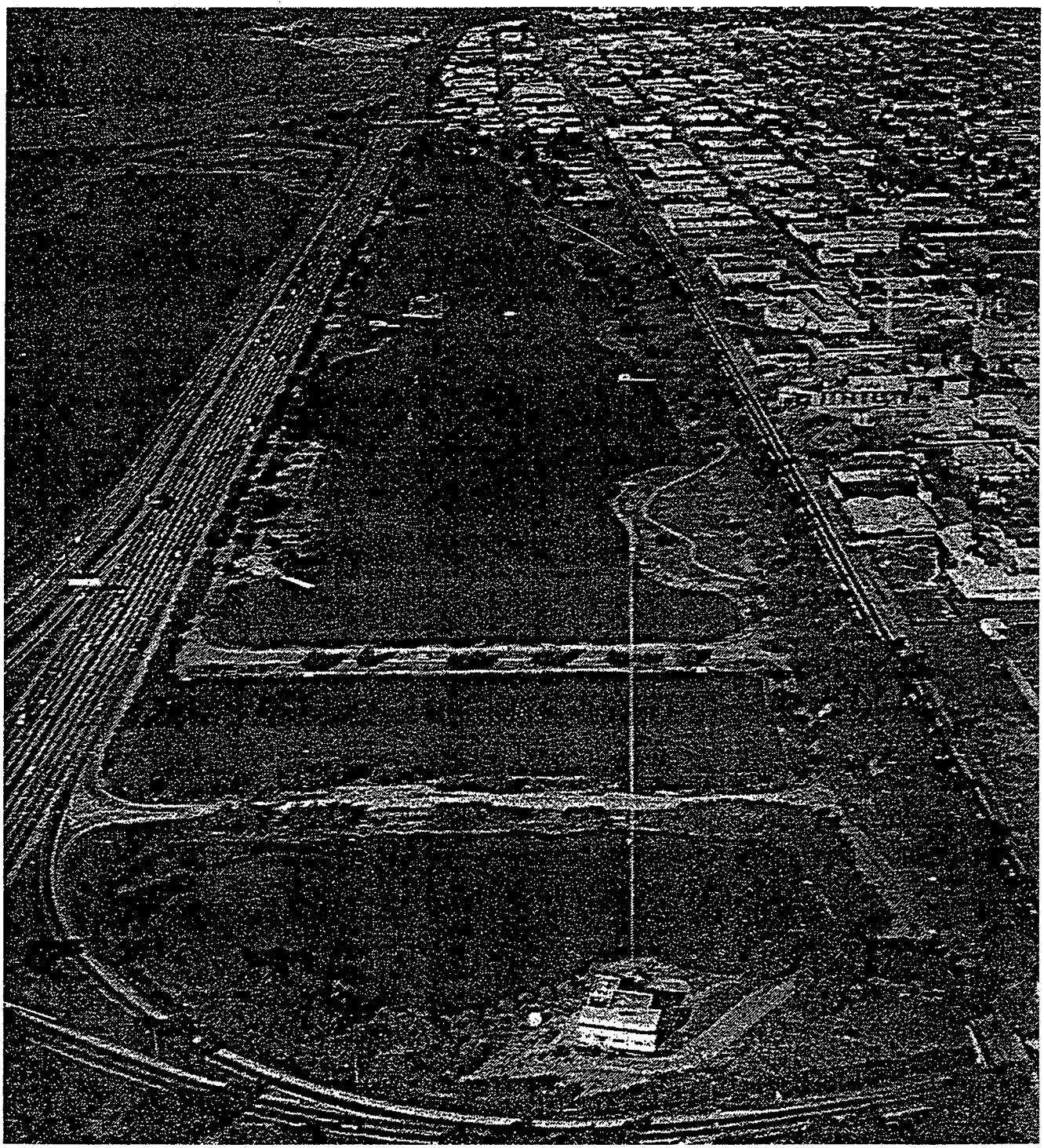


Aquatic Park Master Plan

City of Berkeley Summer 1990

MPA Design

Landscape Architects
and Urban Designers

562 Mission Street
San Francisco, CA
94105

415 543-4864

CITY OF BERKELEY
AQUATIC PARK MASTER PLAN

FINAL REPORT

JUNE, 1990

Prepared for:
Joint Subcommittee on Waterfront Parks
Bill Montgomery, Parks/Marina Division
City of Berkeley

TABLE OF CONTENTS

7.0. **Appendixes**

Appendix A: Public Workshop Reports

Appendix B: Task Force Meeting Reports

Appendix C: Environmental Report: Biology

Appendix D: Environmental Report: Hydrology

Appendix E: Environmental Report: Acoustics

INTRODUCTORY AND SUMMARY

In June, 1989, the City of Berkeley contracted with MPA Design to generate a master plan for Aquatic Park, a narrow mile-long tidal estuary at the Berkeley Waterfront east of Interstate 80 between University and Ashby Avenues. Comprised of one long main lagoon and two small separate ponds at its south end, the "Model Boat Pond" or "Model Yacht Basin" and the privately owned "Radio Station Pond," the 99 acre Aquatic Park consists of 69 acres of water area and 30 acres of shoreland. Aquatic Park is bounded on the west by the I-80 freeway and on the east by the Southern Pacific Railroad, which is located along the approximate line of the original Bay shoreline.

Due to many years of neglect, the tidal estuary including the two ponds has been cut off from adequate inflows of Bay water. Evidence of poor circulation and stagnation has resulted. In addition to the lagoon's poor water quality, the park is adversely impacted by unacceptably high noise levels from the adjacent freeway and train traffic as well as from poor linkages with the nearest residential and commercial neighborhoods. Relatively isolated by the barriers posed by the freeway and railroad, Aquatic Park has not supported a number and variety of park users commensurate with its size and advantageous location alongside the Berkeley Waterfront.

A nine-month planning process was undertaken for the project, with four phases and three public workshops as indicated:

Phase 1	Site Analysis, Goal Development, Select Program Elements (First Public Workshop)
Phase 2	Develop Alternate Conceptual Plans (Second Public Workshop)
Phase 3	Develop Detailed Preferred Conceptual Plan and Final Recommended Plan (Third Public Workshop)
Phase 4	Final Plan revised per Commission review and final report.

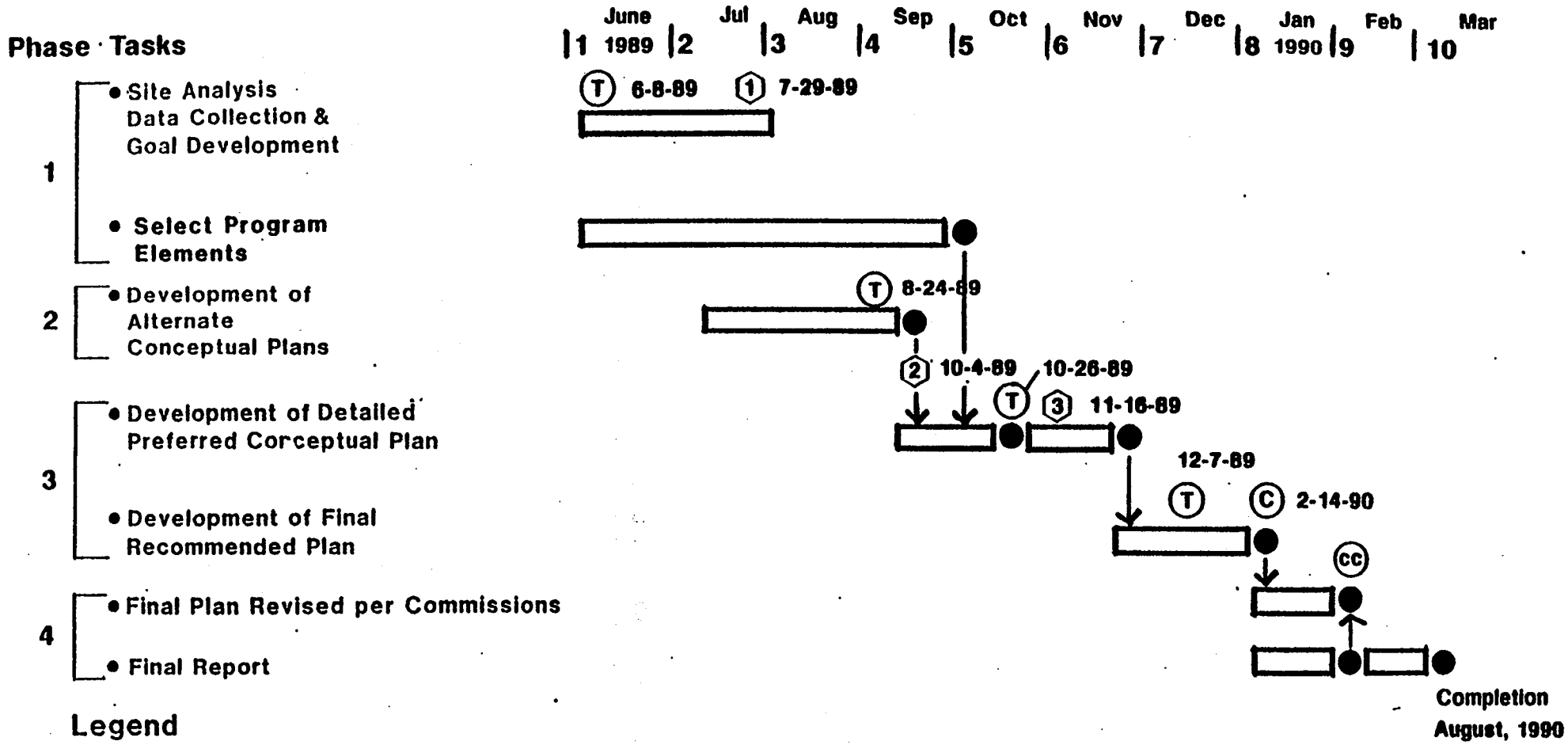
Figure 1, "Aquatic Park Master Plan Schedule, "indicates the chronology of this planning process in more detail.

The three public workshops were facilitated by the professional public participation consultants, Moore, Iacofano, Goltsman. The first workshop began with a site walking tour which was instrumental both in familiarizing community participants with the significant environmental factors at the park and in generating initial planning ideas and program elements which guided the planning team throughout the process.

The public was also invited to a series of "task force" meetings with the "Joint Subcommittee on Waterfront Parks." Comprised of three members each from the Parks Commission and the Waterfront Commission, this body functioned as the lead city agency for the project. Bill Montgomery, director of the Parks/Marina Division, acted as the city staff representative

City of Berkeley Aquatic Park
MPA Design Revised Schedule

Figure 1



Legend

- ● Completed Product (Plan/Report)
- ⬡ Public Workshops- Maximum of 4 (or 3 with Self-Guided Tour Counting as 2)
- (T) Presentation & Meeting w/ Task Force – Maximum of 4
- (C) Presentation & Meeting w/ Combined Waterfront and Parks Commission (Total of 1)
- (CC) Presentation & Meeting w/ City Council (Total of 1)

6. Introduce concessions for food, beverages and sports including public roller-skate, bicycle and boat rentals.

7. Build a resident caretaker residence on Bird Island.

8. Continue to encourage all existing water-related recreational activities.

9. Acquire lands if necessary to secure wildlife habitat at the south end of the park, to obtain an existing building for use as a youth-oriented community center building, and to expand park shoreline buffer between Addison Street and Bancroft Way.

3. Provide for an appropriate amount and type of private development, to make the Waterfront part of Berkeley's vibrant urban community, attractive to and usable by Berkeleyans, neighboring Bay Area residents and other visitors.

4. In all types of development, meet the needs of unemployed and underemployed Berkeley residents, in both construction and permanent jobs.

5. Establish uses and activities that reflect and enhance the unique character of the Waterfront and foster the community's relationship with the shoreline.

Specific recommendations for Aquatic park include:

1. "Replace Bolivar (Drive) adjacent to the freeway with a landscaped buffer and soundwall to mitigate the noise impacts on Aquatic Park."

2. "Construct new two-way bicycle/pedestrian facility connecting (the Marina Area), Aquatic Park, and Fiftieth Street."

3. "Buffer Aquatic Park from freeway noise by encouraging Caltrans to construct a sound wall as part of the Interstate 80 improvements."

3.3 **West Berkeley Area Plan Working Draft,** 1988

The West Berkeley Area Plan Working Draft "Issues Profile" of May, 1988 identifies seven "West Berkeley Subareas," of which Aquatic Park is included as the seventh subarea. Nevertheless, Aquatic Park is not discussed in detail as the Plan devotes itself specifically to the other six (developed) subareas. However, Aquatic Park is addressed in terms of its relationship to the other subareas. The plan contains the following assertions with regard to Aquatic Park:

1. "there is a need for an improved main visual entry" to Aquatic Park.

2. "West Berkeley ....lacks a cohesive system of bicycle and pedestrian routes, linking residential areas with parks, commercial areas and employment centers."

3. The need for increased open space and recreation opportunities for residents has been a voiced concern. Improving access to Aquatic Park is one way of providing such opportunities. The lack of bicycle routes and lack of access to the Waterfront in addition to the lack of structured programs in Aquatic Park represent a small list of potential projects.

The Working Draft's Statement of "Preliminary Goals, Policies and Implementation Strategies" which followed in October, 1988, contains some additional specific policy recommendations impacting on Aquatic Park:

4.0 THE SITE

4.1 Natural Factors Inventory and Analysis

a. Environmental Resources

The area of Aquatic Park and the surrounding waterfront has been the subject of several environmental reports (Berkeley Waterfront Plan, West Berkeley Area Plan, student reports) and as a result, the environmental resources of the study area are well known. The significant environmental resources at Aquatic Park are the tidal wetland in the south pond (Radio Station Pond); the main lagoon itself, and the small areas of "eclectic" marsh vegetation located in shallow portions of the lagoon's shoreline. In addition, the waters and mudflats of San Francisco Bay should be considered as an environmental resource for Aquatic Park since much of the wildlife observed in the park is assumed to utilize the Bay edge habitat as well as Aquatic Park itself. (See Appendix C: Environmental Report: Biology).

b. Geology and Soils

The east shore of the Aquatic Park lagoon represents the approximate line of the original East Bay shoreline as it had been filled by around 1930. The Eastshore Freeway (I-80) was constructed in the early 1930's on a roadbed of Bay fill approximately 1,000 feet west of the east shoreline.

Dredging of the lagoon began late in 1935 and park construction began on the east shore in 1936. Salt was leached from the shoreline soils by two phased watering operations and gypsum was added to the soil to further neutralize the salt. After the Bay mud fill had dried following the second watering, eight inches of topsoil were spread over the surface of the shoreline. Nevertheless, it is anticipated that salt water seepage and salt spray may continue to be a limiting factor in plant establishment. (See Appendix C: Environmental Report: Biology and Appendix D: Environmental Report: Hydrology).

c. Topography

The Aquatic Park lagoon lies in a depression between the Eastshore freeway berm to the west and the Southern Pacific Railroad berm to the east. Of these two berms, the railroad berm is by far the most prominent, with elevations varying from 15 feet to 22 feet above the water level, compared to an average of only ten feet difference in elevation between the freeway and the lagoon.

Although it appears when viewed from the park as a berm with extremely steep slopes often exceeding 2:1, the railroad bed is in fact located on a level grade with the adjacent streets to the east. The steep slopes falling off from the railroad to the park can be perceived as a bluff separating the neighborhoods of West Berkeley from the park borders.

A comprehensive hydrology and water quality study is needed to adequately describe the existing conditions, analyze alternative circulation schemes, determine flood hazards, and develop a water quality monitoring program. The Plan would provide design and repair criteria for hydraulic structures (culverts, gates, weirs, etc.), shoreline treatment, water depths, bottom configuration, and water level management, etc. to meet the desired uses of the park as established by the Master Plan. (See Appendix D: Environmental Report: Hydrology).

e. **Saltwater Aquatic Vegetation**

Saltwater marsh vegetation at Aquatic Park is presently not well-developed in the main lagoon and the Model Yacht Basin, where it occurs mainly in very small scattered patches. Factors limiting tidal marsh formation include steep shoreline gradients often marked by concrete or rock bulkhead walls and the pronounced lack of tidal fluctuation resulting from the siltation of the Bay-lagoon culverts. Around the south lagoon (Radio Station Pond) where tidal variation is more prevalent, marsh vegetation is more continuous and dense.

Many of the aquatic plants present in the lagoons are characteristic of salt and brackish marshes elsewhere around San Francisco Bay. Gumplant (Grindelia humilis) and bulbrush (Scirpus robustus and S. acutus) grow in pockets between rocks along the shoreline. In the few locations where a shallow shoreline edge occurs - particularly at the north and south ends of the main lagoon - patches of Pickleweed (Salicornia virginica), Saltgrass (Distichlis spicata), gumplant (Grindelia humilis) and bulrush (Scirpus spp.) are found. Mats of the invasive, non-native iceplant (Mesembryanthemum cryptallinum) encroach into these bands of marsh vegetation and appear to be taking it over in places.

Cattails (Typha spp.) are present along the water on the east side of the main lagoon and Widgeon grass (Ruppia maritima) grows underwater along the south shore.

The south lagoon (Radio Station Pond) is much less disturbed than the north and central lagoons, largely because it is bordered on only two sides by roads and there are no well-defined access trails to the west and southwest ends of the lagoon. A large group of willows (Salix lasiandra) grows at the northeast end of the lagoon and represents valuable habitat for black-crowned night herons. The east shore is a thick band of bulrush and cattails. Low growing marsh vegetation including brass buttons (Cotula coronopsies), pickleweed, saltgrass and fat hen (Atriplex patula var. hastata) grow on the north shore of the lagoon. Almost the entire southwest quarter of the pond is mudflat, which is alternately submerged and exposed with tidal fluctuation. The mudflat is barren in places but also supports patches of pickleweed. The Radio Station Pond is protected by wetland preservation laws. (See Appendix C: Environmental Report: Biology).

Society's Christmas bird count. Water in the lagoons provides habitat for swimming and surface-feeding waterfowl, pelicans, gulls, and terns. Shorebirds forage in the shallow water and on the mudflat in the south lagoon and herons and egrets perch on the shoreline and forage along the water's edge. The willow trees on the northeast end of the south lagoon are important roosting sites for black-crowned night herons. Coates (1989) counted 32 species of marine birds using the park during her surveys from November 1988 through mid-February 1989.

Data on fish are not available but large fish populations are typically observed in the main lagoon in the fall months. (See Appendix C: Environmental Report: Biology).

4.2 Social Factors Inventory and Analysis

a. Views

Potential Bay views from both the east and west shores of Aquatic Park are severely limited by the Eastshore Freeway (I-80) which is typically ten feet above the water level in the lagoon and approximately three feet above the west bank arm of Bolivar Drive. Views from atop the railroad berm (at approximately 18 feet above the water line) afford vistas of downtown San Francisco, the Golden Gate Bridge and Mount Tamalpais in scattered locations where breaks occur in the dense screen planting running alongside the railroad tracks. Removing portions of this screen planting would open up panoramas encompassing the Bay Bridge, Yerba Buena and Treasure Islands, downtown San Francisco, Golden Gate Bridge and Mount Tamalpais. Similar views from inside park borders could easily be achieved by mounding up fills to create hills and berms. Attractive views of the Berkeley Hills occur from the lagoon and from the west branch of Bolivar Drive.

b. Noise

Undesirable noise levels in Aquatic Park have been identified as a major existing constraint to park use and enjoyment. Peak hour decibel levels during the morning and afternoon rush hours with unimpeded freeway traffic have been measured at 70 dB and above. These measurements are significantly high when compared to average noise levels of 65 dB in some of Berkeley's quieter residential neighborhoods, such as the vicinity of Martin Luther King Jr. Way at Hoskins Street. It should be noted that decibel levels are measured on a scale of geometric progression similar to the Richter scale of seismic activity. While freeway noise is the most offensive noise-polluting element at Aquatic Park, its effects are exacerbated when trains pass. The faster the traffic moves, the noisier is the effect, so that at times of high traffic volume but low speed during bumper to bumper traffic jam events, decibel levels in Aquatic Park actually fall.

e. **Park Land Uses**

In addition to public use of the park as recreational open space and wildlife habitat, a number of private concerns take advantage of leases and informal agreements with the city for conducting private land uses on city parkland. These land uses include:

- Seabird Sailing Center, a retail boat sales facility.
- Berkeley Waterski Club, a private club which conducts waterskiing, including lessons and competitions during an eight month season from March 1 to October 31.
- Berkeley Rowing Club, a private rowing club.
- International Bird Rescue Center, an informal organization which engages in saving birds from oil spills.

f. **Existing Park Buildings**

A collection of existing wooden structures are dotted throughout Aquatic Park. Many are cabin-like in design and appearance. The largest is a U-shaped wood structure on the north end of the lagoon's east bank which houses the Seabird Sailing center and has two outbuildings used for boat storage and storage of city property respectively. The other buildings include the following:

- *Rod and Gun Club*, a two-room cabin currently used sporadically as a conference room, located just south of Bancroft Way on Bolivar Drive.
- *International Bird Rescue Center*, 2 cabin-like buildings located near the Bay Street entry.
- *Rowing Club* building used as a storage barn for rowing shells, located on the south end of the west shoreline.
- *Waterski Club* building, used as waterski club headquarters, located in the central portion of the west shoreline.
- *Waterski Club Judging Tower and Reviewing Stand* building, a house-like structure located on Bird Island.
- *Durkee Factory Water pump and pier*, a historically interesting piece of industrial archaeology located on piers in the main lagoon just off the south-central portion of the east shore.
- *Restroom facilities* in two locations - the picnic area south of Channing Way and the north end of the west bank.

clear civic park-planning interest exists to either acquire this land or control its future development.

4.3 Recreational Uses

Informal existing recreational uses of Aquatic Park have not been inventoried, but they are known to include jogging, fishing, bicycling, picnicking, wildlife observation, dog-walking, and spontaneous unorganized sports such as volleyball, frisbee, and to some extent softball. Sitting, meditation and reading are somewhat restricted by park noise levels and high winds.

More organized activities at Aquatic Park include waterskiing, canoeing, kayaking, rowing and frisbee golfing. Sailing and windsurfing are somewhat restricted by erratic wind patterns and relatively smooth waters. Sailors and windsurfers appear to prefer using the South Sailing Basin in the Bay, opposite the Berkeley Marina.

Figure 2

AQUATIC PARK

FINAL RECOMMENDED PLAN

February 14, 1990

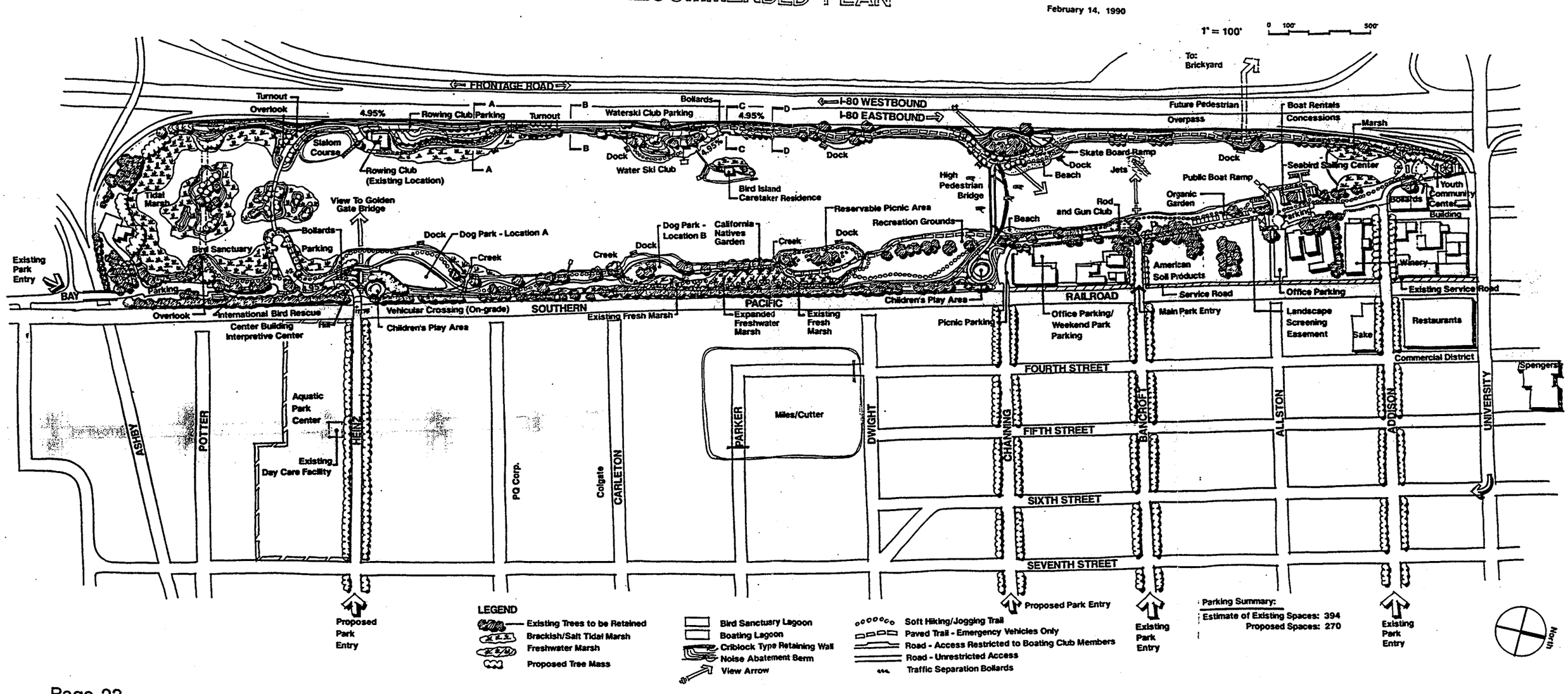
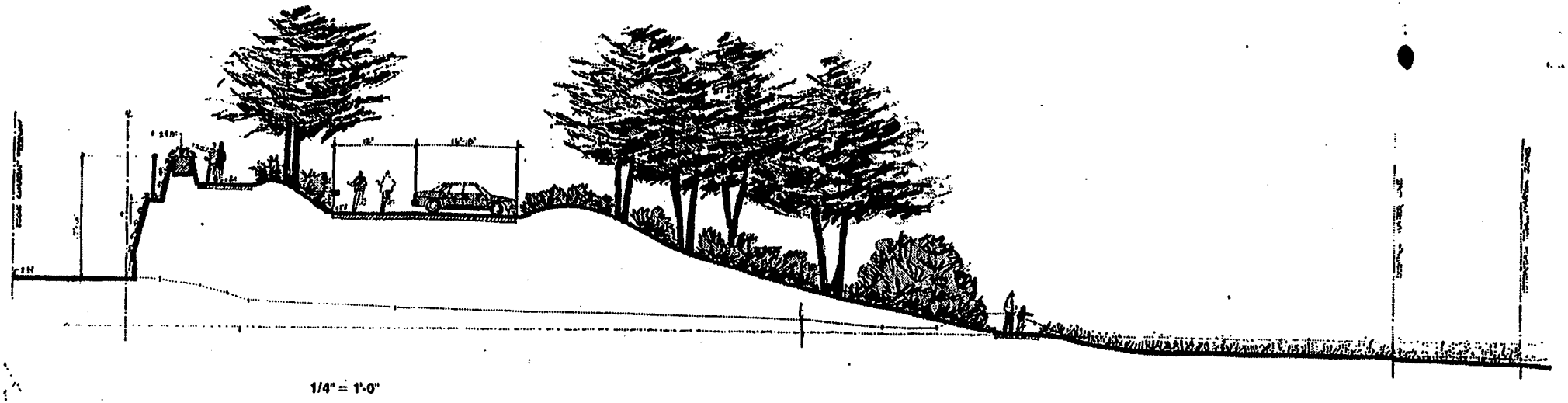
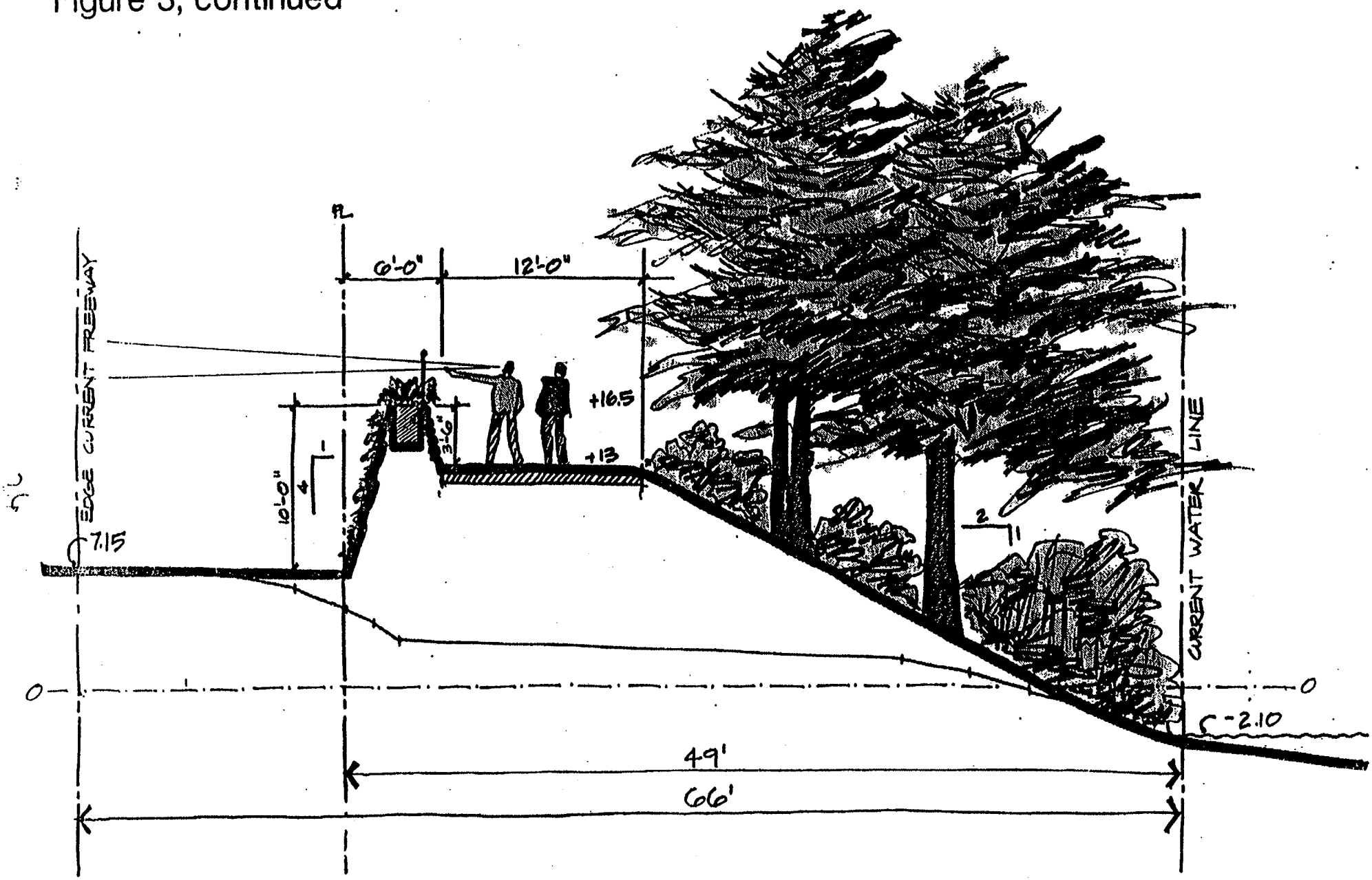


Figure 3 — Proposed Berm Sections



Section A

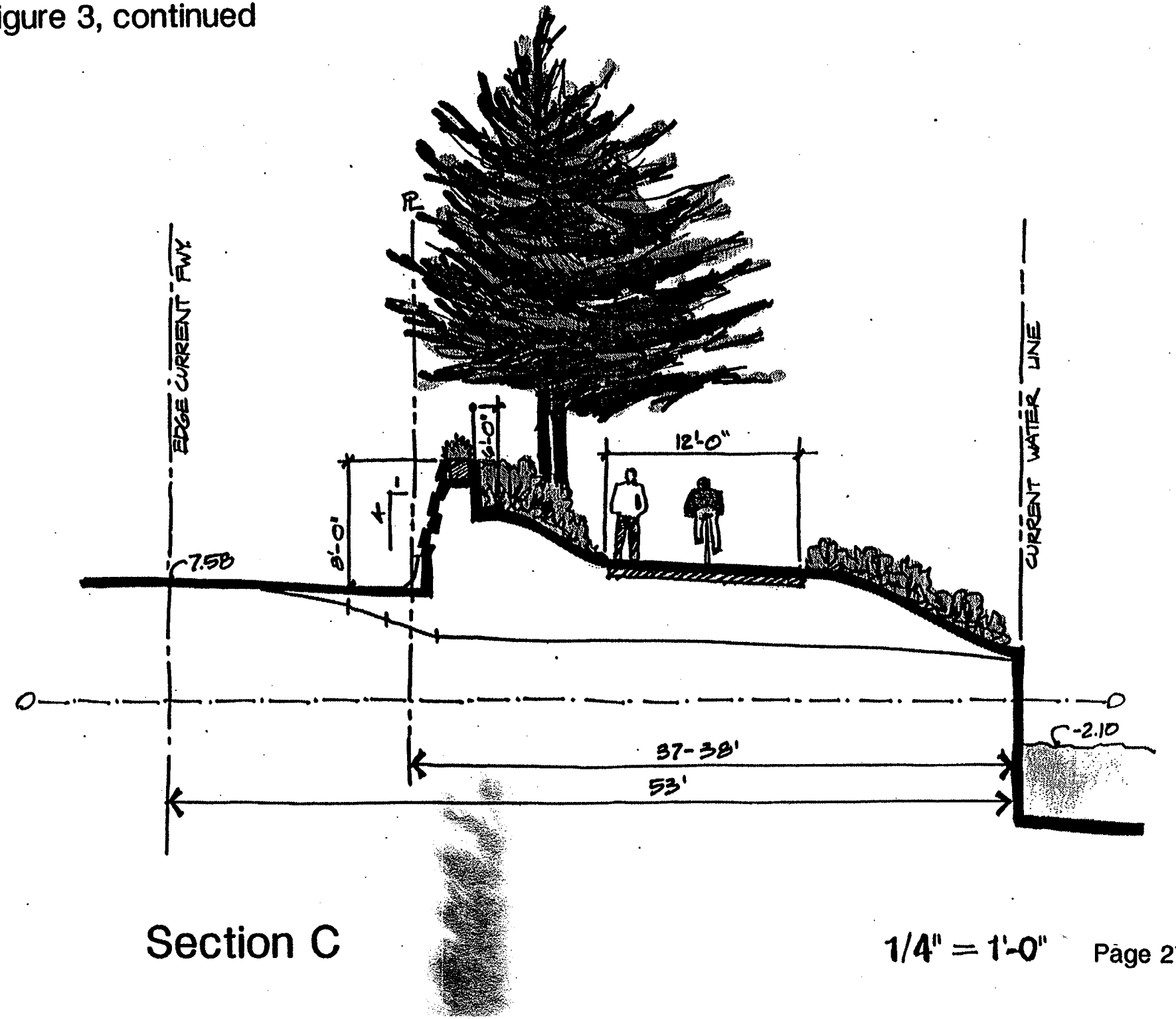
Figure 3, continued



Section B

1/4" = 1'-0"

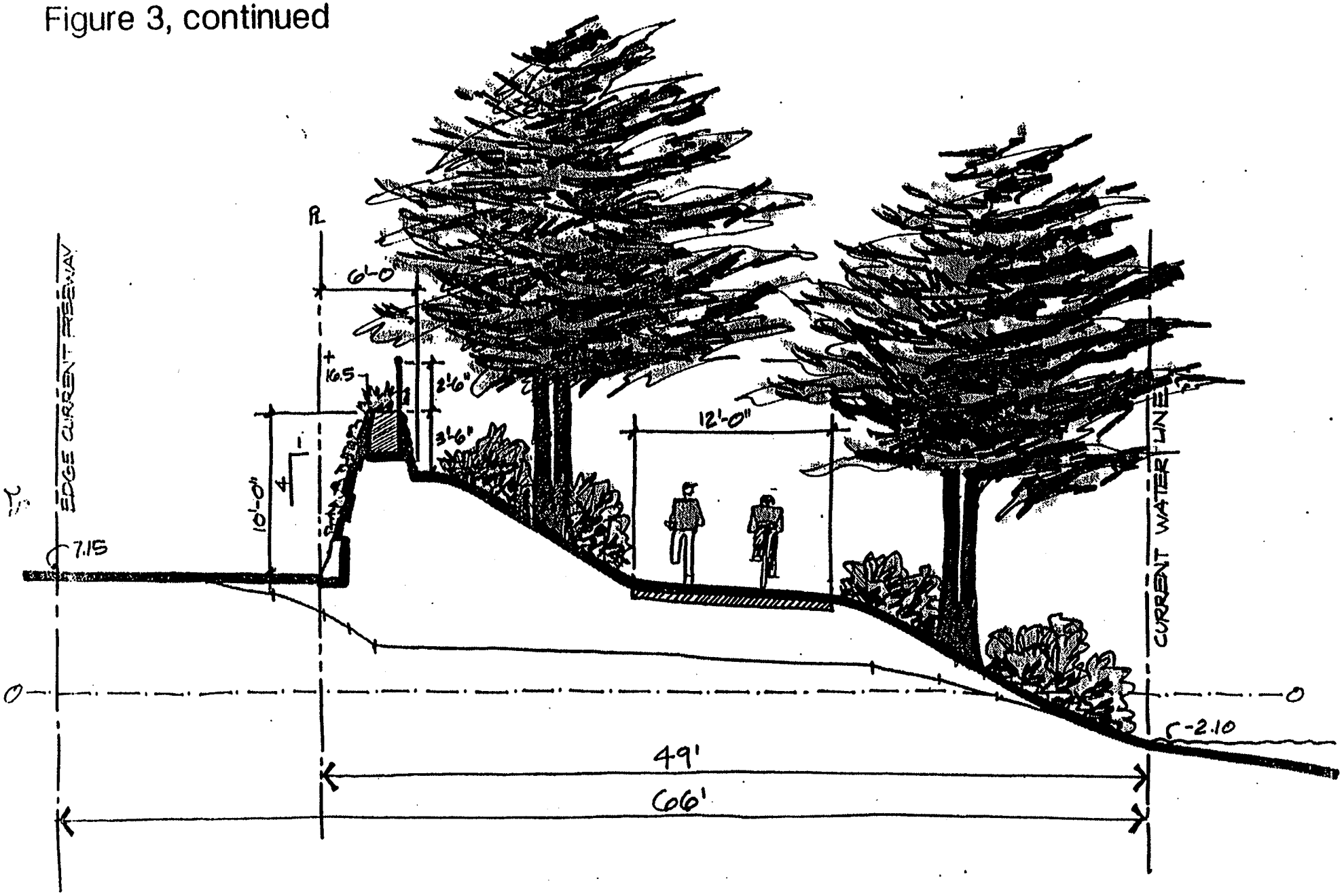
Figure 3, continued



Section C

1/4" = 1'-0"

Figure 3, continued



Section D

1/4" = 1'-0"

Caltrans regulations require a six foot high chain link fence along freeway right-of-ways. This requirement could be satisfied at Aquatic Park by placing a two foot high chain link or welded wire mesh fence atop the four foot high masonry guard wall. (See Figure 3, Sections B and D). Where the shoreline is wider and the noise reduction wall is built higher, a six foot high chain link fence could be installed on a narrow bench in the wall itself. By building the ledge at least six feet below the top of the masonry guard wall, this chain link fence would not impede views out over the guard wall to the Bay and Golden Gate Bridge. (See Figure 3, Section A).

While these proposals should satisfy Caltrans regulations, it is recommended that the City of Berkeley negotiate with Caltrans to determine if the requirement for the six foot high chain link fence can be eliminated or modified to satisfy the particular conditions posed by the new noise reduction berms at the City of Berkeley/Caltrans property line.

c. **Vehicular, Bicycle and Pedestrian Access**

Two additional on-grade railroad crossings will provide improved pedestrian, bicycle and vehicular access into Aquatic Park: One at Heinz Street and one at Channing Way. The existing entry points at Addison, Bancroft and Bay Streets will be retained. In conjunction with concurrent and subsequent plans for an East Bay Shoreline Park, the Aquatic Park Master Plan recommends that pedestrian and bicycle access be provided into Aquatic Park from the Brickyard by means of a pedestrian/bicycle bridge over I-80. This bridge is intended to be built to link the Shoreline Park directly to Aquatic Park without any structural connection to University Avenue or any other major roadway.

d. **Public Vehicular Circulation and Parking**

The Aquatic Park Master Plan calls for the elimination of the vehicular loop which currently exists on both sides of the lagoon. Furthermore, the existing freeway entrance ramp accessed through the park from the south causeway between the Model Boat Pond and Radio Station Pond will be eliminated.

Unrestricted vehicle circulation within Aquatic Park will be confined to the following minor access routes:

- **Addison Street** - "T" intersection providing left turn into parking lot with cul-de-sac turnaround; right turn into parking lot adjacent to the existing restaurant structure with cul-de-sac turnaround. Parking for the offices at Bolivar Drive will be relocated to the south side of the building, permitting conversion of the spaces west of the building to a redesigned parking lot for park use.

- **Bancroft Way to Channing Way** - two-way in-out loop with parking provided at Channing Way. This loop will also provide AC Transit with a bus

turnaround in Aquatic Park.

- **Heinz Street** - left turn into parking lot with cul-de-sac turnaround.

- **Bay Street** - straight entry into parking lot with cul-de-sac turnaround.

Approximately 270 public parking spaces will be provided within park borders i the various parking lots mentioned above.

e. **Restricted Vehicular Circulation and Parking**

In addition to the public vehicular circulation discussed above, restricted additional vehicular circulation will provide emergency access to the entire west shoreline and access by members of the Rowing and Waterski Clubs only to th facilities on the west bank.

For emergency access purposes, a partial or U-shaped loop through Aquatic Pa will be provided from the public entry at Addison Street, over the proposed we bank berms to an exit point at Heinz Street. The emergency access roadway w consist of a twelve foot wide right of way, eight feet of which will be paved wi asphalt as a bicycle path and four feet of which will consist of a crushed gravel paved jogging trail. Since two way circulation will be required on this one-lane roadway, turnouts will be provided to allow vehicles traveling in one direction t yield to vehicles from the other direction.

The southern portion of the emergency access road will be shared by card-carrying members of the Waterski and Rowing Clubs. It is expected that the Clubs will draw up club rules governing two-way traffic flow on a one-way roadway. Parking spaces for both clubs will be provided along the roadway in degrees pullover spaces. A turnaround will be provided just north of the Waterski Club facility, opposite Bird Island.

Limited access to the restricted roadway will be achieved by automatically controlled barriers such as retractable bollards or driveway barrier arms located at key points. It is expected that these devices will be operated by "genie" remote control devices in the authorized vehicles or by card-sized badges issuec to authorized personnel, including the police and fire departments and authoriz boating club members. The bollards or driveway barrier arms would not impec any passage of cyclists, joggers and pedestrians.

The automatically controlled traffic barrier devices will be located at the foll-wing key places:

- **end of Heinz Street cul-de-sac** inside the park: This will be the control point for boating club member entry to their facilities on the west bank.

- **north end of boat club turnaround** just north of the Waterski Club,

opposite Bird Island: This will be the south control point for emergency access vehicles only, with club members excluded north of this point.

- **Cul-de-sac at right turn off of Addison Street:** This will be the north control point for emergency vehicles only, with boating club members excluded.

In addition to the restricted access road planned for the west bank, emergency vehicles only will be admitted to the one lane paved bicycle/jogging road which extends from Channing Way to the proposed Heinz Street park entry. Most of this road is existing, but the portion near Heinz Street will be reconfigured as required by the new roadway grading.

Finally, emergency access only will be permitted between the north end of the Bay Street cul-de-sac and the Heinz Street entry road. This measure is intended to prevent eastbound commuters on Ashby Avenue from making a shortcut detour through Aquatic Park to avoid congestion on Ashby Avenue. All of these limited access routes will be controlled by automatic traffic barrier devices similar to those described above.

f. Pedestrian and Bicycle Circulation

Bicycles

All of the park roads, whether of public or limited access type, will be open to bicycles, thereby providing a bicycle loop around the lagoon. In addition, bicyclists will share the pedestrian/bicycle bridge across the lagoon which is planned for the north portion of the lagoon in the vicinity of Channing Way.

Joggers and Pedestrians

On the west bank, joggers will utilize a four foot wide crushed gravel trail bordering the eight foot wide limited access paved roadway. Due to the narrow width of the west bank berms, pedestrians will share the limited access paved roadway and adjacent jogging trail with bicyclists, joggers and emergency vehicles. In the few locations where the berm is wider, a separate four foot wide crushed gravel pedestrian view trail can climb to the highest vista points above the limited access multi-use roadway. Additionally, at some of these wider berm locations, a secondary jogging trail may descend downslope toward the water line and then climb back upslope to the limited access roadway.

On the east bank, wherever space permits, joggers and pedestrians will enjoy their own separate soft-paved trail, independent of the paved emergency access and bicycle road.

g. **Pedestrian/Bicycle Bridge**

A bridge for pedestrians and cyclists only is planned to span the lagoon in the vicinity of Channing Way. This bridge is envisioned as being high enough to permit small sailing boats to sail under it. The triple purpose of the bridge is as follows:

- To make the west bank more directly accessible to park users
- To thereby improving safety and security on the west bank
- To create two smaller trail loops around the lagoon for walkers who don't want to complete the entire two mile circuit around the main lagoon and for disabled persons.

h. **Wildlife Habitat Enhancement**

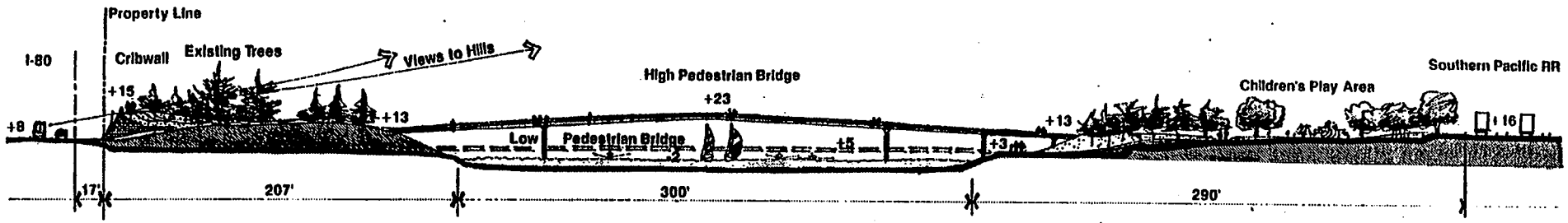
The existing wildlife habitat consisting of the two small lagoons south of the main lagoon will be enhanced to improve their value to wildlife. The Radio Station Pond and Model Yacht Pond will be reconfigured into one larger, tidal wetland by carving up the land causeway separating them into a series of bird islands. Pedestrian access south of Potter Street will be prohibited except to two or three small overlooks.

An overall water circulation plan for all of Aquatic Park is needed to define precise methods for improving the exchange of waters between the tidal lagoon and the Bay, as stated in Section 3.4 of this report. Successful implementation of natural tidal flows into the planned tidal wetland is critical to ensure its value to shorebirds and other coastal wildlife. Plantings of Willow (Salix lasiandra) are envisioned to provide cover for a large variety of birds.

Currently, the Potter Street storm drain outfall runs along the causeway that separates the model boat pond from the radio station pond. Water quality and engineering feasibility studies are needed to determine if this storm drain line can terminate at the east shoreline, discharging into the planned combined lagoon. If it is feasible to eliminate the storm drain line across the lagoon, the wildlife habitat can be planned with maximum flexibility. If, however, the line cannot be eliminated, the two existing ponds will have to continue to be separated by the storm drain structure. This separation can be minimized visually by concealing the storm drain as a pair of small "bridges" connecting the east and west shorelines with the new island in the center of this lagoon.

The tidal wetland area will be separated from the main boating lagoon by a series of weirs. While the wetland will remain subject to tides, it is anticipated that a water circulation system will be designed to allow for holding a higher, near-constant water level for boating in the main lagoon.

Figure 4



Section at Pedestrian Bridge

i. Planting

The most dense existing plantings at Aquatic Park are located along the east shoreline and radio station berms. New plantings at Aquatic Park will supplement this existing landscape while providing a brand new landscape along the noise mitigation berms planned for the west shoreline. Briefly, the planting concept is as follows:

West Berms:

- Preserve existing specimen Monterey Cypress Trees.

- Provide new tree plantings on the top and slopes of the berm. These tree plantings will be interrupted at regular intervals to preserve and enhance views out over the berm to the Golden Gate Bridge. These view corridors will correspond to the alignments of the existing streets in order to maximize Bay views from the surrounding neighborhoods.

- Plant dense but low-growing shrubs and groundcovers on the sides of the berms. Plants will be chosen according to three principal criteria: tolerance of salt spray and wind; wildlife habitat value; and height and density as a function of security. Tall shrubs that are easy to hide behind will not be selected.

- Plant a combination of flat-grown groundcovers and hydroseeded wildflowers and grasses in the planting cells of the retaining wall planned to run along the freeway side of the west berm.

Wildlife Refuge:

- Dense tree and shrub plantings on the slopes of the shores and islands will be selected and planted, primarily to provide habitat value for shorebirds and other wildlife. Native Willow (Salix lasiandra) will be one of the principal members of this plant community.

- Tidal marsh vegetation will be installed on the shallow-sloping shoreline edges. This marsh vegetation will follow the natural gradients of tidal plant communities from submerged, to partially submerged, to marsh plants which grow only above the high water line.

East Shoreline:

The existing plantations of Monterey Cypress, Eucalyptus species, Acacias and other trees will be supplemented with new plantings of California natives.

j. **Irrigation**

A new automatic drip irrigation system is planned to serve all the re-graded and replanted areas within Aquatic Park. This system may extend to existing planted areas on the east shoreline. An automatic spray system may be appropriate to serve the planting cells in the noise reduction berm retaining walls.

k. **Aquatic Recreation**

All of the existing forms of aquatic recreation of Aquatic Park will be retained. These include rowing, kayaking, water-skiing, and fishing. While sailing is not precluded, it is not envisioned as a major form of recreation on the lagoon due to the wind shadow or reduced winds which will result from building the west shoreline berms. If wind conditions are favorable, sailing lessons for beginners could be re-instated at Aquatic Park. However, the South Sailing Basin near the Berkeley Marina will undoubtedly continue to be more popular for sailing. The same is true for wind-surfing. In the short term and until water quality can be significantly improved, swimming and other water contact sports will be precluded.

l. **Land-Based Recreation**

All of the existing land-based forms of recreation will continue at Aquatic Park, including walking, jogging, bicycling, frisbee, frisbee golf, volleyball, and other informal sports. Organized team sports such as softball, football and soccer are not planned due to the narrow park borders which make creation of regulation fields difficult if not impossible and due to the public image of Aquatic Park as "a water park;" not a neighborhood recreation area. Informal games of softball or football without dugouts, backstops, fences, goal lines, etc. will not be prevented but will not be actively encouraged by city recreation managers.

Other land-based recreation activities envisioned for Aquatic Park include a skateboard facility with slopes, obstacles and other challenges planned for one of the wider portions of the west berm, and a dog park similar to the one in current use at Ohlone Park. Three possible locations for the dog park have been identified: one of the wider portions of the west berm; the meadow area along the east shoreline near Heinz Street; and an area just south of the proposed picnic area near Dwight Way. Like the Ohlone Park facility, this dog park would be primarily a place for dogs to exercise and "socialize" off leash, as opposed to a long, linear dog run.

Two "perched" beaches are planned for the shorelines adjacent to the proposed pedestrian bridge. The sand will be retained by bulkhead walls and will be set at an elevation at least one foot above the water level to discourage wading and water contact due to poor water quality.

m. **Children's Play Areas**

Two large children's play areas are planned: one near the proposed pedestrian bridge at Channing Way and one near Heinz Street. Both children's play areas are thought to be "natural" in appearance and construction with play themes based on environmental learning. The play and learning values of wind, noise and wave action; climbing on berms and tunnelling through hills are some of the concepts which may drive the design of these play areas. The Heinz Street play area is planned to serve existing day care facilities in the Aquatic Park Center mixed use development.

n. **Security and Caretaker Residence**

It is envisioned that the improvements proposed for Aquatic Park, such as the pedestrian bridge and the west bank bicycle/jogging trail with its sweeping views out over the Bay will draw many more people to use the park than its current user population. This larger user group should improve safety at Aquatic Park simply by the presence of a number of park-goers engaged in positive, legitimate recreation activities. The continued positive presence of Waterski Club and Rowing Club members will reinforce safety at the park.

In addition, low berm plantings instead of the tall brush that was recently cleared from the west side of the park will discourage crime. Finally, a new caretaker residence on the Bird Island will introduce the 24-hour presence of security personnel in Aquatic Park. It is anticipated that this residence will not be significantly larger than the existing structure on the island.

The caretaker will control access to the Bird Island, leaving the operable bridge open to pedestrians during official park hours. After closing time, the caretaker may choose to close the bridge connection. Either the existing operable bridge or a new one will provide connection between the west shore and the island. The caretaker residence structure will include provision for a judging/reviewing stand on its roof for use by the Waterski Club.

o. **Public Land Acquisition**

Full implementation of the Aquatic Park Master Plan is dependent upon public acquisition of several parcels of privately held land adjacent to Aquatic Park, and/or land use controls over privately held adjacent lands. These parcels include the following properties:

- Radio Station Pond and Banks: acquire or regulate land use to preserve for wildlife habitat.

- Restaurant/Club at north end of lagoon: acquire for use as a youth-oriented community center.

- Seventy to eighty foot wide strip of land parallel to and east of Bolivar Drive between Addison and Allston Ways: acquire and reconfigure as park border and proposed parking.

- Twenty-five foot wide strip of land parallel to and east of Bolivar Drive on American Soil Products property: acquire for use as a park border and to screen American Soil Products operations including sand mounds, etc. from park. Alternatively, acquire easement across this land for the same purpose.

p. **Recycling Park Buildings**

The existing buildings of the Waterski and Rowing Clubs will continue to provide their current functions. The Seabird Sailing Center and its two outbuildings will be converted for use by concessions including public boat rental and storage, bicycle and roller skate rental, and snack bar as well as restrooms. A small retail facility for boat sales as well as boat storage for the Rowing Club and the retail facility might fill the remaining space if available.

The International Bird Rescue Center will be converted to an interpretive nature center serving the wildlife refuge planned for the south end of Aquatic Park.

The Rod and Gun Club will not be demolished immediately but will be allowed to decay until such time as demolition is warranted. This is due to its poor existing condition and prime location along the water's edge where it is more desirable to preserve park open space than to preserve buildings.

The existing independent restroom structures on the west bank will be demolished; those on the east bank near Channing Way will be retained and restored.

6.0 ULTIMATE VISION OPTIONS

Aquatic Park's opportunities for recreation and passive park use are severely limited by its narrow shorelines. This problem is compounded by the fact that urban development was allowed to occur west of the Southern Pacific Railroad along the east shoreline between University Avenue on the north and Channing Way on the south. Since the railroad itself provides the east border of the park along the remaining two-thirds of its length, from Channing Way south to Ashby Avenue, the urban development west of the railroad appears as somewhat of an aberration. Consequently, it could be reasonably argued that the "true destiny" of Aquatic Park is to contain all the lands west of the railroad between University Avenue and Ashby Way.

With this thought in mind, MPA Design prepared two alternative "ultimate vision options" to allow for demolition of the development west of the railroad with expanded park use in this area (Figure 5). In order to replace lost development while preserving land values and development rights, new residential and commercial structures could be built directly over the railroad right-of-way, as indicated in Figure 5. Not only would these ultimate vision options allow for the introduction of more intensive land-based recreation, but they would literally bring urban residents into the park by providing apartments and condominiums overlooking the lagoon. It is envisioned that the housing units could terrace down to the park from a plaza level over the railroad.

Structured parking could be provided east of the railroad (Figure 5a) or in a 120 foot wide zone west of the railroad (Figure 5b). These future vision options do not constitute part of the currently proposed Aquatic Park Master Plan, but they are offered for further review, discussion and conceptual development within the Berkeley community.

Figure 5

ULTIMATE VISION PLAN A

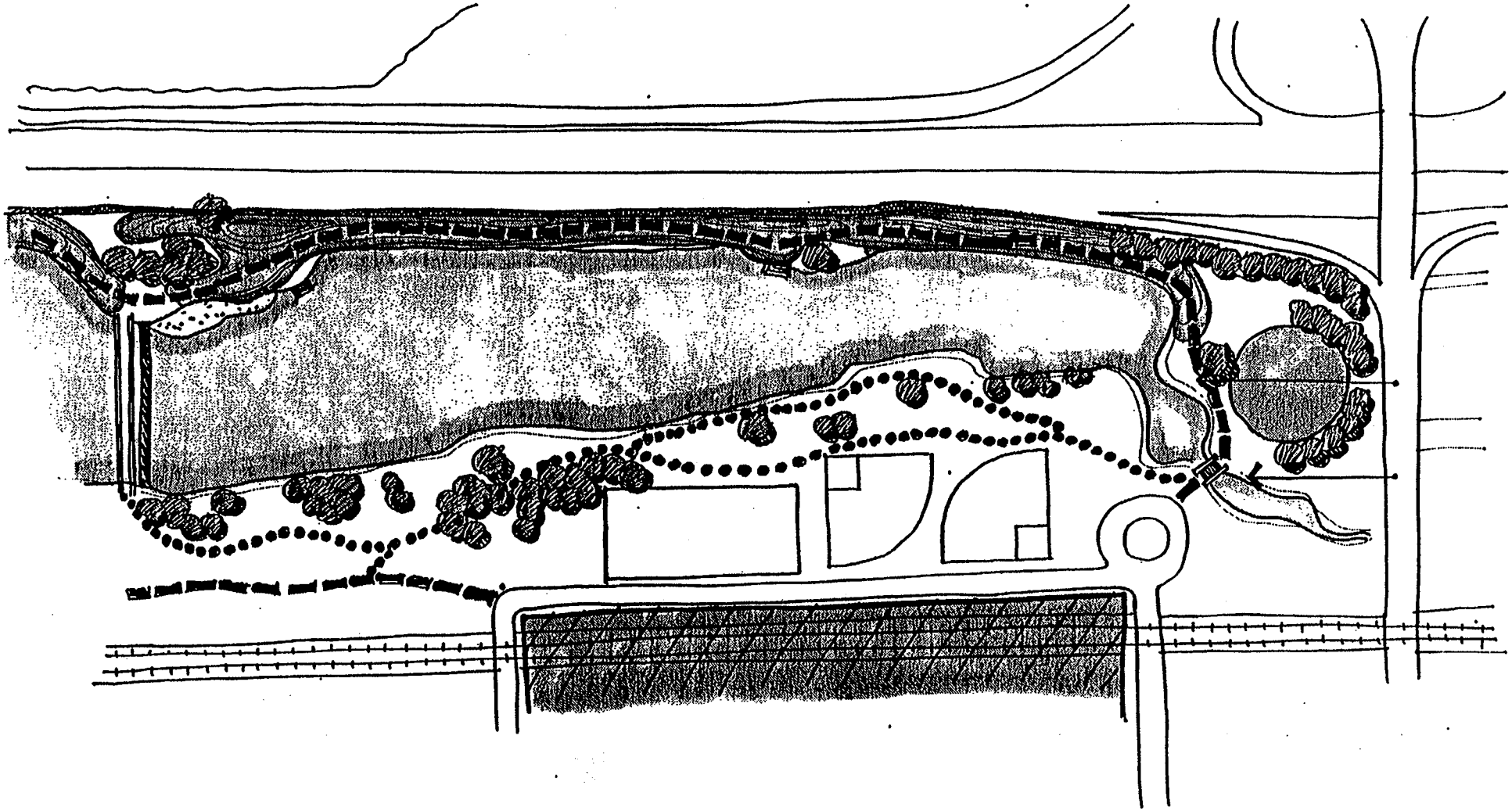
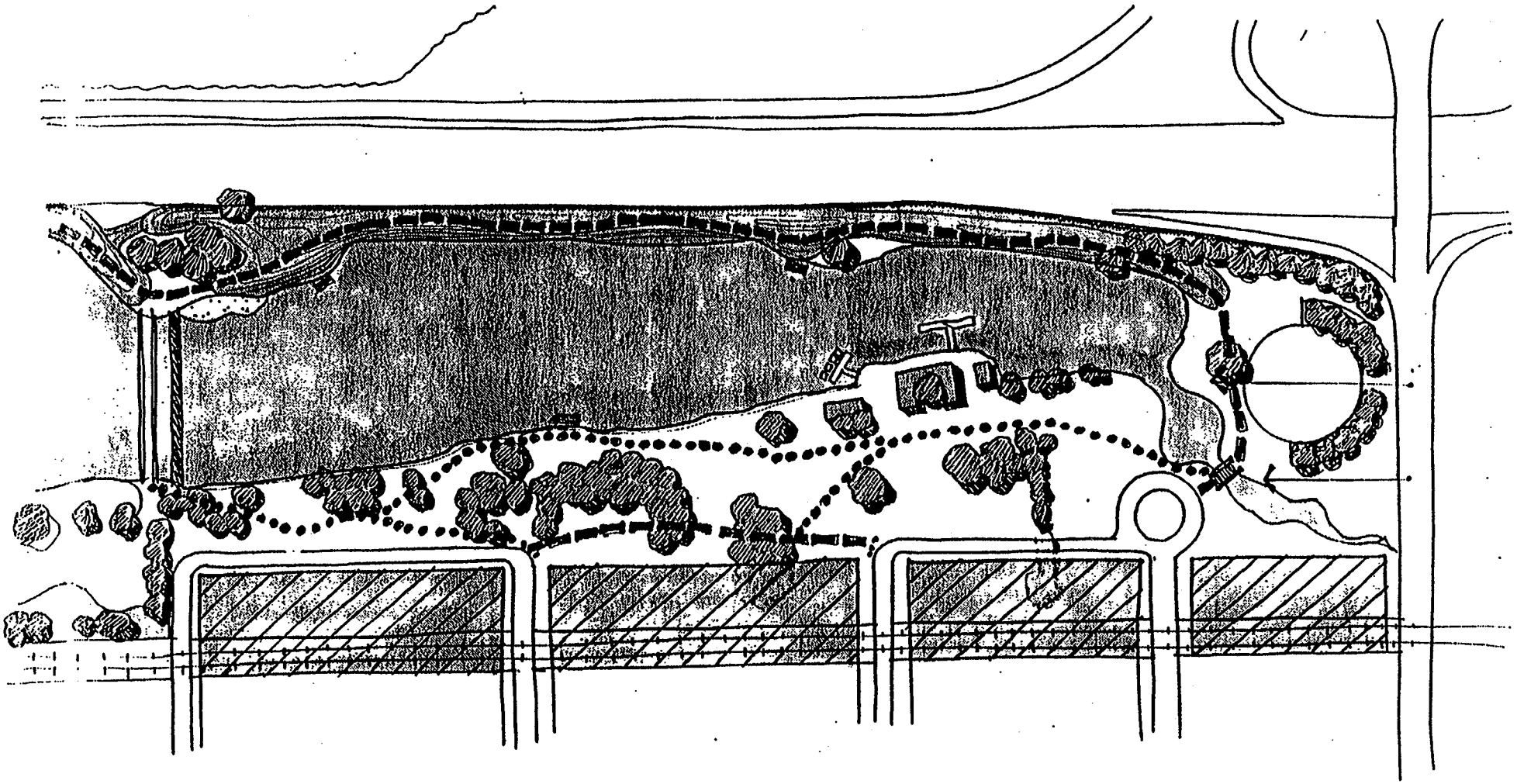


Figure 5, continued

ULTIMATE VISION PLAN B



Appendices

Appendix A
Public Workshop Reports

City of Berkeley
Aquatic Park Master Plan Process

COMMUNITY WORKSHOP #1 AND WALKING TOUR REPORT

A Summary of Comments Received from Community Workshop #1 and the Questionnaire Completed by Participants in the Aquatic Park Walking Tour, both held on July 29, 1989.

Prepared by:

MOORE IACOFANO GOLTSMAN
1802 Fifth Street
Berkeley, CA 94710
(415) 845-7549

August 1989

TABLE OF CONTENTS

Appendices

I. INTRODUCTION

This report is a summary of the questionnaires completed by participants in the Aquatic Park Walking Tour held July 29, 1989 and of Community Workshop #1 held immediately following, in connection with the City of Berkeley Aquatic Park Master Plan Process.

Walking Tour Participants

Ed Bennett
Alicia Carter
Mary Caldwell
David Chew
Kevin Cox
Michael Cozzens
Pete D'Agostino
Michael Dunn
Mary Anne Flette
Gene Harris
Willie Harold
Donald Jen
Ric Jesch
Larry Jossens
Beverly Kelly
Chris Kitting
Mark Knox
George Leonardas
Carol Loud
Don Madden
Lexy Montgomery
Leonard Muise
Anna V. Murl
Jeb Rechen
Barbara Rivenes
Carole Schemmerly
Rett Smart
John Stewart
Becky Tamil
RB Thum
Michele Van Ort
Diane Watson
David Welty
Bridgit
Unknown

MPA Design Staff

Michael Painter
Carl Emura
Brooks Kolb

Consultants

Daniel Iacofano, MIG
Jim Oswald, MIG
Xavier Briggs, MIG

II. WALKING TOUR QUESTIONNAIRE SUMMARY

The following is a summary of comments received on the questionnaire completed by participants in the Aquatic Park Walking Tour.

A. Overview

The purpose of the walking tour was to experience Aquatic Park and identify positive and negative features of the site as well as major constraints and opportunities for development and/or improvement. Walking tour participants were asked to take a specially prepared route through the site, based on key observation points or "stations" (see Appendix A for a sample walking tour map). Participants picked up a guidebook at Station 1, near the intersection of Bancroft Way and Bolivar Drive. The guidebook provided information on the park and prompted walking tour participants to consider major park features and key planning issues. After the tour, walking tour participants reconvened to record their observations on a questionnaire.

Of the 36 persons (24 of them Berkeley residents) who signed up to participate in the Aquatic Park Walking Tour, 31 completed the Tour questionnaire. Approximately 18 of these were men and 12 women (1 was unmarked), most of who were between 30 and 45 years of age. Several senior citizens with a history of involvement in the park also participated in the Tour and questionnaire.

Both frequent and occasional users of Aquatic Park offered opinions on the park's most striking features — its positive and negative qualities. About 10 of the respondents said they use the park "seldom" while 12 said "weekly" and 6 "daily".

Overall, this small sample demonstrates a broad range of opinion on what existing or potential features are most important to the Master Plan. Notably, *noise* was cited by more than half (16) the respondents as a major issue to be addressed in the Master Plan.

B. Question Summaries (Frequent responses)

Question 1: What are your most vivid impressions of Aquatic Park?

Respondents answered this question with a wide range of park features. These most "vivid impressions" overlap to some extent with Questions 2 and 3, although respondents were not asked to evaluate in Question 1, only to list. The following responses therefore suggest opportunities as well as challenges among the prominent and distinctive qualities of Aquatic Park. Clearly, Aquatic Park is a special and unique open space in a crowded urban environment, and a range of users and age groups recognize its importance and potential

a. Natural Beauty/Views/Open Space

Despite its proximity to the freeway and various industrial land uses, respondents appreciate the park's openness, natural beauty (in some sections more than others) and lakeside views. Half the respondents cited these qualities as among their most vivid impressions of the Aquatic Park. Related responses to question 2 and 3 suggest that users feel that the Park helps alleviate the scarcity of open space in the West Berkeley area.

In addition, some respondents noted that the Park's bird life and vegetation add greatly to its beauty and attractiveness as open space.

b. Noise

Twelve (12) respondents cited noise as one of the most striking features of Aquatic Park. (See Question 3 below)

c. Wind and water

Twelve (12) respondents cited one or both of these features. Based on responses to the questions which followed, a wide range of park users value what is perhaps the Park's most unique feature, its large body of water.

d. Other Features

Additional responses included: inadequate maintenance, the need for renovation, a lack of connection to the nearby community, the narrowness of the west side, bad odors, traffic and the potential for enhancement of the park as a city resource.

Question 2: What do you like most about Aquatic Park?

a. Water

Twelve (12) respondents cited water as the Park's greatest attribute. Some stressed the value of existing as well as potential uses. Others appreciated the lakeside views and the sense of openness and serenity which the water lends to an otherwise noisy environment.

b. Landscaping/Views/Open Space

Many respondents cited the Park's open space and potential as an urban park as making it valuable to the community or region. Several noted specifically that the crowded feeling of the nearby community makes a well-developed open space vitally important. Several were impressed with existing landscaping,

although many others felt that much can be done to make the park cleaner and more attractive (see Question 3 below).

c. Natural Habitat/Wildlife

Nine (9) respondents cited the park's role as a natural habitat, especially as a refuge for bird life, among its most positive features.

d. Other Features

Several respondents (a small disc golfer group participating in the tour) felt that the disc golf course is among the park's greatest attributes. Only one respondent described the park's windiness as a positive feature.

Question 3: What do you like least about Aquatic Park?

a. Noise

The most frequent answer on the questionnaire, noise was noted by 16 respondents as among the greatest drawbacks of Aquatic Park, and noise was the only drawback identified on a few. A number of respondents suggested remedies in Question 4 (see below). One noted that the noise level varies, depending on the proximity of buildings and vegetation. Finally, one respondent felt that the City should not concentrate on the noise factor ("This is an urban park!").

b. Inadequate Maintenance/Facilities

About one third (1/3) of the respondents identified poor upkeep or inadequate facilities as among the most negative features of Aquatic Park. Several cited the lack of bathroom and drinking water facilities in particular. A number mentioned litter, run-down buildings and smelly, decomposing algae as evidence of the need for improved maintenance.

c. Criminal Activities/Loiterers/Safety Issues

Respondents identified criminal activities, loiterers in cars (on the east side) and "cruisers" as reasons they dislike Aquatic Park. One reported threats and intimidation he and a companion had experienced. Another cited the "feeling of being unsafe."

d. Access/Traffic Issues

Related to noise and safety, several respondents identified traffic on the east side and the nearby freeway access as a hazardous feature of the Park for pedestrians

and cyclists. A few criticized the existing location of access points (see Question 4 below).

e. Odors

Six (6) respondents mentioned bad odors, in particular the smell of decomposing algae at the north end, as among the greatest drawbacks of the Park.

f. Eyesores

A number of respondents identified such visual features as weeds, the dirt piles opposite Seabird Sailing Center, algae/"scum", nearby industry and abundant trash (in the water and on land).

Question 4: Additional Comments or Suggestions?

The following categories summarize the most frequent responses to this question.

a. Address the noise problem in Aquatic Park.

Respondents' suggestions for the west side of Aquatic Park ranged from constructing a sound wall to increasing vegetation or building a landscaped mound with bike/walkways. Reducing noise level, particularly on the west side, is important to most users.

b. Change/improve access points and road ways.

A number of respondents identified specific access and/or traffic control improvements. A few suggested closing the west side to all vehicles except water skiers and service vehicles. Others are more concerned about Potter Street traffic ("Divert the freeway!") or the possibility of creating access across the railroad tracks at additional points (e.g., near the north end, to accommodate lunchtime park users).

c. Add facilities and improve maintenance.

Respondents specified bathrooms and drinking fountains as needed facilities, particularly in the picnic/play field area on the Park's east side. A few called for "facilities for families and children", expressing a desire that Aquatic Park be made more attractive and "friendly" (i.e., safe and accessible) to families and young people. Specific suggestions included pony rides, a merry-go-round, game equipment rental, fountains, a playground, a youth center and a skateboard facility (perhaps on the west side). One respondent suggested the construction of a pedestrian/bicycle bridge at halfway point (near the flagpole).

d. Enhance the natural habitat.

Several respondents suggested vegetation or water quality improvements to enhance Aquatic park's role as a habitat for bird and fish life. One identified the need for greater turbulence (and oxygenation) in the water to support marine life. One respondent called upon the City to determine the state's role in meeting the need for water circulation and suggested that the City check its 1954 contract with the State Division of Highways.

e. Maintain a wide variety of uses.

Respondents value the Park's role as a vital, multi-use open space. They like the fact that it plays host to water and land activities and most indicated a desire to see it serve an even wider range of uses and a greater number of users in the future. A number of respondents indicated that the park is underutilized, relative to its size and potential. One felt that more users would make the park safer and easier to protect against vandalism.

f. Be creative and long-term about planning.

Several respondents echoed the need for the Master Plan. They called for long-term flexibility and creativity in planning. A few want the Park to meet regional as well as community needs, and one suggested that Aquatic Park be modeled after Tilden or Golden Gate Park in terms of service orientation and facilities.

Finally, one respondent called for more informative and well-organized events like today's tour.

III. WALKING TOUR OBSERVATIONS: COMMUNITY WORKSHOP #1

In addition to completing a Walking Tour Questionnaire, almost two thirds (2/3) of Tour participants participated in the Community Workshop which followed. This Workshop was held at the West Berkeley Senior Center from 12 noon until 2 p.m. Here, community members met with site planners and City of Berkeley Parks and Marina Division staff to discuss their likes and dislikes of the site and to identify their goals and objectives for the park and its future use. A station-by-station summary, along with a summary of overall objectives/key issues is presented below. Photoreductions of the wallgraphics recorded at this Workshop are included in Appendix C.

Walking Tour participants' comments are grouped according to each station point, although some comments pertain to the areas adjacent to or in between to the stations as well. The designation in front of each item indicates the type of comment:

(+) Positive response to site or quality of area;
(–) Negative response to site or quality of area;
(o) Opportunity or suggestion for improving the area.

A. Potential Planning Goals and Objectives:

1. *Improve the quality of the human and natural environments.*

- Address the key issues of crime (especially vandalism, sex and drug-related activity), wind, noise, environmental quality and water quality.
- Bring families back as regular users of Aquatic Park
- Bring in more activities and people to the site to deter crime.
- Buildings need maintenance (especially painting).

2. *Achieve a balance between the human and natural environments.*

- Safeguard the Park's role as a natural resource.
- Study the bird population and the human impact on birds in the Park.
- Maintain the diversity of the park's resources and plant and animal species.
- Address congestion in the park: birds, people, bikes and cars need separation.

3. *Introduce more community-serving activities and facilities into the park.*

- Add drinking fountains and safe, clean restrooms.
- Consider paddleboats and low intensity food concessions.

- Consider youth-run businesses for youth.
- Consider adding night lighting with random on/off feature.
- Consider small-scale commercial land uses with themes related to the park's unique character (i.e., its water), including frisbees, kites, etc.
- Consider a permanent, on-site staff for information, equipment checkout and other services (possibly an on-site resident ranger program).
- The Park could use an information/concession booth.
- Consider locating a community meeting room for clubs and other groups somewhere on the lakefront, with bathrooms, a kitchen and other facilities.

4. Improve park access and circulation and reduce conflicts between pedestrians, autos, joggers, skiers, etc.

- Address parking needs.
- Consider no-road options on the west side. This side is used as a through-way by all: cyclists, joggers, and vehicles..
- Minimize traffic. Keep people in the park (on foot) and keep traffic out.

5. Create a flexible Master Plan document.

- Balance regional, community and neighborhood needs.
- Prepare the Master Plan as a program and process for upgrading the facilities and orientation of Aquatic Park.
- Consider the Park's relationship to other parks, and emphasize uses that are not or cannot be served elsewhere.
- All changes should be monitored over the long-term. Check for appropriateness and level of repair required.

B. Station Observations

Station 1: Starting Point

– Decomposition and black sulfide is unsightly and smelly.
– Nearby dirt piles (toward Seabird) are unsightly and should be controlled.
– Bolivar Drive is very narrow and a buffer may be needed between the roadway and park area.
o The base of Bancroft Way could be a bus turnaround point if space allows. Adjoining business might be interested in such development.

Station 2: Seabird Sailing Center

– Traffic control is inadequate where Addison joins Bolivar Drive (people run the stop sign).
– The roadway is too narrow to handle traffic around Bolivar and coming out of the restaurant and businesses.
o (Toward Station 3) Businesses might make this "strip" more attractive (e.g., a wine garden).

Station 3: Lake Overview - North End

+ Facing the northern tip of the park is a good commercial site.
– Overgrown and decomposing algae is unsightly and smells bad. This is the shallowest part of the lake.
– Nesting birds are attacked by dogs.
– There is a wigid grass as well as algae problem now.
o Potential exists for small-scale commercial activities such as a kite shop, concession stand, etc.
o "Work with (instead of against) the algae growth". A boardwalk could be built along a marsh area here.

Station 4: Bollards

– Low water level is a problem all along the lakeshore.
– This area shows a particularly low fish population (varies around the lake).
– Weeds should be cleaned up.
o A pedestrian/bicycle bridge could be built here (across to Station 1 area).

Station 5: Water Ski Club and Tidal Gates

+ Boat engines (that don't leak or spill oil) may create an ecologically beneficial water turbulence here, which is missing elsewhere in the park. Planners should study this.
– Lack of outflow to San Francisco Bay (causing poor circulation in the lake) is noted at the tidal gates.
– Birds appear to be scared away by the noise of boat engines.
– Conflicts arise between boaters and cyclists/joggers in the congestion of Bolivar Drive in this area.
– This long stretch (Stations 4 to 7) is particularly windy and noisy (few barriers exist) between the path and the freeway.
– Some taxpayers feel shut out of public parkland (the island).
o While all park users are permitted on Bird Island, the perception may exist that its use is restricted to water skiers only.
o Check the City's existing agreement with the Water Ski Club. What are the costs and benefits? How many people use the island for skiing? Does the City gain any revenue?
o Examine environmental impacts of water skiing (especially on bird life and water quality.
o Adding aeration equipment or a wave machine(s) should make the lake more hospitable to plant and fish life.
o A separate pedestrian path might be built to increase safety and reduce congestion.
o Vegetation might be established on the island to make it more of a bird refuge.

Station 6: Rowing Club

+ Bird behavior near the rowing facilities indicates good treatment by users, a satisfactory sharing of space by humans and wildlife.
o Firewood storage in this area is unsightly and needs clean-up.
o Swimming opportunities might be considered if water quality can be improved.
o Consider noise abatement options, including a landscaped mound with skateboard park, bike and walkways. Dredging materials might be used to help form sound walls.

Station 7: Model Yacht Basin/Birdwatching

– The roadway here (toward Station 8) is too narrow and particularly congested when filed with parked cars.
– Uses for this area are poorly defined.
o The City might make this throughway a pedestrian only bridge and prohibit parking on nearby roads.
o Perhaps model yacht tournaments could be brought back with proper facilities and program support. These events can bring an element of pageantry back to the park.

Station 8: Bird Rescue Center

– Weed and algae growth impede yacht racing and other uses of the basin.
o Examine the Bird Rescue Center's role. If not a habitat or refuge, does it serve the birds in Aquatic Park at all? Perhaps the center should be relocated in favor of something more park-focused. The building here, originally home to the Model Yacht Club, could serve various uses. One organization is looking, for example, to establish a Berkeley-based Wildlife Refuge Center.
o An interpretive ecological center and/or educational and youth-oriented program might also be considered.

Station 9: Potter Street/Radio Station

– Freeway access from Potter Street is a hazard to park users.
o Check Caltrans plans for this interchange and consider potential uses for space.
o Consider Potter Street as an alternative park entry point.

Station 10: Disk Golfing

+ The grass area here is good for picnics and as one of the few wide stretches of grass in the park, it lends a feeling of space.
+ Disc golfing is very compatible with other uses. The disc golf course here is one of the only ones in the Bay Area and hosts major tournaments.

+ This area will support a wide variety of uses.
– Restroom facilities and drinking fountains are much needed, as well as other facilities for families.
– The land areas surrounding the lake are very confined.
o "Let's get art in the park." Consider an arts or amusement center. Would such uses attract too many people and too much traffic?
o This is the only open space available to the immediate community, and yet to some it does not seem a part of West Berkeley (more like a regional park).
o Consider options for integrating this grassy area with existing businesses on the other side of the tracks.
o Facilities and programs that invite a greater number of users will add to the safety of this area and discourage vandalism.

Station 11: Freshwater Marsh

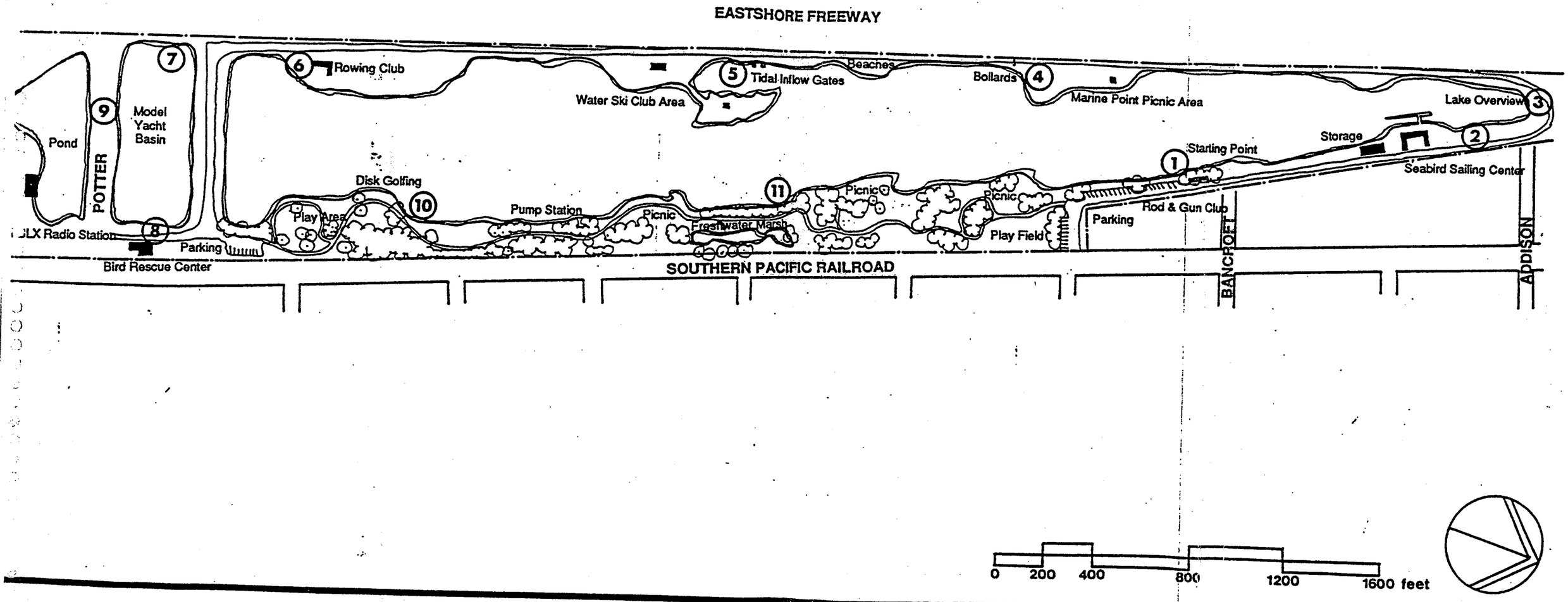
o The run-down bathroom facility could be reopened, renovated and expanded to include a small concession.

APPENDICES

Sample Walking Tour Map

Sample Participant Questionnaire

Photoreduction of Workshop Wallgraphics:
Walking Tour Debrief/Community Workshop #1



AQUATIC PARK Walking Tour Map

July 30th. 1989

57

BERKELEY AQUATIC PARK

WALK ON THE WATER
WALKING TOUR QUESTIONNAIRE

1. What are your most vivid impressions of Aquatic Park?

2. What do you like most about Aquatic Park?

3. What don't you like about Aquatic Park?

4. Additional comments or suggestions?

For user analysis purposes, please complete the following:

Please check one: _____Male _____Female

Age (Please write in): _____

Zip code of home residence (Please write in): _____

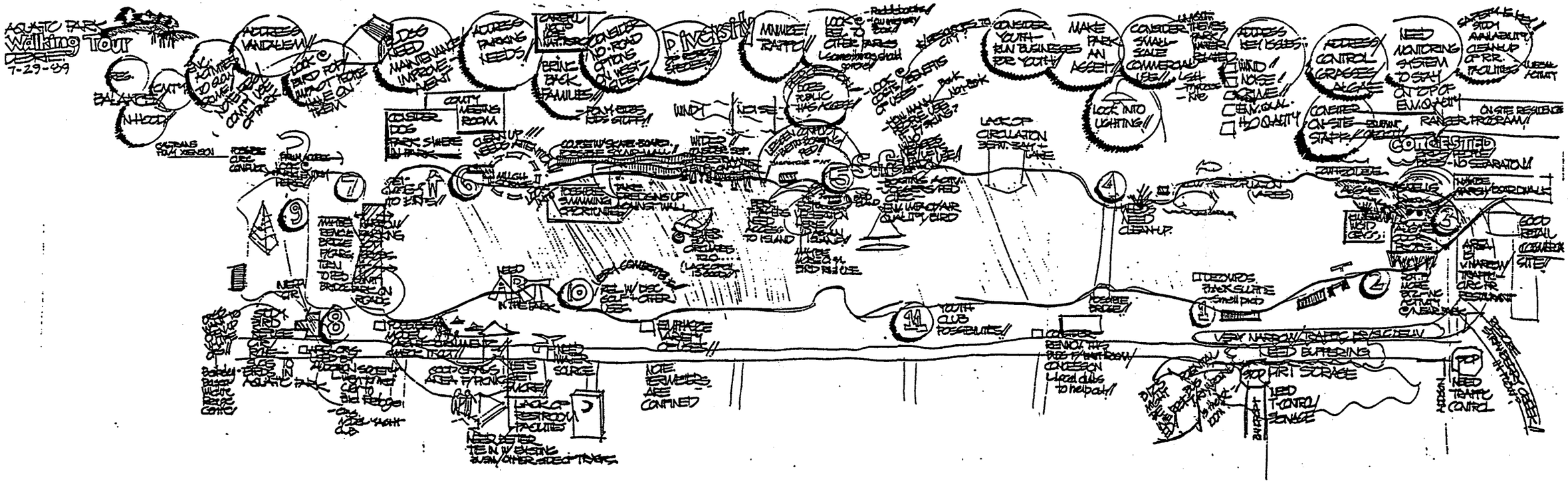
How often do you use Aquatic Park (circle one):

seldom monthly weekly daily

How did you get to Aquatic Park today? (circle one)

bus car bicycle walk other _____

Thank you for your participation in today's event!



AQUATIC PARK
Walking Tour Debrief/
Community Workshop #1
July 29, 1989

City of Berkeley
Aquatic Park Master Plan Process

COMMUNITY WORKSHOP #2 SUMMARY REPORT

A Summary of Comments Received from Community Workshop #2 held October 4, 1989 at the West Berkeley Senior Center.

Prepared by:

MOORE IACOFANO GOLTSMAN
1802 Fifth Street
Berkeley, CA 94710
(415) 845-7549

October 1989

TABLE OF CONTENTS

I. INTRODUCTION

This report is a summary of the second Community Workshop in connection with the City of Berkeley Aquatic Park Master Plan Process, as well as the comment sheets — Comments on Master Plan Options — completed by participants in the event. The workshop was held October 4, 1989 at the West Berkeley Senior Center.

Workshop Participants	Kathy Warr	Rett Smart
	Gary Macchi	Mary Beth Thomsen
	Al Frosini	Mary Cardwell
	Dan Stapleton	Richelle Matli
	Craig Warr	Mark Knox
	Andrea Plough	Tom O'Connor
	George Pedrick	Miles McKey
	Beth S. Weinberger	D.W. Bauer
	Larry Jossens	Jerry Heinrichs
	Curt Colella	David Methven
	Chris Kitting *Waterski Club*	
	Jeb Rechen *Rowing Club*	
	Gene Harris *Seabird Sailing Center*	
	Jo Lynch *Waterski Club*	
Task Force Members	Becky Temko	Robert B. Thum
	Carole Schemmerling	Ed Bennett
	Donald Jen	Hollis Carr
MPA Design Staff	Michael Painter	Brooks Kolb
Consultants	Daniel Iacofano, MIG	Jim Oswald, MIG
	Xavier Briggs, MIG	

The purpose of this workshop was to present alternative plans for the Aquatic Park Master Plan and to provide an opportunity for community review and discussion of the alternatives (referred to as Option 1 and Option 2).

Daniel Iacofano, MIG, welcomed workshop participants and provided an overview of the project background and planning process, as well as a review of the Walking Tour and Community Workshop held July 29. Mr. Iacofano emphasized that tonight's workshop would provide an opportunity for community members to further refine and articulate their goals for the improvement of Aquatic Park.

II. PRESENTATION OF ALTERNATIVE PLANS: OVERVIEW, COMMENTS AND QUESTIONS

The following is a summary of the Presentation of Alternative Plans for Park Improvement. The presentation was made by Brooks Kolb, MPA Design, with the aid of long, color wallgraphics for each plan alternative. Following his presentation, the public was invited to comment and ask questions of clarification. These questions and comments are also summarized below.

A. Presentation Overview

Mr. Kolb emphasized that the design team's two overriding concerns in conceptualizing improvements for Aquatic Park were to:

- Increase the number of uses and the extent of use of the park and
- Develop creative noise abatement measures

Both alternatives include:

- New park entries designed to enhance the park's connection to the surrounding area
- Large new wildlife/wetland areas at the south end of the park
- A picnic and play area near Channing Street on the east side
- Earth berm sound walls filled with glass and
- Hillsides on the east side to provide views over the freeway

Distinguishing features of each option include:

Option 1

- Additional features designed to support a wetland at the north end
- A new community center
- One pedestrian bridge across the lake
- Displacement of the water ski/boat center southward toward the Rowing Club and
- Two viewpoints into the park from the west

Option 2

- Greater focus on human use of the north end
- Greater overall focus on wildlife in the park
- Use of a restaurant as a community center or focal point
- A bus turnaround loop linking Bancroft Way and Channing Street
- A new, multi-use development to be built over the railroad tracks
- Separate pedestrian and bike trails for the east side
- Two pedestrian bridges over the lake
- No displacement of the water ski clubhouse
- One viewpoint into the park from the West

Mr. Kolb mentioned that the design team decided not to include any new dog or pet-serving uses to the plans, in order to protect the fragile and highly valued wildlife ecology of the park. In addition, no bridal trail was included, as this type of use would likely complicate movement considerably on the narrow east shore.

B. Public Comments and Questions

Removal of Water Skiers
A participant asked why designers had not prepared an alternative plan without any water ski use in the park. Mr. Kolb responded that each option could easily be conceptualized (and neither would fundamentally be altered) without water skiers in the park. Furthermore, community input strongly favored an overall increase in use of the park as a way of making it a more vital and safe community resource. Water skiers, he said, add to the park's vitality and usage

Similar Parks
A participant asked whether the proposed plans had been modeled after other parks. Mr. Kolb responded that such modeling was not a part of the design process but that elements of both options could be found elsewhere (in existing parks).

Noise Abatement and Earth Berm Structure
Responding to a participant question, Mr. Kolb explained the process of noise reduction using glass-filled earth berms to be placed adjacent to the freeway. He stressed that this measure should significantly reduce noise levels on the east side. It represents a soft, earth-based approach among the various options for reducing noise. Answering a later question, he added that the height of the proposed berm is approximately 13 feet from water level and 6 - 8 feet above the freeway height. This design, moreover, would allow later addition of a pedestrian walkway over the freeway.

West Shore Roadway
Mr. Kolb answered a question about the west shore roadway by clarifying that there would be no public access roadway on the west shore in either plan. The roadway would be open to authorized water skiers, emergency and park vehicles and joggers (perhaps along a narrow, paved trail. It would provide two lanes up to the water ski club and one lane beyond.

Water Quality
A participant asked for an update on the water quality of Aquatic Park lagoon. He also wanted to know whether local industry continues to dump waste into it.

Mr. Kolb responded that while water quality analysis was not in itself a part of the design "mission" of the landscape architects assembling the Master Plan, access to water was clearly important to the usage of the park. Bill Montgomery, Parks Superintendent, added that the Master Plan would be a land use document, with water quality as a background issue (addressing, e.g., the tidal exchange between San Francisco Bay and the park lagoon). Mr. Kolb stated that it would be important to create better circulation in the lagoon, as well as greater tidal variation (at the south wetland area in particular). Current water quality is probably dubious in terms of contact sports such as swimming.

24-Hour Park Uses
A participant commented that 24-hour uses such as a trailer park would add activity and enhance safety in the park, and she asked whether consideration had been given to such uses. Mr. Kolb responded that designers sought to provide a reasonable increase in park use without sacrificing the bucolic nature of the park which its users seem to value greatly.

Decisions and Process
Responding to a participant question, Bill Montgomery explained that the task force would use tonight's comments to propose a preferred alternative plan. It would again be available for public review before undergoing final refinement by the design team. The Plan would then go to City Council for review and approval.

Community Center
Responding to a question about uses for the community center, Mr. Kolb explained that such the center would be able to host teen dances, weddings and other social events.

Railroad Pedestrian Overpass
It was mentioned that the railroad tracks have deterred access from the nearby community and asked whether overpasses had been considered. Mr. Kolb responded that such walkways would require handicap access that would make them large and costly. Instead, proposed plans include new, on-grade crossings.

Overtrack Development
A participant asked whether any developer has expressed interest in the multi-use (residential and commercial) overtrack development proposed in Option 2. Although no investor has expressed a clear and direct willingness to build it, the design team found an interest in exploring the idea as a future option.

Pedestrian Bridge
Responding to a question about the height of the bridge proposed to span the middle of the lake, Mr. Kolb confirmed that two options are up for discussion: a high bridge allowing waterski boats to pass and a low bridge allowing passage of rowing shells only.

Tree-lined Access Roads
A participant asked whether tree-lined access roads (such as Bancroft Way) were included in the Plans. Mr. Kolb confirmed that they were and explained that they should make the access roads more attractive to pedestrians and would visually signify "park entry" to pedestrians and drivers searching for the park entry roads.

Willow Trees
A participant asked if willows in the park would be able to survive the high salinity in the lake's proposed wetland area. Mr. Kolb pointed out that the willows in the Radio Station Pond appear to be surviving well.

Freeway Barrier
Several participants felt that the proposed barrier planting might be insufficient to meet Caltrans standards (for freeway border barriers) and that meeting the standard would be critical if the City hopes to secure partial funding for the earth berm from Caltrans. It was announced that on Thursday, October 12 at 12:30 p.m., Caltrans would hold an open meeting to discuss the I-80 freeway. Mr. Kolb agreed to research Caltrans barrier requirements.

III. DISCUSSION OF ALTERNATIVE PLANS

Workshop participants were asked to identify advantages and disadvantages for each alternative plan or option. In addition, participants recorded advantages and disadvantages on comment forms which were distributed at the outset of the workshop. Both oral and written comments are summarized below, along with a subsection of General Comments and Recommendations,in which participants' additional comments and suggestions are summarized. Some of these comments refer to both alternatives, some to neither.

(Note: *Bird Island* lies near the Water Ski Club on the western edge of the park lagoon and contains the ski judging facility.)

A. Advantages and Disadvantages of the Alternative Plans

Option 1 Advantages

- Raised earth berm on the west side (but design needs clarification).
- The "step back" approach.
- Pedestrian bridge ("if people cooperate"). This could work in Option 2 as well.
- Raised trail.

Option 1 Disadvantages

- Water may be too shallow for motorboats at the proposed water ski site, and skiing may negatively impact wildlife if the club site is moved southward.
- Heintz Street throughway: access is good but could introduce unwanted and unsafe traffic conditions into the park.
- Two vehicle (2) lanes on the west side may not be necessary if turnouts are added.
- The access grade from Heintz may be too steep, infeasible.
- The wildlife area may be too small to represent an asset to park users.
- Trails through the wetland area may negatively impact wildlife.
- Configuration of the south end road and parking lot should be reconsidered. Parking may not be appropriate or desirable along the road, but consider adding a multi-use pathway to run alongside it.
- The organic farm may not be a desirable or attractive feature for the park surroundings.
- Removal of parking at the end of Bancroft Way.
- Less attention to wildlife needs (relative to Option 2).
- Removal of American Soil Products. City acquisition of land seems unrealistic.

Option 2 Advantages

- Seems more favorable to wildlife (especially at the south end).
- Preferred by water skiers. Bird Island could be reconfigured to reduce standing waves.
- Pedestrian walkway is good. Moving it closer to wildlife areas might be desirable, if it would not have a negative impact on the wildlife.
- Access to the marina.
- West side access may be good for safety, although difficult to enforce.
- Mini-concession. Consider a "coffee wagon" or similar business.

Option 2 Disadvantages

- A bridge to Bird Island may be unfavorable to wildlife and invite vandalism. Consider connecting the east and west sides via a pedestrian bridge located further north (toward the center of the lake).
- Creating multiple paths on the east side may congest the narrow land strip.
- Vehicle access to wildlife area at the south end would negatively impact wildlife as well as human users. Consider allowing pedestrians only.)
- Model yachts may not be desirable, but keep active uses in this area of the park.

General Comments and Recommendations

- Financing proposed improvements will be a challenge. Contact Caltrans about the sound wall and related requirements.
- Consider adding a bridge from the west side to Bird Island.
- Explore other noise reduction options. The cost of glass and of cleaning maintenance may make the existing option unfavorable.
- The disc golf course is an important and unique asset to Aquatic Park and should be protected. Studies have shown very high rates of use for disc golf courses around the country, as well as lower maintenance costs than for other active recreation uses (such as tennis).
- Additional barrier(s) may be needed on the west side berm to prevent freeway access (check Caltrans requirements).
- Study and indicate the Aquatic Park's potential relationship to the proposed Eastshore Park.
- The tranquil and "neighborly" character of the east side is a strong point of the park. Seek improvements that enhance and preserve it.
- Bill Montgomery noted that both alternatives make passive use of recreation space, and that Berkeley is in need of active recreation facilities, e.g. ballfields.) Public response indicated that Aquatic Park is not a suitable site in which to compensate for this citywide recreation need, especially given its unique and attractive configuration around water. One person summarized this point point of view by saying "It's a water park."
- Consider adding a volleyball court and other compatible, active uses such as a ropes course in the play area.

- Reconsider proposed hills, as they may impede existing uses of the east side.
- Consider a fenced dog park at the northwest end of the park that would not impact wildlife or other park uses. There is a distinct interest in this type of facility.
- Explore options that maintain the current configuration of businesses at the north end. Significant changes may not be feasible.
- Consider adding water-related activities at the north end.
- Consider eventual extension of the park through a land bridge under the freeway (to connect with proposed Eastshore Park).
- Study park users' perceptions of water skiers' exclusive use of Bird Island.
- Take long-term air quality into account. Significant amounts of soot fall in the area (industrial fallout).
- Preparation of the preferred alternative should be based on a more comprehensive study of the impacts of water skiers in the park (including impacts on the living and non-living environment and on other park users).
- Study the hydrological impacts of proposed changes, and pay more attention to overall feasibility. Pay closer attention to realistically achievable goals. Certain proposals seem "farfetched."

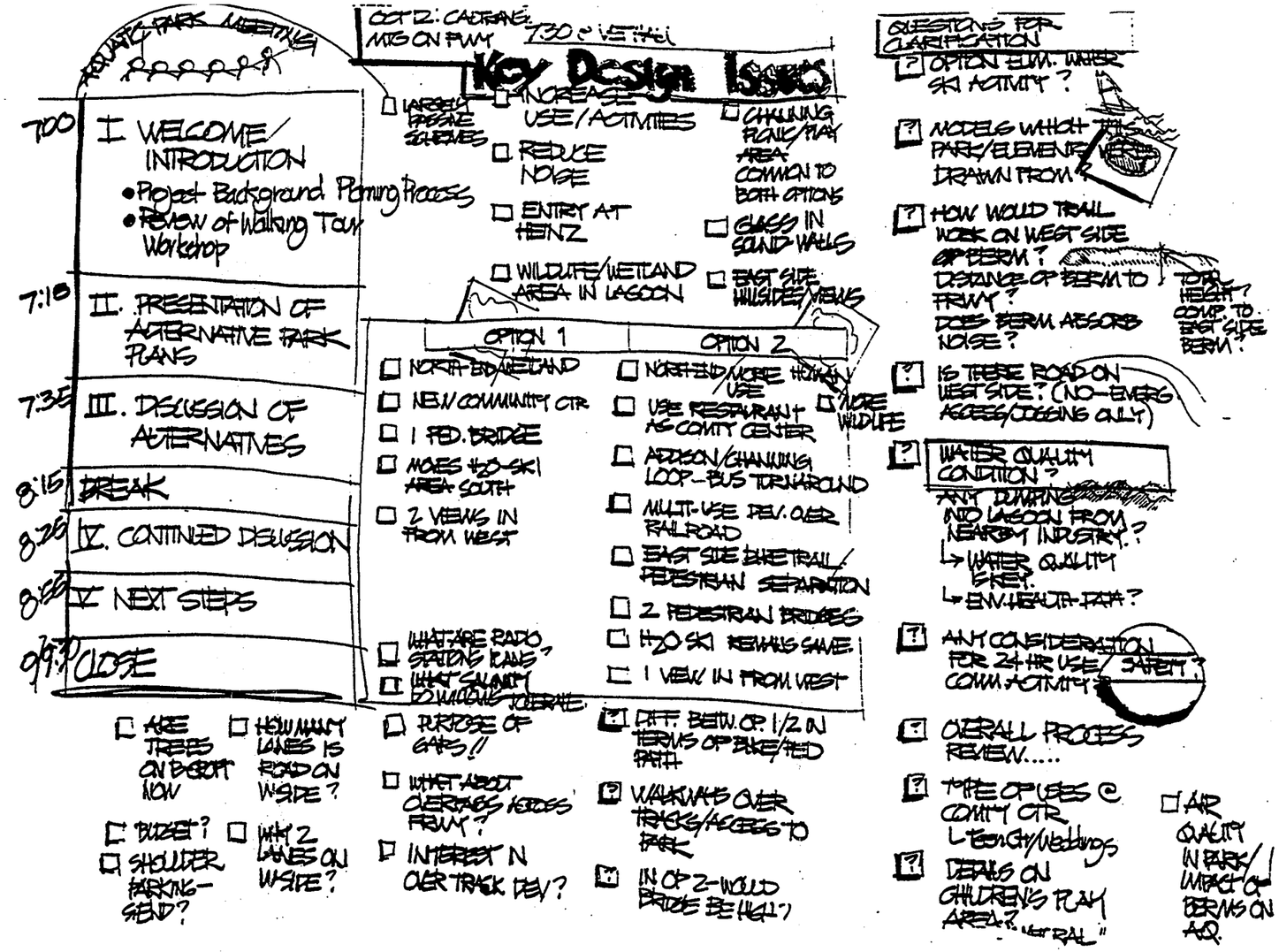
IV. NEXT STEPS

Bill Montgomery announced that public comments received from this workshop would be reviewed by the Joint Subcommittee on Waterfront Parks. The design team would then prepare a "preferred alternative" based on input from the City and the public. A third workshop would be held (has since been scheduled for Thursday, November 16) to provide the community an opportunity to review and discuss this revised plan.

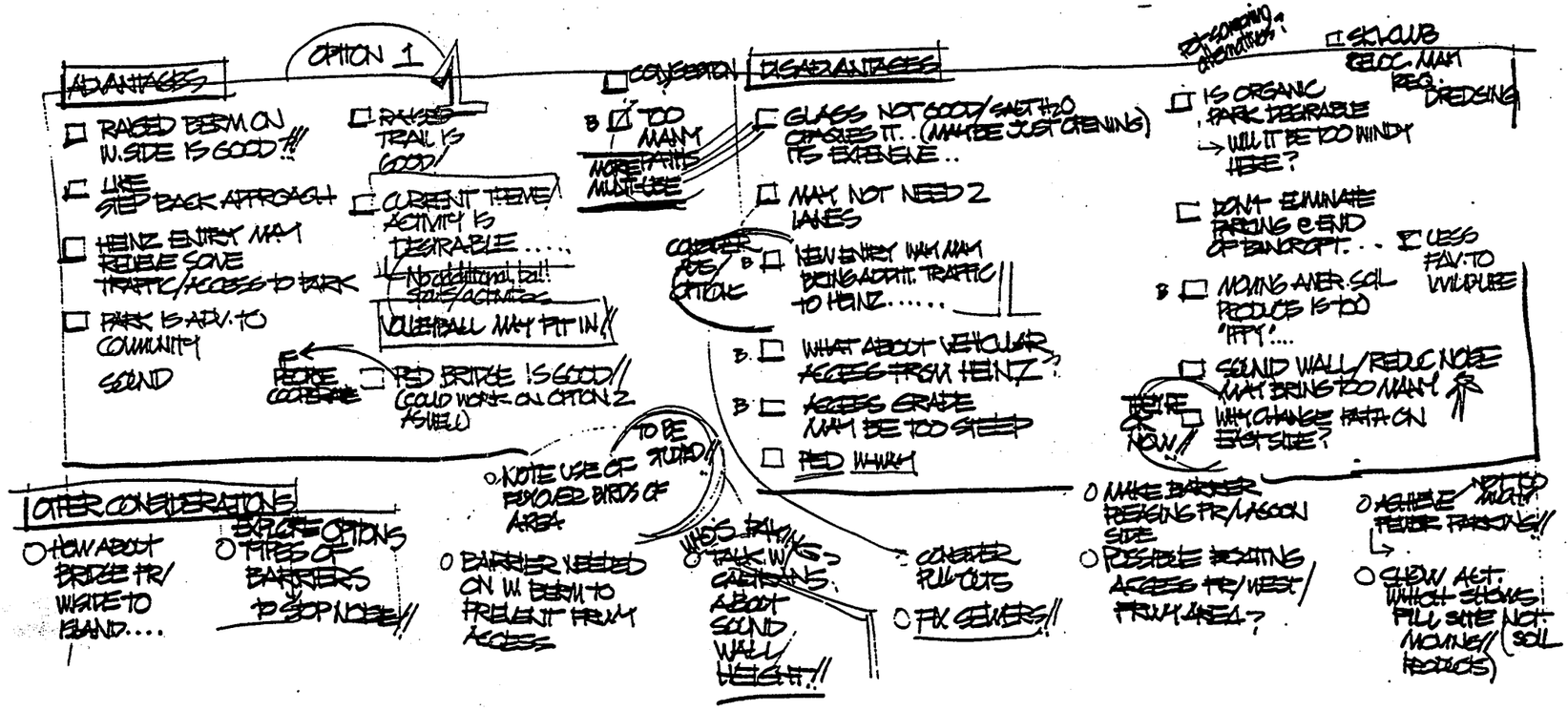
Daniel Iacofano, MIG, thanked community members for their participation and urged them to stay involved in the Aquatic Park Master Plan process.

Appendix

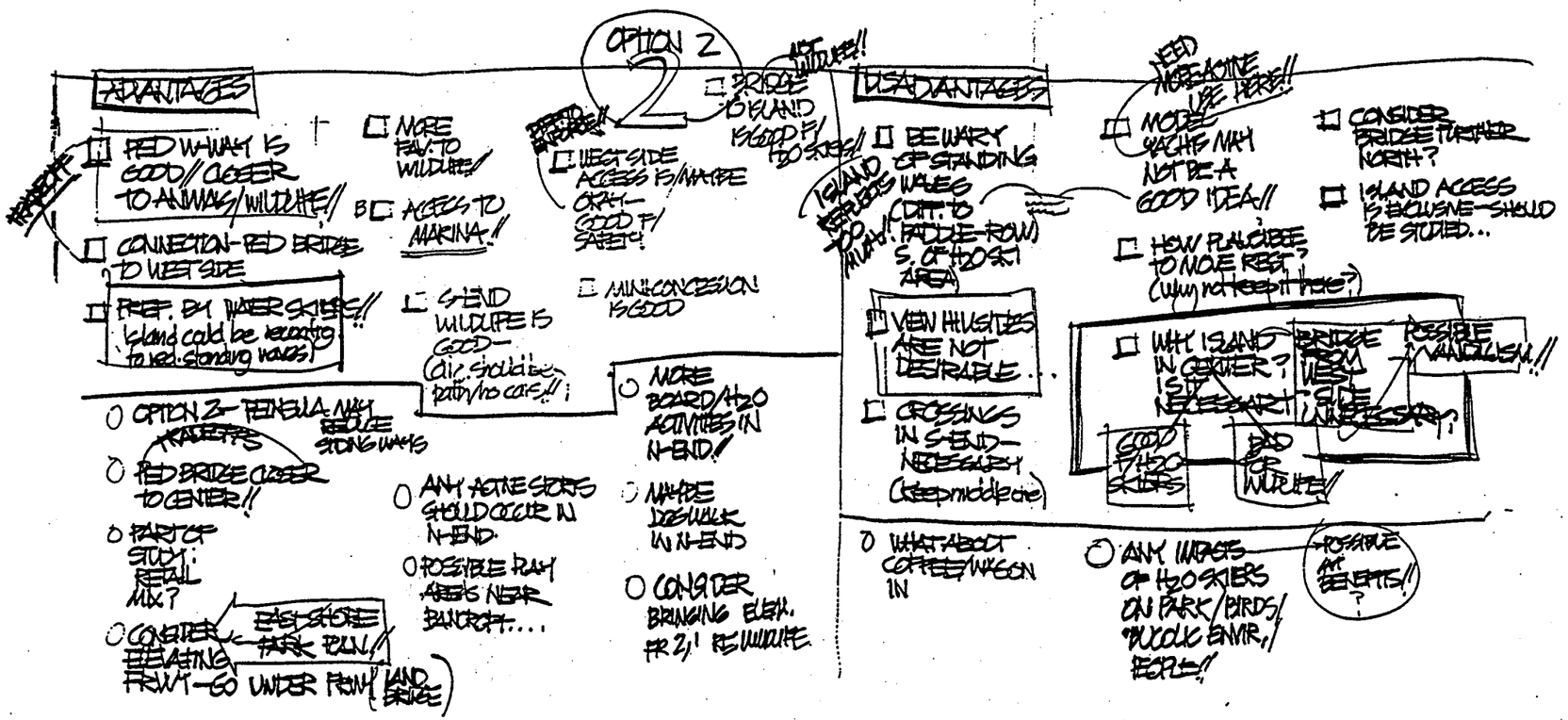
Photoreduction of Workshop Wallgraphics



CITY OF BERKELEY
Aquatic Park Master Plan
Community Workshop #2
October 4, 1989
Welcome/Introduction and Presentation of Alternative Park Plans



CITY OF BERKELEY
Aquatic Park Master Plan
Community Workshop #2
October 4, 1989
Discussion of Alternatives:
Option 1


OPTION 2
ADVANTAGES
DISADVANTAGES
PROVIDE
NOT WILDLIFE!!
RED W-WAY IS GOOD // CLOSER TO ALMAR/WILDLIFE!!
MORE FAV. TO WILDLIFE!
ACCESS TO MARINA!!
CONNECTION-RED BRIDGE TO WEST SIDE
PREF. BY WATER SKIERS!! (Island could be secondary to wet-standing waves)
SEND WILDLIFE IS GOOD- (Air, shoulder path/no cars!!)
MIN CONCESSION IS GOOD
WEST SIDE ACCESS IS/MAYBE OKAY- GOOD F/ SAFETY!
BRIDGE TO ISLAND IS GOOD F/ DO SKIES!!
BE WARY OF STANDING WAVES
CONT. TO FADDE-ROW S. OF HOST AREA
VIEW HINDSIDES ARE NOT DESIRABLE
CROSSINGS IN SEND- NECESSARY (Keep middle one)
NEED MORE ACTIVE USE HERE!!
MODEL YACHTS MAY NOT BE A GOOD IDEA!!
CONSIDER BRIDGE FURTHER NORTH?
ISLAND ACCESS IS EXCLUSIVE- SHOULD BE STUDIED...
HOW PLACEBEE TO MORE REST? (Why not keep it here?)
WHY ISLAND IN CENTER? IS IT NECESSARY?
BRIDGE FROM WEST SIDE NECESSARY?
POSSIBLE WANDLEN!!
GOOD F/ H2O SKIERS
BAD FOR WILDLIFE!!
OPTION 2- PENINSULA MAY REDUCE STORM WAVES
RACE PTS
RED BRIDGE CLOSER TO CENTER!!
PART OF STUDY: RETAIL MIX?
CONSIDER EATING FRUIT-GO UNDER FROM (LAND BRIDGE)
EAT STORE
PARK RUN!!
ANY ACTIVE SPORTS SHOULD OCCUR IN N-END
POSSIBLE RAM AREAS NEAR BUNCROFT...
MORE BOARD/H2O ACTIVITIES IN N-END
MAYBE BOARDWALK IN N-END
CONSIDER BRINGING ELEM. FR 2,1 TO WILDLIFE
WHAT ABOUT COFFEE WAGON IN
ANY IMAGES OF H2O SKIERS ON PARK/BIRDS/ "PUBLIC ENVIR./ PEOPLE"!!
POSSIBLE ART EVENTS!!
?

City of Berkeley
Aquatic Park Master Plan Process

COMMUNITY WORKSHOP #3 SUMMARY REPORT

A Summary of Comments Received from Community Workshop #3, held November 16, 1989 at the West Berkeley Senior Center.

Prepared by:

MOORE IACOFANO GOLTSMAN
1802 Fifth Street
Berkeley, CA 94710
(415) 845-7549

November 1989

TABLE OF CONTENTS

I. INTRODUCTION

This report is a summary of the third and final Workshop held in connection with the City of Berkeley Aquatic Park Master Plan Process, as well as the comment sheets — Comments on Master Plan Options — completed by participants in the event. The workshop was held November 16, 1989 at the West Berkeley Senior Center.

Workshop Participants	Jaroscav Mach	Francis Smith
	Mary Beth Thomsen	Miles McKey
	Don E. Richards	Mark Knox
	S. Dewitt B. Rivelles	Dave Methven
	David Methven	Dan Stapleton
	Sara MacKusick	
	Chris Kitting *Waterski Club*	
	Jeb Rechen *Rowing Club*	
	Gene Harris *Seabird Sailing Center*	
Task Force Members	Ed Bennett	
	Donald Jen	
Additional (mailed in) Comments	John Steere *environmental planner*	
	Dr. Dick Bailey *aquatic ecologist*	
MPA Design Staff	Michael Painter	Brooks Kolb
Consultants	Daniel Iacofano, MIG	Jim Oswald, MIG

The purposes of this workshop were to: a) present the preferred conceptual plan and a "Maximum Recreation Alternative" for the Aquatic Park Master Plan and b) provide an opportunity for community review and discussion of the options.

Daniel Iacofano, MIG, welcomed workshop participants and provided an overview of the project background and planning process, as well as a brief review of the previous community workshops (held July 29 and October 4).

Brooks Kolb, MPA Design, then presented the preferred conceptual plan and alternative.

II. PRESENTATION OF PREFERRED CONCEPTUAL PLAN AND ALTERNATIVE

The following is a summary of the Presentation of a Preferred Conceptual Plan for Park Improvement and of the Maximum Recreation Alternative made by Brooks Kolb, MPA Design. Following his presentation, the public was invited to comment and ask questions. These questions and comments are also summarized below.

A. General Goals for Park Improvement

Mr. Kolb began by reviewing the design team's ongoing vision of the improvement of Aquatic Park, which included several new "General Goals." These general goals or design principles include:

- Bringing more people to the park
- Creating a safer environment throughout the park
- Linking the park with the City via bike, pedestrian and automobile access
- Maximizing the park's role as a wildlife habitat (and balancing this with the first goal)
- Connecting the park to the brickyard
- Increasing the park's size

B. Questions from Workshop Participants

Size of the West Wall

A participant asked if a four (4) foot wall on the west side (at the freeway border) would provide adequate safety.

Automobile Access on the West Side

Participants asked why the plans propose to limit automobile access to the west side of the park and whether the proposed plan would allow access to the ski area from the cul-de-sac. Another asked how an access gate would work. Mr. Kolb explained that it would allow access by police cars and park vehicles only.

Western Shoreline Footpath

Responding to a participant question, Mr. Kolb explained that there will be a pathway along portions of the west shoreline of the lake, but that it will not be continuous. He said that increased pedestrian use of the west side has been well planned and will "open up" the area.

Dogs in the Park
A participant asked whether dogs will be allowed in the park. Mr. Kolb responded that they would be, but only on a leash, except in a dog park if it becomes adopted in the master plan.

Earth Berm versus Soundwall
Responding to a question about the choice of noise reduction material, Mr. Kolb explained that an earth berm is the best possible noise reduction strategy according to the consultant team's acoustical engineers' studies. In addition, it provides a more sylvan, park-like edge.

III. DISCUSSION OF PLAN ALTERNATIVES

Two alternatives were presented - the Preferred Conceptual Plan as developed to date; and a "maximum recreation option." The discussion focused on human activities in Aquatic Park and on park facilities. Participant's verbal and written comments have been summarized below:

A. Human Activities

The Park in a System
It was mentioned that Aquatic Park should be considered as part of a system, functioning either as a neighborhood or community park. It was suggested that this distinction be reflected in the development of the Master Plan.

Number of Uses
A participant commented that the Maximum Recreation Alternative may encourage too many uses in the park. Mr. Kolb emphasized that the design process would continue to seek a balance between maximum use/safety and tranquility/refuge (or between low and high use). Participants discussed different visions of how much wildlife and how much use is desirable. Several felt that the Maximum Recreation Alternative would promote overuse of park space and would detract from the park's function as open space and as a wildlife sanctuary. They felt that the plan should not encourage too many non-water-related recreational activities . Extensive recreational use might require patrolling, scheduling and coordinating staff. Additional uses, one participant commented, can always be added gradually, as need arises.

Restricting Recreational Uses
One participant commented that rollerskating and skateboarding should be restricted to certain areas.

Wildlife Needs
Workshop participants stressed that the design process should seek to protect existing wildlife (especially bird) use of the park, while enhancing the role of the park as refuge, perhaps by creating birding zones.

Children's Play Area
It was asked whether the children's play area would be located in the meadow. Mr. Kolb responded that two sites had been proposed - one in the meadow near Channing and one in the meadow near Heinz.

Play Fields
Workshop participants commented that the play fields should remain somewhat unstructured but said the design process should allow for soccer play on the fields.

Bike Rental
Some participants felt that bike rental might be a compatible and enriching recreational business use of park space. Others felt that bike rentals and other concessions would change the character of the park, occupying space while detracting from its unique, wildlife and water-oriented environment.

Sailing
A participant commented that the installation of an earth berm or other acoustical buffer may block winds and make sailing on the lake impossible. Others expressed concerned that there may not be enough space on the lake for extensive sailing use. It was suggested that water use rules might reduce congestion and safety hazards caused by extensive water-related recreation. One participant felt that the potential conflicts to sailing could be resolved by establishing the lagoon for "amateur" sailors and small boats only.

Water Ski Impacts
A participant felt that the City should limit the access of motor boats and jet skis. Another suggested adding a jetty or berm near the rowing area to help block waves generated by the motorboats which create waves too large for rowing. The earlier configuration of these two water sports may have been better. A participant commented that the configuration of the causeway with its limited access road proposed for the south end should be reconsidered as it might reflect waves that would disturb rowers leaving the rowing dock.

B. Facilities

Heinz Street Access
A participant commented that opening up Heinz Street would provide good access to the park and that the City should consider placing a stop light at the intersection of Heinz and Seventh Street.

Par Course
It was suggested that the City retain and repair the existing par course.

Dog Park
Several participants felt that a dog park would not be appropriate or desirable in the park, while another suggested that it only be considered if fenced in.

Restrooms
A participant asked if there would be any improved restroom facilities. Maintenance of restrooms will continue to be critical to their usefulness in the park.

Separate Pathways
A participant suggested separating the pathways for biking and roller skating from a pedestrian path, although there may not be enough space to achieve such separation.

Pedestrian Bridge
Responding to a participant question about the safety of the proposed pedestrian bridge, it was discussed that Caltrans may require the bridge extension over I-80 to be enclosed. Another participant commented that control of the bridge needs further study. Several felt that a higher bridge offers numerous advantages: pleasure sailing; a potential connection to the marina; greater clearance for paddlers; good views; and a shorter loop around the park for walkers. It may, as a disadvantage, reduce visual access from some areas of the park and change the park's character. Of the participants voting on this issue:

- 7 favored a high pedestrian bridge
- 1 favored a lower bridge
- 13 favored no bridge

One participant suggested that the City consider a small ferry instead of a bridge.

Height of the Earth Berm
A participant asked whether a 10-foot berm would be sufficient in terms of desirable air and noise quality.

Ranger Staff
It was suggested that the City consider staffing two to three (2-3) "interpretive rangers" at a caretaker residence in the park. This would add to the safety of the park, as well as enhance its role as a refuge and learning environment. One ranger, for example, could supervise the bird sanctuary area.

Working with Caltrans
A participant asked whether Caltrans had been informed of the proposed closure of the Bay Street accessed on-ramp to I-80. Mr. Kolb responded that Caltrans itself proposes closure of this on-ramp due to its non-conformance with Caltrans' current safety regulations.

Rod and Gun Club
It was suggested that the City consider renaming the Rod and Gun Club.

Kayak Slalom Course
A participant expressed concerned that the conceptual plan seemed to eliminate the existing kayak slalom course near the Rowing Club.

Visitor's Center
A participant commented that the visitor entry areas were well-designed

Bird Rescue Center
A participant suggested that the Bird Rescue Center could be rehabilitated and transformed to protect Berkeley wildlife and serve as an interpretive center.

Structured versus Unstructured Facilities
All but one of the workshop participants favored unstructured sports facilities over structured facilities reserved for specific uses. "Openness" is desirable, they felt, and is needed in the neighborhood. The park's facilities could be regulated so as to allow special use of a general, unspecified recreation area by "reservation."

Park Accessibility
A participant expressed concern that the park be made accessible to people with disabilities.

Algae Buildup
Any plan for park improvement should address the undesirable buildup of algae during summer months.

Lakeshore
A participant felt that making the water's edge less rocky would enhance the park. Another thought that such a proposal should be studied for impact on bird life and natural sediment. Dr. Kitting, an ecologist, warned against filling in the lakeshore to create additional pathway.

Running Path and Water Ski Access Road
A conflict might exist between the proposed running path and the motorboat access road (where the two are combined). Consider a grade separation between the road and running parth.

Road Reconstruction
A participant commented that some of the proposed road reconstruction (for example, at the south end) is unnecessary and would disturb wildlife habitats.

Integrating Surrounding Businesses
It was suggested that the Master Plan attempt to integrate businesses surrounding the park into the character and implementation of its improvement.

C. Additional Comments

Below is a summary of comments and recommendations mailed to the Berkeley Parks and Marina Division by two environmental professionals.

Water Quality and Wildlife
Improve water quality through such measures as detention basins to remove storm water contaminants and add salmon release in a catch and release fishery. Prepare a lake management plan addressing long-term water quality goals. Consider adding drainage pipes at the north end of the lagoon for improved water circulation.

Urban Aquaculture Farm
If water quality permits, consider calling for bids to establish an urban aquaculture farm similar to existing terrestrial farms in Berkeley. Oysters, clams, fish and other seafood might be cultured in a small portion of the lagoon. This could be a joint project with a state and/or university extension program.

Riparian Zones
Consider adding small-scale riparian zones (using native shrubs, tules and bunch grasses) along the four (4) rivulets which the enter the estuary south of Bancroft. These zones would improve the water quality and habitat value of these streamlets.

Spartina Marshes
Consider adding several small *Spartina* marshes along the shoreline to create visual diversity, filter out pollutants and provide waterfowl habitat.

Translucent Soundwall
Consider installing a translucent, acrylic soundwall that would reduce noise from the freeway while preserving views into the park. The soundwall could be constructed in a variety of hues to make it a colorful, aesthetically pleasing "gateway" to the City. It would be more of a "membrane" and "light sculpture" than a barrier.

New Docks
Consider adding several docks to get people out over the water and to provide platforms for fishing, etc.

Linking Aquatic Park and Eastshore State Park
Consider Aquatic Park and the future Eastshore State Park a "recreational and ecological integrity," linking the two via a pedestrian bridge over the I-80 freeway.

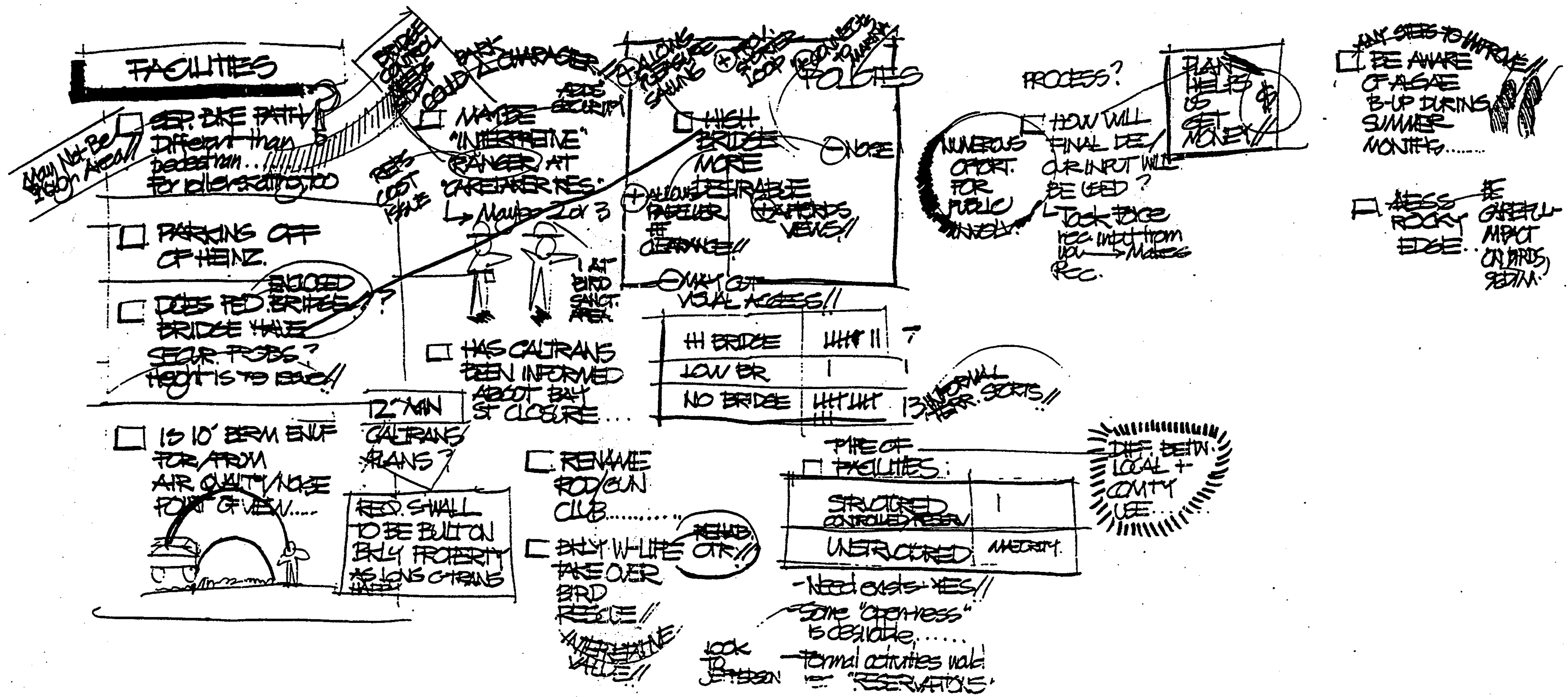
Assessment District
Consider establishing an assessment district that would raise funds for park maintenance and improvement through small taxes on surrounding businesses.

IV. NEXT STEPS

Bill Montgomery, Parks Superintendent, reiterated that the Aquatic Park Master Plan will help secure funding to implement improvement of the park. Participants asked how the final process of decisionmaking would include community input. Mr. Montgomery explained that a task force of decisionmakers (the Joint Subcommittee on Waterfront Parks) is incorporating public input into the recommendation it will make to the City. It was emphasized that there will be additional opportunities for community participation as plan review begins. Community members were encouraged to stay involved.

Appendix

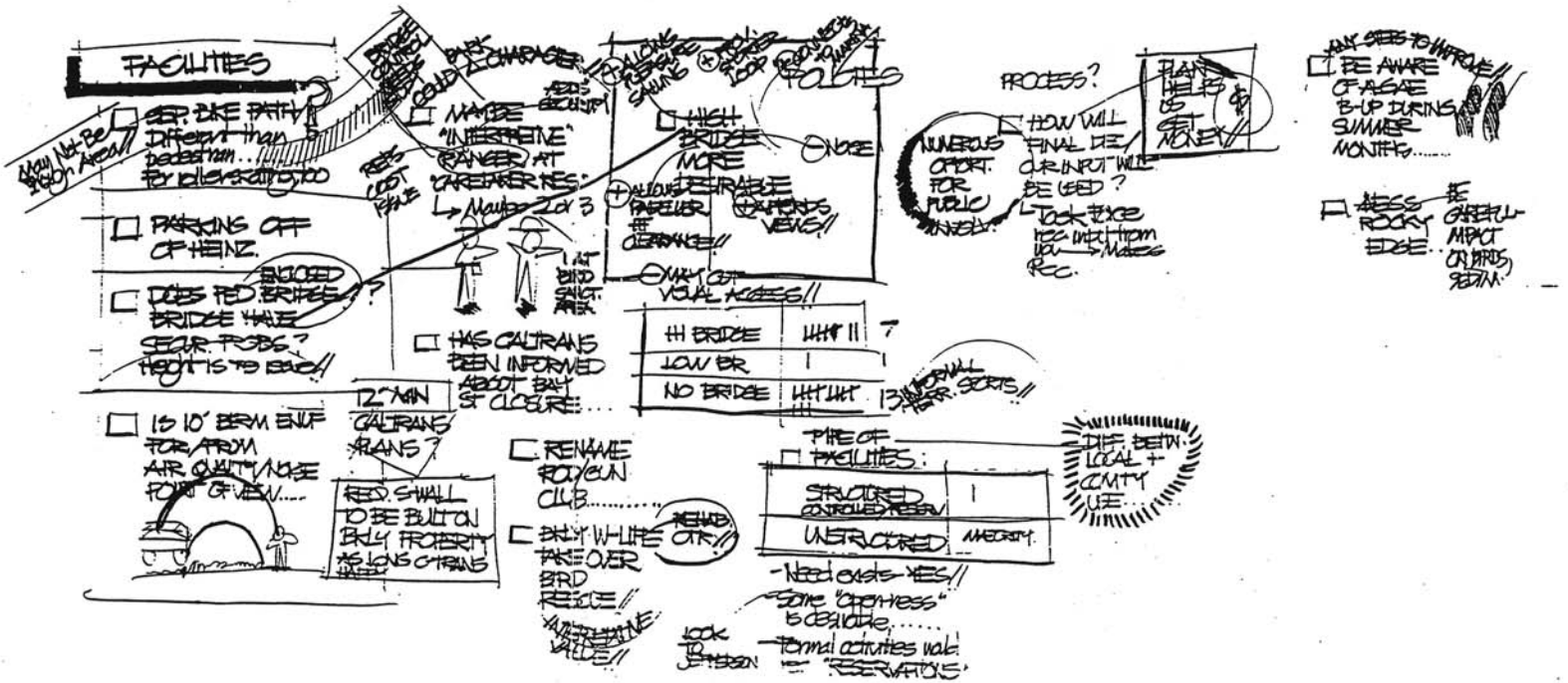
Photoreduction of Workshop Wallgraphics


FACILITIES
SEP. BIKE PATH
Different than pedestrian... for rollerskating too
May Not Be Right Area!!
PARKING OFF OF HEINZ
DOES PED. BRIDGE HAVE SECUR. PROBS?
ENCLOSED
Height is the issue!!
IS 10' BERM ENUF FOR/FROM AIR QUALITY/NOISE POINT OF VIEW....
12' MIN
CALTRANS PLANS?
RED. S-WALL TO BE BUILT ON BKLY PROPERTY AS LONG C-TRANS
MAYBE "INTERPRETIVE" RANGER AT "CARETAKER RES."
Maybe 2 or 3
RES. COST ISSUE
PARK CHARACTER
ADDS SECURITY
HAS CALTRANS BEEN INFORMED ABOUT BAY ST CLOSURE...
RENAME ROD/GUN CLUB.......
BKLY W-LIFE TAKE OVER BIRD RESCUE!!
REHAB CTR!!
ALTERNATIVE VALUE!!
HIGH BRIDGE MORE DESIRABLE
POLICIES
NOISE
AFFORDS VIEWS!!
MAY CUT VISUAL ACCESS!!
HI BRIDGE
HI BRIDGE	~~||||~~ ‖
LOW BR.	|
NO BRIDGE	~~||||~~ ~~||||~~ ||| 13

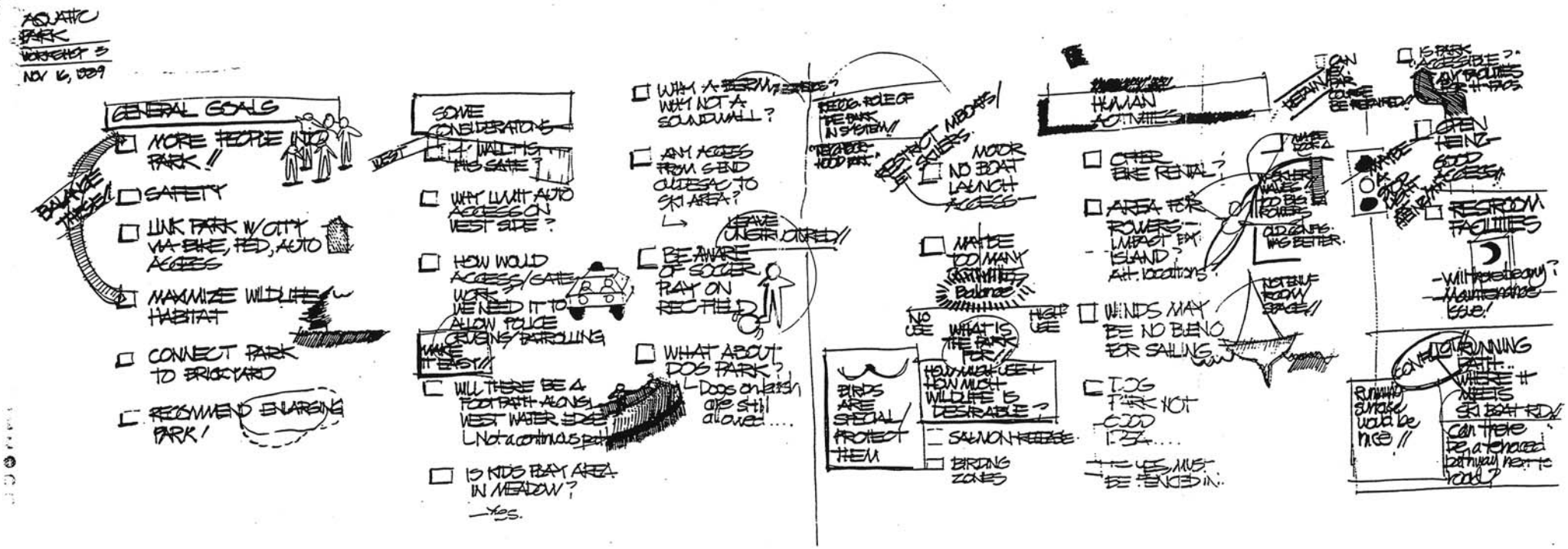
INFORMAL REC. SPORTS!!
TYPE OF FACILITIES:
STRUCTURED CONTROLLED RESERV. 1
UNSTRUCTURED MAJORITY
-Need exists-YES!!
-Some "openness" is desirable.....
-Formal activities need "RESERVATIONS"
LOOK TO JEFFERSON
DIFF. BETW. LOCAL + COUNTY USE
PROCESS?
HOW WILL FINAL DEC./OUR INPUT WILL BE USED?
Task Force rec. input from you → Makes Rec.
NUMEROUS OPPORT. FOR PUBLIC INVOLV.
PLAN HELPS US GET MONEY!! $
ANY STEPS TO IMPROVE!!
BE AWARE OF ALGAE B-UP DURING SUMMER MONTHS.......
ACCESS ROCKY EDGE...
BE CAREFUL-IMPACT ON BIRDS, SEDIM.

City of Berkeley
AQUATIC PARK MASTER PLAN
Community Workshop #3
November 16, 1989
Discussion of Facilities and Next Steps

86



City of Berkeley
AQUATIC PARK MASTER PLAN
Community Workshop #3
November 16, 1989
Discussion of Facilities and Next Steps



City of Berkeley
AQUATIC PARK MASTER PLAN
Community Workshop #3
November 16, 1989
General Goals and Considerations and Discussion of Human Activities in the park

Memorandum

Bill Montgomery
Parks/Marina Division
City of Berkeley
201 University Avenue
Berkeley, CA 94710

Date: November 16, 1989
Job: Aquatic Park
From: Brooks Kolb
Re: West Berkeley Area Plan Committee Meeting 11-13-89

Date of Meeting: 11-13-89
Present: Refer to attached list of attendees
Purpose: Obtain input from West Berkeley Area Plan Committee and neighborhood residents into Aquatic Park Master Plan Process

The meeting was chaired by Gil Kelly, head of the City Planning Department.

I. Bill Montgomery presented the master planning process and schedule. The third of three public workshops will take place on Thursday, 11-16-89. The purpose of this workshop will be to review a *detailed preferred conceptual plan* prepared by MPA Design and reflecting public comments on two *alternate conceptual plans* presented at the second of 3 public workshops on October 4, 1989. Following the third public workshop, the plan will be refined into a final recommended plan for referral to the Joint Subcommittee on Waterfront Parks, the combined Waterfront and Parks Commissions, and the City Council. The public is invited to all of these additional meetings.

II. Brooks Kolb presented the detailed preferred conceptual plan as it has evolved to date. (Refer to drawing dated 11/13/89)

III. Comments on the plan were registered as follows, grouped by subject area:

A. Water Quality: Should be investigated carefully in a separate study since master plan study does not have resources to cover this subject definitively. Study should investigate:

1. Whether (and to what extent) industrial toxic dumping is occurring in the lagoon.

MPA Design
Landscape Architects and Urban Designers
562 Mission Street
San Francisco, CA 94105
415 543-4664
FAX 415 543-3672

2. Level of coliform bacterial counts and whether (or to what extent) they pose a hazard to water contact sports.

3. Impact of proposed EBMUD sewage transfer facility to be located at foot of Bancroft.

B. Noise Abatement Strategies:

1. It is unknown at this time what agreements may be reached between City of Berkeley and Caltrans regarding Caltrans financial contribution toward noise abatement at Aquatic Park.

2. Strategy for master plan will be to present noise reduction berms as City's preferred solution and negotiating position with Caltrans.

3. Decibels are measured in a logarithmic scale, so the estimated reductions from 70 decibels (current average) to 62-63 decibels (with berms) should be a significant improvement and is markedly better than a standard free-standing masonry Caltrans sound wall at 65 decibels.

C. Waterskiing contributes to noise; why build the noise reduction berms and then allow waterskiing as a use - isn't this defeating the purpose? (This question was not debated.)

D. Concessions should be emphasized to draw more users to park. Concessions should include bike rentals, roller skate rentals and boat rentals, as well as snack shops.

E. Sailing and sailing lessons should be restored to the lagoon, as they were in the past.

1. Seabird Sailing Center could be adapted as a boat rental/sailing school facility.

2. A high pedestrian bridge across the lagoon should allow for passage of small sailboats underneath.

3. Following installation of berms, winds will be somewhat reduced but it is uncertain how this will affect sailing on the lagoon. It is most likely that winds will be adequate for small sailing boats.

4. Sales of sailboats complement sailing lessons and should be continued.

5. City should take over operation of Seabird Sailing Center to prevent it from being exclusively a retail sales facility.

6. Potential wind patterns following installation of berms should be analyzed to determine their impact on sailing.

7. A public boat launch should be included in the master plan.

F. Additional land-based recreation uses are a first priority for master plan and should include:

1. Softball
2. Football
3. Soccer
4. Jogging parcourse (repair existing or replace)
5. Dog park (consider including)

G. Children and Youth Activities should be made a priority. Consider including:

1. Children's theater
2. More than one children's play area
3. Youth recreational center
4. Skateboard area (already included on drawing dated November 13, 1989)

H. Surrounding Land Uses:

1. Planning recommendations should include setback requirements for new buildings going up adjacent to park, as well as height, bulk and density zoning.

2. Drawing should indicate all buildings between Bolivar Drive and Southern Pacific tracks - not just ones selected to be shown by MPA.

I. Safety

1. Park must be well lighted after dark.

2. Planting should not encourage loitering and unsavory activities.

3. A caretaker residence on bird island could be incorporated.

J. Access

1. Consider eliminating new vehicular entry at Heinz Street. (Concensus was not reached on this point.)

2. Provide every possible means for vehicular, pedestrian and bicycle access and entries.

3. A main entry should be established and emphasized.

4. AC Transit entry is extremely important - consider using existing Bancroft to Addison loop rather than proposed Channing to Bancroft loop for bus access to park.

K. Recreation Buildings

1. Consider re-using Rod and Gun Club as a recreational activities building.

2. Using the restaurant/brewery structure at the north end of the park for a community/recreation center is a good concept.

IV. Conclusion: Get as many active uses into the park as possible.

BK:cs

Memorandum

Bill Montgomery
Parks/Marina Division
City of Berkeley
201 University Avenue
Berkeley, CA 94710

Date: January 4, 1990

Job: Aquatic Park

From: Brooks Kolb

Re: Task Force Meeting
December 7, 1989

Date of Meeting: December 7, 1989

Present: Joint Subcommittee on Waterfront Parks:
Rob Thum, Ed Bennett, Becky Temko, Hollis Carr, Don Jen, Carole Schemmerling
Bill Montgomery, Parks/Marina Division, City of Berkeley
Brooks Kolb, MPA
Public: ± 8 persons including Jo Lynch, Professor Christopher Kitting

Agenda: Review detailed preferred conceptual plan as presented at Third Public Workshop (November 16, 1989); develop final recommended plan for review by full membership of Waterfront and Parks and Recreation Commissions

I. Brooks Kolb presented the detailed preferred conceptual plan and a summary of public response to it. (Refer to Community Workshop #3 Summary Report prepared by Moore Iacofano Goltsman).

A. The presentation included a proposed revised road configuration at the south end of the lagoon to address comments by the Rowing Club and others indicating that the earlier road configuration would encourage wave turbulence at the existing Rowing Club dock and would eliminate the quiet cove setting of the existing slalom course.

B. Brooks cautioned that while the proposed configuration at the south end of the lagoon is intended conceptually to link the current Radio Station Pond to the Model Yacht Basin to form a single water body, this concept cannot be thoroughly implemented without removing the segment of the Potter Street storm drain outfall that crosses the lagoon.

MPA Design

Landscape Architects
and Urban Designers

562 Mission Street
San Francisco, CA
94105

415 543-4664
FAX 415 543-3672

1. Further water quality studies will be necessary to determine feasibility of removing Potter Street outfall.

2. If Potter Street outfall cannot be moved, MPA Design proposes to simulate the concept of a single water body by disguising the exposed portions of the storm drain line as bridges to an island.

3. Regardless of whether Potter Street outfall is removed or retained, the existing "causeways" supporting the two roadways would be broken up into a series of islands.

C. Brooks indicated with paper templates of a regulation softball diamond and football field, the difficulty of fitting regulation sports facilities into the available space provided by the widest borders of the main lagoon on the east side. Without acquisition of new park lands or land reclamation from the lagoon, regulation sports facilities cannot easily be incorporated at Aquatic Park.

D. In response to comments by the West Berkeley Area Plan Committee that a major or primary park entry is desirable, Brooks presented three design options intended to enhance the sense of entry into Aquatic Park:

1. Lend special emphasis to the Bancroft Avenue entry by building a cascade or waterfall on the proposed west bank berm. The cascade could be a recirculating water feature, either freshwater or saltwater, and would be visible several blocks away from the park entry at Bolivar Drive.

2. Lend special emphasis to the Bancroft Avenue entry by installing a whitewater jet (or jets) in the lagoon directly opposite Bancroft near the east shoreline. The jets would be visible several blocks away from the park entry at Bolivar Drive.

3. Enhance Addison Avenue entry by extending the lagoon northward to provide views of the water along Addison.

II. Discussion of proposed master plan elements resulted in the following recommendations by the Joint Subcommittee for inclusion in the final recommended plan:

A. **Pedestrian bridge:** Include one pedestrian bridge located near Channing Way as shown on the master plan drawing.

1. By a "straw vote", 3 committee members expressed preference for a high bridge. No votes were recorded for a low bridge.

2. Rob Thum preferred to defer decision on whether bridge should be high or low.

3. Carole Schemmerling preferred an angular, "more interesting" bridge alignment to the straight shot shown.

B. **Sailing:**

1. Sailing will not be encouraged as a major park use since proposed berms on west side will cut winds significantly and since no one has used lagoon for sailing in last 5 to 6 years.

C. **Organized Sports:** (softball, football, etc) - Due to spatial limitations and identity of Aquatic Park as a "water park", include informal recreation in master plan only (no formal, regulation softball diamonds and football fields).

D. **Existing buildings:**

1. Try to acquire restaurant/brewery building off north park property line for use as a community center building to include teen dances, teen indoor games, etc.

a. Building is ideal for policing since there is only one vehicular exit.

2. **Rod and Gun Club** - Retain in its existing location for remaining life of building, but eliminate as a master plan element.

a. Since building has dry rot, it is assumed that it will eventually be demolished and removed.

b. Replacing club is not advisable due to its awkward size and location on prime park shoreline.

3. **International Bird Rescue Center** - Retain in its existing location for use as an injured bird sanctuary and/or wildlife interpretive center.

E. **On-Grade Railroad Crossings:** Apply to Southern Pacific for two additional on-grade pedestrian and vehicular railroad crossings - one at Heinz and one at Channing. If Southern Pacific will agree to only one crossing, Heinz Street location takes precedence.

F. **Land acquisition** outside of park borders - where recommended, acquisition of lands should be adopted by City's General Plan rather than Aquatic Park Master Plan.

1. Lands recommended for acquisition include:

a. Restaurant/brewery at north end of park

b. American Soil Products Property (would be leased back to Aca Farms or another tenant farmer).

2. Acquisition of Radio Station Pond was not discussed.

3. Acquisition of developed properties between Southern Pacific railroad and Bolivar Drive (MPA's "future vision plan") was not discussed.

G. **Water feature** (opposite Bancroft, to emphasize sense of entry from Bancroft) include in master plan, with the following stipulations:

1. A waterfall or cascade on the west berm would be too small to be visible from as far away as Sixth Street, thus option for free-standing jets is preferable.

2. Saltwater features have technical difficulties due to corrosion of metal pipes; other pipe materials (plastic, etc.) should be substituted.

3. Jets will aid circulation and aeration of the lagoon and prevent fish kills in the portion of the lagoon surrounding the jets.

4. A design competition could be established for the water feature.

5. A wind-driven water feature should be considered.

6. Consider alternative to employ flags and banners to signal park entry, instead of water feature.

7. Design of water feature should minimize conflicts with boating.

H. **Beaches:** Include a "perched beach", with sand retained against a bulkhead water wall, on the east side.

1. West side beach may be in too much shadow to be worth including.

I. **Dog Parks:** Recommendation whether to include or exclude was referred to the full membership of the two commissions (Waterfront and Parks and Recreation) after the following discussion points were made:

1. Two alternative purposes or visions for the dog park were expressed, each with different design implications:

a. Park could be a "dog run" - a place where dogs can run off leash - suggesting a long, narrow configuration, perhaps located on the west berm; or

b. Park could be a place primarily for dogs and people to socialize together - suggesting a smaller, corral-like configuration similar to the dog park at Ohlone Park.

2. Carole Schemmerling stated that the second vision (Item 1b) is the one with active community support.

3. Bill Montgomery inquired how far people will be willing to walk their dogs from a parking place to the dog park - this could be an important design consideration.

4. A "straw vote" on inclusion of the dog park in the master plan was tied 3 to 3.

J. **Separate bike and jogging trails:** Make provision for separation of bike and jogging trails where width of park borders permits - particularly along the east shore.

K. **Skateboarding:** Include due to Youth Commission's interest in a planned skateboard facility. Caution: No city in California operates such a facility due to high liability.

L. **Retaining walls at proposed berm along freeway:** Include with the following design stipulations:

1. Design irrigation system to minimize overspray problem over cars traveling on freeway.

2. Select tough, wind and salt spray resistant plant species for wall.

3. Design wall with as much variation of configuration as possible, including varied heights, curves and straight sections, etc.

4. Consider using gabion walls as well as cribwalls for this application.

M. **Fish and Oyster Stocking** (as recommended in letter by Dick Bailey on Engineering Science): Inclusion or exclusion is dependent on further water quality studies.

1. Seafood may be dangerous to eat given poor water quality.

2. Fishing might conflict with boating as a park use

N. Seabird Sailing Center Area:

1. Convert Seabird Sailing Center building and outbuildings for use as a boat rental facility, bicycle and roller skate rental facility, cafe, and food/drink concessions.

2. Retain small portion of Seabird Sailing Center building as a boat sales facility.

3. Provide public boat launch from dock at Seabird Sailing Center. Launch to be restricted to manually powered boats, kayaks, etc. (All motor boats to be launched from Waterski Club launch.)

III. Conclusions and Discussion of Next Steps

A. Joint Subcommittee recommended that a complete water quality study be undertaken and that City Council seek funding for this study.

B. Final recommended plan to be presented to full membership of both overseeing commissions (Waterfront and Parks and Recreation) in a meeting to be held in mid-February, 1990; then to city Council in March.

C. Master plan elements which were not specifically discussed at this meeting will be incorporated into final recommended plan as they appeared on drawing presented at the meeting.

BRK:cs

Appendix C
Environmental Report: Biology

N. **Seabird Sailing Center Area:**

1. Convert Seabird Sailing Center building and outbuildings for use as a boat rental facility, bicycle and roller skate rental facility, cafe, and food/drink concessions.

2. Retain small portion of Seabird Sailing Center building as a boat sales facility.

3. Provide public boat launch from dock at Seabird Sailing Center. Launch to be restricted to manually powered boats, kayaks, etc. (All motor boats to be launched from Waterski Club launch.)

III. **Conclusions and Discussion of Next Steps**

A. Joint Subcommittee recommended that a complete water quality study be undertaken and that City Council seek funding for this study.

B. Final recommended plan to be presented to full membership of both overseeing commissions (Waterfront and Parks and Recreation) in a meeting to be held in mid-February, 1990; then to city Council in March.

C. Master plan elements which were not specifically discussed at this meeting will be incorporated into final recommended plan as they appeared on drawing presented at the meeting.

BRK:cs

lsa

MARSH ENHANCEMENT AT AQUATIC PARK

Setting

Marsh vegetation at Aquatic Park is associated with the three existing ponds or lagoons there and with the "springs" along the east side of the main or north lagoon. Vegetation that grows in the marshes depends primarily on salinity levels in the water that supports it. There is presently almost no tidal action in the main or central lagoons from San Francisco Bay because the culverts that are meant to provide tidal exchange function poorly. Concrete and rock borders around the edges of the lagoons limit plant rooting opportunities and make steep slope gradients. The combination of little or no tidal fluctuation and steep, impenetrable slopes currently preclude salt marsh formation at Aquatic Park. There is tidal exchange in the south lagoon and slopes are not as steep. Marsh vegetation has thus been able to establish around the perimeter of the south lagoon. Salinity levels in the north and central lagoons depend on the amount of freshwater inflow from the City of Berkeley to the east and the amount of rainfall accumulated in the lagoons during the winter. In summer some of the water in the lagoons evaporates, resulting in higher salinity levels. Water in the springs along the east side of the main lagoon is fresh, and its source is probably runoff from industries east of the park (Razani 1989).

Many of the plants associated with the lagoons are characteristic of salt and brackish marshes elsewhere around the San Francisco Bay. Cordgrass (Spartina foliosa), a common species of emergent plant often associated with salt marshes, does not grow in the park, probably due in part to the abrupt slope of the shore and a lack of true tidal action in the lagoons. Marsh vegetation is presently not well-developed in either the main or central lagoons and occurs mainly in very small scattered patches. Marsh vegetation around the south lagoon, or KRE pond, is more continuous and dense. Marsh plants throughout the Park are interspersed with non-native plants. Most noticeable of the non-natives are iceplant (Mesembryanthemum crystallinum) and pampas grass (Cortaderia selloana) which tend to replace and outcompete native species (Jacobs 1989).

The main, north lagoon is surrounded by a concrete wall. Mostly non-native trees grow on top of the concrete walls and along the roads that border the lagoons. The west and east sides of the lagoon are composed of rock and rip rap with individual plants or small patches of gumplant and bulrush (Scirpus robustus and S. acutus) growing between the rocks. Its southern end is formed by a berm which supports a road. Along the water's edge on the south end is a mostly barren, sandy strip with scattered rocks and a few patches of pickleweed (Salicornia virginica), saltgrass (Distichlis spicata), gumplant (Grindelia humilis), and bulrush). The north end of the main lagoon is closely bordered

by an extension of Bolivar Drive. Several moderate-sized, non-native trees and shrubs border the upper edge of the lagoon along the road. A concrete wall determines the upper end of the marsh vegetation growing at the edge of the lagoon, where there are more different species of marsh-associated plants than on any other parts of the main lagoon's shoreline. Species consist of pickleweed, saltgrass, alkali bulrush (Scirpus robustus), gumplant, and fat hen (Atriplex patula var. hastata). Mats of iceplant (Mesembryanthemum crystallinum) encroach into the band of vegetation and appear to be taking it over in places.

The central lagoon's north and east sides are bordered with small stones. Vegetation consists of patches of bulrush, pickleweed, saltgrass, and iceplant. The entire east side supports cattails (Typha sp.) along the water and pine trees on the berm above the water. Widgeon grass (Ruppia maritima) grows underwater along the south shore, and pickleweed, saltgrass, and other marsh plants grow along the south shore near the culverts that drain from Potter Street.

The south lagoon is much less disturbed than the north and central lagoons, largely because it is bordered on only two sides (north and east) by roads and there are no well-defined access trails to the west and southwest ends of the lagoon. Cypress and pine trees grow along the road berm on the north of the lagoon and a large group of willows (Salix lasiandra) grow at the northeast end of the lagoon. The east shore is a thick band of bulrush and cattails. Pylons are partially submerged in the water at this end of the pond. Low-growing marsh vegetation including brass buttons (Cotula coronopsis), rabbit's foot grass (Polypogon monspeliensis), pickleweed, saltgrass, and fat hen grow on the north shore of the lagoon. Almost the entire southwest quarter of the pond is mudflat, which is alternately submerged and exposed with tidal fluctuation. The mudflat is barren in places but also supports patches of pickleweed.

A large, dense patch of cattails and willow trees form the freshwater marsh along the extreme eastern edge of the park parallel to the center and south of the main lagoon. These plants grow in a depression that remains wet throughout the year. Three to four small rivulets flow out of the depression into the main lagoon. Vegetation along these small drainages occurs in very narrow strips and is surrounded by manicured, non-native grass. Plant species present include young willows and alders, watercress, sedges, and rushes.

Aquatic Park is valuable to large numbers of resident and migratory birds due to its proximity to the San Francisco Bay and its location along the Pacific Flyway (Coates 1989). The park is censused annually during the National Audubon Society's Christmas bird count. Water in the lagoons provides habitat for swimming and surface-feeding waterfowl, pelicans, gulls, and terns. Shorebirds forage in the shallow water and on the mudflat in the south lagoon and herons and egrets perch on the shoreline and forage along the water's edge. The willow trees on the northeast end of the south lagoon are important roosting sites for

black-crowned night herons. Coates (1989) counted 32 species of marine birds using the park during her surveys from November 1988 through mid-February 1989.

Enhancement Potential - Existing Conditions

The existing hydrologic regime in the main and central lagoons is essentially non-tidal and there are no daily fluctuations in the water surface. Given these conditions, there is minimal opportunity to establish salt marsh around the lagoons because all salt marsh plants are adapted to varying water levels on a daily cycle. Current water levels in the lagoons are static and are therefore greatly limited in their potential to support any more than a very narrow band of marsh plants. In order to establish wider areas of salt marsh, conditions must be changed from steep banks with no tidal fluctuation to banks that are less steep and receive tidal fluctuation. Design and implementation of a system that allows tidal action in the lagoons is therefore critical to any enhancement plans in Aquatic Park.

According to Zedler (1984) suitable habitat for salt marshes depends on a number of factors. The most suitable topography is almost flat, with an ideal slope of only about 1-2% or less. This makes larger areas available for salt marsh vegetation than a steeper slope gradient and allows for better water circulation, preventing impoundment and stagnation of water. Most marsh species can occur over a broad range of elevations with changes in abundance in different areas of the marsh according to elevation. Most plants do better with lower salinity levels, at least while they are getting established (although too much fresh water over time allows invasion by freshwater marsh species). Other factors applicable to Aquatic Park include availability of nutrients and levels of toxic compounds in the system. Zedler (1984) states that if a site with appropriate conditions is made available, plants may establish themselves naturally, but it takes more time for them to establish themselves, especially on bare ground. It is therefore best to seed or plant vegetation to establish new marsh.

The best opportunities to expand and improve marsh habitat at Aquatic Park presently occur at the north end of the main lagoon, in the central lagoon, and in the existing freshwater marsh on the east side of the park. The entire park would benefit from the improvements in water quality that would result from better tidal exchange and flushing in the lagoons. The key factor in establishing salt marsh around the lagoons lies in the design of a tidal management plan that will provide tidal fluctuation and allow a band of marsh vegetation to establish within the levels of that fluctuation. In addition, existing concrete walls and rock that prevent marsh vegetation from growing need to be removed and substrate in which plants can grow needs to be provided. The slopes around the edges of the lagoons may be modified to provide a broader marsh area. It is unlikely that habitat for sensitive plant or animal species can be

deliberately created because of the limited amount of space available, the lack of true tidal conditions, and the high amounts of disturbance by humans and dogs. A reasonable primary goal of a marsh enhancement project at Aquatic Park might be to provide improved habitat for existing wildlife and increase the number and diversity of animals using the enhanced marsh.

The south lagoon already supports a diversity of plant and animal species and the existing conditions there provide valuable wildlife habitat. The best plan for this area would be to leave it as it is now, but improve its water quality and circulation by increasing tidal exchange with the Bay, and eliminate invasive non-native plants around the edge of the lagoon. More characteristic marsh vegetation that has better value to wildlife (in terms of providing food or cover) could be planted to replace undesirable species that are removed. The lagoon's south, east, and southeast shores are currently protected from disturbance by humans and domestic animals because there is no obvious access to those areas by road or trail. The dense vegetation and mudflats are already valuable to wildlife. Efforts should be made to continue to protect and preserve the lagoon either by agreement with the current property owner or by the City acquiring and protecting it.

The north end of the main lagoon would be greatly improved with better water circulation. Removing the concrete wall would keep water from stagnating and allow creation of a larger, wider marsh. The road above the water should be removed, reduced to a footpath, or set back from the marsh. A longer, more gradual slope could then be created by grading the upland and adding fill to the water. Bay mud could be used to fill about 50 to 100 feet of the end of the lagoon, making a more gradual dropoff and raising the substrate level to allow marsh plants to grow on it. Engineers should be consulted to determine a slope that would remain stable over time. Consideration should also be given to a type and source of fill and a method to use (such as an underwater rip rap wall) to retain the fill material and maintain slope stability. Adding fill would probably require a permit from the Army Corps of Engineers under section 404 of the Clean Water Act. If fill is used, it should be tested for toxic substances before placing it in the lagoon. The most appropriate plants to use when seeding or planting the marsh are species that already exist on-site, such as alkali bulrush, pickleweed, fat hen, gumplant, and saltgrass. Experimental plantings of other species could also be made to increase the diversity of plants in the marsh. Planting should be planned to provide the most optimal conditions for establishment of the plants. Those that tolerate submergence best such as pickleweed, must be planted in and next to the water, while gumplant and other upper marsh species should be planted higher and farther away from the water. Iceplant should be removed so that more desirable marsh vegetation can be planted and established. The marsh area should have a buffer from the road or footpath to the north to provide a wildlife screen and prevent disturbance by dogs and humans. A dense strip of native shrubs and trees including coyote bush

(Baccharis pilularis), toyon (Heteromeles californicus), and species of willows planted along the upper end of the marsh would provide a buffer that would also attract birds. Access points into the marsh for wildlife viewing may be provided in the form of observation platforms above the marsh or a narrow boardwalk along its upper end.

To enhance the marsh for wildlife, taller, emergent vegetation and adequate cover would provide hiding areas for herons and egrets, and might attract marsh wrens, red-winged blackbirds, and possibly salt-marsh yellowthroats. A few downed logs in the marsh would provide perches for foraging and roosts away from disturbance for larger birds. Other bird species that might be expected to inhabit the marsh include song sparrows and nesting wild mallard ducks. Garter snakes and frogs might also move into the marsh.

The central lagoon could be improved in much the same way as the north end of the main lagoon. Longer, more gradual slopes could be created along its edges to allow for a greater area of marsh and different gradients on which vegetation could be planted and established. Buffer trees and shrubs could be planted to screen the area for wildlife and prevent trampling of vegetation and other disturbance and access points for park users could be provided. Again, water quality and circulation needs to be improved for these plans to succeed.

Additional wildlife habitat could be created on the existing island in the main lagoon or by creating a new island or islands in any of the lagoons. After creating the proper elevation levels and slopes, marsh vegetation could be planted around the perimeter of the island. Islands would provide roost sites away from land where birds could safely roost. Flocks of shorebirds that feed on Bay mudflats during low tides may roost on islands during high tides if the tops of the islands are higher than the water surface and are unvegetated, allowing shorebirds to detect approaching predators.

In the freshwater marsh, water quality should be tested and improved, if necessary. The marsh could be enlarged by increasing the size of the depression where water collects. More native tree, shrub, and herbaceous species can be planted in and near the depression and along the rivulets that flow into the main lagoon. Plants that grow to varying heights should be used to increase the diversity and layering of canopy cover in these areas. Increasing plant species diversity and creating greater structural diversity by creating over- and understory would contribute to the value of the freshwater marsh by attracting birds and other wildlife to forage and seek cover near the water.

Enhancement Alternatives - Alterations to Existing Conditions

Two alternatives involving which would involve alterations to the existing conditions are proposed. Any alternative chosen for enhancing or creating marsh

must provide a tidal water management plan to assure the tidal exchange and fluctuation necessary to establish and maintain marsh vegetation in the lagoons. Alternative I proposes removal of Potter Street, leaving a remnant of the street as an island that could be enhanced for wildlife. Bridges from the east and west would allow foot traffic to the island. Bolivar Drive would also be removed and an island that could be enhanced for wildlife could be created from a remnant of this road as well. A new bridge would be built to allow cars to cross the main lagoon, but would be only about one-lane wide. Removal of the roads would create one large lagoon from the existing three, in which water would circulate. Alternative II involves removing Potter Street between the south and central lagoons and leaving a remnant as an island with no access bridge to it. Bolivar Drive would remain as it is now.

In either alternative, the opportunity to create marsh and potential effects on wildlife depend on how the plan is implemented. Alternative II would be better, biologically, than Alternative I. Alternative I might result in significant adverse impacts to biological resources in the south lagoon because it would become more like the existing north and central lagoons. Habitat for roosting black-crowned night herons would be destroyed if the willows at the northeast end of the south lagoon died or were removed. Shorebirds that feed in the mudflats currently exposed during tidal fluctuation would also be adversely affected if the tidal regime were changed in the south lagoon. A potential drawback to either alternative might be the incorporation of the south lagoon into the park, resulting in alterations to existing wildlife habitat there due to decreased isolation and increased disturbance to wildlife.

In Alternative I, effects of implementation would depend on what happens to the south lagoon. If the central lagoon became more like the existing south lagoon by having a similar regime of tidal fluctuation, marsh vegetation could be established and more habitat could be improved for wildlife. If the reverse happened, i.e., if the south lagoon became more like the existing central lagoon, significant adverse impacts to the vegetation and wildlife in the south lagoon would occur due to changes in tidal fluctuations and salinity levels. If Potter Street is removed and an island is created, plans should be made to change the storm drains under Potter Street to ensure that they do not discharge into the combined central and south lagoons. Large amounts of runoff would adversely affect biological resources in and around the new lagoon by affecting water quality and salinities. If either plan is chosen, the willows that support roosting black-crowned night herons on the northeast side of the south lagoon would probably be disturbed by removing or altering the berm along which they grow. Removal of the willows and disturbances to the night herons would be a significant adverse effect of either alternative.

The freshwater marsh could still be enhanced with implementation of any of the alternatives discussed above.

Monitoring

A monitoring program should be incorporated into any plans that are made to enhance or create marsh at Aquatic Park in order to track progress and assure the success of the project. Zedler (1984) presents some factors to consider in a monitoring plan. Some of these ideas are:

- Build flexibility into the plan in order to make adjustments to the improvements, meet changing habitat needs, and/or correct aspects of the habitat enhancement that fail.
- Elevations that have been created should be checked at the beginning of the project, then every year and after heavy flooding to make sure that conditions critical to survival of marsh vegetation remain stable.
- Soil salinity should be checked at least twice a year, after winter rains when the salinity is lowest, and in the late summer, when salinity is highest.

Zedler (1984) states that monitoring is still an experimental process, and that new programs benefit from past successes and failures. More research is needed about the design and implementation of monitoring programs, as methods for monitoring enhanced or restored marshes are still being developed. Because there are no set standards or rules for monitoring plans, thought should be given to designing such a plan for Aquatic Park. The plan should be an integral part of the proposal to enhance or create marsh at Aquatic Park.

REFERENCES

LITERATURE CITED

Coates, C. 1989. A marine bird census of Aquatic Park. In: The Aquatic Park reports. U.C. Berkeley Environmental Science Senior Seminar report. Berkeley, California, pp. 2 - 15.

Jacobs, R.J. 1989. A survey of aquatic vegetation at Aquatic Park. In: The Aquatic Park reports. U.C. Berkeley Environmental Science Senior Seminar report. Berkeley, California, pp. 2 - 15.

Razani, R. 1989. Water quality at Aquatic Park. In: The Aquatic Park reports. U.C. Berkeley Environmental Science Senior Seminar report. Berkeley, California, pp. 2 - 15.

Zedler, J.B. 1984. Salt marsh restoration: A guidebook for southern California. California Sea Grant College Program, Institute of Marine Resources, University of California A-032, La Jolla, California. 46 pp.

lsa

WILDLIFE MANAGEMENT ALTERNATIVES AT AQUATIC PARK

OPTION I. MANAGEMENT OF AQUATIC PARK FOR WILDLIFE

A. Improve water circulation and quality in the ponds

Creating wildlife habitat in the Park depends on establishing tidal fluctuation and more gradually sloped banks, allowing a band of marsh vegetation to grow within the levels of fluctuation. Flushing action, water circulation and water quality must all be improved to provide better wildlife habitat.

B. Enhance and create new marsh throughout the Park

Create tidal marsh around the perimeters of the lagoons by grading slopes and planting and seeding vegetation within the areas of tidal fluctuation. Remove roads, leaving remnants as islands, and create tidal marsh around them. Expand and enhance existing freshwater marsh in the Park.

C. Dedicate all or most of the park to wildlife

Provide areas where access is prohibited into the marshes, and others where limited access is provided by boardwalks, viewing platforms, and buffers such as shrub planting and fencing. This would benefit wildlife by minimizing disturbance by humans and dogs.

D. Prohibit waterskiing throughout the entire year

Prohibiting waterskiing throughout the year might increase the numbers of summering birds that forage in the lagoon, such as brown pelicans and terns. This cannot be guaranteed, but if the possibility is considered, it might be on an experimental basis. Waterskiing could be prohibited for a few years and the effects monitored regularly to determine whether bird use in the lagoon actually does increase. (The original reason for closing the park to waterskiing from October 31 to March 1 was based on the months when hunting was formerly allowed on the bay (middle of October to the middle of January). Hunting is no longer allowed in the bay adjacent to urban areas.)

E. Protect new and enhanced marsh from effects of waterskiing

Any tidal marsh that is created should be protected from the effects of waterskiing by setting up barriers (such as log booms) around the perimeter.

F. Maintain or improve the current wildlife value of the south (KRE) pond

The south pond is valuable to wildlife as it is, providing roost sites for black-crowned night herons and mudflat for shorebirds. It is relatively isolated from the central and main lagoons and is therefore less disturbed by humans and dogs. It could be improved if flushing were increased by improving tidal action. If it is more fully incorporated into the Park, access should be restricted by prohibiting dogs in the area, not allowing trails around or into its southern end, and creating buffers or barriers around portions of it to limit disturbance.

G. Create more mudflat for roosting shorebirds

The south pond already provides mudflat where shorebirds have been observed. This habitat type is scarce around the bay, and is especially valuable to shorebirds for roosting when mudflats along the edge of the bay are submerged during high tides. Creating more mudflats at Aquatic Park could provide valuable habitat for shorebirds, especially if tidal action in the park could be muted (delayed) to leave areas within the park exposed longer, when tides are high in the bay. These mudflats could either be along the edges of the lagoons or, even better, be islands that would be submerged at high water levels in the lagoons. Islands would protect roosting shorebirds from disturbance by people and dogs using the park.

H. Discourage domestic and hybrid ducks in the Park

Discourage or prohibit bread feeding by the public, which increases the numbers of domestic and hybrid ducks. Concentrations of these ducks may encourage transmission of diseases between domestic and wild waterfowl in the Park.

Option II. Balanced approach - managing Aquatic Park for wildlife and other uses

Most of the measures discussed above could be implemented in a balanced approach to managing for wildlife at Aquatic Park. These include:

* Improving water circulation and water quality

* Creating, expanding, and enhancing marsh habitat, particularly at the north end of the main lagoon, in the central lagoon or in these and other appropriate areas when final plans for the park are determined

* Continuing to allow waterskiing, but changing the seasonal closure to extend from late September or early October through March or mid-April. Prohibiting waterskiing for an extended time would bracket the season when many waterfowl species are still present

in the bay area. Extending seasonal limits on waterskiing might benefit two species of ducks in particular, Barrow's goldeneye and redhead, that move into the area from January through early March. Other migrants that are present on the bay until later in the season may then also use the Park later in the season

* Allowing more access points into marsh areas, and protecting fewer areas such as the south pond and some enhanced marsh areas around the lagoons. Access points could still be designated and controlled through the use of gates, boardwalks, shrub plantings, and/or fencing

* Maintaining or improving the south lagoon but limiting access and disturbance there to protect wildlife from humans and dogs

* Creating mudflat for roosting shorebirds

* Discouraging domestic and hybrid ducks in the Park

Option III. Retain Existing Conditions

Option IV. Managing Aquatic Park for non-wildlife uses

If none of the measures discussed above are implemented, the value of the Park to wildlife would probably decrease. Some factors which could result in decreased wildlife habitat quality are:

* Allowing year-round waterskiing in the Park, which would discourage its use by wintering and migrating waterfowl

* Allowing access into the south pond, increasing its susceptibility to disturbance

* Disturbing the willows along the northeast edge of the south pond, which would adversely affect black-crowned night herons that roost there

* Flooding the small mudflat in the south pond, thereby eliminating an area presently used by shorebirds

Appendix D
Environmental Report: Hydrology

Philip Williams & Associates, Ltd.
Consultants in Hydrology

Pier 35, The Embarcadero
San Francisco, CA 94133
Phone: (415) 981-8363
Fax: (415) 981-5021

HYDROLOGY AND WATER QUALITY: BERKELEY AQUATIC PARK

by

Jeffrey Haltiner, Ph.D., P.E.
Principal

January 3, 1990

#595

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SUMMARY

Aquatic Park includes three separate tidal lagoons covering approximately 100 acres. The main lagoon (60 acres) is approximately one mile long, 400-600 feet wide, and 4 to 8 feet deep; it contains 400 to 600 acre-feet of water.

South of it, the Model Boat Pond (MBP) covers 4.9 acres and is 3-5 feet deep. The southernmost pond (Radio Tower Pond: RTP), privately owned, covers about 3.9 acres. It is shallow, with a greater daily tidal range than the two ponds to the north, and functions primarily as shorebird habitat.

The three lagoons contain a total of twelve culverts linking the ponds to the Bay and to each other. In addition, a number of gates and weirs have provided hydraulic control. At present, the circulation system is in relatively poor condition. Sand transport by wave action has blocked all of the Bay-lagoon culverts, except the Radio Tower Pond (RTP) culvert. As a result, tidal circulation is extremely limited.

Water quality, although only sporadically analyzed, varies significantly on a seasonal basis. During winter rainstorms, overflow from the storm sewers discharges to the lagoons, carrying a variety of urban chemical and organic pollutants in a dilute form. Subsequent water quality is strongly affected by the amount of tidal circulation and flushing. When the hydraulic system permits normal circulation, the main lagoon is probably suitable for contact recreation during the summer; however, this

has not been established by a regular monitoring system. During the rainy season, bacteriological contamination probably exceeds the standards for contact or non-contact recreation.

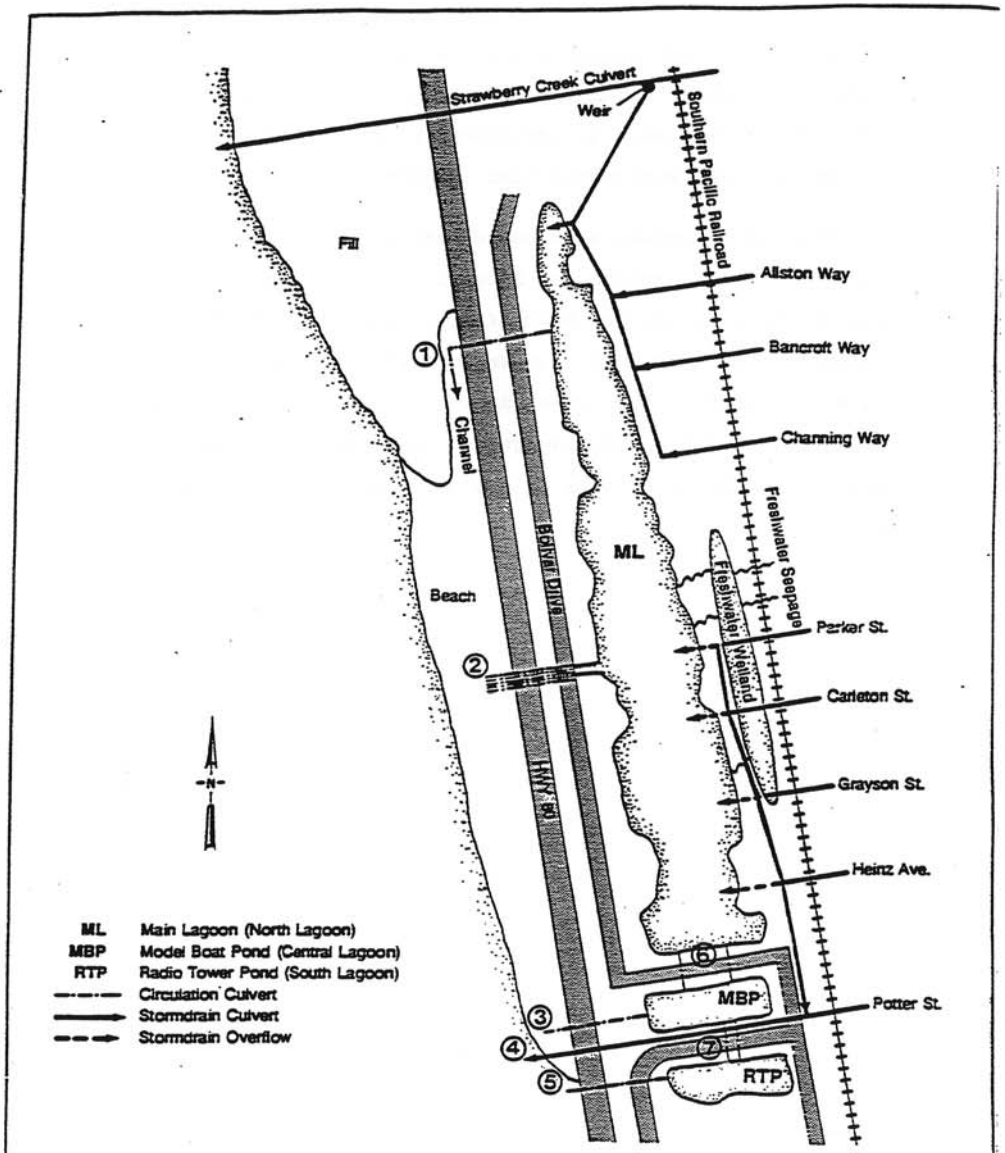
Aquatic Park is subject to potential flooding during periods of exceptionally high tides or a combination of intense rainfall and high tides. Because of the complexity of the hydraulic system and the present (deteriorated) conditions of the Aquatic Park culverts, estimated past flood predictions may not be correct. At present, the threat of tidal flooding is low, while potential rainfall runoff flooding is higher, since the Bay-Lagoon culvert (which would let tidal water in an excess storm drain flow out) are blocked. However, from a legal standpoint, the existing FEMA (Federal Emergency Management Agency) 100-year flood hazard elevation of 6.0 ft. NGVD would still apply. Thus, any new buildings constructed would have to have the finished floor elevation 1.0 ft. above the 100-year flood elevation.

A comprehensive hydrology and water quality study is needed to adequately describe the existing conditions, analyze alternative circulation schemes, determine flood hazards, and develop a water quality monitoring program. The Plan would provide design and repair criteria for hydraulic structures (culverts, gates, weirs, etc.), shoreline treatment, water depths, bottom configuration, and water level management, etc. to meet the desired uses of the park as established by the Master Plan.

I. INTRODUCTION

As shown in Figure 1, Aquatic Park includes a large tidal lagoon and a smaller lagoon originally designed for use by model boats. A third small pond, located south of the model boat pond, is partially owned by a local radio station. The pond areas were originally part of San Francisco Bay, but were separated from the Bay during the mid-1930s by the construction of Interstate 80 to the west. During the 1940s, the lagoons were dredged and the fill used to raise the surrounding areas for subsequent landscaping as a park. Excellent descriptions of the history of Aquatic Park are available in two UC Berkeley reports (Ferlin, 1983; and Razani, 1989).

In this section, we provide an overview of the hydrologic characteristics of Aquatic Park, existing hydraulic structures and circulation, and water quality issues at the Master Plan level. As the existing condition of the lagoons and facilities is relatively poor, and the information on the above issues is relatively sparse, a workplan to develop a more detailed understanding of: 1) the existing conditions (bathymetric, hydraulic structures, circulation, water quality, vegetation, aquatic organisms, etc.); 2) recommendations for restoration or replacement of the hydraulic control structures; and 3) a lagoon management plan, are also presented. In general, the hydraulic structures have not been adequately maintained and are in poor condition. Because of this, management of the lagoons has been difficult. For these and other reasons, water quality and



Philip Williams & Associates, Ltd.
Consultants in Hydrology

Hydraulic Structures at Berkeley Aquatic Park
(Modified from Ferlin [1983])

FIGURE 1

circulation in the lagoons has often been poor during the past 40 years. Upgrading the water quality regime will require a substantial commitment in additional planning, construction, maintenance, and management cost and effort.

The tidal lagoons at Aquatic Park are similar to a number of other salt water lagoons and lakes in the Central Coast. These include those at Stinson Beach (Marin County), Lake Merritt (Oakland), the salt water lagoon at Baylands (Palo Alto), Laguna Grande and Roberts Lake (Seaside), and Lake El Estero (Monterey). Experience gained in the design and maintenance of these facilities will be helpful in guiding restoration at Aquatic Park.

II. EXISTING CONDITIONS

A. TOPOGRAPHY/BATHYMETRY[1]

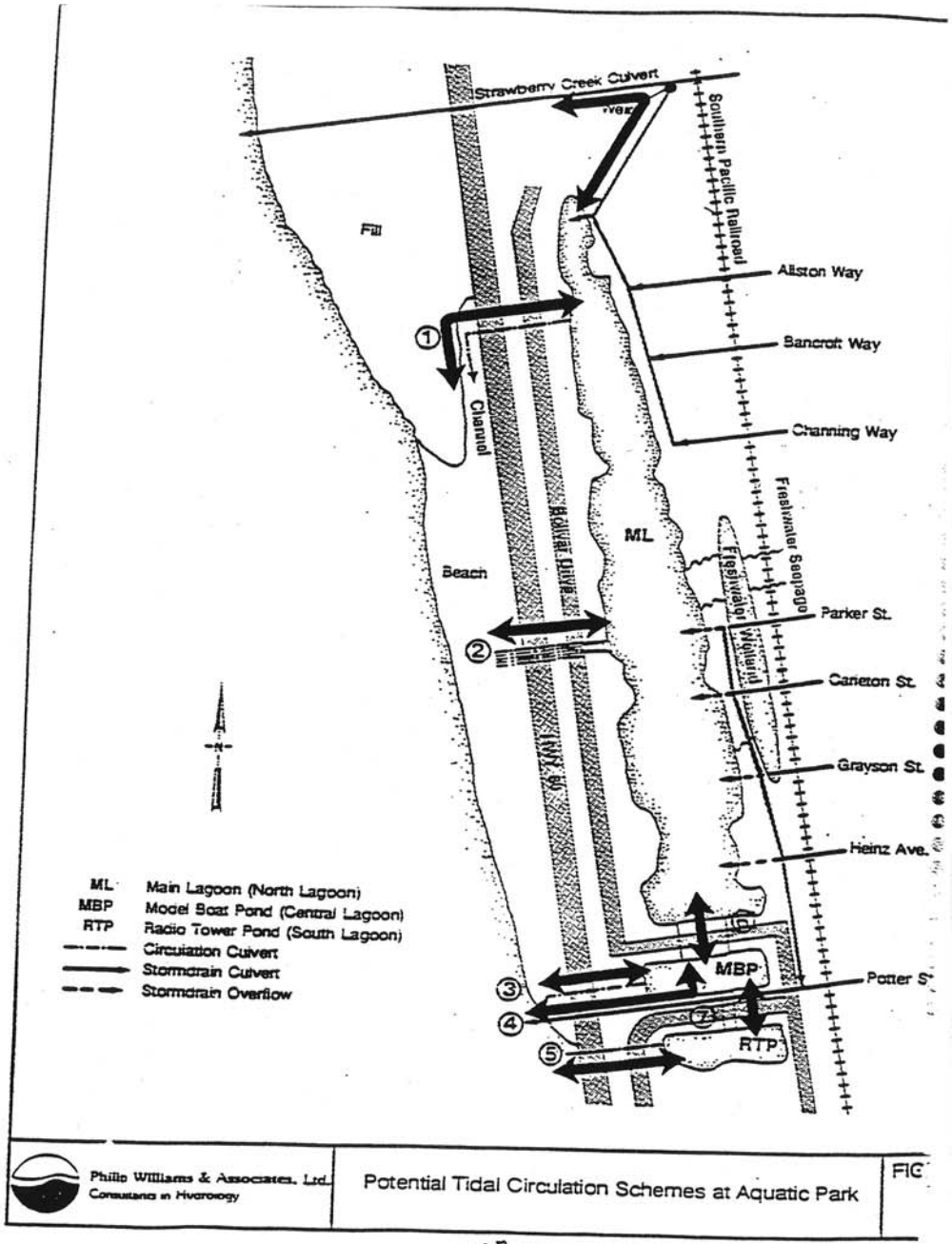
The main (north) lagoon is approximately 1 mile long and 400 to 600 feet wide, and occupies 67 acres. There is no current bathymetric map to indicate bottom contours in any of the three lagoons. Several representative lagoon cross-sections made in this study of the locations are shown in Figure 3, and the cross-sections in Figures 4 through 9. These suggest that existing water depths range from 4 to 8 feet. The main lagoon is relatively narrow and deep in the north end, with a soft layer of organic mud (1-3 feet deep) on the bottom. To the south, it is wide and shallow, with a hard sandy bottom (the organic mud is likely dispersed by turbulence from the ski boats). The MBP has bottom depths at -2 to -3 ft. At the time of the survey, the water surface elevation was 1.5 feet NGVD[2]. The main lagoon contains about 400-600 acre-feet of water.

Siltation and deposition of organic matter have apparently reduced water depths somewhat. A 1970 report (ES, 1970) indicates that depths at that time ranged from 8 to 15 feet.

---

1 Topography refers to landform elevations, while bathymetry refers to below-water shoreline and bottom configuration.

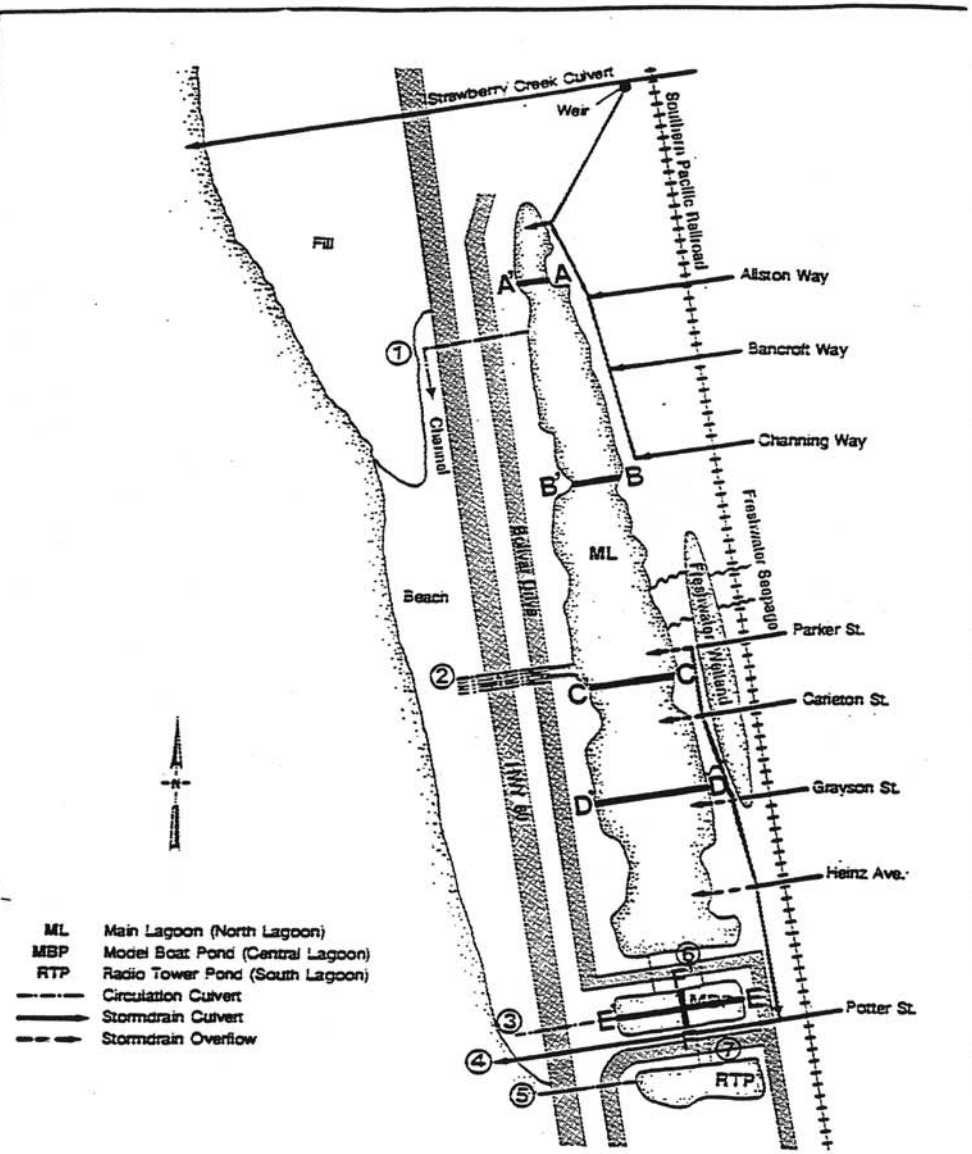
2 NGVD refers to National Geodetic Vertical Datum. This is the standard elevation datum in use throughout the U.S. It corresponds closely with Mean Sea Level (MSL). It was established in 1929. The City of Berkeley has its own datum, which is 3.17 feet above NGVD and 6.23 feet above Mean Lower Low Water (MLLW), the standard datum used in referencing tidal elevations.



Phillip Williams & Associates, Ltd.
Consultants in Hydrology

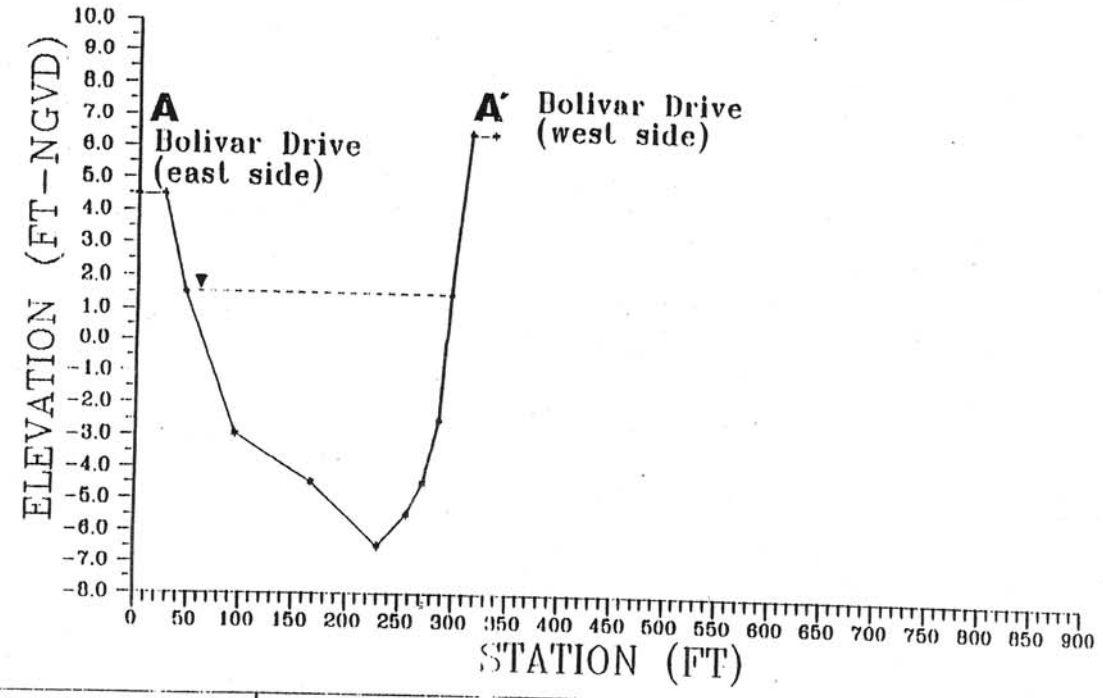
Potential Tidal Circulation Schemes at Aquatic Park

FIG



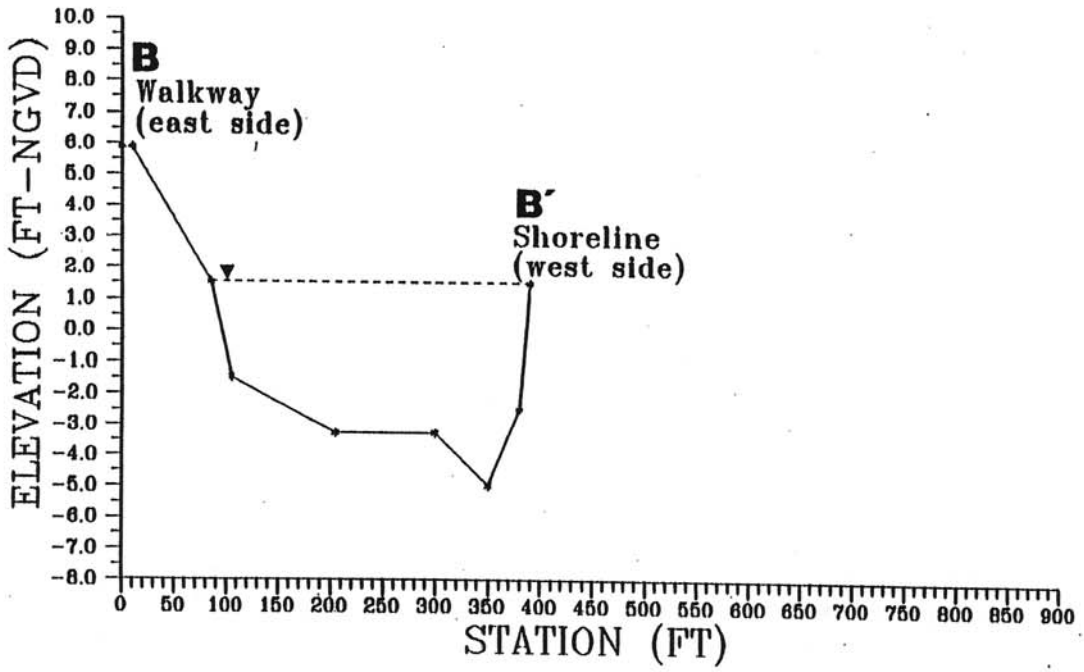
Phillip Williams & Associates, Ltd. Consultants in Hydrology	Location of Lagoon Cross-Sections	FIGURE 3

AQUATIC PARK CROSS-SECTION A



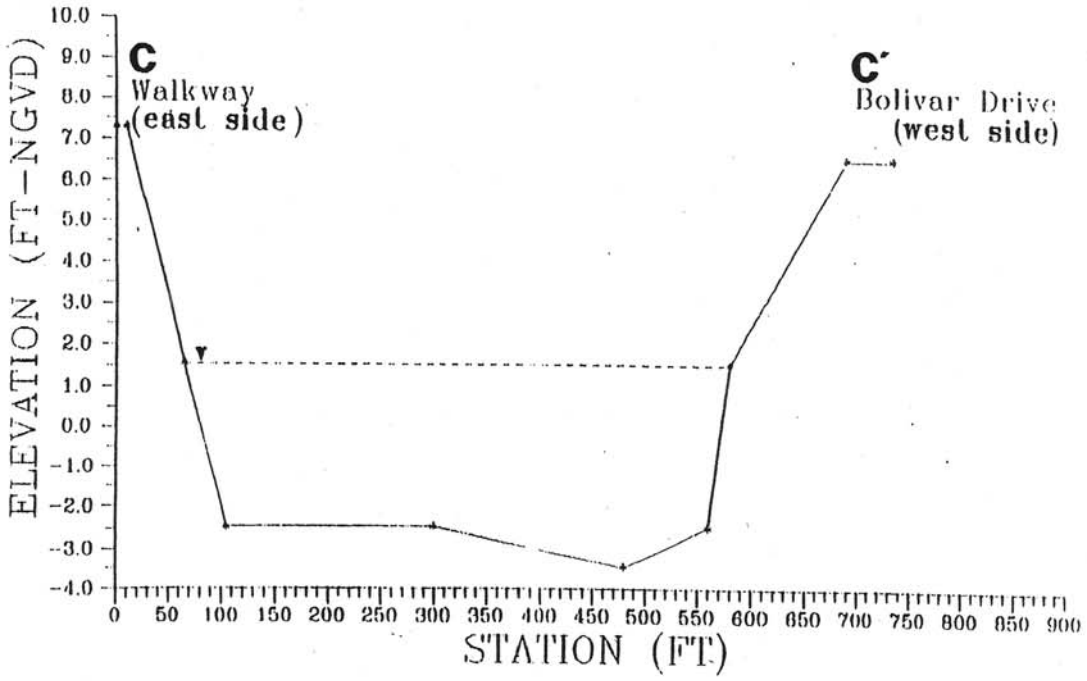
		Philip Williams & Associates, Ltd Pier 35, The Embarcadero San Francisco, California 94133	FIGURE 4

AQUATIC PARK CROSS-SECTION B



		Philip Williams & Associates, Ltd Pier 35, The Embarcadero San Francisco, California 94133	FIGURE 5

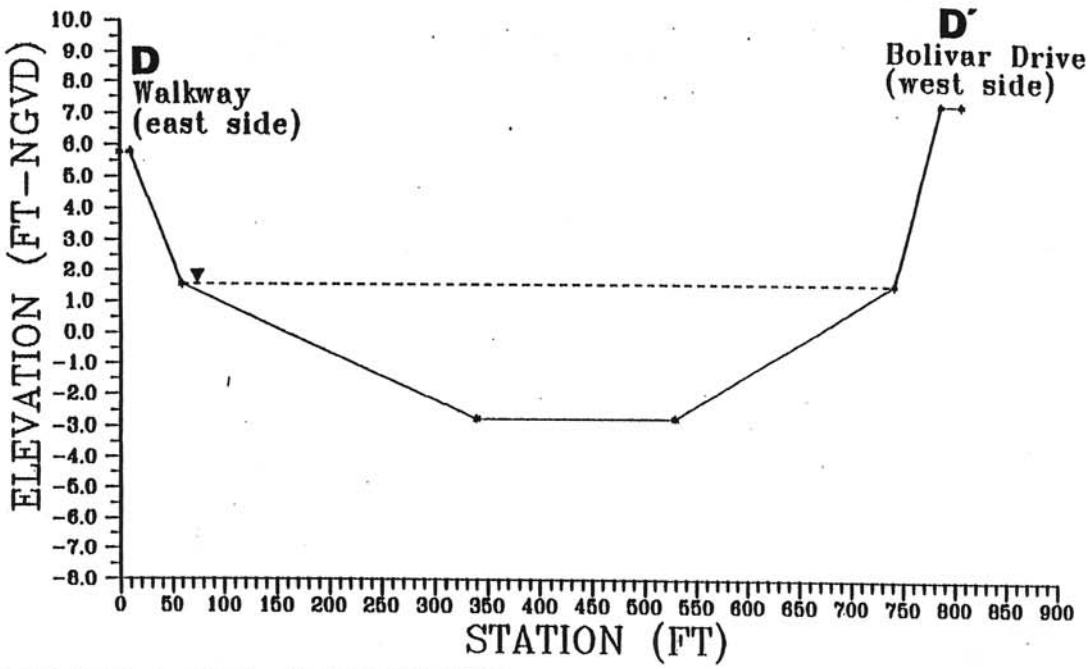
AQUATIC PARK CROSS-SECTION C



Philip Williams & Associates, Ltd
Pier 35, The Embarcadero
San Francisco, California 94133

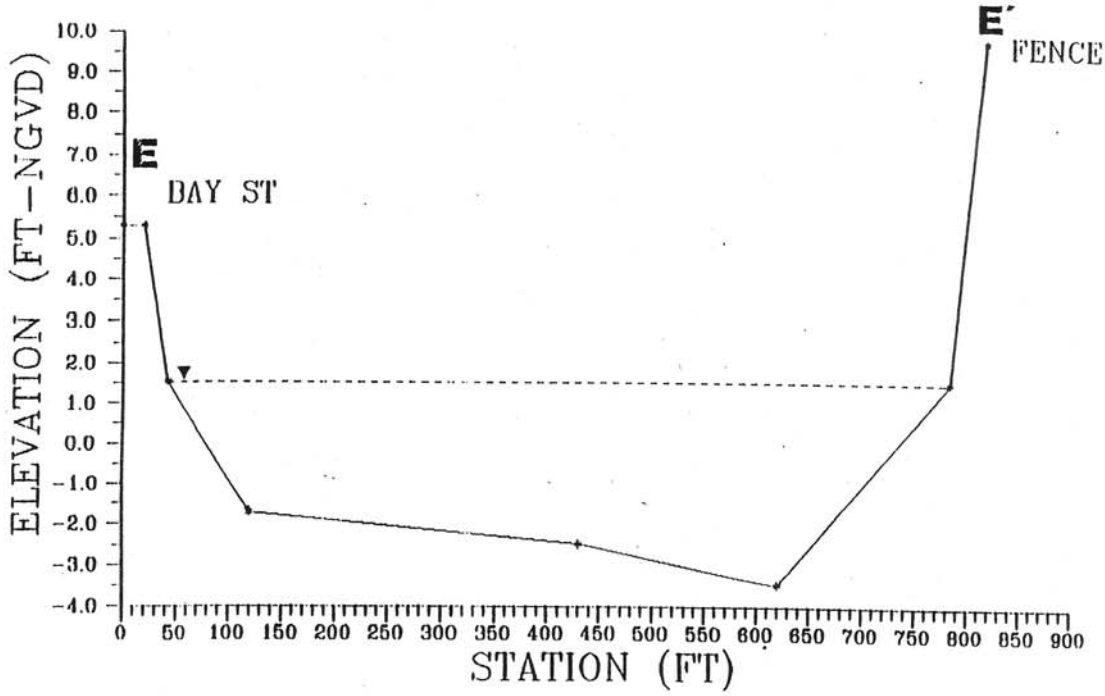
FIGURE 6

AQUATIC PARK CROSS-SECTION D



		Philip Williams & Associates, Ltd Pier 35, The Embarcadero San Francisco, California 94133	FIGURE 7

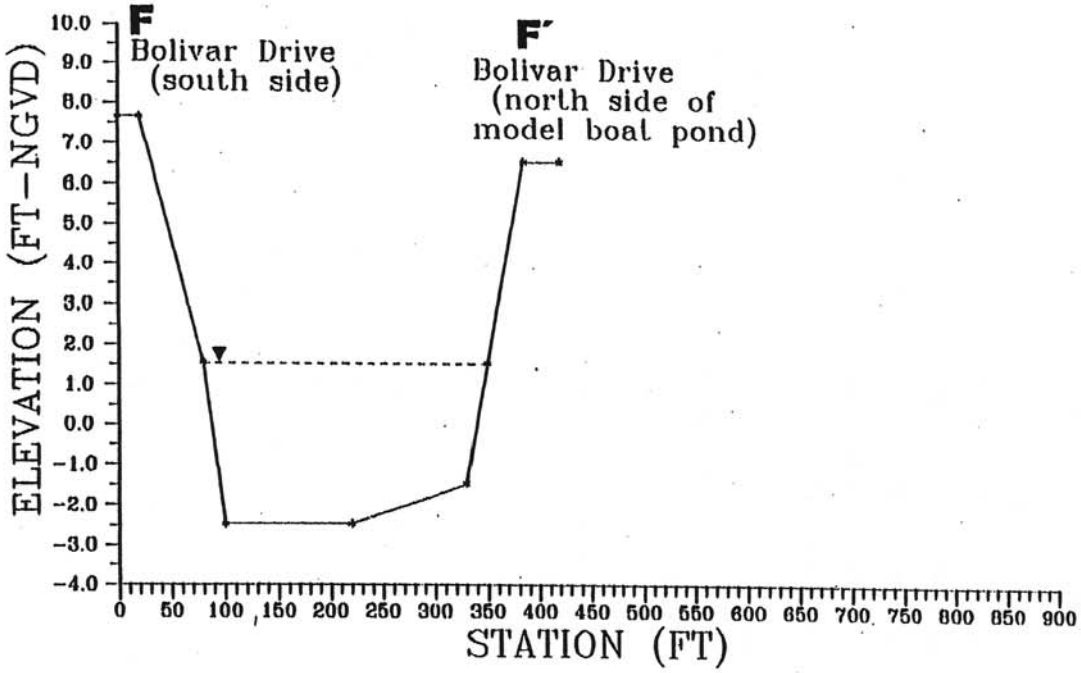
AQUATIC PARK CROSS-SECTION E



Philip Williams & Associates, Ltd
Pier 35, The Embarcadero
San Francisco, California 94133

FIGURE
8

AQUATIC PARK CROSS-SECTION F



	Philip Williams & Associates, Ltd Pier 35, The Embarcadero San Francisco, California 94133	FIGURE 9

Apparently, dredging has been conducted in the park, although no substantial dredging has occurred in recent years.

The shoreline edge is relatively steep, with a vertical stone bulkhead built at some locations and loose rip-rap placed around other reaches of the shore. Shoreline erosion caused by wind- and boat-generated waves is evident at some locations. The stone bulkhead has deteriorated in many locations, which are currently experiencing moderate erosion.

The Model Boat Pond (MBP) is 3 to 5 feet deep, with sloped, vegetated banks. It contains about 17 acre-feet of water when the water surface is at +1.5 ft. NGVD. It has two concrete box structures on the north bank (which supports the 18-inch diameter culverts to the main lagoon) and a concrete bulkhead in the southeast corner (which contains two culverts). A single concrete bulkhead on the west side supports the gate and culvert which previously connected the MBP to the Bay.

The Radio Tower Pond (RTP) is relatively shallow (0.5 to 2 feet deep). It contains a variety of shallow ponding areas and low areas. Unlike the Main Lagoon and MBP (which represent urban lakes), the RTP is more characteristic of a natural tidal wetland. Although the tidal range (difference in water level between high and low tide) is damped compared with the Bay, it is greater than the other two lagoons. This daily ebb and flow of Bay water produces the characteristic salt marsh vegetation, shallow ponding, and mudflats in the RTP, and provides excellent shorebird habitat.

Constructed by placing fill over what was previously part of San Francisco Bay, much of Aquatic Park's grassy picnic areas, roads, and walkways are at low elevations compared with the Bay. Elevations range from 3 to 5 ft. NGVD. Considering that spring tides in the Bay exceed 4 ft. NGVD and that the 1983 high tide exceeded +6.0 ft. NGVD, the relatively low elevations affect drainage and flood hazards at the site. While flooding has evidently not represented a serious problem in the past, provision for avoiding flood hazards must be included in the operation of the circulation system and the construction of any new structures in the area.

B. CIRCULATION

The three ponds at Aquatic Park represent tidal lagoons; the primary source of water circulation is via tidal circulation of salt water from San Francisco Bay. In addition, during intense winter rainstorms, the ponds receive overflow water from the City storm drain system.

The hydraulic structures which affect Aquatic Park are shown in Figure 2 and described in Table 1. The results described below represent a reconnaissance-level inspection of the system. Surveying of culvert invert (flowline) elevations was conducted by the Berkeley Public Works Department.

In the main lagoon, five 24-inch diameter concrete culverts connect the lagoon with San Francisco Bay. On the lagoon side, the culverts end in a concrete box structure which previously

TABLE 1:

DATA ON CIRCULATION CULVERTS AT BERKELEY AQUATIC PARK[1]

Culvert[2] #	Type[3]	Diameter (Inches)	Invert Elev.[4] (Lagoon)	Invert Elev. (Bay)	Comments
A. Culverts Connecting Lagoons to San Francisco Bay					
1	RCP	24	-0.07	NF[5]	Culvert has slide gate on Lagoon side. Bay side completely buried by fill; culvert inoperative.
2	RCP (5)	24	-1.23	+0.77	Culverts completely plugged with sand. Lagoon side concrete hydraulic structure had flap gates and weir deteriorated. Culvert inoperative.
3	RCP	24	-1.53	NF	Culvert completely buried on the Bay side. Inoperative.
4	RCB	48 (wide) 84 (high)	-2.43	-5.43 (?) Pipe invert -0.43 (sand)	Culvert partially filled (about 3.5-4.5 feet) with sand. Vertical opening 2 1/2 to 3 1/2 feet. High tide flows up culvert beyond junction with MBP. Conveys some fresh water at all times from Potter Creek.
5	RCB	24	-2.63	-2.63	Open on both lagoon and Bay sides. Slide gate on pond side is kept open.
B. Culverts Interconnecting Lagoons					
6	RCP (2)	18	-0.53 (w) -1.03 (e)	NF	Connect main lagoon and MPB. Condition uncertain. One main blocked.

Culvert[2] #	Type	Diameter (Inches)	Invert Elev.[4] (Lagoon)	Invert Elev. (Bay)	Comments
7	RCB (2)	18	-0.13		Connect MPB to Potter St. Culvert. 1 slide gate (damaged).
		24	?	?	1 slide gate missing (replaced by piece of plywood).

1 Does not include storm system culverts on east side

2 Culvert is keyed to Figure 1

3 RCP = reinforced concrete pipe
RCB = reinforced concrete bar

4 All invert elevations in Ft. NGVD

5 NF (Not Found)

included flap gates to allow water inflow from the Bay while preventing outflow. At present, the tidal flap gates are inoperable. Furthermore, all five culverts are completely plugged with sand on the Bay side, preventing any tidal circulation at this time. It will reportedly cost about $80,000 to clean the culverts. The problem of sand blockage has apparently been ongoing since the lagoon was originally built. The Berkeley shoreline experiences moderate wind-generated waves 1 to 3 feet high as a result of the strong summer westerly sea breeze. This suspends the Bay sand and carries it into the culverts. When the culverts are open and tidal water flows into the lagoon, the suspended sand is deposited as the water passes through the culverts. In the past, the flap gates for the lagoon side of the culverts prevented back flow, which would have helped scour the sand out of the culverts and carry it back to the Bay. Even if the culverts were cleaned and full tidal action allowed to enter and exit the culverts (i.e., no flap gates), it is possible that wave-generated sand transport may still block the culverts. However, blockage frequency would be greatly reduced. Blockage of these culverts represents the major water-quality problem affecting Aquatic Park at the present time.

In the north end of the main lagoon, a single 18-inch concrete culvert previously connected the Bay and the lagoon. Although there is no design document describing the original circulation of the lagoon, it is likely that the north culvert was intended to create a net counter-clockwise circulation, with Bay inflow through the 5 main culverts and outflow through the

north culvert. However, on the Bay side of I-80, extensive fill has been placed and the end of the culvert buried. It is completely inoperative at this time.

In the south end of the lagoon, two 18-inch culverts connect the main lagoon with the model boat pond. These are always open (no gates), and water levels in these two water bodies are the same. These culverts are apparently functional, although there may be some accumulated sediment. A single culvert also connects the model boat pond to the Bay. This culvert is non-functional, with the end on the Bay side completely buried in sand (its location was tentatively identified, and it probably could be excavated and flushed if desired). Two short (one 18-inch, one 24-inch) culverts also connect the model boat pond to the Potter Street outfall. These two culverts had slide gates, now deteriorated, on the MBP side.

The Potter Street storm sewer drain flows west under the street separating the model boat pond and the radio tower pond and discharges to the Bay. (Adjacent to the MBP, it is horseshoe-shaped [9 feet wide, 7 feet high] with its invert at -2.43 ft. NGVD.) At its discharge location, the Potter Street outfall is apparently a rectangular box culvert, 96 inches wide; it is partially filled with sand, with a vertical opening of 2.5 to 3.5 feet. Assuming it is still 7 feet high, there is 3.5 to 4.5 feet of sand above its invert. The Potter Street culvert carries rainstorm runoff from a large area of West Berkeley; it replaced Potter Creek (one of the eight creek systems which

flowed through Berkeley prior to development) and apparently contains some freshwater flow at all times. In addition, because of its low elevation, tidal waters flow from the Bay up the culvert during high tides. During the past summer, with the main lagoon culverts blocked by sand, the gates on the short connect culvert between the Potter Street culvert and the MBP were manually opened during high tides to provide some circulation and keep the MBP and main lagoon water elevation high.

The Radio Tower Pond (RTP) is connected to the Bay by a single 24-inch RCP; although there is a slide gate on the RTP end of the culvert, this is apparently never closed, and the culvert is open to full tidal inflow and outflow. On the Bay side, this culvert (unlike the five main lagoon culverts, the north culvert, the MBP culvert, and the Potter Street outfall) is not experiencing sand blockage. There are three reasons for this:

- The culvert experiences full inflow and outflow during each tidal cycle (unlike the five main lagoon culverts). Thus, sand deposited in the culvert during tidal inflow is flushed from the pipe during the next tidal outflow.

- The culvert extends further into the Bay (about 35 feet west of the frontage road) than the five main culverts (which discharge at the base of the road). Thus, it is less subject to wave action.

- The beach elevation is slightly lower and much narrower at this location. This is the southern extent of the

beach, and there is much less sand available to plug the culvert.

In addition to the above culverts, which connect the three ponds to the Bay and to each other, a series of storm system culverts (shown in Figure 1) drain to the east side of the main lagoon from developed areas of Berkeley further east. As originally constructed, these storm drains discharged directly into the main lagoon, since this represents the area of lowest elevation. Although dry during the summer, they convey relatively high flow during winter rainstorms. This rainfall runoff contains a variety of pollutants which degrade water quality in the lagoons. To partially alleviate this problem, a bypass culvert was constructed which captures the storm runoff from Parker, Carleton, Grayson, and Heinz Streets and conveys it to the Potter Street culvert and then to the Bay. This apparently functions during small-to-moderate rainstorm events; large events exceed the bypass pipe capacity and the excess is discharged to the lagoon. The northern storm drains in Figure 1 convey all runoff from Channing, Bancroft, and Allston Way directly to the north end of the main lagoon. In addition, a weir/diversion line in Strawberry Creek Culvert (the main culvert draining Central Berkeley and Strawberry Creek flow to the Bay) will discharge excess runoff from that culvert to the main lagoon during large rainstorms.

The final source of water in Aquatic Park comes from a series of seeps and springs which emerge from the Southern

Pacific Railroad berm along the central portion of the main lagoon. There is a large elevation drop (10 to 12 feet) between the land east of the railroad and Aquatic Park. The seepage areas indicate that this steep slope has intercepted the groundwater table. The seepage supports a long narrow fringe of freshwater wetland along the east park border which provides vegetation diversity and freshwater habitat.

C. FLOOD HAZARDS

Aquatic Park is subject to potential flooding during extreme high tides or during a combination of high tides (which restrict outflow) and heavy rainstorms. The area is included in the 1974 FEMA flood study of Berkeley. In this study, the 100-year flood elevation is shown as +6.0 ft. NGVD. This is the same as the 100-year estimated high tide in the Bay (the 100-year high tide has been subsequently revised to +6.3 ft. NGVD). The assumption in this study was that since the lagoons are connected to the Bay, high water levels would be the same in each. This simplistic assumption is incorrect, since the size of the culverts would restrict the flow of water from the Bay into the lagoons. At present, the culverts are blocked and the risk of tidal flooding is low.

The most serious flood hazard in the Aquatic Park area would probably result from a severe winter rainstorm in conjunction with high tides (which would restrict outflow from the major culverts). Excess storm runoff would pond in the lagoons, raising their level. To adequately quantify this risk, a flood

routing study would be required. Such a study would be complex, since it must include both local inflow to the Aquatic Park area from the surrounding drainage basin, but also overflows from the major Strawberry Creek and/or Potter Street systems.

Legally, the FEMA flood hazard elevation is still official, and any new buildings in this area would have to have the finished floor elevation set at +7.0 feet NGVD as a minimum. Much of the land surrounding the lagoons is at low elevation and may be subject to occasional inundation. This is not likely to cause extensive damage.

The existing radio station building to the south (on private land) adjacent to the RTP is at a very low elevation and likely subject to high flood hazard. If this is rebuilt, it should setback out of the wetland area and at a higher elevation.

D. WATER QUALITY

No new water quality tests were conducted during this review. The results represent an analysis of the (sparse) previously collected information (Altamirano, 1983; Rezani, 1989; Betts, 1983; and Engineering Science, 1970).

Water quality in the three lagoons results from the complex interaction of inflow water and circulation from the Bay, stormwater runoff from the east, and the internal physical and biological processes within the system. Typically, water quality is described by a variety of physical, chemical, and biologic

parameters. Potential uses of a water body, depending on its water quality, are established by the Regional Water Quality Control Board (RWQCB). The RWQCB has established levels of various parameters which must be met in order for water bodies to be acceptable for "contact" or "non-contact" recreation. Although the City has established a reasonable pattern (summer use only) for use of the lagoon by water skiers (contact recreation) and others, there has been no consistent program of ongoing water quality monitoring on a seasonal and annual basis to determine long-term water quality and to verify what types of recreation are suitable. This is discussed in greater detail in the section on recommended future studies.

The major water quality issues can be discussed in relation to circulation in the lagoons and pollutant inflow from the storm drains.

Circulation of water between the Bay and the three lagoons is critical to provide flushing of suspended pollutants and to prevent eutrophication of lagoon waters. It has been problematic throughout the history of Aquatic Park, but has become critical in recent years. The problems result from a combination of natural factors, lagoon design, and lagoon management.

The bottom of the lagoons are below the invert of the Bay-lagoon culverts. Thus, it is impossible to drain the lagoons or even exchange a significant portion of the lagoon water with the Bay on any single tidal cycle. Thus, the goal must be to exchange a portion of the lagoon water during each tidal cycle

and assume that sufficient internal mixing of lagoon water occurs such that on a monthly basis, all of the lagoon water is replaced with Bay water. The culverts connecting the lagoons to the Bay are relatively small (low flow capacity) in relation to the bottom of the lagoon. Thus, even if all the culverts were functioning and there were no tidal gates, tidal circulation would be limited. However, because of the present blockage of the five main culverts in the main lagoon and the long-term blockage of the north culvert and the MBP culvert, there is virtually no circulation at present. (The City has managed to get some circulation through the Potter Street system.) Even if the culverts are open, the goal of maintaining a relatively constant water elevation in the main lagoon (about +1.5 to +2.0 ft. NGVD) greatly restricts the potential for tidal circulation; water can only enter through the lagoons during periods of high tide. Primarily water in the surface layer (top 1 to 2 feet) of the lagoons will be exchanged, while lower water zones will likely remain trapped for months. This stratification is enhanced by both thermal and salinity gradients, such that warmer, less salty water overlies colder, saltier water. The only source of mixing is wind- or boat-generated turbulence.

As a result of the lack of circulation, fish kills and algal blooms have occurred in the past. Fish kills usually result from lower dissolved oxygen levels, which are a consistent problem in the lagoons (ES, 1970). The algal blooms are also indicative of poor circulation, resulting from elevated nutrient levels and higher water temperatures. At Aquatic Park, these nutrients are

transported to the lagoons through the storm drains as urban runoff (lawn and garden fertilizer, animal and human waste, etc.). When summer circulation is inadequate, the nutrients remain in the system and warmer air and water temperatures encourage algal growth. Thus, eutrophication results as a direct combination of poor circulation and storm sewer pollutant inflow. While neither of these will be simple to correct, improved circulation should have a higher priority than reducing storm sewer overflows.

The Bay circulation and storm drain runoff also control the salinity regime in the lagoons. In freshwater systems, high salinity is usually perceived as a problem. However, since tidal circulation with the Bay is the only source of water circulation, Aquatic Park should be considered as a saline (and occasionally brackish) system. Indeed, it is the storm drains (which discharge fresh water) that contain the major pollutants. Salinity of the Bay is typically 32 to 35 ppt (parts per thousand). Thus, in the lagoons, we would expect similar salinity levels, except during periods of rainfall runoff. Because of the relatively poor circulation with the Bay, salinity in the main lagoon was 18 ppt during mid-July, 1989. The only inflow water at this time was coming into the MBP via tidal flow up the Potter Street culvert. Although primarily Bay water (32 ppt), the inflow salinity (25 ppt) indicated that some freshwater was flowing in the Potter Street system and mixing with the tidal Bay water. Salinity in the RTP was 32 ppt, reflecting regular tidal circulation for the Bay. The 1983 and 1989 UC Berkeley

studies at Aquatic Park indicated a wide range of salinities throughout the main lagoon and MBP, again indicating the importance of seasonal freshwater inflow and Bay circulation.

Although there are advantages to a variety of salinity regimes in the various lagoons, the importance of Bay circulation and the pollutant inflow problems from the storm drains suggest that a higher salinity regime is probably preferable. Although some organisms can tolerate a range of salinities, relatively large, sudden shifts between fresh and salt water can create a salinity shock to which most organisms cannot adapt.

The summer freshwater flows in the Strawberry Creek and Potter Street culverts are of better quality than the early winters flows (which contain street runoff). Thus, these could be used to support freshwater wetlands. The freshwater wetland on the east fringe of the park, created by groundwater seepage, appears to be in relatively good condition.

One of the main pollutant concerns affecting human use of the lagoons is bacteriological contamination. The winter rainfall-runoff contains animal fecal material and transports it to the lagoons. In addition, sewer system leaks and overflows contribute some human waste to the storm sewer discharge. Data collected by Betts (1983) suggest that fecal contamination is a significant problem during the winter months, exceeding the standards for both contact and non-contact recreation. This persisted until at least April and possibly later. Thus, summer use of the Park for contact recreation is likely to be

acceptable, although again, no long-term studies are available to document this.

Trace elements such as heavy metals are also of concern. The 1983 and 1989 studies indicated that heavy metal contamination was not a severe problem, although slightly elevated levels of mercury were detected. Since heavy metals are often adsorbed to sediment, the organic muck and sediment on the lake bottom may be high in trace elements. If this is ever dredged, testing should be conducted to determine the concentrations and potential danger of resuspension.

III. MASTER PLAN IMPLEMENTATION AND ADDITIONAL STUDIES

The proposed Master Plan would combine the RTP and MBP lagoons into a single expanded tidal salt marsh, create additional wildlife areas in the main lagoon, and expand the freshwater marsh along the eastern park border.

The integration of the Radio Tower Pond and Model Boat Pond is a desirable goal from a wildlife perspective. However, the presence of the Potter Street Outfall will make this difficult. The culvert presently extends from -2.4 ft. (at its invert) to +5.5 ft. at the top, and would effectively separate the two wetland areas if it is not relocated.

The Potter Street culvert represents the simplest potential source of tidal inflow to the expanded wetland. The section of culvert through the new marsh could possibly be completely eliminated, allowing full tidal action. The stormwater flow from the creek would be discharged to the marsh, exiting at the western side where the culvert goes under the freeway. Further study would be required to determine if this is desirable from a salinity and water quality perspective.

This alternative would require several feet of filling in the MBP to raise the pond bottom. At present, it has a bottom elevation of -3.0 ft. NGVD. Typically, coastal salt marshes are at elevation +1.0 to +3.0 feet (with deeper channels). Thus, 4-6 feet of fill would be required to raise the bottom of the MBP. Material from the berm separating the two ponds could be used for

this. In addition, increased tidal circulation in these ponds would almost certainly require relocation of the radio station building to a higher elevation.

It is possible that this project would be accomplished in phases, with the ponds initially remaining separated, but with wetland restoration and tidal action initiated in the MBP.

The continuation of existing uses in the main lagoon will require improved circulation, while maintaining a relatively small range in depth variation to accommodate water-skiing.

The circulation and water quality regime at Aquatic Park is complex and poorly understood, and requires significant improvement. Both circulation and water quality must be adapted to the desired uses of the Park. For example, recreational boating and water-skiing require relatively constant water depths, while a tidal saltmarsh benefits from a large daily tidal range. Likewise, water contact sports such as water-skiing and swimming require higher water quality than boating.

A detailed hydrology and water quality study is needed to refine the preliminary information in this report and to achieve the Master Plan goals. Such a study should include:

1. A detailed bathymetric map is required to describe the existing lagoon elevation-volume characteristics. This will be needed to determine the size of future culverts necessary to provide improved circulation.

2. Water Quality Monitoring

An ongoing water quality monitoring program should be established to document the seasonal and annual variation of critical water quality parameters. The selection of parameters to monitor will be based on the desired uses as established by the Master Plan. This program will be developed in conjunction with the RWQCB to ensure that it complies with criteria for various classes of recreational use.

3. Develop Alternative Circulation Systems

A variety of circulation schemes are feasible using existing or new hydraulic structures. A number of schemes should be analyzed which meet the circulation needs of each lagoon. Such a system would have the following goals:

- Provide the needed circulation at the least cost in terms of installation and maintenance.
- Minimize potential failure by sediment blockage, mechanical breakdown, etc.
- Minimize the complexity of the system.
- Minimize the amount of active management required by the City.

A computer model capable of simulating various culvert and weir connections between the pond and the Bay would be used to analyze potential circulation schemes.

A full range of options would be analyzed for each of the lagoons. These would include:

A. Measure to Improve Water Circulation and Quality in the Main Lagoon

a. Clean the existing 5 main culverts to the Bay. Allow increased tidal flooding to reduce future sediment deposition.

b. Repair and modify the headwall structures on the lagoon side of the five culverts as needed to meet circulation goals.

c. Provide an intake structure for the five culverts on the Bay side to prevent sand blockage.

d. Locate and excavate the Bay side end of the north culvert in the main lagoon to restore tidal circulation.

e. Use tidal circulation from the Strawberry Creek culvert as a source of water to the main lagoon.

f. Expand the daily range of water elevations in the lagoons to improve water quality.

g. Examine various combinations of flap gate structures to create a net circular flow of water through the lagoons.

h. Use of mechanical pumps or aerators to meet water level and quality objectives.

B. Measures to Improve Circulation in the Model Boat Pond (In Its Present Condition or as a Tidal Wetland

a. If the MBP is hydraulically connected to the main lagoon, either with culverts or by a weir, all the measures which improve water quality in the main lagoon will also improve water quality in the MBP.

b. Locate and excavate the Bayside end of the model boat culvert and restore tidal circulation.

c. Use tidal circulation from the Potter Street culvert as a major source of water to the MBP.

4. Analyze the Storm Drain and Flood Control Functions of the Lagoons

The frequency and amount of storm drain inflow to Aquatic Park is an important component of the winter water balance in the Park. The behavior of these systems during typical and extreme winter storms would be analyzed. This would include a review of the size of areas draining to the park, the hydraulic capacity of the culverts and bypass lines, and the severity of design rainstorms.

5. Shoreline Configuration and Water Depths

The type of shoreline treatment, bottom configuration, and operating water depths in the lagoons are dependent on the selected uses. For urban lakes, vertical stone or wooden bulkheads are often preferred to provide shore protection and proximity of walkways or grass to the water edge. Stone rip-rap placed on a shallow slope also provides some protection. Flatter, vegetated slopes are more appropriate for wildlife areas. In wetland areas for shorebird use, shallow ponding areas and ground surface elevations must be carefully designed in relation to the tidal regime to maximize vegetation establishment and subsequent wildlife use. A greater variation in daily tidal range is desirable to simulate natural salt marsh habitat. Thus, the detailed design of the circulation system, the grading plan, shoreline treatment, landscape treatment, and restoration by native vegetation must all be designed to achieve the variety of uses specified by the Master Plan.

The cost for the above studies is uncertain, but likely to range from $50.00 to $100,000. Potential funding sources besides the City should be explored. For example, the State Coastal Conservancy may be willing to fund the wetland portion of the Master Plan. Other state agencies may be willing to fund the main lagoon study.

REFERENCES

Altamirano, C. 1983. Water Quality in Aquatic Park: Chemical and Physical Parameters Affecting Recreation and Wildlife. In Berkeley Water: Issues and Resources. D. Sloan and S. Stine (eds.): UC Berkeley Environmental Science Senior Seminar Reports, Berkeley, CA.

Betts, I. 1983. Water Quality at Aquatic Park: Biological Parameters. In Berkeley Water: Issues and Resources. D. Sloan and S. Stine (eds.): UC Berkeley Environmental Science Senior Seminar Reports, Berkeley, CA.

Engineering-Science. 1970. Preliminary Investigations of Waters and Sediments in Aquatic Park Lagoon. December 1970.

Ferlin, C.L. 1983. History and Development of Aquatic Park. In Berkeley Water: Issues and Resources. D. Sloan and S. Stine (eds.): UC Berkeley Environmental Science Senior Seminar Reports, Berkeley, CA, pp. 127-133.

Razani, R. 1989. Water Quality at Aquatic Park. UC Berkeley Environmental Science Senior Seminar Reports, Berkeley, CA.

U.S. Federal Insurance Administration. 1974. Flood Insurance Study for Berkeley, California, September 1974.

Appendix E

Environmental Report: Acoustics

WILSON, IHRIG & ASSOCIATES, INC.
ACOUSTICAL CONSULTANTS

5776 BROADWAY
OAKLAND, CA
U.S.A. 94618
(415) 658-6719
(415) FAX 652-4441

20 October 1989

Mr. Brooks Kolb
MPA Design
562 Mission Street
San Francisco, CA 94105

Subject: Aquatic Park Master Plan:
Noise Analysis

Dear Mr. Kolb:

As you requested, we have made an analysis of the effectiveness of a berm with low wall in reducing noise from Highway I-80 traffic at Aquatic Park.

The noise level calculations were made using the FHWA Stamina 2.0 computer program, the latest version of the highway traffic noise prediction program which includes provisions for assessing the effects of terrain and sound barriers. The traffic volume statistics were obtained from CalTrans documents and the distribution of vehicle types from the report by Matthew Williams.

The details of the layout of Aquatic Park and the elevations were taken from the drawings received from you on 29 September 1989. The details of the proposed berm and wall for noise barrier were as discussed with the large scale architectural drawings reviewed during our meeting of 28 September 1989.

Basically, the design analyzed consists of a continuous earth berm along the west edge of the Park, directly adjacent to the west property line. The berm height, determined by the narrowest section of land between the property line and water, is 6 ft above the freeway. The top of the berm includes a 12 ft width roadway for emergency vehicles and walking. To maximize the noise reduction without blocking the view to the west for people walking on the berm, our recommendation was to add a 4 ft height masonry wall or fence to the west side of the berm. This makes the overall height of the sound barrier 10 ft above the freeway and 17 ft above the Park water level. This results in an effective sound barrier, as is borne out by the results of the noise level calculations.

In carrying out the analysis of the noise to be expected in Aquatic Park with the proposed barrier, the calculations were done at four selected locations on the east side of the Park, as indicated on Figures 1A and 1B. The noise calculations were done for four different conditions:

1. With no barrier or berm, as for the present, with grade level at the east side of the Park assumed to be the same as the freeway and sloping down to the water

2. With a continuous barrier as proposed, 10 ft total height above the freeway elevation, extending from the south end to the north end of Aquatic Park

3. With one 300 ft length gap in the proposed barrier for viewing the Park from the highway, with the gap located opposite Receiver Location #3 and,

4. With two 300 ft length gaps for viewing from the highway, as shown by Figures 1A and 1B.

In addition to the calculations using the combination earth berm and relatively low wall as the sound barrier, an estimate of the noise reduction for a standard CalTrans type of vertical masonry barrier only was done, i.e., without the use of a landscape berm as part of the sound barrier construction.

The overall results of the calculations of the expected noise levels are given in Table I. The numerical values indicated are the equivalent sound levels, L_{eq}, based on the peak hour traffic flow rates and are representative of the noise exposure level for the daytime hours at the Park.

As is evident from the figures on Table I, the continuous berm barrier will provide 7 to 8 dBA reduction of the noise exposure level at the activity areas of the Park on the east side of the water. With a single 300 ft length gap in the barrier, the overall noise reduction at the east side is reduced by 2 dBA in the area directly opposite the gap and has smaller effect, 1 dBA or less at receivers somewhat distant from the gap, i.e., beyond about 500 ft radius. Similarly, with two gaps only the receiver locations directly opposite the gaps are significantly affected.

To graphically indicate the comparison of the results with the continuous berm barrier and with the gaps in place, Figure 2 presents a bar chart showing the precise calculated levels for the equivalent noise exposure level for the four receiver locations. Note on the bar chart that at locations distant from the gaps there is little effect, whereas at intermediate distances and near the gaps, the effectiveness of the barrier is reduced by the sound transmitted through the gap.

The overall conclusions from this study are:

1. A combination berm and low barrier wall along the west side of Aquatic Park, with overall height not less than 10 ft above the I-80 roadway surface, is an effective means for reducing noise exposure in the Park - providing 7 to 8 dBA reduction of the equivalent noise level.

2. Small gaps in the barrier for viewing the Park from the highway would probably not have a significant effect on the noise exposure level within the Park. However, gaps of sufficient length to provide for significant view from the roadway do diminish the noise reduction at locations directly east of each gap by about 2 dBA, diminishing to about 1 dBA along a radius of approximately 500 ft from the gap.

3. The use of a CalTrans vertical masonry wall type barrier would be approximately 2 to 3 dBA less effective in reducing noise than the landscape berm type of barrier and, therefore, would be less effective in improving the overall noise environment of the Park than the landscape berm type of barrier.

Our recommendation as a result of this study is the use of a barrier which consists of a combination of the flat topped landscape berm with a low barrier wall on the west side of the berm. The wall should not be less than 4 ft height to give an overall barrier height of 10 ft above the I-80 roadway surface. Further, this barrier should be continuous from the south to the north end of the Park, with as much wrap around at each end as can reasonably be accommodated within the limitations of the terrain.

Very truly yours,

WILSON, IHRIG & ASSOCIATES, INC.

George Paul Wilson

George Paul Wilson, Ph.D.

encls

GPW:bdm

TABLE I ESTIMATED EQUIVALENT PEAK HOUR SOUND LEVELS ALONG EAST SIDE OF AQUATIC PARK WITH A SOUND BARRIER OF 10 FT HEIGHT ABOVE THE I-80 PAVEMENT

Receiver Location	Peak Hour L_{eq} - dBA				
	No Barrier	Continuous CalTrans Barrier	Continuous Berm Barrier	Berm Barrier w/1-Gap	Berm Barrier w/2-Gaps
1	70	65	63	63	63
2	70	65	62	63	63
3	70	65	62	65	65
4	72	67	64	64	64

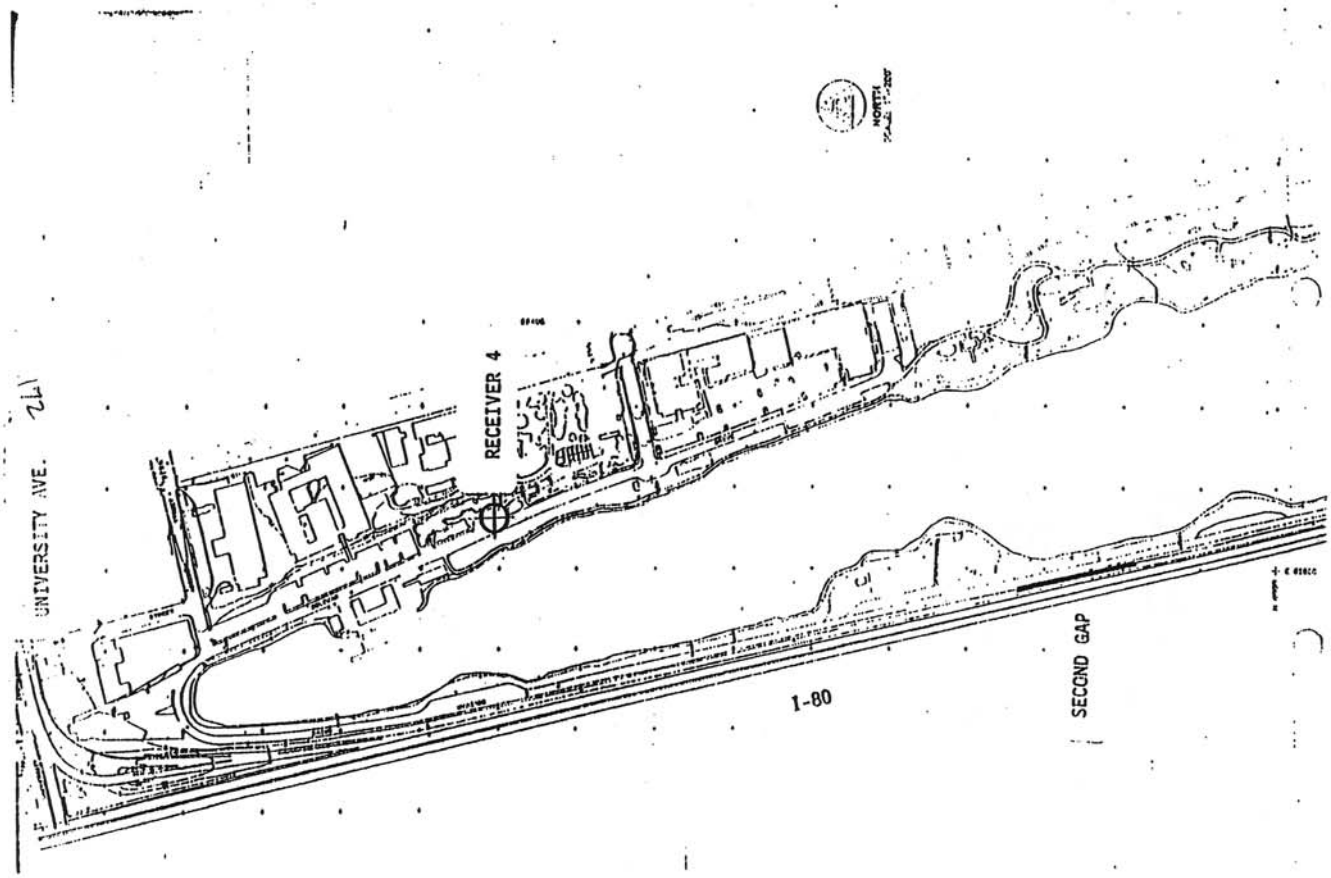


FIGURE 1A PLAN VIEW OF AQUATIC PARK SHOWING LOCATIONS FOR RECEIVERS AND BARRIER GAPS USED FOR NOISE LEVEL CALCULATIONS

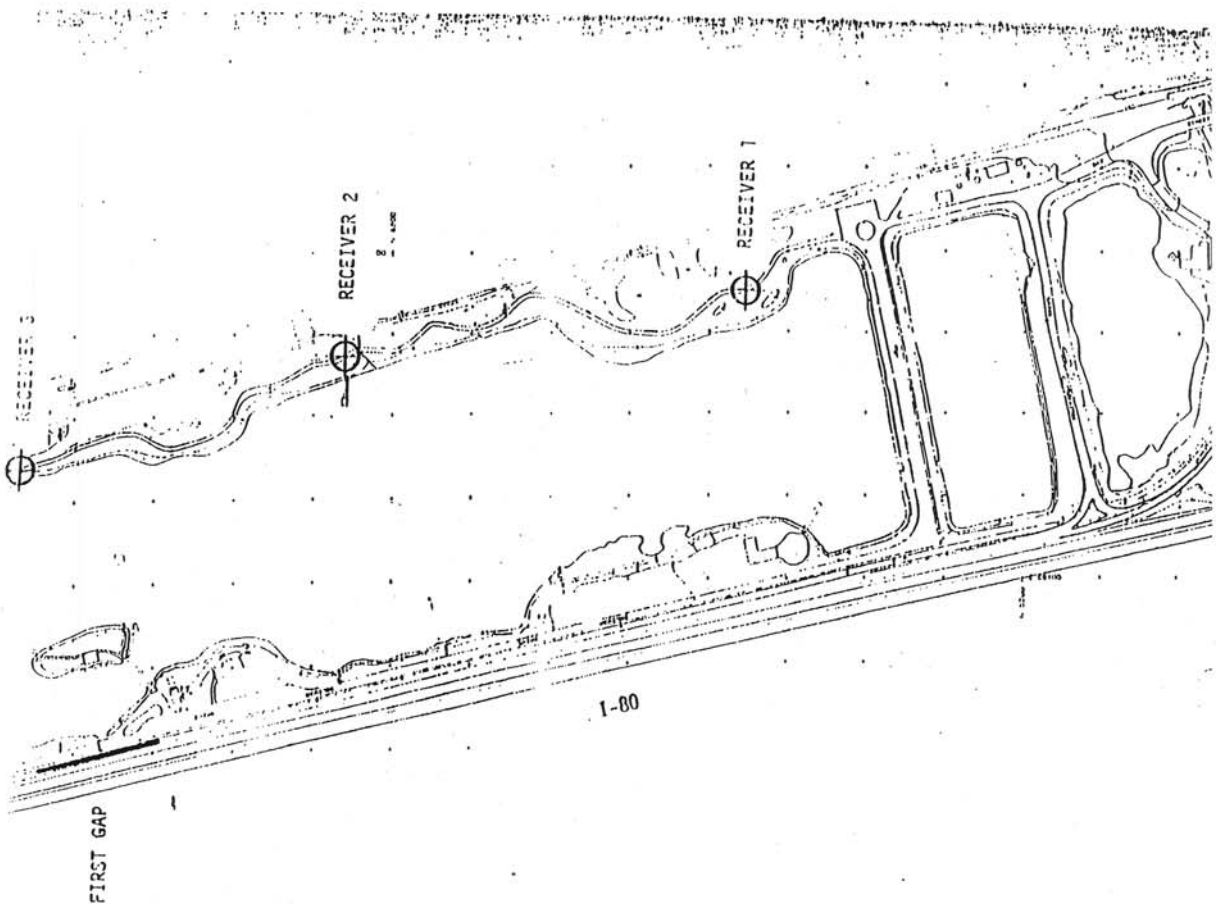


FIGURE 1B PLAN VIEW OF AQUATIC PARK SHOWING LOCATIONS FOR RECEIVERS AND BARRIER GAPS USED FOR NOISE LEVEL CALCULATIONS

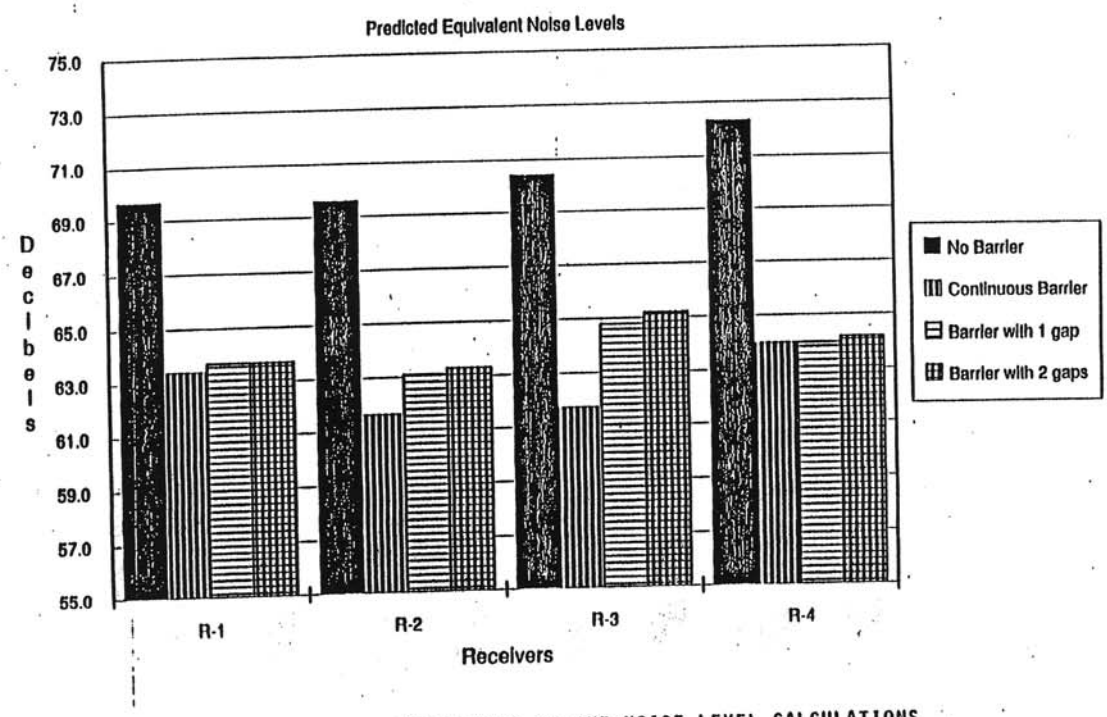


FIGURE 2 BAR CHART SHOWING THE RESULTS OF THE NOISE LEVEL CALCULATIONS FOR THE LANDSCAPED BERM AND WALL TYPE BARRIER.