of its mobility. It can be operated by one person, although he or she must be trained in its operation. Located near the launch facilities, it can handle the movement of large boats (ranging from 8-50 tons) from the water to drydock or vice versa.

_____ guidelines and codes.

Design Guidelines

Water Areas

Channels - Entrance

Minimum Width: 75 feet at design depth

Minimum Depth: 3 feet below deepest draft vessel anticipated to be berthed in harbor, or 4 feet whichever is greater.

Channels - Interior

Minimum Width: 75 feet at design depth

Minimum Depth: 2 feet below deepest draft vessel anticipated to be berthed in harbor, or 4 feet, whichever is greater.

Fairways

Minimum Width: 1.75 times length of longest berth where berths are perpendicular to the fairway.

1.50 times length of longest boat where boats are berthed parallel to the fairway.

Minimum Depths:

Berth length	Minimum Depth	
	power	sail
up to 25'	4'	4'
35'	6'	6'
45'	6'	6'
55'	8'	8'
65'	8'	10'

Berths - single

Minimum Water Depth: same as for fairways

Minimum Width: beam of boat + 2 feet

Berths - double

Minimum Water Depth: same as for fairways
and singles

Minimum Width: double berth equal to sum
of two single berths

Building Codes (Uniform Building Code 1976 Ed.)

Group A division 3

Any building or portion of a building having an assembly room with an occupant load of less than 300 without a stage, including such buildings used for educational purposes and not classed as a group E or group B Division 2 Occupancy.

Group H division 4

Repair garages

Group B division 1

Gasoline and service stations, storage garages where no repair work is done except exchange of parts and maintenance requiring no open flame, welding or the use of highly flammable liquids.

Group B division 2

Wholesale and retail stores, office buildings, drinking and dining establishments having an occupant

load of less than 100.

Requirements Based on Occupancy

			Live loads
Yacht club	- Group A	division 3	100 lbs/ft ²
Shops	- Group B	division 2	75 lbs/ft ²
Harbormaster	- Group B	division 2	50 lbs/ft ²
Service station	- Group B	division 1	100 lbs/ft ²
Public toilet/showers/lockers			50 lbs/ft ²
Machine shop	- Group B	division 4	125 lbs/ft ²

Required Separations

Yacht club.....(A-3) - (B-2) none, (B-2) - (B-4) 1 hour

Machine shop...(B-2) - (B-4) 1 hour

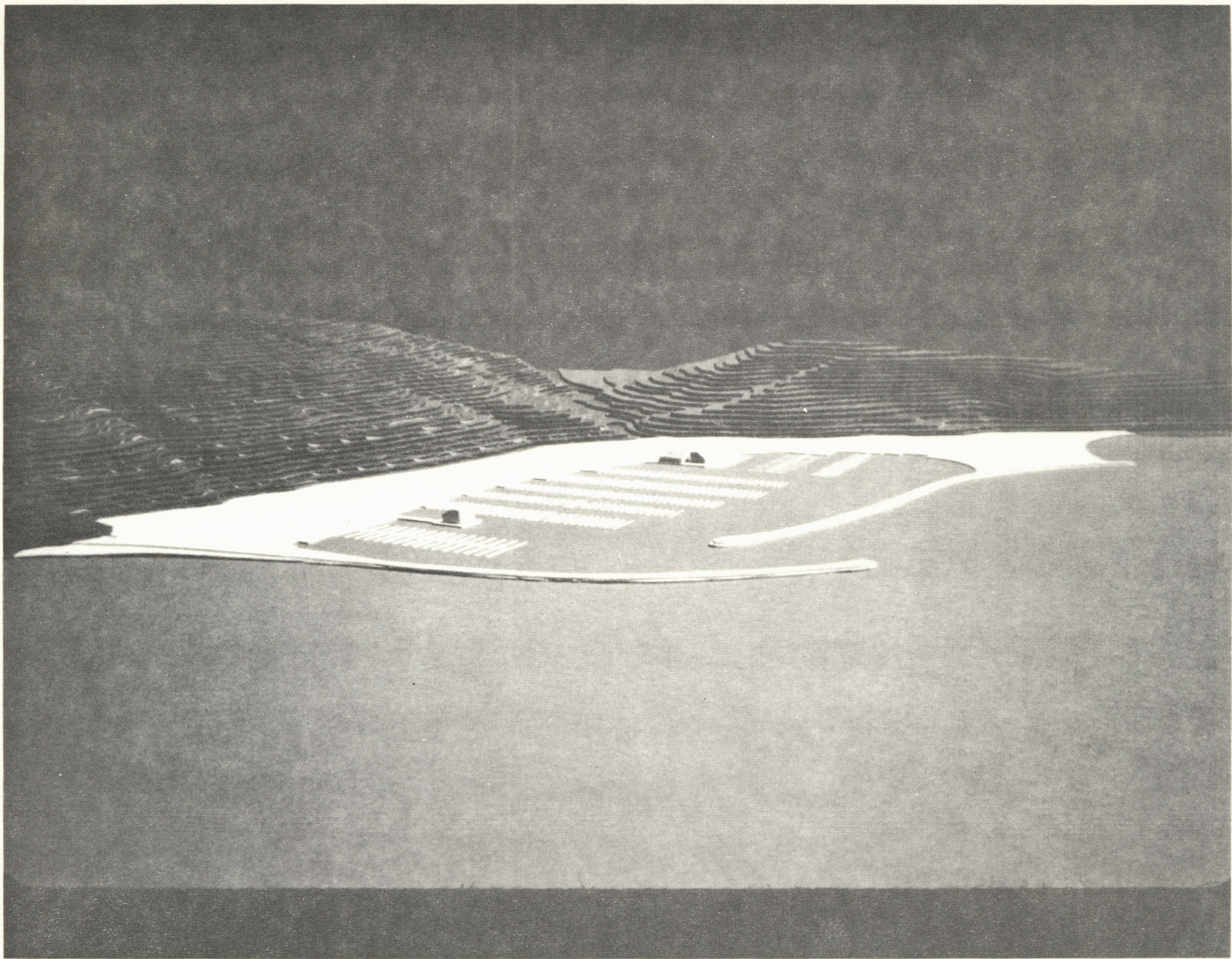
Ventilation @ toilet rooms.....1 air change/15 min
Group B-2

Floors: such water closet rooms in connection with
food establishments where food is prepared, stored,
or served, shall have a nonabsorbent interior
finish on floors, walls, and ceilings and shall

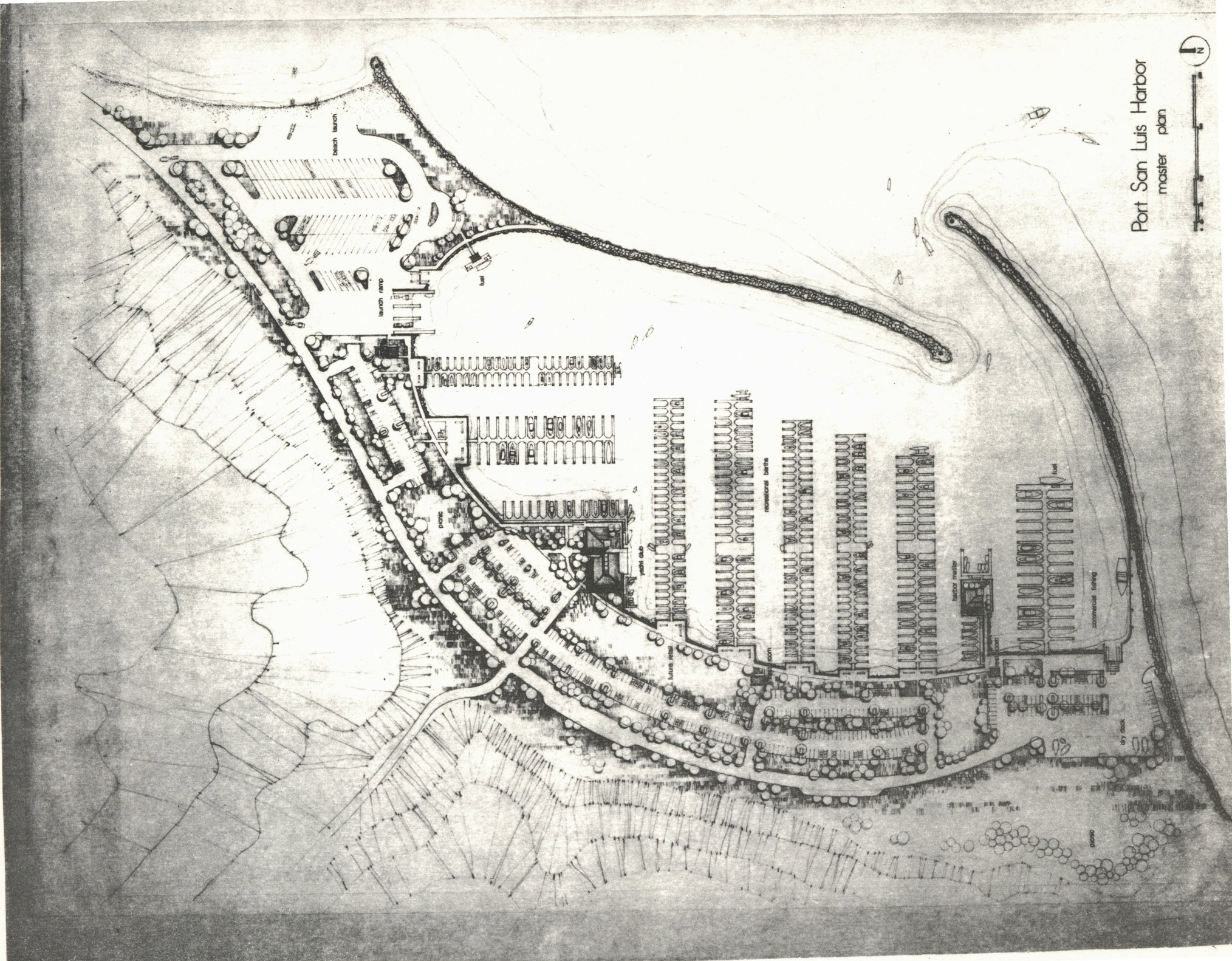
have hand washing facilities therein or adjacent
thereto.

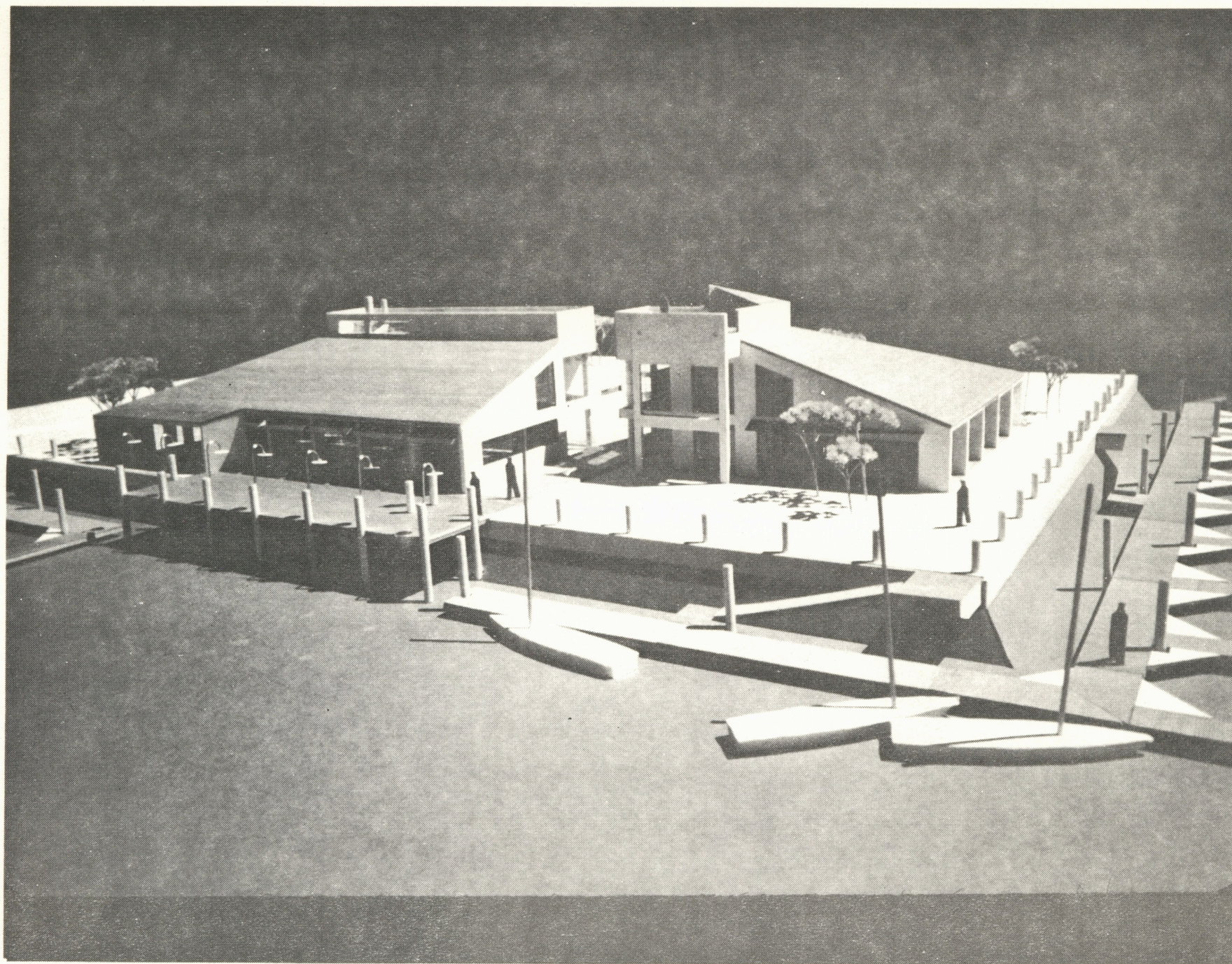
preliminary design

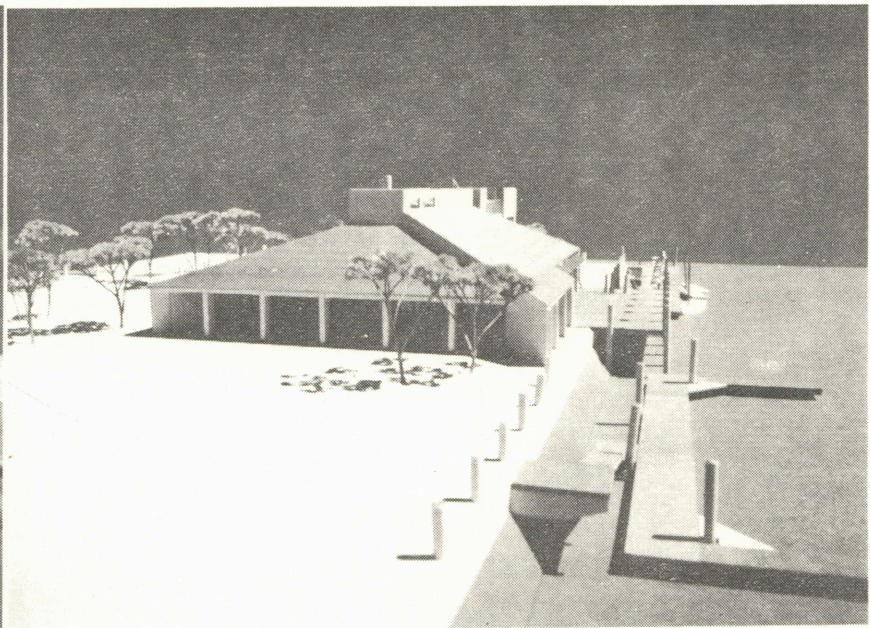
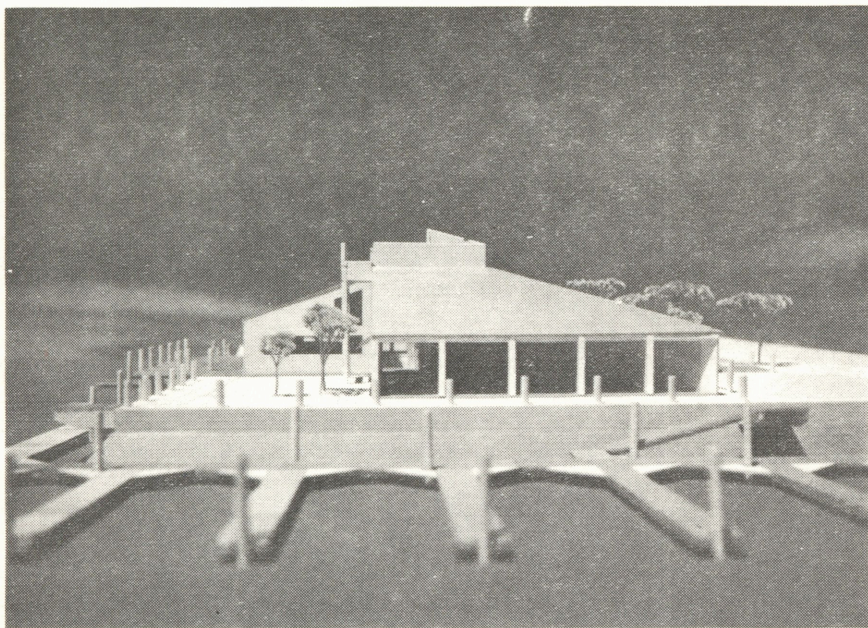
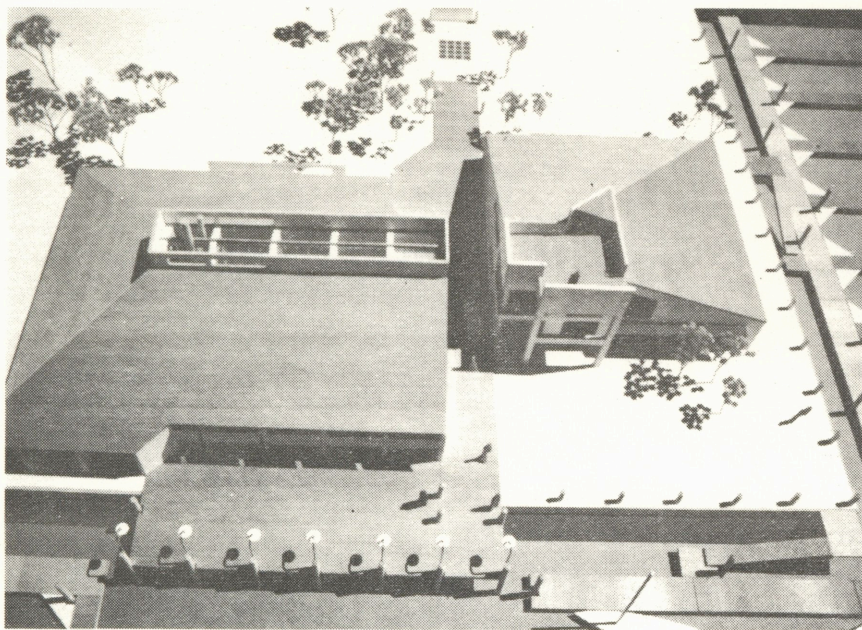
design

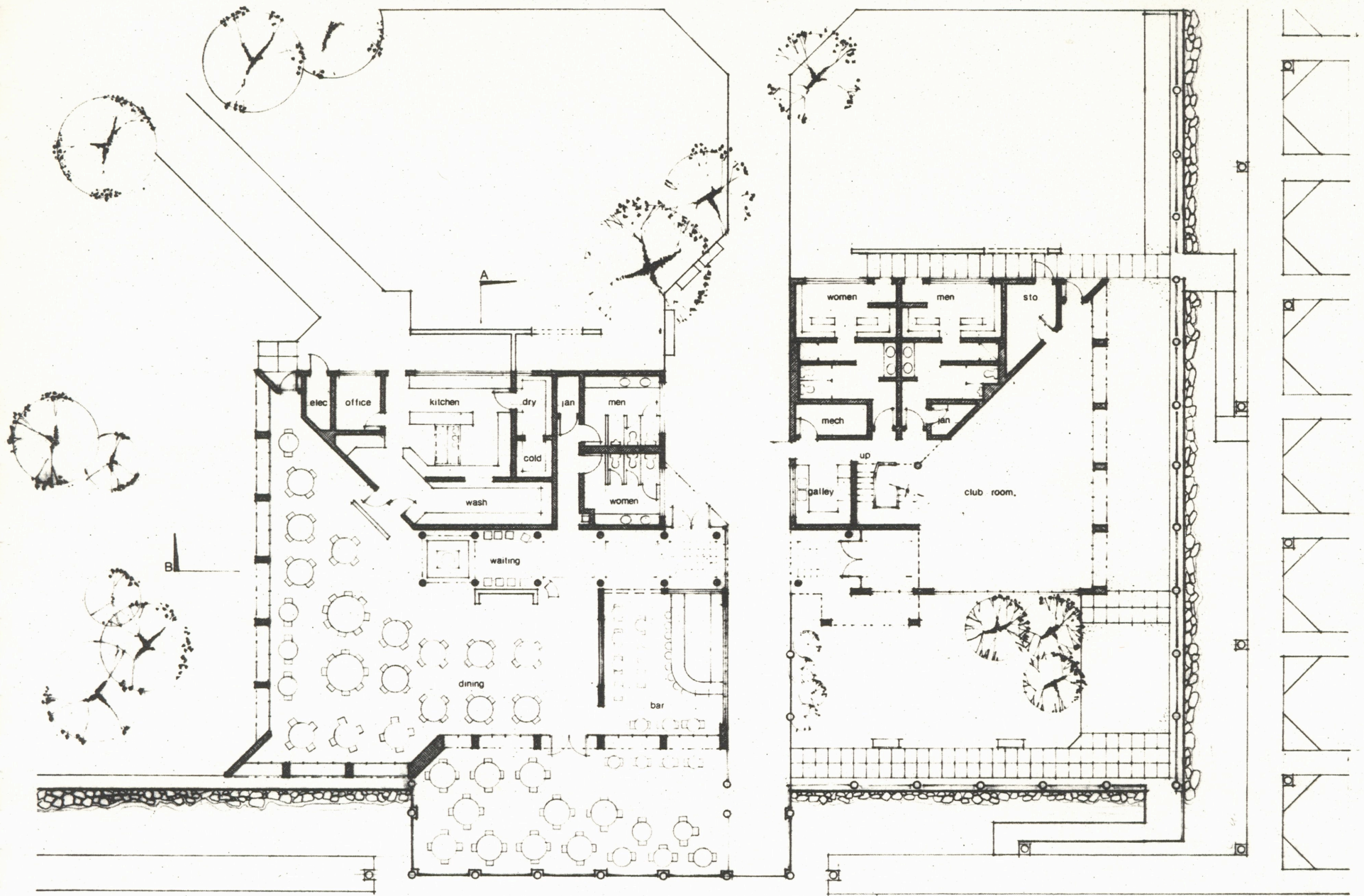


Port San Luis Harbor
master plan



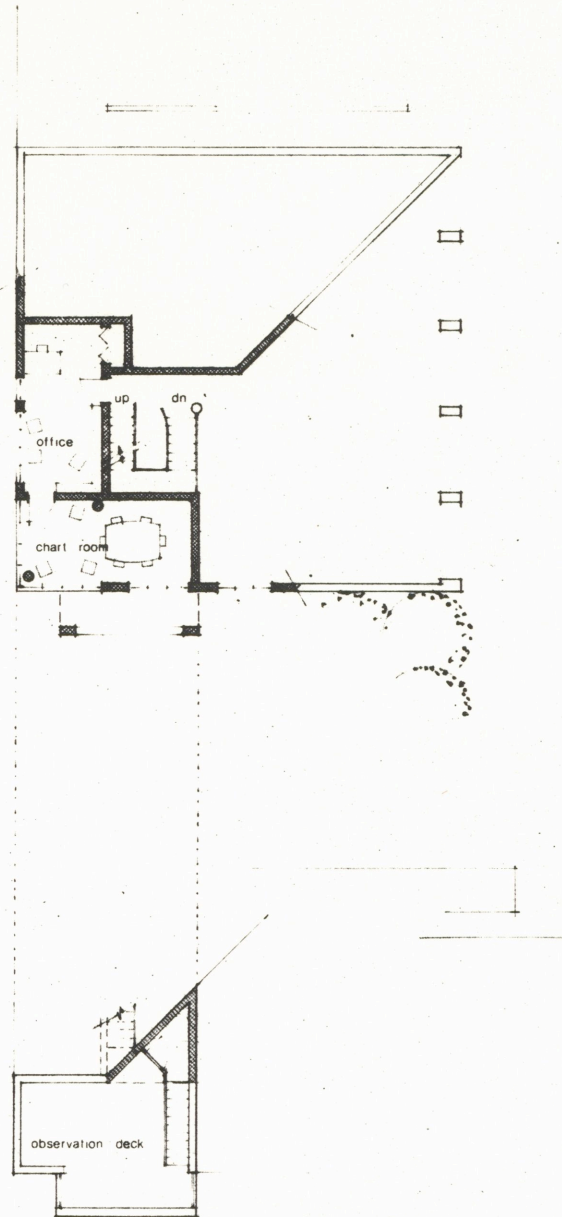
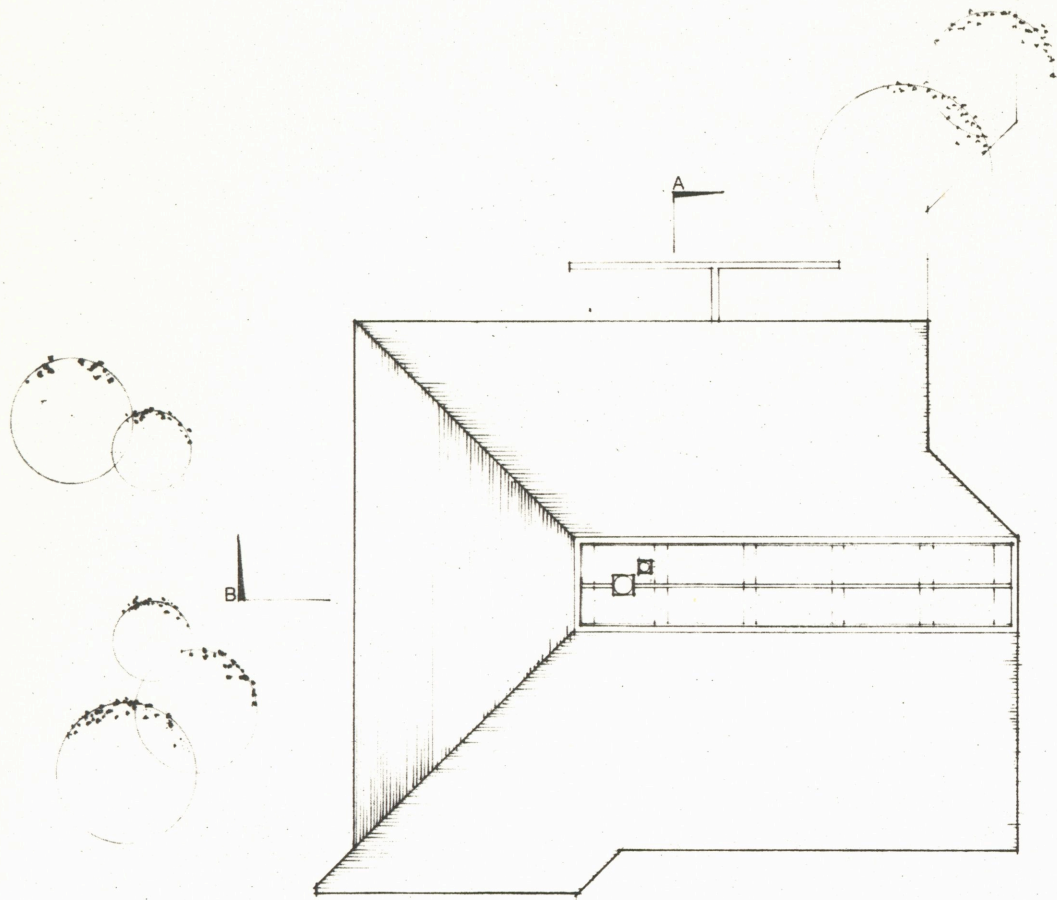




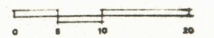


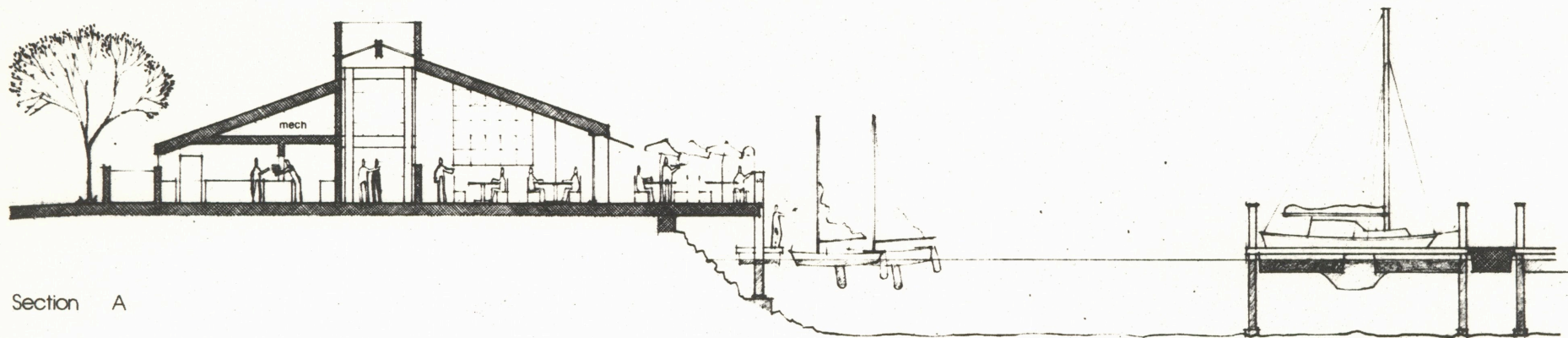
Yacht Club



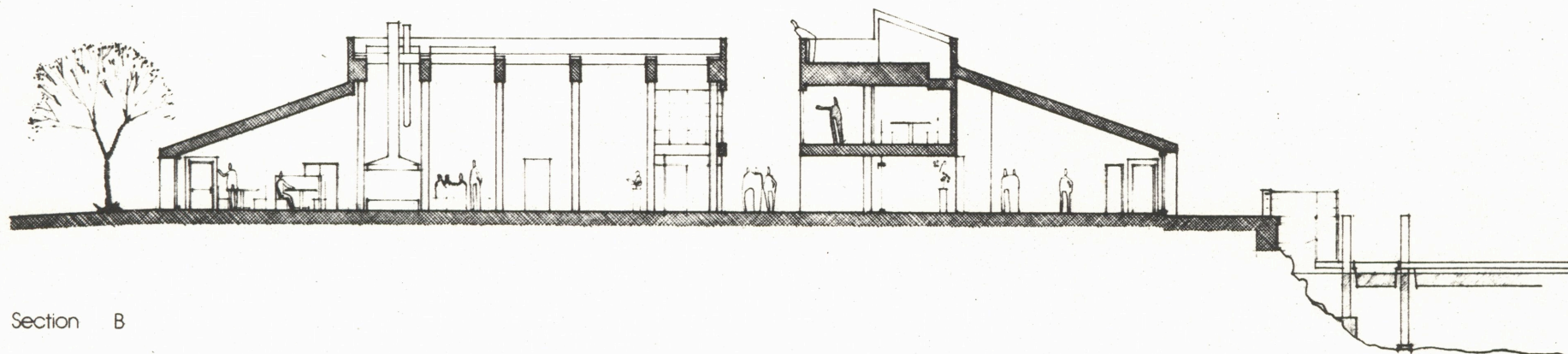


Upper Levels



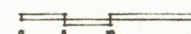


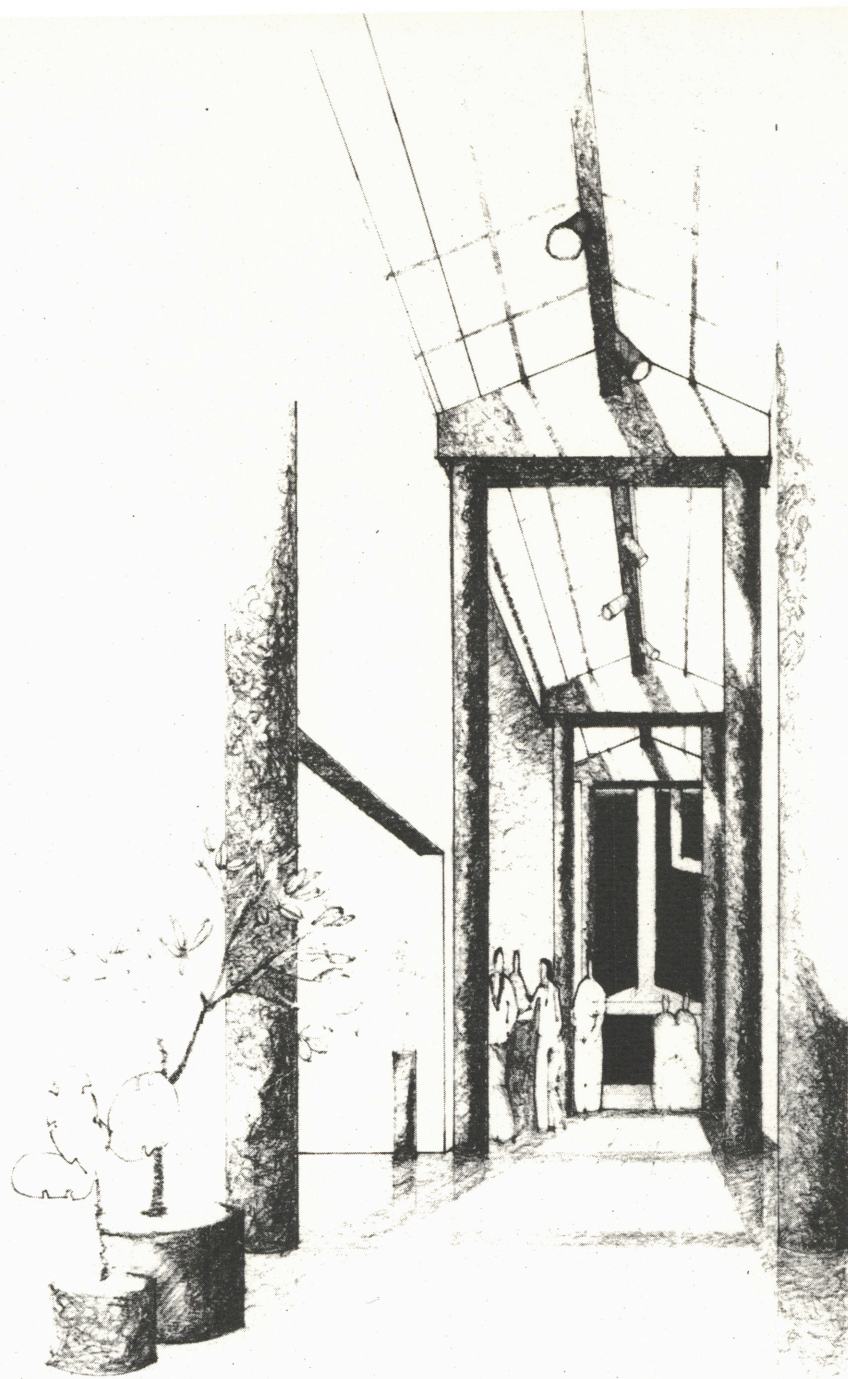
Section A



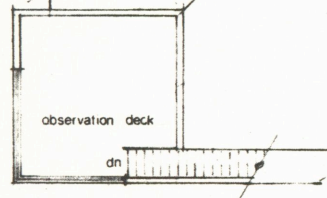
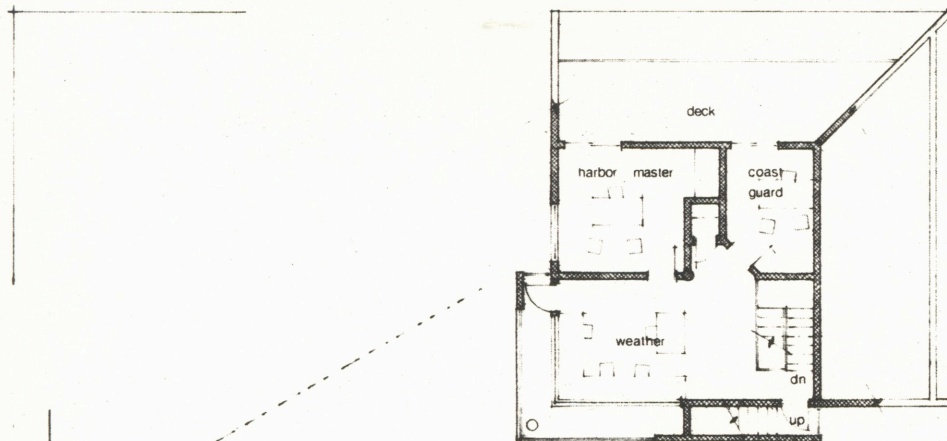
Section B

Sections

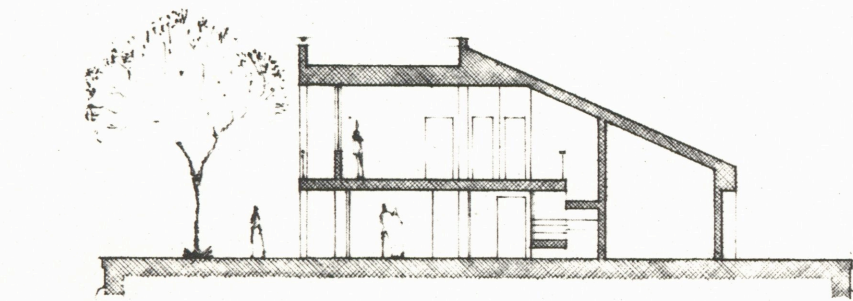




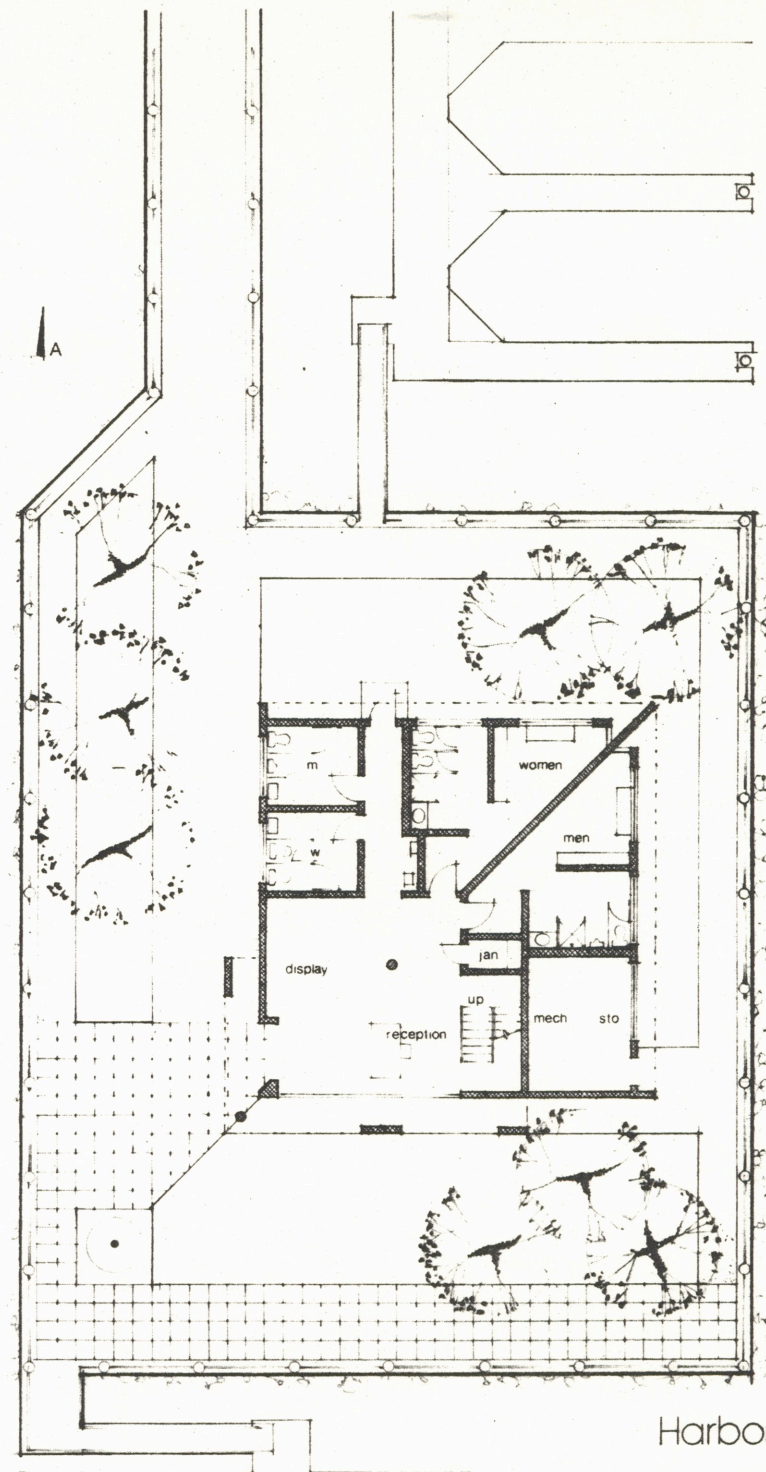
J. GARCIA 9/21



Upper Levels

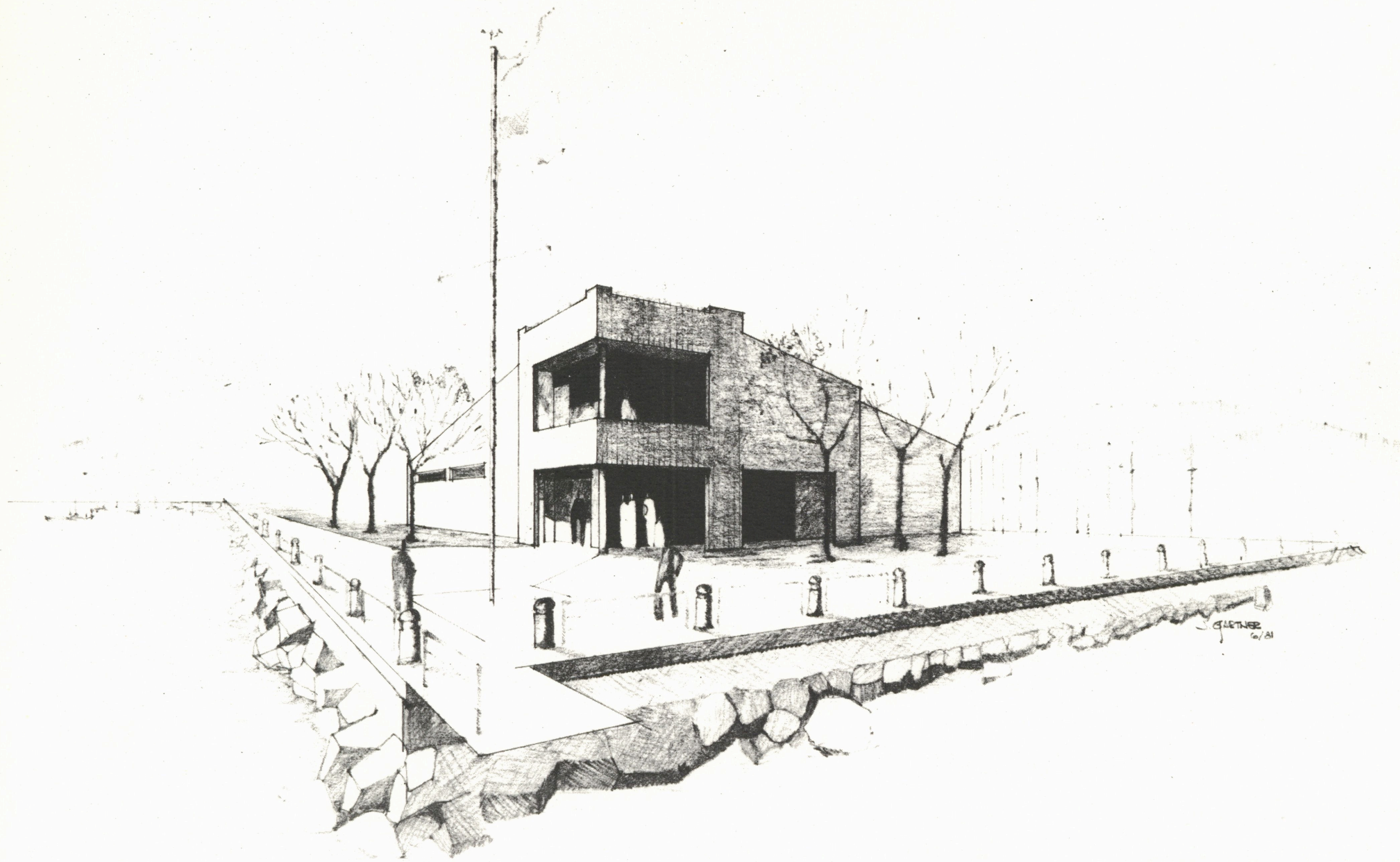


Section A



Harbor Master





Footnotes

¹Donald W. Adie, Marinas: A Working Guide to Their Development and Design, (London: The Architectural Press Ltd., 1975), p. 11

²Adie, p. 38

³Adie, p. 38

⁴Adie, p. 38

⁵Adie, p. 61

⁶San Luis Obispo County, Population Projection (San Luis Obispo County: San Luis Obispo County Office, 1978, p. 1

⁷U. S. Department of Commerce, United States Coast Pilot (Washington, D.C.: Defense Mapping Agency, Hydrographic/Topographic Center, 1980), p. T.13

⁸C. E. Chatham, Jr. and C. W. Brasfield, Design For Expansion of Port San Luis, California (Vicksburg: Corps of Engineers, 1969), p. 1

⁹U. S. Department of Commerce, p. 156

¹⁰U. S. Department of Commerce, p. 157

¹¹U. S. Department of Commerce, p. 157

¹²Adie, p. 163

¹³Adie, p. 174

¹⁴Adie, p. 166

¹⁵Adie, p. 166

¹⁶Adie, p. 166

¹⁷American Society of Civil Engineers, Small Craft Harbors (New York: American Society of Civil Engineers, 1962), p. 94

¹⁸Adie, p. 122

¹⁹Adie, p. 123

²⁰Adie, p. 181

²¹Adie, p. 113

²²Adie, p. 51

²³Adie, p. 257

²⁴Adie, p. 261

²⁵State of California The Resources Agency Department of Boating and Waterways, Layout and Design Guidelines for Small Craft Berthing Facilities. (Sacramento: Department of Boating and Waterways, 1980), p. 3

Illustrations

¹C. E. Chatham, Jr. and C. W. Brasfield, Design For Expansion for Port San Luis, California (Vicksburg: Corps of Engineers, 1969), p. P-12

²Alonzo DeF. Quinn, Design and Construction of Ports and Marine Structures (New York: McGraw Hill Book Company, 1972), p. 91

³State of California, Layout and Design Guidelines for Small Craft Berthing Facilities (Sacramento: State of California, 1980), p. 7

⁴State of California, p. 9

⁵State of California, p. 4

⁶State of California, p. 5

⁷State of California, p. 6

Bibliography

Adie, Donald W. Marinas: A Working Guide to Their Development and Design. London: The Architectural Press Ltd., 1975.

American Society of Civil Engineers. Small Craft Harbors. New York: American Society of Civil Engineers, 1969.

Beazley, Elisabeth. "Marinas", Architectural Review, August 1963, p. 94

Board of Commissioners. Port San Luis Harbor. Avila Beach: Board of Commissioners, 1967.

Chatham, C. E. and Brasfeild. Design For Expansion of Port San Luis, California. Vicksburg: Corps of Engineers, 1969.

McCoy, Esther. "Marina Del Ray Harbor", Progressive Architecture, March 1974, p. 44

Quinn, Alonzo Def.. Design and Construction of Ports and Marine Structures. New York: McGraw-Hill Book Company, 1972.

Robinette, G. O. Plants/People/and Environmental Quality. Washington: U. S. Department of the Interior, 1972

"Rugged Small Buildings for a Marina", Architectural Record, Oct. 1968, p. 160

San Luis Obispo County. Recreation Plan. San Luis Obispo: County, 1968.

U. S. Department of Commerce. United States Coast Pilot. Washington: Defense Mapping Agency, Hydrographic/Topographic Center, 1980.

Wood, A. M. Muir. Coastal Hydraulics. New York: Gordon and Breach
Science Publishers, 1969.

MONTANA STATE UNIVERSITY LIBRARIES
stks 720.6.M76G198 CA
Port San Luis Harbor /



3 1762 00172895 3



~~NA 2540~~
720.6
~~M76~~
~~6195~~

