SHORELINE ENHANCEMENT PLAN

SAN RAFAEL, CALIFORNIA

August 1991

Prepared for:
City of San Rafael
1400 Fifth Avenue
San Rafael, California 94915

Prepared by:
MPA Design, Planners and Landscape Architects, San Francisco, CA
Philip Williams & Associates, Ltd., Hydrology Consultants,
San Francisco, CA
WESCO, Ecological Consultants, Novato, CA

SOUTH POND PLAN IMPLEMENTATION COST ESTIMATE
Shoreline Enhancement Plan
San Rafael, California

Item	Quantity	Unit	Unit Cost	Total Cost
Demolition/Site Preparation Inc. removing concrete drainage box, enhance rip-rap	57,500	sf	Allow	$ 11,500.00
Landscape Earthwork Import soil and grading	350	cyd	Allow	12,000.00
Landscape Construction				
A. Asphalt Paving	9,100	sf	2.25	20,475.00
B. Crushed Stone Jogging Path	1,680	sf	3.00	5,040.00
C. Crushed Stone Paving	2,159	sf	3.00	6,477.00
D. Stone Steps	15	lf	25.00	375.00
E. Redwood Benches	8	ea	700.00	5,600.00
F. Park Sign	1	ea	Allow	5,000.00
G. Entry Gate	1	ea	4,500.00	4,500.00
H. Post and Cable Fence	35	lf	Allow	400.00
I. 4' High Black Vinyl Clad Chain Link Fence and Service Gate	615	lf	15.00	9,225.00
J. Pump Station Architectural Modifications			Allow	12,000.00
K. Strengthening of Existing Wood Bypass Structure			Allow	1,000.00
Planting & Irrigation				
A. Fine Grading	46,633	sf	.12	5,596.00
B. Trees - 15 gal.	63	ea	125.00	7,875.00
C. Shrubs - 5 gal.	196	ea	28.00	5,488.00
D. Groundcover - 1 gal.	287	ea	5.50	1,578.00
E. Hydroseed	13,400	sf	.22	2,948.00
F. Irrigation	33,300	sf	1.00	33,300.00
G. Mulch	33,300	sf	.12	3,996.00
H. Water Edge Planting	12,600	sf	Allow	4,500.00
Two Year Maintenance Period	46,700	sf	.35	16,345.00
Subtotal				$175,218.00
15% Design Contingency and Contractor Overhead and Profit				26,282.00
Grand Total				**$201,500.00**

Notes:

1. All levee and flapgate improvements will be a part of a drainage assessment district and are not included in this estimate.

2. All costs are in 1991 dollars.

3. Cost estimate exclusive of water meter hook-up.

BAYVIEW MARSH PLAN IMPLEMENTATION COST ESTIMATE
Shoreline Enhancement Plan
San Rafael, California

Item	Quantity	Unit	Unit Cost	Total Cost
Demolition/Site Preparation Inc. weed removal, pre-emergent application, asphalt removal, clean-up of the site	164,880	sf	Allow	$15,000.00
Landscape Construction				
A. Asphalt Paving	300	sf	2.25	675.00
B. Crushed Stone Path	2,715	sf	3.00	8,145.00
C. Crushed Stone Paving	1,488	sf	3.00	4,464.00
D. Redwood Benches	9	ea	700.00	6,300.00
E. Park Sign	2	ea	5,000.00	10,000.00
F. Entry Gate	1	ea	Allow	4,500.00
G. Vinyl Clad Chain Link Fence	960	lf	14.00	13,400.00
H. Post and Cable Fence	1,320	lf	5.00	6,600.00
Planting & Irrigation				
A. Trees - 15 gal.	151	ea	125.00	18,875.00
B. Shrubs - 5 gal.	305	ea	28.00	8,540.00
C. Groundcover - 1 gal.	517	ea	5.50	2,843.00
D. Hydroseed	64,711	sf	.20	12,942.00
E. Irrigation	95,666	sf	1.00	95,666.00
F. Mulch	160,377	sf	.12	19,245.00
Two Year Maintenance Period	95,666	sf	.35	33,483.00
Subtotal				$260,718.00
15% Design Contingency and Contractor Overhead and Profit				39,102.00
Grand Total				**$299,820.00**

Notes:

1. All costs are in 1991 dollars.

2. Cost estimate exclusive of water meter hook-up.

MMWD POND PLAN IMPLEMENTATION COST ESTIMATE
Shoreline Enhancement Plan
San Rafael, California

Item	Quantity	Unit	Unit Cost	Total Cost
Demolition/Site Preparation Weed removal, pre-emergent application, clean-up of site	82,257	sf	Allow	$ 7,400.00
Landscape Construction				
A. Asphalt Paving-Pedestrian	5,338	sf	2.25	12,011.00
B. Crushed Stone Path	3,900	sf	3.00	11,700.00
C. Crushed Stone Paving	300	sf	3.00	900.00
D. Post & Cable Fence	930	lf	5.00	4,650.00
E. Benches	6	ea	700.00	4,200.00
F. Park Sign	1	ea	Allow	5,000.00
G. Entry Gate	1	ea	Allow	4,500.00
H. Vinyl Clad Chain Link Fence	1,330	lf	14.00	18,620.00
Planting & Irrigation				
A. Trees - 15. gal.	115	ea	125.00	14,375.00
B. Shrubs - 5 gal.	372	ea	28.00	10,416.00
C. Shrubs/Groundcover-1 gal.	246	ea	5.50	1,353.00
D. Hydroseed	43,813	sf	.20	8,763.00
E. Irrigation	32,182	sf	1.00	32,182.00
F. Mulch	75,995	sf	.12	9,119.00
Two Year Maintenance Period	47,650	sf	.35	16,677.00
Subtotal				$161,866.00
15% Design Contingency and Contractor Overhead and Profit				24,280.00
Grand Total				**$186,146.00**

Notes:

1. All costs are in 1991 dollars.
2. Potential water control structure costs are not included in this estimate.
3. Additional required rubble facing to levee is not a City responsibility and not included in this estimate.
4. Cost estimate exclusive of water meter hook-up.

SHORELINE INDUSTRIAL PARK "GREEN" PLAN IMPLEMENTATION COST ESTIMATE
Shoreline Enhancement Plan
San Rafael, California

Item	Quantity	Unit	Unit Cost	Total Cost
Demolition/Site Preparation Weed removal, pre-emergent application, clean-up of site	131,607	sf	$ Allow	$ 11,900.00
Landscape Earthwork Import Soil and Grading	7,000	cyd	Allow	40,000.00
Landscape Construction				
A. Asphalt Paving	14,760	sf	2.25	33,210.00
B. Asphalt Paving-Vehicular	8,961	sf	3.50	31,364.00
C. Crushed Stone Path	3,300	sf	3.00	9,900.00
D. Crushed Stone Paving	2,245	sf	3.00	6,735.00
E. Picnic Tables	8	ea	1,400.00	11,200.00
F. Barbecues	8	ea	200.00	1,600.00
G. Benches	15	ea	700.00	10,500.00
H. Trash Receptacles	5	ea	300.00	1,500.00
I. Park Sign	1		Allow	5,000.00
J. Concrete Curb-Parking Lot	706	sf	9.50	6,707.00
K. Concrete Curb-Sand Area	105	lf	25.00	2,625.00
L. Sand	100	cyd		5,000.00
M. Play Structure	1		Allow	25,000.00
N. Restroom/Telephone	1		Allow	125,000.00
O. Entry Gate	1		Allow	4,500.00
Planting & Irrigation				
A. Trees - 15 gal.	90	ea	125.00	11,250.00
B. Shrubs - 5 gal.	354	ea	28.00	9,912.00
C. Groundcover - 1 gal.	260	ea	5.50	1,430.00
D. Turf-Hydroseed	36,158	sf	.22	7,955.00
E. Irrigation	93,860	sf	.80	75,088.00
F. Mulch	57,700	sf	.12	6,925.00
Two Year Maintenance Period	74,734	sf	.35	26,157.00
Subtotal				$470,458.00
15% Design Contingency and Contractor Overhead and Profit				$70,568.00
Grand Total				**$541,026.00**

Notes:

1. All costs are in 1991 dollars.

2. Cost estimate exclusive of water meter hook-up.

PLAN IMPLEMENTATION COST ESTIMATE SUMMARY

South Pond	$201,500.00
Bayview Marsh	299,820.00
MMWD Pond	186,146.00
Shoreline Industrial Park Green	541,026.00
TOTAL	**$1,228,492.00**

All costs are in 1991 dollars.

ORDER OF MAGNITUDE COST ESTIMATE FOR PROPOSED HYDROLOGIC CONTROL IMPROVEMENT OPTIONS

The following conceptual order of magnitude costs for proposed hydrologic control improvement options are presented for reference. Further engineering and evaluation of important hydrologic issues not addressed in The Enhancement Plan are required in order to properly select options, size and place water control structures, and provide hydraulic and hydrologic information necessary for a successful Enhancement Plan. (See Hydrologic Appendix, Section VI.)

South Pond

Replacement of present flap gate with slide flap gate	$20,000-27,000
Replacement of culvert connecting South Pond to Bay	$30,000-45,000
South Pond Levee Improvements (under separate City contract)	

Bayview Marsh

No proposed changes.

MMWD Pond

Tidal Marsh Option

New culvert construction between MMWD Pond and Bay	$35,000-45,000
and/or replace existing culvert between Bayview Marsh and MMWD Pond	$25,000-35,000

Brackish Pond Option

Manually operated hydraulic connection to Bay	$30,000-40,000

Freshwater Pond Option

Connection to CMSA reclaimed water line (See Reclaimed Water Project Appendix) (Exclusive of Water Meter)	$3,000-7,000

Levee Improvements

Responsibility of Shoreline Industrial Park

7. CONSTRUCTION DOCUMENTATION COST ESTIMATE

Estimation of professional construction documentation services for the *Shoreline Enhancement Plan* are presented below. Fees are based on construction estimation costs from Section 7 of this report. Fees are presented separately for each of the four project parcels and considered as four independently bid projects. Some savings would be achieved by consolidating projects into fewer bid document packages. All sub-consultant fees are included.

Construction documentation services would include the following items for each project:

1. Working Drawings
    a. Site Preparation or Demolition Plan
    b. Dimension Plan - to establish horizontal control for the following:
        i. Roads
        ii. Parking areas
        iii. Paths, walks, steps, ramps
        iv. Recreation facilities
        v. Site furniture
    c. Grading Plan - establish finished grades for all planting and paving areas.
        i. Subsurface landscape drainage
    d. Construction Details - including fences, benches, structures, for all elements of design.
    e. Planting Plan and Details
    f. Irrigation Plan and Details
    g. Electrical Engineering
        i. Site lighting electrical plans and details as needed.
        ii. Electrical supply to irrigation controller.
    h. Structural Engineering
        i. Analysis and calculations of structures designed by the Landscape Architect.

i. Architectural

i. Design of public restroom building

j. Civil Engineer

i. Review of grading by Landscape Architect

ii. Landscape storm drainage system

iii. Analysis of fill impact near Shoreline Industrial Park landfill and adjacent levee.

2. Specifications: Technical sections for work designed by the Consultant. Necessary bidding information, General Conditions of the Contract provided by City.

3. Preparation of estimate of probable construction cost.

4. Meetings required to complete the project.

The Construction Documentation scope does not include Construction Administration services such as construction inspector fees, plant material quality review, irrigation pressure testing review, and project punch listing and approval. Direct project costs such as printing, reproduction and delivery are not included in the Construction Documentation Estimate.

It is recommended that the preparation of maintenance specifications be considered to facilitate bidding and contracting of maintenance services.

Recommended project information furnished by the City to Consultant prior to commencing work on Construction Documentation:

A. An up-to-date topographic survey of the existing sites.

B. Applicable architectural or engineering drawings and specifications for levee work or structures under separate contract but related to the project.

C. As-built planting and irrigation drawings of Bayview Marsh.

Construction Documentation Estimate

South Pond	$ 9,420
Bayview Marsh	$13,860
MMWD Pond	$19,970
Shoreline Industrial Park "Green"	$10,610
Total	$53,860

8. MAINTENANCE AND MONITORING PROGRAMS

Maintenance and monitoring programs which benefit the establishment and longevity of the *Shoreline Enhancement Plan* landscape are critical toward achieving the habitat objectives (Chapter Two) of the intended design. The commitment of material and manpower resources to maintain a roughly $1.2 million dollar shoreline investment is no small endeavor. An understanding of the required maintenance and monitoring programs and costs which will promote successful habitat and landscape areas, must be considered in conjunction with the efforts to make the Shoreline Enhancement Plan a reality.

The *Shoreline Enhancement Plan* has been designed with maintenance practices and costs in mind. From generalized site-wide concepts such as irrigation, planting, and mulching techniques; to more detailed considerations such as mower widths and maintenance truck accessibility requirements, habitat and landscape areas which function as naturally as possible with a conservation of resources have been sought.

The maintenance and monitoring programs for the *Shoreline Enhancement Plan* incrementally change over time. By virtue of the emphasis upon native and indigenous plantings, naturalized habitats, and low intensity uses, as the landscape establishes, the intensity level of manpower and resources required to maintain it will diminish. Major maintenance costs anticipated in the establishment of the landscape during the first two years after construction are estimated in the two-year maintenance period as a part of the Construction Budget in Chapter 6. The following third to fifth years after construction will gradually decrease in required maintenance intensity with an eventual consistent level of maintenance established from the sixth year on, assuming relatively consistent environmental conditions. For the purpose of estimating a baseline maintenance and monitoring program, this chapter is developed for the third through fifth years after initial construction.

The following program has been developed for the *Shoreline Enhancement Plan* habitat and landscape with input and assistance from the San Rafael Parks Department.

Scope of Work

The maintenance and monitoring programs include all labor, materials and equipment necessary to provide complete and continuous maintenance of the Shoreline Enhancement Plan landscape and habitat areas.

Workforce and Performance

All personnel shall be under the supervision of experienced supervisors and work in accordance with standard horticultural practices accepted by the industry. It is assumed that some labor will be utilized from the Marin Conservation Corps and community volunteer groups. The appearance and health of the landscape as well as the quality of the habitats shall be considered

over the methods and procedures of maintenance. All work will be performed with the utmost concern for the safety of workers, the public, and the sensitive nature of the shoreline environment.

Irrigation

All irrigation systems shall be inspected regularly for damage or malfunction. Programming of systems should be for night and early morning which coincides with lower wind levels and park usage by visitors. Programs should be reviewed throughout the year to compensate for seasonal and climatic changes. At least 4 seasonal changes in the programs should be made per year: Spring, Summer, Winter, Fall. The runoff of water across walks and roads and excessive runoff in landscape areas should be prevented. Watering should be deep and slow to establish moisture to the depth of the root zone without waterlogged soil conditions. Lawns should be deep watered by repeat cycle irrigation with enough water to wet the soil to the depth of the root system.

Weed Control

Conventional weed control practices typically performed in most parks are not recommended for the Shoreline Park areas. Weed control should be selective with emphasis on removal and eradication of only invasive weedy species which compromise habitat value. Native and indigenous species of habitat value for both cover and food supply should be allowed to grow. A weed-free park environment is not conducive to the habitat objectives of the park. Groundcover and shrub areas should reflect natural species typically found and flourishing in similar locations. Invasive weedy species such as Fennel, Pampas Grass and Scotch Broom should be removed in order not to compromise valuable habitat vegetation. Weeding should be done manually or by the use of selective herbicides when absolutely necessary. Mulching with a minimum of 2" deep bark mulch will assist in weed control in public use areas.

Pruning

Pruning should be done by qualified personnel and consist of thinning and shaping to achieve a natural appearance. Excessive pruning or "stubbing back" should not occur. All pruning cuts should be clean and allowed to heal naturally. All cuttings should be removed from the site, chipped as mulch, or placed for habitat value as directed by supervisors. Trees should be pruned to thin heads to lighten windload. Prune evergreens in Fall and early Summer, prune deciduous trees when dormant. Prune plants in close proximity to walks only enough to allow people and vehicles to move without interference.

Tree Staking

Maintenance procedures include maintaining and replacing stakes and tree ties equal to original installations until plants are capable of standing vertical and free, and able to resist normal high winds. When trees become too large for stakes but will not withstand winds, guy wires should be installed.

Mowing and Trimming

All groundcovers bordering paving and utilities should be taper edged in order to maintain a neat appearance and maintain path widths. Groundcovers should be allowed to grow around and under shrubs. As shrubs expand, groundcovers should not be removed to prevent them from growing beneath shrubs. Lawns should be mowed to a height of 2 1/2 inches when they reach a height of 3 1/2 inches any time of the year. Lawns should be mowed a minimum of every seven days during the months of March through October. Grass should be kept from overgrowing sprinkler heads. Damage to tree trunks with mowers or "weed-whips" should be avoided.

Fertilizing

Fertilizers should be applied only in landscaped areas which do not run off into ponds or marshes in order to keep lawns, groundcovers, trees, shrubs and vines in a healthy, vigorous, growing condition. Those areas should be fertilized via broadcast dry fertilizers. Slow release fertilizers should be used once in early spring and once in late spring. Supplemental fertilizing may be considered. Lawns should be fertilized with 3-4 lbs. actual nitrogen/1,000 SF/YR, March 1, April 15, September 1, October 15. Habitat plantings around ponds and marshes will not be fertilized.

Insect, Pest and Disease Control

Chemical controls are to be employed only if absolutely necessary as a last resort, and after accurate identification of the problem. Habitat areas should receive spot control only. Insects and diseases should be controlled by the use of state approved insecticides and fungicides. Spraying should be done only by qualified, trained personnel. In no case shall extremely toxic materials such as parathion, TEPP, or dieldrin, etc., be permitted.

Hydrologic Structures

Hydrologic structures are to be maintained in working condition and operated in accordance with hydrologic criteria for each pond and marsh.

General Maintenance

All trimmings, cuttings, trash, and debris should be removed daily from the site. Trash cans are to be situated where demand is greatest. Restrooms, play area sand pit, barbecues and trash cans, should be inspected and maintained daily, or as necessary. Asphalt paths should be blown clean weekly. Crushed stone paths and seating areas should be raked and filled as needed to provide even and clean surfaces. Any minor erosion should be repaired. Maintain 2" depth of bark mulch in planting areas at all times to provide a uniform layer which retains soil moisture and inhibits weed growth. Trimmings and cuttings should be chipped and applied as mulch whenever possible.

Maintenance and Monitoring Costs

The following annual maintenance and monitoring costs are anticipated for the *Shoreline Enhancement Plan.* These costs are in addition to current Parks and Recreation Department budget and resources. Annual equipment and materials costs are amortized over five years. This estimate is based on 1991 City staff and Marin Conservation Corps labor rates.

Area	Labor Cost	Equipment and Materials Cost
South Pond	$10,000	$2,000
Bayview Marsh	17,000	3,000
MMWD Pond	8,000	1,600
Shoreline "Green"	25,000	6,000
Sub-total	$60,000	$12,600 divided by 5 years
TOTAL ANNUAL COSTS	**$60,000**	**$2,520**

9. FINAL ENHANCEMENT PLAN

10. CEQA DOCUMENTATION - INITIAL STUDY

INITIAL STUDY FOR THE PROPOSED SAN RAFAEL SHORELINE ENHANCEMENT PLAN

Prepared for:

MPA Design, Planners and Landscape Architects
562 Mission Street
San Francisco, CA 94105

and

City of San Rafael Planning Department
P.O. Box 60
San Rafael, CA 94915

Prepared by:

Western Ecological Services Company, Inc. (WESCO)
384 Bel Marin Keys Boulevard, Suite B
Novato, CA 94949
(415) 883-6425

July 1991
MPA 9101

PREFACE

This Initial Study has been prepared by Western Ecological Services Company, Inc. (WESCO) for the City of San Rafael under contract to MPA Design, Planners and Landscape Architects of San Francisco. The purpose of this report is to identify and evaluate the potential environmental impacts of the implementation of the San Rafael Shoreline Enhancement Plan. This Initial Study has been prepared in accordance with the California Environmental Quality Act (CEQA), State guidelines, and the guidelines and policies of the City of San Rafael.

This document has been assembled from a variety of sources, including published and unpublished literature, background studies pertinent to the project, and site visits. With the intent of CEQA in mind, the authors have compiled a document which emphasizes feasible mitigation measures. Unless otherwise noted, all background documents used in the preparation of this report are available for inspection at the offices of MPA Design, WESCO, or the City of San Rafael.

TABLE OF CONTENTS

LIST OF FIGURES

I. INTRODUCTION

This Initial Study has been prepared for the City of San Rafael and MPA Design in accordance with the California Environmental Quality Act (CEQA) of 1970, as amended. The subject of the Initial Study is the implementation of the San Rafael Shoreline Enhancement Plan in San Rafael, California. The purpose of the CEQA review process is to evaluate the proposed project for significant environmental effects. This review includes the following:

1. Informing governmental decision-makers and the public about any potential and significant environmental effects of proposed activities.

2. Identifying ways that the environmental damage can be avoided or significantly reduced.

3. Preventing significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.

4. Disclosing to the public the reasons a governmental agency approved the project despite significant environmental effects resulting from the project.

The guidelines for implementing CEQA encourage Lead Agencies to prepare an Initial Study to determine if a proposed project could have a significant effect on the environment. If significant impacts are anticipated, an EIR would be required. In such a case, the Initial Study can be used to determine the environmental issues on which the EIR should focus. If the Initial Study determines that the potential impacts can be adequately mitigated to an insignificant level, these can be incorporated into a Negative Declaration and would eliminate the need for an EIR. CEQA provides for the Negative Declaration process to minimize costs, time delays, and unnecessarily bulky documents, while ensuring that the intent of CEQA is fulfilled. Lead agencies are free to design their own Initial Study formats, usually in the form of a checklist with supporting commentary.

The Initial Study is based on a checklist form with potential impacts categorized by the technical area. Each item on the checklist is answered with a "yes," "no," or "maybe" response, representing the likelihood and degree of potential impact due to the proposed project. Corresponding to each checklist item are comments explaining the determination of level of impact. The depth of discussion provided for each item corresponds to the degree of the potential anticipated impact, and/or the amount of information necessary to determine the significance of the impact.

A "yes" response to any item indicates that a significant impact could occur with or without mitigation. A "no" response indicates that the proposed project, not including additional mitigation, is judged to have no significant impact. A "maybe" response indicates one or more of the following: (a) there is some potential for significant impact, but additional studies are required; (b) the environmental parameters being considered are difficult to assess, and further studies are required; or (c) a potential for significant impact exists with the project as proposed, but can be reduced to an insignificant level with additional mitigation measures.

II. PROJECT DESCRIPTION

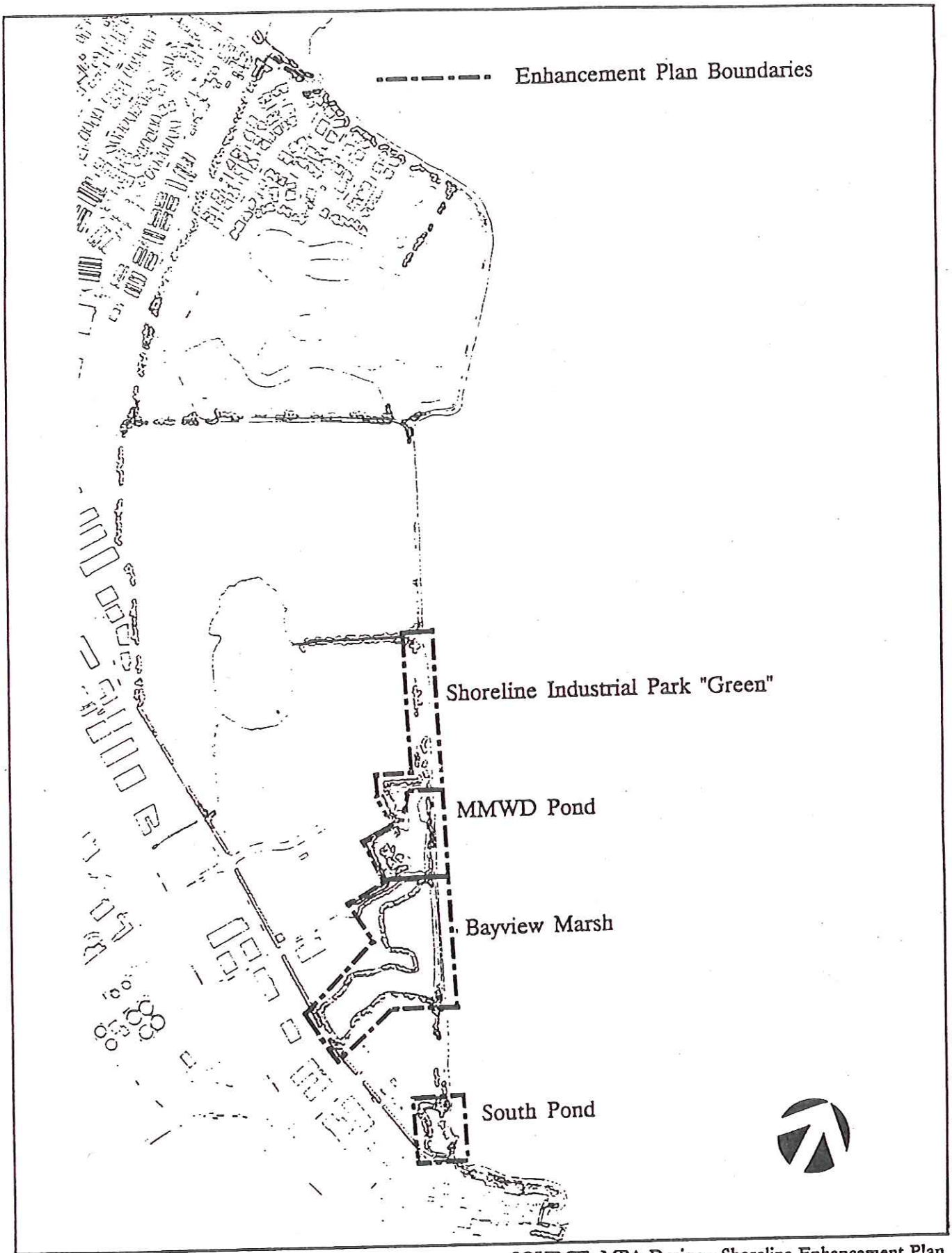
The San Rafael Shoreline Park Master Plan was approved by the City of San Rafael in 1989, based on an Initial Study and Negative Declaration on the Master Plan. The Enhancement Plan was commissioned by the City and involves development of open space, habitat enhancement, and increased recreational and public access opportunities. The site consists of 2.3 miles of public and private shoreline property directly adjacent to San Francisco Bay in San Rafael, California (see Figures 1 and 2).

The Shoreline Enhancement Plan specifically focuses on four City-owned parcels within the Master Plan area and provides detailed design specifications for those areas. The four parcels comprise approximately 21.2 acres, including three wetland areas (South Pond, Bayview Marsh and MMWD Pond) and a one hundred foot wide area between the Bay and the Shoreline Industrial Park, known as Shoreline Industrial Park Green. The Industrial Park Green is adjacent to the former San Quentin landfill. Based on hydrologic studies conducted by Philip Williams & Associates (PWA), the Plan includes an assessment and makes recommendations for enhancing the wetland areas. The Enhancement Plan area features levees constructed of imported fill materials with an existing asphalt path along some parcels of the property. An objective of the Plan is to provide consistently designed enhancement of both public and privately owned shoreline properties.

The Enhancement Plan includes a hydrologic analysis of the wetland areas and recommendations are made for controlling and maintaining water quality standards in the South and MMWD Ponds, and the Bayview Marsh. It would be the responsibility of the City of San Rafael to determine the timing and appropriateness of the recommendations made in the hydrologic analysis.

The following features of the Enhancement Plan apply to all four parcels, with elements of the Plan specific to each parcel following this discussion. The Enhancement Plan proposes to:

- add or continue a three foot wide crushed stone jogging path along the 2.3 mile length of the Shoreline band
- construct an eight foot wide asphalt shoreline path along the top of the levee
- add park benches and rock seating along the path
- provide buffer planting and fencing to screen visual impact of future urban development along the wetland perimeter, and to discourage encroachment onto preserved wildlife habitat areas
- develop meadow areas at the Industrial Park Green
- improve marsh habitat
- construct a parking lot and new restroom facility at the Industrial Park Green site. Limited onstreet parking will also be designated at Pelican Way and Piombo Place.



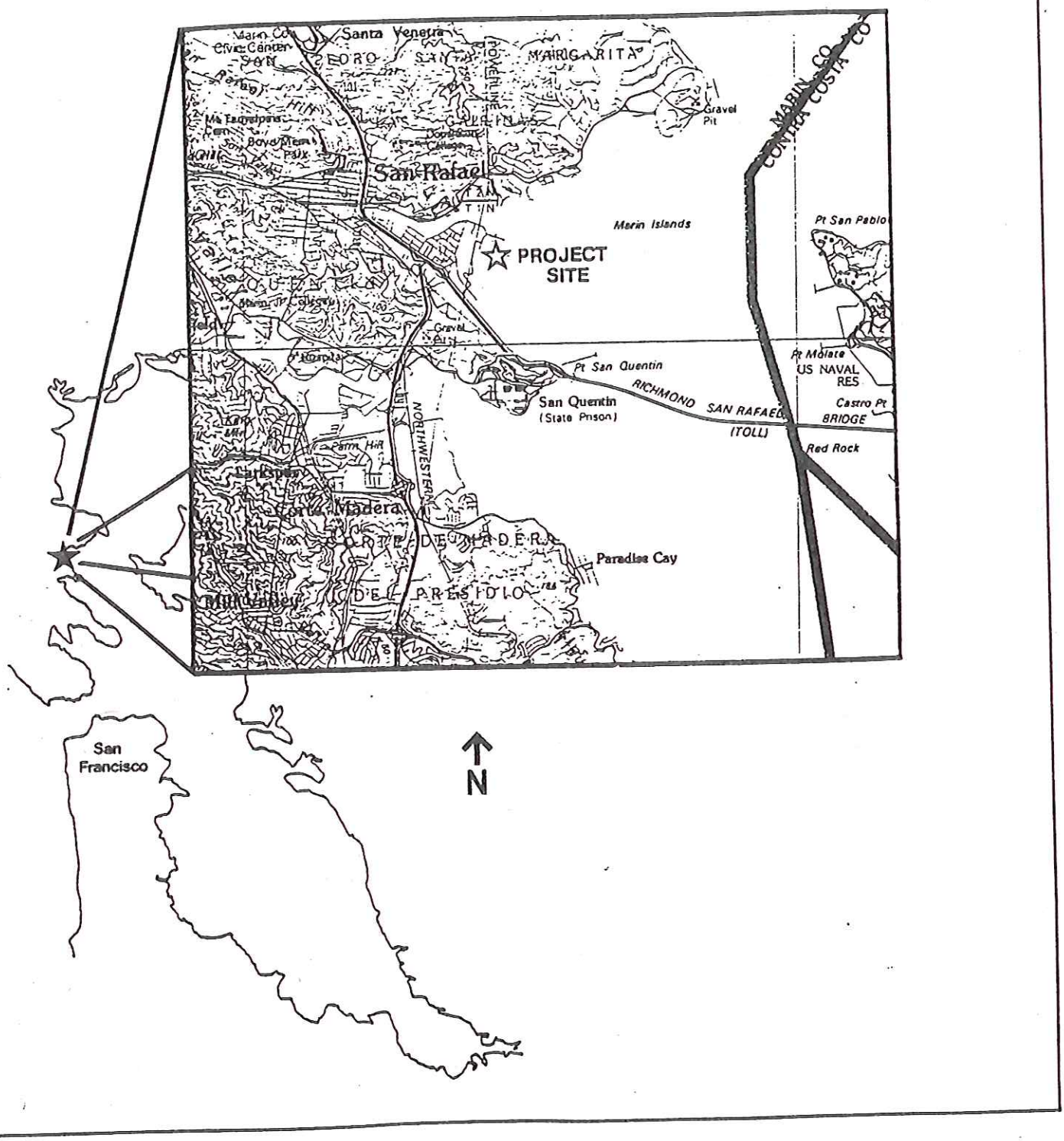
SOURCE: MPA Design - Shoreline Enhancement Plan

FIGURE 1

WESCO

Shoreline
Enhancement Plan

SAN RAFAEL SHORELINE
ENHANCEMENT PLAN AREA



Shoreline
Enhancement Plan

FIGURE 2

REGIONAL MAP

Levee improvements, culvert replacements, and other flood and water quality control measures would occur concurrently or prior to commencement of Plan implementation.

A. SOUTH POND

South Pond is located in the southernmost portion of the Shoreline area and contains a 0.7 acre relatively freshwater pond which receives stormwater runoff during periods of rainfall (see Figure 3). The Pond is separated from the Bay by a levee which is scheduled for improvement by the City Public Works Department subsequent to the environmental review process (Strom, pers. comm.). The Pond was designed for flood control; water is pumped out of the Pond in order to allow drainage from surrounding areas, prevent overtopping and erosion of the levee, and increase the storage capacity. The pumped water is discharged onto the rip rap on the bay side of the levee. During periods of high tides, tidal flow may enter South Pond resulting in elevated salinity levels. Due to the recent drought conditions, runoff has not been sufficient to allow for adequate flushing, resulting in a stagnant appearance and foul odor (PWA 1991). A helipad approach/departure path exists on the western portion of the Pond, with fencing around the perimeter of the wetland area.

The Enhancement Plan would provide for planting of native, drought-resistant vegetation. The site would be fenced and service gates erected for maintenance vehicles. Public access would be provided at Piombo Place and connect via an eight-foot wide asphalt path to the shoreline levee path. Seating and interpretive kiosks would be interspersed along the levee path.

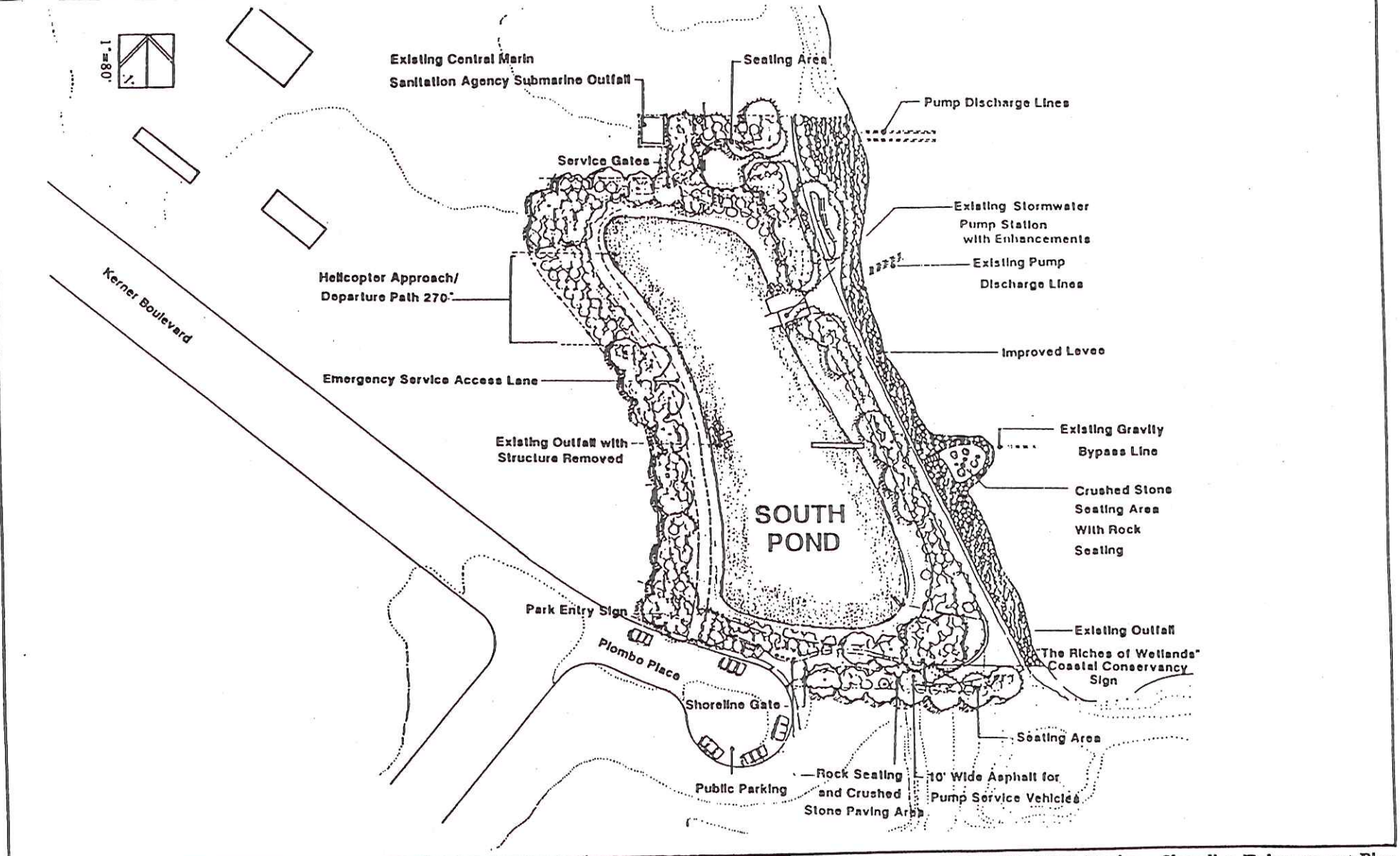
Hydrologic improvements would include creating a seasonal freshwater/brackish pond regime, gate replacement, and culvert repair or replacement. Further hydraulic analysis is recommended to ensure the appropriate elevation and size of culvert connections to the Bay (PWA 1991).

B. BAYVIEW MARSH

Bayview Marsh consists of a 7.4-acre tidal pond fully connected to the Bay (see Figure 4). An asphalt walkway exists on the eastern edge of the parcel along the levee, with public parking provided at the Pelican Way entrance to the north. A study conducted in 1982 indicated hazardous materials had probably been disposed of in the landfill near the Marsh; however, water quality measurements in 1982 and 1987 reported no major concentrations of toxics (PWA 1991).

The Enhancement Plan would maintain the existing asphalt path, add typical marsh plant species and fencing to protect habitat areas, and install a bubbler irrigation system. Seating and interpretive kiosks would be provided along the levee and on the Pelican Way path at the southwest corner of MMWD Pond.

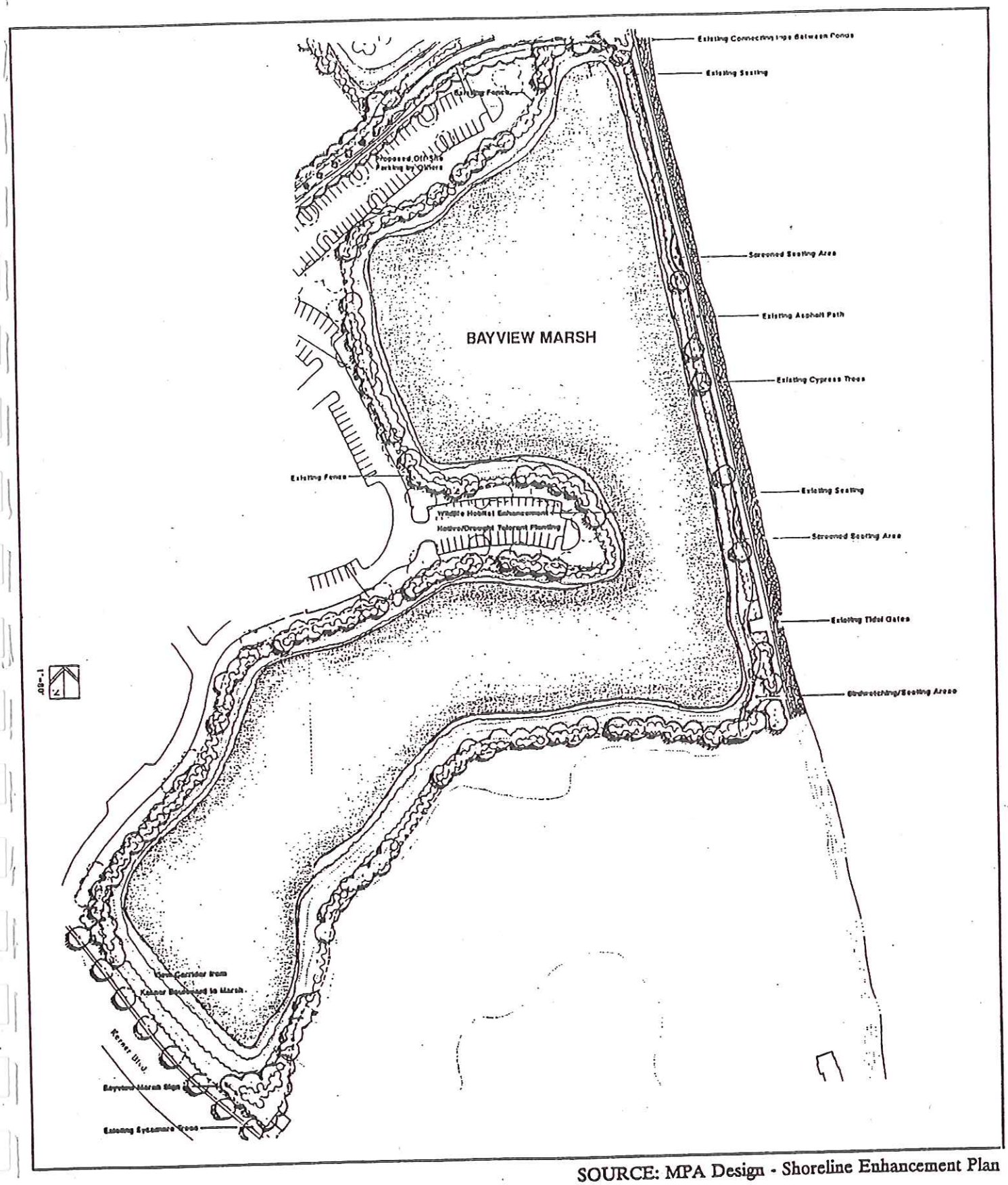
The construction of a barrier between the adjacent storage yard and the marsh is recommended to control the accumulation of sedimentation in the marsh (PWA 1991).



SOURCE: MPA Design - Shoreline Enhancement Plan

FIGURE 3

SOUTH POND CONCEPTUAL PLAN



SOURCE: MPA Design - Shoreline Enhancement Plan

WESCO

Shoreline
Enhancement Plan

FIGURE 4

BAYVIEW MARSH CONCEPTUAL PLAN

B. MMWD POND

MMWD Pond is a 3.3-acre brackish pond with a 0.5-acre island surrounded by a shallow moat (see Figure 5). A levee separates the Pond from the Bay and is in poor condition, allowing seepage of Bay water into the Pond when tidal elevations are higher than the water surface elevation in the Pond (Strom, pers. comm.). The hydrologic studies performed in 1990 indicated that, due to the lack of circulation in the Pond and recent drought conditions, water tends to stagnate, resulting in concentrated salts during the dry season and a foul odor.

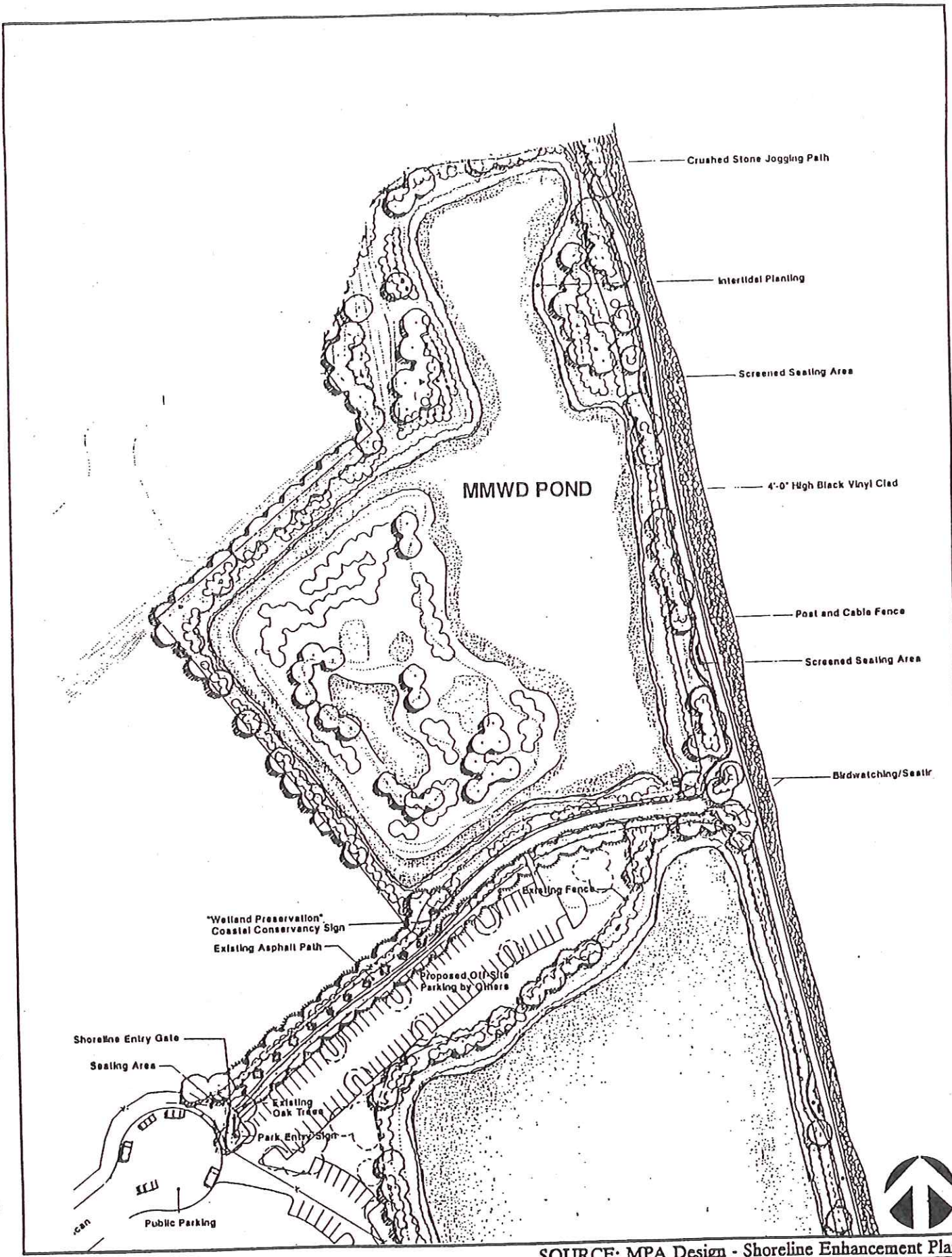
The City has explored three hydrologic enhancement alternatives for the MMWD Pond: 1) creating a tidal marsh; 2) creating a brackish pond; and 3) maintaining a freshwater pond through the use of reclaimed water. Further hydrologic and botanical analyses would be required prior to determining the optimal alternative.

The Enhancement Plan would establish native salt marsh and transition zone vegetation, fencing, gates, and a new access point from the Shoreline Industrial Park.

C. SHORELINE INDUSTRIAL PARK GREEN

The Industrial Park Green consists of 3.85 acres of unimproved land and includes a 100 foot wide BCDC park band dedicated to the City (see Figure 6). It is bordered by the undeveloped Shoreline Industrial Park which is adjacent to the closed San Quentin landfill.

The Enhancement Plan would require the import of soils to support the base and sides of the landfill, which presents no engineering concerns regarding slope or soil stability (Strom, pers. comm.). The Plan also entails the planting of upland habitat species and shrubbery as well as the installation of irrigation systems. Public access would be from the shoreline path from Canalways to the north and the MMWD Pond to the south. A fourteen-car parking lot with a public restroom and telephone would be provided in the southern portion of the parcel north of the MMWD Pond. The open space area in the Industrial Park Green would be the primary recreational area in the Plan.



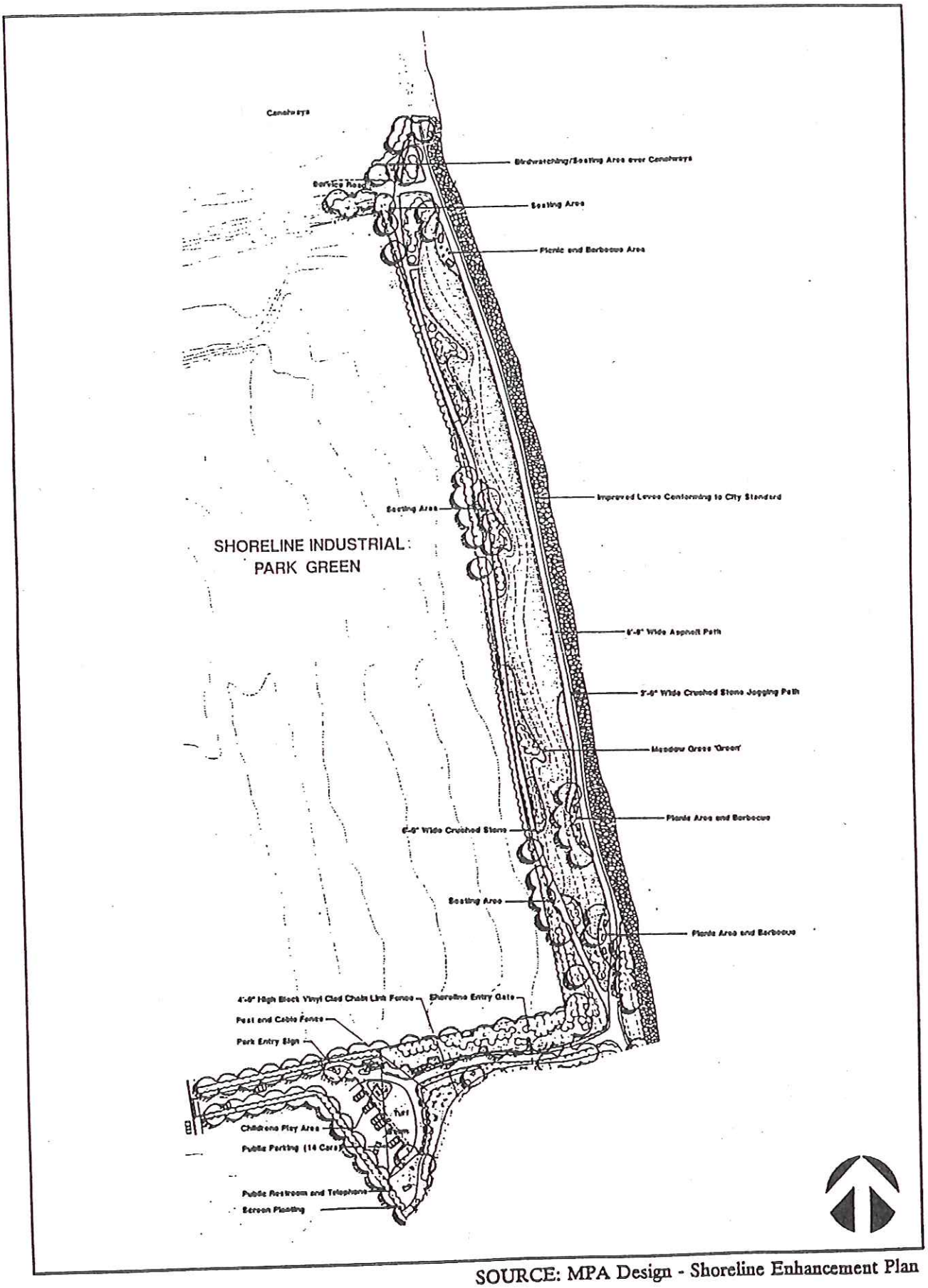
SOURCE: MPA Design - Shoreline Enhancement Plan

FIGURE 5

MMWD POND CONCEPTUAL PLAN

WESCO

Shoreline
Enhancement Plan



SOURCE: MPA Design - Shoreline Enhancement Plan

FIGURE 6

WESCO

Shoreline
Enhancement Plan

SHORELINE INDUSTRIAL
PARK GREEN CONCEPTUAL PLAN

III. PURPOSE AND NEED FOR THE PROJECT

The purpose of the project is to ensure the preservation and enhancement of wildlife habitat, open space, and recreational opportunities in the shoreline area of San Rafael. The City of San Rafael commissioned and approved the San Rafael Shoreline Park Master Plan to accomplish this goal. The Shoreline Master Plan was approved and is in conformance with the City of San Rafael General Plan and zoning policies.

IV. INITIAL STUDY ENVIRONMENTAL EVALUATION CHECKLIST

A. BACKGROUND

1. Name of Proponent: City of San Rafael Planning Department

2. Address and Phone Number of Proponent:

   P.O. Box 60

   San Rafael, CA 94915 (415) 485-3085

3. Date of Checklist Submittal: 07/18/91

4. Agency Requiring Checklist: City of San Rafael Planning Department

5. Name of Proposal (if applicable): San Rafael Shoreline Enhancement Plan

B. ENVIRONMENTAL IMPACTS

(Explanations of all responses are provided on attached sheets).

	YES	MAYBE	NO
1. Earth. Will the proposal result in:			
a. Unstable earth conditions or in changes in geologic substructures?	___	___	X
b. Disruptions, displacements, compaction or overcovering of the soil?	X	___	___
c. Change in topography or ground surface relief features?	X	___	___
d. The destruction, covering or modification of any unique geologic or physical features?	___	___	X
e. Any increase in wind or water erosion of soils, either on or off the site?	___	X	___

	YES	MAYBE	NO
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?	___	___	X
g. Exposure of people or property to geologic hazards such as earthquakes, landslides, mud-slides, ground failure, or similar hazards?	___	___	X
2. Air. Will the proposal result in:			
a. Substantial air emissions or deterioration of ambient air quality?	___	___	X
b. The creation of objectionable odors?	___	___	X
c. Alteration of air movement, moisture or temperature, or any change in climate, either locally or regionally?	___	___	X
3. Water. Will the proposal result in:			
a. Changes in currents, or the course or direction of water movements, in either marine or fresh waters?	___	X	___
b. Changes in absorption rates, drainage patterns, or the rate and amount of surface water runoff?	___	X	___
c. Alterations to the course or flow of flood waters?	___	___	X
d. Change in the amount of surface water in any water body?	___	___	X

	YES	MAYBE	NO
e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?	___	X	___
f. Alteration of the direction or rate of flow of ground waters?	___	___	X
g. Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?	___	___	X
h. Substantial reduction in the amount of water otherwise available for public water supplies?	___	___	X
i. Exposure of people or property to water related hazards such as flooding or tidal waves?	___	___	X
j. Significant changes in temperature, flow, or chemical content of surface thermal springs?	___	___	X
4. Plant Life. Will the proposal result in:			
a. Change in the diversity of species, or number of any species of plants (including trees, shrubs, grass, crops, microflora and aquatic plants)?	X	___	___
b. Reduction of the numbers of any unique, rare or endangered species of plants?	___	___	X
c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?	___	___	X
d. Reduction in acreage of any agricultural crop?	___	___	X

		YES	MAYBE	NO
5.	Animal Life. Will the proposal result in:			
	a. Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms, insects or microfauna)?	X	___	___
	b. Reduction of the numbers of any unique, rare or endangered species of animals?	___	___	X
	c. Introduction of new species of animals into the area, or result in a barrier to the migration or movement of animals?	___	X	___
	d. Deterioration to existing fish or wild-life habitat?	___	___	X
6.	Noise. Will the proposal result in:			
	a. Increases in existing noise levels?	___	X	___
	b. Exposure of people to severe noise levels?	___	___	X
7.	Light and Glare. Will the proposal produce new light or glare?	___	___	X
8.	Land Use. Will the proposal result in a substantial alteration of the present or planned land use of an area?	___	___	X
9.	Natural Resources. Will the proposal result in:			
	a. Increase in the rate of use of any natural resources?	___	___	X
	b. Substantial depletion of any nonrenewable natural resource?	___	___	X

		YES	MAYBE	NO
10.	Risk of Upset. Does the proposal involve:			
	a. A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions?	___	___	X
	b. Possible interference with an emergency response plan or an emergency evacuation plan?	___	___	X
11.	Population. Will the proposal alter the location, distribution, density, or growth rate of the human population of an area?	___	___	X
12.	Housing. Will the proposal affect existing housing, or create a demand for additional housing?	___	___	X
13.	Transportation/Circulation. Will the proposal result in:			
	a. Generation of substantial additional vehicular movement?	___	___	X
	b. Effects on existing parking facilities, or demand for new parking?	X	___	___
	c. Substantial impact upon existing transportation systems?	___	___	X
	d. Alterations to present patterns of circulation or movement of people and/or goods?	___	___	X
	e. Alterations to waterborne, rail or air traffic?	___	___	X
	f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?	___	___	X

		YES	MAYBE	NO
14.	Public Services. Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas:			
	a. Fire protection?	___	___	X
	b. Police protection?	___	___	X
	c. Schools?	___	___	X
	d. Parks or other recreational facilities?	X	___	___
	e. Maintenance of public facilities, including roads?	X	___	___
	f. Other governmental services?	___	___	X
15.	Energy. Will the proposal result in:			
	a. Use of substantial amounts of fuel or energy?	___	___	X
	b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?	___	___	X
16.	Utilities. Will the proposal result in a need for new systems, or substantial alterations to the following utilities:			
	a. Power or natural gas?	___	___	X
	b. Communications systems?	___	___	X
	c. Water?	___	___	X
	d. Sewer or septic tanks?	___	___	X
	e. Storm water drainage?	___	___	X
	f. Solid waste and disposal?	___	___	X

		YES	MAYBE	NO
17.	Human Health. Will the proposal result in:			
	a. Creation of any health hazard or potential health hazard (excluding mental health)?	___	___	X
	b. Exposure of people to potential health hazards?	___	___	X
18.	Visual and Aesthetics. Will the proposal result in the obstruction of any scenic vista or view open to the public, or will the proposal result in the creation of an aesthetically offensive site open to public view?	___	___	X
19.	Recreation. Will the proposal result in an impact upon the quality or quantity of existing recreational opportunities?	X	___	___
20.	Cultural Resources.			
	a. Will the proposal result in an alteration of a significant archaeological or historical site, structure, object or building?	___	___	X
	b. Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?	___	___	X
	c. Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?	___	___	X
	d. Will the proposal restrict existing religious or sacred uses within the potential impact area?	___	___	X
21.	Mandatory Findings of Significance.			
	a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to			

	YES	MAYBE	NO
eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	___	___	X
b. Does the project have the potential to achieve short-term, to the disadvantages of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)	___	___	X
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)	___	___	X
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	___	___	X

C. DISCUSSION OF ENVIRONMENTAL EVALUATION

1. Earth:

a. No. The proposed project would not result in unstable earth conditions or changes in geologic substructures. Moderate amounts of fill materials would be imported to support the levee at the Shoreline Industrial Park Green and South Pond sites, but do not present any engineering concerns (Strom, pers. comm.).

b. Yes. The proposed project would entail disruption, compaction and overcovering of soil. Preliminary grading for levee improvement, importing topsoil for revegetation and levee support, construction of asphalt and crushed stone paths along the top of the levee and the parking lot/restrooms at the MMWD Pond site entail disruption to and compaction of soils.

Mitigations

The City of San Rafael shall conduct the appropriate engineering studies and prepare grading plans prior to commencement of the Enhancement Plan project. Clean fill materials shall be utilized and all construction shall meet the City of San Rafael building codes and standards.

c. Yes. The proposed project would result in a slight change to the topography of the existing levee surface. However, this alteration would not be significant and would contribute to the aesthetic value of the site.

Mitigations

No mitigation is necessary.

d. No. The proposed project would not result in the destruction, covering or modification of any unique geologic or physical features.

e. Maybe. The proposed project requires construction of a parking lot at the Industrial Park Green site and the addition of an asphalt path along the top of the levee. These elements of the Plan would increase the impervious surface area, resulting in a slight increase in offsite drainage. Additionally, site grading could cause erosion.

Mitigations

Drainage and grading plans which include erosion control measures shall be prepared prior to commencement of the project and meet the City of San Rafael standards. The drainage plan for the parking lot shall direct outfall away from wetland areas to a system with adequate capacity to accommodate the offsite drainage from the parking lot.

f. No. The proposed project would not affect a change in deposition or erosion of beach sands or siltation. The City of San Rafael is considering controlling deposition and sedimentation through culvert and gate modification or replacement; this would assist in maintaining water quality standards and ensure adequate flushing of the wetland areas.

g. No. The proposed project would not expose people or property to geologic hazards.

2. Air:

a. No. The proposed project would not create substantial air emissions or the deterioration of ambient air quality.

b. No. The Enhancement Plan would not result in the creation of objectionable odors. The City is considering water quality control measures which would have the beneficial effect of remediating the existing odors in South and MMWD Ponds.

c. No. The proposed project would not result in any local or regional alteration of climatic conditions.

3. Water:

a. Maybe. If the MMWD Pond is converted to a tidal marsh or brackish pond (with periodic tidal circulation), tidal waters would be admitted through a direct connection between the Bay and the Pond. The conversion of the MMWD Pond to a tidal marsh or brackish pond would constitute a beneficial impact to the water quality of the existing wetland. Further hydrologic studies would be required in order to determine the optimal alternative for improving the Pond's water quality.

b. Maybe. The proposed project requires construction of a parking lot at the Industrial Park Green site and the addition of an asphalt path along the top of the levee. These elements of the Plan would increase the impervious surface area, resulting in a slight increase in offsite drainage.

Mitigations

See mitigation for 1(e).

c. No. The City of San Rafael is considering levee improvements to increase flood control effectiveness.

d. No. The proposed project would not change the amount of surface water in any water body.

e. Maybe. The proposed project requires construction of a parking lot at the Industrial Park Green site and also allows runoff from the Shoreline Industrial Park to enter the MMWD Pond. The offsite drainage from the parking lot and Industrial Park may contain automobile-related and other contaminants, which may impact the water quality of the wetland areas.

Mitigations

Drainage plans which address water quality issues of the parking lot and Industrial Park outfall shall be prepared prior to commencement of the project and shall meet the City of San Rafael water quality standards. The drainage plan for the parking lot shall direct outfall away from wetland areas to a system with adequate capacity to accommodate the offsite drainage from the parking lot. According to the East San Rafael Neighborhood Plan DEIR (1985), development to the west of the Shoreline Park area would accommodate the additional drainage.

f. No. The proposed project would not alter the direction or rate of flow of ground waters.

g. No. The proposed project would not result in a change in the quantity of ground waters.

h. No. The proposed project would not result in a substantial reduction in the amount of water otherwise available for public water supplies. Irrigation of landscaped areas would require a moderate supply of reclaimed water. The use of reclaimed water would have the beneficial effect of reducing demand for potable water.

i. No. The proposed project would not expose people or property to water-related hazards. The City of San Rafael has scheduled levee improvements which would have the beneficial impact of augmenting the flood control effectiveness along the shoreline.

j. No. The proposed project would not create significant changes in temperature, flow, or chemical content of surface thermal springs.

4. Plant Life

a. Yes. The proposed project requires the removal of mostly weedy, non-native plant species and revegetation with native or naturalized drought-tolerant plants adapted to the local area. This is considered a beneficial impact.

Mitigation

No mitigation is necessary.

b. No. No unique, rare, or endangered plants are known in the area.

c. No. The proposed project would utilize only native or naturalized species for revegetation that already occur in the vicinity.

d. No. No agricultural crops are grown in the area.

5. Animal Life

a. Yes. The Plan is designed to enhance habitat conditions for wildlife. As a result, the number and diversity of wildlife utilizing the shoreline area should increase.

b. No. The proposed Enhancement Plan would not result in the reduction of habitat or number of any unique, rare, or endangered species. Habitat conditions would improve for locally occurring species.

c. Maybe. The project revegetation and plants may provide conditions which are attractive to certain species of wildlife currently not inhabiting the shoreline area. This is considered a beneficial effect. The project would not create any barriers to animal movement or migration.

d. No. One of the project's goals is to enhance habitat conditions for native fish and wildlife.

6. Noise:

a. Maybe. The concentration of patrons of the Shoreline Park would result in a slight increase in ambient noise levels in the area. However, due to the lack of sensitive receptors and the minimal expected increase in noise levels generated by recreational users, this impact would not be significant.

Mitigations

No mitigation is necessary.

b. No. The proposed project would not result in the exposure of people to severe noise levels.

7. Light and glare:

No. The proposed project would not create new light and glare. Landscape designs for the parking lot to be constructed at the MMWD Pond would have vegetation to screen headlights from the surrounding areas.

8. Land use:

No. The proposed project would not result in a substantial alteration of the present or planned land use of the area.

9. Natural Resources:

a. No. The proposed project would not result in the increase in the rate of use of any natural resources.

b. No. The proposed project would not result in the substantial depletion of any nonrenewable natural resource.

10. Risk of Upset:

a. No. The proposed project would not involve risk of an explosion or the release of hazardous substances.

b. No. The proposed project would not involve the possible interference with an emergency response or evacuation plan. A fenced helipad site is approximately thirty feet from the western edge of South Pond, and, in order to conform to safety standards, no trees are to be planted in the approach/departure path of the helipad (Klope, pers. comm.).

11. Population:

No. The proposed project would not alter the location, distribution, or growth rate of the human population of an area.

12. Housing:

No. The proposed project would not affect existing housing, or create a demand for additional housing.

13. Transportation/Circulation:

a. No. The proposed project would not result in the generation of substantial additional vehicular movement. While an increase in traffic is predicted, the amount would not be significant and would occur predominantly during off-peak hours.

b. Yes. The proposed project would have an effect on existing parking facilities and would create a demand for new parking. The fourteen-car parking lot at the Industrial Park Green site and the onstreet parking to the west of the Park would accommodate this increased demand (Freitas, pers. comm.).

Mitigation Measure

No mitigation is necessary.

c. No. The proposed project would not have a substantial impact on existing transportation systems.

d. No. Alterations to present patterns of circulation or movement of people and/or goods are not anticipated to result in a significant impact due to the proposed project.

e. No. The proposed project is not located in an area that would present an effect on waterborne, rail, or air traffic.

f. No. The proposed project would not present a hazard to motor vehicles, bicyclists, or pedestrians. The project would have the beneficial impact of providing a recreational area specifically designed for bicycle and pedestrian circulation.

14. Public Services:

a. No. The proposed project would not require a substantial increase in the need for fire protection.

b. No. The proposed project require a slight increase in the need for police protection; however, this increase is not considered significant.

c. No. The proposed project would not constitute a substantial burden on the school system.

d. Yes. A major component of the proposed project is its recreational features, requiring minor maintenance by park officials of the restroom facilities, structures, pathways, and other amenities.

Mitigations

The City of San Rafael would be responsible for allocating park personnel for the maintenance of the Shoreline Park.

e. Yes. It is anticipated that the proposed project would affect maintenance of public facilities, as stated above.

Mitigation Measure

See mitigation measure for 14(d).

f. No. The proposed project would not affect other governmental services.

15. Energy:

a. No. The proposed project would not result in the use of substantial amounts of fuel or energy.

b. No. The proposed project would not require development of new sources of energy or result in a substantial increase in demand on existing sources.

16. Utilities:

a. No. The proposed project would not substantially affect power or natural gas utilities.

b. No. The proposed project would not substantially affect communication systems.

c. No. The proposed project would not substantially affect water services.

d. No. The proposed project would not substantially affect sewer or septic tank services.

e. No. The proposed project would not result in a need for a new or substantial alternation in the storm water drainage systems.

f. No. The proposed project would not substantially affect solid waste and disposal facilities.

17. Human health:

a. No. The proposed project would not result in the creation of any health hazard or potential health hazard.

b. No. The proposed project would not expose a population to potential health hazards.

18. Visual and Aesthetics:

No. The proposed project would not result in an aesthetically offensive site. The Enhancement Plan would have the beneficial impact of improving the aesthetic qualities of the site by introducing native vegetation and other improvements to the shoreline area.

19. Recreation:

Yes. The proposed project would have a beneficial impact by enhancing the existing recreational amenities by providing a jogging path, benches, and interpretive kiosks.

Mitigations

No mitigation is necessary.

20. Cultural Resources:

a. No. The proposed project would not result in an alteration of a significant archaeological or historical site, structure, object or building. The Enhancement Plan area consists of fill and introduced materials.

b. No. There is no evidence of prehistoric or historic buildings, structures, or objects on the site.

c. No. The physical change associated with the proposed project would not potentially affect unique ethnic cultural values.

d. No. The proposed project would not restrict existing religious or sacred used within the potential impact area.

21. Mandatory Findings of Significance:

a. No. The proposed project would not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory.

b. No. The proposed project would not have short-term adverse impacts. No long-term impacts are anticipated except for the long-term beneficial effect of increasing the recreational opportunities and habitat enhancement of the shoreline area.

c. No. The proposed project would not have cumulatively considerable impacts.

d. No. The proposed project would not have environmental effects to cause substantial adverse effect on human beings.

D. CONCLUSION OF ENVIRONMENTAL EVALUATION

It is not anticipated that the San Rafael Enhancement Plan would have a significant adverse impact on the environment if the recommended mitigation measures are implemented.

E. DETERMINATION

On the basis of this initial evaluation:

- I find the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

- I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet have been added to the project. A NEGATIVE DECLARATION WILL BE PREPARED.

- I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

Date: _____

Signature: _____

For: _____

V. INDIVIDUALS, AGENCIES, AND ORGANIZATIONS CONSULTED

Klope, Tom. Senior Associate, MPA Design, San Francisco, CA.

Freitas, Jean. Principal Planner, San Rafael Planning Department, San Rafael, CA.

Strom, Lloyd. Director of Public Works, City of San Rafael, San Rafael, CA.

VI. REPORT PREPARATION

WESTERN ECOLOGICAL SERVICES COMPANY, INC.

Steve Foreman - Principal in Charge/Wildlife Biologist

Angela Atkinson - Project Manager/Planner

Clare M. Fallon - Production Manager

VII. LITERATURE CITED

City of San Rafael General Plan, 1988.

East San Rafael Neighborhood Plan EIR. Blayney-Dyett, 1985.

Shoreline Enhancement Plan. MPA Design, Philip Williams & Associates, WESCO, 1991.

Shoreline Park Master Plan Initial Study. LSA, 1989.

11. HYDROLOGIC APPENDIX

Philip Williams & Associates, Ltd.
Consultants in Hydrology

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

CONCEPTUAL ENHANCEMENT PLAN FOR THE SAN RAFAEL SHORELINE: HYDROLOGIC APPENDIX

by

Joan Florsheim, Ph.D.
Associate

and

Philip B. Williams, Ph.D., P.E.
Principal

December 11, 1990

#690

TABLE OF CONTENTS

I. INTRODUCTION

The purpose of this study is to provide background information on the hydrologic conditions of the San Rafael Shoreline for use in management and development of a conceptual enhancement plan. The San Rafael Shoreline project area contains three ponds: Bayview Marsh; MMWD Pond; and South Pond (Figure 1). The ponds are unfilled portions of the mudflats that formerly extended from the San Quentin Peninsula.

The project area has been significantly altered by human activity in the past 70 years. The ponds are separated from San Rafael Bay by a levee that reaches an elevation of approximately 10 ft. NGVD. At present, only Bayview Marsh is connected tidally to the Bay. Portions of the wetland were diked in the 1920's and the remainder was diked in 1956.

The present study was limited in scope to a conceptual understanding of the hydrologic conditions at the San Rafael Shoreline. Additional studies are needed to fully understand the existing hydrologic conditions and ensure that the final enhancement plan is based on a complete understanding of the tidal hydraulics necessary for successful operation and placement of control structures.

Tidal Inundation and Flood Hazard

San Rafael Bay is shallow adjacent to the project area and at low tide mudflats are exposed. The tidal range in the area is given by the U.S. Army Corps of Engineers as:

	MLLW Datum	NGVD Datum
100-Year Tide	+8.8	+6.1
MHHW	+5.7	+3.0
MHW	+5.1	+2.4
NGVD	+2.7	0.0
MLLW	0.0	2.7

The FEMA Flood Insurance Rate Map for the City of San Rafael (1984) shows Shoreline Park to be within the 100-year and the 500-year flood boundary zone designation. The dominant source of flooding is from high tides and storm waves from San Francisco Bay. Tidal frequency data showing tidal elevation in feet NGVD (USCOE, 1984) is as follows for San Rafael Bay at San Rafael:

10-Year	50-Year	100-Year	500-Year
5.6 ft.	6.0 ft.	6.1 ft.	6.4 ft.

These flood estimates indicated by FEMA reflect still water elevations. Calculations by Williams (1982) suggest that the existing levee would reduce wave set-up such that areas on the inboard side of the pond filled to an elevation of 10 ft. would be protected from the 100-year high tide. The pedestrian path on the levee should not be used during high tides in combination with storm waves.

II. BAYVIEW MARSH

A. PHYSICAL CHARACTERISTICS

Bayview Marsh is a tidal pond that is fully connected to San Rafael Bay. The marsh has an area of approximately 7.4 acres and is the combination of what was formerly 2 separate ponds. The marsh has a length of 820 ft. parallel to the levee separating the pond from the bay. The width ranges from 880 ft. in the southern arm to 110 ft. at the narrowest point. The marsh was graded to a maximum depth of -5.0 ft NGVD with side slopes of 4:1 above 0.0 ft. NGVD and 1:10 below 0.0 ft. NGVD. Figure 2 shows an east-west cross section through the pond. Up to 6 inches of fine-grained sediment has filled the bottom of the marsh since grading took place in 1986, giving a short term sedimentation rate of approximately 1.5 inches per year.

The marsh is bordered by a storage yard for construction material to the south. To the north, the Pelican Way walkway forms a levee between Bayview Marsh and the MMWD Pond. These two ponds have the potential to be hydraulically connected through a culvert. The westward side of Bayview Marsh is currently undeveloped, but is approved for a future business park with no buffer between the marsh and the developed area. However, drainage from most of the developed area will be diverted away from the marsh, with parking lot runoff still allowed into the marsh.

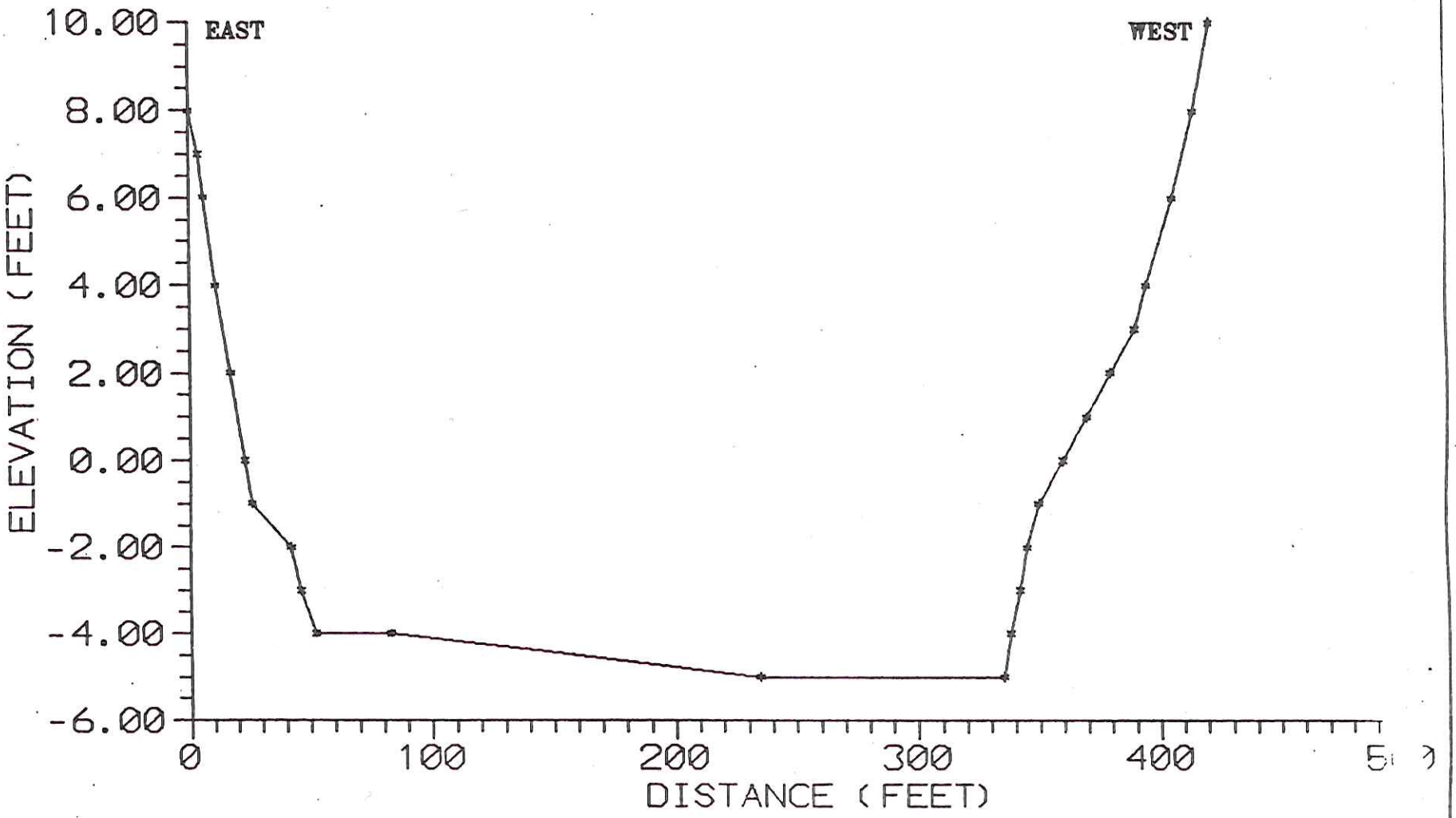
B. WATER CONTROL STRUCTURES AND DRAINAGE FEATURES

There are two water control structures in Bayview Marsh: 1) a double culvert connecting the marsh to the bay; and 2) a culvert connecting Bayview marsh to the MMWD Pond. The two 6 ft. culverts have an invert elevation of -4.0 ft. NGVD and extend 70 ft. from the marsh under the levee to the bay. The culverts are open on the marsh side of the levee and can be controlled by two 6 ft. slide gates on the bay side, however, the slide gates are maintained in an open position.

The culvert which connects Bayview Marsh to the MMWD Pond has an invert elevation of 0.0 ft. NGVD, a diameter of 18 inches, and extends 110 ft. under the walkway between the two ponds. The culvert has a concrete headwall and a drainage gate in the marsh which is silted in a closed position due to sedimentation in the marsh.

C. CIRCULATION AND WATER QUALITY

Bayview Marsh is nearly fully tidal. Fine-grained sediment transported into the marsh with incoming tides is deposited and is raising the bottom elevation of the marsh. Through time, vegetation will extend into the bottom of the marsh, and a slough channel system will develop.



DATE: 10-4-90	BAYVIEW MARSH CROSS SECTION	Philip Williams & Associates Pier 35, The Embarcadero San Francisco, California 94133	FIGURE

Sources of freshwater to the marsh include direct precipitation and in the future, parking lot runoff will be allowed to enter the marsh. Because the marsh flushes with the ebb and flow of the tide, water quality in the pond will be similar to water quality in the bay. Salinity measured in Bayview Marsh on July 14 and October 7, 1990 was 30 ppt and 31 ppt respectively, similar to the salinity measured in San Rafael Bay.

Eljumaily-Butler Associates (1982) note that sediment and vapor analysis indicate that some hazardous materials have probably been disposed in the landfill near the marsh. High concentrations of zinc and contaminants in the former disposal site had not migrated into the marsh by 1982. Water quality measurements taken by WESCO (Management and Monitoring Plan for the East San Rafael Wetlands, 1987) are reported in Table 1. WESCO reports that there are no major concentrations of toxics present in the marsh.

TABLE 1:

RESULTS OF WATER QUALITY TESTING AT EAST SAN RAFAEL PONDS, SEPTEMBER 26, 1986

	Test Results			
PARAMETER	MMWD Pond 5584	South Pond 5585	Bayview Lagoon 5586	San Pablo Bay 5587
pH	7.6	7.2	7.3	7.5
ECW (umhos/cm)	31,000	15,200	34,000	75,000
Orthophosphate (mg/l)	0.05	0.03	0.08	0.09
EP (mg/l)	0.42	0.22	0.08	0.13
Nitrate nitrogen (mg/l)	1.51	0.30	0.22	0.18
Chlorophyll-A (ug/l)	10.80	10.4	6.9	4.4
Total Kjeldahl nitrogen (mg/l)	3.2	1.7	0.6	1.2
Lead (mg/l)	0.38	0.17	0.42	0.36
Zinc (mg/l)	0.03	0.02	0.02	0.01
Copper (mg/l)	0.02	0.01	0.04	0.02
Chromium (mg/l)	0.16	0.04	0.17	0.16
Cadmium (mg/l)	0.034	0.012	0.040	0.041
Nickel (mg/l)	0.14	0.03	0.18	0.17
Mercury (mg/l)	0.001	0.003	0.002	<0.001

* Management and Monitoring Plan for the East San Rafael Wetlands, Prepared for the City of San Rafael by WESCO, June 1987

III. MMWD POND

A. PHYSICAL CHARACTERISTICS

MMWD Pond is a brackish water pond which is isolated hydraulically from San Rafael Bay. The pond has an area of approximately 3.3 acres which includes a small island (0.5 acre) on the southwest side of the pond. The island is surrounded by a shallow moat which is dry during part of the year. The length of the pond is approximately 580 ft. and ranges in width from 90 ft. at the north end of the pond to 350 ft. at the southern part of the pond.

The pond is bordered by the San Quentin Landfill on the north, the MMWD storage yard on the west, and Bayview Marsh to the south. The levee between the pond and San Rafael Bay is in poor condition, and is thought to allow seepage of bay water into the pond when tidal elevations are higher than the water surface elevation in the pond (Lloyd Strom, pers. comm., 1990).

B. WATER CONTROL STRUCTURES AND DRAINAGE FEATURES

There are two water control structures in MMWD Pond: 1) an culvert and overflow drain connecting the pond to Bayview Marsh; and 2) a culvert draining a newly constructed road on the fill north of the pond. The culvert between Bayview Marsh and MMWD Pond is an 18 inch culvert with an invert elevation of 0.0 ft. NGVD and a slide gate. A concrete structure around the culvert has an overflow outlet at an elevation of 3.5 ft. NGVD, which prevents water surface elevation in the pond from increasing above the elevation of the drain.

The culvert that drains the road north of the MMWD pond is not used at present, however, when this area is developed as Shoreline Industrial Park, runoff will enter the pond.

C. CIRCULATION AND WATER QUALITY

Sources of freshwater to the pond include direct precipitation and runoff from adjacent land. The pond was intended to provide seasonal freshwater habitat, such that the pond would fill to the elevation of the overflow drain during the wet season, and slowly evaporate during the dry season. There is no tidal circulation in the pond because of the levee which separates the pond from the bay and because the culvert joining MMWD Pond to Bayview Marsh is maintained in a closed position on the MMWD Pond side and silted shut on the Bayview Marsh side. The levee between the pond and the bay is thought to allow seepage of bay water into the pond when the tidal elevation is higher than the water surface elevation in the pond. Water quality data collected by WESCO (1987) are presented in Table 1. At the present time there is no circulation in the Pond, and water stagnates and concentrates salts during the dry season.

During the recent drought, MMWD Pond has become saline due to lack of sufficient freshwater source. Salinity was measured using a refractometer between 1989 and 1990 in MMWD Pond and San Rafael Bay as:

Location	8/21/89*	3/7/90*	4/6/90*	5/3/90*	7/14/90+	10/7/90+
SE Corner, MMWD Pond	35 ppt	20 ppt	24 ppt	28 ppt	38 ppt	50 ppt
San Rafael Bay	28 ppt	24 ppt	28 ppt	28 ppt	30 ppt	30 ppt
* Jean Starkweather (1990) + Measured by PWA						

These data suggest that salinity varies seasonally, and that the pond is more saline in the late summer than in the spring. As water evaporates from the pond during the dry summer season, the salinity of the pond increases relative to the bay. Winter rainfall dilutes the pond water causing it to be less saline during the wet season. Evaporation and seepage of bay water into the pond through the levee increase the salinity throughout the spring and summer months. Present salinity levels in the pond are saline. Table 1 shows water quality data provided by WESCO (1987).

IV. SOUTH POND

A. PHYSICAL CHARACTERISTICS

South Pond is a relatively freshwater pond fed by stormwater runoff during periods of rainfall. The pond has a area of approximately 0.7 acres with a maximum length of 310 ft. and width ranging from 70 to 130 ft. The pond is graded flat to a depth of -5.7 ft. NGVD with 4:1 side slopes. Figure 3 shows an east-west trending cross section through the pond.

South Pond is surrounded by an access road at an elevation of 2 ft. on the east side of the pond, and at a higher elevation on west side of the pond. The pond is bordered on the north by a storage yard for construction material, on the ease by a helicopter pad, and on the south by currently undeveloped land of the Shaku Industrial Park. The levee separating the pond from the bay will be improved as part of the enhancement plan.

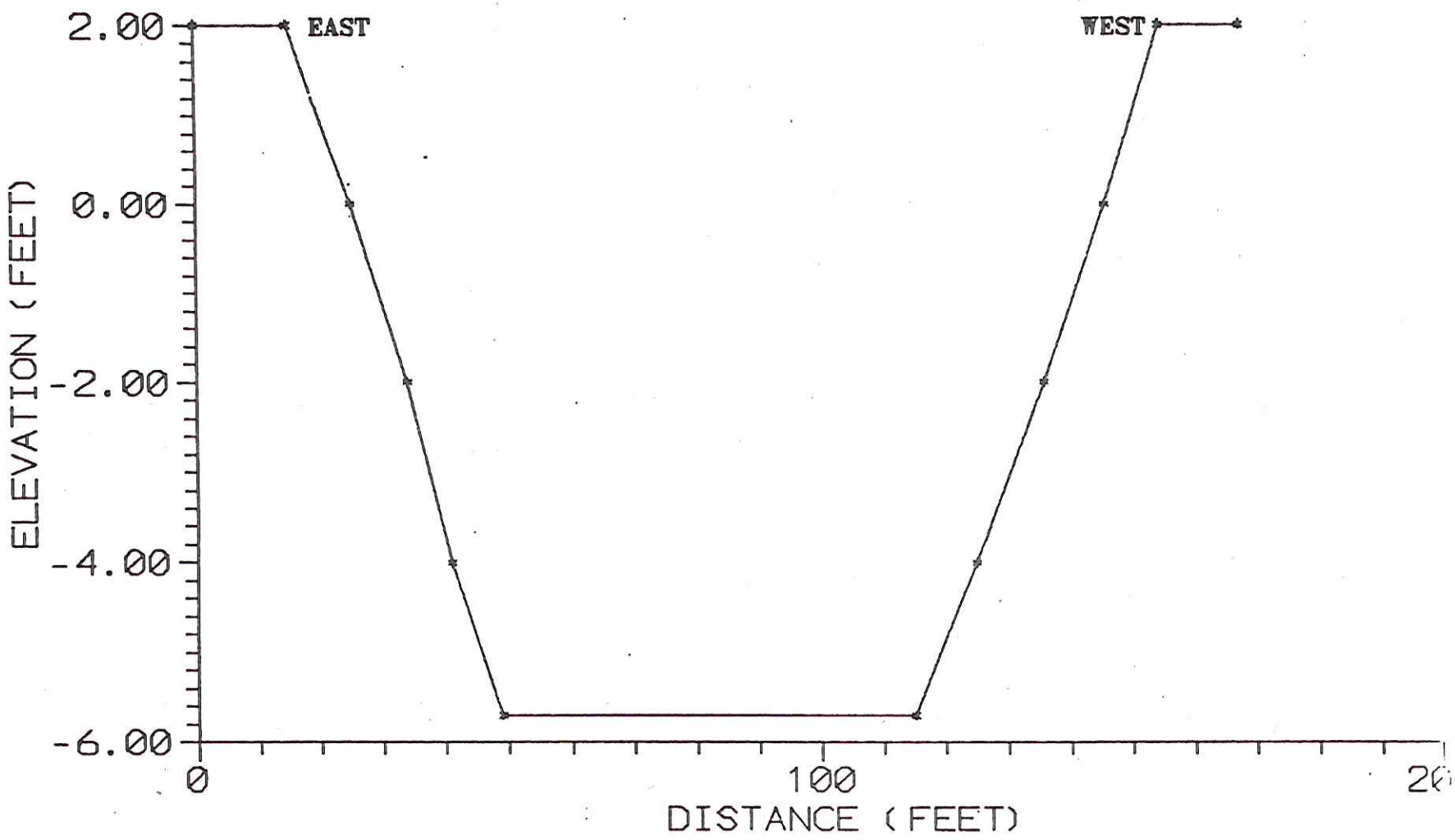
B. WATER CONTROL STRUCTURES AND DRAINAGE FEATURES

There are three water control structures in South Pond: 1) a 54-inch culvert carrying stormwater runoff; 2) a stormwater pump station; and 3) a 12-inch culvert draining the Shaku Industrial Park. In the past, the 54-inch culvert carried storm runoff from upslope areas to the bay. 48 feet of the culvert were removed so that water now fills South Pond before discharging to the bay through the continuation of the culvert which passes under the levee. The 54-inch outlet culvert has an invert elevation of -4.7 ft. NGVD with a slide gate maintained in an open position. The outlet to the 54-inch culvert which enters San Rafael Bay is presently silted in so that the gate is slightly open.

The stormwater pump station is designed to maintain the water surface elevation in South Pond below a maximum elevation of +1.7 ft. NGVD. Water is pumped out of the pond in order to allow drainage from surrounding areas, to prevent overtopping and erosion of the levee, and to increase the storage capacity of the pond. The pumped water is discharged onto the rip-rap on the bay side of the levee.

C. CIRCULATION AND WATER QUALITY

South Pond was designed for flood control. During periods of heavy rainfall, stormwater runoff enters South Pond through the 54-inch culvert. When the water surface elevation in the pond is high relative to the tidal elevation, water will flow out of the pond into the bay through the flap gate at the end of the culvert. If the rate of stormwater runoff exceeds the capacity of the culvert to discharge the floodwater and the water surface elevation in the pond raises above 1.7 ft. NGVD, the storm water pump station will pump water from the pond.



DATE: 10-4-90	SOUTH POND CROSS SECTION	Phillip Williams & Associates Pier 35, The Embarcadero San Francisco, California 94133	FIGU 3

Because the flap gate on the bay side of the levee is currently silted in an opened position, tidal flow may enter South Pond during relatively high tides. Salinity measured in the Pond on July 14, 1990 was 24 ppt or brackish (30 ppt was measured in San Rafael Bay). On October 7, 1990 salinity was measured as 29 ppt. The pond appeared stagnant with a foul odor. During the recent drought, there probably has not been enough runoff to allow flushing the water in the pond. Water quality data for South Pond are shown in Table 1.

V. OPPORTUNITIES AND CONSTRAINTS

A. BAYVIEW MARSH

Enhancement of Bayview Marsh was originally planned to provide a tidal habitat in the San Rafael Shoreline. The marsh is currently functioning successfully. Tidal flows transport sediment into the marsh raising the marsh bottom elevation, and vegetation is extending into an incipient marsh plain. It is expected that in the future, slough channels will develop as the marsh reaches an equilibrium elevation. Because the marsh is functioning successfully at present, no change in the operation of the tide gate from its fully opened position is recommended.

Opportunities to control sedimentation from the adjacent material storage yard south of the marsh include constructing a barrier between the storage yard and the marsh to prevent fine-grained debris from entering the marsh during storms.

Opportunities to maintain water quality standards in the marsh include diverting runoff from the future parking lot adjacent to Bayview Marsh.

B. MMWD POND

The MMWD Pond was planned as a freshwater habitat for the San Rafael Shoreline. During the present drought conditions, measurements of pond salinity have reached 50 ppt, much higher than the salinity of San Rafael Bay (30 ppt). In addition, the pond is stagnant and has an odor. It is expected that in the future, without additional sources of freshwater and improvements in circulation, MMWD Pond will remain saline during drought conditions, or brackish during wetter years and will experience further degradation of water quality.

Two options are considered for enhancement of the MMWD in order to improve circulation and water quality including: 1) creating a tidal marsh; and 2) creating a brackish pond. Hydrologic advantages and disadvantages of the two enhancement alternatives are shown in Table 2.

Creating a freshwater pond is not feasible at present due to the lack of a freshwater source. The only potential source of fresh water would be treated wastewater as is the case in Remillard Pond in Larkspur. If a source of fresh water becomes available in the future, creation of a freshwater habitat should be evaluated.

Creation of a tidal marsh in the MMWD Pond could be achieved by constructing a culvert or bridge through the levee between MMWD Pond and the bay and thereby creating a direct connection between the bay and the pond, and/or by improving or replacing the existing

TABLE 2:

HYDROLOGIC ADVANTAGES AND DISADVANTAGES OF THE TWO ENHANCEMENT ALTERNATIVES FOR MMWD POND

Enhancement Alternative	Advantages	Disadvantages
I. Tidal Marsh	Creation of Marsh Habitat	Loss of Pond Habitat
	Good circulation Good water quality	Requires initial construction costs
	Little long-term maintenance	
	Sedimentation benefits marsh development	
II. Brackish Pond	Maintains Pond Habitat	Poor circulation and concentration of pollutants
		Sedimentation has deleterious effect on pond
		Requires short- and long-term maintenance
		Potential fish entrapment
		Impacts to vegetation of rapid changes in salinity and water surface elevation
		Requires initial construction costs

culvert between Bayview Marsh and MMWD Pond with a larger culvert or a bridge to allow full tidal action. If a connection to Bayview Marsh is continually open, the system would be self scouring, and maintenance dredging in Bayview Marsh would not be anticipated. With continual tidal action bringing in sediment which would settle out, a salt marsh plain with slough channels would develop similar to the Bayview Marsh.

Creation of a brackish pond could be achieved if tidal inflow is allowed periodically to maintain water levels at a predetermined level (based on vegetation requirements) which keeps the moat around the island inundated in order to optimize habitat. The pond would fill with freshwater during the wet season. Tidal inflow would supplement the pond as evaporation lowers the water surface elevation during the dry season. A hydraulic connection to the bay would be placed at an elevation high enough to minimize sedimentation. This hydraulic connection would be manually opened during high tide when water surface elevations decreased below the target elevation based on observations made by the City of San Rafael.

Long-term constraints to a brackish pond include: 1) continuing long term management and maintenance commitment by trained personnel; 2) lack of circulation and degradation of water quality, since part of the MMWD Pond is situated over a landfill (Eric Mc Guire, pers. comm.); and 3) sedimentation as a result of periodic tidal inflow would eventually reduce the volume of MMWD Pond. Short-term constraints to creating a brackish pond include: 1) possible fish entrapment, since fish could enter the pond while the culverts are open and then not be able to exit the pond; and 2) the ecosystem could be impacted in the zone where water salinity changes rapidly during the period where tidal inflow supplements the water level in the pond.

Both alternatives would involve further hydraulic study in order to determine operation and design criteria of the water control structures. In addition, the operation of control structures should be keyed into the requirements of vegetation to tolerate seasonal changes in salinity.

C. SOUTH POND

South Pond was originally intended to be a flood control facility, with freshwater inflows during the wet season and evaporation during the dry season. The current configuration of the outlet flap gate is partially open due to sedimentation in San Rafael Bay, and some tidal inflow currently enters the pond during high tidal cycles. Salinity in South Pond during the present drought condition was measured as 29 ppt (similar to the salinity measured in San Rafael Bay of 30 ppt). This indicates that in the summer, brackish conditions exist in South Pond.

Opportunities for enhancing South Pond include creating a seasonal freshwater/brackish pond regime where water would be relatively fresh during the wet season due to contribution of stormwater runoff, and relatively brackish during the dry season due to tidal contribution. Managing the water surface elevation throughout the year is preferable to allowing the water

level to fluctuate. An optimum seasonal freshwater/tidal regime would let tidal water in slowly during the summer months as the freshwater is evaporated. Some storage volume would be lost due to the tidal inflow over a period of years. This would cause the pump to operate more frequently in the future.

The culvert connection between South Pond and the bay which would let in tidal flow during the dry season should be sized, and a suitable elevation should be determined based on hydraulic analysis so that future maintenance is minimized. The present flap gate, which is silted in, should be replaced with a slide-flap gate. This structure should be maintained to prevent it from silting in. At present there is a leak in the culvert connecting South Pond to the bay. This leak should be fixed, or the culvert should be replaced.

If treated wastewater becomes available in the future, the option of supplementing the pond with freshwater rather than tidal inflow during the dry season could be considered.

VI. ADDITIONAL STUDIES NEEDED

Important hydrologic issues that are not addressed within the existing scope of our work include:

1. Mapping bathymetry in the MMWD Pond. Bathymetry currently exists for the two other ponds.

2. Quantification of freshwater input and output in the three ponds.

3. Measuring the existing extent of tidal influence in the three ponds.

4. Prediction of future tidal circulation in the ponds with the enhancement project. This would require development of a hydraulic computer model for use in the enhancement project design and hydraulic analysis of the relationship between pond water surface elevation and tidal elevation. The model would be calculated using existing data and data collected in steps 1, 2, and 3 in order to determine the size and location of culverts for the various enhancement alternatives. The model could be run to ascertain both a summer dry period and winter storm operating schedule for the hydraulic control structures in the three ponds. The advantage of conducting further studies regarding the enhancement alternatives, is that proper placing and sizing of water control structures will minimize future maintenance needs, and provide the hydraulic and hydrologic information necessary for a successful enhancement plan.

12. RECLAIMED WATER PROJECT APPENDIX

PRELIMINARY DESIGN REPORT

for the

CENTRAL MARIN RECLAIMED WATER PROJECT

Prepared for:

MARIN MUNICIPAL WATER DISTRICT
Corte Madera, California

November 1990

Prepared by:

ENGINEERING-SCIENCE
DESIGN • RESEARCH • PLANNING
600 BANCROFT WAY, BERKELEY, CALIFORNIA 94710 • 415/548-7970
OFFICES IN PRINCIPAL CITIES
NC231.14

NC231/165-04

4.

PROJECT DESCRIPTION

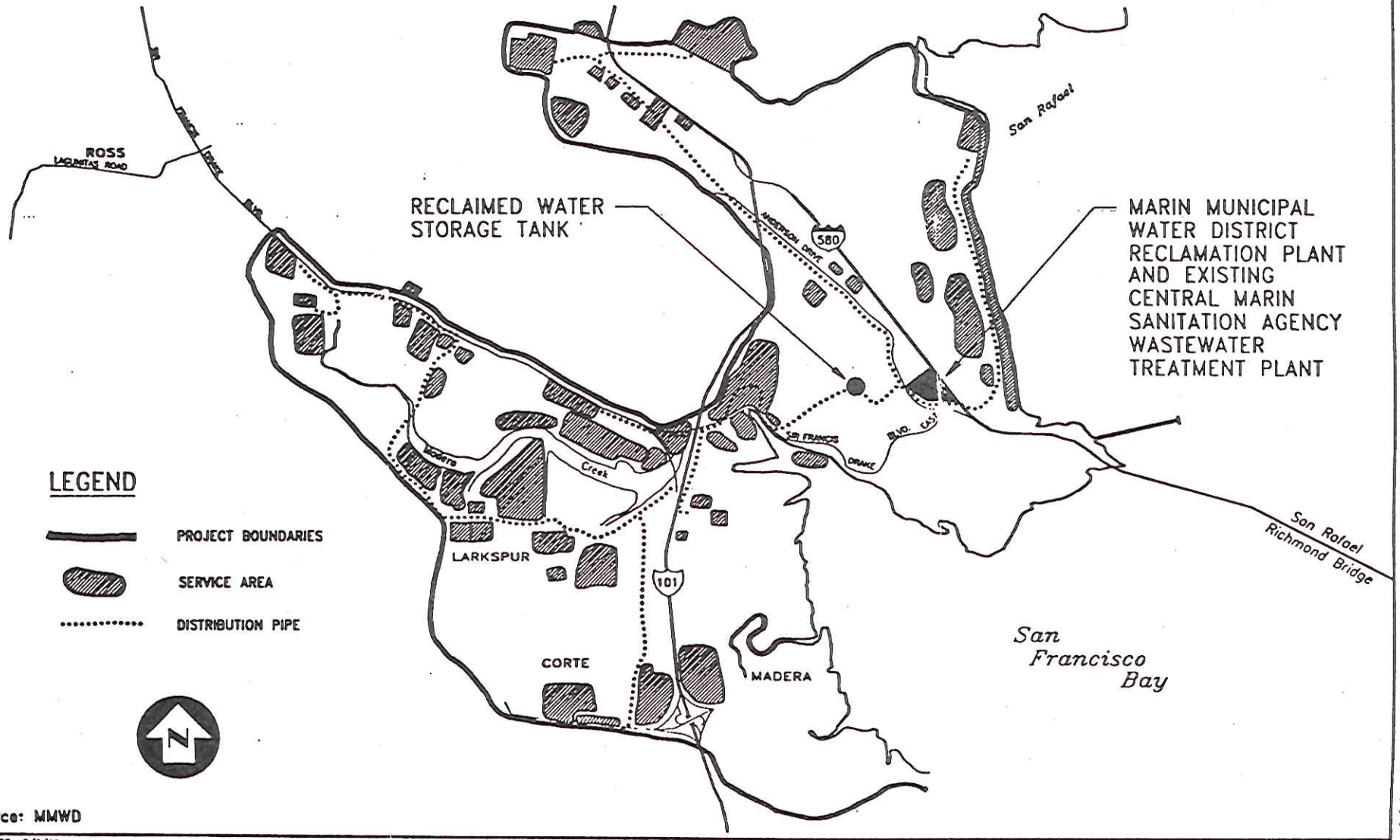
The Central Marin Reclaimed Water Project will supply approximately 800 to 900 acre-feet per year of reclaimed water for landscape irrigation and other commercial needs throughout the central portion of the District's service zone. The project will provide reclaimed water by processing secondary effluent from the Central Marin Sanitation Agency (CMSA) Treatment Plant located adjacent to Highway 580 in east San Rafael, Marin County.

The reclaimed water will be used for institutional irrigation of parks, playing fields, medians, and commercial landscaping in the lower Ross Valley and east San Rafael areas. See Figure 1.1. In addition, some of the reclaimed water will be made available for commercial uses such as cooling towers and ready-mix concrete plants. Approximately three-fourths of the market will be developed through conversion of service for existing consumers of potable water. The service area covers more than five square miles and includes portions of the communities of Kentfield, Greenbrae, Larkspur, Corte Madera, and San Rafael.

Facilities will be planned and developed to treat the secondary effluent to meet the "Wastewater Reclamation Criteria" presented in Title 22, Division 4, Chapter 3 of the California Administrative Code, Section 60301 et seq. The reclaimed water treatment plant is proposed for construction adjacent to the CMSA plant. The treated reclaimed water will be pumped to a storage and regulating tank on San Quentin Ridge from which it will flow by gravity to locations of use.

RECLAIMED WATER PROJECT BOUNDARY AND SERVICE AREAS

Central Marin Reclaimed Water Project



Source: MMWD

MMWD\RWPB 8/6/93

ENGINEERING—SCIENCE

FIGURE 1.1

The distribution system will consist of approximately 65,000 feet of pipe varying in diameter from 6 inches to 20 inches. Most of the pipe will be installed in city streets. The District conducted the preliminary design and cost estimates of the distribution system.

Funding for the project will come from the District reserves, water sales and future connection fees. The project is scheduled to be operational and able to begin serving customers in 1995.

AUTHORIZATION

To commence project implementation the District, by agreement for engineering services, dated 24 October 1989, authorized Engineering-Science (ES) to conduct certain studies and prepare a preliminary design for a water reclamation facility located at the Central Marin Sanitation Agency's secondary treatment facility in San Rafael, California.

STUDY OBJECTIVE

The objective of this study is to select treatment and storage facilities in terms of type of treatment and rated capacity, and to prepare a preliminary design for a system that balances technical quality with costs, both capital and operation and maintenance costs. The system must be easy to operate and produce reliable, high-quality product water suitable for unrestricted reuse for landscape irrigation and certain other commercial uses. A major factor in determining project feasibility and cost-effectiveness is market size or demand. Obviously, the larger the project, the lower the unit cost of product water. District staff, assisted by ES, has refined a market demand study by conducting limited interviews with major existing potential users and future (new development) users and the estimated demands are discussed in Section 2. About ten of the potential existing users identified in the District's July 1989 Project Report (Reference 1) represent approximately 70 percent of the projected 855 AF/yr demand. Information gathered includes water demand, quality requirements, types of uses, and attitudes toward use of reclaimed water.

SCOPE OF WORK

The following tasks comprise the scope of work. The results will be presented in a Preliminary Design Report.

Task 1	Compile, review, evaluate, and summarize existing basic data.
Task 2	Update and refine the assessment of the reclaimed water market potential. This task is being performed by the District.
Task 3	Determine the reclaimed water quality requirements.
Task 4	The District, with assistance from ES, will determine the rated capacity of the treatment plant, the capacity of the product water pumping station, and the size of the storage reservoir.

Task 5 Conduct a pilot effluent filtration program using pilot filters from Parkson Corporation and from General Filter.

Task 6 Evaluate the results of the pilot treatment facilities.

Task 7 Resulting from the pilot work, define the recommended treatment requirements and develop a process flow schematic.

Task 8 Prepare a design criteria task report. *(completed in April 1990)*

Task 9 Prepare preliminary design of the required facilities including:

- Influent Pump Station
- Chemical Feed Systems (Alum and Polymer)
- Reactor - Clarifiers
- Filters
- Chlorinators
- Chlorine Contact Tank
- Effluent Pumping

Task 10 Prepare construction cost estimates, annual operation and maintenance cost estimates, and estimate the overall projected cost of the product water.

Task 11 Define regulatory, economic and institutional requirements and constraints.

ACKNOWLEDGMENTS

Engineering-Science is appreciative of the assistance given to its project staff during the conduct of this phase of the work. In particular ES is grateful for the help and support of John Peckham, the District's Project Manager; guidance of Ronald L. Johnson and Randy Poole, District General Manager and Chief Engineer, respectively; Allen Brown, Supervisor of Water Treatment; Bob Castle, Senior Engineer; Kevin McDonald, Associate Engineer; and Steve Cooney, Water Treatment Operator.

Additional assistance during the conduct of the pilot work and overall study were provided by CMSA, in particular Joseph Remley, General Manager; Philip Frye, Manager of Operations; and Tom Rose, Technical Services Engineer. The operations staff at CMSA were of great help and assistance.

PROJECT STAFF

This study was conducted by ES' Project Manager, Bill Kirkpatrick and Project Engineers Erica Kundidzora, Therese Wooding, Loren Weinbrenner, Ron Chapman, Vinod Badani and David Friedland under the guidance of Jerry Cole, Principal-in-Charge. Technical Directors were Joe Reichenberger, Pat Creegan and Dennis Kasper, Ph.D.

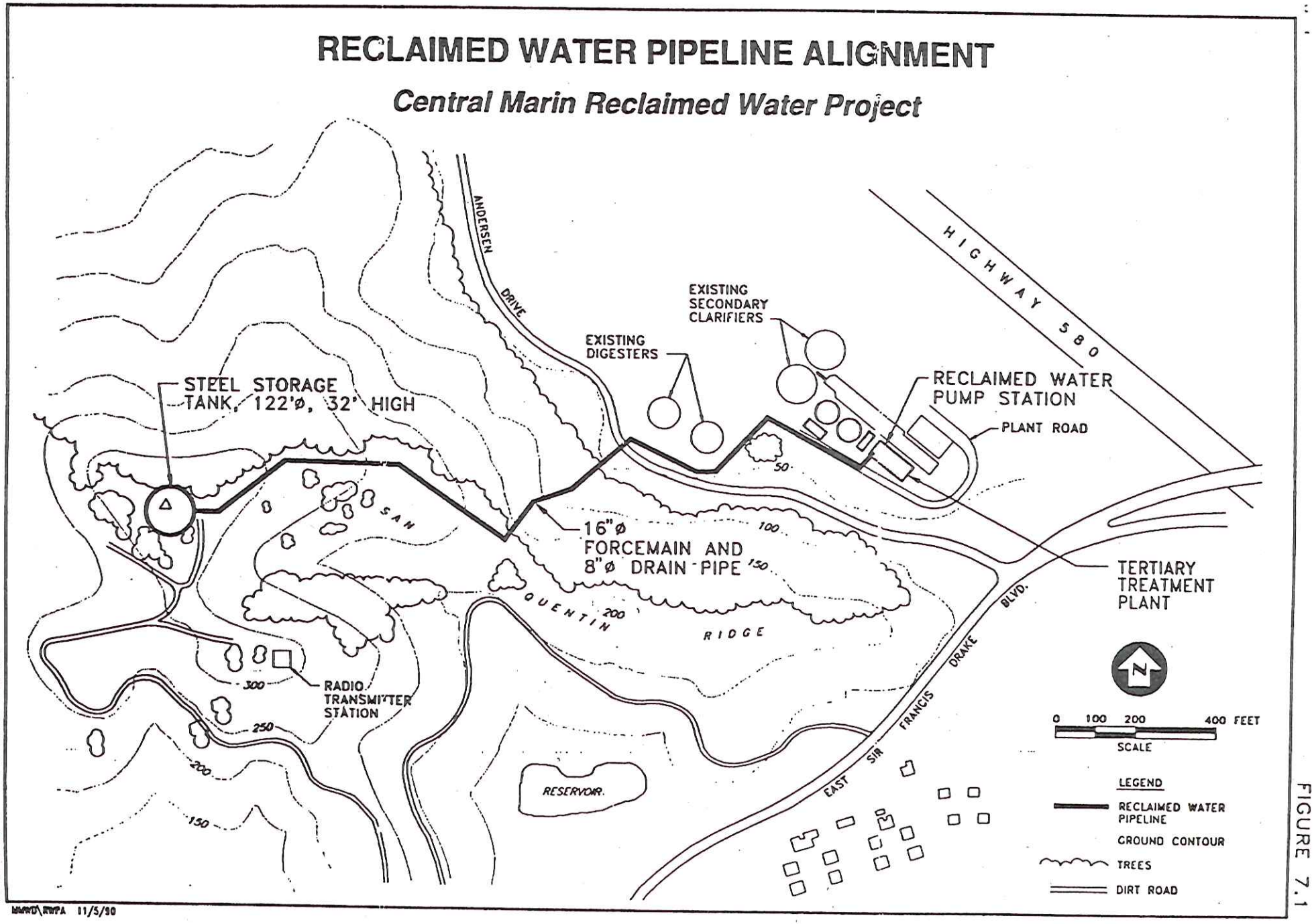


FIGURE 7.1

ENGINEERING—SCIENCE

MMWD\RWPA 11/5/90

PROJECT TEAM

City of San Rafael

Sharon McNamee, *Recreation Director*
Jean Freitas, *Principal Planner*
Lloyd Strom, *Asst. Public Works Director*
Tom Rothenberger, *Asst. Park Superintendent*

MPA Design
Planners and Landscape Architects

Michael Painter
Thomas Klope
Carl Emura
Roger Ravenstad

Philip Williams & Associates, Ltd.
Consultants in Hydrology

Philip Williams
Joan Florsheim

Western Ecological Services Company, Inc. (WESCO)
Biological Resources Consultant

RMI –

Steve Foreman
Richard Nichols
Angela Atkinson

Shoreline Enhancement Plan Committee

Karyn Gear, *The California State Coastal Conservancy*
Eric McGuire, *Marin Municipal Water District*
Barbara Salzman, *Marin Audobon Society*
Sue Scott, *Planning Commission*
Jean Starkweather, *Marin Conservation League and Marin Park and Open Space District*

SHORELINE ENHANCEMENT PLAN

SAN RAFAEL, CALIFORNIA

TABLE OF CONTENTS

LIST OF FIGURES

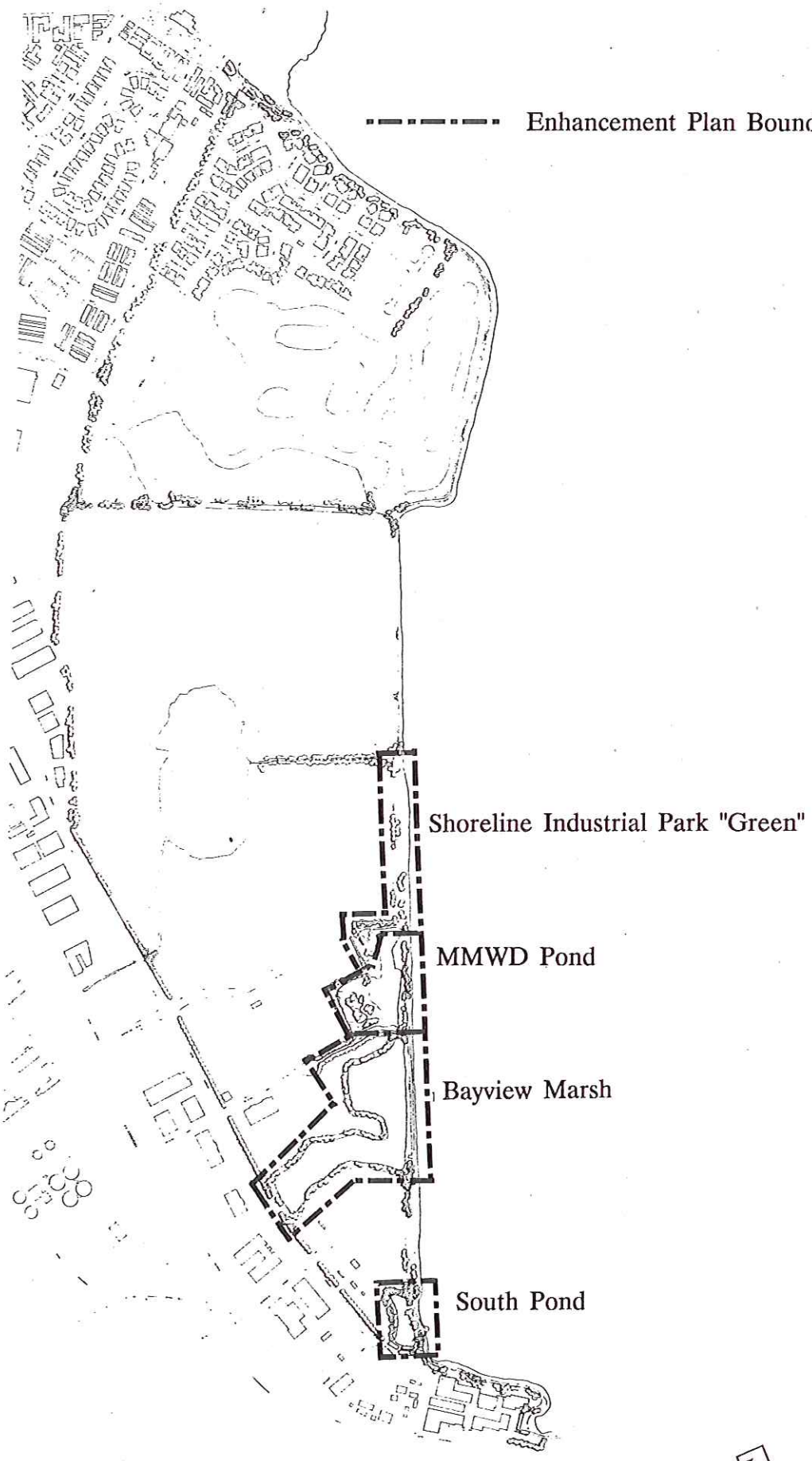
1. INTRODUCTION

Recognizing the open space, wildlife habitat, and recreational value of its shoreline area, the City of San Rafael, commissioned and ultimately approved the *San Rafael Shoreline Park Master Plan* in 1989. That plan made general recommendations for public access and improvements along the East San Rafael Shoreline from Pickleweed Park to Point San Quentin including both publicly and privately held lands. A consistently designed and unified park band developed over time by multiple property owners was a major goal of that plan.

This *Shoreline Enhancement Plan* is the next step of program and design refinement of solely City-owned parcels within the larger *San Rafael Shoreline Master Plan* area. Representing a commitment by the City to realize its portion of the San Rafael Shoreline Park, the content of the *Shoreline Enhancement Plan* completes the design process for public lands and, upon approval, will allow the next phase of preparation of construction and bid documents for ultimate development.

This Plan is a document which presents more detailed design and cost estimates for the development of hydrologic enhancement, habitat enhancement, public access and low intensity uses on four parcels of land adjacent to San Francisco Bay. The Plan area comprises approximately 21.2 acres and includes three wetland areas known as South Pond, Bayview Marsh, and MMWD Pond, and a one hundred foot wide area between the Bay and the Shoreline Industrial Park known as Shoreline Industrial Park "Green". It includes a hydrologic conditions assessment and enhancement recommendations, and wildlife habitat design which will restore and maintain productive terrestrial and wetland habitat for shorebirds, waterfowl and other wildlife species along the San Rafael shoreline. It also identifies public access and low intensity recreation amenities along the shoreline levee that are compatible with habitat enhancement and protection. Finally, it presents estimated construction and maintenance costs for planning and ultimate implementation of the Plan.

The *Shoreline Enhancement Plan* is the product of a design process involving a multidisciplinary team of consultants in collaboration with City Staff, a Shoreline Committee, environmental groups, neighboring property interests, the California State Coastal Conservancy, and input from various public jurisdictional agencies.



SAN RAFAEL SHORELINE ENHANCEMENT PLAN AERIAL

2. STATEMENT OF HABITAT OBJECTIVES

A major focus of the *Shoreline Enhancement Plan* is the restoration and enhancement of wildlife habitat areas. The proposed design will improve the overall value of the project site to wildlife as well as increase both the abundance and diversity of species found there. No disruption to existing wetlands, major drainage patterns, or shoreline edges are proposed. Enhancement to habitat areas through planting, irrigation, buffer zone establishment and fencing to prevent intrusion by humans and pets are proposed. The availability of reclaimed water from Central Marin Sanitation Agency is a possibility for use as both irrigation and supplemental pond water within the next two to three years. Availability will be dependent upon cost. A summary appendix regarding reclaimed water is found at the end of this document.

The major habitat enhancement objectives embodied in the Plan can be summarized as follows:

Objective - Enhance Native Habitats

A primary objective of the Plan is to improve the quality of the existing ponds and marshes and the surrounding landscape to provide increased habitat for migratory and resident wildlife species. To meet this objective, the Plan provides the following design elements:

- Eradication of invasive and weedy plant species that possess little or no habitat value such as Pampas Grass, Scotch Broom, and Fennel.
- Replanting of desirable native and naturalized plant species with high habitat value and appropriateness to the Marin shoreline environment.
- Installation of bubbler-type irrigation to sustain upland vegetation and provide maximum water conservation and control of competitive weedy plant species.
- Mulching of Upland vegetation areas above elevation 10 for maximum water conservation and control of competitive weedy plant species.
- Provisions for a variety of cover for nesting and foraging waterfowl.
- Proposals for the control of relatively constant water levels in ponds throughout the year for maximum habitat value.
- Establishment of healthy stands of marsh vegetation to enhance habitat.
- Establishment of vegetational zones throughout wetland and terrestrial habitats consistent with those which would naturally occur along the Marin shoreline.
- Establishment of habitats which function as naturally as possible requiring minimal maintenance or human assistance to thrive.

- Enhance water quality in ponds and marshes.

Objective: Protect Native Habitats

Throughout the enhancement, establishment and maturing phases of the *Shoreline Enhancement Plan* habitats, protection of the areas from intervention by humans and adverse animal species is required. To meet this objective, the Plan provides the following design elements:

- Locates low-intensity recreational activity and public access areas away from sensitive habitat areas.

- Prohibits human and pet access to sensitive habitat areas and protects steep slopes through fencing, barrier plantings, vehicular control gates and bollards, except for maintenance.

- Buffers visual impact of human activity and surrounding land uses on sensitive habitat areas through planting design.

- Increases environmental awareness of public through interpretive displays and quality of overall park design.

Objective: Maintain Enhanced Habitats

Once native habitats are enhanced, a concerted effort toward maintaining them both for short-term establishment and long-term success is important. The *Shoreline Enhancement Plan* integrates maintenance requirements into habitat design. The Plan recommends the following maintenance:

- Planting should occur preferably in late fall to allow winter rains and early spring conditions optimum effect on plant establishment.

- Seeded areas should be broadcast sown and then oversprayed with binding mulch prior to winter rains for maximum seed viability.

- Irrigation of upland habitat should be provided throughout the first summer season with inspection of plant vigor made the following spring.

- Non-native or weedy species which compete with the establishment of desired plants should be removed manually, mechanically, chemically or by burning, with preference for manual removal. Chemicals are to be used for spot treatment or applied as a last resort.

- Long term monitoring of the habitat plantings should include supplemental plantings of thriving species where needed over time.

- Encourage dense vegetation cover on Uplands adjacent to ponds and wetlands.

- Leave low weedy species that provide habitat even when of non-native species.

3. GENERAL DESCRIPTION

The *Shoreline Enhancement Plan* refines the planning and design guidelines set forth in the *San Rafael Shoreline Park Master Plan* and does not conflict with any aspect of that Plan. The following section describes the existing characteristics, habitat enhancement, public access improvements and low intensity recreation uses designed for each of the four subject parcels of this project. A description and analysis of hydrologic conditions for each parcel area is provided in Section 11 of this report. Descriptions and details of public access designs are provided in Section 5 of this report.

A. SOUTH POND

1. Existing Characteristics

South Pond is the southernmost and only noncontiguous parcel of the *Shoreline Enhancement Plan*. It is a 1.75 acre open space located at the end of Piombo Place and contains a pond of approximately 0.7 acres. The parcel is surrounded by light industrial/office land uses in varying stages of development including a private helipad site to the west, a privately owned construction yard to the north, San Francisco Bay to the east, and two private undeveloped parcels to the south.

South Pond is a relatively freshwater pond fed by stormwater runoff during periods of rainfall. The pond has a maximum length of 310 ft. and width ranging from 70 to 130 ft. The pond is graded flat to a depth of -5.7 ft. NGVD with 4:1 slide slopes.

There are three water control structures in South Pond: 1) a 54-inch culvert carrying stormwater runoff; 2) a stormwater pump station; and 3) a 12-inch culvert draining the Bay Park Offices. In the past, the 54-inch culvert carried storm runoff from upslope areas to the bay. 48 feet of the culvert were removed so that water now fills South Pond before discharging to the bay through the continuation of the culvert which passes under the levee. The 54-inch outlet culvert has an invert elevation of -4.7 ft. NGVD with a slide gate maintained in an open position. The outlet to the 54-inch culvert which enters San Rafael Bay is presently silted in so that the gate is slightly open.

The stormwater pump station is designed to automatically maintain the water surface elevation in South Pond below a maximum elevation of +1.7 ft. NGVD. Water is pumped out of the pond in order to allow drainage from surrounding areas, to prevent overtopping and erosion of the levee, and to increase the storage capacity of the pond. The pumped water is discharged onto the rip-rap on the bay side of the levee.

Because the flap gate on the bay side of the levee is currently silted in an opened position, tidal flow may enter South Pond during relatively high tides. Salinity measured in the Pond on July 14, 1990 was 24 ppt or brackish (30 ppt was measured in San Rafael Bay). On October 7, 1990 salinity was measured as 29 ppt. The pond appeared stagnant with a foul odor. During the recent drought, there probably has not been enough runoff to allow flushing the water in the pond.

Engineering improvements to the existing levee separating South Pond from San Francisco Bay are currently in preliminary design by the City Public Works Department. Those improvements would be done concurrently with the South Pond improvements. This plan incorporates preliminary grading design for the future levee work provided by the City. The parcel currently also contains the Central Marin Sanitation Agency submarine outfall line.

Public parking for the shoreline band is currently provided on Piombo Place with access to the levee via an unimproved pump maintenance vehicle access road. The site is fenced, but publicly accessible. An approach/departure path for the adjacent helipad site is required across the South Pond site along a portion of its western side.

Existing vegetation around the pond is minimal. The one acre of transitional habitat around the pond has very little vegetation other than assorted weedy species of no significant habitat value. Some cattails, tules, and pickleweed surround the immediate pond edge.

South Pond is used by a number of species of waterbirds, especially in winter, when there is optimum water quality and highest water level. Waterfowl use the pond as a resting and feeding area. Birds of prey, shorebirds and mammals range through the site to a lesser extent due to the minimal vegetation. The site, if vegetated, could provide important cover, feeding, and nesting areas for birds and animals.

Waterfowl use the open water year-round with heaviest use in the fall and winter. Mallards have been known to rest and rear young on this pond.

2. Hydrologic Enhancement

South Pond was originally intended to be a flood control facility, with freshwater inflows during the wet season and evaporation during the dry season. The current configuration of the outlet flap gate is partially open due to sedimentation in San Rafael Bay, and some tidal inflow currently enters the pond during high tidal cycles. Salinity in South Pond during the present drought condition was measured as 29 ppt (similar to the salinity measured in San Rafael Bay of 30 ppt). This indicates that in the summer, brackish conditions exist in South Pond.

Opportunities for enhancing South Pond include creating a seasonal freshwater/brackish pond regime where water would be relatively fresh during the wet season due to contribution of stormwater runoff, and relatively brackish during the dry season due to tidal contribution. Managing the water surface elevation throughout the year is preferable to allowing the water level to fluctuate. An optimum seasonal freshwater/tidal regime would let tidal water in slowly during the summer months as the freshwater is evaporated. Some storage volume would be lost due to the tidal inflow over a period of years. This would cause the pump to operate more frequently in the future.

The culvert connection between South Pond and the bay which would let in tidal flow during the dry season should be sized, and a suitable elevation should

be determined based on hydraulic analysis so that future maintenance is minimized. The present flap gate, which is silted in, should be replaced with a slide-flap gate. This structure should be maintained to prevent it from silting in. At present there is a leak in the culvert connecting South Pond to the bay. This leak should be fixed, or the culvert should be replaced.

If treated wastewater becomes available in the future, the option of supplementing the pond with freshwater rather than tidal inflow during the dry season could be considered. (See Reclaimed Water Project Appendix.)

3. Habitat Enhancement

The *Shoreline Enhancement Plan* provides improved habitat all around South Pond. Modest quantities of imported topsoil will evenly transition abrupt grades around the pond and provide improved conditions for plantings. No alterations to the pond or its edge occur.

New planting reflects species and organization typical to ponds naturally found along the Marin shoreline. The areas immediately around the pond will be planted with pickleweed, fat hen, and gum plant. Tules which currently exist in the pond will remain and expand within the wetland habitat. Transitional and upland tree and shrub species will be planted beyond the inundation zone and provide habitat and visual buffer between wetland and adjacent developments. Plant species are specified in Section 5 of this report. Upland trees and shrubs will have bubbler-type irrigation. Transitional and pond vegetation will be non-irrigated.

The South Pond parcel will have a six foot high chain link fence along all sides except the shoreline levee. The proposed plan will remove the existing fence across the Piombo Place edge and provide a four foot high black vinyl clad chain link fence between pond habitat and public access trails. The pond habitat will be completely fenced. Two service gates will be provided for maintenance access. A post and cable fence will discourage access on steeper slopes. Pump maintenance vehicle access will be provided from Piombo Place to the pump station, and emergency service access, if ever needed, is provided on the west side of pond through transitional habitat.

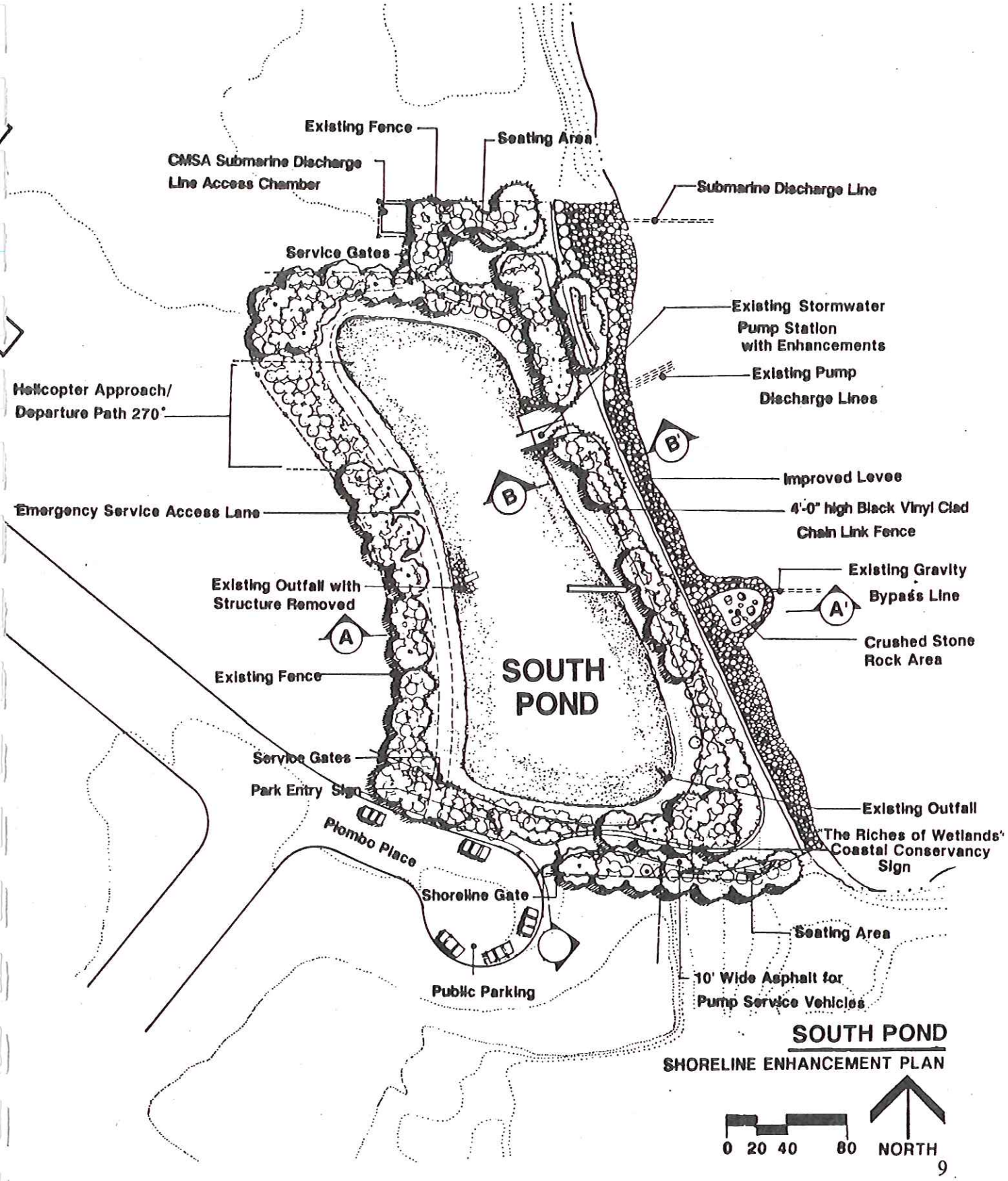
4. Public Access Improvements

Public access to the shoreline band will be identified at the Piombo Place entrance by a Shoreline Park sign. A ten foot wide asphalt path will connect from a widened entry gathering space at the street to the shoreline levee path. An asphalt shoreline path will follow the top of the levee. It will be ten feet wide up to the pump station in order to accommodate service vehicles and eight feet wide beyond that point as the standard dimension for the shoreline path. A three foot wide crushed stone jogging trail lies adjacent to all asphalt paths. Crushed stone seating areas are designed at the north end of the pond and at the intersection of the access and shoreline paths. Eight foot long wood benches are situated to provide views to the pond and the bay. An existing outcropping on the outboard side of the levee, which is inundated during highest

tides, will have basaltic boulders similar to the levee materials positioned for casual seating. The existing pump station will have a general exterior upgrading including wood siding, trellis structure and painting to soften its architectural effect. The existing wood pier will remain non-publicly accessible and requires some strengthening. The existing concrete outfall structure adjacent to the pond will be removed. A Coastal Conservancy wood kiosk and interpretive panel entitled, "The Riches of Wetlands", will be located at the intersection of the access and shoreline paths. A lockable wooden service gate and bollards will control vehicular access to the path allowing only pedestrian, bicycle, emergency and maintenance vehicle access. Public access is not provided around the west side of the pond in order to ensure maximum habitat value.

5. Low Intensity Uses

Planned uses for the South Pond parcel are low intensity in nature and located to give greatest value to habitats. Birdwatching and sitting areas are located at the north and south ends of the pond with vistas over the water visually buffered from the pond by low plantings. Jogging, walking, rollerskating, and bicycling will occur on either the asphalt or crushed stone paths.


Existing Fence
Seating Area
CMSA Submarine Discharge Line Access Chamber
Submarine Discharge Line
Service Gates
Existing Stormwater Pump Station with Enhancements
Existing Pump Discharge Lines
Helicopter Approach/ Departure Path 270°
B'
B
Improved Levee
Emergency Service Access Lane
4'-0" high Black Vinyl Clad Chain Link Fence
Existing Gravity Bypass Line
Existing Outfall with Structure Removed
A'
A
Crushed Stone Rock Area
SOUTH POND
Existing Fence
Service Gates
Park Entry Sign
Existing Outfall
"The Riches of Wetlands" Coastal Conservancy Sign
Plombo Place
Shoreline Gate
Seating Area
Public Parking
10' Wide Asphalt for Pump Service Vehicles
SOUTH POND
SHORELINE ENHANCEMENT PLAN
0 20 40 80
NORTH

B. BAYVIEW MARSH

1. Existing Characteristics

Bayview Marsh is a tidal pond that is fully connected to the Bay. The marsh has an area of approximately 7.4 acres with an additional 3.7 acres of transitional and upland habitat around its edges. The marsh was graded in 1986 to a maximum depth of -5.0 feet NGVD with side slopes of 4:1 above 0.0 ft. and 1:10 below 0.0 ft.

The marsh is bordered by a privately owned construction yard to the south, Bayview Business Park and Kerner Boulevard to the west, Pelican Way walkway to the north and San Francisco Bay to the east.

Cordgrass and pickleweed have been established in some areas around the marsh. Pickleweed areas are expanding in width naturally while cordgrass has required some planting. Saltgrass, brass buttons, and saltbush habitat is developing in the transitional habitat zone. Upland habitat, which comprises a landscaped perimeter around the marsh around elevation 10 NGVD include toyon, cypress and oak which have survived drought conditions without benefit of irrigation since 1987. A four foot high black vinyl clad chain link fence exists along Kerner Boulevard, Bayview Business Park and Pelican Way walkway. An eight foot high chain link fence exists along the south property line.

An eight to ten foot wide asphalt path extends from Pelican Way to the shoreline and southward to the Fairview Lands property line along the top of the shoreline levee. Several wood benches are frequently used by shoreline visitors. A metal gate and bollards control vehicular access at Pelican Way where a wood Shoreline Park sign identifies the park entrance. Public parking is marked in the cul-de-sac. There is a need to fence along the south side of the access path from Pelican Way to the Shoreline path to prevent vehicular access from the parking lot. An existing spray irrigation system exists in the upland habitat around the marsh and has not been activated in several years. It has been found that spray irrigation is ineffective in providing adequate water to desired plantings as it assists competitive undesirable species which block irrigation and outpace native plant species. Spray irrigation water is wind blown on this site.

There are two water control structures in Bayview Marsh: 1) a double culvert connecting the marsh to the bay; and 2) a culvert connecting Bayview Marsh to the MMWD Pond. The two 6 ft. culverts have an invert elevation of -4.0 ft. NGVD and extend 70 ft. from the marsh under the levee to the bay. The culverts are open on the marsh side of the levee and can be controlled by two 6 ft. gates on the bay side, however, the slide gates are maintained in an open position.

The culvert which connects Bayview Marsh to the MMWD Pond has an invert elevation of 0.0 ft. NGVD, a diameter of 18 inches, and extends 110 ft. under the walkway between the two ponds. The culvert has a concrete headwall and a drainage gate in the marsh which is silted in a closed position due to sedimentation in the marsh.

Bayview Marsh is nearly fully tidal. Fine-grained sediment transported into the marsh with incoming tides is deposited and is raising the bottom elevation of the marsh. The marsh is important for muted tidal action. Through time, vegetation will extend into the bottom of the marsh, and a slough channel system will develop.

Sources of freshwater to the marsh include direct precipitation and in the future, parking lot runoff will be allowed to enter the marsh. Because the marsh flushes with the ebb and flow of the tide, water quality in the pond will be similar to water quality in the bay. Salinity measured in Bayview Marsh on July 14 and October 7, 1990 was 30 ppt and 31 ppt respectively, similar to the salinity measured in San Rafael Bay.

Eljumaily-Butler Associates noted in 1982 that sediment and vapor analysis indicate that some hazardous materials have probably been disposed in the Bayview Business Park landfill near the marsh. High concentrations of zinc and contaminants in the former disposal site had not migrated into the marsh by 1982. Ongoing monitoring finds no concentrations of toxins in the marsh.

A variety of wildlife uses the Bayview Marsh site. The upland habitat along the top and upper slopes of the marsh may serve as cover to species that are flooded out of adjacent, lower wetland areas during high tides or periods of heavy rainfall. Raptors such as Red-Tailed Hawks *(Buteo jamaicensis)*, Black-Shouldered Kites *(Elanus caeruleus)*, and Northern Harriers *(Circus cyaneus)* fly around the marsh in search of prey. Other birds frequenting the marsh slopes include Western Meadowlarks *(Sturnella neglecta)*, House Finches *(Carpodacus mexicanus)*, Lesser Goldfinches *(Cardeulis psaltria)*, Red-Winged Blackbirds *(Agelaius phoeniceus)*, and Killdeer *(Charadrius vociferus)*. Mammals that use the marsh edges as well as surrounding habitats include Ground Squirrels *(Spermophilus beecheyi)*, Blacktail Jack-rabbits *(Lepus californicus)*, California Voles *(Microtus californicus)*, and House Mice *(Mus musculus)*. The levee and bordering interior habitats likely support Western Fence Lizards *(Sceloporus occidentalis)*, Alligator Lizards *(Gerrhonotus sp)* and Garter Snakes *(Thamnophis sp.)*

Bird species most closely associated with the Bayview Marsh habitat type are the Long-Billed Marsh Wren *(Cistolthorus palustris)*, Savannah Sparrow *(Passerculus sandwichensis)*, Song Sparrow *(Melospiza melodia) and other wading birds and waterfowl.* The use of the marsh by Great Egrets *(Casmerodius albus)*, Snow Egrets *(Egretta thula)*, and Black Crowned Night Herons *(Nycticorax nycticorax)* is of particular interest because of the site's proximity to the rookery on West Marin Island. This heronry is among the largest in the San Francisco Bay region.

2. Hydrologic Enhancement

Previous enhancement of Bayview Marsh was originally planned to provide a tidal habitat in the San Rafael Shoreline. The marsh is currently functioning successfully. Tidal flows transport sediment into the marsh raising the marsh bottom elevation, and vegetation is extending into an incipient marsh plain. It is expected that in the future, slough channels will develop as the marsh reaches

an equilibrium elevation. Because the marsh is functioning successfully at present, no change in the operation of the tide gate from its fully opened position is recommended.

3. Habitat Enhancement

The *Shoreline Enhancement Plan* improves the habitat around Bayview Marsh, maintains the existing asphalt path, adds barrier fencing to protect habitat areas and improves the irrigation system with a more efficient bubbler application which is designed to accommodate reclaimed as well as potable water supplies. Habitat improvements will reflect plant species and organization typical to marshes naturally found along the Marin shoreline. Upland tree and shrub species will screen and buffer adjacent land uses from habitat and marsh. Existing cypress trees and shrubs planted in 1986 and 1987 will remain and additional plantings will provide improved habitat and screening. A complete plant list is found in Section 5 of this report including a prototypical section defining habitat types.

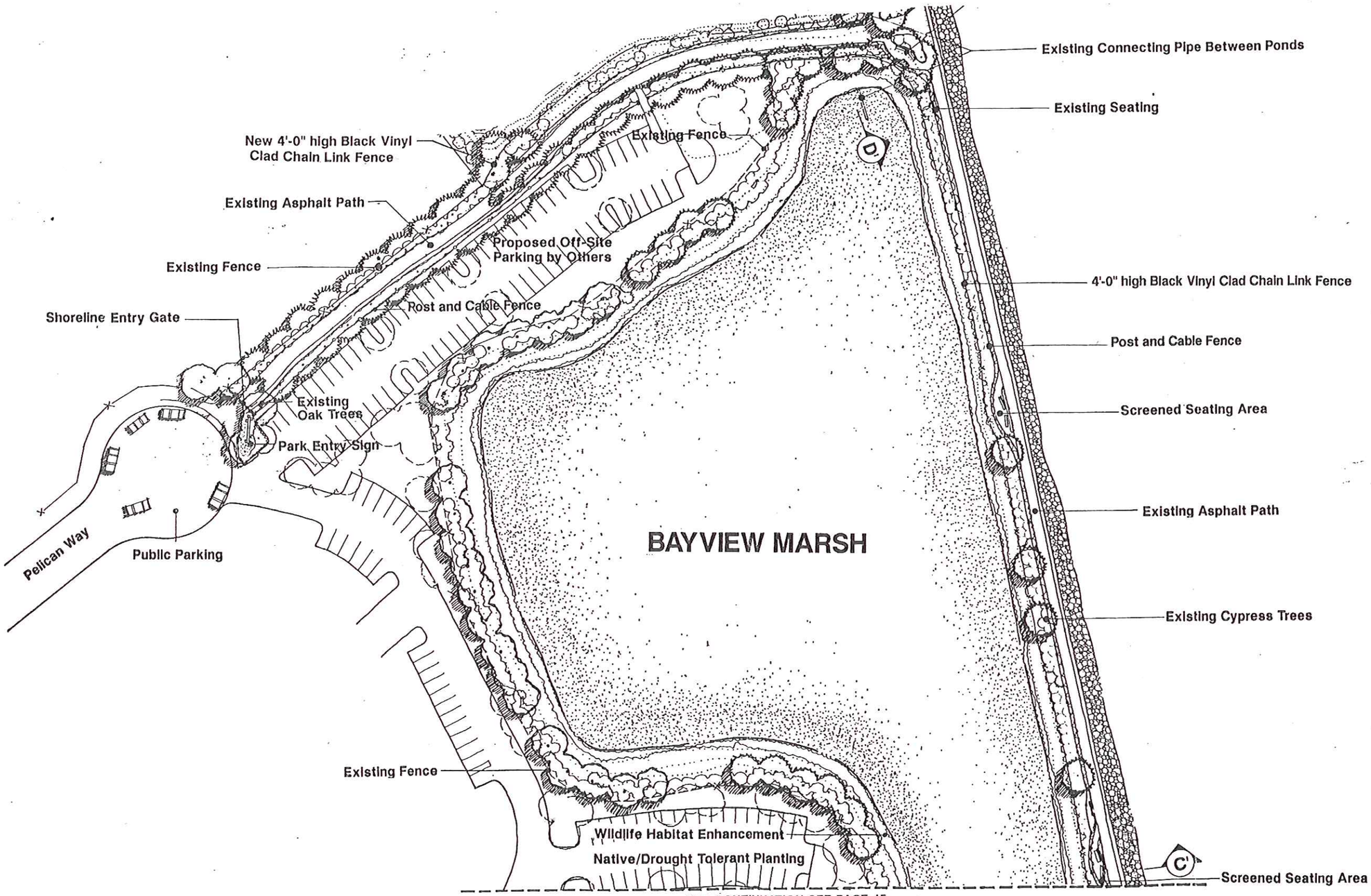
A four foot high black vinyl clad chain link fence will be extended to the end of the Pelican Way path and continue along the entire inboard side of the shoreline levee to the Fairview Lands fence at elevation 4.0. The marsh will be completely fenced and have occasional gates for maintenance access. A post and cable fence will be provided along the inboard side of the shoreline path at the top of the slope to discourage public access to the slopes.

4. Public Access Improvements

Public access to the shoreline band will be identified at Pelican Way entrance by a new Shoreline Park sign. The existing eight foot wide asphalt path will remain with a three foot wide crushed stone jogging path added beside it. The existing asphalt shoreline levee path will remain with a crushed stone jogging path added against the top of the rip rap levee. Some asphalt will require removal to accommodate the jogging trail. Crushed stone seating areas will be added with wood benches at three locations along the shoreline levee as shown on the plan. A new lockable wood vehicular control gate and wood bollards will replace the existing gate at Pelican Way. A Coastal Conservancy wood kiosk and interpretive panel entitled "Wetland Preservation" will be located on the Pelican Way path at the southwest corner of MMWD Pond. A new wood Shoreline Park sign will identify Bayview Marsh along Kerner Boulevard. Planting design will preserve a view from Kerner Boulevard to the marsh and beyond to the bay and Marin Islands.

5. Low Intensity Uses

Uses accommodated around Bayview Marsh are low intensity in nature and located in areas which allow views and interest without compromising habitat value. Birdwatching, sitting, photography and reading areas are located along the shoreline levee path. Jogging, walking, bicycling and rollerskating will occur on either the asphalt or crushed stone paths. Public access is not provided along the west and south sides of the Marsh.



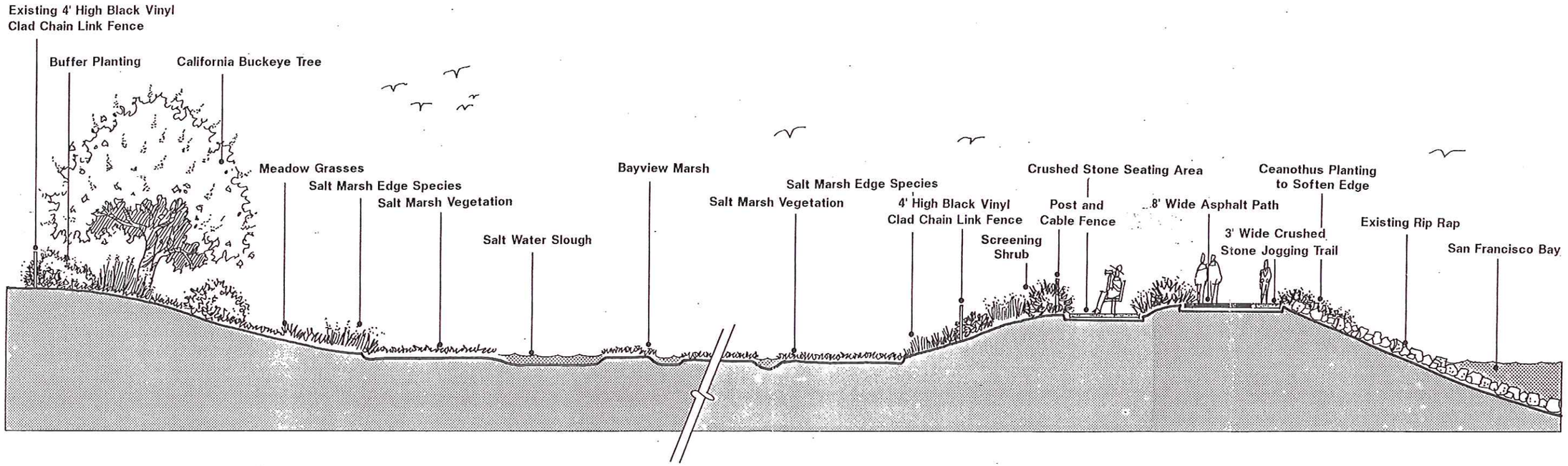
FOR CONTINUATION SEE PAGE 15

BAYVIEW MARSH - NORTH

SHORELINE ENHANCEMENT PLAN

0 20 40 80 NORTH


FOR CONTINUATION SEE PAGE 14
Proposed Off-Site Planting by Others
C
C'
Screened Seating Area
Existing Tidal Gates
Existing Fence
Birdwatching/Seating Areas
Existing Fence
Wetland Habitat Enhancement
View Corridor from Kerner Boulevard to Marsh
Bayview Marsh Sign
Existing Fence
Existing Sycamore Trees
BAYVIEW MARSH - SOUTH
SHORELINE ENHANCEMENT PLAN
0 20 40 80
NORTH



SECTION CC

BAYVIEW MARSH SECTION

SHORELINE ENHANCEMENT PLAN

C. MMWD POND

1. Existing Characteristics

MMWD Pond is a very brackish water pond approximately 3.3 acres in size which includes a small island separated by a shallow moat. Surrounding the pond is an additional 2.2 acres of habitat. The pond is bordered by the Shoreline Industrial Park (which was once the San Quentin landfill) to the north, the MMWD storage yard to the west, Bayview Marsh to the south and the bay to the east. The levee between the pond and the bay does not meet BCDC standards and requires upgrading which will be done by Shoreline Industrial Park.

Current access to the pond area is from Pelican Way to the west or from the shoreline levee trail to the north and south. Eight foot high chain link fences exist along the west and north property boundaries.

Vegetation around the pond is weedy and overgrown with Vetch *(Vicia americana)*, Sweet Fennel *(Foeniculum vulgare)*, and French Broom *(Cytisus monspessulanus)*. Low lying areas support stands of pickleweed, creeping saltbush and fat hen. The water level at the end of the 1990 summer season was the lowest ever recorded. Concrete rubble and levee rock which do not meet City or BCDC standards are exposed in the pond due to the low water level.

MMWD Pond is isolated hydraulically from San Rafael Bay. There are two water control structures in MMWD Pond: 1) a culvert and overflow drain connecting the pond to Bayview Marsh; and 2) a culvert draining a newly constructed road on the Shoreline Industrial Park fill north of the pond. The culvert between Bayview Marsh and MMWD Pond is an 18 inch culvert with an invert elevation of 0.0 ft. NGVD and a slide gate. A concrete structure around the culvert has an overflow outlet at an elevation of 3.5 ft. NGVD, which prevents water surface elevation in the pond from increasing above the elevation of the drain.

The culvert that drains the area north of the MMWD Pond is not used at present, however, when this area is developed as Shoreline Industrial Park, runoff will enter the pond.

Sources of freshwater to the pond include direct precipitation and runoff from adjacent land. The pond was intended to provide seasonal freshwater habitat, such that the pond would fill to the elevation of the overflow drain during the wet season, and slowly evaporate during the dry season. There is no tidal circulation in the pond because of the levee which separates the pond from the bay and because the culvert joining MMWD Pond to Bayview Marsh is maintained in a closed position on the MMWD Pond side and silted shut on the Bayview Marsh side. The levee between the pond and the bay is thought to allow seepage of the bay water into the pond when the tidal elevation is higher than the water surface elevation in the pond. At the present time, there is no circulation in the Pond and water stagnates and concentrates salts during the dry

season. During the recent drought, MMWD Pond has become saline due to lack of sufficient freshwater source. Salinity was measured using a refractometer in October of 1990 at 50 ppt.

Salinity varies seasonally, and the pond is more saline in the late summer than in the spring. As water evaporates from the pond during the dry summer season, the salinity of the pond increases relative to the bay. Winter rainfall dilutes the pond water causing it to be less saline during the wet season. Evaporation and seepage of bay water into the pond through the levee increase the salinity throughout the spring and summer months. Present salinity levels in the pond are saline.

Bird species commonly observed at the MMWD Pond are Great Blue Heron, Great Egret, Snowy Egret, Mallard, American Wigeon, Scaup sp., Bufflehead, Coot, Killdeer, Black-necked Stilt, Spotted Sandpiper, Forsters Tern, Black Phoebe, Song Sparrow, Redwing Blackbird, House Finch, and Gull. Other waterfowl, shorebirds and raptors occasionally use the site. The pond is used by the greatest number of bird species in winter when there is the greatest diversity and number of species and there is more water in the pond. Waterfowl are most numerous and use the pond as a resting and feeding area.

2. Hydrologic Enhancement

The MMWD Pond was planned as a freshwater habitat for the San Rafael Shoreline. During the present drought conditions, measurements of pond salinity have reached 50 ppt, much higher than the salinity of San Rafael Bay (30 ppt). In addition, the pond is stagnant and has an odor. It is expected that in the future, without additional sources of freshwater and improvements in circulation, MMWD Pond will remain saline during drought conditions, or brackish during wetter years and will experience further degradation of water quality.

Three options are considered for enhancement of the MMWD in order to improve circulation and water quality including: 1) creating a tidal marsh; 2) creating a brackish pond; and 3) maintaining a fresh water pond through the availability of reclaimed water.

Each option requires further environmental study beyond the scope of this design phase in order to determine the most appropriate solution from the standpoints of habitat appropriateness, water quality effectiveness and management requirements. The ultimate design should be developed which conserves the greatest resources and benefits the greatest number of environmental and hydrologic objectives of this plan. Once more precise study of the options are made, a hydrologic enhnacement approach to the MMWD Pond may be selected.

Tidal Marsh

Creation of a tidal marsh in the MMWD Pond could be achieved by constructing a culvert or bridge through the levee between MMWD Pond and the bay and thereby creating a direct connection between the bay and the pond, and/or by improving or replacing the existing culvert between

Bayview Marsh and MMWD Pond with a larger culvert or a bridge to allow full tidal action. If a connection to Bayview Marsh is continually open, the system would be self scouring, and maintenance dredging in Bayview Marsh would not be anticipated. With continual tidal action bringing in sediment which would settle out, a salt marsh plain with slough channels would develop similar to the Bayview Marsh.

Brackish Pond

Creation of a brackish pond could be achieved if tidal inflow is allowed periodically to maintain water levels at a predetermined level (based on vegetation requirements) which keeps the moat around the island inundated in order to optimize habitat. The pond would fill with freshwater during the wet season. Tidal inflow would supplement the pond as evaporation lowers the water surface elevation during the dry season. A hydraulic connection to the bay would be placed at an elevation high enough to minimize sedimentation. This hydraulic connection would be manually opened during high tide when water surface elevations decreased below the target elevation based on observations made by the City of San Rafael.

Long-term constraints to a brackish pond include: 1) continuing long-term management and maintenance commitment by trained personnel; 2) lack of circulation and degradation of water quality, since part of the MMWD Pond is situated over a landfill; and 3) sedimentation as a result of periodic tidal inflow would eventually reduce the volume of MMWD Pond. Short-term constraints to creating a brackish pond include: 1) possible fish entrapment, since fish could enter the pond while the culverts are open and then not be able to exit the pond; and 2) the ecosystem could be impacted in the zone where water salinity changes rapidly during the period where tidal inflow supplements the water level in the pond.

Freshwater Pond

Creating a freshwater pond is not feasible at present due to the lack of a freshwater source. With the potential of reclaimed water availability within the next two to three years from CMSA, (see Reclaimed Water Appendix), the possibility of MMWD Pond becoming a consistently freshwater pond throughout the year can be considered. During the recent drought, winter rainfall has been insufficient in maintaining low saline levels in the pond. As water has evaporated from the pond during the dry summer season, the salinity of the pond has been compounded relative to the bay. Normal winter rainfall patterns would benefit more consistent lower saline levels throughout the year. Additional fresh water made available by a possible CMSA reclaimed water source could maintain adequate freshwater quality and water level throughout the year. Costs of water and infrastructure must be evaluated as part of a more detailed review of this option.

3. Habitat Enhancement

This *Shoreline Enhancement Plan* recommends the establishment of healthy and vigorous stands of native marsh and transition zone vegetation around the pond and island. Upland habitat will surround the pond above elevation +10 and be bubbler irrigated. Transition and marsh habitat plant species that are seeded will be non-irrigated and function as a native Marin habitat. Plant species are specified in Section 5 of this report.

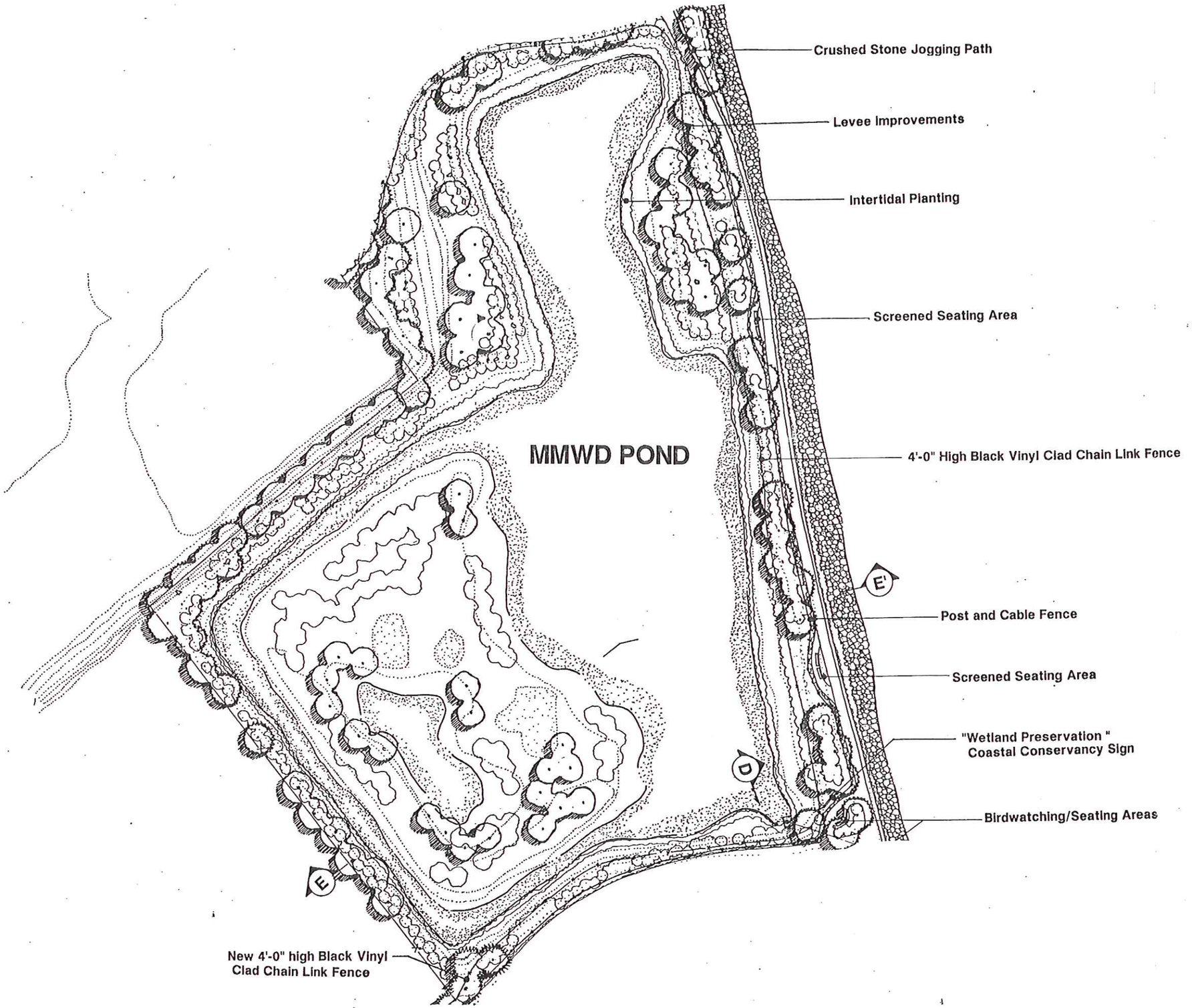
The MMWD Pond will have a four foot high black vinyl clad chain link fence around the south, east and north edges of habitat which will complete fencing around the entire site. Gates will be provided for maintenance access. A post and cable fence will be provided along the inboard sides of pedestrian paths to protect steep slopes which border habitat areas.

4. Public Access Improvements

Public access to the MMWD Pond area will be provided via the existing asphalt Pelican Way entrance walk described as part of the Bayview Marsh improvements and the shoreline levee path. Three crushed stone seating areas furnished with wood benches are located along the shoreline path with views toward the pond for birdwatching. These seating areas occur in areas which will be screened by plantings. Public access is not provided along the west side of the pond in order to ensure maximum habitat value.

5. Low Intensity Uses

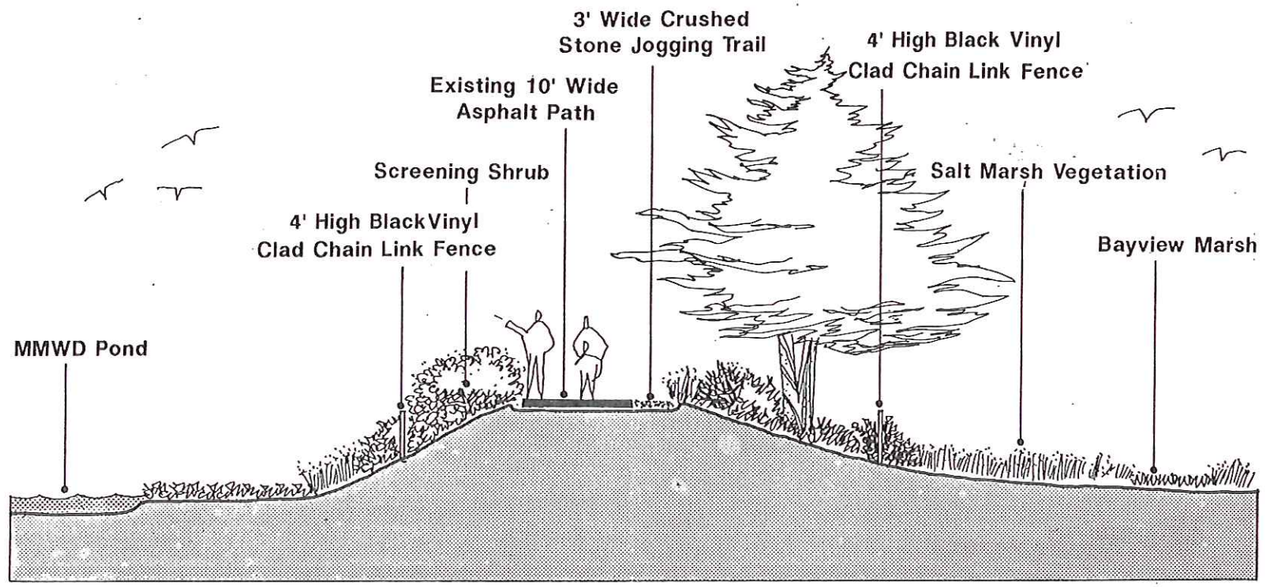
Planned uses for the MMWD Pond are low intensity in nature and located to give greatest value to habitats. Birdwatching and sitting areas are located to give views of the pond with minimal impact on wildlife using the pond. Jogging, walking, rollerskating and bicycling will occur on either the asphalt or crushed stone paths.



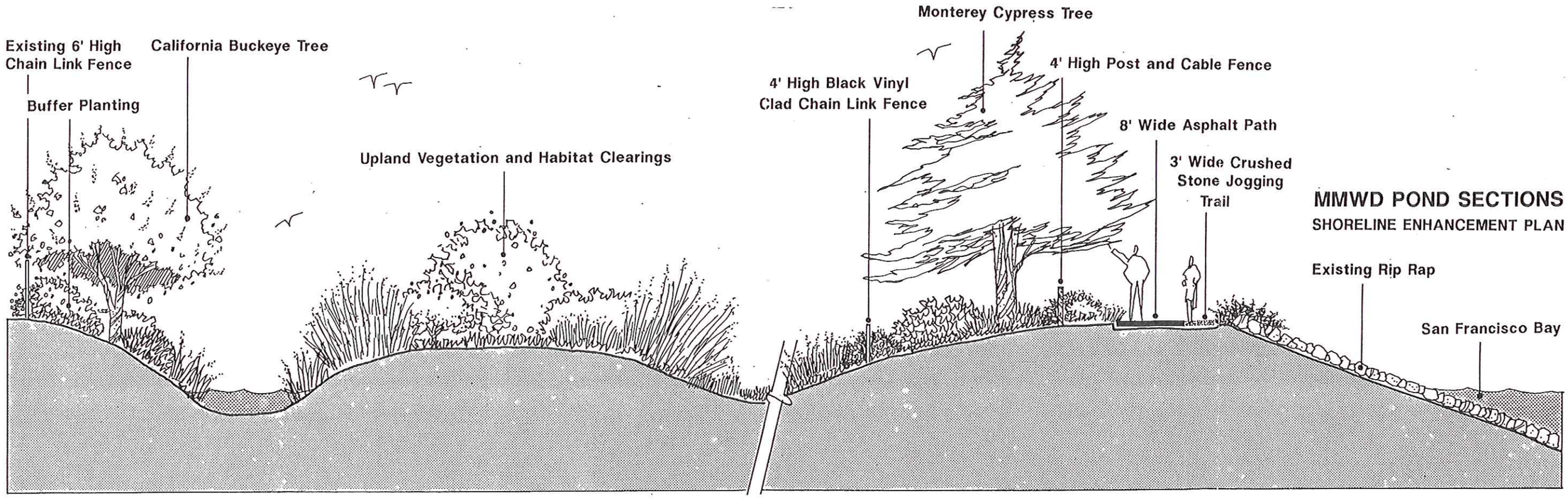
MMWD POND

SHORELINE ENHANCEMENT PLAN

0 20 40 80 NORTH



SECTION DD



SECTION EE

MMWD POND SECTIONS
SHORELINE ENHANCEMENT PLAN

D. SHORELINE INDUSTRIAL PARK "GREEN"

1. Existing Characteristics

The Shoreline Industrial Park "Green" is the northernmost parcel of the *Shoreline Enhancement Plan* and the only one which does not possess a wetland. The site is approximately six hundred feet long and is one hundred feet in width along the shoreline and also includes a dedicated park parcel from the Shoreline Industrial Park adjacent to the MMWD Pond. The entire Shoreline Industrial Park "Green" site comprises approximately 3.85 acres. The site includes the one hundred foot wide BCDC park band which has been dedicated to the City and is unimproved. The eastern edge of the parcel is the bay levee constructed of rubble; to the south is the MMWD Pond; to the west is the undeveloped Shoreline Industrial Park which is on top of the now closed San Quentin Landfill; and to the north is Canalways Marsh and levee. A city maintenance road enters the Shoreline Industrial Park "Green" site at the far northeast corner. A subterranean city pump vault requiring occasional access is at the north end of the parcel.

The majority of the Shoreline Industrial "Green" site along the shoreline levee is generally elevation 10.0 NGVD. The site includes a roughly 2 to 1 slope up to the top of the Shoreline Industrial Park which is elevation 18. The top of the sloped portion of the site is roughly the parcel boundary.

Vegetation on the Shoreline Industrial Park "Green" includes weedy species in the generally level areas and *Carpobrotus edulis*, Hottentot Fig Iceplant planted on the slopes of the landfill which is intended to control erosion. A temporary eight foot high chain link fence exists along the toe of the landfill slope.

2. Habitat Enhancement

The *Shoreline Enhancement Plan* improves the habitat value of the Shoreline Industrial Park "Green." The consistently sloped landfill edge will receive modest amounts of import soil to sculpt its edges in order to provide irregularly shaped areas that are defined by berms and plantings. The area will be gradually sloped and no modification to the landfill will occur other than addition of fill to its base and sides in certain areas. This concept currently raises no significant engineering concerns regarding the stability of landfill or levee.

New planting will consist of upland habitat species along the project boundary at the Shoreline Industrial Park parcel. Shrub planting will follow the sculpted contours of the slopes and help to provide wind protected areas and screening. Lawn areas for recreation will be gently sloped and transition the area between slope and shoreline levee. The lawn specification will be a low water consumptive blend meeting Recreation Department maintenance criteria.

Irrigation will be bubbler-type for all shrub and groundcover areas and stream spray for lawn areas. The stream system will consist primarily of rotary heads which emit streams of water more capable of withstanding windy conditions at the San Rafael shoreline area. Impact sprinklers, conventionally used on lawn

areas, are less appropriate due to the susceptibility of wind drift in their application of water. A mulch layer will be provided in all shrub and tree planting areas to limit weed growth, conserve water, and ease maintenance. Tree and shrub planting will help buffer public uses from the MMWD Pond. A post and cable fence will occur adjacent to the path from the Shoreline Industrial Park to protect the slope. A four foot high black vinyl clad chain link fence extends around the north end of the MMWD Pond as a part of the MMWD Pond improvements.

3. Public Access Improvements

Primary public access to the Shoreline Industrial Park "Green" will be from the shoreline path via Canalways and the MMWD Pond. Other access points from the Shoreline Industrial Park are anticipated depending on its final design. The eight foot wide shoreline path will split at the north end of the "Green" site with one path continuing along the levee and one gently sloping up to the west of the landfill slope. The upper path will follow the top of the slope to the southern end of the site before gently sloping down to meet the shoreline levee path at elevation 10.0. A three foot wide crushed stone jogging trail will continue between the shoreline levee and the shoreline path. Three crushed stone picnic areas furnished with picnic tables and barbecues will be provided along the levee path. The picnic areas are located near major access points and are accessible to city maintenance vehicles by way of the adjacent shoreline path. Tree and shrub plantings around the picnic areas will help shelter and shade them. City access will be maintained from the existing service road along the Canalways property line.

The new access point from the Shoreline Industrial Park includes a fourteen car parking lot provided on the higher elevations above the MMWD Pond. A public restroom and telephone are included as public amenities in the parking lot area. As a major entrance to the Shoreline Park, the Shoreline Industrial Park access will include a wooden Shoreline Park sign. A childrens' play area will be featured at the brow of the slope with a modest lawn area and play equipment in a sand pit. Public seating will ring a peripheral walk with commanding views from the highest point along the Shoreline Park. A Coastal Conservancy wood kiosk and interpretive panel entitled, "Uplands" will be located in the parking lot terrace area.

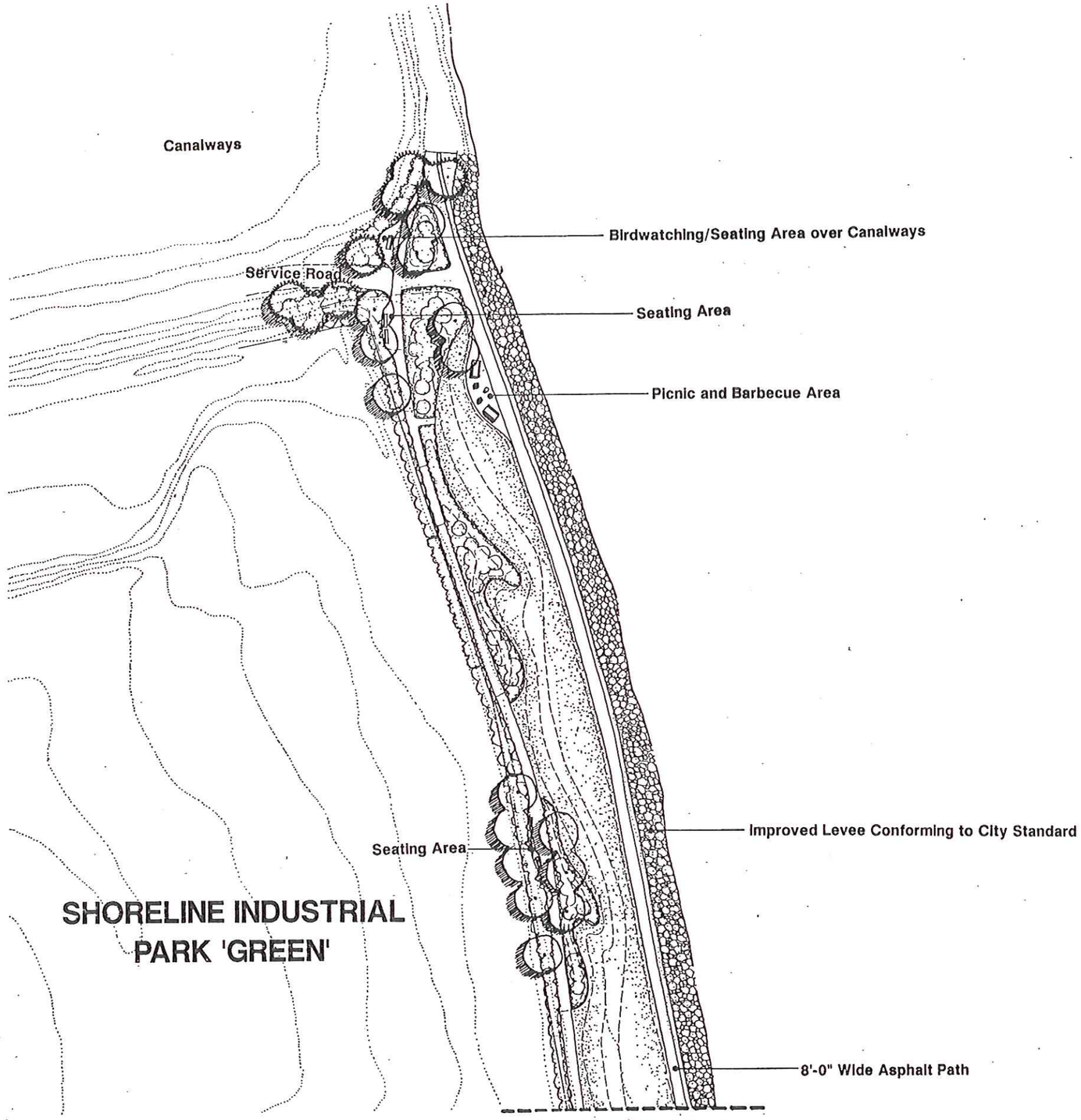
Public access to the shoreline band will be provided from the parking area down to the levee along an eight foot wide asphalt path with vehicular egress limited to service vehicles by a lockable wood gate and bollards. The slope of the path will not exceed five percent. The new access path will meet the Shoreline path between the "Green" and the MMWD Pond. Disabled access is provided on all paths.

4. Low Intensity Uses

The Shoreline Industrial Park "Green" is the primary open space for recreation along the Shoreline Park. It is isolated from sensitive habitat areas and represents the only significant area capable of providing large open space for recreation. While not large enough to accommodate structured play fields, it

will provide areas for group activities and play with significant views. Lawn areas will be used for kite flying, informal group activities like volleyball, as well as picnicking and sunbathing. Bicycling, jogging, walking, and rollerskating will occur on both of the asphalt paths or the crushed stone path along the levee. No fencing is proposed for the site. The city maintenance access road at the north end of the site will remain.

Uses programmed for the Shoreline Industrial Park access area above the MMWD Pond area are low intensity in nature. The parking lot is designed to afford panoramic views of the San Rafael Shoreline with low berms and plantings to screen headlights and car grills from the park and habitats. Seating and childrens' play equipment are featured at the top of the slope while buffered with plantings and fenced from habitat around the pond. Walking, bicycling, and jogging trails are kept to edges of the parcel and screened from pond habitat. Seating areas are designed with adequate setback and level area minimizing impact to habitat but allowing views into and over the pond at locations of particular interest. The future design of the Shoreline Industrial Park should prevent vehicular access to the shoreline "Green".



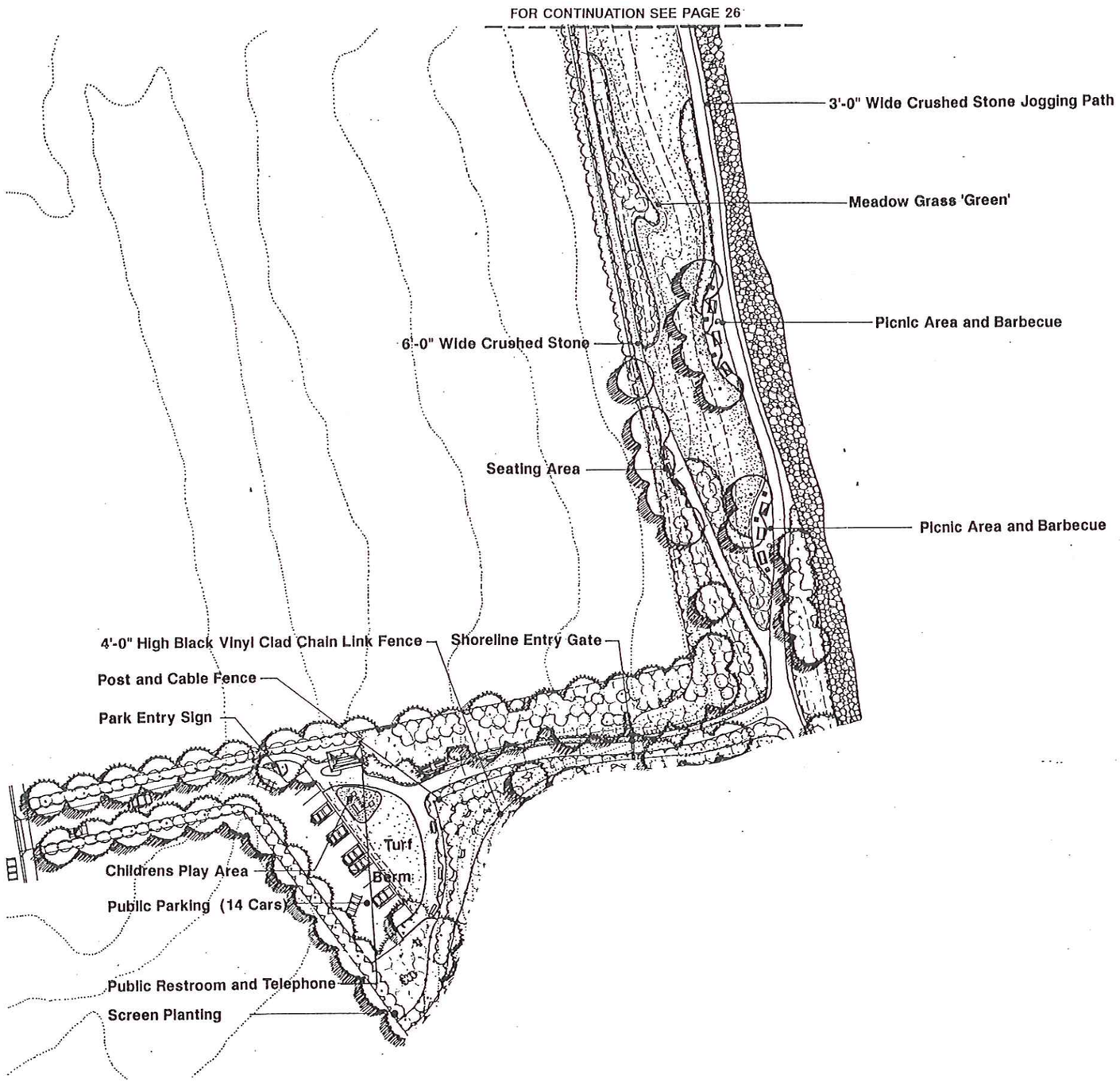
FOR CONTINUATION SEE PAGE 27

SHORELINE INDUSTRIAL PARK 'GREEN' - NORTH

SHORELINE ENHANCEMENT PLAN

0 20 40 80 NORTH

FOR CONTINUATION SEE PAGE 26



SHORELINE INDUSTRIAL PARK 'GREEN' - SOUTH

SHORELINE ENHANCEMENT PLAN

4. PLANTING PROGRAM

The planting program for the *Shoreline Enhancement Plan* includes plant species that are native to the Marin shoreline or have been naturalized to that environment. The shaping and organization of the site's character and habitat value are enhanced by the planting design as the plan drawings indicate and the specific organization of species show. A primary objective of the plant palette and design is to ensure a landscape that, when implemented, will naturalize to the greatest extent possible, be low in water requirements, low in maintenance, provide valuable wildlife habitat and succeed in a difficult environment.

Since water is a very limited resource along the San Rafael shoreline, the plant list is predominantly drought tolerant. Lawn areas have been kept to a minimum and will consist of seed blends which require less water than conventional turf types yet are appropriate turf surfaces for low intensity recreation and parks department maintenance practices.

Irrigation for the planting areas is proposed only in the upland habitat areas as a bubbler system for all trees and shrubs and stream spray heads for lawn areas. The irrigation system will accommodate the potential future use of treated secondary water from Central Marin Sanitation Agency. (See Reclaimed Water Project Appendix.) Upland Marsh and High Marsh areas will be seeded at times appropriate to plant establishment and ultimately function as a naturally occurring Marin landscape comprised of annual and perennial species without irrigation.

Recommended initial container sizes of plants are primarily one and five gallon. These smaller sizes are generally better suited to acclimatization to the shoreline environment and can establish at a rate which is ultimately faster and with greater success than larger ones. Seeded plantings are to be broadcast spread and then hydromulched with an overspray in order to maintain the greatest quantity of viable seed. Eradication of noxious, non-native plant species such as Broom, Iceplant, and Pampas grass is proposed.

Once established, the *Shoreline Enhancement Plan* landscape is intended to resemble and function as a naturally occurring Marin shoreline landscape. It will serve as valuable wildlife habitat offering cover, feed, and forage areas for both resident and migratory species. The planting program is intended to achieve passive management to the greatest extent possible requiring only a minimum level of manpower and equipment resources.

Native and Naturalized Plants for Revegetation and Landscaping Around South Pond, Bayview Marsh, MMWD Pond, and Shoreline Industrial Park "Green"

San Rafael Shoreline Enhancement Plan

Botanical Name	Common Name	Size
UPLAND HABITAT		
Trees		
Aesculus californica	California Buckeye	15 gal/5 gal
Cupressus macrocarpa	Monterey Cypress	15 gal/5 gal
Pinus muricata	Bishop Pine	15 gal/5 gal
Quercus agrifolia	California Live Oak	15 gal/5 gal
Shrubs		
Baccharis pilularis consanguinea	Chaparral Broom	1 gal
B. douglasii	Douglas Baccharis	1 gal
B. viminea	Mule Fat	1 gal
*Ceanothus gloriosus**	Pt. Reyes Ceanothus	1 gal
Eriogonum arborescens	Santa Cruz Island Buckwheat	1 gal
*Fremontia californica**	Flannel Bush	1 gal
Heteromeles arbutifolia	Toyon	1 gal
Prunus illicifolia	Islay	1 gal
Rhamnus californica	Coffeeberry	1 gal
Rhus integrifolia	Sugar Bush	1 gal
Salvia leucophylla	Purple Sage	1 gal
Sambucus caerulea	Blue Elderberry	seeded
Herbs and Groundcovers		
Elymus glaucus	Blue Wildrye	seeded
Elymus triticoides	Creeping Wildrye	plugged
Eriophyllum stacchadifolium	Lizard Tail	seeded
Eschscholzia californica	California Poppy	seeded
Festuca idahoensis	Idaho Fescue	seeded
Hordeum brachyantherum	Meadow Barley	seeded
Hypericum concinnum	St. John's Wort	seeded
Lasthenia californica	Goldfields	seeded
Lupinus spp.	Lupine	seeded
Sisyrinchium bellum	Blue-eyed grass	seeded
Stipa pulchra	Purple stipa	seeded

Botanical Name	Common Name	Size
TRANSITIONAL MARSH (Not subjected to tidal waters)		
Atriplex patula hastata	Fat Hen	seeded
Baccharis consanguinea	Chaparral Broom	seeded
B. glutinosa	Sticky Baccharis	seeded
B. pilularis	Dwarf Coyote Brush	seeded
Limonium californicum	Marsh Rosemary	seeded
Salix sp.	Willow	cuttings
HIGH MARSH (Occasionally covered by tidal waters)		
Cotula coronopifiolia	Brass Buttons	seeded
Grindelia humilis	Gum-Plant	seeded
Jaumea carmosa	Jaumea	plugged
Salicornia virginica	Common Pickleweed	plugged
Scirpus robustus	Alkali Bulrush	plugged
LOW MARSH (Covered by tidal waters twice a day)		
Spartinia foliosa	Cordgrass	plugged

*Require well-drained planting sites.

Note: Seeded species shall be broadcast spread with hydromulch overspray.

UPLAND HABITAT
El. + 10.0

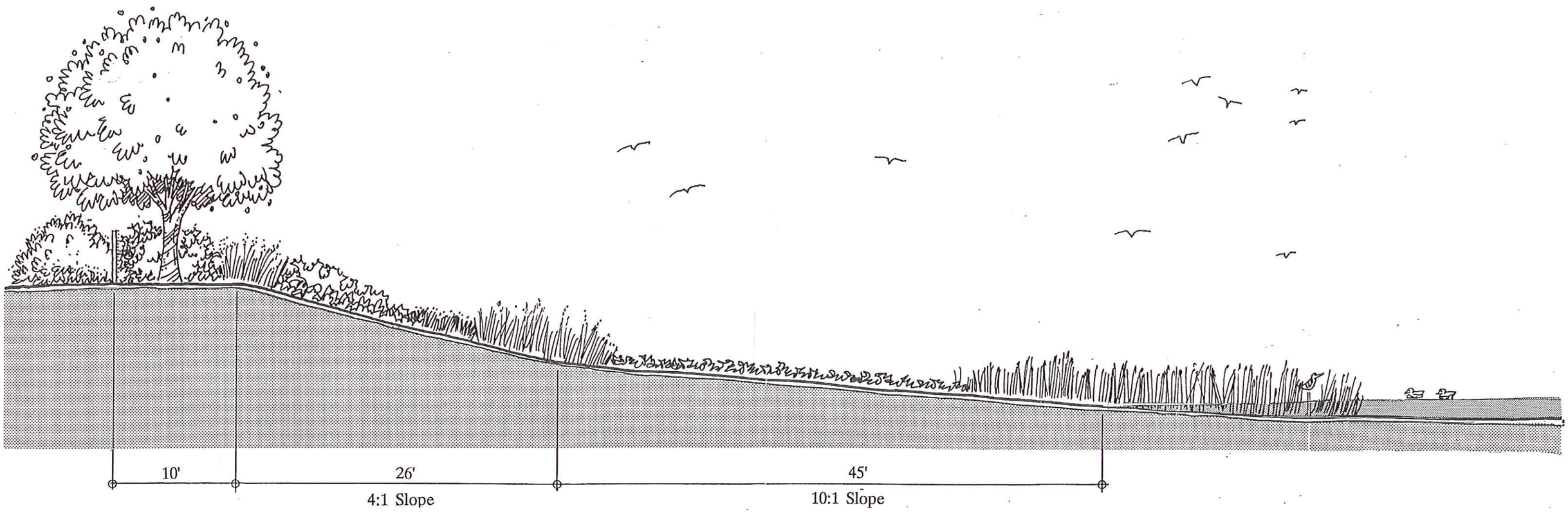
TRANSITIONAL HABITAT
El. 10.0 to 6.5
Rarely subjected to tidal waters

MARSH VEGETATION

High Marsh El. 6.5 to 0.0
Partially or occasionally
covered by tidal waters

Low Marsh El. 0.0 to -2.5
Covered by tidal waters twice a day

MUDFLAT
Frequently covered by tidal waters



MARSH PLANTING ZONES
Shoreline Enhancement Plan
San Rafael, California

5. PUBLIC ACCESS FACILITIES DESIGN

The following public access facilities are designed as part of the *Shoreline Enhancement Plan* improvements.

Asphalt Path

The primary pedestrian and vehicular access element of the Plan is an eight foot wide asphalt path. This path will accommodate pedestrians, bicycles, general maintenance trucks, security vehicles, and trucks for occasional maintenance of the levees. Its section design shall be determined by soil characteristics which vary throughout the site. Meandering edges of the path will be smooth and flowing. The path will have a 2% minimum cross slope for adequate drainage. Maintenance to the asphalt path will include occasional patching and resurfacing depending on extent of use.

Crushed Stone Path and Seating Areas

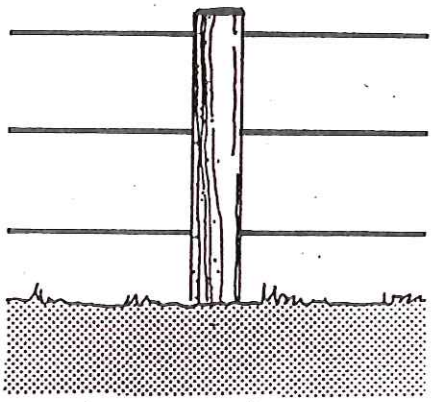
A three foot wide jogging trail running the length of the park is designed as crushed stone. The desired surface is intended to be a comfortable and safe medium to jog on. The crushed stone will be a consistent buff or brown color throughout the entire park. A Class II rock base layer and top layer of fines will be the same type of material. Redwood headers will contain the path on each side when it is not adjacent to asphalt. Where the path follows alongside the rock work at the tops of levees, it should flow uninterrupted up to the rocks. Picnic and seating areas are also designed with crushed stone surfaces. These areas, like the path, slope at a minimum 2%. Maintenance on the crushed stone surfaces requires periodic raking to keep smooth and even and semi-annual additions of material in worn or eroded areas.

Vinyl Clad Chain Link Fencing

Barrier fencing around sensitive wetland and habitat areas are indicated on the plan. The fencing is intended to keep people and domestic animals out of sensitive habitat areas. Already in place as part of the East San Rafael Wetlands Mitigation Plan at Bayview Business Park, a four foot high black vinyl clad chain link fence is proposed as the fencing standard throughout the park. New fencing will occur at midslope to levees approximately four feet below the top of the levee so as not to block views and be more easily screened with plantings. Black vinyl clad is selected for its durability and receding color quality. Gates are included at strategic points for maintenance access and controlled wildlife monitoring or study.

Wood Post and Cable Fencing

Designed as a device to keep park users from accessing steep slopes on levees or landscaped areas, a wood post and black vinyl cable fence is proposed. This fence consists of six inch diameter posts four feet high with three cables drawn between them. This relatively transparent fence will provide a simple barrier, with excellent durability, at minimal cost. Tops of the posts will be chamfered and sloped for positive drainage. Spacings between posts shall be approximately ten feet. Extent of the post and cable fencing is shown on the plan drawing.



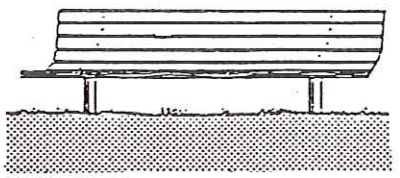
Entry Signage

Signs appropriate to the shoreline area are designed to ensure visual appeal and to identify the location of major entries to the park. The signage is simple and durable and consistent in design at each entrance for overall park unity. Entry sign locations include South Pond at Piombo Place, Bayview Marsh at Pelican Way, Shoreline Industrial Park "Green" at parking lot entrance, and an identification sign for Bayview Marsh on Kerner Boulevard.

The recommended park sign backgrounds are wood siding with a semi-transparent finish that is gray weathering in color. Lettering is routed wood painted white. The signs are free standing and permanently mounted. Other directional signage throughout the park should be compatible in design. Entry signs are approximately 30 inches high, 8 feet long.

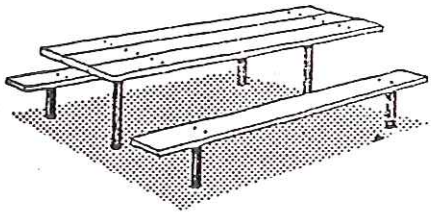
Benches

The recommended bench for the park has been selected for its simple design, durability and comfort. Wood seating slats eight feet long are redwood and attached to a black metal frame with zinc plated carriage bolts. Benches will be double pedestal for extra strength and permanent placement. Arm rests shall be considered in the event of future vandalism. Locations of benches are shown on the park plan.



Bench Specification:
Fabricator: Iron Mountain Forge, or approved equal. Model No.: 281-8XR

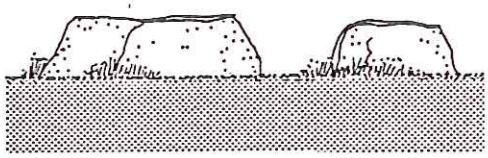
Picnic Tables



Picnic tables selected for the park conform to City maintenance requirements. The tables are six feet long, permanently anchored pedestal tables constructed with painted black steel frames and 3" x 10" construction heart redwood seats and tops. Wood pieces can be changed without removing the frames, a practice the City currently employs. The tables are selected for their ability to seat groups of people and are wheelchair accessible. Their locations are in areas of crushed stone paving along the Shoreline Industrial Park "Green". Tables will accommodate disabled access.

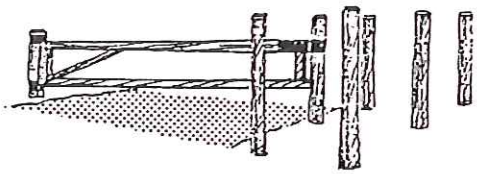
Picnic Table Specification:
Fabricator: Iron Mountain Forge, or approved equal.
Model: Mountaineer Series 266-6XP
Finish: Redwood Table Tops and Seats
Black painted metal frames.

Crushed Stone and Rock Area



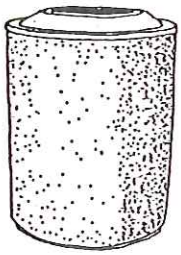
Rock placement is proposed on the small existing levee outcropping at South Pond. The levee outcropping is an area that is inundated during highest tides and the rocks will be in one of the few areas outboard of the levee path. They will blend with the existing rip-rap and will be similar in material and size.

Vehicular Access Gates



Vehicular control at each entry to the park is of particular concern. Access will be limited to maintenance and emergency vehicles only. Control of motorcycles and cars will be established while allowing access for pedestrians and bicyclists. Lockable wooden gates supported on posts with latch assemblies are proposed at entrances to South Pond, Pelican Way and Shoreline Industrial Park "Green". Locations are shown on the park plan.

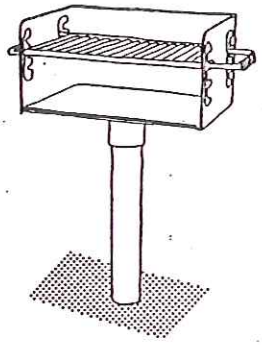
Trash Receptacles



Trash receptacles are City Standard, simple in design, difficult to vandalize, and easy to maintain and service. Concrete accent elements in colors similar to the shoreline crushed stone path and rockwork are selected. Trash receptacles will be consistent throughout the park placed at spacings governed by activity use and need by park maintenance staff. Trash receptacles are round, have drainage holes in the bottom, include internal plastic cans, and are permanently anchored to the ground.

Trash Receptacle Specification:
Fabricator: Dura Art Stone, Newark, California or approved equal.
Model No.: TR-Q
Color: Coachella Sand C-15 by L.M. Scofield Company
Finish: Medium Sandblast

Barbecues

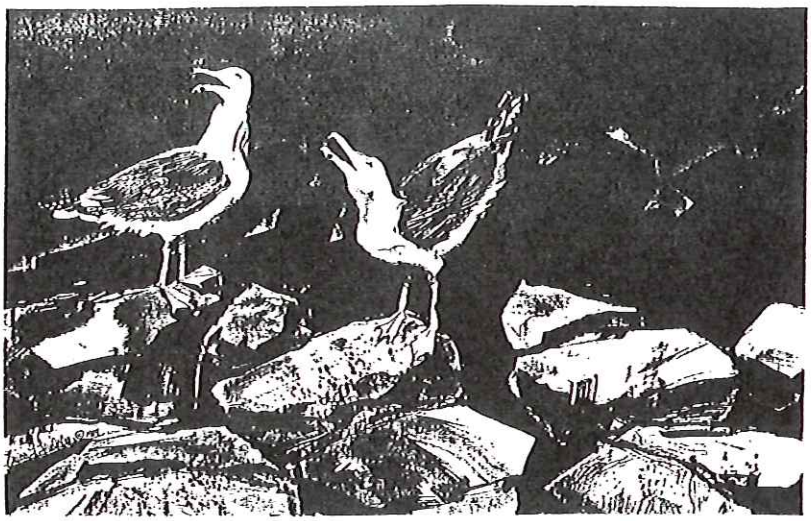


Barbecues are in areas around picnic tables on the Shoreline Industrial Park "Green". The recommended barbecue for the park is a permanently anchored unit with a rotating grill for draft control and maintainability. Specifications include galvanization of all parts and a finish of heat resistant black enamel paint.

Barbecue Specification:
Fabricator: Iron Mountain Forge Barbecue
Model No.: 200-X
Finish: Hot dipped galvanized and painted black.

Interpretive Display Kiosks

Three double-sided Interpretive Display Kiosks provided by the State Coastal Conservancy are proposed for the Shoreline Enhancement project each highlighting an environmental aspect appropriate to the shoreline site. The Kiosks are prefabricated redwood structures and will be located at South Pond, Shoreline Industrial Park "Green" parking area, and MMWD Pond near the Pelican Way Entrance. The selected artwork features "Uplands", "The Riches of Wetlands", and "Wetland Preservation" each appropriate to the location indicated on the plan. Final panel selection and precise location will be reserved for the Shoreline Committee.

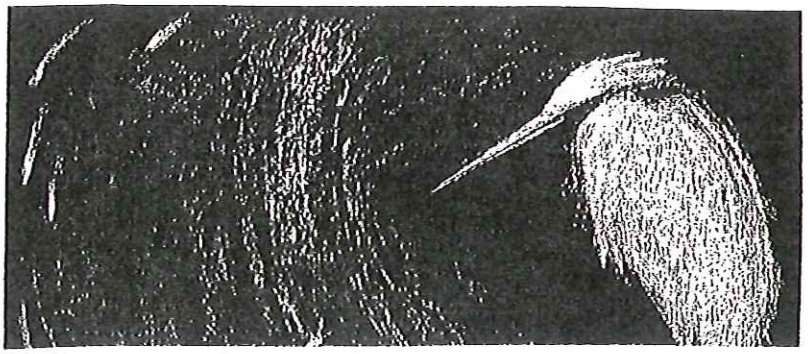


FOR millions of years the riches of coastal wetlands have supported large populations of sea and land life. The nutrients accumulated in shallow waters and organic ooze feed the thick stands of cordgrass, colonies of worms, crabs, flocks of migrating birds, and schools of fish. Human attitudes toward this rich environment have changed dramatically over the centuries. Coastal Indians depended heavily on the abundant life-sustaining food from the marsh, as well as on materials for making baskets, boats, tools and dwellings. White settlers thought the marsh was useless. They diked, drained or filled thousands of acres of marshland and turned them into agricultural residential, and industrial sites.

Although this loss continues, people are beginning to realize the importance of caring for the few remaining acres of marsh and mudflat. We are now recognizing the interconnections between all living things and that these interconnections affect our own quality of life and survival on this planet.

Panel: "The Riches of Wetlands"

Location: South Pond

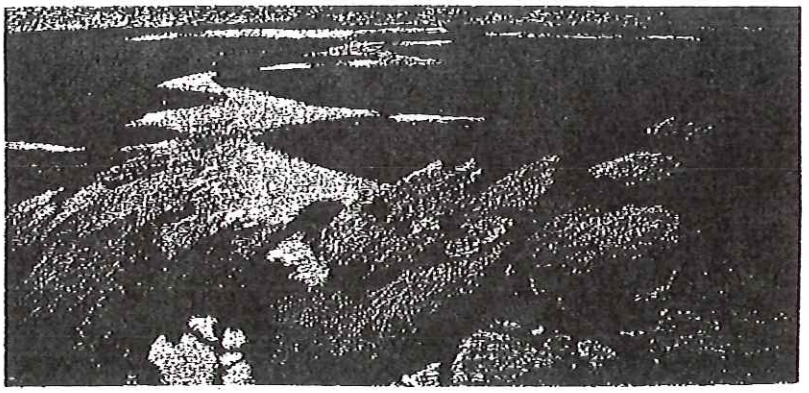


THE first life on land probably crept from the same kind of ooze that stretches before you. Today, highly developed species – such as the egret, with its supple movements and complex hunting and mating patterns – share the marsh with their one-celled predecessors, revealing a continuous thread of life that has evolved since primeval times.

During the past 100 years, people have diked, drained, filled and destroyed ninety percent of North American coastal wetlands. The destruction continues today causing impact to animals and plants, increasing flooding of surrounding areas, and decreasing the sense of wildness and natural beauty in our lives. What you see here is an attempt to halt further damage, and an experiment in restoring a severely altered ecosystem.

Teams of biologists, botanists, engineers, ecologists and volunteers – working with citizen groups and public agencies – are coaxing this wetland back to life. It's a big job. Interaction with nature is a subtle art. Do we humans have the patience and sensitivity to co-create with nature? No one knows for sure. You look upon the beginning of a grand experiment.

Panel: "Wetland Preservation"
Location: Bayview Marsh



BEFORE you lies a tiny patch of coastal wetland. It represents one of the few remaining links in a once enormous system of salt marshes and mudflats that edged major portions of North, Central and South America. Although a marsh such as this may be vastly reduced in size, it continues to be affected by events both near and far.

Many marshes depend upon constant or seasonal flushing of fresh water from upland streams. For this reason they are significantly impaired by the building of upstream dams and the erosion and sedimentation that result. They are also damaged by the toxins carried downstream by industrial and agricultural runoff.

Because this marsh serves as temporary home to migrating birds, its ecology can be affected by activities in distant lands. Timber clearing and landfill activities in Canada, or the diverting of a river in Brazil, may eliminate one bird or an entire species that commonly rests at this habitat during migration.

On the seaward side, the construction of rock jetties and the dredging of bays and marinas can alter the natural sand-carrying capacity of ocean waves. Protective dunes may become eroded and disappear, or unusually large sand deposits may close the marsh channel to the sea and smother the marsh itself with sediment.

John Muir once said, "When we tug at a single thing in nature, we find it attached to the rest of the world."

The more we learn about the interconnections of everything from a tiny wetland in California to a vast river system in Brazil, the less likely we are to destroy, unwittingly, the life around us.

Panel: "Uplands"
Location: Shoreline Industrial Park Access to MMWD Pond

6. PLAN IMPLEMENTATION COST ESTIMATE

The *Shoreline Enhancement Plan* has a total estimated plan implementation cost of $1,228,492.00. The following cost estimate is broken down into the four major property parcels for easier reference and includes a two year maintenance period. It is calculated in 1991 dollars with itemized unit costs derived from comparable parks in the Bay Area which were competitively bid.

Estimated project construction costs presented herein could be reduced with utilization of Marin Conservation Corps labor. Site clearing, light demolition, planting, and planting area maintenance such as weeding are recommended as potential projects. Such assistance could result in overall savings of up to 3%, or $40,000, on the total implementation cost.

Associated levee and major hydrologic control improvements proposed in the Plan are presented separately as order of magnitude costs for reference only. These costs are conceptual design estimates only and require further engineering design and detail to be comparable in level of development to the rest of the *Shoreline Enhancement Plan* figures.