Mare Island Final Reuse Plan

Volume II
Expanded Report

CITY OF VALLEJO
CALIFORNIA

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MARE ISLAND FINAL REUSE PLAN

VOLUME II: EXPANDED REPORT

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1.0 REUSE PLAN

1.1 ORGANIZATION

The Defense Base Closure and Realignment Commission (BRAC) recommended the closure of Mare Island in its June 1993 report to President Clinton. The President accepted the BRAC recommendations in July 1993, and Congress confirmed the closure in October 1993. The Navy is scheduled to complete all its shipyard work by the spring of 1995 and close the base in the spring of 1996.

Once the President announced his acceptance of the BRAC recommendations, the City of Vallejo (City) and other communities affected by the closure focused their attention on developing and implementing a successful conversion process. This process is known as the Mare Island Futures Project (Project). It is the goal of this Project to become a national model for successful conversion of a military facility.

Two groups with broad regional representation have been created to guide the City's reuse efforts -- the Mare Island Futures Legislative Committee (Legislative Committee) and the Mare Island Futures Work Group (Work Group). The goals of these groups are to:

- Develop and implement an expeditious reuse process with political and legislative support that results in Mare Island being an economic asset for Vallejo and the rest of Solano County, Napa County, and the Bay Area.

- Develop a reuse process that identifies the following: immediate steps to address the needs for those impacted by closure; mid-term steps for securing interim uses for existing facilities which are ready for reuse; and long term steps for identifying uses for the entire site.

The Legislative Committee has representation from local, state, and federal elected officials. Its mission is to insure that federal, state, and local legislative issues affecting the conversion of Mare Island are addressed in a timely and efficient manner.

The Work Group currently has 50 members and is made up of representatives of labor, business, governmental, educational, environmental organizations, and private citizens with interests in the reuse of Mare Island. The Work Group has the responsibility for the development of the Final Reuse Plan (Plan). The first task was to develop the following reuse goals through community input:

- Create jobs and other economic development opportunities to sustain and improve the economic conditions in Vallejo, the rest of Solano County, Napa County, and the greater San Francisco Bay Area into the 21st century.

- Create a self-sustaining and multi-use community that is unified under a common design theme with a balance of industrial, office, commercial, residential, educational, recreation, cultural, and open space uses that will meet the needs of future generations.

- Preserve and enhance the history of Mare Island as an integral part of the reuse.
- Use a variety of innovative economic development tools, including public-private partnerships and domestic-international partnerships, for marketing, financing, and acquisition.
- Ensure that those impacted by closure are provided retraining and educational opportunities for careers that are high paying and highly skilled.
- Ensure that the human services needed by those impacted by downsizing and closure are easily accessible and available.

These goals then became the basis for the development of the Conceptual Reuse Plan which was completed in November 1993. The City Council approved this Conceptual Reuse Plan on December 7, 1993. The Work Group began the preparation of the Final Reuse Plan immediately following this Council approval with assistance from three sources. The first was from an Advisory Panel from the Urban Land Institute (ULI) based in Washington, D.C. A group of nine real estate and land use professionals with experience in base closures analyzed the opportunities and constraints on Mare Island, and made recommendations to the City regarding reuse.

The second source of assistance was from three consulting teams led by the following firms: EDAW, Inc. for infrastructure, transportation, and land use planning studies; Bay Area Economics and Economic and Planning System for market feasibility studies and fiscal analysis; and Harder Kibbe for human services studies.

Finally, the Work Group has also been assisted by five resource groups and two Navy committees made up primarily of citizens with special interests in various aspects of Mare Island. The resources groups are: Human Services; Retraining; Employment Development; Educational Facilities; Recreation, and Open Space, and Arts. The two Navy committees are Historic Preservation and Archaeological and the Restoration Advisory Board. The findings and recommendations from these groups were considered by the Work Group in the development of the Final Reuse Plan.

An organization chart of the Project is included with this Plan as Attachment 1.1. A current membership list of the Legislative Committee is included as Attachment 1.2 and the Work Group is Attachment 1.3. The ULI report is Attachment 5.0. The reports of the Resource Groups are within Attachment 6.0. Attachements can be found in Volumn III of this Plan.

1.2 COMMUNITY INPUT

An important component of the reuse planning process was the commitment of the City and the Project to make the process open and accessible to the public. This was accomplished through a number of methods. Meetings of the Work Group, Legislative Committee, and Resource Groups were open to the public. The membership of the Work Group was reflective of the labor, business, governmental, educational, and environmental communities in Vallejo, the rest of Solano County, and Napa County. All Legislative Committee, Work

Group, and Resource Group meetings were advertised on the local television channel and in the local newspaper. Participation in the Resource Groups was open to anyone who wanted to contribute time and ideas. A number of community forums were led by a trained facilitator to receive and record input from the public on the draft Conceptual and Final Reuse Plans. Some of these meetings were broadcast on the local television channel. Finally, all materials -- reports, videos, and other informational items -- were available to the public. The product of this commitment is a Final Reuse Plan which reflects input from the community.

A diagram of the planning process is included as Attachment 1.4.

2.0 REGIONAL AND ECONOMIC SETTING

2.1 RELATIONSHIP OF MARE ISLAND'S PHYSICAL SETTING AND LOCATION WITH VALLEJO AND THE REST OF THE BAY AREA

2.1.1 Regional Location

Mare Island is located on the western edge of the City of Vallejo in southwestern Solano County in Northern California. It is approximately 30 miles northeast of San Francisco in the North Bay subregion of the San Francisco Bay Area, and approximately 60 miles from Sacramento, California's state capital. Mare Island is within easy travel distance of the major cities within Solano County (Benicia, Fairfield, and Vacaville), and adjoining Napa County (American Canyon and Napa), Contra Costa (Concord, Martinez, and Richmond), Sonoma (Santa Rosa and Petaluma), and Marin (San Rafael and Novato). See Figure 2.1-1.

2.1.2 Local Setting

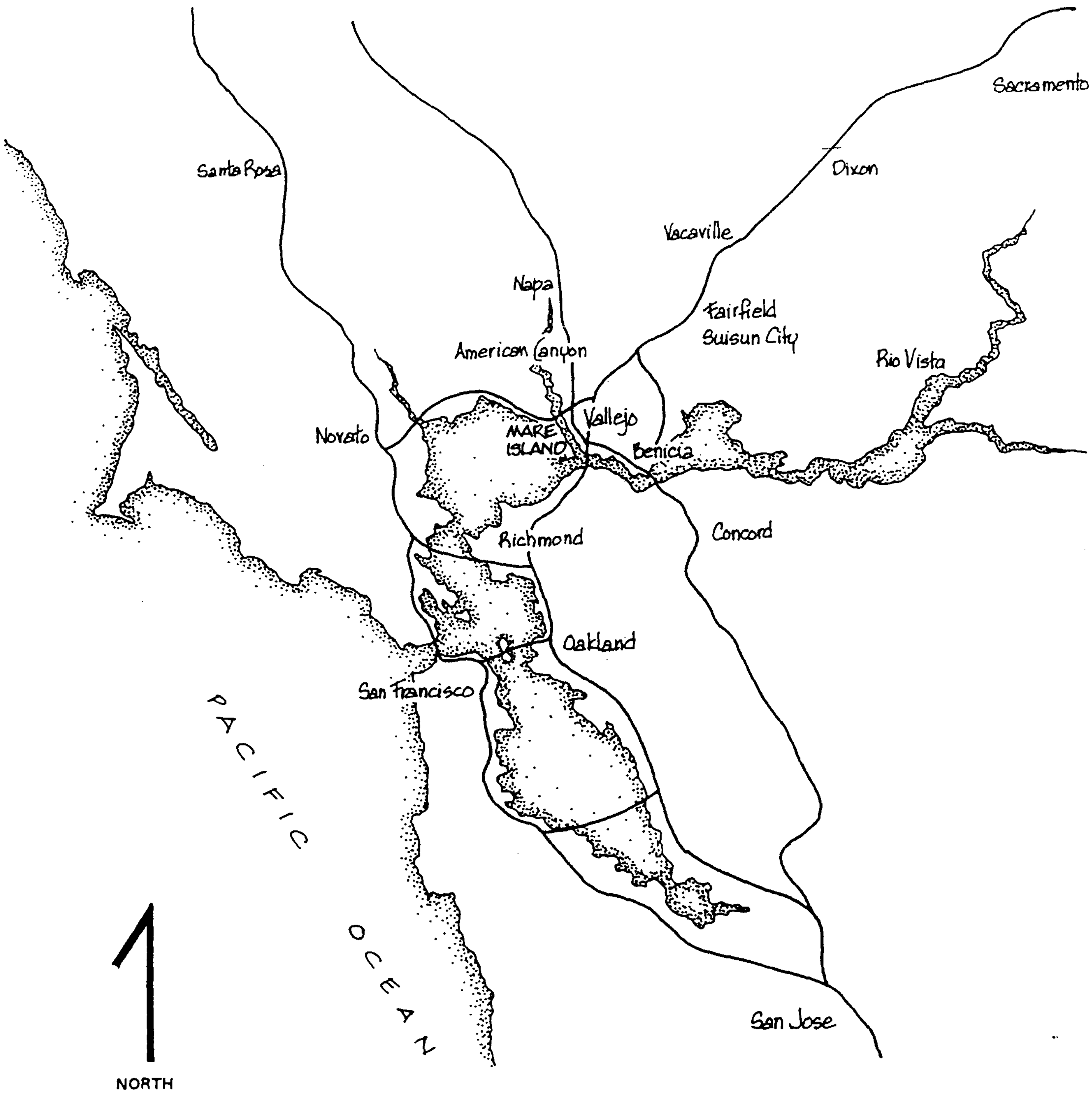
Mare Island is located between Mare Island Strait (part of the Napa River) on the east, San Pablo Bay on the west, Carquinez Strait on the south, and the Napa Marsh, Route 37, and San Pablo Bay Wildlife Refuge on the north. The entire site lies within the incorporated boundaries of the City of Vallejo. The two points of access are from State Route 37, the primary route across the North Bay connecting U.S. Route 101 and Interstate 80, and across the Mare Island Causeway from Tennessee Street, one of Vallejo's main arterials and connections from Interstate 80. See Figure 2.1-2

2.1.3 General Site Characteristics

Mare Island is approximately 3.5 miles long by one mile wide. It has approximately 5,460 acres, of which 1,650 acres are dry uplands. Tidal and nontidal wetlands comprise 1,450 acres with the remaining 2,360 acres as submerged lands. Mare Island is relatively flat ranging in elevation from sea level to 284 feet above sea level at the southern end of the site. Mare Island is currently developed with approximately 960 buildings with 10.5 million square feet of industrial, office, residential, educational, commercial, recreational, cultural, and institutional uses. There is one large upland open space area; this is the 200-acre "Hill", and it is a part of the original Mare Island. This federal facility also includes the Causeway from Mare Island to Tennessee Street, the off-site Roosevelt Terrace housing complex located on Sacramento Street, Building 513 (Employment Office and Badge and Pass Office) on Wilson Avenue, a rail spur which extends from the Island and through Vallejo to Broadway, and a bulkhead extending from the Sandy Beach area into the Mare Island Strait. See Figure 2.1-3.

2.2 DEMOGRAPHIC AND REGIONAL ECONOMIC SETTING

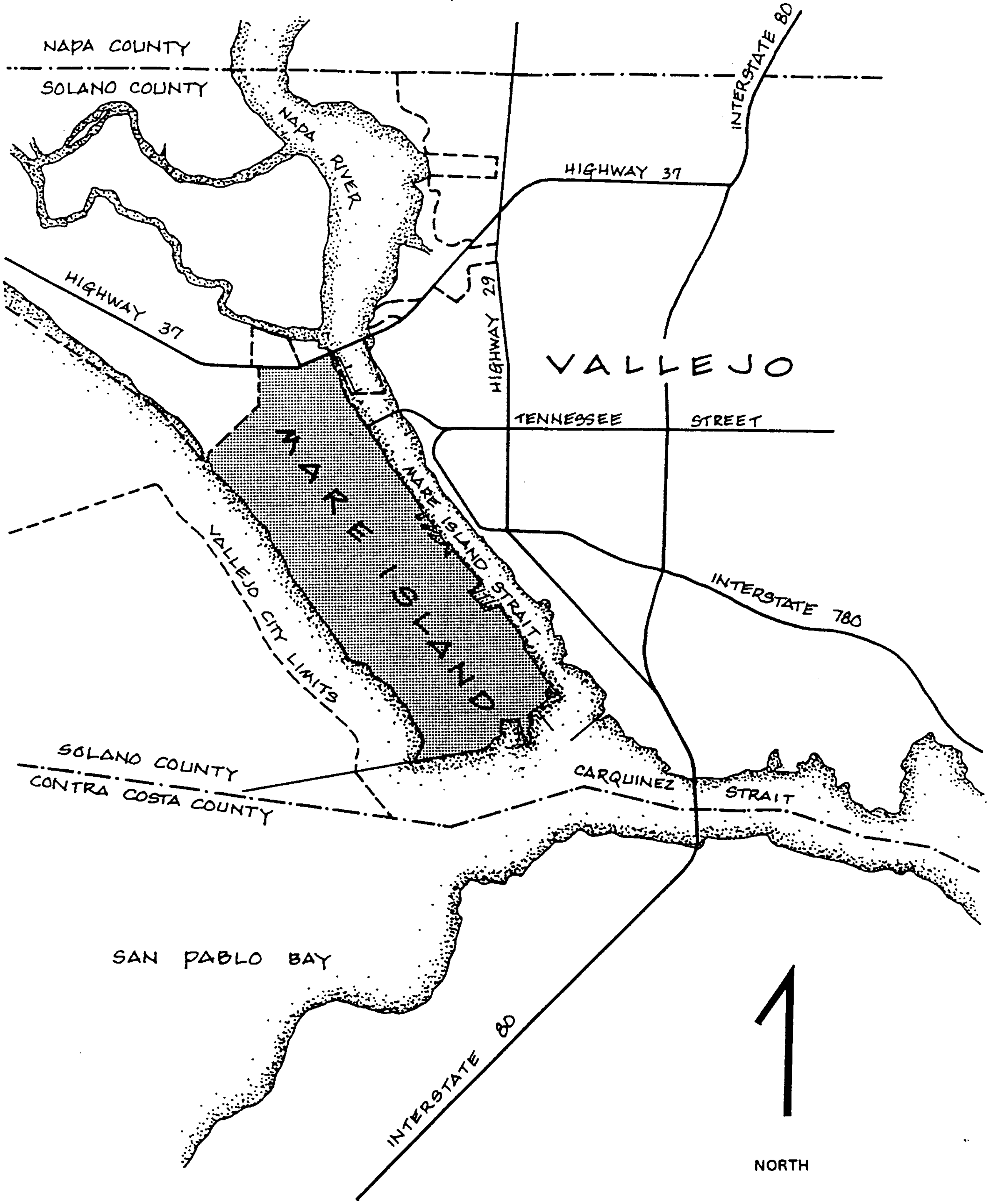
The reuse potential of Mare Island will depend on the demographics and economic characteristics of the residents and workers in Vallejo and the region. The following is a description of the demographic and economic trends for this area.



Mare Island Final Reuse Plan

Figure 2.1-1

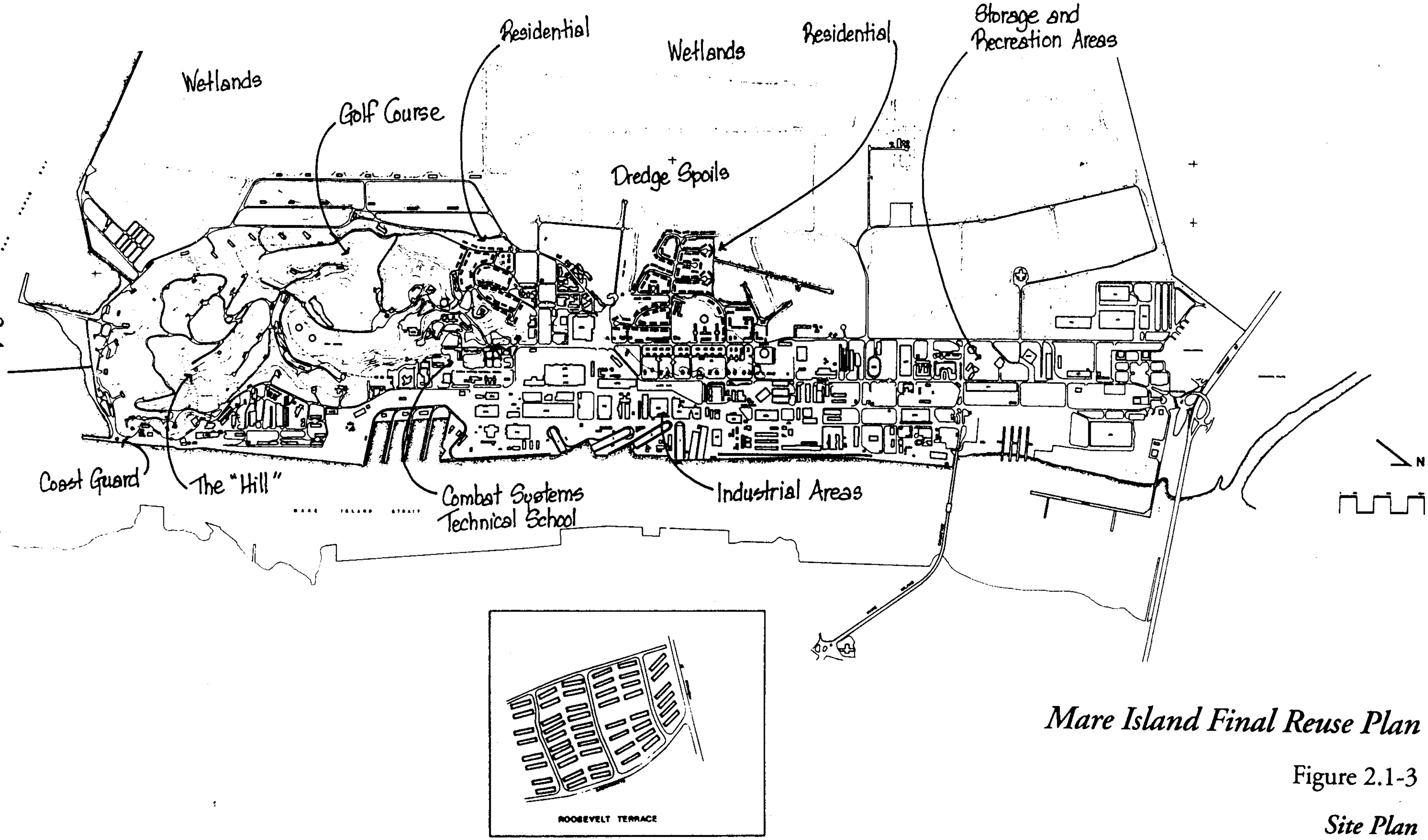
Regional Location



Mare Island Final Reuse Plan

Figure 2.1-2

Local Map



Mare Island Final Reuse Plan

Figure 2.1-3

Site Plan

Vallejo experienced substantial population growth during the 1980's, echoing Solano County as a whole. Population increased from 81,559 in 1980 to 109,1990 in 1990, a compound annual rate of three percent. The 1994 population is 116,148.

Vallejo, as well as Solano County, is dominated by owner-occupant households; almost 62 percent of Vallejo's households owned their housing unit in 1990 (compared to only 56 percent for California). Median household income for Vallejo in 1993 was $42,108, which is slightly below Solano County but slightly above the statewide median of $40,391.

In 1990 over 40 percent of Vallejo's approximately 50,000 resident workers worked in Vallejo itself. Just over 15 percent commuted to Contra Costa County, 11 percent commuted to San Francisco, and 10 percent commuted to Alameda County. Less than six percent commuted to Benicia or Fairfield; the remainder commuted to other locations within the Bay Area.

Vallejo and much of Solano County have a relatively affordable housing stock. The median reported house value for Vallejo in Vallejo was $140,600, compared to almost $196,000 for California. This factor offers a strong competitive advantage for Vallejo in attracting new industry and other businesses.

Solano County has been experiencing substantial employment growth during recent years; between 1982 and 1992, Solano County employment grew at an annual compounded average rate of 3.3 percent, compared to 2.2 percent for California as a whole. The Association of Bay Area Governments forecasts that Solano County will continue this strong economic growth into the future. It expects the County to add almost 75,000 new jobs between 1995 and 2010, an overall increase of more than 63 percent. The majority of this projected growth is in service and retail sectors.

Although Vallejo has a relatively competitive demographic profile and an expectation of strong employment growth in the future, its strengths must be considered within the regional economy. Solano and its neighboring counties have experienced a significant imbalance between the demand and supply of commercial and industrial space. In addition, the Bay Area has been subject to a severe recession along with the rest of the nation. Moreover, the Bay Area as a whole has been severely impacted by base closures. Mare Island will have to compete with commercial and industrial sites as well as other closed military bases in attracting new businesses for reuse.

3.0 REUSE CONSIDERATIONS

3.1 GEOLOGY

3.1.1 Summary

Mare Island Naval Shipyard is located within the northern San Francisco Bay Area and within the Coast Ranges Geomorphic Province. The southern portion of Mare Island includes an upland area underlain by sandstone and shale surrounded by a narrow shelf of alluvium and filled land. The central and northern areas consist of relatively thick alluvium and bay mud. The area is seismically active and the site could be adversely affected by earthquakes generated on several regionally active fault zones. New construction and existing structures will be designed or retrofitted through buildout to comply with established seismic safety codes. In addition, appropriate engineered designs and control measures will be implemented that would minimize damage from ground shaking, liquefaction, expansive soil, differential settlement, subsidence, erosion and slope failure.

3.1.2 Description of Conditions

Regional and Site Geology

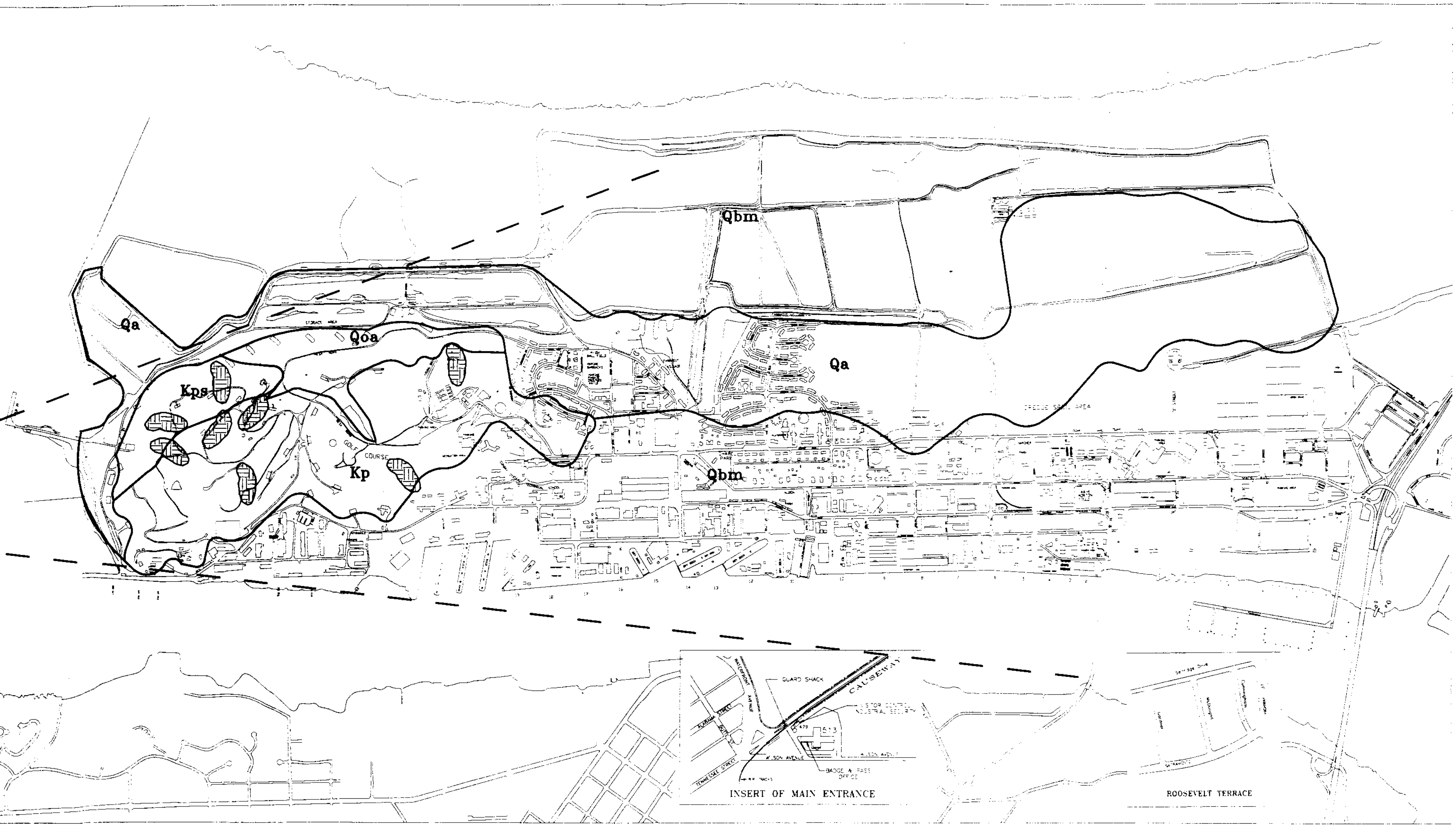
Mare Island is located within the northern San Francisco Bay area and the Coast Ranges Geomorphic Province of California. Mare Island forms a peninsula surrounded by the Napa River-Mare Island Strait to the east, Carquinez Strait to the south, and San Pablo Bay to the west. The geology of the site is shown on Figure 3.1-1. The southern portion of Mare Island consists primarily of sandstone and shale bedrock of the Great Valley Sequence, and is surrounded by a narrow shelf of alluvium and filled lands. The central and northern areas consist of alluvium and recently deposited or younger bay mud.

The majority of Mare Island has a relatively flat topography, ranging in elevation from near sea level in the extreme north end to 40 feet above sea level in the south-central area. Hills in the southern portion of Mare Island rise to approximately 275 feet above mean lower low water (MLLW).[1] Mare Island has a total of 5,460 acres, of which 1,630 acres are dry land, 510 acres consist of dredged sediment disposal ponds, 920 acres are wetlands, and the remainder are tidal mudflats (U.S. Navy, 1989).

Seismicity

Mare Island is located within the seismically-active region of western California. The seismicity of this region is primarily related to the San Andreas Fault Zone. The site is located in Seismic Zone 4 (Uniform Building Code). No evidence of active faults has been identified at the Mare Island Naval Shipyard. However, earthquakes generated along nearby active faults will likely cause moderate to strong ground motion at the site. Active faults

[1] Elevations at the MINS are also reported with reference to the Mare island Datum (MIN). Elevation +100 feet MID is equivalent to mean lower low water (0 feet MLLW).



Suspected Fault Lines (Franklin Fault)

Potential Landslide Areas

Qbm	Bay Mud
Qa	Alluvium
Qoa	Older Alluvium
Kps	Arkosic Sandstone, Buff, Minor Shale
Kp	Micaceous Shale, Minor Thin Sandstone Beds

Source: Dibblee, 1980,1981

EDAW, Inc.

Mare Island Final Reuse Plan

Figure 3.1-1

Geology

capable of producing moderate to large earthquakes in the area include the Rodgers Creek, Greenville, Green Valley, Hayward, Concord, Calaveras, and San Andreas faults.

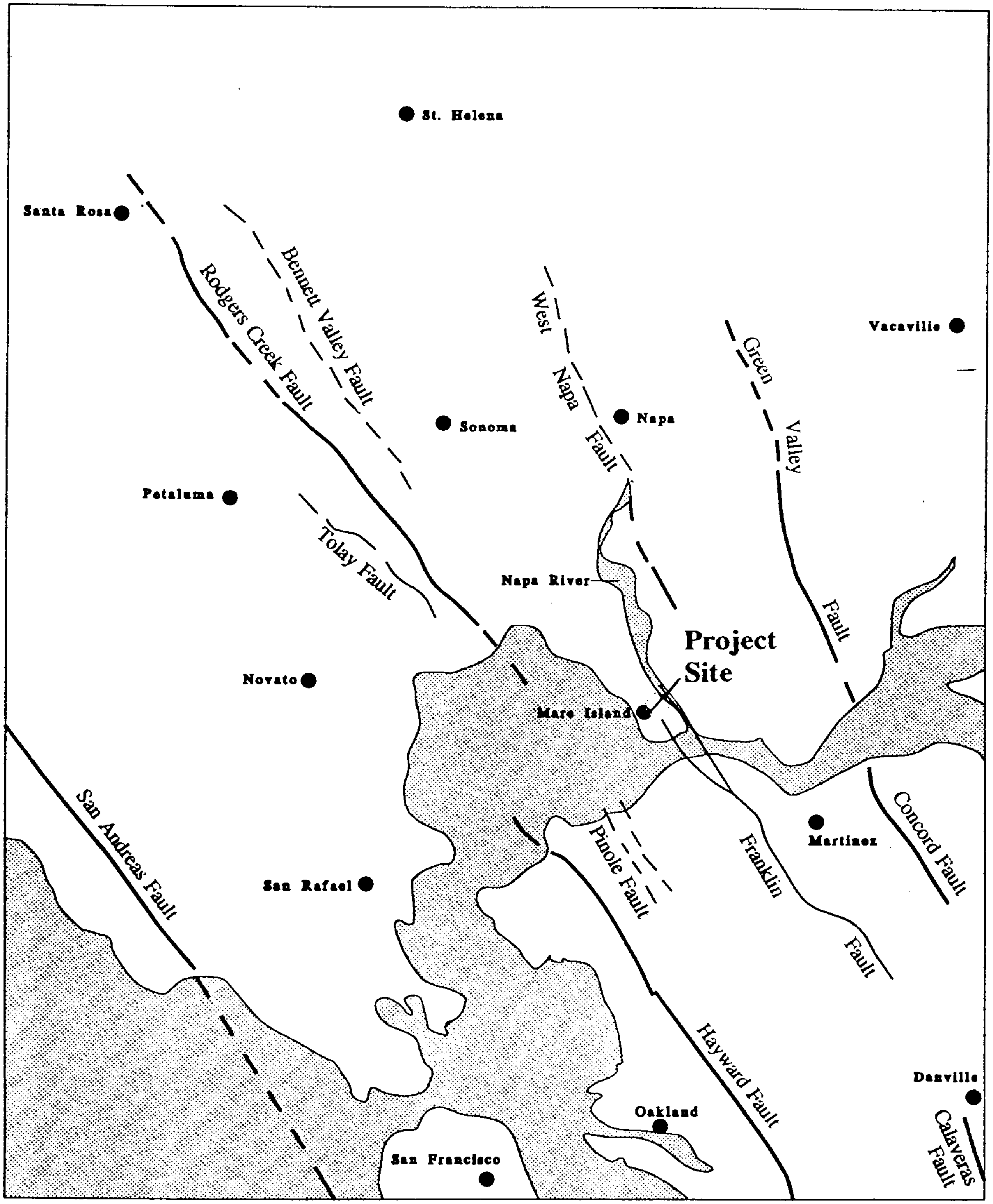
In addition to the active faults within the region, other faults are recognized as potentially active. Two traces of the Franklin fault run adjacent to Mare Island. The Franklin fault is considered to be potentially active and is thought to be a northern branch of the Calaveras fault. The Franklin fault has been identified south of Carquinez Strait, but is obscured to the north of Mare Island. Other potentially active faults in the area surrounding Mare Island Naval Shipyard include the Pinole, Antioch, and Tolay faults. The active and potentially active faults within the San Andreas Fault Zone located within 30 miles of the site are shown on Figure 3.1-2.

The largest earthquake that can be reasonably expected to occur within the present geologic framework along a fault is typically referred to as the maximum credible earthquake (MCE). The largest expected earthquake is sometimes referred to in geologic literature as the upper-bounds earthquake or maximum earthquake. The maximum probable earthquake (MPE) for a seismic source is defined as the maximum earthquake expected to occur within the next 100 years. The concept of a MPE for seismic source has been superseded by other probabilistic statements and estimates of the MPE are not available for many seismic sources. The seismic history and seismic parameters related to the MCEs for the regional active faults are summarized in Table 3.1-1.

Magnitude: The total energy release that occurs at the epicenter of an earthquake is measured by motion recorded by seismographs. This measurement is referred to as the earthquake magnitude and is generally expressed with reference to the Richter Magnitude Scale. The Richter Scale is logarithmic and each successively higher magnitude reflects an increase of about 32 times the amount of energy released by an earthquake. Earthquake magnitude can also be expressed as moment magnitude, which can be directly measured or calculated on the basis of the area of the fault rupture surface and fault displacement during an earthquake. Published estimates of the Richter and moment magnitudes for maximum credible earthquake (MCE) and maximum probable earthquakes (MPE) for the regional active faults are presented in Table 3.1-1.

Intensity and Acceleration: Ground motion is strongest at the epicenter and generally diminishes (attenuates) with distance away from the epicenter. The severity of ground shaking at any particular point is referred to as the earthquake intensity and is a subjective measure of the effects of ground shaking on people, structures, and earth materials. Intensity is generally expressed by the Modified Mercalli Scale, which is summarized in Table 3.1-2. The expected maximum intensities at Mare Island Naval Shipyard for maximum credible earthquakes (MCEs) on regional active faults are presented in Table 3.1-1. In addition, estimated maximum intensity and peak horizontal accelerations at Mare Island Naval Shipyard for the MCEs are also presented. The highest expected ground acceleration (g) would occur during the MCE on the Rodgers Creek Fault zone, the closest active fault to the site, and is expected to be 0.40g.

Probability of Occurrence: The probability of an earthquake occurring along a fault is a function of the estimated interval between earthquakes (recurrence interval), and the known or



Legend

Active Fault -
Fault has evidence of surface displacement within the last 11,000 years

Potentially Active Fault
Fault has evidence of surface displacement within the last 2 million years

0 10 Miles

Mare Island Final Reuse Plan

Figure 3.1-2

Regional Faults

TABLE 3.1-1
MAJOR ACTIVE FAULTS POTENTIALLY AFFECTING THE PROJECT SITE
Mare Island Reuse Plan

Fault	Approximate Distance from Project (miles)	Historic Damaging Earthquakes	Historic Surface Faulting	Known Micro-seismic Activity	Estimated Maximum Credible Earthquake Magnitude[1,3]	Estimated Maximum Probable Earthquake Magnitude[2]	Estimated Maximum Peak Ground Acceleration at Site During Maximum Credible Earthquake[4]	Expected Ground Shaking Intensity at the Site
San Andreas	24	1838, 1906	Creep and surface rupture	Yes	8.5 (7.8)	8.25	0.17g	VIII
Hayward	14	1836, 1868	Creep and surface rupture	Yes	7.25 (7.1)	6.5	0.37g	IX
Calaveras	24	1861	Surface rupture	Yes	7.25 (6.3)	6.5	0.07g	VI
West Napa	8		None known	Yes	6.5 (6.5)	N/A	0.35g	VIII
Rodgers Creek	6	1898	None known	Yes	7.0 (6.9)	N/A	0.40g	IX
Concord	9	1955	Creep	Yes	6.5 (6.7)	5.75	0.26g	XIII
Greenville	29	1980	Surface rupture	Yes	6.9 (6.8)	5.75	0.08g	VII
Green Valley	14	1889?, 1965	None known	Yes	6.5 (6.9)	N/A	0.29g	IX

[1] The maximum credible earthquake (MCE) is the maximum earthquake that appears capable of occurring under the presently known tectonic framework. It is a rational and believable event that is in accord with all known geologic and seismic facts. In determining the maximum credible earthquake, little regard is given to its probability of occurrence, except that its likelihood of occurring is great enough to be of concern. It is conceivable that the maximum credible earthquake might be approached more frequently in one geologic environment than in another. (California Division of Mines and Geology (CDMG) Note 43, 1975).

[2] The maximum probable earthquake (MPE) is the maximum earthquake that is likely to occur during a 100-year interval. It is to be regarded as a probable occurrence, not as an assured event that will occur at a specific time . (CDMG Note 43, 1975).

[3] Estimated maximum credible and probable earthquake magnitudes listed are "preferred" magnitude based on magnitude estimates from multiple sources (Greensfelder, 1974; Contra Costa County, 1991). Moment magnitudes, shown in parenthesis, from Wesnousky, 1986.

[4] Estimated maximum peak acceleration calculated using attenuation methodology based on moment magnitude for MCEs and distance from causative fault (Joyner and Boore, 1981).

TABLE 3.1-2
MODIFIED MERCALLI SCALE[1]

M[4]	Intensity	Effects	v,[2] cm/s	g[3]
	I.	Not felt. Marginal and long-period effects of large earthquakes.		
3	II.	Felt by persons at rest, on upper floors, or favorably placed.		
	III.	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.		0.0035-0.007
4	IV.	Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of IV wooden walls and frame creak.		0.007-0.015
	V.	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.	1-3	0.015-0.035
5	VI.	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees, bushes shaken (visibly, or heard to rustle - CFR).	3-7	0.035-0.07
6	VII.	Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices (also unbraced parapets and architectural ornaments - CFR). Some cracks in masonry C. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.	7-20	0.07-0.15
	VIII.	Steering of motor cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.	20-60	0.15-0.35
7	IX.	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. (General damage to foundations - CFR.) Frame structures, if not bolted, shifted off foundations. Frames racked. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluviated areas sand and mud ejected, earthquake foundations, sand craters.	60-200	0.35-0.7
8	X.	Most masonry and frame structures destroyed with their foundations. some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.	200-500	0.7-1.2
	XI.	Rails bent greatly. Underground pipelines completely out of service.		>1.2
	XII.	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.		

Note: *Masonry A, B, C, D.* To avoid ambiguity of language, the quality of masonry, brick or otherwise, is specified by the following lettering (which has no connection with the conventional Class A, B, C construction).

- *Masonry A:* A Good workmanship, mortar, and design, reinforced, especially laterally, and bound together by using steel, concrete, etc; designed to resist lateral forces.
- *Masonry B:* Good workmanship and mortar, reinforced, but not designed to resist lateral forces.
- *Masonry C:* Ordinary workmanship and mortar; no extreme weaknesses such as non-tied-in corners, but masonry is neither reinforced nor designed against horizontal forces.
- *Masonry D:* Weak materials, such as adobe; poor mortar; low standards of workmanship, weak horizontally.

[1] From Richter (1958).
[2] Average peak ground velocity, cm/s.
[3] Average peak acceleration (away from source).
[4] Richter magnitude correlation.

estimated date of the last major earthquake. The U.S. Geologic Survey (USGS) estimates the probability of a large earthquake, magnitude 7 or greater, occurring on any of the major active fault zones within the San Andreas Fault Zone in the San Francisco Bay Region within the next 30 years to be approximately 67 percent (USGS, 1990). The estimated probabilities for the occurrence of a magnitude 7 earthquakes on the Hayward and Rodgers Creek Fault zones during this period are 22 and 28 percent, respectively. Estimates for the other active faults were not developed by or incorporated into the USGS study. Therefore, the combined probability of 67 percent for occurrence of a magnitude 7 earthquake in the Bay area should be considered a minimum estimate.

Recent Seismic History: The most recent major earthquake originating in the vicinity of the site occurred in 1898. Estimates of the magnitude of the 1898 earthquake have recently been revised, and it is currently estimated to have had an average magnitude of 6.7 on the Richter Scale (Toppozada, et al., 1992), with an intensity of VIII on the Mercalli Scale. Mare Island suffered considerable damage during this earthquake, and it was thought that the epicenter was along the obscured northern portion of the Franklin fault. However, a recent reevaluation of the available historical data suggest that the epicenter for the 1898 earthquake was centered near the intersection of the Rodgers Creek fault and the north shore of San Pablo Bay (Toppozada, et al., 1992), approximately nine miles northwest of Mare Island. Damaging earthquakes (M5.6, M5.7) also occurred at the northern end of the Rodgers Creek fault in 1969. Recent investigations on the Rodgers Creek fault have estimated recurrence intervals for a damaging earthquake of 131 to 370 years, with a best estimate of 230 years (Schwartz, et al., 1992).

Other significant historic earthquakes within the region surrounding the project site include earthquakes on the Hayward Fault zone in 1836 and 1868; the 1838, 1906, and 1989 (Loma Prieta) earthquakes on the San Andreas and the 1980 earthquake on the Greenville Fault. During the Loma Prieta earthquake (with an epicenter approximately 78 miles south of Mare Island Naval Shipyard), the peak ground acceleration measured at Mare Island Naval Shipyard was 0.06 g (Milo, 1994).

In 1982, an evaluation of the seismic vulnerability of structures at Mare Island Naval Shipyard was performed in 1982 in accordance with a Naval Facilities Engineering Command (NAVFAC) seismic safety program (URS/Blume, 1982). The evaluation assessed the relative stability of "Mission-Essential" and "Life Safety" buildings during ground shaking produced by an earthquake with an 80 percent probability of not being exceeded in 50 years. Site-specific seismic response spectra were developed for areas underlain by rock and intermediate-depth soil. The expected peak ground acceleration for the probabilistic earthquake was estimated to be 0.27 g.

Initially, 95 buildings were considered under the seismic safety program for modernization, rehabilitation, or major repairs. The evaluation of structures was performed to identify potentially hazardous conditions and corrective actions. Following a preliminary screening process, 77 buildings on Mare Island were identified for further evaluation by the "Rapid Evaluation Procedure" (REP) specified by NAVFAC. The REP evaluation resulted in prioritization of 20 buildings for further structural analysis. The investigation also concluded that the seismic vulnerability of two water tanks, structures at six electrical substations, and utilities located in areas susceptible to ground failure should be further evaluated (URS/Bloom, 1982). The subsequent evaluation of the buildings indicated that 15 of the 20 buildings required extensive structural repair or retrofit (URS/Bloom, 1983).

Soils and Sediment

Soils: Ten distinctive soil types have been mapped by the U.S. Soil Conservation Service (SCS) at the site (Figure 3.1-3). These surface soils include, Altamont Clay (AcE), Diablo-Ayar Clay (DaC), Dibble Los Osos (DbE), Millsholm loam (MmE and MmG2), Reyes Silty Clay Loam (Rd), Reyes Silty Clay (Re), Valdez Silty Clay Loam (Vd) and engineered fill (Ma). These soils comprise three basic soil types: loams, clays, and engineered fill. The loams and clays are generally shallow deposits, with depths of 60 inches or less and generally have a high water content and moderate to high shrink-swell potential. The estimated properties of these soils are summarized in Table 3.1-3 and shown in Figure 3.1-3.

Many of the original marshlands and lowlands on Mare Island have been filled, especially in the northern portion. The depth of engineered fill varies from three to seven feet depending on the original topography. The engineered fill consists of a heterogeneous mixture of materials; the bulk of the fill material is comprised of sandstone, shale, concrete, and asphalt fragments (U.S. Navy, 1989).

Younger Bay Mud and Alluvium: Mare Island's shallow surface soils are underlain by a 40-80 foot layer of recently deposited younger bay mud. Younger bay mud consists of predominantly, soft, semi-consolidated, water-saturated, plastic, silty clay, rich in organic material, with minor sand layers and lenses. These sediments generally have low strength and high natural water content and are very compressible (California Division of Mines and Geology, 1969). Bottom contours of the younger bay mud underlying the site are shown on Figure 3.1-4. Younger bay muds may fail from an imposed load due to low strength, high compressibility, and differential settlement. Differential settlement results from variability in the thickness of the mud. Younger bay mud becomes increasingly unstable as the thickness of overlying fill increases.

Liquefaction Potential

Liquefaction is the sudden loss of strength of a saturated cohesionless sediment primarily due to ground shaking. All areas of Mare Island underlain by young alluvium, bay mud, or fill may be prone to liquefaction during seismic shaking due to the presence of loose saturated soils, dredged spoil sediments, shallow groundwater, and the potential for strong ground shaking in the event of a major earthquake on any of the active faults in the Bay Area.

Subsidence

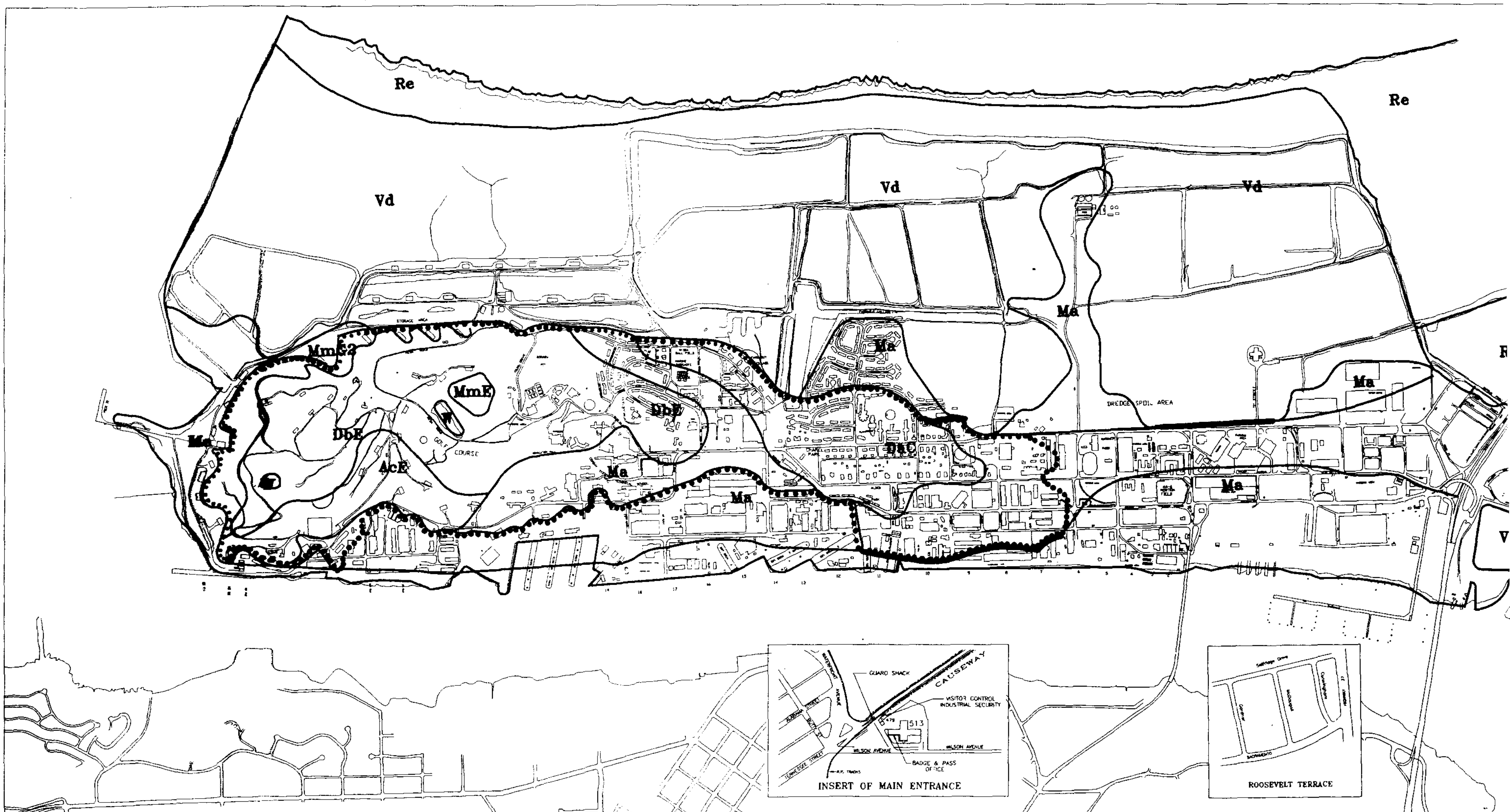
Subsidence is a general term describing the downward deflection of the ground surface. Subsidence can be caused by several processes including compaction or consolidation of soil or sediment underlying a subsiding area. The young alluvial deposits and bay mud sediments at Mare Island are poorly consolidated and susceptible to compaction (granular sediments) and consolidation (cohesive sediments). Filled areas that may not have been properly

TABLE 3.1-3

ESTIMATED SOIL PROPERTIES
Mare Island Reuse Plan

Classification									
Soil Map Unit	**Map Symbol**	**Depth to Bedrock (feet)**	**Depth of Typical Profile (inches)**	**USDA Texture**	**Unified**	**Permeability (inch per hour)**	**Reaction (pH)**	**Shrink-Swell Potential**	**Infiltration Rate**
Altamont	AcE	2.0-3.5	0-28	Clay	CH	0.06-0.2	6.1-8.4	High	Very slow
			28-38	Silty clay loam	CL	0.06-0.2	7.4-8.4	Moderate	
			>38	Siltstone					
Diablo	DaC	2.5-4.0	0-36	Clay	CH	0.06-0.2	6.1-8.4	High	Very slow
			36	Consolidated sediments					
Dibble	DbE	1.5-3.5	0-18	Loam	ML or CH	0.63-2.0	5.6-6.5	Moderate	Slow
			18-36	Light clay	CH	0.06-0.2	6.1-7.3	High	
			>36	Sandstone					
Millsholm and Millsholm variant	MmE, MmG2	1.0-3.0	0-17	Loam	SM or ML	0.63-2.0	6.1-7.3	Low to moderate	Very slow
			17	Sandstone					
Reyes	Rd, Re	>5.0	0-60	Silty clay loam or silty clay	MH or OH	0.06-0.2	<4.5-8.4	High	Slow
Valdez	Vd	>5.0	0-60	Silty clay loam	CL	0.06-0.2	5.6-8.4	Moderate	Very slow

Source: USDA, 1977.



———	Contour Of Original Island
•••••	Line Of Uplands (1859)

AcE	Altamont Clay, 9–30% Slopes
DaC	Diablo–Ayar Clay, 2–9% Slopes
DbE	Dibble Los Osos, Loams 9–30% Slopes
Ma	Made Land (Engineered Fill)
MmE	Millsholm Loam,15–30% Slopes
MmG2	Millsholm Loam, 30–75% Slopes
Rd	Reyes Silty Clay Loam
Re	Reyes Silty Clay
Vd	Valdez Silty Clay Loam, Moist
W	Water

N

200' 0' 200' 400' 600' 800'

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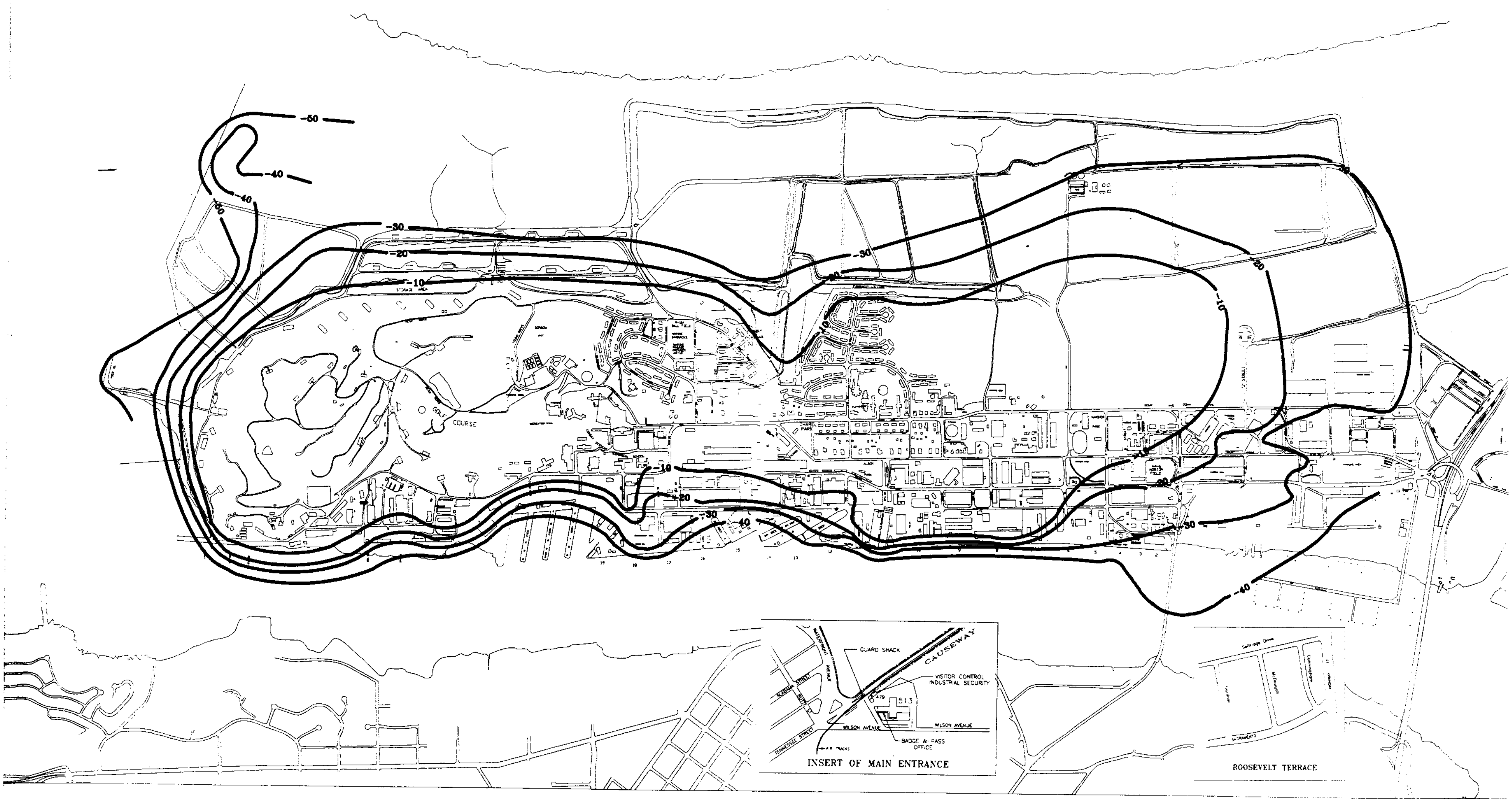
Figure 3.1-3

Soils



Contours of Bottom of Bay Muds (FT)

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Figure 3.1-4

Bay Bottom Contours

compacted are also susceptible to settlement. Compaction can be caused by strong vibration (including during earthquakes) or loading (buildings or other structures) at the surface. The potential settlement of underlying soils is the most prevalent soil hazard at Mare Island. The low-density, compressible soils and sediments have a low bearing capacity. Structures sink or settle if foundations have been inadequately designed or are damaged. Areas that are most susceptible to subsidence are shown on Figure 3.1-5.

Slope Stability

Slope stability is dependent on a combination of factors, including rainfall, rock and soil types and structure, steepness of slope, vegetation, seismic conditions, and human interaction. Slopes over ten percent may be more susceptible to landsliding, soil creep, and erosion depending on the depth and type of soil cover and the underlying rock types. Steeper slopes are more susceptible to soil creep, which is the continuous downslope movement of soil or rock particles. Soil creep is usually more prominent on slopes covered with clay soils. Landslides may be triggered by earthquakes, especially where slopes have been oversteepened and where soils are saturated. Areas that have undergone mass movement in the past are susceptible to land slide reactivation and erosion.

The western, central, and northern portions of Mare Island Naval Shipyard are relatively flat, with slopes generally less than four percent. These areas are stable except at the margins of Mare Island Naval Shipyard subjected to wave erosion. The slopes of the upland area in the southeastern portion of Mare Island Naval Shipyard are moderately steep (8 to 25 percent) to steep (greater than 25 percent) slopes. A map of the slope conditions at Mare Island Naval Shipyard is presented on Figure 3.1-6.

The moderately steep slopes at the site are generally stable (Nilsen, et al., 1979). However, landslides or potential landslides have been identified in areas with moderately steep slopes (U.S. Navy, 1989). The steepest slopes at the project site are developed on sandstone and shale bedrock in the southern portion of upland area (Figures 3.1-5 and 3.1-6). These slopes are moderately unstable (Nilsen et al., 1979). The shale bedrock in this area is weaker than the sandstone and tends to be landslide-prone (U.S. Navy, 1989). Rock (block) slides have been identified in the upland area in areas underlain by sandstone as well as shale bedrock areas (URS/Bloom, 1982). Steep slopes may also be subject to rotational landslides and debris slides in areas of thick colluvium. Detailed geologic mapping is not available for the project site and it is possible that adverse bedding[2] may be present in bedrock areas. Identified landslides at Mare Island Naval Shipyard are shown on Figure 3.1-5.

In addition to potential landsliding on hill slopes, failure of levees at Mare Island Naval Shipyard could occur during high water conditions or strong seismic shaking. The failure of levees could result in flooding of low-lying areas.

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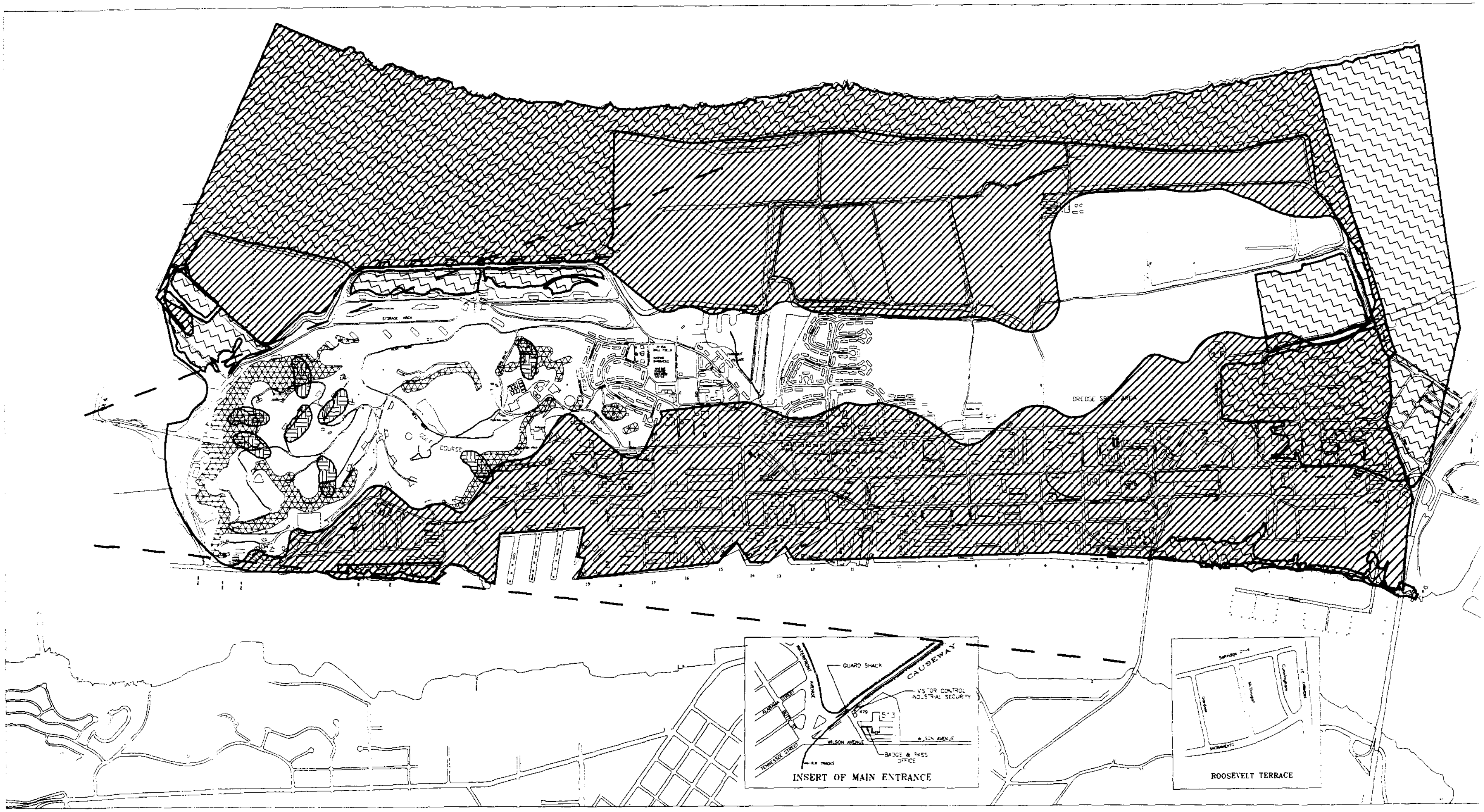
[2] Adverse bedding is a condition wherein the bedding (or layering) of the bedrock underlying a slope is oriented in the same general direction as the topographic slope, increasing the potential for landsliding.



Subsidence Areas

Steep Slopes

Flood Areas

Suspected Fault Lines
(Franklin Fault)

Potential Landslide Areas

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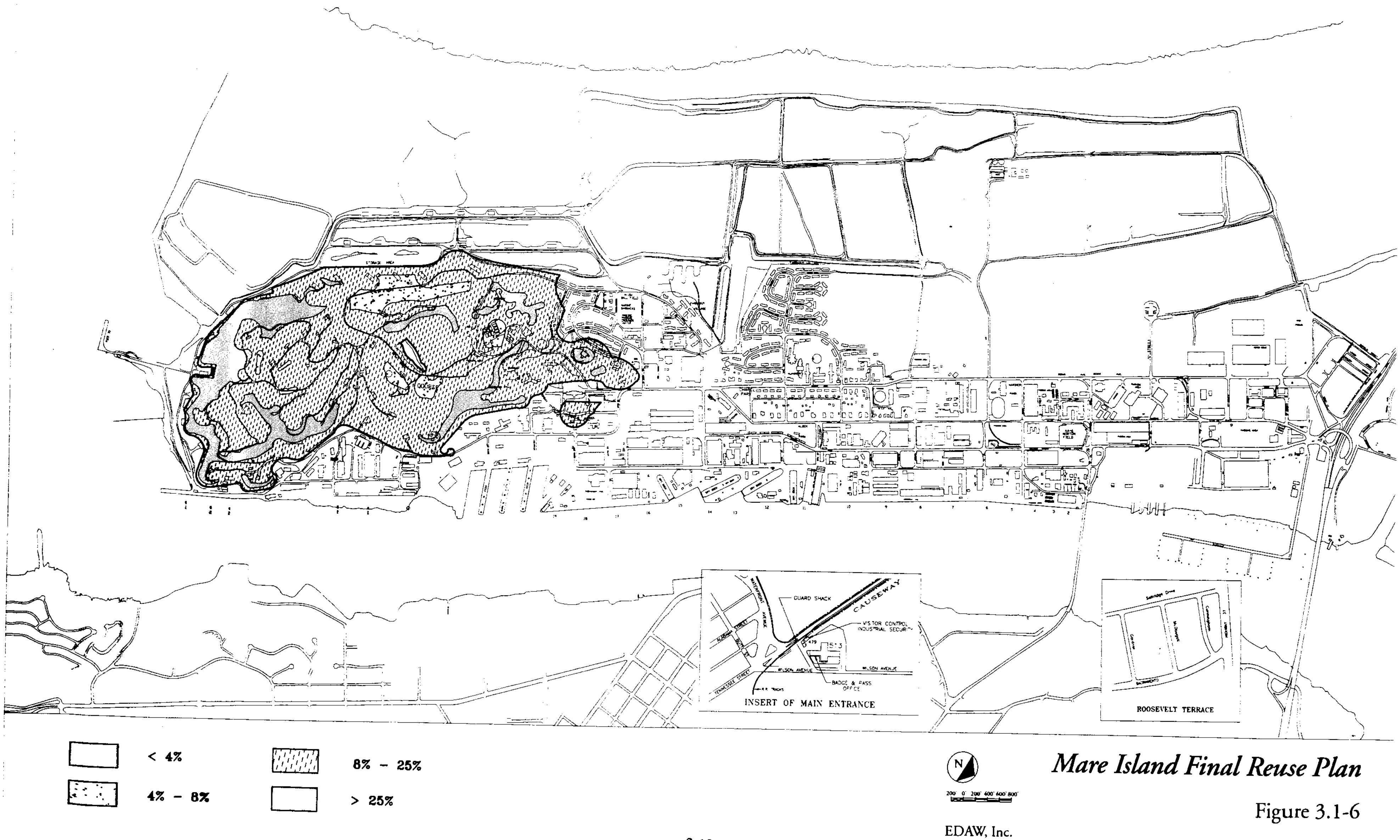
Figure 3.1-5

Natural Constraints



Mare Island Final Reuse Plan

Figure 3.1-6

Slope

3.1.3 Issues Affecting Reuse

Strong Ground Shaking

Strong ground shaking during an earthquake could cause structural damage and injuries to residents and workers. A very high potential exists for the site to endure moderate to strong ground shaking due to a moderate to large magnitude earthquake on a fault within the Bay Area, especially if such an event were to occur on the nearby Rodgers Creek, Hayward, or Franklin faults. Ground shaking could cause structural damage to buildings and infrastructure (roads, bridges, and utilities), building collapse, falling objects, fire, flood, induce slope failures, differential settlement, subsidence, and release of hazardous materials. Earthquake-induced liquefaction of saturated soils may cause ground failure, and damage to overlying structures.

Damage caused by earthquakes could be substantially reduced if proper building design and construction techniques are used, and existing buildings are retrofit to withstand anticipated ground shaking events. Underground utilities could be retrofit or upgraded to minimize pipe breakage.

Settlement

Placement of fill or structures in areas underlain by bay mud may cause settlement. Significant settlement could cause damage to paved surfaces, building foundations, and underground utilities. The majority of Mare Island proposed for reuse and/or development under the Final Reuse Plan is underlain by younger bay mud, primarily a soft, silty clay with a high water content, high plasticity, low strength, and high compressibility. The younger bay mud becomes increasingly unstable as the weight of the fill or structure increases.

High Shrink-Swell Potentials

The surface soils at the site have moderate to high shrink-swell potentials in response to moisture fluctuations. These expansive soils may cause severe damage to building foundations and paved surfaces by causing differential movement of rigid structures.

Slope Instability

New construction that involves cut and fill slopes could expose soils to excessive erosion and may promote slope instability. Disturbed soils exposed on slopes tend to be easily eroded. Excessive soil erosion could cause slope destabilization and failure. Eroded soils could enter surface water systems, causing a reduction in water quality.

Cut and fill slopes could be come unstable if improperly constructed. Structures near unstable slopes could be damaged by future slope movement. Soil creep probably would occur on some of the steeper slopes as well as on cut and fill slopes constructed at the site. Slope failure could cause property damage or hazards to people. Landslides on road cuts could cause temporary road closure.

Failure of Levees

The Mare Island Final Reuse Plan includes development of a light industrial area in the north central portion of the site. This area, which is within the expected 100-year flood hazard zone, is protected by a levee system. Failure of levees could cause flooding that could result in human injury or property damage. Breaching of the levee system in 1983 caused significant flooding.

3.1.4 Recommendations and Implementation Actions

Strong Ground Shaking

3.1(a) Code Compliance (City): New construction will be completed in accordance with the provisions of Title 24 of the California Code of Regulations (CCR) and comply with the most recent edition of the Uniform Building Code Seismic Zone 4 standards as required by the City of Vallejo for new development.

3.1(b) Existing Structures: Existing structures intended for human occupation that do not meet current safety criteria will be retrofitted to comply with Seismic Zone 4 standards. If it is infeasible to retrofit an existing structure, the structure will be abandoned and removed.

All unreinforced masonry (URM) structures will be evaluated in compliance with the City of Vallejo Ordinance No. 1075. The ordinance specifies that owners of URM buildings[3] have an engineering report prepared to investigate a building's adequacy to resist specified seismic design forces. Buildings exempted from the requirements of the ordinance include residential buildings with five or fewer dwelling units, most warehouses, and buildings that have been structurally upgraded. Buildings that qualify as "historic property" are exempted but required to meet the retrofitting requirements of the State Historical Building Code.

3.1(c) Design and Upgrading of Utilities (City): Utilities will be designed or upgraded to provide sufficient flexibility to withstand the expected ground motion induced during the maximum credible earthquake on each of the faults in the area.

3.1(d) Geotechnical Investigation (Development Applicants): A geotechnical investigation will be performed by applicants to define liquefaction potential for any development projects proposed in areas underlain by young alluvial deposits and bay muds. Development in those areas will be restricted to land uses that would minimize risks to users.

3.1(e) Public Awareness and Preparedness (Tenants): Building occupants will be required to educate occupants regarding the seismic hazards associated with the area and participate in earthquake preparedness programs. Public awareness and preparedness are crucial to the prevention of loss of life and property during an earthquake. Earthquake preparedness

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[3] The ordinance defines an un-reinforced masonry building as any building containing walls and/or columns constructed wholly or partially of masonry without at least 50 percent of the reinforcement required by the most recent Uniform Building Code.

programs will include methods of minimizing hazards associated with falling objects, broken glass, fire, flood, downed utility lines, and exposure to hazardous materials.

Settlement

3.1(f) Geotechnical Investigation (City): A detailed geotechnical investigation will be completed by development applicants prior to the placement of fill or improvements over areas underlain by bay mud or young alluvium. The geotechnical report will provide recommendations for reducing settlement in areas intended for development. These recommendations may include surface loading to cause consolidation prior to construction and/or engineered foundation designs to minimize post-construction settlement.

3.1(g) Structural Survey (City): A structural survey of existing high reuse potential buildings and other improvements intended for reuse constructed on fill over bay mud will be performed by a qualified structural engineer to assess whether structural damage has occurred due to settlement. If structural damage has occurred, recommended repairs will be completed prior to reuse.

High Shrink-Swell Potentials

3.1(h) Design of Foundations (Development Applicants): Foundations of new structures will be constructed to resist soil movement. Surface drainage will be controlled to minimize seasonal fluctuations in soil moisture content. Appropriate foundations for the specific field conditions will be designed by a geotechnical engineer for development applicants to reduce potential damage to structures caused by expansive soils. New roads will be designed so that the road base extends below the depth of seasonal moisture change.

Slope Instability

3.1(i) Geotechnical Investigation (Development Applicants): A detailed geotechnical investigation that addresses erosion potential and slope stability issues will be conducted by development applicants for projects proposed in areas of steep slopes. The geotechnical report will provide recommendations regarding the steepness of the cut and fill slopes based on the geologic site conditions. The grading plan will incorporate all recommendations of geotechnical reports. All grading activities will be supervised by a geotechnical engineer or engineering geologist so that grading options can be evaluated and adjusted, if necessary, based on encountered field conditions.

3.1(j) Grading Requirements (Development Applicants/Tenants): All construction grading activities will be conducted in compliance with the statewide General Permit for Storm Water Discharges Associated with Construction Activities to prevent water quality degradation. Grading activities will be conducted during the months of April through September to minimize the likelihood of erosion and sedimentation caused by storm runoff. All exposed surfaces will be revegetated as soon as possible after grading activities are completed to reduce the soils susceptibility to erosion. All potentially unstable areas, either existing slopes, or new cut and fill slopes created during development will be stabilized during site grading. Stabilization measures for existing slopes will consist of flattening slopes, removal of existing weak soil and replacement with engineered fill, or installation of engineered fill buttresses at the toe of unstable slopes. New fill slopes can be stabilized by proper compaction, installation of subsurface and surface drainage, and flattening of cut and fill slopes.

Failure of Levees

3.1(k) Levee System Investigation (Navy): A geotechnical investigation of the stability of all levee systems that protect areas of development proposed by the reuse plan will be performed by the Navy and appropriate actions taken to ensure the integrity of the levee systems.

3.2 FLOODING HAZARDS

3.2.1 Summary

The Mare Island Naval Shipyard is located in a coastal environment at the edge of San Pablo Bay near the mouth of the Napa River. Low-lying areas in the north and west portions of the island are subject to flooding. Existing dikes prevent flooding and should be maintained. Flooding could occur as the result of extreme storms, high tides, tsunami or seiche wave runup, land subsidence, and worldwide sea level rise. Development may be restricted within flood-prone areas. Detailed floodplain studies will be required of any proposed development within mapped flood-prone areas. The City should consider requesting that FEMA conduct a Flood Insurance Study of Mare Island.

3.2.2 Description of Flooding Hazards

Regional and Site Hydrology

The Mare Island Naval Shipyard occupies a peninsula at the northeastern margin of San Pablo Bay. It is bounded on the east by Mare Island Channel (an extension of the Napa River), on the south by the Carquinez Strait, and on the west by San Pablo Bay. The climate is considered Mediterranean, characterized by cool wet winters and hot dry summers. The normal annual precipitation in the vicinity of the site is approximately 20 inches per year. The precipitation intensity for the 100-year, 12-hour rainfall event is 3.45 inches (Rantz, 1971). Runoff at Mare Island occurs primarily as overland flow and in poorly developed drainageways; no flowing steams exist on the island. Groundwater quality underlying Mare Island is considered poor and is not currently used as a water source (U.S. Navy, 1989).

Flooding

Portions of Mare Island are subject to flooding, especially the low-lying areas to the north and west. A flood inundation study, based on existing data, was conducted for the Mare Island Master Plan (U.S. Navy, 1989). The results of this study indicated that areas below 8.8 feet mean lower low water (MLLW) may be subject to inundation during a 100-year flooding event (including potential effects of tides, storms, and river flow). This study did not include potential effects of wave runup, land subsidence, or worldwide sea level rise.

Significant flooding has occurred at Mare Island as recently as 1983 when a dike broke and portions of the northern shipyard were flooded. Up to six feet of water inundated the areas around buildings 617, 621, 627, 751, and 759 (Young, 1994). The building themselves were not affected. This area is within the 100-year flood inundation area (Figure 3.2-1). The Mare Island Final Reuse Plan proposes development of this area for light industrial use.

Tsunamis and Seiches

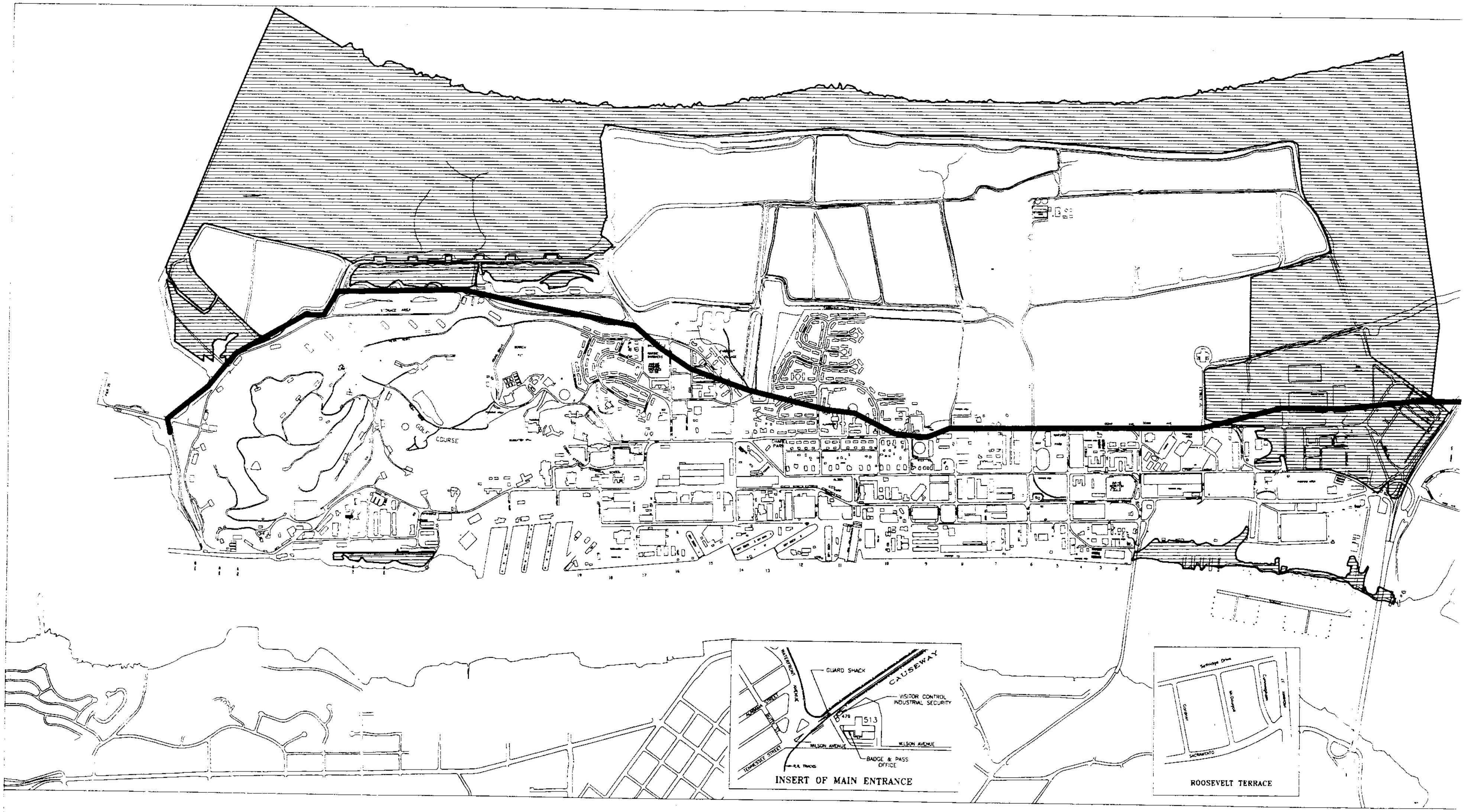
Potentially destructive seismic sea waves, or tsunamis, can be generated by deformation or rapid movements of the sea floor during strong earthquakes. It has been calculated that the wave runup at Mare Island would be less than one tenth of the height of the tsunami at the Golden Gate (Ritter and Dupre, 1972). The 200-year tsunami (probability of occurring once every 200 years) is estimated to attain a height of 20 feet at the Golden Gate, and would cause less than two foot runup at Mare Island (U.S. Navy, 1989). The estimated area of inundation resulting from a 200-year event is shown on Figure 3.2-1.

A seiche is a wave that oscillates in closed or partially closed bodies of water, generally resulting from seismic or atmospheric disturbances. The most likely generating mechanism for a seiche in the San Francisco Bay is motion along one of the major regional faults (URS/Bloom, 1982). However, none of the seismic events in the Bay Area, including the 1906 San Francisco event, have generated a damaging seiche. This indicates that more than large ground motions are required to generate a damaging seiche; the period of the seismic waves and the natural period of the water body (a function of geometry) need to be coincident. The historical data indicate that the probability of a damaging seiche at Mare Island appears low.

Sea Level Rise and Subsidence

Either a rise in worldwide sea level or subsidence in the land surface at Mare Island would exacerbate flooding hazards in the low-lying areas. Sea level rise is a generally accepted consequence of global warming, an expected response to the "greenhouse effect." The complex climatologic conditions that would control sea level rise are difficult to predict and a wide range of estimates for the rate of sea level rise have been proposed. For planning purposes, sea level rise resulting from the "greenhouse effect" during the next century in the San Francisco Bay area has been estimated to be approximately four feet (Philip Williams & Associates, 1985). The cumulative increase in sea level would increase the expected elevation of flood waters.

Subsidence of the land surface could occur as the result of compaction or consolidation of young sediments and fill at Mare Island (discussed in Section 3.1, Geology). Subsidence would increase the potential for flooding by settlement associated with loading of the sediments with buildings would only affect localized areas. Seismic compaction may also



Limit of Tsunami Inundation (200-year event)

Flood Areas

N

300 0 200 400 600 800

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Figure 3.2-1

Flooding

occur as the result of strong seismic shaking, which could affect the majority of lands on the margins of Mare Island. However, most of the sediments that underlie Mare Island have been subjected to strong seismic shaking in the recent past. Seismically-induced compaction has, therefore, already occurred and large areas of Mare Island are not expected to experience settlement in the future. Settlement could occur in areas underlain by poorly compacted fill, particularly any areas filled since the last major seismic shaking event at Mare Island in 1898.

FEMA Considerations

The Federal Emergency Management Agency (FEMA) has developed Flood Insurance Rate Maps (FIRMs) for most urban areas in the United States, which indicate the floodway for the 100-year flood and areas of inundation for the 100- and 500-year floods. These maps are used as planning tools to evaluate flood related hazards for specific properties and to provide risk-based data for setting flood insurance rates.

Mare Island has not been evaluated by the FEMA. In general, FIRMs are not prepared for federal lands. Upon conversion of the Naval Shipyard from federal ownership to private holdings, individuals and businesses may be subject to losses caused by flooding. Flood insurance would by available to future landowners at Mare Island from the National Flood Insurance Program since Solano County is a participating community. However, without the involvement of FEMA or the preparation of FIRMs, a planning and enforcement tool used by most communities would not be available.

There is currently no mechanism to require that a Flood Insurance Study (FIS) be conducted by FEMA for Mare Island. However, FEMA has expressed an interest in conducting an FIS, and would do so at the request of the community. The study would be funded by FEMA. The resulting FIRMs would probably be available two to three years after the study was begun by FEMA (Durrin, 1994).

Once areas of special flood hazards are established, development proposals at the Naval Shipyard will be subject to the provisions of the City of Vallejo Flood Damage Protection Ordinance. Under these provisions, the flood hazards and proposed floodproofing of any new structures or structures undergoing substantial improvement will be reviewed by the Department of Public Works.

3.2.3 Issues Affecting Reuse

Flood Prone Areas

Portions of the Mare Island Naval Shipyard are subject to flooding. Additional development in flood-prone areas could exacerbate existing flooding problems. Construction of buildings or other improvements in flood-prone areas could increase flood inundation levels by removing floodplain storage area from the system. In addition, the improvements would be subject to damage from floodwater inundation. Historic evidence of levee failure at the north portion of the Naval Shipyard and the potential for strong groundshaking and associated liquefaction indicate damage and/or failure exists.

3.2.4 Recommendations and Implementation Actions

Flood Prone Areas

3.2(a) Conformance with Flood Damage Protection Ordinance (City): Development should be restricted in those areas subject to flooding (below 9 feet MLLW) as shown on Figure 3.2-1. Development that is proposed in these zones should be subject to standards and criteria established by the National Flooding Insurance Program and the provisions of the City Flood Damage Protection Ordinance.

3.2(b) Preparation of Flood Insurance Study (FEMA): The City should consider requesting a Flood Insurance Study (FIS) be conducted by The Federal Emergency Management Agency (FEMA). The resulting Flood Insurance Rate Maps (FIRMs) will provide a more refined planning tool than the existing flood hazard map and will allow for the involvement of FEMA in floodplain planning and management.

3.2(c) Evaluation of Levee Systems (Navy): The Navy will evaluate the integrity and adequacy of the levee systems protecting developed areas at the northern margin of the site prior to reuse of the areas protected by the levees. The evaluation will present recommendations that would provide protection from a 100-year flood event.

3.3 VEGETATION AND WILDLIFE

3.3.1 Summary

Mare Island covers approximately 5,460 acres, only 1,630 of which are dry land. The remaining 3,830 acres consists of wetlands, tidelands, and dredge sediment ponds. Most of the dry land is occupied by the Naval Shipyard and associated facilities, leaving few remaining areas of native vegetation. Most of the plant material on the dry portion of the island consists of lawns and landscaped areas, although grassland, oak woodland, and coastal scrub habitats do exist. Wetland habitats consist of tidal and non-tidal areas which support coastal salt marsh vegetation, which rotationally provide open water, mudflat and pickleweed marsh habitat. Reuse activities at Mare Island, including maintenance, construction and infrastructure repair, will be conducted so as to avoid damage to wetland areas wherever possible.

Mare Island is reported to have one of the largest documented salt marsh harvest mouse populations in San Francisco Bay. Other sensitive species known to exist on the island are the California black rail, clapper rail and salt marsh common yellowthroat. The salt marsh wandering shrew has also been sighted (in a study dating from 1987). Several sensitive plant species may potentially occur on the island, but their existence has not been confirmed. Expansion of the National Wildlife Refuge and compliance with current federal and state policy and regulations regarding wetlands and endangered species will promote the conservation of the salt marsh harvest mouse and other sensitive species which may also inhabit the unique habitats found on the Island.

3.3.2 Description of Conditions

Mare Island is separated from the western portion of the mainland by the Napa River and lies at the southern end of the 73-square mile Napa Marsh. The island is bordered to the east by Mare Island Strait, to the south by Carquinez Strait, and to the west by San Pablo Bay. The 11,790-acre San Pablo Bay Wildlife Refuge lies immediately north and is contiguous with the tidal wetlands found along the western edge of the island.

Mare Island is approximately 5,460 acres in extent. It is relatively flat, ranging in elevation from near sea level in the northern portion to 275 feet above sea level in the hills at the southeastern edge. Only 1,630 acres of the total area of the island consists of dry land; the remaining 3,830 acres consists of wetlands, tidelands and dredge spoil ponds. Most of the dry land area is occupied by the Naval Shipyard and associated facilities, leaving few areas of native vegetation remaining on the island. Wetland habitats on the island consist of tidal and non-tidal areas which support coastal salt marsh vegetation, and dredge ponds which rotationally provide open water, mudflat and pickleweed marsh habitat. Upland habitats on the island include grassland, oak woodland, coastal scrub, and landscaped areas and lawns. Each habitat type is delineated on Figure 3.3-1.

Wetlands

A nationwide effort to map wetlands on all Navy properties has been underway for the past four years. A draft map of the wetland areas on Mare Island Naval Shipyard has been prepared but a final product is not yet available. The mapping relied on aerial photographs and other existing information and it is not expected to provide any conclusions different than what has been represented in documents prepared by the U.S. Fish and Wildlife Service and Mare Island Naval Shipyard (Pomeroy, pers. comm.) that are available for review.

Tidal Marsh: Tidal marsh habitat occurs primarily on the western edge of the island although two small strips of tidal marsh can also be found on the northeastern and southeastern shores. The tidal marsh varies from the other marsh habitat on the island in that it still receives tidal influence from San Pablo Bay and Mare Island Strait at the mouth of the Napa River. Salt marshes in the San Pablo Bay area are normally characterized by three zones: a low marsh of Pacific cordgrass (*Spartina foliosa*) or bulrush (*Scirpus* spp.) which receives maximum submergence, a middle marsh of pickleweed (*Salicornia virginica*), and a high marsh of peripheral salt-tolerant species. On Mare Island, this zonation is not readily evident and pickleweed dominates the tidal marsh habitat (Munoz, 1988).

The tidal marsh area on the northeastern shore of the island, north of the causeway, has also been described as a brackish marsh dominated by alkali bulrush (*Scirpus robustus*)(Munoz, 1988). In this area freshwater from the Napa River mixes with tidal waters from San Pablo Bay, creating brackish conditions. Pickleweed does occur inland of the bulrush vegetation.

The tidal marsh areas on Mare Island provide habitat for the salt marsh harvest mouse (*Reithrodontomys raviventris*) and the California clapper rail (*Rallus longirostris obsoletus*), both federally listed endangered species. The California black rail (*Lateralus jamaicensis coturniculus*), salt marsh common yellowthroat (*Geothlypis trichas sinuosa*) and Suisun shrew

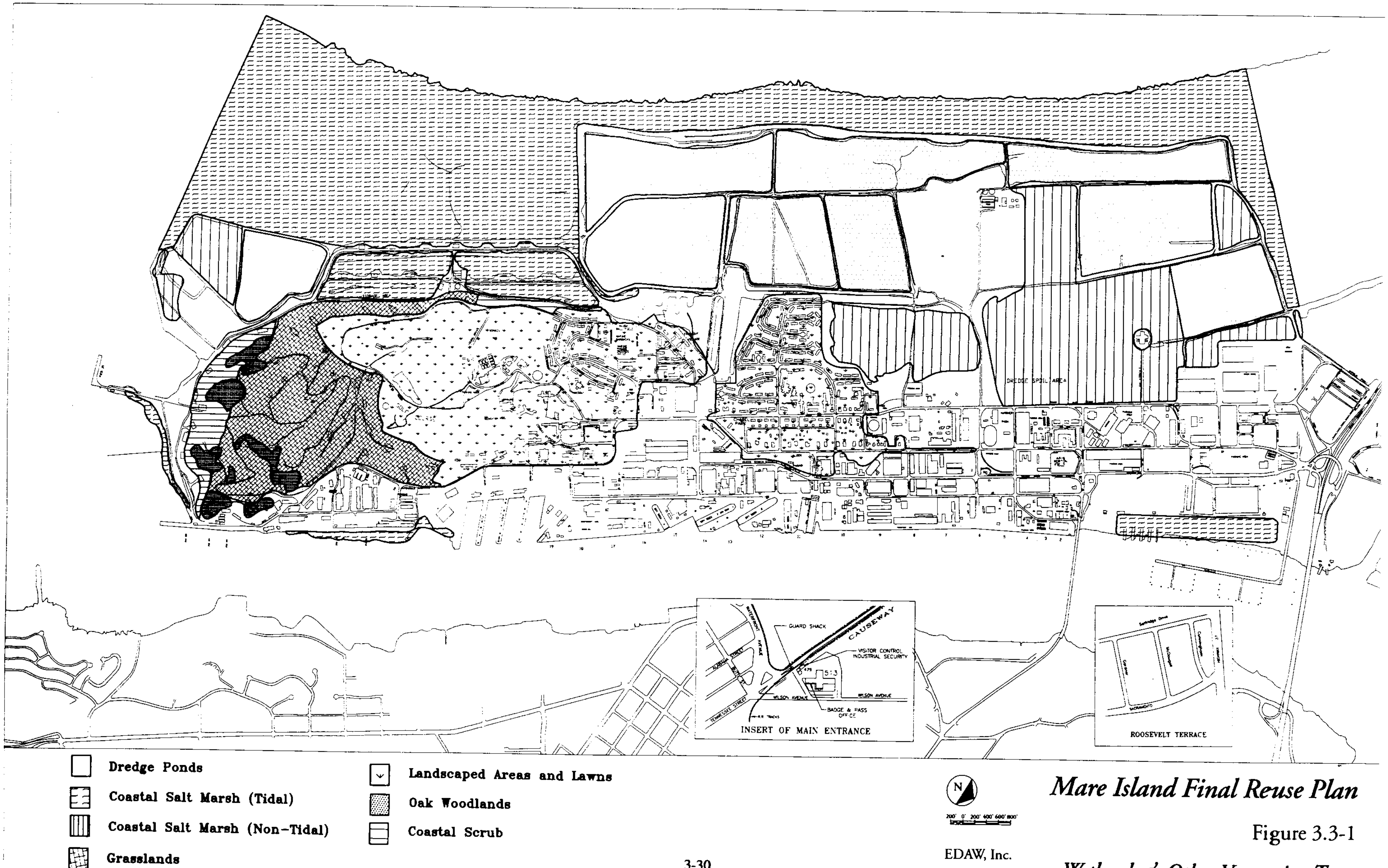

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Figure 3.3-1

Wetlands & Other Vegetation Types

(*Sorex ornatus sinuosus*), all candidate species for federal listing as threatened or endangered, are also known to occur in these tidal marshes. Other common species that inhabit the marsh include sandpipers, ducks, geese, terns, herons, egrets and owls. Tidal marshes on the west side of the island provide nursery areas for fish.

Non-Tidal Marsh: Non-tidal marsh habitat has been removed from tidal influence through the construction of dikes, levees and other barriers. Since most of these areas serve primarily as inactive dredge sediment ponds, they tend to be high in saline and support monotypic stands of pickleweed. Also, present to some extent are fat hen (*Atriplex Patula*), brass buttons (*Cotula Coronopifolia*), salt grass (*Distichlis Spicata*), rye grass (*Lolium* spp), rabbit foot's grass (*Polypogon Monspeliensis*), and Australian saltbush (*Atriplex Semibaccata*.) The non-tidal areas do support a variety of wildlife species including the salt marsh harvest mouse, canvasback ducks, mallard ducks, marbled godwits, avocets and long-billed curlew.

Dredge Ponds: The active dredge sediment ponds provide three types of habitats periodically; open water, mudflats, and pickleweed (pickleweed will revegetate spoiled areas quickly). Salt marsh harvest mice have been found inhabiting dredge ponds on Mare Island within one year after depositon of dredged sediment. (Munoz, 1988). The dredge ponds also provide open water habitat for waterfowl and mudflats for shorebirds during the cycle of use.

Other Vegetation and Wildlife Habitats

Mare Island contains approximately 1,630 acres of dry land that consist primarily of developed areas for the Naval Shipyard. Most of the plant material on the dry land portion of the island is introduced for lawns, landscaped areas, the golf course, the cemetery, and recreation fields. There is also an arboretum established on the island, within Alden Park, which contains over 1,000 specimens of a wide variety of tree species from around the world. The tree plantings were initiated in 1868 by Commodore James Alden. The arboretum provides habitat for songbirds that forage at high levels. Eucalyptus and cypress trees planted around St. Peters Chapel have been found to provide roost sites for monarch butterflies (CNDDB, 1994).

Remnants of native upland habitats occur at the top and along the slopes of the hill on the southern portion of the island. Grassland, oak woodland and coastal scrub vegetation are all found in this area. The grasslands contain both native and non native grass species and are used primarily for grazing through the Agricultural Outlease Grazing Program. The rangelands are managed in conformance with the Agricultural Outlease Conservation Plan. Plant species identified in the grassland include annual fescue (*Festuca* sp.), soft chess (*Bromus mollis*), silver hairgrass (*Aira caryophyllea*), purple needlegrass (*Nassella pulchra*), wild oats (*Avena* sp.) and sweet fennel (*Foeniculum vulgare*). Grasslands provide habitat for graniverous species such as the California ground squirrel (*Spermophilus beecheyi*), and the California vole (*Microtus californicus*) which in turn provide a food source for raptors such as the American kestrel (*Falco sparverious*), red-tailed hawk (*Buteo jamaicensis*) and northern harrier (*Circus cyaneus*). They also provide refuge for the western rattlesnake (*Crotalus viridis*) which utilizes the marshlands to prey upon the large populations of rodents.

The oak woodland habitat is limited in extent and tends to be concentrated in steep riparian zones at the southern end of the island. The dominant oak species is coast live oak (*Quercus agrifolia*) with a limited number of valley oak (*Quercus lobata*). Other plant species present in this habitat include California buckeye (*Aesculus californica*), toyon (*Heteromeles arbutifolia*), elderberry (*Sambucus* sp.) and wild rose (*Rosa californica*). The oak woodland vegetation in the steep riparian zones protects from erosion and provides shade and wind protection for the cattle using the adjacent range sites. Oak trees provide food, shade, shelter, and nesting habitat for a variety of wildlife species. Raptors use the crowns of the trees as nesting sites and other birds such as the western bluebird and American kestrel make their nests in trunk cavities.

The coastal scrub habitat occurs intermixed with the grassland and woodland areas on the steep, south-facing slope of the hill on the southern portion of the island. Vegetation in this habitat includes coyote brush (*Baccharis pilularis*), sagebrush (*Artemisia* sp.), bush lupine (*Lupinus* sp.), poison oak (*Toxicodendron diversiloba*), and a variety of annual herbaceous species including Indian paintbrush (*Castilleja* sp.). Wildlife using this habitat include similar species to those found in the adjacent grasslands and woodlands. The coastal scrub offers cover and refuge for wildlife that may hunt in the marshlands and then retreat to the scrub, grasslands or woodlands.

Sensitive Species

For purposes of this analysis, the discussion of sensitive species focuses on those species that are: listed or proposed for listing as threatened or endangered, or listed as candidates, by the U.S. Fish and Wildlife Service (USFWS); and species listed or proposed for listing as rare, threatened or endangered, or listed as candidates, by the California Department of Fish and Game (CDFG). Other species can be considered sensitive, such as animals designated species of special concern (CSC) by CDFG, and plants listed as rare or endangered by the California Native Plant Society (CNPS), but the existing information reviewed for Mare Island does not discuss these categories of species. However, a general discussion is provided at the end of this section which addresses known or expected occurrences of CSC or CNPS species on Mare Island based on review of various documents, the California Natural Diversity Data Base (CNDDB), and discussions with experts.

Sensitive species known or expected to occur at Mare Island are listed in Table 3.3-1 and shown on Figure 3.3-2, along with a description of their habitat types and nearest recorded location to Mare Island. All sensitive species known or suspected to occur inhabit the tidal and non-tidal wetlands on the island. The salt marsh harvest mouse was found within the dredge ponds and is the target species identified in a Memorandum of Understanding between the Navy and USFWS for continued use of the ponds. The MOU is described further in Section 3.3.3. In this MOU, the Navy agreed to designate all tidal wetland occurring on the western side of the island, and all tidal wetlands adjacent to Mare Island Strait and north of the Causeway as permanent habitat for the salt marsh harvest mouse. Mare Island is reported to have one of the largest documented salt marsh harvest mouse populations in San Francisco Bay (Western Division, 1989).

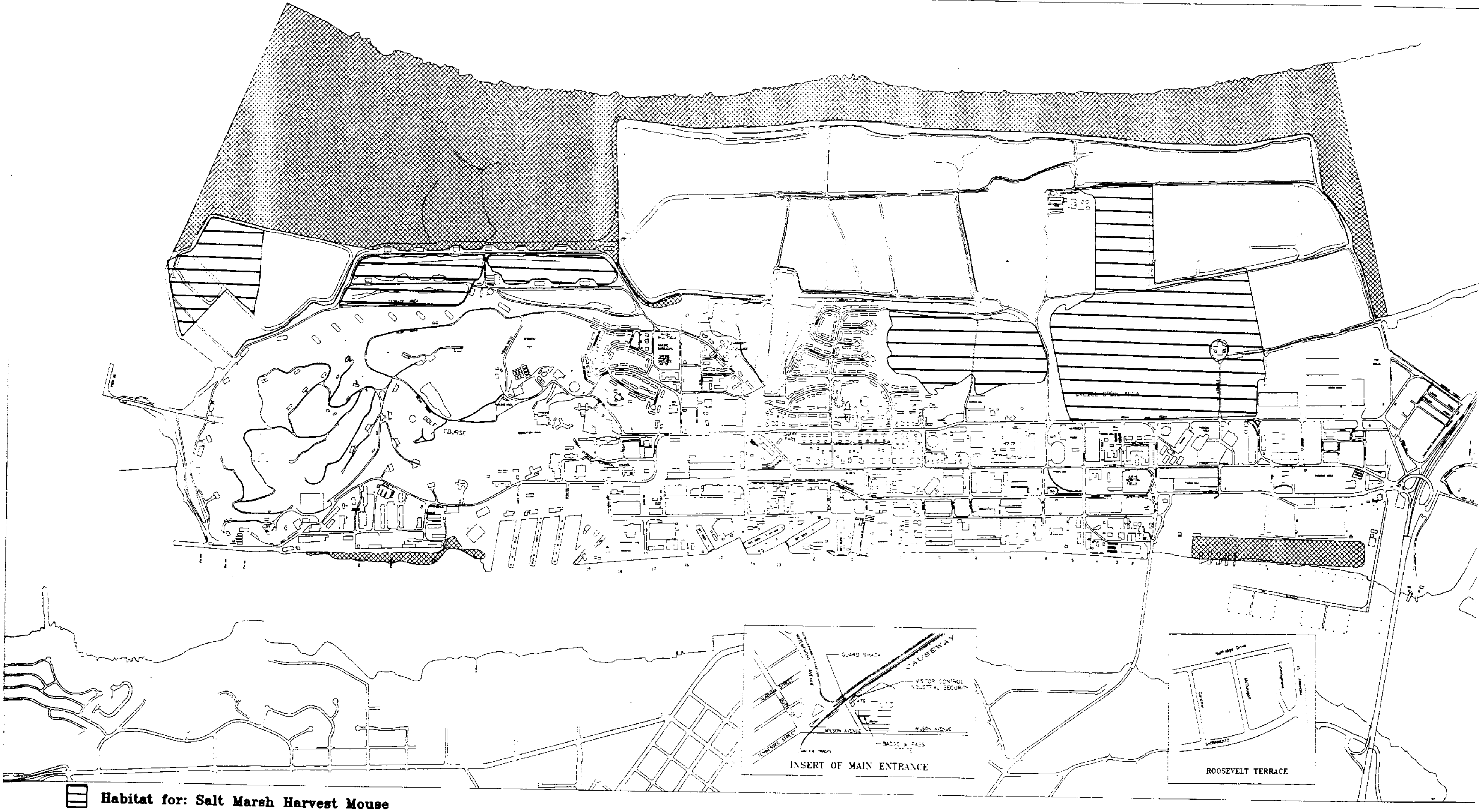
Table 3.3-1: Sensitive Species Known or Potentially Occurring on Mare Island

Name	Listing Status Federal/State/ Other	Occurrence on Mare Island	Habitat / Nearest Location to Mare Island
ANIMALS			
American Peregrin Falcon *(Falco peregrinus anatum)*	FE/SE	Known	Occasionally forages on island
California Black Rail *(Lateralus Jamaicensis coturniculus)*	C2/ST/---	Known	Salt marsh on southwest edge of Mare Island. Last seen 1992
California Brown Pelican *(Pelecanus occidentalis californicus)*	FE/SE	Known	Occasional resident in tidelands and marshes
California Clapper Rail *(Rallus longirostris obsoletus)*	FE/SE/---	Known	Salt marsh on southwest edge of Mare Island. Last seen 1992
Salt Marsh Common Yellowthroat *(Geothlypis trichas sinuosa)*	C2/---/CSC	Known	Napa River above Mare Island Strait, mouth of Dutchman Slough, near Highway 37 Bridge
Saltmarsh Wandering Shrew *(Sorex vagrans halicoetes)*	C1/---/CSC	Potential	Tidal saltmarsh. Giant Marsh near Pt. Pinole.
Suisun Shrew *(Sorex ornatus sinuosus)*	C1/---/CSC	Known	At mouth of Carquinez Strait, non-tidal areas #3 and #17[1]
Salt Marsh Harvest Mouse *(Reithrodontomys raviventris)*	FE/SE/---	Known	Most habitat located on the west shore. Two small areas remain on the east side
San Pablo Song Sparrow *(Melospiza melodia samuelis)*	CZ/CSC	Potential	Tidal Marshes
Townsend's Big-eared Bat *(Plecotus townsendii)*	CZ/CSC	Potential	Roosts in abandoned buildings

Western Mastiff Bat ***(Eumops perotis)***	**CZ/CSC**	**Potential**	**Roosts in abandoned buildings**
Winter-run Chinook Salmon ***(Oncorhynchos tshawytscha)***	**FT/SE**	**Known**	**Seasonal resident in the tidelands**
PLANTS			
Delta Tule Pea ***(Lathyrus jepsonii ssp jepsonii)***	**C2/---/CNPS 1B**	**Known**	**Coon Island on the Napa River**
Diablo Rock Rose ***(Helianthella castanea)***	**C2/---/1B CNPS**	**Potential**	**Chaparral and coastal scrub habitats**
Suisun aster ***(Aster chilensis lentus)***	**C2/---/1B CNPS**	**Suspected**	**Northeast of Fagan Slough, Fagan Marsh**
Hispid bird's beak ***(Cordylanthus mollis hispidus)***	**C2/---/CNPS 1B**	**Suspected**	**1.8 miles west of Creed Station on Creed Road; 1.5 miles north/northeast of Denverton**
Mason's lilaeopsis ***(Lilaeopsis masonii)***	**C2/SR/CNPS 1B**	**Suspected**	**East bank of Napa River at Vallejo River Park. Border of northern coastal salt marsh**
Soft bird's beak ***(Cordylanthus mollis mollis)***	**C1/SR/CNPS 1B**	**Known**	**Salt marsh site - narrow strip north**

Notes: FE = Listed as Endangered by the Federal Government
FT = Listed as Threatened by the Federal Government
C1 = Category 1 Candidate for Federal listing
(Enough data is on file to support federal listing)
C2 = Category 2 Candidate for Federal listing (Taxa which existing information indicates may warrant listing, but for which substantial biological information to support a proposed rule is lacking)
SE = Listed as Endangered by the State of California
ST = Listed as Threatened by the State of California
SR = Listed as Rare by the State of California
CSC = California Department of Fish and Game "Species of Special Concern"
1B = Designation by the California Native Plant Society. Plants rare, threatened or endangered in California and elsewhere

1. According to the 3/8/94 BRAC report, one shrew was trapped during a 1987 study but the specimen was insufficient to provide positive identification. No further evidence of the Suisun Shrew on Mare Island has been found.



Habitat for: Salt Marsh Harvest Mouse

Habitat for: California Black Rail
California Clapper Rail
Salt Marsh Yellowthroat
Salt Marsh Harvest Mouse
San Pablo Song Sparrow

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Figure 3.3-2

Sensitive Species Habitat

The California black rail, clapper rail and salt marsh common yellowthroat have been known to occur on Mare Island for several years. Identification of the salt marsh wandering shrew on the island occurred during trapping studies for the salt marsh harvest mouse conducted in 1987 (CNDDB, 1994). According to Elizabeth Pierson, Ph.D., a noted authority on bats, Townsend's big-eared bat could roost in abandoned buildings on the Island. Townsend's big-eared bats have been reported from Angel Island. The plant species listed in Table 3.3-1 have not been identified through surveys conducted for other species on the western half of the island. However, their occurrence on Mare Island is still possible.

There is an additional species that has been observed or identified as expected to occur on Mare Island that, while it does not meet the definition of sensitive species as described, is designated a CSC species by DCFG. This species is the burrowing owl (*Athene cuniculare*). The burrowing owl typically inhabits grasslands that are laden with ground squirrel burrows, which it uses for nesting. The owls are often found at the borders of marshlands of the San Francisco Bay because these areas provide abundant foraging habitat.

3.3.3 Description of Existing Agreements

Memorandum of Understanding between the Navy and USFWS

A Memorandum of Understanding was reached between the U.S. Fish and Wildlife Service (USFWS) and the Mare Island Naval Shipyard ("Navy") in July 1988. Its primary purposes are: 1) to allow for maintenance dredging activities and Navy management of dredge disposal ponds located on Mare Island; 2) to ensure, though the establishment of standards and conditions, that these activities comply with the Endangered Species Act of 1970 (as amended); 3) to promote the conservation of the salt marsh harvest mouse and the unique habits in which it is found; and 4) to promote other endangered/sensitive species which may be found on Mare Island.

Key provisions of the agreement are as follows:

- The Navy agrees to limit its dredge disposal activities to areas specified in the MOU, and retains the right to use these ponds until it determines that their use is no longer practical. Should the Navy abandon these ponds for dredge disposal purposes, it will give full consideration to converting them (or a portion thereof) to salt marsh harvest mouse habitat.

- The Navy will set aside approximately 219 acres (containing roughly 180 acres of existing non-tidal wetland habitat) as a permanent preserve for the salt marsh harvest mouse. The Navy also agrees to designate all tidal wetland occurring on the western side of the island, and all tidal wetlands adjacent to Mare Island Strait and north of the causeway, as permanent habitat for the salt marsh harvest mouse.

- Within the non-tidal area set aside for the salt marsh harvest mouse, the Navy will directly enhance approximately 30 acres using methods such as tidal flushing and installation of drainage culverts. The Navy also agrees to indirectly enhance approximately 170 acres of existing non-tidal wetland habitat through actions such as removal of debris and sections of levees/roads.

- In addition to the set-asides noted above, the Navy will create approximately 44 acres of wetland habitat specifically for the salt marsh harvest mouse.

- Scientific research and monitoring is being conducted by the Navy on a number of issues. These include monitoring of: a) benches built into the dredge disposal ponds; b) portions of the plant community and salt marsh harvest mouse populations; and c) livestock grazing and horseback riding in certain areas. Surveys to determine the extent and status of endangered, proposed, and candidate species were scheduled to occur between January 1989 and January 1991.

- The design of all studies conducted by the Navy, as well with the personnel who will undertake them, must be reviewed through USFWS. This requirement also applies to construction plans pertaining to wetland and salt marsh harvest mouse habitat enhancement.

- The Navy, in coordination with USFWS, agrees to support creation of an overlay refuge with the San Pablo Bay unit of the San Francisco Bay National Wildlife Refuge, using lands west of the westernmost dredge ponds on Mare Island.

As a result of the MOU, the Navy has taken several actions to improve wetlands on Mare Island. These include the following:

- Removed debris.
- Removed, repaired, or raised levees as appropriate.
- Constructed soil benches on inside slopes of all reconstructed and raised levees.
- Placed soil from an adjacent shipyard dredge pond on barren areas to promote the growth of pickleweed.
- Took actions to allow tidal flow into areas to enhance habitat and promote pickleweed growth.
- Created/reclaimed 34 acres of wetlands and developed tidal marsh to provide essential habitat for Salt Marsh Harvest Mouse (1992-1993).
- Researched and monitored plant community and Salt Marsh Harvest Mouse (1990-1993).
- Converted duck ponds on the south end of Mare Island from stagnate ponds breeding mosquitoes to tidal flush areas, thus reducing the need to use pesticides to control mosquitoes. The Navy is working with USFWS, Solano County Mosquito Abatement District, and NAVFAC to expand this idea marsh-wide.
- Initiated study of alternative applied techniques to reduce the use of pesticides on Mare Island, especially in the marsh.
- Conducted survey and research to decide the extent and status of other endangered, proposed, and candidate species. The survey determined that the Clapper Rail exists on Mare Island.

- Prepared draft MOU for a permanent overlay for National Wildlife Refuge of Mare Island Naval Shipyard. MOU is being reviewed and is expected to be completed in late 1994, early 1995. Conducted routine testing of water decanted form dredge ponds to determine water quality (Mare Island Naval Shipyard BRAC Cleanup Plan).

The MOU, as drafted, is effective for ten years from the date of its signing, at which time (July 1998) it is scheduled to be reviewed, updated and renewed by the parties. However, in that the Navy will no longer possess land use authority over Mare Island in 1998, the future of the MOU is uncertain. The City of Vallejo could replace the Navy as signatory to the present MOU, or it may be feasible for the City to enter into a new MOU with USFWS. The City is currently examining this issue in conjunction with the Navy and USFWS. Whatever the outcome, certain areas of the island are designated through the MOU for the specific purpose of providing long term protection of the salt marsh harvest mouse population at Mare Island. As a result, these areas are likely not available for any use other than preservation of habitat and will be considered as such in the Final Reuse Plan.

Cooperative Agreement for the Conservation and Management of Fish and Wildlife Resources (USFWS, CDFG, and Navy)

This cooperative agreement was signed in early 1991 by the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Game (CDFG), and the Mare Island Naval Shipyard (Navy). The overall goal of the agreement is to achieve the "protection, enhancement, and management of fish and wildlife resources." Its more specific function is to define the roles of the signatories in implementing the wildlife section of the Natural Resources Management Plan ("plan") for Mare Island. Key provisions of the agreement are as follows:

Navy Responsibilities:

- The Navy will assist USFWS and CDFG, within the limits of available funding and manpower, in areas such as: execution of the Natural Resources Management Plan; provision of equipment, materials, and personnel for fish/wildlife management; regulation of hunting and fishing on Mare Island; and provision of public access for hunting and fishing.

- Law enforcement officers from CDFG and USFWS shall have access to the non-restricted areas of Mare Island, but only upon adhering to specified security procedures.

- A Natural Resources Committee will be established by the Commanding Officer of Mare Island (CO) to oversee implementation of the cooperative agreement.

USFWS/CDFG Responsibilities:

- USFWS and CDFG will lend technical assistance to the Navy in preparing and implementing the wildlife section of the Natural Resources Management plan (e.g., assistance in the preparation of management plans, provision of personnel to assist with monitoring and information gathering).

- If the CO determines that additional law enforcement is needed to protect fish and wildlife at Mare Island, and USFWS and CDFG are unable to provide additional wardens, the agencies shall assist the CO in identifying and training Deputy Game Wardens.

- USFWS will identify federal agencies, and CDFG will identify state agencies, that are available (budget limitations permitting) to provide technical assistance to the Navy.

Transplanting of fish or wildlife to the Shipyard will be authorized only by mutual consent of the signatory agencies and only if supportive documentation is provided.

A general inventory and review of fish and wildlife resources, and their future potential at the shipyard will be jointly completed every five years dependent on available funds. The inventory will be incorporated into the Wildlife Section of the Natural Resources Management Plan. The Wildlife Section will also outline both a long range general plan and a detailed five year plan for preservation and enhancement of identified fish and wildlife resources. The five year plan will be reviewed annually by the signatory agencies.

The Wildlife Section of the Natural Resources Management Plan will identify areas available for regulated hunting and fishing and specify quotas for maximum allowable number of people for each area.

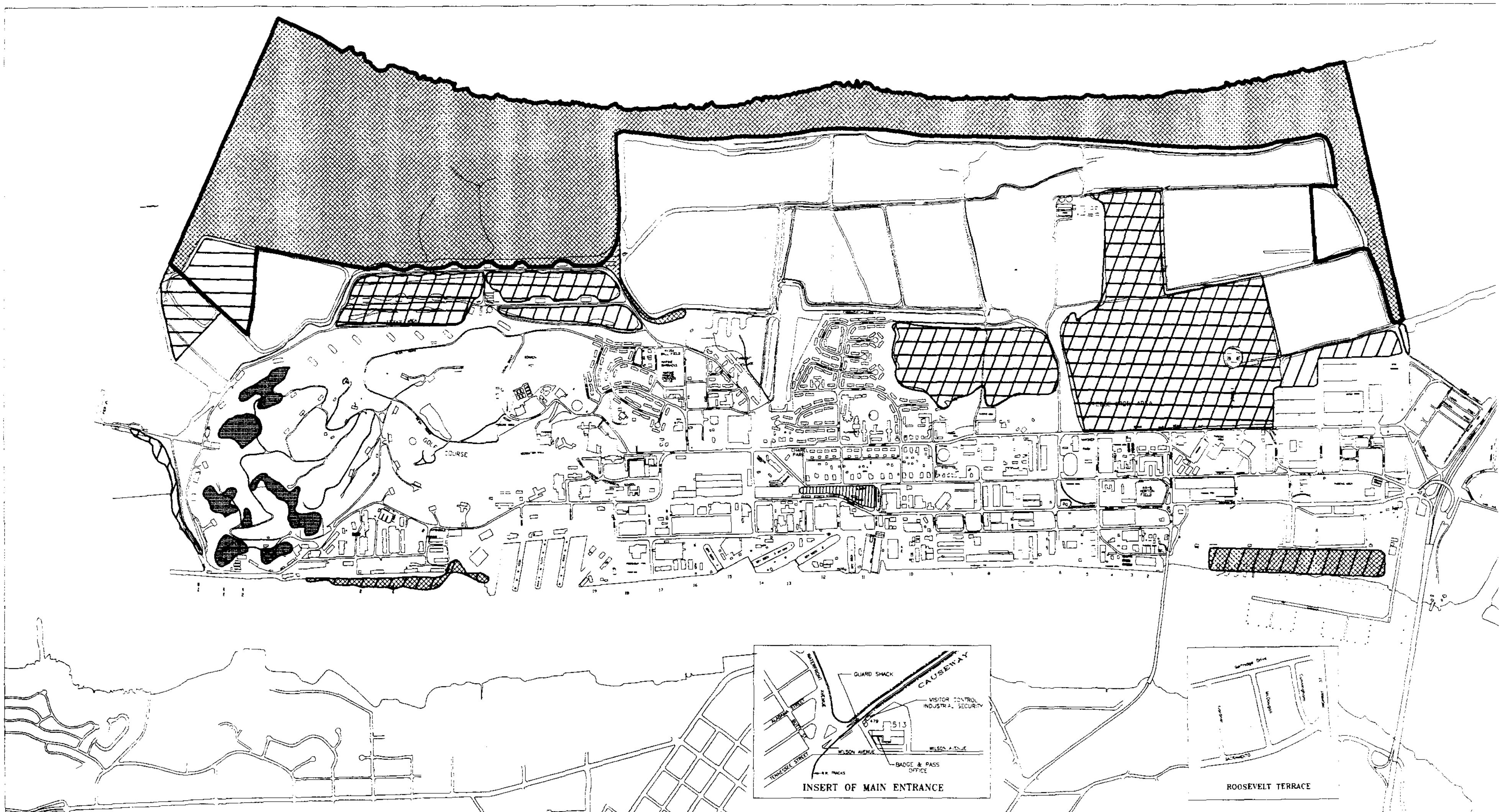
The agreement is to remain in effect indefinitely, but may be modified or amended by mutual agreement by authorized representatives of the signatory agencies. Only mutual agreement by the signatory agencies may terminate this agreement unless the Commanding Officer determines that it is necessary to do so for the mission of the Shipyard or other requirements of national defense.

The future of this agreement is uncertain, as is the status of the implementation of its tasks. However, the focus of this agreement is to preserve and protect the wildlife habitat on the island. This task would likely be imposed on any jurisdiction overseeing the island. The tasks are more broad than those outlined in the MOU and could therefore possibly be incorporated into a Resource Management and Protection Plan prepared as a component of reuse activities.

3.3.4 Issues Affecting Reuse

Wetlands

The tidal and non-tidal wetlands at Mare Island are extensive and create a contiguous band of habitat along the western edge of the island. This band of habitat is also directly connected to the San Pablo Bay Wildlife Refuge to the north, creating a continuous strip of coastal salt marsh habitat in this area of San Pablo Bay. Biological issues affecting reuse are presented on Figure 3.3-3. Wetlands are considered a valuable resource and one that has been declining



Habitat for: Salt Marsh Harvest Mouse

Habitat for: California Black Rail
California Clapper Rail
Salt Marsh Yellowthroat
Salt Marsh Harvest Mouse
San Pablo Song Sparrow

Overlay Wildlife Refuge

Wetlands

Oak Woodlands

Alden Park

200' 0' 200' 400' 600' 800'

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Figure 3.3-3

Biological Constraints

in extent throughout the State. Several resource and regulatory agencies responsible for monitoring activities in wetlands maintain "no net loss" policies of either wetland habitat value or extent of habitat area. Avoidance of wetland areas is preferable. Where avoidance is infeasible, measures to reduce the effects on wetlands must be considered and mitigation must be provided to replace habitat lost.

Reuse activities for Mare Island could result in the loss of wetland habitat or disrupt the continuous corridor of marsh habitat existing on the eastern edge of San Pablo Bay. However, the Final Reuse Plan avoids all of the contiguous wetland habitat along the western edge of the island and preserves the strip of coastal salt marsh on the northeastern edge as open space. The Regional Bay Park proposed for the far southern end of the island could affect a small strip of coastal salt marsh habitat, but it is discontiguous with other marsh areas and is not reported to provide habitat for the endangered species found on the island.

Active dredge disposal sites on the island periodically contain open water and mudflats that serve as habitat for waterfowl and shorebirds. If all dredge ponds are removed, it will displace these groups of wildlife unless similar habitats are created in the vicinity.

Sensitive Species

The tidal and non-tidal wetland areas also support all of the sensitive species known to occur or potentially occur on the island. These habitats have been monitored for several years, and through the existing MOU between the Navy and the USFWS, some of these areas have been recommended for preservation as permanent habitat for the federally endangered salt marsh harvest mouse. Although the proposed National Wildlife Refuge overlay is still being discussed, preliminary maps indicate that the overlay will be expanded to include all of the tidal wetlands at the westernmost edge of the island, the tidal wetland at the northeastern edge of the island, and two inland non-tidal wetland areas that are revegetated dredge spoil ponds.

The Final Reuse Plan designates no uses within most of the identified sensitive species habitat on the island. Depending on the extent of the overlay wildlife refuge, there may be non-tidal wetland areas which provide habitat for the salt marsh harvest mouse that remain under control of the City. Environmental education opportunities exist, as do passive recreational opportunities within these non-tidal areas. While the potential for using the wetland areas as an amenity is great, proposals to allow public access into these habitat areas would need to be reviewed by CDFG and USFWS

Mosquito Abatement

This issue area overlaps with both wetlands and sensitive species because the mosquito abatement activities conducted by the Solano County Mosquito Abatement District are focused in the non-tidal wetland areas on the island. Mosquito abatement has become an increasingly difficult issue due to the magnitude of the mosquito problems on the island and the fact that abatement techniques could result in harm to the salt marsh harvest mouse or its habitat. To attempt to resolve the issue, the Navy recently contracted a study to analyze the mosquito problems and mosquito management options at Mare Island. The study has been completed and a report is in draft form (Pomeroy, pers. comm.). Both short term and long term recommendations for mosquito control will be addressed in this report. Mosquito abatement issues may be magnified under the Final Reuse Plan given potential increases in the resident human population.

Significant Non-Wetland Botanical Areas

Alden Park, which lies within the developed areas of the base, not only has historical significance but contains over 1,000 specimens of a wide variety of tree species from around the world. The grasslands on the southern portion of the island have been described to contain, or have the ability to be dominated by, native grass species such as purple needlegrass. Native grasslands are diminishing in extent in California, and efforts to restore native grass species have met with difficulty. If the grasslands in this area do contain a high percentage of native grass species, they would likely be considered a valuable resource. The oak woodland habitat on the southern portion of the island is valuable in that it adds diversity to the natural habitat and supports coast live oak and valley oak that are 60 feet in height and 20 inches in diameter.

The Final Reuse Plan designates Alden Park as an Historical Park. The grasslands and woodlands at the southern end of the island are mostly included in the Regional Park designation. Consideration should be given to preserving or restoring native grass species and oak woodlands within the Regional Park.

Avifauna

Many bird species have been observed at Mare Island using the coastal salt marsh habitats, the dredge ponds, and the upland habitats. Because most of the coastal salt marsh habitat on the island is contiguous with the San Pablo Bay Wildlife Refuge, it creates an unobstructed movement corridor for many species and uninterrupted foraging habitat for raptors. In 1988, the Navy installed a 115,000 volt above ground power line across Cullinan Ranch, extending from the Pacific Gas and Electric Company's Vaca-Dixon Ignacio transmission line at a point approximately 4.8 miles west of Mare Island to a new electric substation on Mare Island near the northern property boundary.

Concerns were raised by USFWS that installation of this power line would result in an increase in migratory bird mortalities due to collisions with the line. Construction of the line was permitted by the Corps with the condition that the Navy conduct a three-year monitoring program to determine if adverse impacts to migratory birds and/or endangered species have occurred. The bird studies were completed by PG & E and concluded that the significance of bird mortality caused by the Mare Island transmission line is difficult to determine. However, certain bird groups were considered more vulnerable than others. In informal consultation between the Navy, PG & E and USFWS, feasible alternatives for mitigating bird strikes have been identified, including planting trees adjacent to the power line and installing highly visible markers on the line.

USFWS would like to see the line removed because once it begins restoration efforts at Cullinan Ranch, bird use is expected to increase in the area and avian collisions with the line could also increase. If the line is not removed, the mitigation alternatives would likely be required. Another issue arises when considering the design of the poles for the line and the proposed use of Cullinan Ranch which the line crosses through an easement. Since being purchased by the USFWS in 1990, Cullinan Ranch is slated to undergo restoration as a coastal salt marsh by reintroducing tidal action. The wood poles as designed for the transmission line are not expected to withstand the wet conditions proposed and would therefore have to be replaced (Pomeroy, pers. comm.).

3.3.5 Recommendations and Implementation Actions

3.3(a) Memorandum of Understanding between the Navy and USFWS (City/USFWS): The City and USFWS will review standards and conditions, and, if mutually agreed, amend the existing Memorandum of Understanding to accomplish the mutual goal of promoting the conservation of the salt marsh harvest mouse and other endangered/sensitive species which may also inhabit the unique habitats found on Mare Island.

3.3(b) Cooperative Agreement for the Conservation and Management of Fish and Wildlife Resources (City/USFWS/CDFG/Navy): USFWS and CDFG will lend technical assistance to the City in preparing an agreement to implement the wildlife section of the Natural Resources Management Plan for Mare Island. The plan will define the roles of the signatories, include an inventory and monitoring program for fish and wildlife resources , and stipulate management objectives, actions and specific techniques to achieve the protection, enhancement and restoration of fish and wildlife resources on Mare Island.

3.3(c) Expansion of National Wildlife Refuge (USFWS): The USFWS will coordinate with the City on the expansion of the San Pablo Bay National Wildlife Refuge to support the objectives of the National Wildlife Refuge System, including endangered species and migratory bird management and environmental education.

3.3(d) Mitigation of Impacts of Ground Power Line (City/Navy/USFWS/Corps): The City will cooperate with federal agency representatives to develop an appropriate strategy to mitigate the adverse impacts that the existing above ground power line poses to the migratory bird population.

3.3(e) Long-Term Solutions to Mosquito Problems (City/MAD): The City will seek and include input from the Solano County Mosquito Abatement District personnel concerning the possible impact of future development decisions on mosquito breeding.

3.3.6 Determination and Discussion of Jurisdictional Interests

California Department of Fish and Game

The California Department of Fish and Game has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitats necessary for biologically sustainable populations of those species. Pursuant to the California Fish and Game Code and other statutes (notably the California Environmental Quality Act, but also the federal Fish and Wildlife Coordination Act - see below), the Department has permitting authority or trustee agency status over projects affecting various fish and wildlife resources.

For example, a formal agreement with the Department is required for activities affecting streams (Sections 1601-1603, Fish and Game Code), permits from the Department may be necessary for "taking" of California listed rare, threatened or endangered species (Section 2081, Fish and Game Code), and the Department must consult with and provide appropriate biological expertise to lead and responsible agencies in reviewing projects under CEQA (Section 1802, Fish and Game Code and CEQA Section 15386).

At Mare Island, CDFG would exercise authority over activities that affect state listed species, including the black rail, clapper rail and salt marsh harvest mouse. It would also provide review of the Final Reuse Plan through the CEQA process. The channels identified in the hill area on the southern portion of the island could be subject to CDFG jurisdiction if they contain a channel, bed and bank, and evidence of observable scour. Wetland areas that do not support state listed species would also be of concern to CDFG, and activities proposed in these areas would be subject to review by the Department through the CEQA process. Although it is unclear how agreements with the Navy and resource agencies would be transferred, the existing Cooperative Agreement for the Conservation and Management of Fish and Wildlife Resources (to which CDFG is a signatory agency) designates responsibilities for the Department in providing guidance for the management of natural resources on Mare Island.

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers regulates activities affecting waters of the United States and wetlands under Section 10 of the Rivers and Harbors Act (1899) and Section 404 of the Clean Water Act (1972). Section 103 of the Marine Protection, Research and Sanctuaries Act (1972) authorizes the Corps to issue permits for the transportation of dredged material for the purpose of ocean disposal.

Section 10 jurisdiction applies to structures and work within the navigable waters and adjacent wetlands up to the mean high water line. Historic sloughs and other unfilled areas behind levees that are below historic mean high water levels may also be subject to Section 10 jurisdiction. Section 404 regulates the disposal of dredged or fill material in waters of the United States in a much broader sense which includes wetlands. Wetlands are defined as those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions.

Various types of permits for activities within Section 10 and Section 404 jurisdiction may be obtained from the Corps. Depending on the nature, extent and duration (i.e. temporary vs. permanent) of the activity, the authorizing action may be as simple as a Letter of Permission or as complicated as an Individual Permit with a detailed mitigation plan, alternatives analysis and full public interest review.

At Mare Island, waters of the United States and wetlands subject to Corps jurisdiction would consist of the tidal and non-tidal wetlands, including the dredge disposal ponds. The Corps regulates activities in these areas and has been involved in the MOU process (Pomeroy, pers. comm.) as well as the dredging operations. The Navy currently has a permit from the Corps to conduct its dredging operations. A discussion of this authorization is provided in Section 3.5. Any reuse activities that may affect these areas would require review and approval by the Corps.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service derives its authority over biological and wetland resources at Mare Island primarily through the Endangered Species Act (1972) and the Fish and Wildlife Coordination Act. The Endangered Species Act protects endangered species and their habitats in two ways. Section 7 of the Act prohibits federal agencies from engaging in actions that jeopardize the continued existence of endangered or threatened species, or that destroy or adversely affect species' critical habitat. Under Section 7, federal project sponsors must enter into formal consultation with the Service whenever federally implemented, funded or authorized actions may affect listed species. Mare Island Naval Shipyard is required to consult with USFWS under this section of the Act.

The second way the Act protects listed species is through Sections 9 and 10(a). Section 9 prohibits any person from "taking" endangered fish and wildlife species. Section 10(a) authorizes the granting of incidental taking permits, which allow some (limited) harm of individual members of a species if certain stringent mitigation measures (usually preparation of a Habitat Conservation Plan) are agreed upon.

Through the Fish and Wildlife Coordination Act, federal agencies with involvement in water resources projects (e.g., wetlands) are required to consult with the Service (and CDFG) so that the proposed action reduces or minimizes wetland (and other natural resource) impacts to the greatest extent practicable. Any project requiring Corps authorization (see above) could be subject to review by the Service under this Act.

Other statutes that involve authorizing or commenting actions by the Service include the National Environmental Policy Act, the Marine Mammal Protection Act, and the Fish and Wildlife Conservation Act.

Implementation of the Final Reuse Plan could require review or permit issuance by the Service if any effect on the endangered species or their habitats is identified. The Service also maintains authority over activities proposed in some of the tidal and non-tidal wetland areas through the existing MOU between the Navy and the Service, and the Cooperative Agreement for the Conservation and Management of Fish and Wildlife Resources (of which it is a signatory agency).

The Service has expressed an interest in securing fee title to tidal and non-tidal wetlands, and is currently working on a cooperative agreement with the Navy to establish an overlay national wildlife refuge on the tidal wetlands as part of the San Pablo Bay National Wildlife Refuge. When the Shipyard closes, the Service would like to acquire title to the tidal and non-tidal wetlands. The Service may also desire the use of a Building 505 as administrative and support facilities. Since funds are not available for the acquisition of a part of these areas the Service would seek the transfer of this land under the authority of Public Law 80-537 (16 U.S.C. 667d) without reimbursement.

3.4 ENVIRONMENTAL CONTAMINATION

3.4.1 Summary

The Mare Island Naval Shipyard has been operated since the mid-1800s to the present as a shipyard. Numerous industrial activities have been conducted at the base over this period. Under the requirements of the Base Realignment and Closure Act (BRAC) process, Mare Island Naval Shipyard is currently completing a basewide Environmental Baseline Survey (EBS) and a Base Cleanup Plan (BCP). The EBS is a preliminary assessment and summary of all known and suspected areas where hazardous materials and/or petroleum products have been handled, stored, disposed of or released within the boundaries of the Naval Shipyard and in adjacent areas. The EBS identifies numerous sites within Mare Island Naval Shipyard at which environmental contamination has occurred or is suspected. A wide range of hazardous materials,[4] including fuel products, radiological materials, industrial solvents, and heavy metals have been identified as potential environmental contaminants. In addition to these industrial wastes, large areas of Mare Island Naval Shipyard have been identified as being potentially affected by the disposal of ordnance (exploded and unexploded) and/or deposition of related residues. The existing and potential presence of contamination at Mare Island Naval Shipyard requires extensive environmental investigation and remediation of numerous properties by the Navy. The potential human and environmental health effects posed at some of these sites could present significant constraints on the reuse of portions of the Naval Shipyard. The investigation and remediation activities that could be required for some of the sites would likely result in delays in the development of the affected sites. Based on the findings of the EBS, the BCP will portray a plan and a schedule for remediation activity.

The mitigation of potential effects of hazardous materials on human and environmental health is rigorously regulated by federal, state, and local laws and regulations. These regulations will control the sale, transfer, or leasing of properties at Mare Island Naval Shipyard that have been affected by the release of hazardous materials to the environment. However, the process of investigation and remediation of affected sites may significantly impact the opportunities and schedules for reuse. The City of Vallejo will develop a parcel prioritization which identifies the most desirable parcels that could be leased or transferred in their present condition to create new jobs on Mare Island. A priority will be placed on matching tenants or buyers proposing similar uses to existing uses. The parcel priority process will prioritize contaminated parcels with the most significant job creating opportunity pursuant to the Final Reuse Plan.

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[4] A hazardous material is any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety, or to the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, radioactive materials, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the work place or the environment.

3.4.2 Jurisdictional Interests/Regulatory Framework

Mare Island Naval Shipyard is currently under the jurisdiction of the U.S. Department of Defense (DoD) and the Navy. The management of hazardous materials at Mare Island Naval Shipyard is performed by the Environmental, Occupational, Safety and Health Office (EOSHO). The State of California and the Navy signed a Federal Facility Site Remediation Agreement (FFSRA) in 1992, an instrument by which the Navy agreed to undertake specific environmental restoration actions to comply with state and federal laws and associated regulations. FFSRA also included a schedule for completion of documentation for the agreed upon actions. The following is a discussion of the major federal and state laws and regulations which cover the management of hazardous wastes and the mechanisms by which the environmental restoration activities at Mare Island Naval Shipyard will address these requirements.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): CERCLA and its amendments are the basic components of the federal "Superfund law". Originally passed in 1980, CERCLA created the national policies and procedures to identify and remediate sites contaminated by the release of hazardous materials. CERCLA formalized the process for identification sites and the prioritization for the clean-up of sites through the National Contingency Plan (NCP). The NCP presents the requirements for a stepwise process for the evaluation of sites. The early stages of the process include Preliminary Assessment (PA) and Site Inspection (SI) activities. The results of these stages allows a site to be evaluated by the Hazard Ranking System (HRS) which, in turn, provides a priority ranking that determines if a site should be placed on the National Priorities List (NPL). Federal facilities, such as Mare Island Naval Shipyard, are typically evaluated as a single site ("fenceline to fenceline") possibly containing many hazardous materials sites. Mare Island Naval Shipyard has been preliminarily evaluated under this process and has not been placed on the NPL (non-NPL site).

Community Environmental Response Facilitation Act (CERFA): The preliminary assessments of federal military installations identify potential contamination areas associated with operation of these facilities which typically included significant handling, storage, and disposal of hazardous materials. The identification of contaminated sites potentially leads to investigation and, possibly, remediation activities which can be expensive and time-consuming. Recognizing that such activities can significantly inhibit the planning and implementation of reuse plans for closed federal facilities, Congress amended CERCLA in 1992 through the passage of the Community Environmental Response Facilitation Act (CERFA). The purpose of CERFA is to expedite the identification of uncontaminated real property within closing facilities which offer the greatest opportunity for reuse and redevelopment. Uncontaminated, or "CERFA-clean", property is defined as any real property on which no hazardous substances and no petroleum products were stored for one year or more, known to have been released, or disposed.

Mare Island Naval Shipyard has been slated for closure pursuant to the Defense Base Closure and Realignment Act of 1990 (BRAC). A BRAC Cleanup Plan (BCP) has been developed for MINSY. The BCP provides a status of ongoing environmental restoration and associated compliance programs. The BCP is a dynamic document which will be updated periodically as restoration activities proceed and new data becomes available. The restoration and compliance programs described in the BCP will be developed and used in conjunction with the Mare Island Conceptual Reuse Plan. The process of developing, implementing, and updating the BCP is directed by the BRAC Cleanup Team (BCT), comprised of representatives from DoD, U.S. Environmental Protection Agency (EPA) and California Environmental Protection Agency (CEPA). The BCT coordinates with the local community through the Restoration Advisory Board which includes community members.

Identification of uncontaminated properties at Mare Island Naval Shipyard is the responsibility of the Navy. The U.S. Environmental Protection Agency (EPA) is the regulatory authority for enforcement of CERCLA, including the CERFA amendments. However, the EPA has joined with the California Environmental Protection Agency (CEPA) in the implementation of CERFA for DoD facilities in California. CEPA serves as the "lead agency" for base closures in California which are not listed on the NPL, including Mare Island Naval Shipyard. CEPA generally follows EPA guidance for CERCLA sites in the investigation of these sites. To facilitate the interaction of CEPA, EPA, and the Navy personnel in investigating Mare Island Naval Shipyard, a task force with project coordinators from each of these entities has been formed.

CERFA requires a process and schedule for identification of uncontaminated sites. The Department of Defense has established policies and procedures for implementation of CERFA. For the purpose of complying with CERFA, a basewide Environmental Baseline Survey (EBS) has been conducted at Mare Island Naval Shipyard. A recently released Preliminary Draft EBS (Mare Island Naval Shipyard, 1994) forms the basis of much of the information presented in this discussion. In performing the EBS, the Navy followed a systematic process of reviewing all available and appropriate information on former land uses, documentation on known or suspected releases, performing site inspections and investigations, and conducting interviews with knowledgeable Mare Island Naval Shipyard staff.

The Preliminary Draft EBS identifies the locations of known and suspected sites of hazardous materials releases, storage, treatment, and disposal at Mare Island Naval Shipyard and summarizes the available information on the findings and status of past and current environmental investigations. In compliance with the requirements of CERFA, the Preliminary Draft EBS also presents conclusions regarding the BRAC classification of identified sites, including identification of uncontaminated properties. The BRAC property classifications are summarized below:

- *Category 1 - Uncontaminated:* Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred, including no migration of substances from adjacent areas. Most residential units are classified as Category 1.

- *Category 2 - Only Storage Occurred:* Areas where only storage of hazardous substances of petroleum products has occurred, but no release, disposal, or migration from adjacent areas has occurred. Typical Category 2 facilities can include older buildings in which records show no storage of hazardous materials, but which are suited to storage, and newer buildings which have stored hazardous materials, but have no records of releases.

- *Category 3 - Contaminated But No Remediation Required:* Areas where storage, release, disposal, and/or migration or hazardous substances or petroleum products has occurred, but at concentrations that do not require a removal or remedial action. The concentration of any hazardous substance or petroleum constituent must be below chemical specific Applicable or Relevant and Appropriate Requirements (ARAR) or specified carcinogenic or non-carcinogenic risk levels.

- *Category 4 - Contaminated But All Remedial Actions Complete:* Areas where storage, release, disposal and/or migration of hazardous substances or petroleum products has occurred, and all remedial actions necessary to proteet human health and the environment have been taken. The criteria for completeness of remedial actions are defined in CERCLA.

- *Category 5 - Contaminated And Remedial Action Underway:* Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, removal and/or remedial actions are underway, but not yet completed.

- *Category 6 - Contaminated But Remedial Action Not Taken:* Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred but required response actions have not been implemented.

- *Category 7 - Property Condition Unknown, Further Study Required:* Areas that have not been evaluated or require additional evaluation, and the presence of sources or releases of hazardous substances or petroleum products is suspected.

Properties in Categories 1, 2, 3, and 4 would be eligible for deed transfer under BRAC guidance. Properties in Categories 5, 6, and 7 would not be eligible for transfer until necessary corrective actions are taken so that the property could be reclassified as Category 1, 2, 3, or 4. All property categories could be considered for leasing although consideration of leases for Categories 5, 6, and 7 would be evaluated on a case-by-case basis.

CERFA was passed to facilitate the transfer of property from the U.S. government to other entities following base closure. The law includes the specific requirements that the deed for the sale or transfer of real property covered under CERFA shall include a covenant warranting that 1) all remediation necessary to protect human health and the environment with respect to any hazardous substance remaining on the property has been taken prior to the date of transfer; and 2) any response action or corrective action found to be necessary after the date of sale shall be conducted by the United States. The deed shall also include a clause granting the United States access to the property in any case in which a response action or corrective action is found to be necessary at the property or on adjoining property. The U.S. government, therefore, remains liable for remediation of environmental contamination at the property.

Following completion of the final EBS (expected in August 1994), DoD will determine which properties are "uncontaminated" as defined in CERFA. The DoD is required to make a Finding of Suitability to Transfer (FOST) before sale or transfer of the property can be completed. After the determination is made, DoD will request concurrence in such a determination from the appropriate regulatory agency. In the case of Mare Island Naval Shipyard, a non-NPL site, concurrence will be sought from CEPA. DoD policy sets a schedule for concurrence and provides a procedure for resolving comments raised by CEPA.

Pursuant of the Base Realignment and Closure process, DoD has established a policy for leasing of property within bases slated for closure, including Mare Island Naval Shipyard. Following review of the EBS and identification of BRAC categories for properties proposed for reuse, the DoD will make a determination of the suitability of the properties for leasing. For appropriate properties, the DoD will make a Finding of Suitability to Lease (FOSL). The FOSLs for properties which contain some contamination by hazardous substances can be made; however, in these cases, the FOSL may include specific land use restrictions to protect human or environmental health. In accordance with CERFA, the State must be notified of proposed leases for properties on which any hazardous substance or petroleum product was stored for one year or more, known to have been released, or disposed of.

Resource Conservation and Recovery Act (RCRA): In response to the need to more closely regulate the handling, storage, transportation, and disposal of hazardous wastes, the U.S. Congress passed the Resource Conservation and Recovery Act in 1976. RCRA presents the federal regulations for the operation of hazardous waste storage, treatment, and disposal sites. The state of California implemented the requirements of RCRA under "interim authorization" from the federal government through enforcement of the California Hazardous Waste Control Law (HWCL) which provides regulations which equal or exceed the federal standards for hazardous waste management. Final authorization for the State to implement the RCRA was given in 1993. The responsible agency for enforcement of RCRA and HWCL is the California Environmental Protection Agency (CEPA), Department of Toxic Substances Control (DTSC).

In 1987, the Navy conducted a basewide RCRA Facility Assessment. This evaluation and subsequent evaluation have identified 136 sites within Mare Island Naval Shipyard which are considered under the jurisdiction of RCRA. The status of the investigation and remediation of these sites are summarized in following sections. The "RCRA sites" are being regulated by DTSC under a RCRA/CERCLA integration program which reduces the redundancy of the regulatory process (Gribble, 1994).

3.4.3 Description of Types of Environmental Contamination

Historic Land Use

The Mare Island Naval Shipyard has been operated as a military installation since the mid-1800s. The operation of the Naval Shipyard has included ship building and ship maintenance which required a wide range of industrial activities. These activities included operation of machine shops, fueling facilities, metal fabrication shops, and operation of fuel storage tanks. These facilities were concentrated in the industrial areas of the northern and eastern portion of the shipyard. The management of fuels, lubricants, paints, solvents and other industrial chemicals has occurred throughout much of the history of the shipyard. In addition to the use, storage, and disposal of these materials, the firing and disposal of ordnance at Mare

Island Naval Shipyard has resulted in the discharge of exploded and unexploded ordnance in several areas of the shipyard.

The principal mission of the Mare Island Naval Shipyard during the last 25 years has been to maintain and refuel modern submarines. These activities, including support for the Naval Nuclear Propulsion Program (NNPP), involved the handling and storage of radioactive materials.

The Mare Island Naval Shipyard includes housing and support services for the people living and working at the shipyard. The age of many of the buildings presents the potential presence of lead-based paints and asbestos-containing materials. Deterioration or disturbance of the paint and asbestos materials could have occurred, potentially resulting in the release of these contaminants to the surface and subsurface.

Known or Potential Hazardous Materials Releases

Installation Restoration Program (IRP): In 1981, the Naval Energy and Environmental Support Activity (NEESA) and Ordnance Environmental Support Office (OESO) initiated Mare Island's Installation Restoration Program (IRP) to evaluate health and environmental hazards associated with operations and waste disposal activities. Initial studies and investigations identified several areas of concern. After further evaluation, some areas were removed from the list and others were added. As of January 1994, 24 Installation Restoration (IR) sites have been identified as areas of concern for which remedial investigations are being performed. The purpose of the remedial investigations are to more fully define the nature and extent of contamination at each site, and evaluate methods of site cleanup. The location and status of the IR sites are summarized in Table 3.4-1 and shown on Figure 3.4-1. Additional IR sites might be added in the future based on findings of the Site Discovery Program.

Site Discovery Program: In addition to the IR sites, 136 sites have been identified as having the potential for a hazardous substance release. Of these, 95 sites are non-permitted sites where known unauthorized releases occurred. Preliminary assessments and site investigations are currently being performed at 128 of these sites. The results of these investigations would indicate which sites would require further action. The sites undergoing preliminary assessments and site investigations are listed in Table 3.4-2 and shown on Figure 3.4-2.

Hazardous Wastes

Most hazardous waste generation has occurred in the shipyard's controlled industrial area. Upon base closure, all hazardous materials/wastes would be collected and disposed of off-site in accordance with RCRA requirements. Hazardous waste generated at the shipyard is handled under guidelines outlined in the Mare Island Naval Shipyard Hazardous Waste Policies and Procedure Manual, which incorporates local, state, and federal regulations. The manual identifies wastes generated by the shipyard and specifies appropriate procedures and processes to manage the waste, including reduction, recycling, and manifest procedures.

In 1987, the Navy signed a Consent Decree that required the facility to develop a program to monitor releases of hazardous substances and/or incidents where there was a serious threat of

TABLE 3.4-1

MARE ISLAND
INSTALLATION RESTORATION PROGRAM SITES

SITE NAME	IRP NO.	HAZARDOUS WASTES	CONSTITUENTS OF CONCERN	AREA OR BUILDING NO.	STA TUS	COMPLIANCE PROGRAM
Facility Landfill, Historic Landfill[1]	IR01	Industrial and non-industrial wastes; abrasives, paints, solvents, acids, plating and mercury wastes, petroleum, PCB's, asbestos, radium-containing equipment	VOCs, SVOCs, PCBs, metals, TPH, and waste oil	LANDFILL	1991	Remedial Investigation & Feasibility Study
Oil sumps[1]	IR02	Industrial and non-industrial wastes; abrasives, paints, solvents, acids, plating and mercury wastes, petroleum, PCB's, asbestos, radium-containing equipment	VOCs, SVOCs, PCBs, metals, TPH, and waste oil	LANDFILL	1991	Remedial Investigation & Feasibility Study
Berths 4 & 5	IR03	Diesel, mercury, cadmium, copper, solvents	VOCs, metals, TPH	BERTH 4 & 5	1991	Remedial Investigation & Feasibility Study
Sandblasting Area	IR04	Spent abrasives	VOCs, metals	900	1994	Removal Action
Concord Annex	IR05	Burned explosives	VOCs, metals, trace explosives	DIKE 12	1991	Remedial Investigation & Feasibility Study
IWTP Surface Water Impoundments	IR06	Lead, chromium, PCBs, diesel fuel, lubricating oils, industrial wastes	VOCs, SVOCs, PCBs, metals, herbicides	981	1993	Removal Action
Station T-3, Acid Pre-treatment Plant[2]	IR07	Lead, waste battery acid	Metals, TPH, acids	463	1991	Remedial Investigation & Feasibility Study
Battery Storage Area	IR08	Lead oxide		629	1993	Removal Action

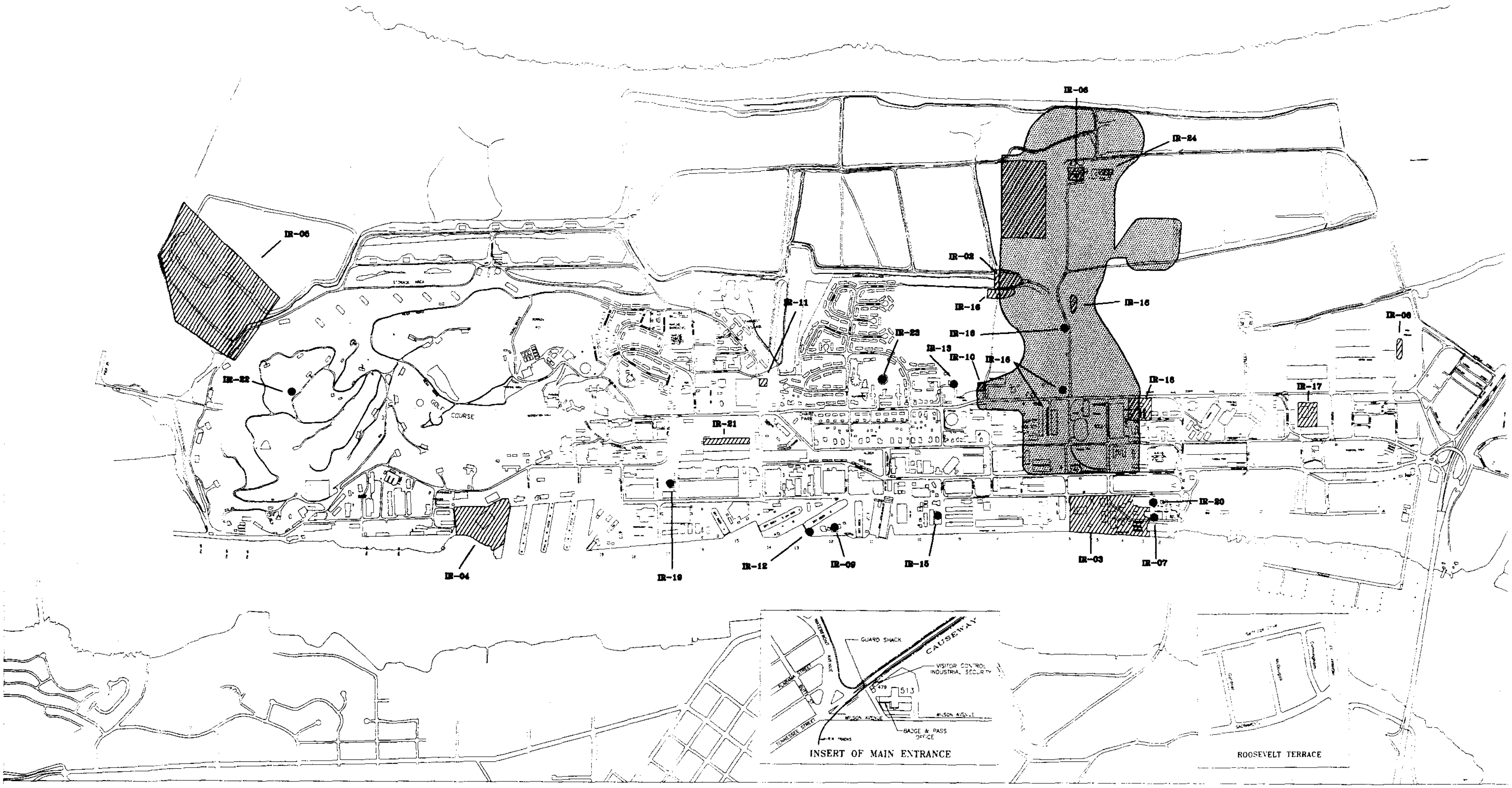
Paint Shop Storage Tanks	IR09	Gasoline, diesel, oils, paints and epoxies, solvents (alcohol, ketones, toluene, ethanol, acetates, turpentine, etc.), spent abrasives	TPH, BTEX	334	1991	Remedial Investigation & Feasibility Study
Electric Equipment Storage Yard	IR10	PCBs		831	1991	Remedial Investigation & Feasibility Study
Electric Equipment Cleaning Area	IR11	PCBs, VOCs		866	1991	Remedial Investigation & Feasibility Study
Electrical Substation	IR12	PCBs		516	1991	Site Investigation
Electrical Transformer Spill	IR13	PCBs		433	1993	Removal Action
IWTP Collection System	IR14	Industrial waste water; solvents, petroleum products, acid and base solutions	Heavy metals, VOCs, SVOCs, PCBs, acids, alkaline solutions		1991	Site Investigation
Plating Shop	IR15	Plating solutions (acid & base), chromium, antimony, copper, oils, solvents, cyanide and caustic solutions	VOCs, metals, TPH	255, 983	1993	Removal Action
Lead Oxide Areas	IR16	Lead oxide		A St. & Cedar Ave.	1993	Removal Action
Old Paint Shop Foundation	IR17	Paints, varnishes, solvents	Heavy metals, VOCs, SVOCs, PCBs	503	1993	Removal Action
Former Base Exchange Gas Station	IR18	Leaded and unleaded gasoline	Metals, TPH	565	1991	Remedial Investigation & Feasibility Study
Metal Cleaning and Boiler Shop	IR19	Acids, heavy metals, TPH		814	1991	Remedial Investigation & Feasibility Study

Battery Acid Storage[2]	IR20	Acids		463, 463A	1991	Remedial Investigation & Feasibility Study
Forge Shop	IR21	Fuel Oils, lead	Metals, TPH	386	1991	Site Investigation
Ammunition Bunkers	IR22	Arsenic, beryllium, cobalt, copper, nickel, lead, explosives, pesticides	Metals, trace explosives, pesticides	A249, A250	1991	Site Investigation
Tank 772	IR23	Diesel	TPH	722	1991	Site Investigation
Digester Tanks	IR24	Industrial sludge	VOCs, PCBs, TPH, metals	867	1992	Removal Action

Source: Mare Island Naval Shipyard Environmental Baseline Survey Preliminary Draft, 18 February 1994.

Notes: VOC = Volatile organic compound
SVOC = Semi-volatile organic compound
PCB = Polychlorinated biphenyls
TPH = Total petroleum hydrocarbons
BTEX = Benzene, toluene, ethylbenzene, xylenes

[1] IRO1/IR02 are being managed as one unit.
[2] IRO7/IR20 are being managed as one unit.



● **Small Installation Restoration Site Areas**

Large Installation Restoration Site Areas

Approximate Facility Landfill Area

IR-14 is an underground pipeline that runs throughout the island

Source: Mins, 1994, Preliminary Draft Environmental Baseline Survey and DoD CERFA Report (19 April 1994)

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Mare Island Final Reuse Plan

Figure 3.4-1

Installation Restoration (IR) Areas

TABLE 3.4-2

MARE ISLAND
PRELIMINARY ASSESSMENT/SITE INVESTIGATION SITES

SITE DESCRIPTION	BUILDING NO.	SUBSTANCE
Radiological Materials Storage	207	Radiological Waste
Radiological Materials Storage	593	Radiological Waste
Radiological Materials Storage	751	Radiological Waste
Radiological Materials Storage	796	Radiological Waste
Radiological Materials Storage	866	Radiological Waste
Storage, repair and disposal area for radiation detection instruments and radioluminescent dials	686,866	Radiological Waste
Electrical/electronics shop waste accumulation areas	686,866	Detergent wastes, solvents
Boiler shop acid tanks (9 sites)	814,85, 87,89,91	Acids and neutralized acids (phosphoric, sulfuric, hydrochloric, acetic)
Inside machine shop accumulation area	680	Asbestos, coolants, lead acids, mercury, oils, paint strippers, solvents
Dumpster	680	Coolants, hydraulic oils, solvents
Welding shop dumpster - sheet metal shop	116	Developers, empty containers, saturated wipes, removers
Forge shop waste accumulation area	386	Beryllium, paint cans, paint skins, quench oil, scrap metal
Sheet metal operation, scrap metal accumulation area	1310	Formica scrap, metal, paint-laden abrasive, rinse waste water, spun glass residues
Sandblasting area	900	Spent abrasives, metals

Shipfitting shop waste accumulation area		Cleaners, electrodes, lubricants, scrap metal, solid and liquid wastes, spent welding materials
Center tool shop waste accumulation area	678	Asbestos blankets, gaskets, pipe insulation, mercury, waste oil, solvents, oily metal cutting, PCB oils, spent abrasives
Hazardous material storage area	831	PCB
Hazardous material container storage area	213	PCB-contaminated solvents, transformers
Battery storage area	629	Spent batteries
Incinerator	Railroad Ave. & 14th St.	Biological waste
Navy pub. and printing waste storage area	65	Blanket washes, deglazing solvents, electrostatic solvents, Kodak processing chemicals
Navy pub. and printing waste storage area	47A	Blanket washes, electrostatic solutions, Kodak processing chemicals
Naval Regional Medical Center Dumpster	H73	Laboratory Reagents, pharmaceutical contaminates, X-ray film, X-ray solutions
Waste crankcase oil tank (300 gal.)	Unknown	Crankcase oil
Industrial waste gravity oil separator, Station T-2	985	Diesel oil, inorganic compounds, lubricating oils, hydraulic oils, scrap oil barge collectors, settle water, wash water
Industrial waste acid neutralization sedimentation tanks, Station T-3	987	Lead waste, neutralized sulfuric acid, sulfuric acid
Industrial waste acid sump, Station T-3	987	Lead, sulfuric acid, waste water (corrosive/toxic)
Dump road area ("A" Street)	A St.	Commercial waste, construction debris, household garbage, unspecified industrial wastes
Industrial waste cyanide sump, Station T-1	983	Alkaline cyanide
Industrial waste cyanide oxidation reaction tank, Station T-1	983	Alkaline cyanide
Industrial waste primary sedimentation tank	981	Metal cleaning solutions, oil-water separator waste, photographic solutions

Industrial waste east blending pond	981	Acid waste water, cyanide, oily water
Industrial waste west blending pond	981	Acid waste water, cyanide, oily water
Industrial waste chrome reduction mix tanks (2 sites)	981	Industrial waste, sulfur dioxide, sulfuric acid, chromium
Industrial waste neutralization mix tank	981	Aluminum, calcium hydroxide, polyelectrolyte, waste water
Industrial waste flocculation tank	981	Waste water
Industrial waste final sedimentation tank	981	Toxic waste water
Industrial waste oil sump tank	981	Diesel fuel, lubrication oils, PCBs
Industrial sewer system	866	Waste water
PCB storage area	831	PCB wastes
Asbestos dumpsters		Asbestos wastes
Asbestos holding area	Landfill	Asbestos, polyethylene bags
Pipe cleaning dip tanks (2 sites)	273	Acetone, alcohol, metal pipe residues
Pipe cleaning dip tanks	101,273, 855	Cleaning chemicals, dilution water, nitric acid, rust, soda ash, sodium dichromate, sodium hydroxide, solvents, sulfuric acid, trisodium phosphate
Plating shop sump	225	Caustic, chromic acid, cyanide, lye, muriatic acid, nitric acid, soda, sulfuric acid
Storage lockers at paint and rubber shop lab	746A, 810	Butyl acetate, empty paint cans, ethanol, methyl ethyl acetate, methyl ethyl ketone, solvents, toluene, xylene
Sulfuric acid collection sump	461	Sulfuric acid
Battery shop electrolyte container	461	Potassium hydroxide
Battery plate accumulation area	461	Antimony battery parts, silver plates, spent lead
Sulfuric acid mixing area	463, 463A	Sulfuric acid

Industrial waste treatment acid storage facility, Station T-3	463, 463A	Acid rinse water
Pesticide rinsing gravel pad	455	Pesticides, herbicides, chlorinated hydrocarbons, pesticide rinse water
Saltwater sump	121	Biler blowdown
Waterfront dumpsters	101,108,114, 128,273,334, 46,750,855	Asbestos waste, lead, lubricating oils, metal shavings, paint, paint thinner, sawdust, scrap, solvent cans, solvents, wood
Paint spray booth waste Mgt units	900	Paint-contaminated water, paint, thinners
Dip tanks	900	Alodines, deoxidizers, irridite, rinsewaters
Water curtain sumps	900	Waste water
Gravity separator at Bldg. 334, near IR09	334	Alcohol, brulin cleaner, epoxies, glacial acetic acid, ketones, nitrate, oakite, paint, silver, thinners
Former spent abrasive piles	334	Copper slag, nickel, paint, metals, spent sandblasting abrasive
Spent abrasives collection sumps	334	Copper, nickel, paint, metals, slag materials
Sludge holding ponds (2 sites)	981	Alkyline, caustics, chromium, lead, solvents
Oil sump No. 1		Lubricating oils, waste oils
Oil sump No. 2		Lubricating oils, waste oils
Fill area	505	Rubber fill
Concord annex circle pit	Concord Annex	Ashes from flashed explosives
Concord annex ordnance	Concord Annex	Detonation residues, detonaters, drug contraband, inert ordnance, powers, primers, projectiles, warheads
Concord annex storm sewers	Concord Annex	Residues from ordnance manufacture
Mare Island Strait	Strait	Acids, caustics, detergents, grease, heavy metals, oil, paints, PCBs, solvents

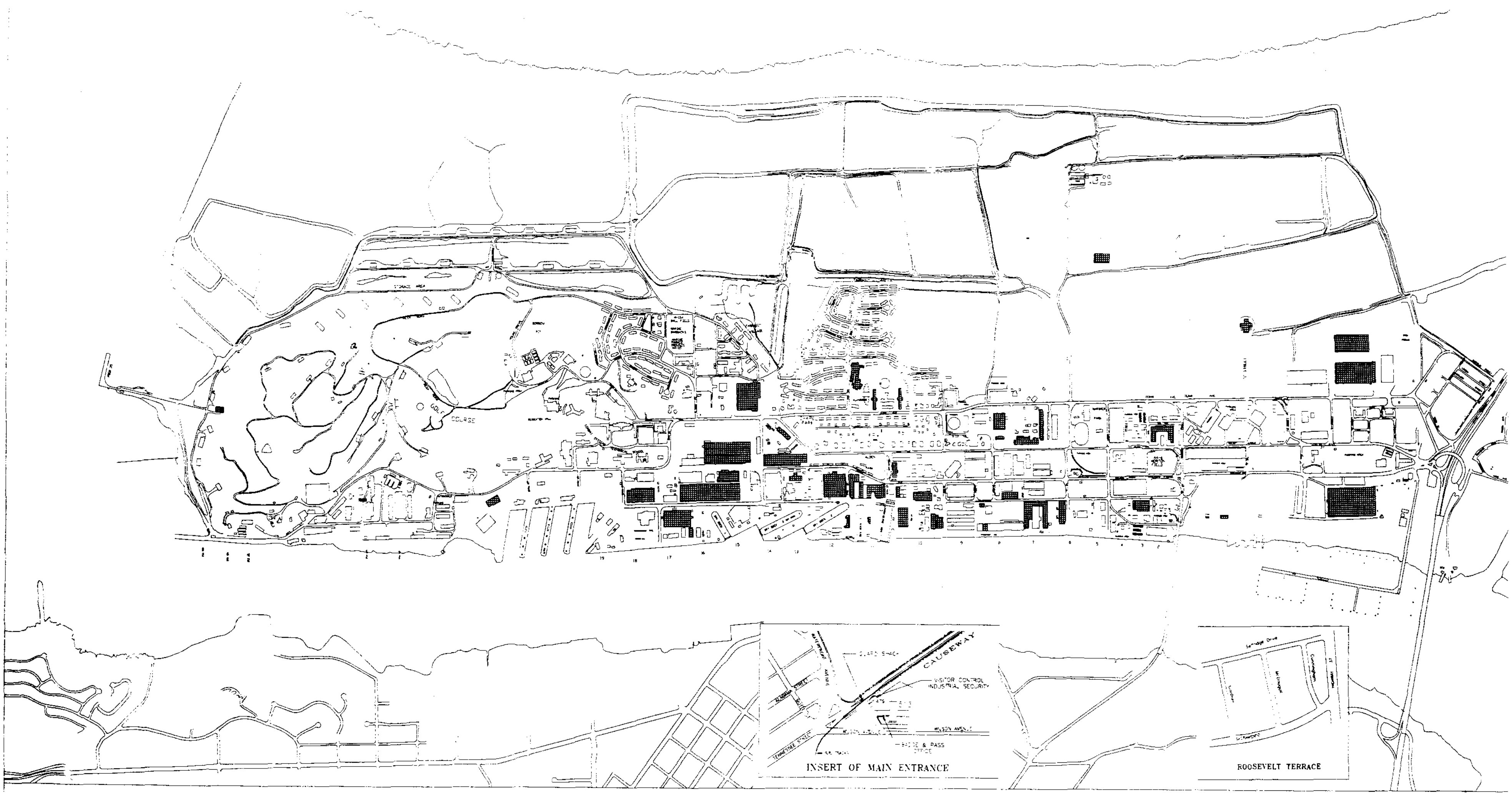
Former container storage area	A249	Oil, diethylthiourea, ethylene glycol, freon solvent, isopropyl, methylene chloride, minerals, monoethanolamine, oxygen generators, spirits, stoddard solvent, sulfuric acid
Former container storage area	A250	Oil, diethylthiourea, ethylene glycol, freon solvent, isopropyl, methylene chloride, minerals, monoethanolamine, oxygen generators, spirits, stoddard solvent, sulfuric acid
Container storage area (mercury waste bldg.)	535	Diatomaceous earth, dilute aqueous solutions, mercuric nitrate, mercury, ship boiler water
Waste oil tank	993	Lubricating oil, transmission fluid, brake fluid
Waste oil tank (2 sites)	637	Lubricating oil, transmission fluid, brake fluid
Facility landfill	Landfill	Asbestos, batteries, cleaning fluids, infectious waste, mercury, thinners, shipboard wastes, sludges, solvents, spent abrasives, waste oil
Waste holding pond	IWTP	Waste water
Container storage area	A195	Alcohols, barium perchlorate, epoxy compounds, hydrogen peroxide, reactive waste, solvents
IW pipeline collection system	IWTC	Waste water
Storm sewer system		Coolants, lead acids, liquid wastes, mercury, metal plating solutions, neutralized acids, oils, paint strippers, solvents
IW pipeline collection system lift station sumps	IWTC	PCBs
IW pipeline collection system wet wells	IWTC	PCBs
Sheetmetal operations	116,117, 115, 52, 62, 672	Deoxidizing dip tank solutions
Pipe cleaning dip tanks	101,273, 855	Nitric acid, stoddard solvent, sulfuric acid
Wastewater generator at transportation shop		Degreasers, fuels, grease, metals, oils, solvents
Storage at paint & rubber shop lab waste	746,810	Ethanol, methyl ethyl ketone, paint waste, solvents, toluene, xylene
Metallurgy laboratory wastes	746	Bronze, manganese, metal scrap, zinc dust

Concord annex ordnance and addition sites		Unknown
Sludge holding ponds	981	Alkalines, caustics, heavy metals, solvents
IW oil sump tanks	433,516,831,866,9 81	Diesel fuel, heavy metals, lubricating oils, PCBs
IW oil sludge tank		Oily sludge
Outside machine shop past disposal and accumulation practices	108,128, DD-1, DD-2	Asbestos, heavy metals, lubricating oils, metal shavings, solvents
Sanitary sewer system		Raw sewage
PCBs management accumulation areas	213,433,516,831,8 66	PCBs
Areas of potential radium releases	387,505,593,680,7 42,751,91	Radium (radioluminescent dials)
Chlordane-contaminated, MINS elementary school and wave barracks	735,765,864	Chlordane
Combat systems tech schools command		Cleaning chemicals, empty pharmaceutical packaging, infectious biological wastes, solvents
Machine shop	680	Acids, asbestos, cleaning solvents, coolants, lead, mercury, oils, paint strippers
	686	Cleaning ingredients, lubricants, methyl ethyl ketone, paints, sealants, stoddard solvent
	455	Pesticides
Storage shed - demolished	62	Sheet metal operations (contaminants not addressed)
	117	Sheet metal operations (contaminants not addressed)
Storage	155	Sheet metal operations (contaminants not addressed)
Berth 16	672	Sheet metal operations (contaminants not addressed)

Shipwrights Buildings	108	Machine Shop operations (contaminants not addressed)
Outside machine shop and toolroom	128	Machine Shop operations (contaminants not addressed)
Dry Docks 1 & 2	DD-1, DD-2	Asbestos, lubricating oils, metal shavings, solvents
Areas of potential radium releases	239,545,627,655	Radium (radioluminescent dials)
South end of island		Ordnance
MINS elementary school & wave barracks	735,765,864	Chlordane
Dry dock discharge tunnel		Asbestos, lubricating oils, metal shavings, solvents
Diesel spill site (June 3, 1991)		Diesel fuel

Source: Mare Island Naval Shipyard Environmental Baseline Survey Preliminary Draft, 18 February 1994.

Notes: PCB = Polychlorinated biphenyls
IWTP = Industrial waste treatment plant
IWTC = Industrial waste treatment collection
MINS = Mare Island Naval Shipyard



Sites Under Preliminary Assessment Or Site Inspection Activities

Source: Mins, 1994, Preliminary Draft Environmental Baseline Survey and DoD CERFA Report (19 April 1994)

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Figure 3.4-2

Current Environmental Investigation

release. In response, the Mare Island Naval Shipyard Hazardous Waste Correction Notice Program was initiated by the Navy in 1988 to track all releases. A listing of significant releases identified 117 spill incidents. Approximately 65 percent of these spill incidents were of petroleum products such as fuels and oils. Other compounds released included fluids associated with automotive activities: brake fluid, transmission fluid, antifreeze; paints and paint remover; preservatives: copper naphanate, cosmoline, tar; industrial and sewage waste water; acids; solvents; PCBs; and solids: lead, asbestos, metallic materials. Approximately 49 percent of the spills were released to water, soil, and/or storm drains. The remaining releases were spilled onto concrete and/or into industrial or sanitary drains, or released into the air. Approximately 41 percent of the spills reported were in quantities of five gallons or less, of which half were less than one gallon; 17 percent of the spills incidents were reported in quantities of 20 or more gallons. In over 32 percent of the spills, the quantity released was unknown.

Hazardous Waste Accumulation and Storage: Hazardous waste accumulation areas are allowed to store hazardous wastes for up to 90 days. The location and materials stored at the hazardous waste accumulation areas are listed in Table 3.4-3. Hazardous waste stored at Mare Island consist primarily of flammable, combustible, and corrosive liquids and solids, and other regulated materials. There are two hazardous waste storage facilities at Mare Island, operating under RCRA Interim Status Permits, which are allowed to store waste up to one year.

Tank Storage: Hazardous Substances and petroleum products are stored in Underground and Aboveground Storage Tanks (USTs and ASTs). The tanks undergo periodic testing to verify integrity and demonstrate compliance with local regulations. In January 1994, a work plan was developed to investigate all possible UST sites for contamination in the Preliminary Draft EBS. A program to properly label all ASTs was recently completed. According to information provided, 83 USTs are, or were located at Mare Island. Of these 83 USTs, 46 have been removed, five are out of service, two were closed in place, two were never used, and ten are active. The locations of 18 USTs could not be verified. A complete listing of the ASTs at the site was not available. A partial list identified 24 active ASTs and one AST that had been removed.

Hazardous Waste Treatment: Six hazardous waste treatment facilities are operated at Mare Island. The types of treatment processes performed are listed in Table 3.4-4. Two oil water separators are located on-site. One is currently operational (Berth 4), the other is inactive (between Buildings 750 and 680). Two other separators were previously disassembled (Building 112). Oil water separators separate oil, fuel, and grease from water. The water is then discharged to the industrial or sanitary sewer and treated at the waste water treatment plant. Other contaminants that are introduced into the oil water separators, such as solvents, are not removed, and are discharged to the waste water treatment plant.

TABLE 3.4-3

MARE ISLAND
HAZARDOUS WASTE ACCUMULATION

BLDG. NO.	RELATIVE LOCATION	HWAA PER-MIT NO.	STA-TUS	UNIT DESCRIP-TION	MATERIAL STORED
213		106-8	Open	Drums	Corrosives, flammmable solids and liquids, oxidizers
108	South wall next to Paint Shack	71-6	Closed		Flammable liquids
112	Sail loft	72-4	Closed	Drums	Flammable liquids
112	West wall inside Bldg. 112	72-8	Open	Drums	Combustible solids, corrosive liquids
112	Northeast wall	72-3	Closed	Drums	Combustible solids, corrosive liquids, corrosive solids
112	2nd Floor, southwest sail loft	72-6	Open	Drums	Flammable liquids, HW Solids
112	Northwest corner, outside Bldg. 112	99-1	Open	Drums	Combustible solids
113	West	106-7	Open	Drums	Flammables, corrosives, ORM-E
117	North end between Bldg. 117 & Bldg. 1345	07-8	Closed	Drums	Combustibles
117	Northeast wall	17-5	Closed	Drums	Combustible solids
117	East	56-4	Closed	Drums	Flammables, combustibles
117	Northeast corner	67-1	Closed	Drums	Flammable solids, combustible liquids, combustible solids
117	South side, inside Wonder Arch	38-8	Open	Drums	Flammable liquids, flammable solids, combustible solids, combustible liquids
117	West side, in paint storage room	71-8	Closed	Drums	Flammable liquids
117	South side outside	38-2	Closed	Drums	Flammable liquids, combustible liquids, ORM-E
121	West by CIA fence	660-1	Open	Drums	Flammables, combustibles, corrosive solids
124	North	64-1	Open	Drums	Flammable liquids, flammable solids, corrosive liquids, corrosive solids, ORM-E
126	West	56-1	Closed	Drums	Flammables, combustibles
126	Two locations inside	56-9	Open	Drums	Flammable liquids, flammable solids, combustible liquids, combustible solids
126	West	38-3	Closed	Drums	Flammable liquids, combustible liquids, corrosives, ORM-E
1304	Between Ways 1 & 2	71-7	Closed	Drums	Flammable liquids
1310	West wall inside Bldg. 1310	17-2	Closed	Drums	Combustible solids
1310	Inside fenced area in northeast corner	17-1	Closed	Drums	Combustible liquids, combustible solids
144	North	51-2	Closed	Drums	Corrosive solids, corrosive liquids
145	Northeast wall	56-6	Closed	Drums	Flammable liquids, combustible liquids, corrosives

(Continued)

147	Northeast wall	38-1	Closed	Drums	Flammable solids, combustible liquids
155	Northeast wall	17-4	Closed	Drums	Flammable solids, combustible solids
165	North wall inside Bldg. 165	26-1	Open	Drums	ORM-E
206	South wall of Bldg. 810 closest to Bldg. 206	134-1	Open		Flammable liquids, combustible liquids, hazardous waste solids, NOS HW, (unreadable)
215	East side outside	500-2	Closed	Drums	Combustibles, corrosives
225	Northwest corner	51-3	Closed	Drums	Corrosive solids
231	Northwest corner, outside	02-1	Closed	Drums	Flammable liquids, combustible liquids, combustible solids
231	East next to car wash	02-3	Open	Drums	Flammable liquids, combustible liquids, combustible solids
237	West wall towards south end of bldg.	133-1	Open	Drums	ORM-E
271	Northwest inside	55-10	Open	Drums	Ignitable solids, corrosive liquids
290	East	72-2	Closed		Combustibles, corrosives
332	East	99-7	Closed	Tank Truck	Toxic liquids
382	Southeast corner outside	41-1	Closed	Drums	Flammable solids, combustible liquids, combustible solids
390	North of Bldg. 388	11-1	Open	Drums	Flammable solids
461		51-4	Closed	Drums	ORM-E
471	East	99-2	Closed		ORM-E
483	Southwest corner, 1st floor	500-6	Closed	Drums	Flammable liquids, combustible solids
483	2nd floor	500-1	Closed	Drums	Flammable liquids, combustible solids
483	South side, 2nd floor	500-5	Closed	Drums	Flammable liquids, combustible solids
515	Rail cars next to bldg.	99-5	Closed	Tank Cars	Corrosive liquids
515	South side outside	99-6	Closed	Tank Cars	ORM-E
571	Southeast	1082-1	Closed	Drums	Combustibles, corrosive solids
571	Inside near corner	1082-2	Open	Drums	Combustible liquids, combustible solids, corrosive solids
637	North next to Tire Shop	02-2	Open	Drums	Corrosive solids, corrosive liquids
637	South wall, middle, exterior	785-1	Open		Combustible liquids
65	South wall in center area	1090-1	Open		Flammable solids, ORM-E
672	Northwest corner	17-3	Closed	Drums	Flammable solids
674	South	56-2	Closed	Drums	Corrosive liquids, corrosive solids
676	Southwest corner inside Bldg. 676	135-1	Open	Drums	ORM-E
676	3rd floor	31-2	Closed	Drums	Flammable liquids, combustible liquids
676	4th floor	38-4	Closed	Drums	Flammable liquids, flammable solids, combustible liquids
678	Between Bldgs. 676 and 678	06-1	Open	Drums	Flammable liquids, combustible liquids
686	South	06-2	Open		Combustible liquids
69	North side outside	71-10	Closed		Flammable liquids
690	Northwest corner	105-1	Closed	Drums	Alcohol, acetone, oil

(Continued)

724	Southeast	72-7	Open	Drums	Flammables, combustible solids, corrosive liquids, corrosive solids, solvents
724	West in fenced area	106-6	Open	Drums	Corrosives, acids, toxics
724	Northeast corner	07-4	Closed	Drums	Flammable liquids
738	Outside by Northwest corner of bldg.	31-1	Open	Drums	Flammable liquids, combustible liquids, ORM-E
738	West	105-5	Open	Drums	Poison, flammables, corrosives, oxidizer
742	East	106-9	Closed	Drums	Corrosive solids
750	South side outside	71-3	Closed	Drums	Flammable liquids
750	South	71-1	Open	Drums	Flammable liquids
759		938-6	Closed	Drums	Toxics, flammables, combustibles, corrosives, mixed waste
759	Northwest, outside	1010-1	Open	Drums	Combustible liquids, combustible solids, corrosive solids
722	South wall near southeast corner	1068-1	Open		Flammables, combustibles, toxics
791	Center of west wall inside Bldg. 791	38-5	Closed	Drums	Flammable liquids, combustible liquids
795	Northwest corner outside Bldg. 795	99-4	Open	Drums	ORM-E
814	East	41-2	Closed	Drums	Corrosives, combustibles
835	Unknown, formerly 07-1	PWC 550	Closed		Corrosives, combustibles
84	Adjacent to northeast wall of Bldg. 84/84A	1030-1	Open	Drums	Flammable liquids
85	North wall, middle	500-4	Closed	Drums	Flammables, combustibles, ORM-E
861	West of Bldg. 861 next to Baker Tank 837N	07-9	Closed	Drums	Combustible solids, toxic solids
866	South side outside	67-4	Closed	Drums	Flammable liquids, combustible liquids, corrosives, ORM-E
866	North, 1st floor	51-6	Open	Drums	Flammable liquids, flammable solids, combustible liquids, combustible solids, corrosive solids
866	Northwest corner, 2nd floor	51-1	Closed	Drums	Flammable liquids, flammable solids, combustible liquids, combustible solids
866	South wall, 1st floor	51-5	Closed		Flammable liquids, flammable solids, combustible liquids, combustible solids, corrosive solids
866	South side outside	67-2	Closed	Drums	Flammables, combustibles, corrosive liquids
89	North	72-1	Closed		Corrosives, combustibles
900	Southeast corner	71-2	Closed		Flammable liquids
923	North side inside building	811-1	Open	Drums	Flammable liquids, combustible liquids, ORM-E
993	Inside fenced area adjacent to Bldg. 993	1097-1	Open	Drums	Flammables, combustibles
A154		106-3	Open	Drums	All
A187	Northwest side	430-1	Closed	Drums	Combustibles
A216	By dock area of Bldg. A216	1066-1	Open		combustible liquids, combustible solids
A228	Northwest across street from bldg.	1004-3	Open	Drums	Flammable liquids, flammable gas, combustible liquids, corrosive liquids
A228	Bunker northwest of bldg.	1004-1	Closed		Corrosives, combustibles
A228	South side of bunker northwest of bldg.	1004-2	Closed		Corrosives, combustibles

A65	Southeast corner	1072-1	Open	Drums	Flammable liquids, combustible liquids, combustible solids
DD-3	North side next to paint shack	71-5	Closed		Flammable liquids
DD-4	South side next to paint shack	71-4	Closed		Flammable liquids
H21	East side inside bldg.	1080-1	Open	Drums	Flammables, combustibles, corrosives
LANDFILL	West of equipment maintenance area	455-1	Closed	Dumpsters	ORM-E
LANDFILL	South of IT trailer	IT-1	Closed	Drums	Solids
BERTH 12	YC-1472, Barge	56-5	Closed		ORM-E
BERTH 12	YC-832, Barge	56-8	Closed		ORM-E
BERTH 12	YC-1471, Barge	56-3	Closed		ORM-E
BERTH 12	YC-1448, Barge	56-7	Closed		ORM-E
BERTH 15	North near nuclear work area	72-5	Closed		ORM-E
BERTH 3	Northwest of Bldg. 471 by CIA fence	106-2	Open	Drums	ORM-E
BERTH 4	Northeast of Bldg. 471, adjacent to Berths 3 & 4	99-9	Open	Baker Tank	Combustible liquids
BERTH 4	Tank car next to berth	99-8	Closed	Tank Car	Combustible liquids
BERTH 5	In fenced area next to water	99-3	Closed		ORM-E

Source: Mare Island Naval Shipyard Environmental Baseline Survey Preliminary Draft, 18 February 1994.

Notes: ORM-E = Other regulated materials - Level E
HW = Hazardous waste
HWAA = Hazardous waste accumulation areas

TABLE 3.4-4

MARE ISLAND
HAZARDOUS WASTE TREATMENT FACILITIES

Unit ID	Treatment Process	Permit Description
MI-AERO-1	Aerosol can puncturing	Conditionally Exempt-Specified Wastestream
MI-AERO-2	Aerosol can puncturing	Conditionally Exempt-Specified Wastestream
MI-AERO-3	Aerosol can puncturing	Conditionally Exempt-Specified Wastestream
MI-IWTP-1	Phase separation, pH adjustment, sludge dewatering	Conditionally Authorized
MI-T2-1	Oil/water separation	Conditionally Authorized
MI-BTB-1	Oil/water separation	Conditionally Authorized

Source: Mare Island Naval Shipyard Environmental Baseline Survey Preliminary Draft, 18 February 1994.

Note: Locations of hazardous waste treatment facilities were not provided.

Medical and Biohazardous Waste[5]

The Naval Branch Medical Clinic (Building 201) provides outpatient consultation and general clinical services. Wastes generated by the clinic include medical or biological wastes, laboratory reagents, X-ray film developing and fixing solutions, solid wastes, and empty or out-of-date pharmaceutical containers. Integrated Environmental Systems is contracted to collect and dispose of these wastes. X-ray film solutions are treated for silver recovery and then disposed of directly into the sanitary sewer system.

Historical records pertaining to generation and disposal of wastes from the historic 1871 Naval Hospital were not available. However, a large incinerator located at Railroad Avenue and 14th Street was reportedly used to destroy solid and biological wastes. Wastes not incinerated are thought to have been disposed at the landfill (IR01).

Radiological Materials and Wastes

Facilities and areas where radiological work has been performed for the Naval Nuclear Propulsion Program (NNPP) contain radioactive materials or have the potential to contain radioactive materials. All radioactive materials associated with the NNPP would be removed upon base closure and detailed surveys would be conducted to verify removal and document the status of the affected areas.

Other radiologic activities, not associated with the NNPP include radioactive materials used for non-destructive test purposes, instrument calibration, electrical instrumentation containing vacuum tubes with radioactive elements, radium dials and gauges, and naturally occurring materials such as potassium-40, thorium, and uranium and thorium daughter products. Similarly to areas associated with the NNPP, all other areas and facilities associated with radioactive materials would be surveyed to identify the presence or absence of radioactive materials, and corrective actions would be performed where necessary. These areas are shown on Figure 3.4-3.

Small quantities of mixed radioactive and hazardous waste have been generated from ship work on nuclear powered ships. Base closure activities may also generate small quantities of mixed wastes. Mixed waste is stored in Building 759. As of January 1994, approximately 19.5 cubic meters of mixed wastes with low level radioactive contamination were stored in Building 759.

Radon: A radon facility screening survey was conducted at the shipyard in 1991 under the Navy Radon Assessment and Mitigation Program. The results of the survey identified low radon levels [range of 4 to 8 picocuries per liter (pCi/L)] in family housing. This range is within the minimum action levels defined by EPA guidelines. Non-housing facilities had readings below 4 pCi/L. A subsequent assessment in 1992 included radon monitoring at 152

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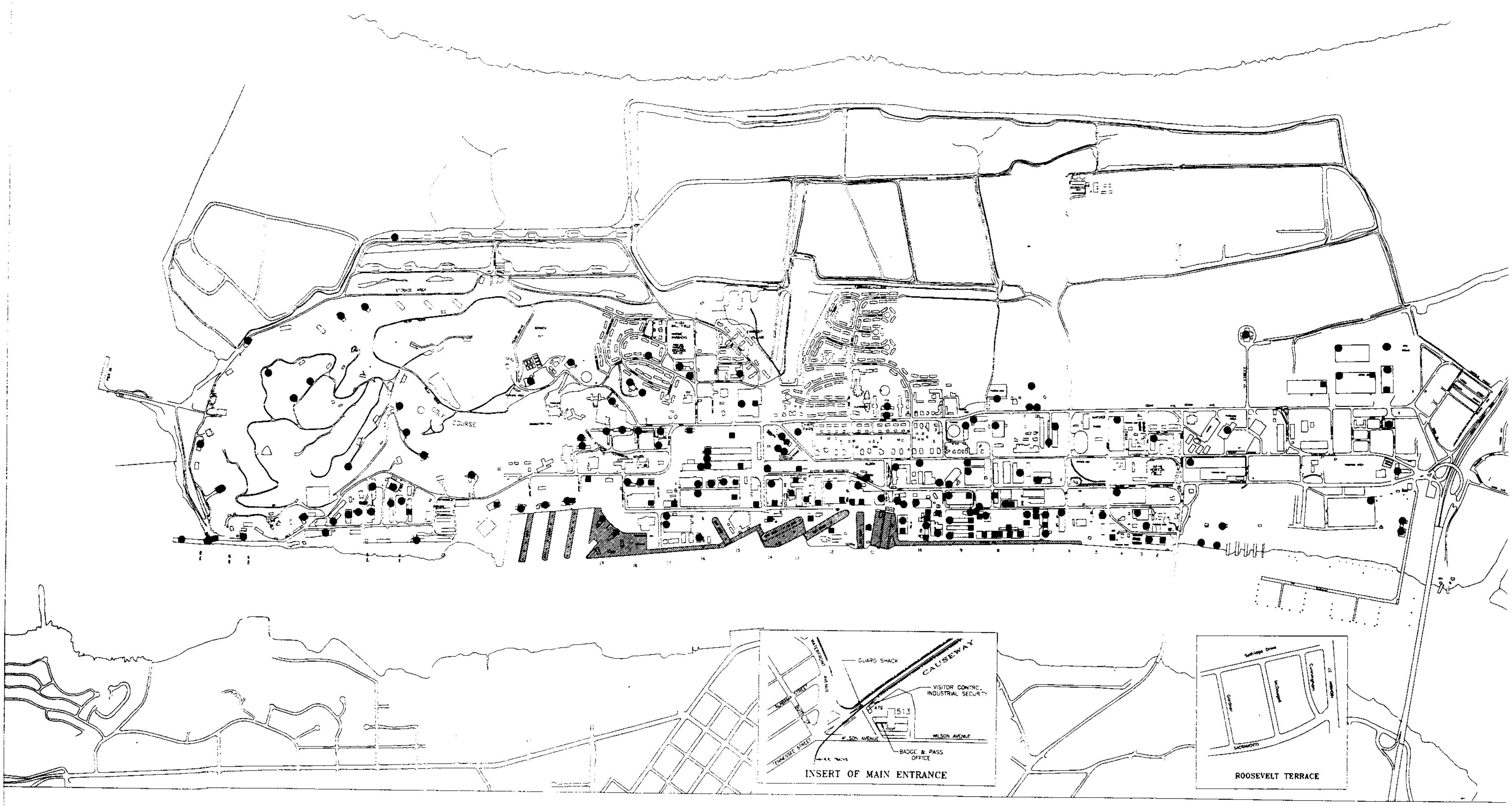
5 Regulated medical wastes include biohazardous wastes which comprise pathological wastes, used and unused sharps, cultures, and stocks of infectious agents, human blood and blood products, wastes from patients with highly communicable diseases, and contaminated animal blood and wastes.



● G-Ram Facilities/Arons

■ NNPP Facilities

▨ NNPP Areas

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Figure 3.4-3

Radiological Facilities

Source: Mins, 1994, Preliminary Draft Environmental Baseline Survey and DoD CERFA Report (19 April 1994) non-housing buildings. The funding for the assessment was canceled and the monitoring program was terminated in 1993. The results of the monitoring are not yet available.

Lead

Lead and lead-containing products have been used extensively at Mare Island since 1854 for the construction and repair of ships. Lead-based house paint was used at the site until 1980. Lead was also used for radiological shielding, ship ballasts, and various battery parts. Known areas affected by lead contamination are listed in Table 3.4-5. Lead-based paint surveys of some shipyard buildings (Buildings 334, 519, 567) have been conducted as part of Mare Island's Lead-Based Paint (LBP) Program. A LBP survey of exterior shipyard housing is currently being conducted. Surveys of interior housing paint have not been conducted.

Asbestos

Asbestos-containing materials (ACM) are potentially present in all buildings on Mare Island constructed prior to the late 1970's. The use of ACM was phased out by the shipyard between 1972 and 1977. Asbestos insulation was historically stored in Buildings 215, 237, and 253. Other ACM materials were used and stored in numerous shops and supply buildings throughout the shipyard. Abatement of asbestos has only been conducted during repairs or modifications to buildings. ACM removal work has been conducted in Buildings 101, 106A and 151. Abatement of shipboard asbestos has been conducted either aboard the ships or in the shipyard's Asbestos Ripout Facility in Building 120. A comprehensive basewide survey for ACM is currently underway.

Pesticides

Pesticides have been used currently and in the past to control mosquitos, insects that invade housing (ants, roaches, fleas, etc.), termites, rodents, birds, and insects that affect landscaping (aphids, snails, etc.) In addition, herbicides have been used to control vegetation.

Past pesticide use included chlordane and DDT which are currently banned. Chlordane was routinely used for termite control around wood framed buildings. Studies conducted in 1990 addressed chlordane contaminated soils in excess of 2.5 mg/kg at Buildings 864, 765, and 735. The site located at Buildings 864 and 765 was redeveloped into a new elementary school and asphalt playground. The Building 735 lot is vacant and fenced to prohibit access. These sites are listed as Preliminary Assessment/Site Investigation sites.

The pesticide storage area for Mare Island is located at the west end of Building 455. A gravel pad area adjacent to Building 455 is used for rinsing pesticide spraying equipment. The Preliminary Assessment/Site Investigation includes this area.

TABLE 3.4-5

AREAS AFFECTED BY LEAD CONTAMINATION

Site Location	Source of Lead
Historical Landfill	Landfill used in early 1900s; lead-acid batteries and spent battery casings disposed.
Acid Tank/Battery Shop (Buildings 463 and 461)	Facility used for disassembly, reassembly, maintenance, recharging and removing lead acid battery plates.
Battery Storage Area (Building 629)	Storage of batteries prior to recharge or disposal.
Building 791	Spills from electrolyte tank; electrolyte added to batteries.
Spent Abrasive Materials (Building 900, pipeline trenches, strait, landfill)	Sandblasting of lead-based paint from ships.
Elemental Lead Work (Buildings 165 and 386)	Lead forming operations such as shaping, cutting, melting, and casting.
Boiler Shop	Metal cleaning.
Industrial Waste Treatment Plant Collection System	Treatment of industrial liquid waste.
Small Arms Range	Spent lead shells form rifle and pistol practice.

Ordnance

Mare Island has a long history with ordnance manufacturing, storage, and disposal. Potential ordnance containing areas are identified on Figure 3.4-4. The specific areas of concern are discussed below.

Small Arms Range Area: Hazards include lead, copper, lead oxide contamination, and limited quantities of live small arms ammunition. Affected areas include the following:

- First small arms range established in 1866 located by the Marine Barracks with impact area near the present small arms range complex.

- Second range area established in 1904 north of initial range in area now occupied by elementary school, parts of Farragut Village, and large dredge spoils area.

- Range complex constructed in 1917 in marshlands west of the North Gate with impact areas located in the dredge spoils area.

- Skeet range located just south of existing Navy Exchange gas station with impact areas located in the dredge spoils area.

- Current small range complex established in 1940, surrounded by navy housing with impact danger areas extending westward into dredge spoils ponds.

- Indoor small arms range located under Building 569 and no longer in use.

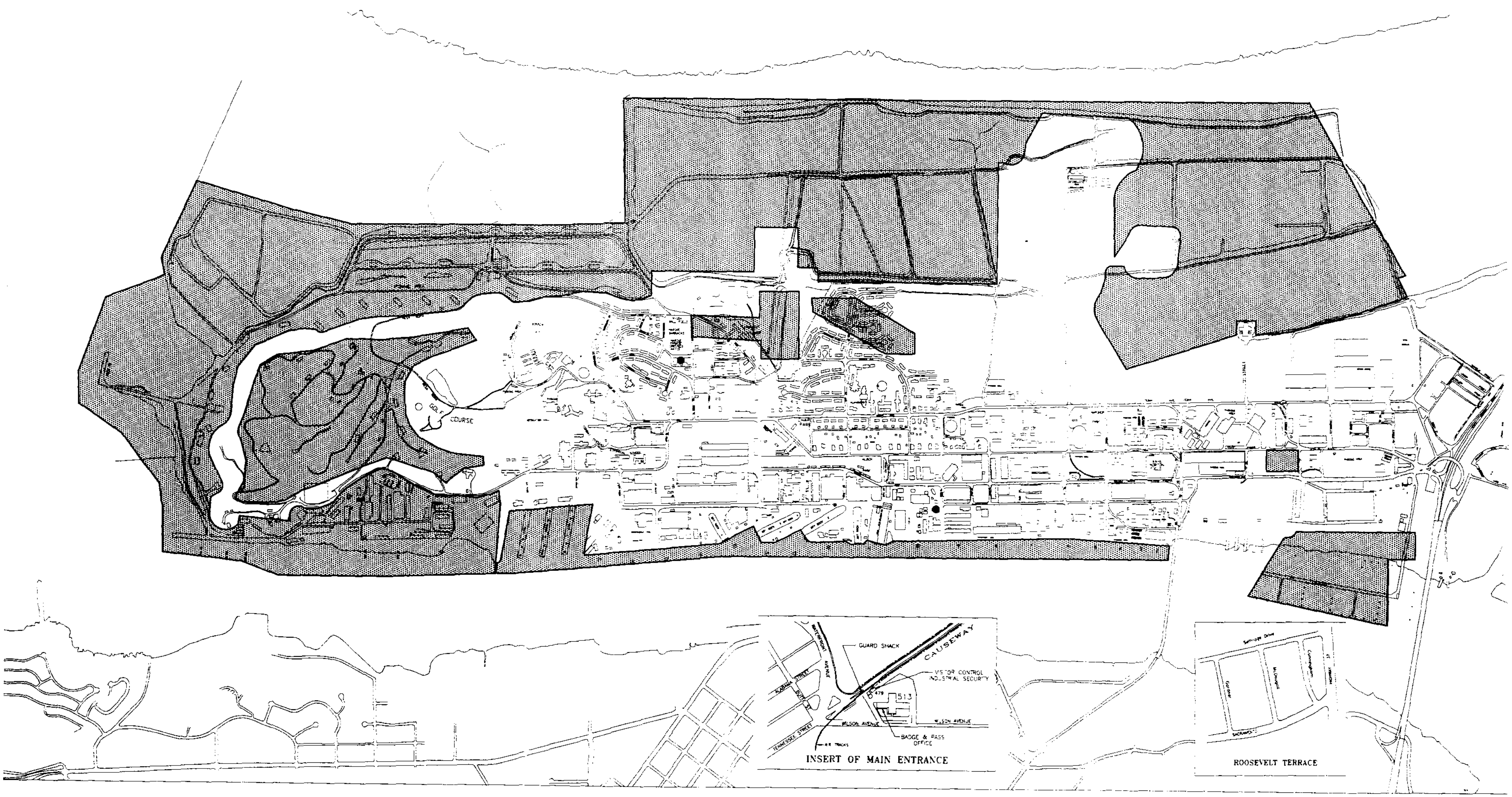
Ammunition Production Areas: Explosive manufacturing, explosive ordnance filling, and demilitarization processes occurred at the south end of the island between 1936 and 1975. These areas, the abandoned sewer laterals, wastewater collection dumps, production building floors, and grounds around production buildings are suspected of being contaminated with residues from explosive compounds.

Landfilled Areas: Wetlands at the south end of the island were filled between 1854 and the early 1950s. In addition to soil from other areas, any substance may have been used for fill, including unexploded ordnance. Sites containing buried ordnance have been identified at various locations.

Dredge Ponds: These ponds contain ammunition and ammunition residues dredged from water from areas where ammunition were handled.

Buried Magazine Area: Magazines used for ammunition storage, located on the uplands at the south end of Mare Island may contain hazardous ammunition residues. Limited quantities of buried ammunition have been found in the area and the ordnance pond is suspected of containing explosive hazards.

Reserve Fleet Pier Area: Unexploded ordnance exists in the water adjacent to the piers. Shore line fill areas are also suspected of containing unexploded ordnance.



● **Areas Containing Potential Ordinance Sites**

Source: Mins, 1994, Preliminary Draft Environmental Baseline Survey and DoD CERFA Report (19 April 1994)

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Figure 3.4-4

Potential Ordinance Disposal Sites

Dike 14 Area: Between Dike 14 and Pier 35 at the south end of the island, naval gun propellant (nitrocellulose) and small arms continually wash up on the beach from buried sources. Unexploded ordnance has been discovered in the tidal area at low tide. A large mass of suspected buried ordnance has been located using geophysical methods. Approximately 5,000 pounds of ordnance material dating from 1864 to 1948, was excavated from an area adjacent to the beach.

Utilities

The industrial waste treatment plant (IWTP) collection system at Mare Island consists of a piping system that transports wastes from 120 source drains in 30 buildings within the industrial area to the IWTP. The system was originally constructed in 1957 as a domestic sewage system and converted and expanded to the current system in 1972. The collection system has been identified as an IR program site because of the potential release of hazardous materials to the system and leakage or discharge of contaminated flows within the system.

There are 35 transformers and other electrical equipment currently active which contain polychlorinated biphenyls (PCBs) at concentrations of 50 ppm or greater. PCBs are strictly controlled by the EPA. An inspection of transformers, capacitors and other electrical equipment should be conducted to identify potential problem areas.

Electrical power is supplied by two 115 kV circuits and provided to Mare Island via overhead transmission lines. Some studies of electromagnetic fields (EMF), such as those generated by transmission lines, suggest that EMF may have adverse human health impacts; however, there is no scientific consensus on the actual health effects of EMF exposure. The California Department of Education has established setbacks for new school sites from high voltage electrical transmission line easements as a prudent measure. However, these setbacks do not apply to existing schools.

A diesel fuel supply system was established in the 1940s to distribute fuel to areas along Berths 4 through 10. The system was recently removed from service. The underground portions of the fuel system are not cathodically protected. Some of the system's tanks, pump house and piping are in the removal/remediation process (IR03). Identification of the locations of abandoned and/or former locations of oil pipelines has not been completed.

Known and Potential Off-Site Sources of Contamination

A survey of adjacent properties to Mare Island Naval Shipyard was performed by the Navy. The survey included a review of available federal, state and Local government records pertaining to hazardous materials management and releases at adjacent properties, interviews with property owners/operators, and a drive-by reconnaissance.

Land uses adjacent to the Naval Shipyard include residential and commercial uses. Two properties with known releases of petroleum products which might affect Mare Island facilities were identified: 55 and 125 Wilson Avenue (near Building 513). Underground gasoline storage tanks were removed from these two sites. The extent of contamination and the status of remedial actions at these two site was not determined.

Property Classifications and Parcelization

Mare Island Naval Shipyard was parcelized in the Preliminary Draft EBS to facilitate the definition of specific areas that could be available for reuse. The parcel boundaries were defined following consideration of potential development areas presented in the Mare Island Conceptual Plan and the preliminary BRAC property classifications developed and proposed by the EBS. The parcels were classified by the Navy in the Preliminary Draft EBS according to proposed primary and secondary land uses such as industrial, office, residential, open space, etc. Each parcel was then given a BRAC category according to cumulative hazardous materials hazards or restriction of properties located within the parcel. The property classifications presented in the Preliminary Draft EBS are shown on Figure 3.4-5. These classifications are tentative and subject to regulatory review.

The majority of Mare Island parcels are classified as Category 7 for reasons such as the potential for unexploded ordnance, past pesticide use, and lack of data on industrial properties. The results of proposed surveys or surveys in progress, such as those for lead-based paint, pesticide residues, PCB-containing electrical equipment, asbestos-containing materials, ordnance, and radiological surveys will provide data which will likely result in a reclassification of additional properties.

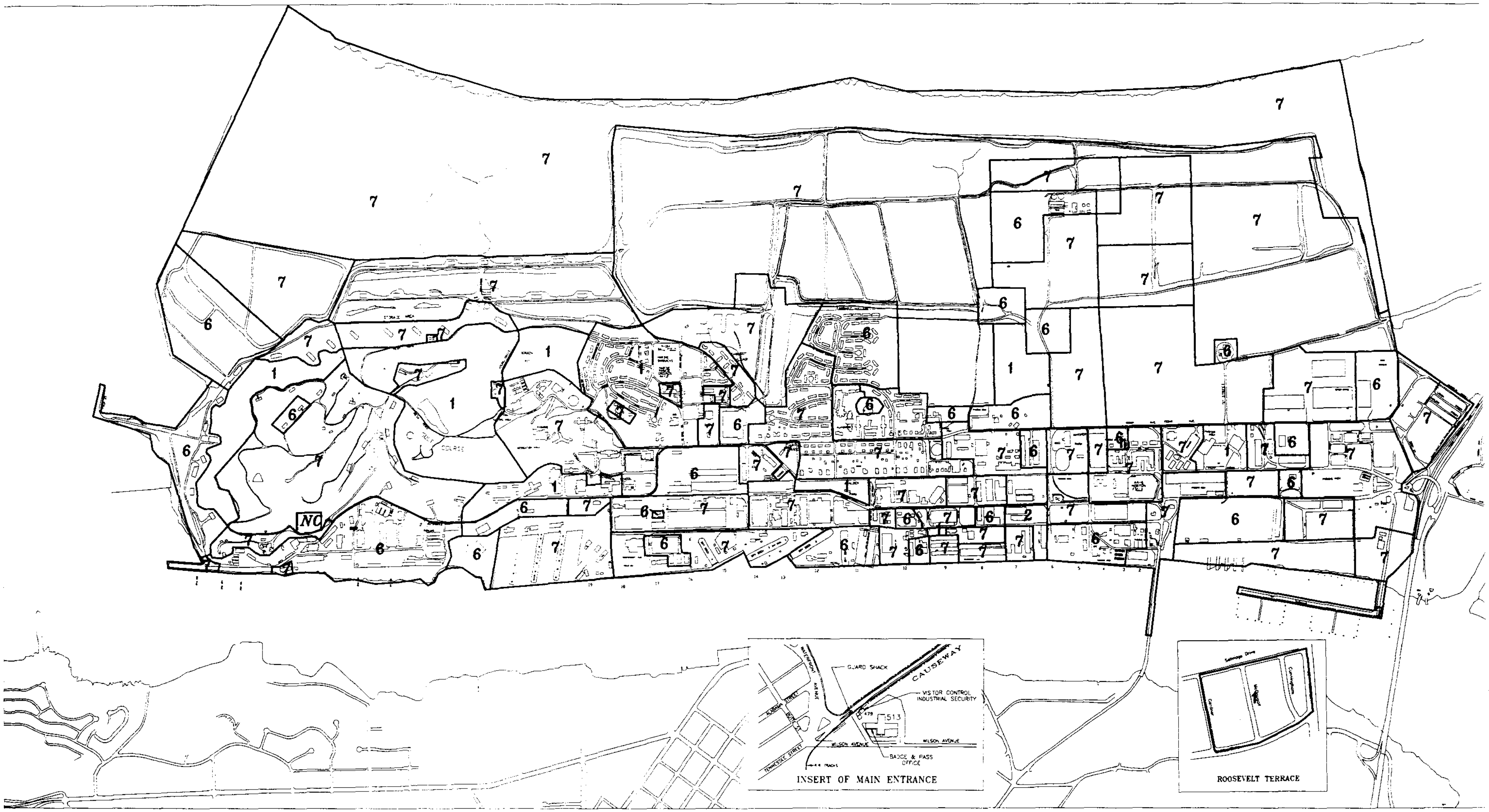
The Preliminary Draft EBS proposes classification of thirteen parcels (A-13, C-05, D-02, D-05, D-06, D-11, D-12, E-01, H-01, O-04, and P-02) as Category 1. The total area of the Roosevelt Terrace residential unit of MINSY is included in this category (E-01). The designation of property as Category 1 indicates that the property may meet the requirements for a Finding of Suitability to Transfer. The determination of FOST will not be made until review of the Preliminary Draft EBS is complete, a final EBS is prepared, and the concurrence of regulatory agencies is negotiated.

3.4.4 Issues Affecting Reuse

Known Environmental Contamination

Numerous and large areas of the project site have been identified as potentially impacted by the release of contaminants to the environment. The complexity of the process to obtain clearance of affected properties will delay the availability of such properties for sale or transfer, potentially impacting the planning options for large areas of Mare Island Naval Shipyard.

The majority of parcels delineated in the Preliminary Draft EBS are categorized as having known environmental contamination or as potentially affected by the release of hazardous materials. The BRAC and CERFA regulations will serve to define the environmental hazards associated with these parcels. The process of further evaluation of these parcels will require varying levels of investigative effort by DoD, the Navy, and the regulatory agencies (EPA and CEPA). Some of the properties within the parcels will require remediation activities prior to the parcels or the properties becoming available for reuse. Implementation of the reuse plan for Mare Island Naval Shipyard will require close involvement in the investigation and remediation activities by the City of Vallejo.



PROPERTY CLASSIFICATION CODE

1 Uncontaminated property
2 Hazardous substance stored – no release
3 Hazardous substance release, below action levels
4 Hazardous substance release, all actions taken
5 Hazardous substance release, not all actions taken
6 Hazardous substance release, no actions taken
7 Areas requiring additional evaluation
NC National Cemetery

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Figure 3.4-5

Property Classification

Lead-Based Paint and Asbestos-Containing Materials

Considering the age of many of the structures at Mare Island Naval Shipyard, the potential for the presence of lead-based paint and asbestos-containing materials is relatively high. The structures at Mare Island Naval Shipyard have been constructed over the period from the mid-1850 to the present with many structures completed and maintained during the time before lead-based paints and asbestos-containing insulation and construction materials were discontinued from use. These conditions may exist in residential and office structures where storage and use of hazardous materials would not normally have occurred. The presence of lead or asbestos in or around these structures could present significant human health hazards, particularly for sensitive uses such as residential development. The Navy is currently planning to conduct basewide asbestos and lead-based paint surveys.

Potential Ordnance and Explosives Residue Disposal Areas

Large areas of Mare Island Naval Shipyard have been identified as potential ordnance and explosives residue disposal areas. The hazards presented within these areas are not well known. The majority of the southern and western margins of Mare Island Naval Shipyard have been identified in the Preliminary Draft EBS as potentially containing ordnance, explosive materials, or explosives residues. The majority of the potentially affected area on the western margin of the site is proposed for open space use in the reuse plan. However, a regional park is proposed for potentially affected areas in the uplands portion of the southern margin of Mare Island Naval Shipyard. Disposal of these materials is also suspected within Mare Island Strait along the eastern margin of the project site. Recreational uses for these areas may present health and safety hazards for users. Residential uses proposed for the southeast portion of the site could pose health and safety risks related to ordnance to occupants.

Contaminated Runoff

Contaminated runoff or infiltration/inflow could enter the Mare Island Naval Shipyard storm water collection system and be discharged to surface water, resulting in water quality degradation. The storm water collection system receives runoff from the developed portions of Mare Island Naval Shipyard and discharges through outfalls directly to Mare Island Strait. Potential past or future spills of hazardous materials into the storm water system, infiltration of contaminated groundwater, or flow of contaminated runoff from contaminated sites within the shipyard would flow directly to the Strait. Such discharges could degrade water quality and potentially adversely impact beneficial uses of the water resources.

PCB Containing Equipment

The presence of polychlorinated biphenyls (PCBs) in transformers and other electrical equipment at MINSY presents the potential for release of the hazardous materials and possible exposure of people and the environment. The Navy maintains a database which identifies the location of all regulated PCB-containing equipment and is currently developing a PCB Elimination Plan to manage decommissioning of this equipment.

3.4.5 Recommendations and Implementation Actions

Known Environmental Contamination

3.4(a) Completion of EBS and BCP (Navy): The Navy will complete ongoing environmental restoration and associated compliance programs to expedite and improve environmental response actions, and facilitate the disposal and reuse of Mare Island, while protecting human health and the environment.

3.4(b) Development of Prioritization Process (Navy/City): The City will request and participate in the development of a prioritization process for investigation of parcels available for lease and transfer. The prioritization process should focus on all parcels designated by the Final EBS as Category 1, 2, and 3 and all parcels designated as Category 7 which provide high job creation potential pursuant to the Final Reuse Plan.

As part of continuing reuse planning, the City will closely monitor and coordinate the results all building condition surveys, improvement and clean-up studies and the Navy's layaway planning to ensure that (1) facilities anticipated for near-term job creation potential are available as soon as possible, (2) a logical phasing plan in developed for facility improvements over the long-term.

3.4(c) Resolution of Hazardous Materials Impacts (Navy/City): The potential for reduction or elimination of hazardous materials impacts will be evaluated and incorporated into the reuse planning process as soon as possible. Phasing of reuse development will consider the potential resolution of hazardous materials impacts within areas that present the most desirable development potential.

Lead-Based Paint and Asbestos-Containing Materials

3.4(d) Lead-Based Paint and Asbestos-Containing Materials Surveys (Navy): Prior to leasing or transfer of properties containing buildings, surveys will be completed by the Navy to determine if lead-based paints or friable asbestos-containing materials are present. The results of the surveys will be presented with recommendations for remediation or removal procedures to be implemented before occupancy or demolition of the identified affected structures. The recommendations should meet the existing federal, state, and local regulations regarding protection of construction workers and occupants. These recommendations will be incorporated into FOSL/FOST requirements for properties with identified hazards.

Potential Ordnance and Explosives Residue Disposal Areas

3.4(e) Potential Ordnance and Explosives Residue Disposal Areas Surveys (Navy): Prior to development of the residential areas, regional park and open space areas, a geophysical survey which does not present an unacceptable risk for detonation of unexploded ordnance will be performed by the Navy to identify buried or exposed ordnance. In addition, a soil sampling plan will be developed and implemented for any areas proposed for residential areas, playgrounds, or construction which would disturb soils. The sampling plan will be designed by a qualified professional to ensure that the plan results in collection of a suitable number of samples for statistical analysis and appropriate analytical testing. Recommendations on the suitability of the intended use or for remedial actions or restrictions for use will be made prior to development or reuse of these areas.

Contaminated Runoff

3.4(f) Evaluation of Storm Drain Network (Navy): The Navy will review the storm drain network at Mare Island Naval Shipyard to determine the locations of drains which could intercept contaminated surface water runoff or groundwater. The condition of storm drains in these areas will be evaluated to determine if replacement or rerouting the drains are appropriate.

3.4(g) Develop BMP Program (City): A Best Management Practices (BMP) program will be developed by the City for the storm water collection system operation during the reuse period.

PCB Containing Equipment

3.4(h) Decommissioning of PCB-Containing Equipment (Navy): The Navy will complete development and initiate the implementation of the PCB Elimination Plan as soon as possible. A notification of the presence of PCB-containing equipment should be included in FOSL or FOST prepared for individual properties if the equipment has not been removed.

3.5 DREDGING

3.5.1 Summary

The Mare Island Strait Channel is presently dredged to a depth of -36 feet MLLW (Mean Lower Low Water) for a minimum width of 400 feet and a length of approximately three miles by the U.S. Army Corps of Engineers (Corps). The berthfront dredging (i.e., between the Corps-dredged channel and the quay wall) varies from a depth of -30 to -39 feet MLLW and is currently conducted by the Navy with its own equipment and personnel. The sediments dredged from the channel by the Corps are disposed of at an in-bay disposal site at the south end of Mare Island; berthfront dredging sediments are disposed of by the Navy at specially constructed and maintained dredge ponds on the west side of the island. The obligation of the Corps to continue maintaining a deepwater channel in the Mare Island Strait after the Navy leaves has not been specifically determined and will be the subject of negotiations between the City of Vallejo and the Corps. Continued deepwater access to at least some of the existing berths could be essential to the future development of Mare Island facilities and property.

As part of negotiations, the City may request that the Corps continue dredging the federally-authorized channel and modify its channel dredging procedure in a manner which will reduce the extent of berthfront dredging required when the City assumes operation and control of the Island. The City is also pursuing retention of the overall Island dredge disposal systems (including the ponds), both for its own needs and as a potential economic resource (i.e., for paid disposal of sediments dredged in other parts of the Bay Area).

3.5.2 Dredging Needs

According to Navy records, dredging of the three-mile-long Mare Island Strait, where the Napa River flows into the Carquinez Strait, commenced over a hundred years ago, in 1892. Dredging of the existing designated Federal Channel to a depth of -30 feet MLLW and a width of approximately 700 feet (Figure 3.5-1) was authorized by Congressional Acts in 1927, 1938; 1945; 1965 and 1968. However, this project has been never fully funded and the present channel, known as the Navy Channel, is dredged only to a width of approximately 400 feet and a depth of -36 feet MLLW to accommodate primarily the requirements of the Navy's "Los Angeles Class" submarines.

The authorized upstream project depth, from Mare Island Causeway Bridge to approximately three miles south of the City of Napa, is -15 feet MLLW for a width of 100 feet, but it is also not maintained at this depth and width for the entire project length. The shoaling rate in the Mare Island Strait, approximately four to six feet annually, is one of the highest of any channel in the Bay Area. The sources of this siltation are primarily sediments transported downstream by the Napa and the Sacramento/San Joaquin Rivers. Contrary to popular belief, only one fifth of the silt comes from the Napa River whereas the rest originates from the Sacramento/San Joaquin Rivers. When the sediments carried by the fresh waters of these two rivers mix with the salt water of San Pablo Bay at the entrance to Mare Island Strait, this mixing causes a colloidal action, and the previously suspended sediments are deposited at the west side of Mare Island. Strong westerly winds during the spring and summer months cause the silt to become waterborne again and enter the Mare Island Strait during flood tide.

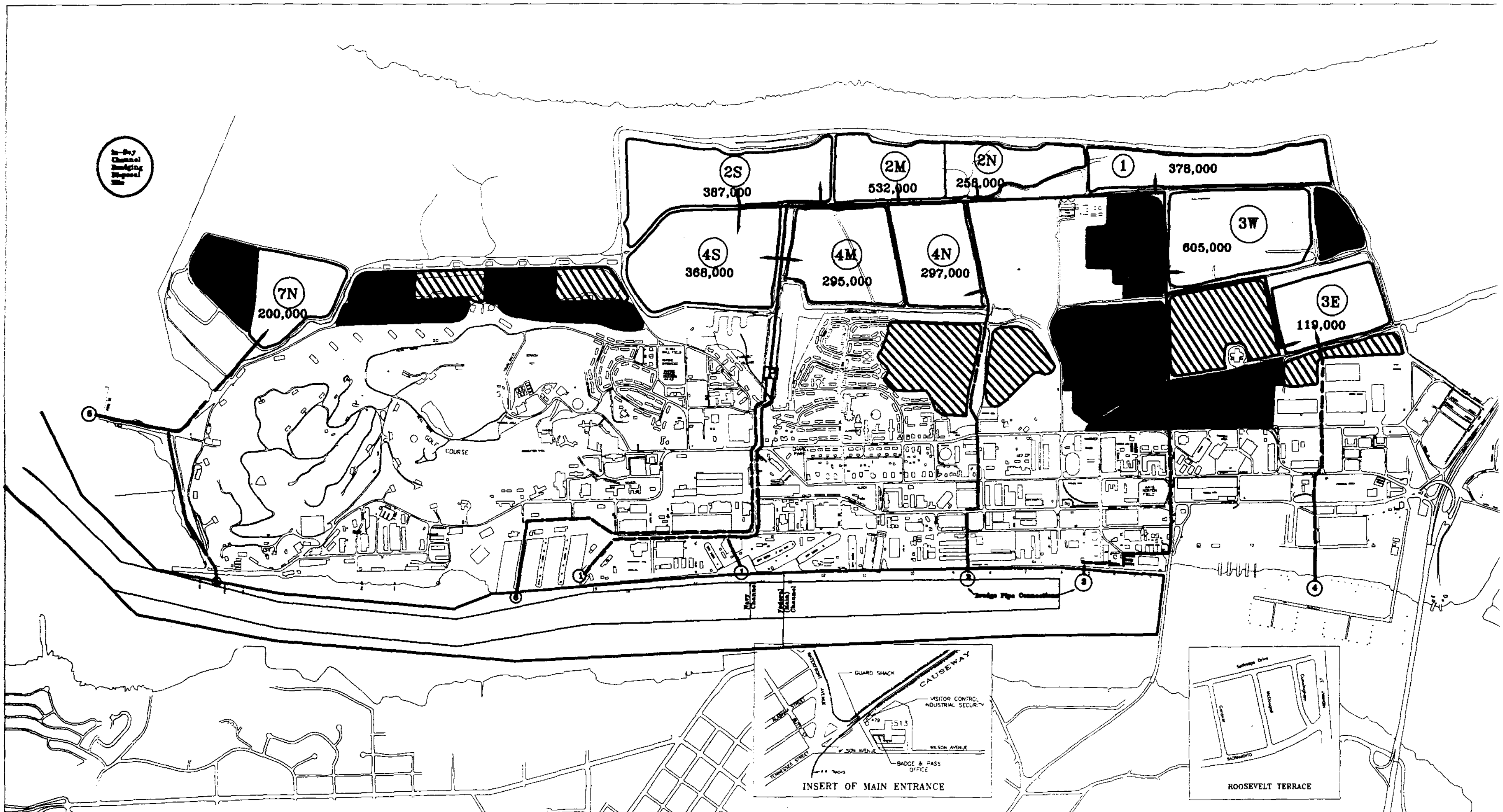
The average silt deposits in the Navy Channel during the last ten years amounted to approximately 800 thousand cubic yards per year. However, in 1993, when the annual rainfall amounts in Northern California returned to normal after seven years of drought, one million cubic yards of sediments needed to be dredged from the Navy Channel. Sediments from the Navy Channel are dredged by the U.S. Army Corps of Engineers and are disposed of by the Corps at a designated in-bay disposal site at the south end of Mare Island (Figure 3.5-1).

Berthfront dredging, conducted by the Navy, is generally conducted along a 225-foot wide strip of water between the Navy Channel and the quay wall. This dredging involves the removal of an additional 500-600 thousand cubic yards of sediments annually. Berthfront dredged sediments are disposed of by the Navy at specially constructed and maintained dredge ponds on the west side of the island (Figure 3.5-1).

3.5.3 Current Status of Operations and Permits

Channel Dredging

Maintenance of the approximately three-mile length of the Navy Channel, from the Carquinez Strait to the Mare Island Causeway Bridge, is the responsibility of the Corps, San Francisco District. The Corps used to perform this work with its own hopper dredge "Harding", but since 1981 the Corps has contracted this work out to private dredging companies such as Manson Construction and Engineering Co. and North American Trailing Co., a Division of



Inactive Dredge Pond - Reuse Potential

Inactive Dredge Pond - FWS Mitigation Site

Surface Mounted Pipes

Underground Pipe

Note: Numbers in active dredge ponds indicate remaining capacity in cubic yards as of November 1993.

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Figure 3.5-1

Dredging

Great Lakes Dredge and Dock Co. In both cases, a hopper dredge (a self- propelled hydraulic suction dredge which deposits the dredged materials in its own "belly" of approximately 3,600 cubic yards capacity, and transports and bottom dumps the materials through a hull opening to an in-bay disposal site) was used. During the last ten years, the required frequency of channel dredging has averaged about every ten months, but at more frequent intervals during especially rainy winter seasons.

The designated downstream disposal site for the materials dredged from the Navy Channel is known officially as the Mare Island Open Water Disposal Site #9, just off the south end of the island (Figure 3.5-1). According to the Corps' officials responsible for monitoring this disposal site, the capacity of this site is considered unlimited for hopper dredging operations. Since the Corps is the lead permitting agency for all dredging in the San Francisco Bay, it does not need a permit to conduct channel dredging operations. However, the Corps does comply with the requirements of other regulatory agencies such as the San Francisco Bay Conservation and Development Commission (BCDC), the Regional Water Quality Control Board and the U.S. Fish and Wildlife Service.

Berthfront Dredging

Berthfront dredging is presently conducted by the Navy utilizing its own hydraulic cutterhead suction dredge which was procured in 1991 at a cost of approximately $2 million. The dredge is operated year-round by a five person civilian crew. The average production rate of the dredge is 300 cubic yards per actual operating hour. The dredged materials are transported in slurry form via a combination of floating, underground and surface mounted piping network to any of ten specially constructed disposal ponds on the west side of the island (Figure 3.5-1). Along the east and south sides of the island, there are a total of eight connecting points for the floating pipeline from the dredge, two of which (#3 and #4) are presently out of service and in need of major repairs or replacement if expected to be used in future dredging operations. A booster pump has been installed on pipelines #1 and #6 to facilitate the option of distributing the dredged materials from these lines to all dredge ponds, except pond #7N.

The present remaining capacity of the dredge ponds is approximately 3.2 million cubic yards, half of which will be used up by the Navy before leaving Mare Island. Thus, approximately 1.5 million cubic yards of capacity will remain when the City is able to gain access to the ponds. This capacity represents 2-3 years of berthfront dredging at existing rates. The capacity of the dredge ponds can be increased by raising the levees surrounding each pond. The Navy has estimated that by spending approximately $8.5 million for raising the levees over the next seven years, the pond capacities can be increased by an additional 10 million cubic yards. At present berthfront dredging rates, this additional capacity represents 15-20 years of berthfront dredge disposal capability. It should be noted, however, that this capability could be significantly extended with modifications to the Corps' existing dredging methods for the main channel.

The berthfront dredging is authorized under Department of Army permit No. 17641E24, issued to Western Division, Naval Facilities Engineering Command on May 12, 1989. The permit expires on May 1, 1994, and the Navy has recently applied for a five year extension of this permit. The Navy has been informed by the Corps that this permit is non-transferrable and that the City of Vallejo will have to apply for a new permit for any continued berthfront dredging operations when the Navy ceases its dredging operations.

Other documents affecting berthfront dredging operations are Order No. 91-127, adopted and issued on September 18, 1991, by the California Regional Water Quality Control Board, San Francisco Bay Region, and the Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service, agreed to in July 1988. Both of these agencies will be involved in any permit activities required for the City to assume control and operations of the island's dredge system (including the disposal ponds).

3.5.4 Annual Cost of Continued Dredging Operations

The cost of the Navy channel dredging has been well documented by the Corps over the last ten years and it has averaged approximately $1.35 per cubic yard (*in situ* measurement), including mobilization and demobilization costs. Channel dredging activity occurred in September 1993, for roughly 855 thousand cubic yards, by Manson Construction and Engineering Co., at a cost of $1.13 per cubic yard, including costs of mobilization and demobilization. These costs can vary considerably based on the total quantity to be dredged, the location of dredging equipment and associated mobilization/demobilization costs, and the number of dredging companies competing for the work. One factor which contributes greatly to the relatively reasonable unit costs of channel dredging at Mare Island Strait is the close proximity of the disposal site at the south end of the island. At an average rate of $1.35 per cubic yard, channel dredging costs range from $1 million to $1.35 million per year.

Since the berthfront dredging is conducted by a combination of various Navy departments, sometimes supplemented by private contractors, the historic costs are more difficult to determine. Based on the available estimates for labor, materials, equipment procurement and maintenance, and capital improvement, berthfront dredging costs average at least $2.50 per cubic yard (*in situ*), approximately half of which can be attributed to cost of labor. At this rate, annual berthfront dredging costs range from $1.2 million to $1.5 million.

3.5.5 Issues Affecting Reuse

Channel Dredging

The need for a deepwater channel to serve the future use and development of Mare Island properties and facilities has not been specifically defined by market studies to date. However, such a channel may, in fact, be very important to future marketability of Island facilities. It is presently not clear what the Corps' obligation may be to maintain the channel at its present width, length and depth both during the "caretaker" period and when the City of Vallejo takes full title to the property thereafter. (No dredging costs are included in the Navy's proposed "caretaker" program in its Regional Coordination Plan of June 1993). The City is currently in discussions with the Corps regarding the Corps' continuing obligation to maintain (dredge) the federally-designated channel in Mare Island Strait. Since the Corps is already maintaining a 35 foot deep channel all the way to Stockton, more than sixty miles east of Mare Island, the continued maintenance of the 2-3 mile section of deepwater channel in Mare Island Strait should be justifiable considering Vallejo's potential need for deepwater access to the Mare Island waterfront.

In reviewing existing channel dredging procedures, the City has found also that changes in the Corps' procedure could help reduce the volume of materials required for disposal due to berthfront dredging activities. By reducing the present width of the berthfront dredging band from 225 feet to 25-35 feet (hopper dredges, as used in Corps dredging can dredge to within 25 feet of the quay wall), future annual berthfront dredging requirements could be reduced from the present 500-600 thousand cubic yards to less than 200 thousand cubic yards. This action would prolong the life of the Island's dredge ponds. A further consideration, affecting primarily the cost of future channel maintenance, is the possibility that the convenient in-bay disposal site at the south end of the island may soon be closed to the dumping of large volumes of materials from the channel and that all future dredge spoils from the channel may be required to be dumped at an offshore disposal site, some 50 miles west of the Golden Gate Bridge, which would significantly increase the channel dredging cost.

Berthfront Dredging

In its report titled "Dredging Requirements, Mare Island Naval Shipyard", dated 4 November 1993, the Navy has included an "Inventory of Dredging Assets" as Attachment "D" to the report (see Volume III, Chapter 7). This list includes all equipment and shoreside installations required to continue future berthfront dredging activities. All this equipment is part of a specially designed dredging system and each component is essential to the proper function of this system, especially the dredge itself.

As noted above, the existing Island dredge disposal ponds are nearing existing capacity. The capacity of these ponds will need to be expanded to support future City berthfront dredging needs. Also, additional capacity in the ponds could be used to dispose of dredged sediments from other sources in the Bay Area as an economic activity in the City's reuse plan for Mare Island.

3.5.6 Recommendations and Implementation Actions

Channel Dredging

3.5(a) Continue Negotiations with Corps for Channel Dredging (City/Corps): The City will continue negotiations with the Corps to ensure future deepwater access to existing Mare Island berths, pending marketing activities and further land use planning. The City will seek to assure that the Corps continues required dredging in the federally-authorized channel of Mare Island Strait.

3.5(b) Change in Channel Dredging Procedures (City/Corps): As part of negotiations with the Corps regarding continued channel dredging in Mare Island Strait, the City will request that the Corps dredge to within 25-35 feet of the Island quay wall in conjunction with other modifications, as a means of reducing/minimizing the berthfront dredging requirement.

Costs of Implementation: The future unit cost of hopper dredging (channel dredging) is expected to remain at its present average of about $1.35 per cubic yard, based on the continued availability of the disposal site at the south end of the island. However, if the present disposal site at the south end of the island should be closed and all dredge sediments will have to be disposed of at an offshore disposal site, the cost of channel dredging would significantly increase.

Berthfront Dredging

3.5(c) Retention of Berthfront Dredging Equipment (City): The City will explore retention of the dredging equipment as related personal property and will not approve transfer of any components of the system to other active bases. The dredge and the dredge tender are especially vulnerable to such potential transfer.

3.5(d) Explore Leasing of Dredge Equipment (City): The City will explore leasing of the berthfront dredge, the dredge tender, and the floating pipeline to a local dredging company (as a potential income source for City operations) with the provision that dredging requirements at Mare Island have priority over any other dredging commitments.

3.5(e) Investigate Dredge Pond Capacity Expansion (City): The City will explore the feasibility of expanding the capacity of the Island's dredge ponds (i.e., by raising the levees). This action will be a part of a more detailed study of dredge sediment disposal needs and economic feasibility and will be conducted in coordination with the Corps, the BCDC, RWQCB and other involved organizations.

Costs of Implementation: While the unit cost of berthfront dredging is expected to remain at its present average of $2.50 per cubic yard, the total annual cost can be reduced considerably by the above actions. Much, if not all of berthfront dredging cost could be offset by revenues gained from leasing the dredge to a private dredging company and/or by disposing of other Bay Area dredged sediments in the Island's ponds as an economic activity.

3.5.7 Jurisdictional Interest of the U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers has been regulating activities in the nation's waters since 1890. Until the 1960's the primary purpose of the regulatory program was to protect navigation. Since then, as a result of laws and court decisions, the program has been broadened so that it now considers the full public interest for both the protection and utilization of water resources.

The regulatory authorities and responsibilities of the Corps are based on the following laws:

- Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the obstruction or alteration of navigable waters of the United States without a permit from the Corps of Engineers.

- Section 404 of the Clean Water Act (33 U.S.C. 1344). Section 301 of this Act prohibits the discharge of dredged or fill material into waters of the United States without a permit from the Corps of Engineers.

- Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413) authorizes the Corps to issue permits for the transportation of dredged material for the purpose of dumping it into ocean waters.

Other laws may also affect the processing of applications for Corps of Engineers permits. Among these are the National Environmental Policy Act, The Coastal Zone Management Act, the Fish and Wildlife Coordination Act, the Endangered Species Act, the National Historic Preservation Act, the Wild and Scenic Rivers Act, and the National Fishing Enhancement Act.

The Corps of Engineers will continue to act as the prime permitting agency for all future dredging in the Mare Island Strait. However, other Federal, State and regional regulatory agencies, such as the Regional Water Quality Control Board and the U.S. Fish and Wildlife Service will continue to be involved in obtaining a Corps permit. At this time, these two agencies are the only ones besides the Corps concerned with dredging operations at Mare Island. The Water Quality Control Board concerns are focused primarily on the clarity and potential toxicity of the water which is decanted into San Pablo Bay from the dredge ponds. The RWQCB requires that such waters be sampled and tested. The Fish and Wildlife Service is primarily concerned with the preservation of endangered species and habitats (see Section 3.3).

As federal property, Mare Island has been exempt from the regulations of other agencies such as the San Francisco Bay Conservation and Development Commission (BCDC), the State Lands Commission, and the Metropolitan Transportation Commission (MTC), which will also have some regulatory authority over future dredging as well as other proposed development on Mare Island when it is converted to ownership by a local, non-military jurisdiction.

3.6 HISTORIC RESOURCES

3.6.1 Summary

The Mare Island Naval Shipyard consists of more than nine hundred buildings and other structures, including some from each stage of the Island's history. The buildings display a variety of architectural and building materials, and were built to serve the historic commands of the U.S. Navy Yard, Marine Barracks, U.S. Naval Hospital and Naval Ammunition Depot. In 1975, the Naval Shipyard was designated as a National Historic Landmark and listed on the National Register of Historic Places.

Conveyance of Mare Island from the Navy to the City will require many historic buildings to be upgraded to meet life/safety standards and seismic hazards in order to permit existing uses to continue or new uses to be established. As part of rehabilitation, these buildings will be modified over time to bring them up to safe levels of occupancy consistent with current building codes. Development of the industrial area to modern standards will require lessening of density and likely demolition of certain historic structures.

To preserve the historic sense-of-place of the Shipyard, Residential, Ammunition Depot and Hospital Historic Districts, uses will need to be selected that would, to the extent feasible, minimize impacts on the historic character defining elements of individual buildings, historic areas, and structures. Reasonable effort must be made to incorporate compatible adaptive uses or uses for which the buildings were originally designed. However, given current market conditions, utility constraints and environmental contamination, adaptive reuse of certain historic buildings will be difficult. Impacts related to rehabilitation of historic buildings must be addressed when tenants were selected and proposals submitted. In addition, methods will need to be identified to mitigate hazardous materials (such as asbestos and lead paint), secure and protect vacant buildings, provide for fire detection and suppression, and correct deficiencies in access for people with disabilities with minimal impact on the buildings if economically feasible.

Most actions for historic buildings, including leasing and rehabilitation, will trigger a review process to comply with Section 106 of the National Historic Preservation Plan (NHPA) and other legal authorities that mandate consideration of effects on historic properties. The compliance review process is designed to ensure that historic properties are considered during project planning and execution. The review process is administered by the Advisory Council on Historic Preservation (ACHP) in coordination with the State Historic Preservation Officer (SHPO), and it involves identification and evaluation of historic properties, assessment of effects, and consultation and agreement on ways to avoid, minimize or mitigate adverse effects. Providing a mechanism for timely and expedient reviews to ensure that buildings are not left vacant, yet are managed in compliance with all applicable regulations, is a planning concern . A Programmatic Agreement for taking into account the effect of the reuse plan on historic properties is being negotiated between the City, Navy and the SHPO to facilitate and expedite the compliance review process.

3.6.2 Past and Present Surveys

The historical significance of Mare Island is based upon its long history as a naval installation. Congress ordered the purchase of Mare Island in 1853. The Naval Shipyard was the first naval base established on the west coast. In 1854, its first commandant was Commander David Glasgow Farragut. The state of California was first to recognize the historic importance of Mare Island Naval Shipyard. In 1960, Mare Island was officially declared California Historic Landmark Number 751. Following this designation, a Historic Site Survey was conducted in 1963, and Mare Island was submitted for consideration as a National Historic Landmark (NHL). National Landmark status was subsequently approved by the Secretary of the Interior in 1975 under the Historic Sites Act of 1935.

In 1984, the Navy updated the Historic Site Survey pursuant to the National Historic Preservation Act (NHPA) Amendments of 1980 (Section 110a2). A comprehensive historical analysis and report (Cardwell Survey), including National Register of Historic Places Inventory Nomination Forms, were prepared and submitted to the Office of National Register

Programs, Western Region, National Park Service. Following the advice of that office and in consultation with the SHPO, Cardwell revised his report in March 1986.

Cardwell Survey

The historic analysis conducted by Cardwell proposed revisions to the NHL and modified the boundaries originally defined in the 1963 Historic Site Survey. This new analysis identified five districts that contain most of the structures considered of historical importance (Figure 3.6-1). Following is a brief description of these districts and their historical importance:

- Shipyard District: The historic shipyard was originally laid out in 1854 by W.P.S. Sanger. The area contains 19th century buildings and engineering construction. Spaces between these structures have been filled in with 20th century construction, but the original plan is readily discernible.

- Residential (formerly Shipyard Support) District: This area was originally designated for housing in the 1854 plan . It contains a large number of classic revival houses, as well as Alden Park and the significant shingle style St. Peters Chapel.

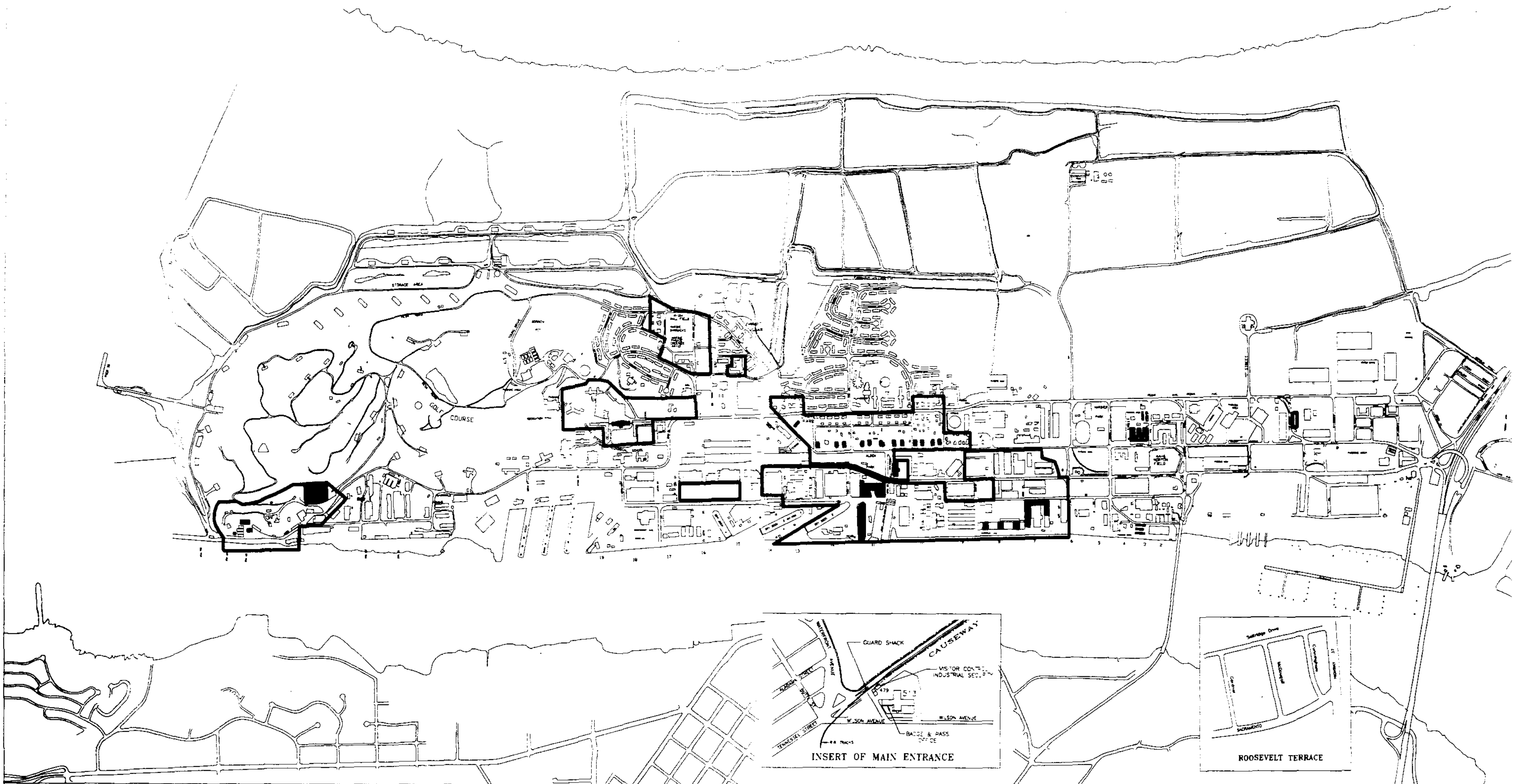
- Naval Ammunition Depot: This area is also known as the magazine grounds and Concord Weapons Station Annex. Within its boundaries lay the oldest magazine (1857), the oldest home (1858), the cemetery (1856) and Civil War era defensive earthworks.

- Hospital District: This area is the site of the 1900 Hospital Reservation. It contains the hospital, built in 1899 on the foundations of an earlier one constructed in 1869, two houses that served as medical officers housing, a small park, and significant plantings along Cedar Avenue.

- U.S. Marine Barracks: This area encompasses the Marine Compound and Officers Quarters build in the 1880s and relocated to face the parade ground established with the new Marine Barracks completed in 1917.

- Significant Buildings Not in Historic Districts: The Marine Officers Quarters M-1 (1822), the Marine Prison Building 84 (ca. 1890, abandoned 1920), and the second stable building (1862) lie outside the designated Historic Districts, but are included in the NHL.

Besides redefining the boundaries of the historic districts of the NHL, the Cardwell Survey identified many additional facilities as historically important and appearing to qualify for listing in the National Register. Because the Western Region, National Park Service concurred with the revised boundary recommendations and additional facilities, they have been treated as if they are included in the National Register as a part of the original National Historic Landmark. The sites and structures were separated into five categories dependent upon their integrity and contribution to the historic landmark or district (Appendix B). These categories are defined as follows:



■ Historic Buildings and Structures

/\/ Historic Districts

N

200' 0' 200' 400' 600' 800'

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Figure 3.6-1

Historic Buildings & Districts

- Category I: Directly contributing to the National Historic Landmark; of particularly strong integrity. Restoration or rehabilitation is a realistic possibility and would be very beneficial to integrity and interpretation of the historic resource.

- Category II: Contributing to the National Historic Landmark but more supportive to the National Historic Landmark themes than of direct significance; of good integrity. Restoration of lesser importance at this time.

- Category III: Contributing to the National Register Historic District, but not to the National Historic Landmark.

- Category IV: Pertaining to the National Register Historic District but may be of insufficient age of integrity to contribute to historical significance. This includes structures that are neutral, but may in time become Category III, buildings that require further research to verify significance. World War II structures generally fall into this category, as well as more modern structures (less than 50 years old) which may be eligible for reasons of military history.

- Category V: Noncontributing to either the National Historic Landmark of National Historic District.

There are 107 facilities that are considered to be in Categories I, II and III.

The Cardwell Survey included revised National Register Nomination Forms for each historic district and State Historic Inventory Forms for each individual building. These forms were forwarded to the Keeper of the National Register for review with the intent that the Nomination Form, which supports the National Historic Landmark designation, will be revised. The Keeper has requested additional information which to date has not been compiled and forwarded. Presently, the Department of the Interior has listed only 38 buildings and structures in the Register (Figure 3.6-1). These are:

- Dry Dock No. 1
- Buildings 46, 47, 85, 87, 88, 89, 90, 104 (St. Peters Chapel), 143, 149, 155, A-1, A-3, A-4, A-5, A-6, A-11, A-16, H-1, M-1, M-2, M-3, M-4, M-5.
- Quarters A, B, C, D, E, H, J, K, L, M, N, O.
- Mare Island Cemetery (Structure A-0).

The above listed buildings/sites were added to the National Register predicated upon the initial Historic Survey conducted in 1963. This list includes some structures that were not identified in the Cardwell Survey (i.e., Buildings 143, 149 and 155). The Cardwell analysis was predicated upon the identification of structures that contribute to several categories of themes which were adopted by the National Park Service in 1970. The themes considered were major American wars up to 1940, political and military affairs, westward expansion (1783-1898), America at work, and society and social conscience. The Cardwell Survey did not address World War II, or, as is now required by the Department of Defense, those properties possessing "Cold War" significance.

Another important historic aspect of Mare Island is its artifacts. These include Navy relics, trophies, paintings, historic prints, photographs and various items from ships such as flags, anchors and steering control wheels. An inventory of historic artifacts is currently taking place by the Naval Historical Center.

3.6.3 Issues Affecting Reuse

Code Compliance and Historic Building Rehabilitation

Conveyance of the Mare Island Naval Shipyard from the Navy to the City will require many historic buildings to be upgraded to meet life/safety standards and seismic hazards in order to permit existing uses to continue or new uses to be established. As part of rehabilitation, these buildings will be modified to bring them up to safe levels of occupancy consistent with current building codes. Development of the industrial area to modern standards will require lessening of density and likely demolition of certain historic structures.

To preserve the historic sense-of-place of the Shipyard, Residential, Ammunition Depot and Hospital Historic Districts, uses will need to be selected that would minimize impacts on the historic character defining elements of individual buildings and structures. Every reasonable effort should be made to incorporate compatible adaptive uses or uses for which the buildings were originally designed. However, given current market conditions, utility constraints and environmental contamination, adaptive reuse of certain historic buildings will be difficult. Impacts related to rehabilitation of historic buildings must be addressed when tenants were selected and proposals submitted. In addition, methods will need to be identified to eliminate hazardous materials (such as asbestos and lead paint), secure and protect vacant buildings, provide for fire detection and suppression, and correct deficiencies in access for people with disabilities with minimal impact on the buildings but only if economically feasible.

Most actions for historic buildings, including leasing and rehabilitation, will trigger a review process to comply with Section 106 of the NHPA and other legal authorities that mandate consideration of effects on historic properties. The compliance review process is designed to ensure that historic properties are considered during project planning and execution. The review process is administered by the ACHP in coordination with the SHPO, and it involves identification and evaluation of historic properties, assessment of effects, and consultation and agreement on ways to avoid, minimize or mitigate adverse effects. Providing a mechanism for timely and expedient reviews to ensure that buildings are not left vacant, yet are managed in compliance with all applicable regulations, is a planning concern . A Programmatic Agreement for taking into account the effect of the reuse plan on historic properties is being negotiated between the City, Navy and the SHPO to facilitate and expedite the compliance review process. The agreement evidences the Navy's compliance with Section 106 and Section 110f of the NHPA by ensuring that the following stipulations are carried out:

Revisions to National Register (Navy): In consultation with the National Park Service and the SHPO, the Navy will re-evaluate the National Register nominations it prepared in 1986 and will revise them, as may be appropriate, to clearly define historic context and to include those historically significant remaining from World War II and the Cold War. The Navy will submit the revised National Register Forms to the Secretary of the Interior and request the currently listed nomination be revised accordingly.

Maintenance of Historic Buildings (Navy): Until the Mare Island Naval Shipyard property is conveyed to the City, the Navy will continue to follow the terms of the Programmatic Agreement among the Navy, the SHPO and ACHP ratified in August 1992, regarding routine maintenance of historic properties included in the NHL, and extend its application to all historic properties included in or eligible for the National Register of Historic Places.

Documentation of Historic Buildings and Structures (Navy): The Navy in consultation with and with assistance of the National Park Service, will develop and implement a program for recording to the standards of the Historic American Buildings Survey or the Historic American Engineering Record those significant buildings and structures that should be documented prior to their placement into caretaker status, awaiting conveyance to the City, or otherwise adapted for another use.

Structural Analysis of Historic Buildings (Navy): The Navy will conduct a structural conditions survey of each building identified as historically significant using the California State Historical Building Code and will ensure a professional historical architect and historical structural engineer are included on the structural survey team. The structural conditions survey report on each building or structure will include general and specific descriptions, identification of known deficiencies, a proposed retrofit scheme, and cost estimates for engineering, material and labor.

Preparation of Historic Preservation Plan (Navy/National Park Service): The Navy, with the assistance of the National Park Service, will prepare a historic plan for the properties identified in the Navy's revised National Register Nomination Forms for Mare Island Naval Shipyard. Using the results of the structural analysis and the National Register Forms, the plan will at a minimum:

- establish preservation priorities and develop preservation/rehabilitation guidelines and specifications for maintaining the character defining elements of the historic buildings, structures and districts, including dedicated parks and plots of historic significance;

- ensure compatibility of new construction with the character of the historic districts; and

- employ strategies for marketing the historic buildings and structures.

3.6.4 Recommendations and Implementation Actions

3.6(a) Adoption of Programmatic Agreement (Navy, etal): The Navy, ACHP, SHPO and City will execute the Memorandum of Agreement and implement its stipulations in order to take into account the effect of the base closure on historic properties.

3.6(b) Storage of Historic Artifacts (City): The Naval and Historical Museum will perform the function of caretaker of historic artifacts when it becomes necessary to take over that function from the Navy. Until a plan for management, funding and interpretation of the artifacts is developed, the artifacts, photographs and documents must be properly cared for. Historic artifacts will be segregated from general warehouse storage to provide for their higher level of curatorial care and preservation. In addition, the extensive Mare Island photographic print and negative collection will be kept intact at their current storage facilities in the Shipyard Historian's Office on Mare Island for the future use of researchers.

3.6(c) Inspection and Preservation of Vacant Buildings (Navy/City): The Navy and City will develop guidelines for treatment of vacant buildings to ensure their preservation and protection. Actions should include physical inspection and review of the Navy's existing documentation before mothballing, protective barriers, regulatory and informational signs, as well as establishment of a monitoring program. For historic buildings in particular, minimum heat, adequate ventilation and frequent monitoring of building interiors will be provided. Police Department patrols will be a priority in all areas with vacant buildings.

3.6(d) Code Compliance (City): The City of Vallejo Development Services Department will review proposed modifications to historic buildings to ensure compliance with building codes as well as historic preservation guidelines. The Development Services Department will be responsible for enforcement.

3.6(e) Preparation of Maintenance Plans (City): The City and/or development corporation will put in place a preservation management system for maintaining historic buildings within their settings. After each building or group of buildings is established, tenants will prepare long-term maintenance plans and establish a cyclic maintenance program, subject to City of Vallejo review, to prevent damage to historic context and ensure that the buildings are well maintained.

3.6.5 Jurisdictional Interests of State Office of Historic Preservation (OHP)

The OHP is part of the State Department of Parks and Recreation. Its head is the SHPO, appointed by the governor. The OHP functions under various state and federal laws, the most important of which is the National Historic Preservation Act. The NHPA delineates specific responsibilities for the SHPO including the following:

1. Conduct statewide surveys and maintain inventories of historic properties.
2. Identify and nominate eligible properties to the National Register.
3. Administer federal assistance for historic preservation.
4. Ensure historic properties are taken into consideration at all levels of planning and development.
5. Assist local government in preservation issues and in becoming certified to carry out the purposes of the NHPA.
6. Consult with the appropriate federal agencies on federal undertakings that may affect historical properties and on the adequacy of any plans developed to protect, manage, or to reduce or mitigate harm to such properties.

7. Advise and assist in evaluating proposals for rehabilitation projects that may qualify for federal assistance.

Additionally, section 106 of the NHPA requires that no federally funded or permitted project can begin unless the SHPO has the opportunity to comment on the impact it is likely to have on historic resources. The OHP comments include suggestions to reduce or mitigate harm to historic resources. Projects can be stopped if the OHP comments are not taken into consideration. The OHP also has a Native American coordinator to ensure Native American concerns are considered during the compliance review process.

If an undertaking, including demolition, regarding a historic property is under the purview of a local certified government and no federal funds or permitting are involved, then the SHPO has no jurisdictional interest other than to provide advice if requested.

3.7 ARCHAEOLOGICAL RESOURCES

3.7.1 Summary

The historic and prehistoric archaeological resources at Mare Island contain the physical record of its occupation and use. The prehistoric sites on Mare Island are among the last of their type known to lie relatively undamaged on the shoreline of San Pablo Bay. Their protection is important to an understanding of past human activity in the Carquinez Straits region and the greater San Francisco Bay Area. The historic sites to be found on Mare Island are unique on the West Coast. The long association of the island with the Navy in the Bay Area has left a detailed record of Naval activities over the past 130 plus years. It is important that significant archaeological resources are protected or recovered in advance of any undertakings (such as upgrading or replacing infrastructure or eliminating hazardous substances, contaminants and pollutants) that might adversely affect these resources. In addition, any Native American remains, associated funerary objects, sacred objects or objects of cultural patrimony will be returned to the appropriate descendents or otherwise treated in accordance with their direction.

3.7.2 Past and Present Surveys

Roop and Flynn Report

Ethnographic evidence indicates that over the last 2,000 years approximately four different tribal populations (the Wappo, Coast Miwok, Southern Patwin, and Ohlonean) have inhabited the Mare Island area. These Native American populations were participants in a vast trade network that made available a wide variety of non-local resources, including obsidian tools, clamshell beads, flicker feather headdresses and soapstone objects. These items would have been procured in exchange for such basic commodities as shellfish, game or fowl, acorns, hard seeds, roots, fibers or other products procured locally. Few prehistoric resources are known to exist in the Carquinez Straits region. Most of the major prehistoric habitation sites were destroyed by later historic occupation of those sites. In order to inventory any possible prehistoric remains left on Mare Island, a draft archaeological resources inventory consisting of a prehistoric and historical archaeological overview, survey, and predictive model were prepared for Mare Island under Navy contract in the mid-1980s (Archaeological Resource Service, 1986). The report (commonly referred to as the "Roop and Flynn Report" after its authors), while thorough in its coverage on prehistoric and historic archaeological resources, does not address the significance of these resources in sufficient detail to allow a determination to be made with respect to the eligibility for inclusion on the National Register of Historic Places. The report identified several areas of both prehistoric and historic archaeological interest that may warrant consideration for inclusion on the National Register. In addition, the Master Plan for Mare Island (July 1989) provides procedural guidance for the consideration of archaeological resources in project planning.

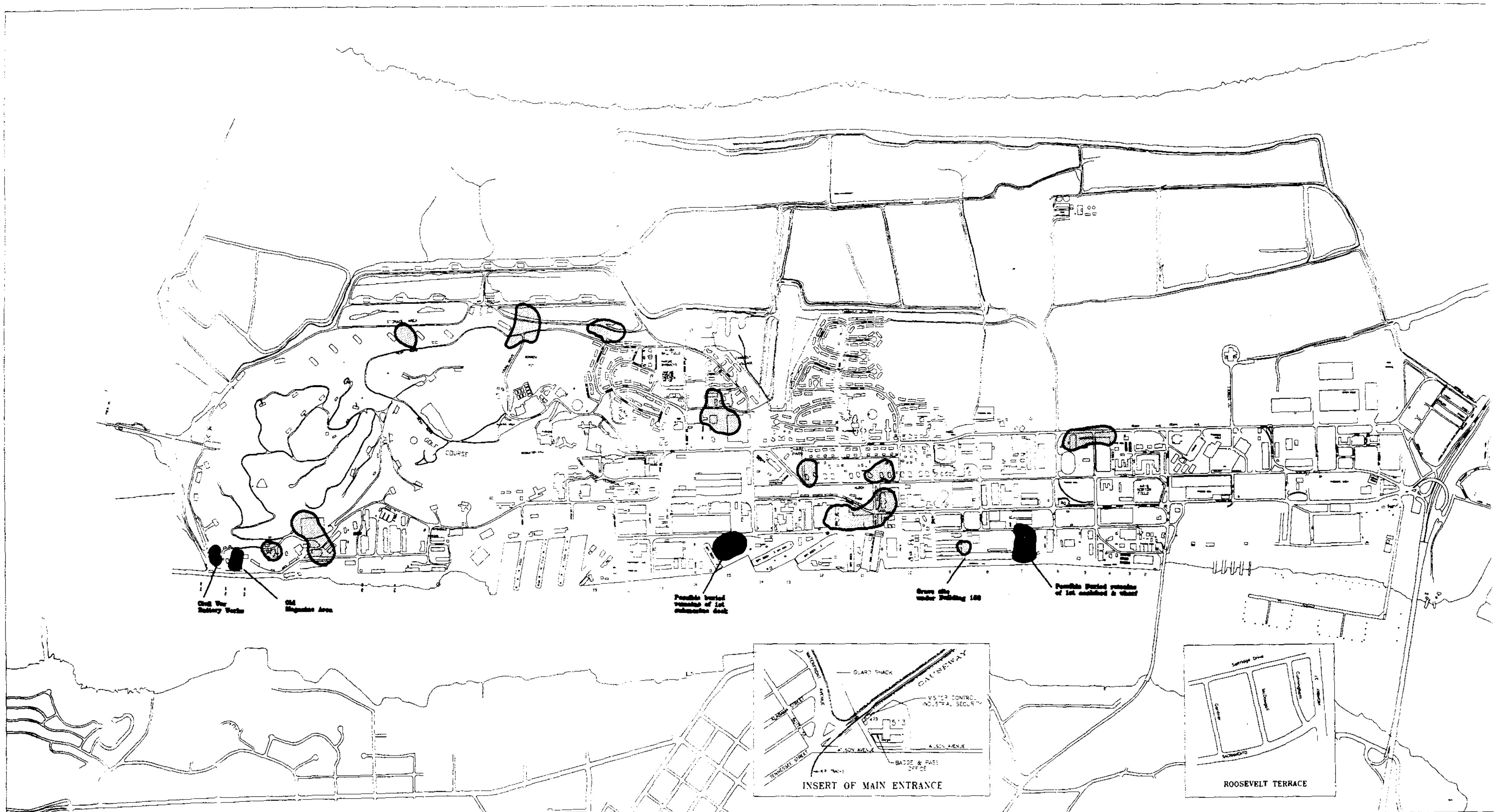
Prehistoric Era Resources: Remnants of several prehistoric occupation and shellfish harvesting/processing campsites have been documented within the original 1852 boundary of the island. Virtually all of these sites have been damaged to some degree. However, the sites individually and cumulatively have the potential to add significantly to existing knowledge of Native American occupation. Their importance is increased by the loss of other comparable occupation sites in the Carquinez Straits region. None of the sites has been the subject of archaeological test excavations. However, the sites appear similar in appearance to the few recorded sites elsewhere within the region. General areas indicating approximate locations of pre-historic sites on the island are shown on Figure 3.7-1 and include:

- Old Magazine Area: Includes three separate deposits which appear to be remnants of village sites. Since the structures currently situated on top of these sites are relatively old and have not been built with modern land leveling techniques, there is a good chance that intact prehistoric remains lie beneath.

- Building A150-A151 Vicinity: Situated in the bluff between the two buildings, the site consists of the remains of a prehistoric shellfish harvesting site.

- Building 986 Vicinity: Contains a site similar in nature to the one mentioned above. A midden deposit may indicate that different techniques were in effect on opposite sides of the island. Part of the site appears to have been lost due to erosion of the bluff in which it is located.

- Cedar-Suisun Avenue Vicinity: Several isolated patches of shell midden were observed in the vicinity of Building 866. This area was originally an upland between two prominent rises. Its location would have provided optimum access to Mare Island Strait and San Pablo Bay as well as the hills to the north and south. Because of its central location, the site is a candidate for early occupation and may be the oldest site on the island. A large percentage of the site has been covered by buildings which may have protected any underlying materials.



Historic Era Sites

Prehistoric Era Sites

Source: Kinane, n.d.
Archealogical Resource Service; 1986.

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Figure 3.7-1

Historic & Pre-Historic Sites

- Industrial Yard-Walnut Avenue Area: Several areas of prehistoric deposits were identified in this area. The area, however, has probably been the most intensively used part of Mare Island since its inception and many of the underlying prehistoric resources have probably been disturbed. At least one and possibly three separate prehistoric sites may be intact beneath the landscaped surface.

- North Base Area: Although not surface surveyed, geological records of test borings from 1928 indicate that a significant prehistoric site may exist beneath dredge spoil deposits in the general vicinity of Mariner Park. The remainder of the North Base Area was not examined during the surface survey because it was situated within the tidally-effected zone prior to establishment of the Navy Yard.

Resources of Traditional Cultural Significance: Properties of Traditional Cultural Significance, as defined in National Register Bulletin #38, are those associated wit the "beliefs, customs and practices of a living community of people passed down through the generations, usually orally or through practice." With respect to Mare Island, if such properties exist, they would be important to the Native American descendants of those who originally occupied the island. Such properties that meet the criteria for inclusion in the National Register are afforded the protection provided by Section 106 of the National Historic Preservation Act. The 1986 archaeological resources survey identified evidence of prehistoric occupation on Mare Island but did not identify any sites that might have traditional cultural significance to surviving Native Americans. If the prehistoric archaeological sites contain human burials, they generally would be considered sacred by Native Americans. However, they might only qualify for inclusion in the National Register because they may contain information relative to the prehistory of the area.

In a related matter, the Navy is attempting to locate all archaeological collections that may have been made on Mare Island since 1854. This is being accomplished pursuant to the Native American Graves Protection and Repatriation Act of 1990. If collections are located, they will be assessed based on condition and content. Recommendations will then be provided with respect to final disposition. Any Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony must be offered to the appropriate descendants.

Historic Era Resources: The archaeological evidence of long demolished structures, and other subsurface remains on Mare Island contribute to a better understanding of its history, and of its capability in fulfilling the primary mission of the Shipyard. The survey identifies a number of historic era archaeological features, the general locations of which are preliminarily shown on Figure 3.7-1, including:

- The grave of a Native American, noted in historic records as being buried on the island in 1794, is supposedly located under pavement in the industrial yard. If the grave is still present, it would be the oldest human burial on Mare Island and may contain artifacts which could be accurately dated from written record.

- Remains of the United States Dry Dock Company Yard, established two years prior to the U.S. Navy Yard, presumably present under Building 46.

- Intact remains of the first major marine railway built on the Pacific coast, including the engine house, preserved under paving and fill soils between Building 122 and Mare Island Strait in the vicinity of Dry Dock No. 2.

- Building 46 now located on the site which originally held the Hanscomb-Secor house. This house was used as the first Bachelor Officer's Quarters on the island. Remains from this period may lie beneath Building 46.

- Deposits associated with the torpedo boat wharf. These features could provide information on the evolution of modern ship building.

- Remains of the first coal shed and wharf lie beneath the present quay wall and waterfront. These remains could provide insight into the technology of this early fueling operation.

- Fill which has been dumped on the landward side of the original quay wall, possibly containing almost 40 years worth of tools and artifacts related to the construction and repair of 19th century ships.

- The defensive earthworks at the southeastern tip of the island, the last Civil War era temporary defensive batteries exposed in the San Francisco Bay Area.

- Deposits around the Marine Gunner's Lodge, the oldest remaining domestic structure on Mare Island, potentially revealing the most complete record of domestic life on Mare Island in 1863.

- Dozens of buildings long since demolished originally occupying the Marine Barracks area. Associated artifacts could provide the most complete record of the oldest U.S. Marine compound on the Pacific.

- Wooden street pavement, in place since 1883, which may have preserved artifacts associated with the earliest periods of the Base's development.

- Artifacts associated with the first submarine dock, which could provide information about the early (1904) experimental craft, the first of its kind on the Pacific coast.

Recent Findings

In early 1993, unanticipated archaeological resources were discovered during the construction of a fire suppression system at Mare Island. Three archaeological/historic properties were discovered and partially impacted by construction in the Old Magazine Areas on the southeast side of the island. These are:

- Portions of a narrow gauge marine railway, possibly a part of the first system of its type built on the Pacific coast.

- Approximately 20 meters of an historic seawall, presumably built circa 1880, composed of large granite blocks.

- Portions of a prehistoric site evidenced by shell midden.

The project is approximately two-thirds complete and the remaining segments are in the vicinity of several archaeological sites excavated through the Old Magazine Area, removing up to fifteen feet of the historic brick retaining wall at the base of the hill behind the magazine buildings. The trenching will then proceed uphill into the area where Civil War fortifications and associated features may exist, and then north through areas where survey has identified prehistoric site remnants. Archaeological recording, monitoring and test excavations are currently being conducted to determine if the sites have integrity and whether project redesign or data recovery may be necessary.

3.7.3 Issues Affecting Reuse

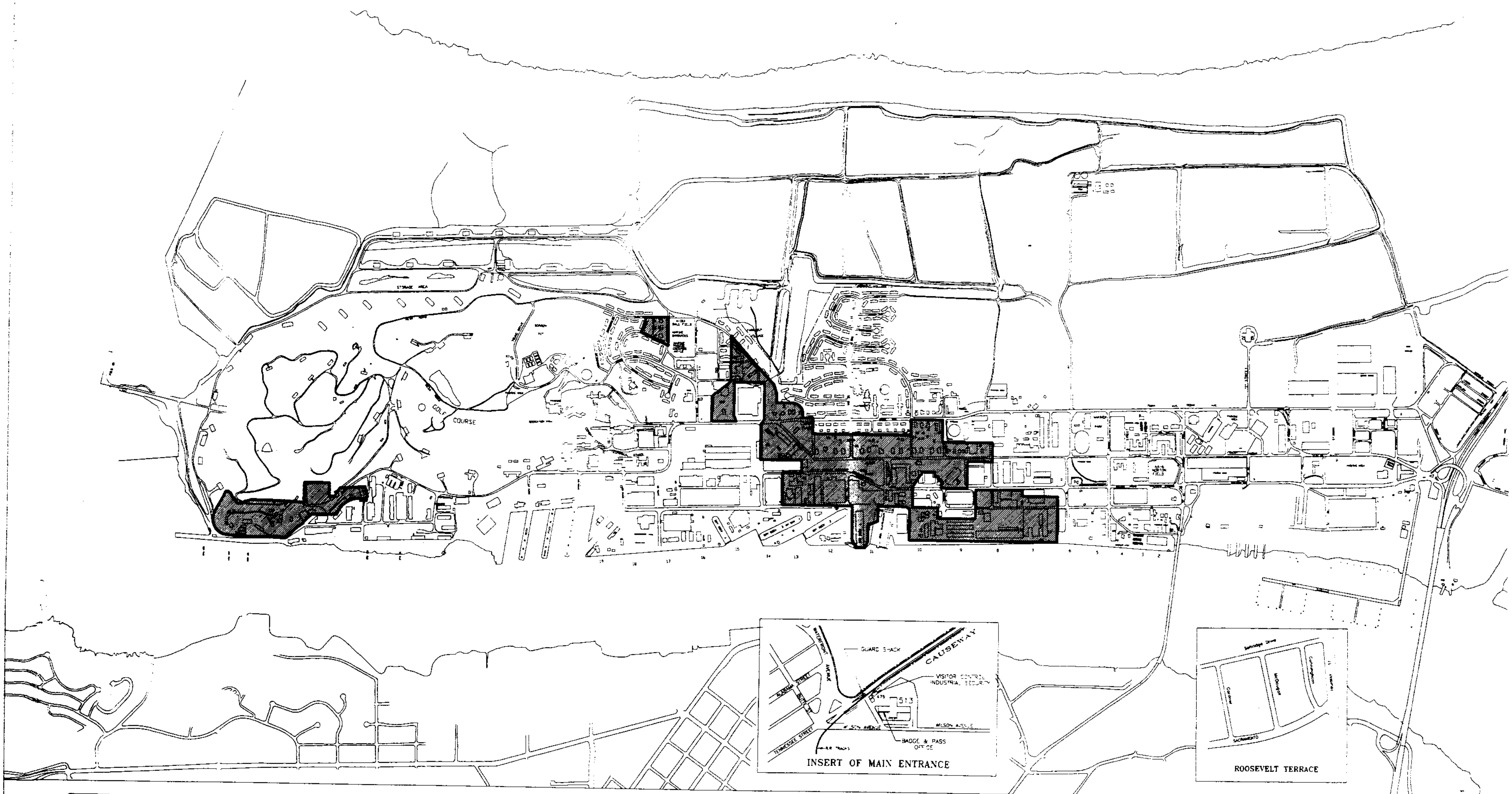
Potential Impacts to Archaeological Resources

Any ground disturbing work undertaken on Mare Island will have the potential to affect known and undiscovered archeological sites and resources. This work would include actions required to make utilities safe and/or in compliance with current standards, and hazardous material remediation. New construction, as well as repair and maintenance of existing buildings, roads and other features will also increase the likelihood of inadvertent damage to sites. Until exact locations were selected and preliminary designs were available for specific projects, it is not possible to accurately survey and determine the effects on such resources. Direct effects will vary and be closely related to specific actions.

All potential archaeological and ethnographic resources need to be identified and evaluated, and methods determined for their preservation and interpretation. In addition, any future rehabilitation and construction activities, such as upgrading or replacing infrastructure or eliminating hazardous substances, contaminants and pollutants, need to consider potential impacts on these resources. The following measures are recommended to mitigate or minimize the impacts that might result from implementation of the Final Reuse Plan. All of these measures will be regularly evaluated and monitored by City staff to determine their effectiveness in reducing impacts.

3.7.4 Recommendations and Implementation Actions

3.7(a) Draft Archaeological Resources Inventory (Navy): Because little is known about the extent, nature or location of artifact caches and the integrity of prehistoric and historic archaeological deposits, preconstruction archaeological testing will be required in areas identified in the plan as being historically sensitive (see Figure 3.7-2). Prior to base closure and real property disposal, the Navy will review the 1986 Roop and Flynn Report and test



Historically Sensitive Areas

Source: Kinane, n.d.

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Mare Island Final Reuse Plan

Figure 3.7-2

Historically Sensitive Areas

archaeological sensitive areas to identify archaeological sites that may qualify for inclusion in the National Register of Historic Places, and prepare State Historic Inventory Forms. The evaluation and forms will be forwarded to the National Park Service and State Historic Preservation Officer (SHPO) for review and suggestions. The appropriate treatment of the sites in consultation with the SHPO, the ACHP, and, where appropriate, the Native American Heritage Commission and Native Americans, will be determined. The accomplishment of appropriate treatment of the archaeological sites will be included as stipulations of the Memorandum of Agreement reached in consultation with the City, SHPO, ACHP, et. al. pursuant to the regulations implementing Section 106 of the National Historic Preservation Act (see Historical Resources section).

3.7(b) Resources of Traditional Cultural Significance (Navy): Prior to base closure and property disposal, the Navy will relocate the sites of traditional cultural significance identified in the 1986 Roop and Flynn Report and decide their potential content and eligibility for inclusion in the National Register. The appropriate Native American descendants will be consulted to determine the presence of any sites of traditional cultural significance. State Historic Inventory Forms will be prepared and the eligibility of any sites of traditional cultural significance will be decided. Application of appropriate treatment of traditional culturally significant sites as stipulations of the Memorandum of Agreement reached in consultation with the City, SHPO, ACHP, et. al. pursuant to the regulations implementing Section 106 of the National Historic Preservation Act (see Historical Resources section) will be included. Arrangements will be made for repatriation of Native American human remains, funerary objects, sacred objects and objects of cultural patrimony contained in archaeological collections taken from Mare Island since 1854, if any are found to exist. Arrangements will be made for the proper disposition of any archaeological collections taken from Mare Island since 1854, if any exist.

3.7(c) Preconstruction Archaeological Surveying (City/Development Applicant): The City will observe the management goals and recommendations provided in Chapter IX of the draft archaeological resources inventory to preserve Mare Island's important archaeological record. The inventory established a context for examining and evaluating archaeological resources, provides a formula for future mitigation, and contains assessment and overview information useful in predicting what types of resources might be found in various locations. Every effort will be made at the design stage to avoid impacts on archaeological resources. If impacts could not be avoided, mitigating measures will be developed at that time in consultation with the SHPO and the Advisory Council on Historic Preservation (ACHP). All work involving ground disturbance will comply with federal and state laws, regulations and policies.

3.7(d) Archaeological Monitoring during Excavation (City/Development Applicant): An archaeologist will conduct a program of onsite monitoring during site excavation in rehabilitation/construction areas that are historically sensitive. Observations will be recorded in excavation plans or documentation prepared under the federal clearance process for forwarding to the SHPO. If prehistoric or historic artifacts were discovered during excavation, the archaeologist will assess the significance of those artifacts, report the findings to the City, and recommend specific mitigating measures as necessary. If previously unknown resources were uncovered, work will be stopped in the discovery area, and the City will consult with all concerned parties according to the Code of Federal Regulations, title 36, part 800, and, as appropriate, California law concerning discovery of Native American skeletal remains.

3.7(e) Report Distribution (City/Development Applicant): The results of both preconstruction surveying and excavation monitoring will be documented in a written reports to be submitted to the SHPO, regulatory and other government agencies, academic libraries and interested parties.

3.7(f) Security Program (City/Navy): If significant archaeological resources were discovered, a security program will be implemented to prevent looting or destruction. Security will be provided by prompt curatorial treatment, onsite protection if necessary, and withholding information about the resources, as permitted under the Archaeological Resources Protection Act. All archaeological collections assessed to be significant could be catalogued as part of Mare Island or Vallejo's museum collection.

3.7(g) Nomination of Discovered Archaeological Sites (City): Any prehistoric archaeological sites discovered during construction/rehabilitation will be documented and evaluated for significance. Significant resources will be nominated to the National Register of Historic Places.

3.7.5 Jurisdictional Interest of the California Native American Heritage Commission

The Native American Heritage Commission maintains an inventory of sites in California that are considered sacred to Native Americans, and works with public agencies and private landowners to protect these sites from damage or destruction. The Commission also preserves and protects burial sites and other sites of traditional cultural significance to Native Americans, and provides for sensitive treatment and disposition of Native American burials, skeletal remains and associated grave goods consistent with the planned use of approved projects. At this time, there are no identified sacred sites on the island, and Native American skeletal remains and grave-related artifacts have not been discovered. Therefore, while the Commission's jurisdiction is currently limited, further analysis of sites and consultation with the Commission and appropriate Native American groups should be conducted to determine if any sites of traditional cultural significance are present. The Naval Shipyard has invited members of the Commission to tour Mare Island, but no date has been confirmed. The Navy has also indicated that on two previous base closure projects in southern California involving surplus properties, the Commission has expressed an interest in obtaining federal funding to list such properties for Native American training centers or cultural heritage programs. The City should coordinate with the Commission through the compliance review process during reuse planning and execution to allow the agency to suggest ways to preserve and protect California Native American cultural traditions, and to avoid or mitigate damage to Native American cultural resources (please refer to Section 3.6 for a discussion of the State Historic Preservation Office's (SHPO) jurisdictional interests).

3.8 BUILDING CONDITIONS

3.8.1 Summary

The current level of information available for many buildings on Mare Island is not sufficient to allow a complete assessment of suitability for reuse (either type of use or timing of availability) or an estimate of the cost to bring buildings into compliance with applicable codes and regulations. Based on the limited studies conducted to date by the Navy, there may be concern for seismic safety code compliance in many of the buildings on the Island. Potential reuse may be constrained by code compliance deficiencies unless necessary structural improvements are made. Existing mechanical and electrical systems may be deficient in some buildings when compared with current standards. Improvements to or replacements of these systems may be required to meet applicable codes or attract candidates for private sector reuse, e.g., Americans with Disabilities Act (ADA). A progressive upgrading of facilities over time will be necessary to improve building conditions and comply with codes. More complete information regarding building conditions will be needed in order to fully assess the range of feasible reuses, the current market value of structures, potential market rents, timing of building availability, and the capital improvements required to make buildings suitable and available for reuse.

3.8.2 Existing Information on Building Conditions

The physical condition of buildings on Mare Island will have a strong influence on reuse potential. The most important aspects of building condition include:

- Structural condition (particularly compliance with seismic safety codes),
- Mechanical and electrical systems condition,
- ADA compliance, and
- Environmental contamination conditions.

Each must be assessed in order to determine the suitability of structures for proposed reuse and/or the cost of required upgrades and improvements.

Regarding the first three of these factors, no comprehensive survey has been conducted of Mare Island buildings. Conditions in each regard are known to vary widely. The high variability in building conditions is due in large part to construction of individual facilities over a long period of time, using several different types of building materials and technologies. A review of construction data for 375 of the most significant non-residential facilities reveals that 10 percent of the structures were constructed prior to 1900, 25 percent were built between 1900 and 1930, 50 percent were built between 1930 - 1950, five percent were constructed between 1950 and 1970, and 10 percent were built from 1970 to the present. Despite the fact that these buildings were built to federal standards and requirements in effect at the time of construction, some may not meet current local or state building codes. In general, only the most recent structures can be expected to approximate current code standards, contain up-to-date electrical and mechanical systems, and provide current standards for access to the physically challenged.

Regarding the fourth aspect of building condition, the Navy is currently conducting a comprehensive survey of environmental contamination conditions on Mare Island, including all buildings. However, this survey is not expected to be completed for much of the Island until after the City's acceptance of the Final Reuse Plan.

The following discussion summarizes existing information on the specific buildings projected for reuse in the Market Feasibility analysis reported in Chapter 4. By focussing on those buildings identified in Chapter 4, a cross-section of structures is represented and an overview of the level of information currently available is provided.

Available information is limited to seismic vulnerability and environmental contamination conditions for some structures. Data is derived from a 1992 seismic vulnerability study conducted for 95 important structures on Mare Island (URS/Blume, May 1982); 21 of these structures are among those projected for reuse in the market feasibility analysis conducted for the Final Reuse Plan. Data regarding environmental contamination is derived from the Navy's preliminary Environmental Baseline Survey (EBS), April 1994. Actual contamination conditions are unknown for most of the structures projected for reuse. Completion of the EBS will be required prior to determination of clean-up requirements and availability for reuse.

3.8.3 Issues Affecting Reuse

The current level of information available for many significant buildings on Mare Island is not sufficient to allow a complete assessment of suitability for reuse (either type of use or timing of availability) or an estimate of the cost to bring buildings into compliance with applicable codes and regulations. Neither the Navy's current estimates of reuse potential and availability (i.e. the "layaway" classifications) nor the facility reuse projections contained in the market feasibility analysis conducted for the Final Reuse Plan have been made with complete data on building conditions.

Based on the limited studies conducted to date by the Navy, there may be concern for seismic safety code compliance in many of the significant buildings on the Island. Potential reuse of these buildings may be constrained by code compliance deficiencies unless necessary structural improvements are made.

Existing mechanical and electrical systems (e.g. heating, ventilation, air conditioning, power, plumbing and telecommunications) may be deficient in some buildings when compared with current standards. Improvements to or replacements of such systems may be required to meet applicable codes or attract candidates for private sector reuse.

In meeting the goals of barrier-free accessibility, building improvements must conform with ADA requirements. For example, lack of ramps, elevators, and adequately sized bathroom facilities may be common in buildings constructed prior to the 1980's. Prospective users of facilities will need to evaluate buildings based on specific proposed uses, as ADA requirements differ based on occupancy.

Regarding environmental contamination, the Navy will continue its EBS and BRAC Clean-Up Plan (BCP) process and is responsible by law for clean-up of contamination at Mare Island. However, the required procedures and schedules for clean-up may delay the availability of many structures with otherwise high reuse potential in the near term.

More complete information regarding building conditions from each of the above perspectives will be needed in order to fully assess the range of feasible reuses, the current market value of structures, potential market rents, timing of building availability, and/or the capital improvements required to make buildings suitable and available for reuse.

3.8.4 Recommendations and Implementation Actions

3.8(a) Building Condition Survey - Structural, Electrical/Mechanical, ADA Compliance (City): The City is obtaining federal funding through the Office of Economic Adjustment (OEA) to conduct necessary studies of building conditions on Mare Island. While these studies will address all facilities on the Island, they will be prioritized as necessary to focus on facilities expected to be in demand for near-term reuse. The studies will provide information regarding existing building conditions and deficiencies and the cost to bring buildings up to current standards.

3.8(b) Monitoring and Input to the Navy's BRAC Clean-Up Plan (City): As the Navy continues its EBS and BCP studies, the City will provide input regarding those areas and facilities to which the Navy should assign highest priority in completing clean-up efforts. The City's priorities will be on those facilities which are expected to be strong candidates for near-term reuse and job creation.

3.9 EQUIPMENT CONDITIONS

3.9.1 Personal Property

Mare Island contains more than 100,000 personal property items. Personal property includes all property items excluding buildings and land. Common personal property items on Mare Island include machinery, tools, computers, and office equipment. Certain personal property items could be attractive to prospective employers on Mare Island following closure. Retaining certain well maintained personal property items and marketing these items as available to prospective tenants will enhance the marketability of Mare Island. It is important that the Navy continue to maintain the equipment during the closure process to ensure its suitability for future disposition.

The statutory process by which personal property on closing military bases is disposed of has recently been revised. The "Pryor Amendment" to the Fiscal Year 1994 Defense Authorization Bill included language which would allow the transfer of certain personal property to the local reuse authority to be used on the base following closure. The implementing guidelines to this legislation were issued in April, 1994 for public comment. There is significant uncertainty in these guidelines regarding how personal property items can be transferred, the cost of transfer and maintenance responsibility for these items prior to transfer.

It is anticipated these guidelines will be amended by October 1994 to provide clearer direction regarding the process for transferring these items for use following closure. Prior to the finalization of these guidelines, City of Vallejo staff will continue to screen personal property being disposed of on Mare Island as the base downsizes. Equipment which may be of value to users of facilities on Mare Island following closure are being warehoused on Mare Island.

3.10 FEDERAL REUSE AND McKINNEY ACT SCREENING

3.10.1 Summary

The Department of Defense (DoD) is required to advertise excess property on closing military bases through a federal screening process whereby federal agencies have the initial opportunity to respond. The screening process for Mare Island Naval Shipyard was initiated in February, 1994 with responses due by April 1, 1994. The Navy received five written proposals requesting transfer of excess property and submitted these proposals to the City of Vallejo for their concurrence. Proposals were received and approved from the United States Coast Guard, the Department of the Interior (Fish and Wildlife Service), and the Department of the Air Force (Travis Air Force Base). A proposal was received from the Department of Agriculture (Forest Service) which is being processed by the City. Subsequently, the City received a proposal from the Department of Justice (Immigration and Naturalization Service). This proposal was rejected by the Vallejo City Council.

Following the review of Mare Island by federal agencies, the Stewart B. McKinney Homeless Assistance Act encourages the use of surplus property by groups assisting the local homeless. The 600 units of off-base housing at Roosevelt Terrace and all suitable buildings on Mare Island are being reviewed as facilities that could be available for McKinney Act housing.

3.10.2 Current Status of Screening Process for Federal Agency Interest

Screening Process

When the DoD no longer needs to retain real property at a closing base, the DoD is required to dispose of the property in accordance with the prescribed screening process in the General Services Administration property disposal regulations and the new expedited process authorized in Title XXIX of 107 Stat. 1909, commonly called the Pryor Act. This screening process for real property requires the DoD to identify first what it needs to retain. Any property excess to the DoD is then made available to other federal agencies (property not needed by other federal agencies is then identified as surplus and reported to the Department of Housing and Urban Development (HUD) for a determination of suitability for homeless use and publication of such properties in the Federal Register). The applicable regulations require the DoD and federal agencies to work with the local redevelopment authority to provide early identification of property which will not be available for redevelopment. In compliance with the above process, the Navy in February 1994, issued a Notice of Availability of Navy Real Property at the Mare Island Naval Shipyard. In the Notice, the Navy requested interested agencies provide, not later than April 1, 1994, written confirmation that they had the necessary approvals to accept a transfer of Mare Island lands.

Federal Agency Interest

The Navy received four written proposals confirming an interest for the excess property and submitted these proposals to the City of Vallejo for their concurrence. These proposals were received from the United States Coast Guard, the Department of the Interior (Fish and Wildlife Service), the Department of the Air Force (Travis Air Force Base), and the Department of Agriculture (Forest Service). The Coast Guard received approval from their headquarters to acquire, at no cost, Buildings A-228, A-136, a portion of ARS-7 and use of Piers 34 and 35 to support its operational needs in the area. The Fish and Wildlife Service gained the necessary approvals to accept a transfer of lands, at no cost, for a National Wildlife Refuge for conservation and management of migratory birds, endangered species and wetlands at Mare Island, and Building 505 for conversion into an office, maintenance shop, visitor center and environmental education center. The Air Force at Travis is interested in 390 to 400 units of military family housing constructed after 1960 and two warehouse buildings 499 and 601 for its storage requirements. However, they are unable to submit a firm commitment until June 30, 1994. Finally, the Forest Service had its request approved to receive a no-cost transfer of Building #1324 for the relocation of its Regional Office (Pacific Southwest Region) from San Francisco. The four requests for excess property transfers are shown on Figure 3-10-1.

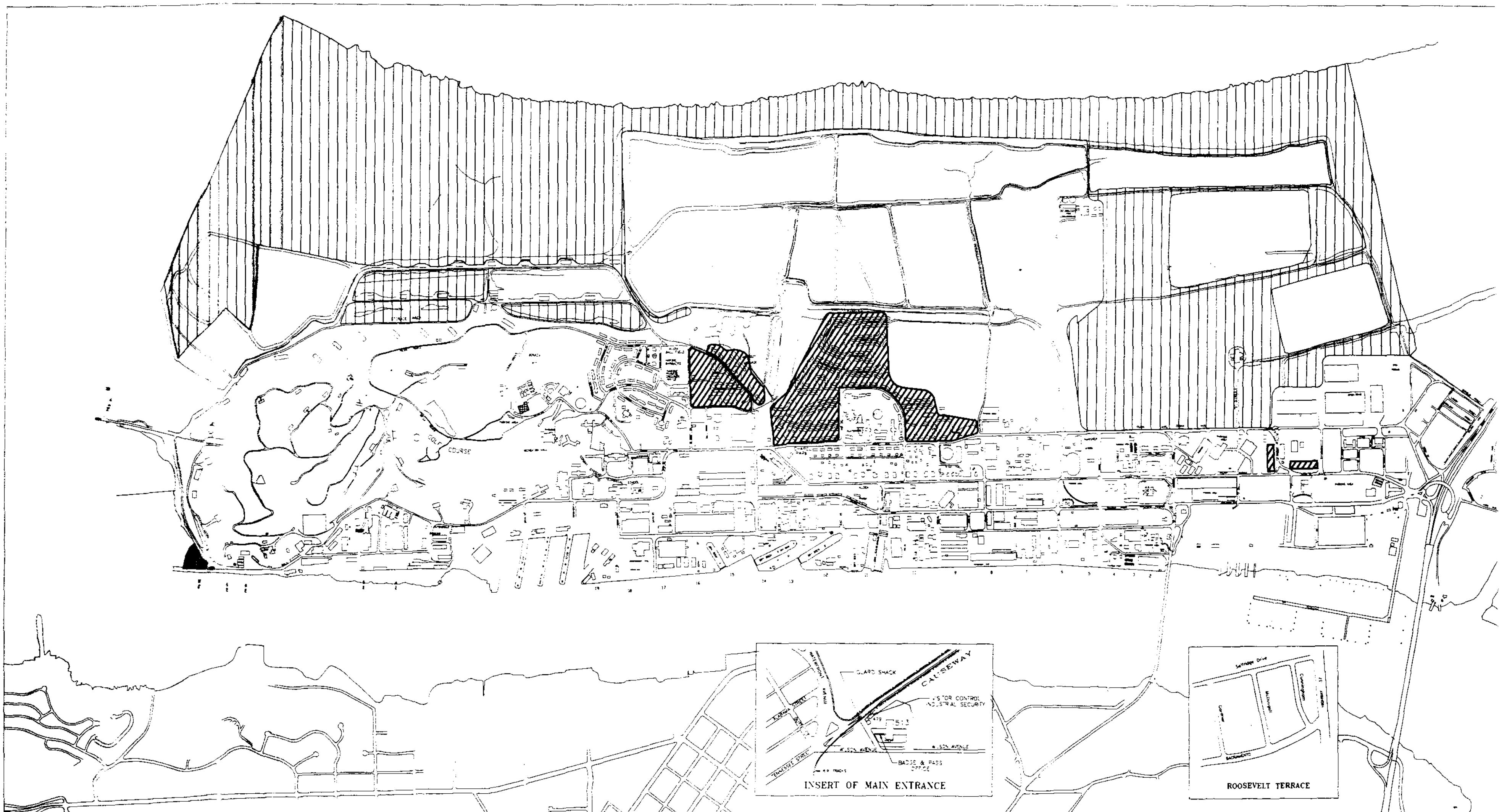
City Concurrence

The City concurred with the proposal of the Coast Guard and with the proposal of the Department of Interior with certain exceptions (i.e., with the caveat that the City of Vallejo reserves for its own use all active dredge ponds for receiving its dredge spoils or for receiving dredge spoils from other areas as a revenue-generating program). The City also endorsed the request of the Department of the Air Force for an extension of the deadline for Travis Air Force Base. Reasons for the City's approval include the following:

- *Coast Guard:* The presence of the Coast Guard in and around the waterway of Vallejo is very beneficial to its citizens. The continued presence of the Coast Guard station, will ensure continued code enforcement, rescue services, and will enhance the marketability of other properties in the area.

- *Fish and Wildlife Service:* The intentions of the Fish and Wildlife Service is to utilize Building 505 and the surrounding wetlands for the establishment of a visitor center and environmental education center. This center will draw people to Mare Island and provide customers for retail and recreational establishments on and off the island.

- *Travis Air Force Base:* The establishment of Air Force housing on Mare Island will be a revenue generator from assessments for the City of Vallejo. The Air Force families will also utilize recreation facilities on Mare Island and trade with merchants



Areas Requested to be Transfered and/or Used By the U.S. Fish and Wildlife Service

Areas Requested to be Leased or Jointly Used By Travis Air Force Base

Areas Requested to be Transfered and/or Jointly Used By the U.S. Forest Service

Areas Requested to be Transfered and/or Jointly Used By the U.S. Coast Guard

N

200' 0 200' 400' 600' 800'

EDAW, Inc.

Mare Island Final Reuse Plan

Figure 3.10-1

Federal Reuse Screening

on and off the Island. With the Air Force providing maintenance and upkeep to a major area of the base, it will free up the City's limited funds to conduct improvements in other areas.

3.10.3 McKinney Act Issues

The Stewart B. McKinney Homeless Assistance Act (commonly called the McKinney Act) is designed to permit recognized providers of assistance to the homeless to receive a high priority in acquiring unneeded land and buildings on federal properties. Buildings and land on closing bases provide opportunities for homeless providers to acquire the infrastructure they need to establish their programs. An alliance of homeless service agencies and non-profit housing developers has been formed to provide a comprehensive continuum of services for north bay homeless utilizing the identified surplus properties in accordance with the McKinney Act. Under McKinney Act conveyance, the property can only be used for the homeless and only for a period of two years. Homeless providers under the McKinney Act must be able to finance upgrades of facilities, pay a proportionate share of municipal service costs, and fund its program operations.

The schedule for the McKinney Act process is as follows:

- Surplus properties suitable for McKinney Act transfer were initially published in the Federal Register on June 3, 1994;
- McKinney providers then have 60 days to submit written "expressions of interest";
- They then have 90 more days to submit a formal application;
- U.S. Department of Health and Human Services then has 25 days to take formal action and respond to the applications.

It is projected that the McKinney Act screening process would be completed by the end of 1994. Within these time frames, the earlier application submittals will receive preference.

Property Ownership and Management

The housing units to be acquired through the McKinney Act and other means should be coordinated by a single entity or agency that is experienced in real estate transactions, property rehabilitation and property management. Such an entity would then lease or transfer title to appropriate program operators of shelters, transitional housing sponsors, and affordable housing programs. This approach will allow for a more centralized and coordinated planning process and the procurement of McKinney Act monies.

Funding for Housing Rehabilitation

A budget and funding commitments for renovation and administration of properties will be needed upon development of a plan for McKinney Act programs. Funding requests should be carried out by McKinney Act operators in a unified and coordinated manner. The City does not have the financial capability to fund McKinney Act programs.

Funding for Services

The ability to fund housing renovation must be a component of any McKinney Act operator's acquisition plan. Currently, no program operator has the resources to add programs at Mare Island without identifying new monies for case and property management and client supportive services, and the City is not in a position to provide funding. The 1995-1996 HUD Supportive Housing Program may provide the necessary monies for the first five years of operational costs. However, the HUD program is a national competition and preparation of a detailed service delivery plan by housing providers will be necessary in order for Mare Island to be competitive.

3.10.4 Recommendations and Implementation Actions

Federal Reuse

3.10(a) Excess Property (City): The City will integrate the results of the federal reuse screening process and the transfer of Mare Island lands into the Final Reuse Plan.

3.11 AIR QUALITY

3.11.1 Summary

The Federal Clean Air Act, as amended in August 1977 and October 1990, dictates that project emission sources must comply with the air quality standards and regulations that have been established by federal, state and county regulatory agencies. Air quality program compliance activities will continue at Mare Island as long as the "Permit to Operate" for the current sources are not canceled or surrendered. To date, there are no plans to cancel any of those permits. Therefore, the maintenance of the current permits will continue until a decision of ownership is reached. Interface with the BAAQMD regulators will be ongoing as long as the permits are current and active. The Navy will transfer the ownership of the permits including air emission credits to the City/Island Development Corporation (IDC) to facilitate reuse of industrial facilities.

3.11.2 Air Quality Standards

Air quality in a given location is described by the concentration of various pollutants in the atmosphere, which are generally expressed in parts per million (ppm) or micrograms per cubic meter (ug/m3). Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The significance of a pollutant concentration is determined by comparing it to federal and/or state ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations of various pollutants that may occur and still protect public health and welfare, with a reasonable margin of safety. The federal standards are established by the U.S. Environmental Protection Agency (EPA) and termed the

National Ambient Air Quality Standards (NAAQS). The state standards are established by the California Air Resources Board (ARB) and are termed the California Ambient Air Quality Standards (CAAQS).

The Federal Clean Air Act, as amended in August 1977 and October 1990, dictates that project emission sources must comply with the air quality standards and regulations that have been established by federal, state and county regulatory agencies. These standards and regulations focus on: 1) the maximum allowable ambient pollutant concentrations resulting from project emissions, both separately and combined with other surrounding sources; and 2) the maximum allowable emissions from the project.

The primary agency for the enforcement of air quality regulations governing Solano County is the Bay Area Air Quality Management District (BAAQMD). The standards set forth by the BAAQMD meet or exceed those set forth by the ARB, which are in compliance with the CAA. The principal BAAQMD regulations that apply to Mare Island include, but are not limited to:

- power plant
- open burning and visible emissions
- abrasive blasting and coating operations
- carbon monoxide (CO) and nitrogen oxides (NOx) emissions from boilers and internal combustion engines, and
- benzene emissions at gasoline dispensing facilities.

All required operating permits for these operations are on file. At present, Mare Island is not required to monitor on-site emissions. Periodic site inspections are made by BAAQMD personnel, who have authority to issue citations of noncompliance with air quality regulations. Compliance is demonstrated by a "Yearly Emission Inventory", which tracks the potential hazardous sources of air pollutants used on Mare Island.

Vehicular emissions also fall under state and federal regulations regarding individual vehicle emission controls. Vehicle emissions contribute a significant portion of the total pollution load emitted from the Naval Shipyard. Approximately 26,000 vehicles enter and leave the Shipyard during two peak commuting hours of the day. Much of the traffic flow is at low idle speeds, particularly during the afternoon rush hour. At these low speeds, the total emissions of hydrocarbons (HC) and CO per vehicle-mile traveled are at a maximum.

3.11.3 Issues Affecting Reuse

Air Quality Program Compliance Activities

The air quality program compliance activities will be continuing at Mare Island as long as the Permits to Operate for the current sources are not canceled or surrendered. To date, there are no plans to cancel any of those permits. Therefore, the maintenance of the current permits will continue until a decision of ownership is reached. Interface with the Bay Area Air Quaility Management District (BAAQMD) regulators will be ongoing as long as the permits are current and active. The Navy will transfer the ownership of the permits, including the Air Emmission credits, to the City to facilitate reuse of industrial facilities.

Vehicular Emissions

Following base closure, one manner in which the City can exercise some degree of control over total vehicular emissions is in transportation system management.

3.11.4 Recommendations and Implementation Actions

3.11(a) Continuation of Air Quality Compliance and Maintenance (Navy): The Navy will execute a number of air quality program compliance activities prior to base closure including the following:

- Apply for the Title V "Operating Permits" of the Clean Air Act.

- Apply for and resolve disposition of air emissions credits.

- Transfer ownership of all transferable permits to City/IDC to facilitate reuse of industrial facilities.

- Determine if air permits are required for Installation Restoration (IR) site remediation.

3.11(b) Implementation of Transportation Recommendations (City): The City will implement the actions listed in the transportation section, which will contribute to an improvement in air quality.

3.12 OTHER JURISDICTIONAL INTERESTS

California State Lands Commission

The State Lands Commission is tasked by state law to protect tide and submerged lands by restricting development to such traditional public trust uses as ports, fisheries, and water related recreation, habitat preservation and open spaces. The State Lands Commission is cognizant of the fact that much of the lands which may fall under their jurisdiction on Mare Island is key to the economic development of the Island and the reestablishment of jobs lost due to the shipyard's closure. In order to fulfill its statutory requirements and assist in the redevelopment of the Island, the State Lands Commission has committed to a process of exchanging the former tidal lands of Mare Island for other properties that do not hold a redevelopment potential. The State Lands Commission is in the process of determining the exact land area (i.e. number of acres) affected. They will then negotiate with the Navy to develop a title swap. The land identified for swap may or may not be on Mare Island. The time table for the completion of these efforts is dependent on the State Lands Commission staff availability.

San Francisco Bay Conservation and Development Commission

BCDC is the regional agency created by the California Legislature with jurisdiction over all open water, sloughs, submerged lands, tidelands, marshlands, managed wetlands and uplands 100 feet from the line of highest tidal action within San Francisco and San Pablo Bays and Mare Island Strait. This jurisdiction includes permitting authority over dredging, filling and development in and along the Bays. Therefore, BCDC will have jurisdiction over a number of reuse activities, including the provision of public access to the Bay and Strait. In addition, BCDC's Bay Plan designates the entire Island as a shallow draft port and water-related industrial site should the Navy close the facility. The Bay Plan also shows the "Hill" at the southern end as a potential park overlooking the Bay.

In conjunction with the Metropolitan Transportation Commission (MTC), BCDC has adopted the San Francisco Bay Seaport Plan. This Seaport Plan responds to state law requiring a maritime element to MTC's Regional Transportation Plan and to BCDC's Bay Plan. This Seaport Plan designates sites for port priority uses, such as marine terminals, and water-related industry sites. Development that is not marine-oriented is restricted within these sites. The current designation for Mare Island in the Seaport Plan is "Military". This designation is considered a port priority use for a shallow draft port or a water-oriented industrial site. The Plan is currently being updated, and this update will include an analysis of and a new designation for Mare Island. This update is expected to coincide with the preparation and completion of the Final Reuse Plan.

Federal Highway Administration

The FHWA is the agency of the Department of Transportation responsible for the federally funded roadway system, including the interstate highway network and portions of the primary state highway network. The FHWA funding is provided through the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), whose chief goal is to "develop a National Intermodal Transportation System that is economically efficient, environmentally sound, provides the foundation for the Nation to compete in the global economy and will move people and goods in an energy efficient manner." (U.S. DOT, 1992).

While ISTEA funding comes from Washington, D.C., regional bodies such as the MTC prioritize local projects in a Regional Transportation Improvement Program (RTIP) which is them submitted to the state (California Transportation Commission) for final approval and disbursement. In sum, ISTEA provides an emphasis on alternatives other than pure highway expansion and gives states and regional governments more control of how those funds are spent.

ISTEA funding and the FHWA have a jurisdictional influence over the Mare Island reuse planning effort to the extent that: a) national policies on funding as described in the ISTEA legislation affect the types of local transportation programs to be funded; b) the amount of available funding and required local match affects the feasibility of some types of projects; and c) the upgrading of Interstate 80 (I-80) and State Route 37 (SR-37) within the study area which are wholly or partially funded by federal dollars. Federal funds are also used to purchase buses for the transit system and ferry vessels for the Vallejo ferry. Potential projects to be funded through the FHWA and the ISTEA process include a southern crossing, heliport improvements, rail upgrades, signal coordination, bikeways and transit system upgrades.

Metropolitan Transportation Commission

The MTC, as described in the section on the FHWA, is the regional organization responsible for prioritizing transportation projects in a RTIP for federal and state funding. The process is based on evaluating each project for need, feasibility, and adherence to the ISTEA policies and congestion management program.

The congestion management program (CMP) requires that each jurisdiction identify existing and future transportation facilities which will operate below an acceptable service level, and provide mitigations where future growth degrades that service level. This issue is important to reuse planning for several reasons. First, it is assumed that the Island will have a right to the off-Island traffic capacity it consumed when operating at "normal" levels (1988 to be consistent with the City of Vallejo traffic model and available traffic data for the Island). Second, any Mare Island trips over the 1988 threshold would be proportionally responsible within the study area for facilities that have a failing level of service, such as SR-37. Third, the emphasis on Mare Island will be on alternative transportation solutions that match MTC's and the ISTEA objectives in increasing efficiency rather than capacity, for example, by establishing ferry service to the Island and promoting transit.

California Department of Transportation

Caltrans is the department responsible for the planning, design, construction, and maintenance of all state highways. One of the two access points to Mare Island is the North Gate from SR-37, a Caltrans facility. There are plans to improve the highway east of Mare Island Strait which will improve access to Mare Island from I-80. Caltrans will be including the reuse in its project plans to ensure adequate capacity.

Caltrans' jurisdictional interest would extend to improvements to the North Gate and the proposed southern crossing, including connections and impact to any state or federal facility (I-80 and I-780). Federal financing for the facility would be subject to review by Caltrans staff and the California Transportation Commission (CTC), along with MTC. If the southern crossing were to be designated a route of regional significance and/or a state highway, Caltrans would have primary jurisdiction over the design, construction, and maintenance of the facility.

Caltrans design standards would be used on most new and expanded roadways on Mare Island where they superseded City design standards. Proposed alternative modes such as bicycle facilities, expanded transit service, or ferry service would likely be funded with federal funds which are administered by Caltrans and the CTC. As such, Caltrans will be included in the planning and review process for these facilities.

3.13 REFERENCES

(See Appendix 4.0, Volume III)

4.0 ECONOMIC FEASIBILITY ANALYSIS

4.1 INTRODUCTION

4.1.1 Purpose and Use of Economic Feasibility Analysis

This chapter provides economic analysis of the market, fiscal, operational, and financing aspects of the planned reuse of Mare Island, and provides a series of implementation strategies to minimize operating and capital financing requirements. Slated for closure by BRAC 1993, Mare Island will convert from a major Navy Submarine repair facility to civilian uses in 1996. This change will result in the direct loss of numerous jobs; prior to the announcement of closure, the anticipated closure of Mare Island was estimated to result in the loss of 1,795 military and 7,523 civilian jobs, and an estimated indirect loss of 5,723 jobs in Vallejo (from *The Economic Impact of Mare Island Shipyard*, SEDCORP, September 1992).

4.1.2 Objectives of Economic Feasibility Analysis

This Economic Feasibility Analysis tests the feasibility of land use designations in the Final Reuse Plan. The objectives of this Economic Feasibility Analysis include the following:

1. Assure that the Final Reuse Plan is realistic from a real estate market perspective and that the Plan will accommodate and encourage attraction of target industries.

The fundamental economic issue surrounding the Final Reuse Plan is how well it responds to potential real estate market demand. The Conceptual Land Use Plan as modified by the ULI Program was not based on a formal market demand analysis. The market analysis contained in this Chapter will establish:

- The market feasibility of specific land use components proposed in the Final Reuse Plan.

- The marketability of specific buildings, facilities, and equipment.

- The expected absorption (space utilization) of various land uses cumulative in three time frames 1996, 2006, and ultimate "buildout."

- Potential revenues that could be obtained through rental of existing buildings, ground lease rents, and land sales over time.

The market analysis conclusions also serve as the quantitative basis for the subsequent organizational, fiscal, and financial analyses contained in this Chapter, as well as to inform the recommended marketing and disposition strategies.

2. Design and evaluate an entity that will manage the real estate assets on Mare Island.

There has been substantial discussion regarding transfer of real property assets, the functional responsibilities, and the appropriate entity to manage the reuse program on Mare Island. The transfer process, functional responsibilities, and entity (Island Development Corporation or IDC) proposed in this Chapter build upon these earlier efforts, adding details necessary to conduct a formal analysis of costs and revenues.

3. Test the fiscal implications of the Final Reuse Plan and provide mitigation measures which protect the City's General Fund.

The fiscal analysis addresses the effects of the Final Reuse Plan upon the City's operating budget. The Mare Island fiscal analysis forecasts municipal service costs and the offsetting municipal revenues expected to occur as the Mare Island is converted to civilian use and developed. Since the City cannot afford to subsidize redevelopment and reuse of the Island, every effort must be made to assure that any municipal service costs incurred are covered by new taxes and other existing municipal revenue sources that will increase with development activity or new revenues sources designed and sized to offset any projected fiscal deficits.

4. Allocate cost responsibilities associated with infrastructure needed to support conversion and development of Mare Island and identify funding sources and strategies.

The financial analysis contained in this Chapter addresses the ability to pay for the identified infrastructure costs given available funding sources. Given that a substantial portion of costs will have to be borne, through one mechanism or another, by development occurring on the Island, a key objective involves estimating this financial capacity. The Operational Analysis and the Fiscal Analysis will also contribute to this capacity analysis by revealing potential support for capital financing derived from the IDC and the City, respectively.

5. Establish a series of implementation recommendations encompassing organizational efforts, financing, and marketing/disposition.

At the end of each Section of this Chapter, a series of implementation recommendations has been provided. These recommendations are intended to form a framework for "next steps" in the conversion process from an organizational, operating, financing, and marketing/disposition standpoint.

4.1.3 Assumptions and Limiting Conditions

1. **Building and Land Quantities.** Data regarding existing building sizes, building uses, and land available for new development were obtained from the Navy and EDAW.

2. **Building Condition.** For purposes of this report, it is assumed that building condition roughly corresponds to age and/or outside appearance.

3. **Estimates of Future Economic Conditions.** To conduct the analyses contained in this Chapter, numerous estimates of future fiscal, financial, market, and economic conditions were made. All of these estimates of the future are subject to change over time, however every effort to make conservative estimates of the future was attempted.

4. **Environmental Assumptions.** According to the Mare Island Environmental Baseline Survey, Mare Island contains numerous identified sites and buildings with varying degrees of environmental contamination, and other sites and buildings identified as requiring further study. The assumptions and recommendations regarding reuse of individual buildings and developable sites assumes that clean-up will occur in a timely manner. Assumptions to properties in terms of the timing of their acquisition, ability to lease, and ultimate disposition via lease or sale, are primarily market-driven. While overall phasing descriptions by subarea of the Island have generally taken known environmental conditions into account, and assumed a rough timetable extending beyond the year 2006 for "areas with hazardous substance release but no actions taken" and "areas requiring further evaluation," this report does not take into account a precise clean-up schedule.

5. **Constant Dollar Assumptions.** All estimates of future revenues, expenses, and other financial data are made in constant (i.e., 1994) dollars rather than inflation-adjusted dollars.

6. **Periodic Analysis.** All analysis and recommendations, including market, fiscal, operating, and capital investment, are conducted for three "snapshot" periods of time: 1996, the year of base closure; 2006, ten years after closure; and "buildout," which is reflected as 30 years after base closure.

7. **Conveyance/Property Transfer Assumptions.** This chapter assumes that the Navy would immediately transfer properties to the Island Development Corporation (IDC) or other participating agencies that are given a Finding of Suitability to Transfer (FOST) or as determined to not require hazardous substance remediation. Properties requiring hazardous substance remediation will be transferred as remediation is completed and certified. The Navy will maintain title and maintenance responsibilities (Care and Custody) of all lands not transferred. Real estate assets will be transferred directly to the IDC for subsequent disposition, except for several selected buildings and facilities that may be conveyed to other federal agencies. The City will also receive several buildings and related equipment necessary to provide public safety (police and fire protection) on the Island as part of the Section 2903 transfer process.

9. **Regulatory Constraints and Jurisdictional Issues.** This chapter assumes that important regulatory constraints and jurisdictional issues which may impact the timing, ability to convey title, and related disposition efforts, being raised by the State Lands Commission and the impact of the Bay Conservation and Development Commission (BCDC) Seaport Plan on are resolved in a timely manner.

4.1.4 Contents of the Chapter

Section 4.2 of this chapter summarizes the Market Analysis conducted for the Final Reuse Plan. Section 4.3 explores organizational options, while Section 4.4 describes two approaches to Navy/City property transfer. Section 4.5 describes the assumptions regarding quantities of buildings and lands assumed to be reused for purposes of conducting the fiscal, operating, and financing analyses described in Sections 4.6, 4.7, and 4.8, respectively. Marketing and ultimate disposition strategies are provided in Section 4.9. Section 4.10 suggests next steps which must be undertaken by a range of entities to implement the concepts contained in the Final Reuse Plan. References used for the entire chapter are described in Section 4.11. Several appendices for this Chapter are also provided, detailing quantitative analysis and related information.

4.2 MARKET ANALYSIS

The Market Analysis was conducted to identify near- and longer-term opportunities for a wide range of land uses for Mare Island during the next 20 years. Specifically, the research and analysis was structured to address the following questions:

- What are the Island's competitive advantage and disadvantages vis-a-vis Solano/Napa County, the Bay Area Region, and other base conversions?

- What existing buildings/uses are likely to be marketable in the near- and longer-term? What buildings are likely not to be marketable in the foreseeable future due to their configuration or condition, and should be scheduled for demolition?

- What are the long-term prospects for new development on Mare Island?

4.2.1 Methodology for Market Analysis

The methodology for the Market Analysis generally followed the steps described below for each land use under consideration:

1. Drive-through/walk-through tours of existing Mare Island buildings and facilities, including the restricted-access Controlled Industrial Area (CIA).

2. Mapping of previously-expressed private, public, and institutional interest in Mare Island buildings and facilities.

3. Interviews with sample of interested parties to determine needs and likely timing of occupancy.

4. Analysis of market area demand and supply factors to assess likely demand for Mare Island existing facilities and new development opportunities.

5. Conclusions regarding likely market acceptance of land use.

6. Recommendations regarding marketability of individual buildings/sites, including identification of buildings that should be slated for demolition.

7. Recommendations to land use planning team regarding phasing of subareas of Mare Island, based on marketability of existing uses and new development sites.

These steps were followed for office, residential, historic shipyard, educational, recreational, and retail uses. For industrial/warehouse uses, a more in-depth analytical framework was followed. Because these uses dominate Mare Island's landscape and offer substantial immediate opportunities as well as constraints to the City of Vallejo, a quantified target industry analysis and research on several key industrial sectors with potential for attraction to the Controlled Industrial Area (CIA) were undertaken.

4.2.2 Demographic and Regional Market Overview

Following conversion, Mare Island will become an integrated part of the City of Vallejo. Its reuse potential will be determined by a variety of market forces, including the local demographic and economic characteristics of residents and workers. This section summarizes recent demographic and economic trends for the City of Vallejo.

- **Population Growth.** Vallejo experienced substantial population growth during the 1980s, echoing Solano County as a whole. Population increased from 81,599 in 1980 to 109,199 in 1990, a compound annual rate of three percent.

- **Household Tenure.** Vallejo, as well as the County, is dominated by owner households; almost 62 percent of Vallejo's households owned their housing unit in 1990 (compared to only 56 percent for the State of California). Median household 1993 incomes for Vallejo, at $42,108, were slightly below Solano County, but slightly above the statewide median of $40,391.

- **Residents' Place of Employment.** Over 40 percent of Vallejo's approximately 50,000 1990 resident workers worked in Vallejo itself. Just over 15 percent commuted to Contra Costa County, 11 percent commuted to San Francisco, and 10 percent commuted to Alameda County. Less than six percent commuted to Benicia or Fairfield; the remainder commuted to a variety of locations, virtually all in the Bay Area.

- **House Values.** Vallejo and much of Solano County have a relative affordable housing stock; the median reported house value for Vallejo in 1990 was $140,600, compared to almost $196,000 for the State. This factor offers a strong competitive advantage for Vallejo in attracting new industry and other businesses.

- **County Employment Growth.** Solano County has been experiencing substantial employment growth during recent years; between 1982 and 1992, Solano County employment grew at an annual compounded average rate of 3.3 percent, compared to 2.2 percent for California as a whole. The Association of Bay Area Governments (ABAG) forecasts that Solano County will continue this strong employment growth into the future; it expects the County to add almost 75,000 new jobs between 1995 and 2010, an overall increase of more than 63 percent.

Although Vallejo has a relatively competitive demographic profile and an expectation of strong future employment growth, its strengths must be considered within the regional marketplace. Solano and neighboring counties have experienced a significant imbalance between the demand for and the supply of commercial and industrial space during the past several years. In addition, the entire Bay Area has been subject to a severe recession, echoing the national economic downturn.

Moreover, BRAC 1993 severely impacted the Bay Area in terms of setting the stage for an eventual significant increase in available industrial and warehouse supply of both buildings and developable land on other military bases including NAS Alameda, Treasure Island, and the Presidio (see Appendix 4-A). In addition to Mare Island, 9.8 million square feet of industrial and warehouse facilities, 2.2 million square feet of office/educational space, and almost 3,700 housing units could enter the Bay Area marketplace during the next decade. While each of the bases has certain competitive advantages and will appeal to a range of end users, some marketing and eventual disposition efforts may overlap. For these reasons, the following market analysis has been structured to examine the special attributes of Mare Island that create market opportunities as well as challenges.

4.2.3 Industrial/Warehouse/Office Market Analysis

Overview of Existing Facilities and Reuse Concept

Mare Island contains approximately 7.2 million square feet of heavy industrial, light industrial, warehouse, and office space, excluding space devoted to educational uses. In the

Controlled Industrial Area (CIA), there is presently approximately 2.8 million square feet of industrial and support space in a mixture of large structures with 40 to 50 feet clear spans and smaller specialized shops. Many of the CIA structures contain specialized equipment used in the manufacture and repair of submarines and other naval vessels, including equipment to roll steel, paint large multi-story objects, and create sophisticated electronic components. The CIA is configured as a series of "job shops," so that individual industrial buildings manufacture customized parts which are then assembled into finished vessels.

Mare Island also has a substantial amount of warehouse/light industrial space in a variety of vintage 1940 to modern buildings located primarily on the northern end of the Island, and approximately 1.7 million square feet of space currently in education/office use in a range of modern and functionally obsolete structures.

For purposes of this analysis, it should be noted that demand and supply for heavy industrial, light industrial, warehouse, and office space are assessed in combination. This is due to the fact that the Solano County market, like many suburban areas in northern California, has experienced development of employment centers primarily in the form of modern industrial or "business" parks. The parks typically contain a mixture of building types, and often a mixture of uses even within buildings.

While certain parks are more "industrial" (e.g., space is used to manufacture or assemble products), and others are oriented more towards "business" (e.g., space is used for front office, back office, and/or warehouse purposes), the similarities among parks are more consistent than any differences. In addition, employment projections for Solano County are made by very broad industrial sectors (including sectors that may be major office or warehouse space users); efforts to segregate employment into finer-grained types of space demand can be misleading and inaccurate, given the way supply is configured at competing parks. Moreover, the Bay Area abounds with examples of older industrial buildings that have been rehabilitated for adaptive reuse as office space, echoing the transition to a business service-based economy. Finally, a relatively new type of space known as "flex-space," which is designed to provide low-cost space for companies with light industrial, warehouse, and office space needs, is growing increasingly common throughout the Bay Area; in this type of space, the mix between types of use is not estimatable.

A wide variety of reuse options and concepts for the industrial, warehouse, and office space on the Island have been considered by the Work Group, the ULI Panel, and employee organizations. Expressions of interest from federal agencies and private companies have also been received. These reuse concepts can generally be categorized into three parallel tracks: reuse of existing buildings and associated equipment (especially in the CIA) for heavy industrial purposes; reuse of building "shells" without associated equipment for another set of industrial, warehouse and office purposes; and demolition of existing improvements to redevelop portions of both the CIA and the northern light industrial area into modern industrial/business parks.

Market Demand and Supply

To further explore the possibilities for reuse, two approaches were taken: an estimate of Solano County residual unmet demand for space expected to be consumed by competing industrial and business parks, and a more focused effort to identify target industries and their locational requirements vis-a-vis the special features available on the Island.

Residual Demand Estimate: A quantitative estimate of residual unmet demand that could be absorbed on Mare Island was made for the Solano County market area, based on employment projections from ABAG and an inventory of approved space that can be built in County business/industrial parks.

As shown in Table 4-1, Solano County is expected to add more than 52,600 jobs between 1995 and 2010 in sectors utilizing at least some space in modern business/industrial parks. These new jobs, primarily concentrated in the manufacturing and services sectors, will require an estimated 20.0 million square feet of new office/warehouse/industrial space for the 15 year period, or approximately 1.33 million square feet per year.

While this employment outlook and subsequent potential demand for new industrial/business park space appears substantial, the Solano marketplace has been anticipating such growth for some time. Developers have constructed numerous industrial/business parks throughout the County, which include significant amounts of entitled but not yet built new space. An inventory of these parks (see Appendix 4-B) indicates that more than 22 million square feet has been approved but not yet constructed. Much of this space will be in well-located modern parks with convenient freeway access, joining existing (primarily single user/owner occupied) firms in established parks that are perceived as prestigious business locations. Thus, on a gross level, comparison of demand from employment growth and potentially competitive new supply indicates that there will be limited residual demand that could be captured by Mare Island, given the locational advantages of other parks.

However, there are several factors which will enable Mare Island's existing industrial/warehouse space and development sites to become competitive, brightening the outlook from the above analysis. For potential users not seeking the special heavy industrial features of the CIA, the Island may be made competitive on the basis of price; in other words, Mare Island could capture substantial amounts of Solano County's estimated demand if asking rents and/or other significant operating costs were below the rest of the market. In addition, Mare Island has been granted the competitive advantage of below-market electric power rates through the Western Area Power Administration for the next ten years, an important competitive advantage for heavy industrial users. Finally, the opportunities to reuse "shell" spaces at below-market rents, coupled with the availability of rail and barge access, may make the Island's industrial facilities especially attractive to those industries who require such features.

Table 4-1: Industrial/Warehouse/Office Square Footage Demand Forecast for Solano County –

		Projected Employees			Industrial/ Warehouse/ Office Park Proportion	Sq.Ft. per Employee	Square Feet Demanded 1995-2010 (k)	Annual Demand 1995-2010 (k)
		1995	2010	# Change 1995-2010				
Construction		7,860	15,170	7,310	25%	250 (a)	457,000	30,000
Manufacturing		10,160	20,730	10,570				
High-Technology		*950*	*5,580*	*4,630*	100%	365 (b)	1,690,000	113,000
Other Manufacturing		*9,210*	*15,150*	*5,940*	100%	460 (c)	2,732,000	182,000
Transportation/ Communication & Utilities		5,550	9,160	3,610	100%	1,140 (d)	4,115,000	274,000
Wholesale Trade		3,920	10,490	6,570	100%	700 (e)	4,599,000	307,000
FIRE	(f)	4,090	8,110	4,020	50%	300 (g)	603,000	40,000
Services		29,430	48,280	18,850				
Business Services		*5,300*	*14,100*	*8,800*	75%	350 (h)	2,310,000	154,000
Other Services		*24,130*	*34,180*	*10,050*	50%	675 (i)	3,392,000	226,000
Government		31,080	32,810	1,730	15%	250 (j)	65,000	4,000
Totals		92,090	144,750	52,660			19,963,000	1,330,000

NOTES:

Retail trade not included in this analysis.

(a) Average of ABAG estimate of space requirements for construction sectors from 1987 input output model; rounded to nearest multiple of five.

(b) Average of ABAG estimate of space requirements for high tech sectors from 1987 input output model; rounded to nearest multiple of five.

(c) Average of ABAG estimate of space requirements for non-high tech sectors from 1987 input output model; rounded to nearest multiple of five.

(d) Average of ABAG estimate of space requirements for transportation, communications, and utility sectors from 1987 input output model; rounded to nearest multiple of five.

(e) ABAG estimate of space requirements for wholesale sectors from 1987 input output model; rounded to nearest multiple of five.

(f) FIRE = Finance, Insurance, and Real Estate.

(g) ABAG estimate of space requirements for FIRE sectors from 1987 input output model; rounded to nearest multiple of five.

(h) ABAG estimate of space requirements for business services sectors from 1987 input output model; rounded to nearest multiple of five.

(i) Average of ABAG estimate of space requirements for other services sectors from 1987 input output model; rounded to nearest multiple of five.

(j) Average of ABAG estimate of space requirements for government sectors from 1987 input output model; rounded to nearest multiple of five.

(k) Rounded to nearest 1,000.

SOURCES: Association of Bay Area Governments, *Projections 94*; Association of Bay Area Governments, *1987 Input-Output Model and Economic Multipliers for the Bay Area*; Bay Area Economics.

Target Industry Analysis: A target industry analysis identifies those industries that demonstrate the greatest potential for growth in the nation, state, and region. Vallejo will have the greatest chance of success in attracting firms to Mare Island if recruitment focuses on those industries that show growth potential and are outperforming the other manufacturing sectors.

A Target Industry Analysis was conducted for this report, based on a set of economic indicators which quantify historic growth trends, future expected employment growth, and existing concentrations of such firms in California and the Solano/Napa/Contra Costa County region (see Appendix 4-C). Those sectors with the greatest likelihood of future growth and interest in Mare Island as a place to conduct their business include the following manufacturing functions:

Materials Processing
- Chemicals and allied products
- Petroleum and coal products

Consumer Products
- Computer and office equipment
- Household audio and video equipment
- Musical instruments, toys and supporting goods, office and art supplies, miscellaneous manufacturing
- Furniture, partitions and fixtures
- Leather, luggage, and footwear products
- Certain types of food and kindred products processing
- Newspaper/Periodical publishing & printing, books, commercial printing, and printing trade services

Industrial Products
- Transportation equipment
- Miscellaneous metal products
- Fabricated metal products
- Scientific/Medical instruments
- Wood containers and wood mill products
- Paperboard containers and boxes, and miscellaneous converted paper products
- Products of purchased glass, structural clay products, pottery

Industry Case Studies: To augment the quantified target industry analysis, six industrial sectors were researched in greater depth. The primary purpose of this research was to ascertain the likelihood of one or more major users to lease existing heavy industrial facilities in the CIA of Mare Island. To select the sectors for the case study research, the sectors identified by the target industry analysis were reviewed along with actual expressions of interest and suggestions for reuse from employee groups on the Island. The final list of case study industries was developed jointly by the Mare Island Economics Team and City of Vallejo staff.

Transportation Equipment Manufacturing. A suggestion that a long-term industrial development opportunity may exist for the manufacture of transit rail cars (SIC 3743) has not been borne out by further research. The size of the international market for railroad passenger car shells is not considered large, and the industry is now carrying excess capacity. Total industry sales in the U.S. are approximately $1.5 billion, an amount not expected to increase soon despite policy changes in support of mass transit. The manufacture of transit vehicles is a highly competitive, low margin, cyclical industry.

The supporting industries which furnish parts and materials to transportation equipment manufacturers are generally made up of small-scale firms which have been in the business for many years. They typically occupy sites in low cost industrial zones and require access to a mainline rail system. Site location decisions often appear to be based primarily on non-cost factors such as distance from the founder's home. Cost is the next most important factor when determining site location, while potential for future expansion is not necessarily a priority.

Two firms were contacted as case studies for this report: Morrison Knudsen, a large national construction and engineering firm, and BCH Manufacturing, a small, local firm which supplies parts to the industry. Morrison Knudsen, Corp. (1993 Transit Group Sales, $50 million), headquartered in Boise, Idaho, is the only domestic manufacturer of passenger vehicles for rail and light transit. It has a manufacturing plant in Chicago which ships car shells to Hornell, New York and Pittsburg, California for assembly. It also imports car shells from Brazil, Portugal, Germany, and France.

The Pittsburg, California plant is used for assembly of BART cars and passenger cars for CalTrans' Division of Rail. Located in a leased facility which was renovated and opened in February, 1994, the plant is expected to be fully operational by the end of the year.

According to Morrison Knudsen, even if the passenger rail and light transit car market in California grows dramatically, it is extremely unlikely that there would ever be enough demand to justify duplicating their Chicago manufacturing facility in California. The firm does not anticipate substantial growth in international sales. Procurement officials at BART and CalTrans' Division of Rail confirmed that demand for light transit and rail cars in California is not expected to increase dramatically in the foreseeable future.

BCH Manufacturing Co. (1993 sales, $1 million), located in Oakland, manufactures wheels and axles for BART and the San Francisco cable car system at a 20,000 square foot site which it has occupied since it opened in 1976. It requires access to mainline rail and therefore feels that Mare Island is too remote of a location. A substantial supply of inexpensive industrial property is more centrally located in Oakland and is accessible to mainline rail service. For example, the new I-880 project is going through Southern Pacific

Railroad's yard; as a result, SP is relocating out of the area and freeing up additional land in Oakland. If BCH were to relocate, that site would be a possibility for the company.

Based on the research described above, the outlook for the manufacture of transit rail cars or supplies limited.

Machine Tools Manufacturing. Much of this industry (SIC 3541, 3542) is made up mainly of small, family-owned firms with less than 50 employees each. However, the industry is dominated by the machine tool divisions of large corporations like GTE, Textron and Ingersoll. Machine tool makers typically specialize in a particular market niche in order to minimize competition. While this ensures stability and sales predictability, the tradeoff is low or stagnant growth. Expansion is typically gained through export orders, which are increasing for the industry overall, but remain unpredictable at the individual firm level.

An on-line computer search of Bay Area machine tool manufacturers with more than 10 employees found 15 firms with total sales of $55 million, employing 360 workers. The majority of these firms have sales of less than $3 million and employ fewer than 40 workers. Most Bay Area machine tool manufacturing firms are located on the Peninsula (directly south of San Francisco) or in Silicon Valley. Three local firms with the highest sales and employment were contacted to provide case studies for this industry. Only local companies were contacted based on the assumption that local firms have a better understanding of the advantages of a Bay Area location, and are familiar with operating a manufacturing enterprise in a dense urban area.

Dynamechtronics, located in Sunnyvale, manufactures milling, drilling, and lathing machinery for the auto industry; the firm exports machine tools to China, Mexico, Brazil and Canada. The firm has 35 employees and annual sales of $15 million. Dynamechtronics has been in business 11 years and is located in Sunnyvale because of its proximity to the founder's home. The firm requires large amounts of electrical power and hazardous material storage and disposal facilities. Accessibility to rail and water transportation (which they lack at their present site) would be beneficial to their export sales.

Pacific Roller Die Co., located in Hayward, makes pipe manufacturing machinery and sheet metal processing equipment for the oil industry. The firm, which occupies a 50,000 square feet facility, has 30 employees and annual sales of $7 million. They have no domestic competition and export their products to China, Japan, and other parts of Asia. The company has been in business 24 years and is located in Hayward because of its proximity to the founder's home. Like Dynamechtronics, Pacific Roller demands large amounts of electrical power and the ability to handle hazardous materials. The firm's paint work is currently subcontracted because they lack the necessary facilities at their present site. Their industry niche is not growing rapidly and they do not contemplate expansion or relocation in the foreseeable future.

Empire Castings Inc., located in Santa Rosa, manufactures die-casting machinery-and molds for the auto industry. It has 25 employees and annual sales of $12 million. This firm is the only domestic manufacturer of this machinery, which it exports to China, Korea, and the Philippines. The company has been in business since 1969. Empire Castings is located in a new 20,000 square foot plant in Santa Rosa due to proximity to the owner's home. The plant built by the firm in 1990 burned in a fire.

Each of the firms contacted views Mare Island as a good location with adequate access. Reuse of an existing manufacturing facility is not considered either a hardship or an obstacle, and is considered equivalent to constructing a new facility. The availability of subsidized power, a paint and blast facility, rail and barge access, and the ability to store and dispose of hazardous materials are considered competitive advantages.

Scientific Instruments/Related Products Manufacturing. The Instruments and Related Products Industry in the Standard Industrial Classification (SIC) codes includes a variety of products ranging from instruments for electricity measurement to imaging devices for viewing inside the body. The industry groups considered for this report include Laboratory Apparatus and Analytical, Optical, Measuring, and Controlling Instruments (382), and Surgical, Medical, and Dental Instruments and Supplies (384).

The medical instruments industry is a high paying industry that employs skilled workers and adds a high value during manufacture. Defense industry technology can be adapted to suit the needs of medical instruments industry according to a Medical Device and Diagnostic Industry report. Overseas markets for medical devices are expanding faster than in the United States. California is particularly dominant in the areas of laboratory apparatus and medical instruments. Over 22 percent of medical instruments exported by the U.S. come from California, amounting to nearly $1 billion in exports annually.

The industry in California focuses on the mid- to high-end range of products, making it technology-intensive. Proximity to the existing high-technology base is an attractive reason for locating a medical instrument company in California. The more complex medical equipment often contains microprocessors, micro-mechanics, and advanced materials. Superconductors, lasers, and computer systems are currently being used in the development of high-technology medical diagnostic equipment. In the future, products will be developed as a result of collaboration of electronics and biotechnology research. For example, electrical engineers are currently working with molecular biologists to research the properties of a saltwater bacterium that will help in developing a very fast, high-density computer memory.

Two companies were contacted as case studies for this report: Thermal Separation Products (formerly Spectra-Physics Analytical) and Finnigan Corporation. Thermal Separation Products is one of the top 10 companies nationwide that manufactures Electromedical Apparatus (3845) and Process Control Instruments (SIC 3823) with an estimated sales volume of $440 million in 1992. The manufactured product is used to test a variety of liquids including petroleum products, drugs, and soft drinks using chromatography technology. The company has over 100 employees and 103,000 square feet at its Fremont location. The former company, Spectra-Physics Analytical, was located in San Jose. The decision to relocate to Fremont was based on lower land costs and the residential location of employees. The company acquired a simple shell structure rehabilitated for production space and a warehouse with a shipping dock. This firm also needs hazardous material storage and waste water treatment facilities and permits.

Finnigan Corporation is one of the top 10 companies nationwide that manufactures Laboratory Analytical Instruments (3826), with an estimated sales volume of $91 million in 1992. The instruments are used for medical and scientific research in mass spectrography. The company has a 200,000 square foot facility in San Jose with 200 employees. In 1982, the company relocated from Sunnyvale to San Jose because of lower land prices.

Both of these companies, typical of instrument manufacturers, could reuse only a small amount of the Mare Island industrial shell space for the manufacture and assembly of instruments. The location of Mare Island and relatively limited access does not appear to be a problem for this type of user, especially if it is offset by low land or building costs. Furthermore, the ability to provide hazardous material disposal and waste water treatment facilities on the Island would be a positive factor in attracting instrument manufacturers.

Metal Processing/Fabrication. Metal processing firms have been forced to reduce costs over the last ten years, at the same time they have faced declining demand and increased competition. The greatest demand for steel mill products comes from the construction and automobile industries. While commercial and public works construction continues to stagnate, the demand for steel is further reduced by the decrease in the steel content of automobiles. Domestic steel mill overcapacity is not expected to decline in the foreseeable future. Typically, mills run at 75-85 percent of capacity. Even mills that have a backlog of orders are not confident enough in future growth to add more workers. This means that orders are often met by importing unfinished steel for further processing. Minimills, which melt steel from scrap, are the only portion of this industry sector which generally face a better outlook, although these facilities depend on the availability of inexpensive scrap metal. In the past, firms have expressed interest in setting up such a facility somewhere in California.

An on-line computer search of Bay Area metal processing firms with more than 10 employees found 38 firms with total sales of $720 million, employing 3,000 workers. The majority of these firms have sales of less than $10 million, employ fewer than 60 workers, and are located in the East Bay or Silicon Valley. Firms with the highest sales and most employees were contacted to discuss their current production requirements and plans for future expansion.

Pinole Point Steel, located in Richmond, has 250 employees, annual sales of $100 million, and manufactures galvanized sheet metal for metal building and hardware manufacturers in 11 western states. They are located in a former Bethlehem Steel facility and have surplus capacity. They require large amounts of electrical power, hazardous material storage capability, and easy access for truck shipments. Accessibility to rail and water transportation (which they lack at their present site) would be helpful in reducing transportation costs.

Cofab Steel Corporation, located in Vallejo, has 40 employees, annual sales of $5 million, and manufactures structural steel for the construction industry and oil refineries. As a small regional steel mill, Cofab serves clients within a 150-mile radius that need a fast turnaround time. The firm is currently facing a backlog of orders. Cofab has been in Vallejo since 1965 and operates on two acres of land in a neighborhood where values are now $175,000 an acre ($4-5 per square foot). The owner would like to move to a facility where costs are closer to $1 per square foot. Before the recession Cofab had plans to relocate and build a new $250,000 plant.

Although Mare Island is viewed as a good, central location, its limited truck access is seen as a disadvantage by a large scale plant like Pinole Point Steel. Conversely, barge access would eliminate one step in the transportation link between a steel processing firm and its suppliers. Rail service is also considered a competitive advantage. Finally, the availability of 40-50,000 square foot shell space and the ability to use a paint facility are considered definite competitive advantages.

Chemicals/Drugs/Bio-Technology. The drug and chemical industry includes a wide range of products from pigments to biological and biomedical products. The Standard Industrial Classification (SIC) name for the industry is Chemicals and Allied Products. The Industry Groups considered in this report include Industrial Inorganic Chemicals (SIC 281), Drugs (SIC 283), and Industrial Organic Chemicals (SIC 286).

In California, the Industrial Inorganic Chemicals industry group focuses on the production of alkalis and chlorine, industrial gases, and inorganic chemicals such as sulfuric and aluminum compounds. Although sales for these industry segments have grown over the last decade, employment levels have remained stable or decreased. California companies in these segments include Dow Chemical in Pittsburg, Grow Group in the City of Commerce, Liquid Air Corp. in Walnut Creek, and General Electric in San Jose.

Dow Chemical was interviewed for this report as a proxy representative of this industry group. The company has been in Pittsburg since 1939 at a 1,000-acre facility with 500 employees producing agricultural and intermediate chemicals. The chemical production takes place in open air structures with heavy equipment surrounded by large open space buffer zones. The company uses water, truck, and rail facilities in their manufacturing process. Reliable, low-cost power is a critical factor for the industry. The Mare Island facilities could provide a good location for a chemical company given the possibility of large land areas with enough buffer space between other uses, low cost land, low cost power, tax considerations, and access to a variety of transportation modes. Access to waste water treatment, hazardous material disposal, and an electronics shop could also be useful for the right kind of chemical company.

A number of Industry Segments within SIC groups 283 and 286 are considered to be within the "Biotechnology" umbrella term, including Pharmaceuticals Preparations (SIC 2834), Diagnostic Substances (SIC 2835), Biological Products except Diagnostic (SIC 2836), and Miscellaneous Industrial Organic Chemicals (SIC 2869). The history of biotechnology research has been closely linked to the Bay Area since its inception in the early 1970s. Since then, the Bay Area has continued to play an important role both in theoretical research efforts and in expanding into the development of companies that have devised commercial applications for new products and processes. Employment in these industries has been growing steadily since 1973. The Bay Area is currently home to 15% of all biotechnology companies in the US. These companies as a group also dominate the nationwide industry in terms of total assets ($4.4 billion out of a total of $11.4 billion).

Biotech industry companies that produce drugs and pharmaceutical products typically develop in three major stages. Start-up companies in the research and development stage have few employees in small spaces, approximately 2,000 to 4,000 square feet of a simple shell structure. Easy access to research institutions and proximity to venture capital firms are critical locational factors. The second stage involves clinical trials of developed new products. Many firms at this stage relocate for future growth flexibility. Facilities can vary from 10,000 to 40,000 square feet depending on the specific product. Space requirements for manufacturing, the final stage, can vary from 100,000 to 2,000,000 square feet depending on the viability of the product and the market potential. Manufacturing equipment and structures need to be highly specialized and controlled. Most firms build new, very costly structures as manufacturing facilities; rehabilitation of existing structures is not considered appropriate at this stage. In general, biotech firms in the first two stages like to locate in proximity to other biotech firms. Manufacturing can be done at a remote location, especially if land costs are low. Access to a skilled work force and to air transport can also be important locational criteria depending on the product type.

Several biotech and drug manufacturing firms have located or relocated manufacturing facilities in Solano County. Chiron, based in Emeryville, employs 30 people in its 30,000 square foot first phase Vacaville facility, but owns 51 acres for future expansion. Alza, based in Palo Alto, employs 400 people in its 200,000 square foot Vacaville facility. Applied Biosystems, based in Foster City, has a 40,000 square foot first phase facility in Vacaville, on 15 acres for future expansion. Bio-Rad, based in Hercules, employs 60 people in its 65,000 square foot Benicia facility. Jameson Pharmaceutical and Life Line Nutritional are relocating from Hayward, Burlingame and Ontario to a 100,000 square foot facility in Vacaville that will employ 200 people.

The existing buildings at Mare Island could potentially be used for companies in the start-up and clinical trials phases of development. Companies in the manufacturing phase would generally prefer low-cost developable land. One of the significant concerns for biotech companies considering locating on Mare Island is the danger of environmental contamination on the site.

Film Production. California has been at the center of the U.S. film industry since the 1920s, when the major film studios moved to Hollywood. Hollywood is still a major force in the international film industry, exporting films and television programming all over the world. California has had a significant role in the success of the U.S. film industry. The pool of acting and directing talent is further supplemented by a vast unparalleled network of writers, suppliers, musicians, and technicians. Furthermore, California high technology has contributed toward developing stunning visual effects in films and videos. Film and video production has seen steady growth over the past decades. When measured in constant dollars, California film production in 1991 was well over double its level ten years earlier. Film industry payrolls exceed those of several manufacturing industries, such as computers and aerospace equipment, although these industries have more jobs than the film industry. However, film production generates a significant number of jobs in service industries.

The film industry is concentrated in Los Angeles County, home to 86 percent of California film industry jobs. However, on-site location shooting is an important aspect of the industry. Many production companies have found that cost advantages to out-of-state locations are less than they were once thought to be, especially given the costs of relocating a production crew from exterior locations to studio locations typically only available in Los Angeles. There is a need in the industry for temporary interior studio filming adjacent to exterior shooting locations. These facilities would enable a production company to film all exterior and interior shots within a single geographic area and thus within a compressed time frame. The California Film Commission has created a Location Resource Library to provide a statewide location information network to producers interested in finding such facilities for productions.

San Francisco did not have, until recently, access to a facility that is large enough to be designated as a sound stage for interior filming and set building. As a result of a joint effort between the San Francisco Redevelopment Agency and the San Francisco Film Commission, airplane hangars on Treasure Island are now being marketed as a sound stage. The SFRDA will lease and eventually take over the 20,000 square foot building with 50 foot clear heights and large spans from the Navy, and sublease it to film companies. The Treasure Island studio is being leased to film companies for $30,000 to $40,000 per month, depending on the permanent improvements accomplished by individual production companies. The facility will become a permanent studio for temporary use by individual companies. Location productions generally last four to 10 months at a time.

A film and video studio for temporary shooting requires a 20,000 to 40,000 square foot building with 50 to 70 foot ceilings and large clear spans in direct proximity to a variety of potential exterior shooting locations. Ideally, the facility would be fully outfitted to meet all fire and safety codes, especially as they apply to special effects and pyrotechnics. Other requirements include sufficient parking adjacent to the studio, electrical outlets on the exterior walls of the studio, and proximity to services such as vehicle and equipment rental, and hotels with 24-hour room service at moderate cost. The facility leasing agency should have sufficient liability insurance, $1 million at a minimum. A facility in a remote location, with limited public access can also be an advantage.

The Bay Area is home to a variety of independent film and video production companies, most of which have no facilities of their own and use other firms for a wide variety of services. These companies may also become a temporary local user market for such facilities.

Lucas Film Studios is a large production company with extensive facilities at Lucas Valley Ranch in Marin County. The company will likely need to expand further, and there is limited expansion potential around the existing facilities at the Ranch. Given the proximity of Mare Island to Marin County, this expansion need may offer an opportunity for reuse on the Island.

In summary, Mare Island has facilities that could potentially meet the requirements needed for temporary filming studios. However, similar to the Treasure Island facility, an entity will need to take over responsibility for obtaining insurance, making necessary improvements, and acting as the subleasing agent. In addition, there may be some potential market demand for a permanent production facility.

Conclusions

The residual demand estimate for Solano County indicates that there is enough "pipeline" supply that could be available at competing business/industrial parks to meet projected demand for new industrial/warehouse/office space for at least the next 15 years. Existing supply that is considered re-usable at Mare Island, approximately 2.5 million square feet, represents an increase of approximately 11 percent to the available "pipeline." In order for the existing supply of Mare Island space to be absorbed during the next 12 years, approximately 16 percent of annual demand from the Solano marketplace for these types of spaces would need to be captured. A more rapid absorption would require capturing an even greater share of total market demand, and//or attracting demand from a broader regional, national, and international marketplace.

Mare Island offers several key competitive advantages which could result in substantial capture of future demand, including below market rates for power, the availability of rail and barge access, the presence of numerous reusable buildings, and the availability of a skilled labor force. However, in order to be competitive, Mare Island will need to make its buildings available to the private sector at discounted lease/sale rates. This will be necessary to offset the perceived "remoteness" of the Island for some industries, as well as the need to absorb Mare Island's space rapidly to create new jobs, support building and infrastructure improvements, and provide public services.

Light Industrial, Warehouse, and Office Space: Most of these types of spaces, located in the northern portion of the Island, offer reuse opportunities for warehouse and light industrial users who desire inexpensive space in Solano County. Comparable spaces (e.g., older, large floorplates, rail and barge access) do not exist in the County. Thus, the existing buildings that will be available in Mare Island's northern light industrial area will serve the County's growing economy. However, they face competition for some potential users from space located in Richmond, Oakland, and other older urbanized communities along I-80. To render

Mare Island's space competitive, it must be offered to the marketplace on a price-competitive basis.

A preliminary marketability assessment of individual buildings was conducted for the northern light industrial portion of the Island. Based on that assessment, while numerous structures appear to offer reuse potential, Buildings 617, 621, and 675 are recommended for demolition. In addition, the entire area will require a master site planning effort, to ensure adequate circulation, parking, and site improvements to render the area marketable.

Heavy Industrial Space: As research in this report indicated, there are a variety of heavy industrial users for whom portions of the Island, primarily within the existing CIA, would be attractive. The primary benefit of seeking reuse of CIA facilities in their existing configuration is the potential to create new "basic" industry jobs for residents of Vallejo and surrounding communities. If the facilities are reused for heavy industrial purposes, there will also be secondary economic benefits to area suppliers, business service providers, and local merchants. It should be noted that there are great risks involved in seeking the relatively rare relocating or expanding tenant, especially against a backdrop of a still-recovering state economy and declines in defense-related manufacturing is challenging.

Successful reuse of the existing heavy industrial facilities depends on an intensive, strategic marketing effort as well as the actual terms of the business transactions. Below "market" lease rates and electric power rates, the availability of extensive equipment, the presence of a skilled workforce, and, for some users, the presence of rail and deep water shipping access will all help make Mare Island attractive to the regional, state, national, and international marketplace, offsetting some of the often-cited disadvantages of conducting heavy manufacturing activities in California.

Two of the more modern buildings in the CIA (Buildings 1310 and 126) may also be marketable as "shells"; that is, large multistory structures with high clearspans that can be cleared of existing equipment and reused for new purposes. The film industry as well as certain equipment and chemical manufacturers would consider these spaces desirable, depending on the terms of the lease transaction.

In contrast, a marketability assessment suggested that certain buildings, most notably Buildings 670, 672, 674, 702, and 738 should be demolished to create space for more convenient parking. It is assumed that these buildings have only very limited or no potential for reuse in their current configuration, either due to age, construction type, or intensive fixture improvements for a specific use.

From a disposition standpoint, an intensive marketing effort should commence as soon as possible (see Marketing and Disposition Chapter). If marketing is not successful after an initial three-year period, it is recommended that the Heavy Industrial Area be re-assessed for redevelopment in alternative uses.

4.2.4 Historic Seaport Visitor Attraction

Overview of Existing Facilities and Reuse Concept

Mare Island contains five National Register Historic Districts including the Shipyard Historic District, Shipyard Support District, Naval Ammunition Depot, Hospital District, and U.S. Marine Barracks. Sites and structures within these districts which are National Historic Landmarks include Alden Park, St. Peter's Chapel, and the Classic Revival houses which make up Captains Row.

Many parties involved in reuse planning for Mare Island have suggested setting aside a portion of the Island as an historic seaport district to be operated as one or more visitor attractions. Specific concepts have included reusing Drydock #1 and Drydock #2 (a historic facility completed in 1892) as well as related nearby historic structures to service historic vessels, construct historic replica vessels in public view, and offer an interpretive program on shipbuilding history and technology. In addition, some have suggested a permanent exhibit of at least one major vessel built at Mare Island, such as the USS Vallejo (a nuclear submarine scheduled to be decommissioned in 1996), in drydock or at wharfside.

An historic seaport district operated as a visitor attraction could achieve several benefits including stimulating economic development by attracting visitors to Mare Island and Vallejo, providing a needed Bay Area site for maintenance of historic vessels, creating training/employment opportunities in both historic and modern ship restoration and maintenance, and preserving the history of Naval shipbuilding in the West.

Operating Models: The following discussion provides a review of operating models utilized across the U.S. by similar historical areas with a maritime theme.

- **Public Historical Park.** Examples of this model include the San Francisco National Historical Maritime Museum (Federal), Angel Island State Park (State), and the San Jose Historical Museum (City). Typically, a public historical park operates as a closed district, charging a nominal admission fee. It offers optional self-guided tours and occasional interpretive programs. Museum shops may be outside the gate or rebate admission fee with purchases; gate areas may attract private shops and vendors if commercial sites are available. Such facilities require a large financial base, can face an arduous approval process with many legislative restrictions, and often suffer from uncertain year-to-year funding appropriations.

  This model may be applicable to Mare Island facilities such as Drydock #1, historic shipyard and shipbuilding technology exhibits, and a visitor center.

- **Foundation-Supported Historic District.** This model is exemplified by the Mystic Seaport and Historic Williamsburg. It can be operated as a closed or open district, with strict control of tenant activities by the sponsor. Tenants are considered as paying performers. This model offers the advantage of more freedom to innovate services and exhibits, as well as the ability to attract secondary donors once the initial funding is committed. However, it has the disadvantage of requiring a major donor willing to endow the project and support it for long periods of time. In Mare Island's case, it is not likely that such a sponsor will be available.

- **Public/Private Historic Redevelopment Project.** Examples of this model include Fisherman's Wharf in San Francisco, South Seaport in New York City, Faneuil Hall in Boston, the Inner Harbor in Baltimore, and Old Town in Sacramento. This model is typically a district open to the public, with some developer-sponsored exhibits and promotions. Most attractions are operated by individual tenants on profit-seeking basis. This model has the advantage of attracting funding from private investors/developers. However, the project must demonstrate an ability to generate positive cash flow and produce a return on public or private investment. This model works best with a commercial development project. The disadvantage of this model is that the public sponsor (often a city or redevelopment agency) must absorb financial losses in case of failure. The market for this model is limited in the case of Mare Island, but may be applicable to the historic residences and the chapel.

- **Commercially Operated Visitor Attraction.** Examples of this model include the Winchester Mystery House in San Jose, as well as numerous historic bed and breakfast inns throughout the country. This model is typically a closed facility which charges a market level tariff or admission fee. Such attractions are run by a single operator with a large staff and usually do not permit concessions. Attractions are generally focused on entertainment, and often provide a tightly choreographed program with a mandatory tour. Operators commonly promote aggressive food and gift sales. The principal advantage of this type of use is that it can be self-supporting and does not require high-quality resources. The disadvantage is the high risk involved. The success of such an enterprise depends heavily on the operator's entrepreneurial skill and showmanship. This model works best with small-scale, easily-managed facilities and is more appropriate for individual properties within and surrounding an historic district. This model is not recommended for the major Historical Park elements on Mare Island.

Market Demand and Supply

The primary market area of the proposed Mare Island Historic Seaport District would encompass the greater San Francisco Bay Area, Solano, Yolo and Sacramento Counties. Three maritime history museums and one commercial maritime exhibit already serve this area:

- **San Francisco National Historical Maritime Museum** - This museum, operated by the National Park Service, highlights California civilian maritime history. It includes an exhibit of six large historic ships at Hyde Street Pier, which had 157,148 visitors in 1993. The combined attendance of Hyde Street Pier, the USS Jeremiah O'Brien, and the Museum building itself is approximately 250,000 annually. Adult admission is $3.00.

- **USS Pampanito.** This is the only submarine on display in the Bay Area; it is located on Pier 45 on the San Francisco waterfront, adjacent to Pier 39 (a visitor attraction) and Pier 43 (a landing site for commuter and tourist ferries). The USS Pampanito attracts approximately 200,000 visitors per year and charges $4.00 for admission.

- **Treasure Island Museum** - This facility, located on a Naval base in the middle of San Francisco Bay that is scheduled for closure, and contains exhibits of Navy/Marine Corps Pacific operations, and Bay Bridge and China Clipper history. Annual attendance is approximately 30,000, and admission is free.

- **Vallejo Naval & Historical Museum** - This facility, located in downtown Vallejo, showcases Mare Island Naval Shipyard history. It has annual attendance of 15,000, and charges adults $1.50 admission.

The supply of major maritime history exhibits in the market area has been static since 1988, when Hyde Street Pier (now a part of the San Francisco National Historical Maritime Museum) opened. Trends in attendance have been static or declining since the onset of the recession; attendance figures for Hyde Street Pier peaked at 192,000 in 1990 and have subsequently remained below 170,000.

There are a large number of other historical museums, railroad and aircraft museums, historic districts and periodic living history events in the market area, most of which attract fewer than 50,000 visitors a year and consume large capital and operating subsidies. A few are popular history-oriented visitor attractions, notably the Renaissance Pleasure Faire and the Winchester Mystery House (estimated at over 500,000 per year, with a $13 adult admission charge).

Expressions of Interest: Both Federal maritime museums in the Bay Area have space needs which could be satisfied within portions of the proposed Mare Island Historical Park. The San Francisco National Historical Maritime Museum has an immediate need for drydock and wood shop space in order to service historic vessels docked in San Francisco. The Treasure Island Museum may need to relocate due to the impending base closure. Depending upon the reuse plan, the Museum may need to relocate.

The Living History Centre, a non-profit organization which produces the Renaissance Pleasure Faire and other history oriented periodic events, has expressed interest in leasing a large, high-ceiling warehouse on Mare Island.

The scope of the Mare Island Historical Park will overlap with that of the Vallejo Naval & Historical Museum, so it is important that exhibits and operations be planned to complement each other.

Conclusions

Based on the above expressions of interest, known models of operations, and market demand for maritime-related historical districts in the Bay Area, a Historic Seaport District could result in a truly unique attraction. It is recommended that the Historic Seaport District have two major components: a National or State Historical Park and a separate portion to be operated by individual businesses or institutions subject to Historic Landmark regulations.

The National or State Historical Park would be organized around educational and research functions such as exhibition of historic vessels, equipment, and buildings; demonstration of shipbuilding craft and technology; exhibition of shipbuilding history (especially Mare Island history); presentations of living history and other interpretive events; and archival and publication activities. Facilities needed to support the Park include a working drydock, workshop, warehouse and marshaling area; vessel exhibit areas: drydock, building way or wharfside; a visitor center with interpretive exhibit and retail areas, food service, restrooms, and parking; collection and archive storage; research and curation areas; and parking for normal weekend (500-1,000) and peak (1,500-2,000) demands.

At full operation, the Historical Park could attract up to 75,000 to 100,000 visitors annually, which could support 1,500 to 2,000 square feet of retail and food services.

The Park should be organized so that it can attract tenants to provide financial support. Potential tenants include industrial users such as historic vessel maintenance contractors (to service San Francisco Maritime Museum vessels). It is likely that these contractor(s) will also desire to provide maintenance services to modern ferries, tugs, and workboats; there is sufficient on-going market demand for such services in the Bay Area. Other potential tenants include historic waterfront and wetlands boat tours and dinner cruises.

In addition to the Park itself, adjacent areas of historical significance could be operated independently for lodging or institutional purposes. It is likely that these buildings will be leased by private businesses, and leases should stipulate operation in a manner that enhances the Historic District as a whole.

The Historical Seaport District will require a managing entity to finance and control overall development and operations. Examples of such entities include the National Park Service, US Navy, California Department of Parks & Recreation, or the Vallejo Naval & Historical

Museum. The Park will also need a community-based organization to provide volunteer support, community liaison and supplemental fund-raising; examples include the Vallejo Naval & Historical Museum and the National Maritime Museum Association. Other operating entities could occupy leaseholds within the Historical Park. Such long-term tenants and exhibitors could include the San Francisco National Historical Maritime Museum, the Treasure Island Museum, the Vallejo Naval & Historical Museum, and Living History Centre.

Like most historical attractions of its kind and size, the Mare Island Historical Park is expected to recover only a small percentage of its operating costs in the form of fees, concessions and other direct revenues. Both capital costs and operations will therefore require subsidies. The prospective benefits of a Historic District to the overall base reuse, the city and the regional economy, appear to justify further planning and development effort by the City. The ultimate feasibility of the Park, however, will depend upon its ability to attract Federal or State sponsorship. Prerequisites for such sponsorship will be a persuasive development plan and a strong showing of community, institutional, and legislative support .

4.2.5 Residential

Overview of Existing Facilities and Reuse Concept

Mare Island currently contains 483 residential units on-site, including 52 single family units and 431 multifamily units. Twenty-one of the single family units, located in the historic district of the Island, are large houses built in a 19th Century Classic Revival style. The remaining single family homes are located in the Farragut Village area and on the southern end of the Island. The 431 multifamily units, concentrated in Farragut Village and Coral Sea Village, consist primarily of duplexes with some garden apartments. The Island also contains approximately 1,500 dormitory beds in 12 buildings. The off-site Roosevelt Terrace housing complex, located at the intersection of Highway 37 and Sacramento Street, has another 600 small multifamily units also available for reuse.

In addition to the available housing stock, Mare Island offers several amenities which render it suitable for long-term housing reuse and new housing development. Portions of the Island offer scenic views of the City of Vallejo and San Francisco Bay. Both a recently constructed elementary school and a day care facility are conveniently located on the Island. Convenience shopping opportunities are also available, and the Island offers abundant active and passive recreational opportunities including golf, swimming, and tennis (see following sections of this Market Analysis for discussion of recreational facilities' future disposition).

A variety of reuse concepts have been proposed for the existing residential housing stock on Mare Island. Travis Air Force Base, which is facing growth in its associated personnel, has expressed preliminary interest in occupancy of 400 out of the 431 multifamily units on Mare Island. The historic single family units offer opportunities for reuse by new residents, for conversion to bed and breakfast lodging to complement visitor attractions, or as small offices. The other single family homes also offer opportunities for reuse by civilian occupants.

Table 4-2: Residential Demand

	1994-1995		1995-2000		2000-2005		2005-2010		Total, 1994-2010	
Total Units Demanded	555		3,620		985		645		5,805	
Single Family Detached	375		2,430		660		430		3,895	
Multifamily (a)	180		1,190		325		215		1,910	
	Owner	**Renter**	**Owner**	**Renter**	**Owner**	**Renter**	**Owner**	**Renter**	**Owner**	**Renter**
Total by Tenure	345	210	2,240	1,380	610	375	395	250	3,590	2,215
By Unit Type & Tenure	**Owner**	**Renter**	**Owner**	**Renter**	**Owner**	**Renter**	**Owner**	**Renter**	**Owner**	**Renter**
Single Family Detached	310	65	2,020	410	550	110	355	75	3,235	660
Multifamily (a)	35	145	220	970	60	265	40	175	355	1,555

Notes:
Demand estimated by taking ABAG projected households and applying to tenure/housing mix derived from 1980 and 1990 Censuses.

(a) For this table multifamily is defined to include single-family attached units.

Sources: Bay Area Economics, based on data from the Association of Bay Area Governments, and the 1980 and 1990 U.S. Census.

Certain dormitory facilities may be convertible to other uses such as live/work units, student housing, or office space, while other dormitory buildings are likely not marketable and will need to be demolished. Most of the units at Roosevelt Terrace are likely not reusable in their current state, but could potentially be rehabilitated and combined into larger, more marketable mixed-income housing.

New housing development concepts have also been proposed, including 20 unit per acre for-sale multifamily housing on the level portions of the southern end of the Island.

Market Demand and Supply

This section forecasts future Vallejo housing demand and evaluates existing and planned competitive supply in Vallejo to gauge the potential demand for Mare Island's existing housing stock as well as for new housing development opportunities.

The Association of Bay Area Governments (ABAG) provides projections of overall household growth for counties and cities in the nine-county Bay region. Projected growth in number of households for the City of Vallejo between 1994 and 2010 is estimated at 5,805 units (see Table 4-2), with a majority of this growth (4,175 units) occurring before 2000.

An analysis of this future Vallejo housing demand by tenure, based on historic tenure patterns indicates demand for 3,235 owner-occupied single family detached units. To meet this future demand, approximately 1,000 single family units have been approved for development in the City of Vallejo, but have not yet been built. In addition, two large projects, Sky Valley and Glen Cove Landing, contain 2,200 approved single family units that have not been built due to litigation and/or foreclosure by the Resolution Trust Corporation (RTC). Thus, the pipeline of approved single family units approaches the demand estimate for this product type for the next fifteen years. Unless Mare Island could provide a single family product type that differs substantially from the range of single family housing planned for Vallejo it is likely that demand for single family housing at Mare Island will be very limited during the foreseeable future.

A similar demand estimate made for for-sale multifamily housing (e.g., townhouse or condominium) units indicates demand for 255 units to the year 2000. A review of current and planned for-sale multifamily supply (see Appendix D) indicates more than 360 new unsold units of this type currently available within Vallejo; 290 units of this standing inventory are scheduled to be auctioned in spring/summer 1994. Prices for available for-sale multifamily housing range from under $75,000 for one-bedroom units, under $100,000 for two-bedroom units, and $150,000 to $170,000 for three- to four-bedroom units (see Appendix 4-D). In addition to the available unsold inventory, there are 650 units that have been approved and not built; however, most of these units are located in Sky Valley, a partially constructed project that is currently in litigation.

The strongest unmet demand for new housing units will arise from renter households, which will need an additional 1,555 multifamily units between 1994 and the year 2010. Demand for 1,115 of these units will occur before the year 2000. A survey of recently built apartment projects in Vallejo (see Appendix 4-D) indicates that the market is currently experiencing relatively low vacancy rates (under five percent). Rents for newer Vallejo units range from about $700 per month for one-bedroom units to $850 per month for two-bedroom units. There is no known pipeline of planned or approved but not built apartment units in Vallejo; this situation echoes the experience of many California communities which saw a dramatic decline in new apartment construction following the 1986 Tax Reform Act, which eliminated most tax benefits for rental property, making new construction of apartment units economically unfeasible in most California locations. Mare Island, through its existing housing stock, offers the opportunity to rehabilitate substantial numbers of existing units. This opportunity, coupled with strong unmet demand, indicates that the reuse potential of much of the Island's (and Roosevelt Terrace's) existing stock is favorable.

Conclusions

The outlook for existing multifamily housing stock at Mare Island is favorable for conversion to market rate rental housing, assuming that the units can be economically rehabilitated. It is recommended that all multifamily units (including dormitory housing) be considered for conversion to rental housing if Travis does not absorb them through its request.

The 31 units of non-historic single family housing, due to their limited numbers, should be marketable for sale. Finally, the 21 units of historic housing, well-located in the central part of the Island, offer opportunities for sale to private residents or for reuse as lodging facilities associated with the recommended Historic Park (see related discussion).

With respect to new housing development on Mare Island, the outlook for multifamily for-sale housing, which was recommended for development in substantial numbers at relatively dense (20 units/acre) configurations in the ULI Panel report, appears to be limited in the near term due to substantial unsold inventory and planned supply elsewhere in Vallejo. It is recommended that new multifamily for-sale housing development be considered as a long-term opportunity (after 2006), and that it be located along the finger piers at the southeastern part of the Island as part of a mixed-use marina village concept. This concept will enhance marketability of these new units, as it will incorporate a marina ambiance into the project. Further, in keeping with the predominately single family character of the Vallejo marketplace, it is recommended that the new units be configured at densities of eight to 15 units per acre, enabling substantial portions of the new project to be constructed as townhouses to enhance marketability. If this approach is taken, the for-sale multifamily units should achieve sale prices in excess of those currently found in the Vallejo marketplace.

While the proposed concept of new luxury single family homes around the golf course offers the potential for revenue generation to the City in the form of future land sales, it is not recommended for consideration in the Final Reuse Plan for several reasons. First, research by

EDAW suggested that expansion of the golf course from nine to 18 holes (which would be needed to make the homes marketable) will likely preclude the creation of buildable homesites due to lack of space. Secondly, if such a development were physically and environmental feasible, it would most likely require the golf course to be operated on a private basis, making it inaccessible to residents of Vallejo.

4.2.6 Recreational Facilities

Mare Island presently contains a wide variety of active and passive recreational facilities including a rifle range, a nine-hole golf course, several indoor and outdoor recreational complexes, and finger piers with reuse potential as a recreational marina. In general, reuse concepts for the active recreational facilities have focused on attracting public and private operators, and making the facilities available for Island occupants, residents of Vallejo, and/or the regional population. The marina concept was advanced in the ULI Plan as a centerpiece of a mixed-use new development project with primarily a multifamily residential orientation.

The following discusses each of these facilities in terms of its reuse concept, market demand and supply factors, and conclusions regarding reuse and/or new development opportunities.

Rifle Range

The Mare Island Rifle Range complex consists of a 600-yard long rifle range and 14 shorter ranges, plus a small unheated classroom building, storage sheds, and two observation towers. The facility is frequently used without charge for law enforcement training when not needed for military training. The Rifle Range has been proposed for reuse as a civilian rifle range as a facility available for law enforcement training conducted by three community college criminal justice departments (Napa, Santa Rosa and Los Medanos Community Colleges), and as a redeveloped active recreational facility (e.g., baseball and soccer fields) to serve the Vallejo community.

A review of potential revenues and probable operating expenses for the rifle range indicates that a non-profit operation of the facility may be financially self-supporting. But, conversion of nearby residential units to occupancy by civilians may not be compatible with a rifle range having weekend hours, the time when civilians would be most likely to use the facility. Since the financial and residential compatibility aspects of the ranges's use is subjective, in the short term (up to 3 years), the use of the present rifle and pistol range should be continued. During the three year period, the range operators will develop a plan and financing to move the range to the southwest part of the Island. Upon relocation of the rifle range, recommended use of this area will be for other developed recreation, such as play fields or other facilities.

Golf Course

Mare Island currently contains a nine-hole golf course located on the southern portion of the Island. Current levels of use are approximately 40,000 to 50,000 rounds per year, with fees ranging from $5 per round for active duty to $8 for guests. Current golf course revenues total $575,000, and operating costs about $400,000. The Farragut Inn, which serves as a golf course amenity, is used for social events and currently grosses about $1.2 million in revenue from catering weddings and parties.

There are several opportunities and constraints which should be noted regarding the golf course. Plans drawn up by GolfPlan Associates of Santa Rosa in the late 1970s indicated that expansion of the Mare Island golf course to 18 holes would be feasible from a physical standpoint.

In order to gauge the potential demand for a new public course on Mare Island, a market analysis involving definition of the market area, evaluation of existing and planned supply, and forecast of demand was conducted. For this analysis, the primary market area for golf courses is defined as Vallejo, Fairfield, Suisun City, and Benicia in Solano County, Sonoma city and rural Sonoma County, Novato in Marin County, Napa and American Canyon in Napa County, and Rodeo, Crockett, Hercules, Pinole, and Martinez in Contra Costa County.

There are a total of 15 courses in the primary market area varying between 9 holes and 36 holes. Eight of the courses (all open to the public) existing in the market area were surveyed for this study (see Appendix 4-E). The service radius for the surveyed courses ranged from 50 to 100 miles. Green fees for the 18-hole courses ranged from $13 to $55 on weekdays and $16 to $70 on weekends. Demand in the market area, as measured by number of annual rounds, has been strong. Annual rounds for an 18-hole course varied from 33,000 at Los Arroyos Golf in Sonoma to 135,000 at the Green Tree Golf Course in Vacaville. There are two additional 18-hole courses planned or underway in the market area, one at Blue Rock Springs in Vallejo, and an Arnold Palmer Signature 18-hole course at Sky Valley in Vallejo. The Sky Valley course is still under construction, although the residential community which was designed to surround it is locked in litigation and has not been built.

According to the National Golf Foundation (NGF), an average of 23,000 people supports each golf course in the U.S. However, the population base needed to support a viable 18-hole course can range from 23,000 to 30,000 residents. Based on estimated 1995 population for the primary market area (see Table 4-3) and the conservative end of the demand factor range, the market area will be able to support up to four courses in addition to the existing and currently planned courses. As population continues to increase in Vallejo and surrounding communities, golf course demand is will also grow.

Thus, demand for the existing as well as an expanded public course at Mare Island appears to be strong, and is recommended for interim leasing during the near-term (before 1996) to the IDC.

Table 4-3: Golf Course Demand

TOTAL 1995 MARKET AREA POPULATION (a)	556,000
Population per Course (b)	30,000
Gross Golf Courses Demanded	18.5
Existing Golf Courses (c)	13.5
Planned Courses (c) (d)	2
Additional 18-Hole Golf Courses Demanded	3

(a) Market Area includes the following areas as defined by ABAG:

Solano County	
Vallejo	125,300
Fairfield	95,000
Suisun City	27,200
Benicia	28,700
Sonoma County	
Sonoma	9,200
Rural Sonoma Valley	30,600
Marin County	
Novato	56,000
Napa County	
American Canyon	8,900
Napa	72,600
Contra Costa County	
Rodeo-Crockett	12,100
Hercules	19,900
Pinole	28,200
Martinez	42,300

(b) from Urban Land Institute.
(c) Existing courses converted to 18-hole equivalents.
(d) See Appendix E.

Sources: Bay Area Economics; ABAG *Projections '94;* Urban Land Institute.

It is anticipated that an operator would be able to pay approximately $300,000 per year for a ground lease for the golf course, minus the amortized cost of improvements (if paid by the operator) to expand the existing nine-hole course to 18 holes. This estimate is based on review of a similar ground lease from the City of Walnut Creek to an operator for an 18-hole course.

Marina

Like all marinas in the region, Vallejo's existing marina currently has a high vacancy rate because of a region-wide softness in the marina slip market. A Mare Island marina development should therefore be considered as a long-term opportunity, and should be developed in connection with new land-based development.

Most marinas cannot be expected to generate significant profits unless their capital costs are very small. However, when they are developed as part of larger projects such as marina-oriented residential development, they can be considered an amenity whose cost can be recouped in the form of a premium on residential unit sale prices/rents.

There is space between the finger piers on Mare Island for up to 400 berths in a conventional comb-shaped floating dock arrangement. Given a surplus of space (see below), a more flexible, attractive, and economical arrangement would be to install floating docks with power, water and lighting alongside the finger piers so that boats of different lengths can be moored bow to stern. Approximately 160 boats could be moored at the finger piers in this configuration, and the layout could be densified later if sufficient demand emerges.

While conventional marinas cost up to $30,000 per berth (Vallejo Marina, Unit 2, 1991), for the concept described above, without showers, laundry, harbor office or bathrooms and with the use of existing concrete finger piers for vehicular access and lateral support of the floating docks, gross costs of $10,000 per berth are assumed. It is assumed the $800,000 capital cost would be funded by the residential development, which would be justified economically if it adds $1,200 per housing unit to market value.

Operating and maintenance costs other than dredging and fuel purchased for resale average $900 per berth at Vallejo Marina and should be similar here, totalling $72,000. Dredging at $2.50 per cubic yard would add costs of $100,000 per year.

Rental rates for new, good quality berths in the Vallejo-Benicia area are now $5.00 to $5.50 per foot per month. Assuming an average length of 40 feet, revenues would be $230,000 per year gross and $58,400 per year net at full occupancy. Net operating revenues would be negative below 75 percent occupancy. The marina therefore does not appear able to support a significant ground lease payment.

In conclusion, a small private marina is recommended as a value-enhancing adjunct to residential development with the understanding that high vacancies may be experienced initially due to the large surplus of marina berths in the area. An initial unit of 80 berths, using two of the four basins, should be ample to meet island resident demand. A marina this small cannot support a full-time staff is proposed to be managed by the same entity as the housing.

Parks and Recreational Facilities

Mare Island contains numerous indoor and outdoor recreational facilities including 27 acres of parks and playing fields, and 249,000 square feet of indoor recreation space with 900-seat theaters, swimming pools, gymnasiums, racquetball courts and fitness centers (housed primarily in Rodman and Owen Centers). A unique historic feature of the Island, Alden Park, contains a collection of exotic plants from around the world. Other facilities include a field house saddle club, a hobby shop, substantial open space in the "Hill" area, and numerous wetland areas along the southern and western portions of the Island.

The total of all outdoor and indoor recreational facilities represents a surplus for expected future Island resident and worker populations. However, there is a regional need for additional parks and playing fields.

Proposed reuse concepts have included extensive preservation of existing Alden Park, development of new public parks, and preservation of open space, including the Hill Park (approximately 150 acres). Proposals have also been made for development of Pier 35 for public fishing, maintenance of the existing equestrian center, and open space use of existing wetlands. Rodman Center has been proposed for retention as a public recreation facility.

A new outdoor recreation-sports complex has also been suggested to meet region-wide needs. Additionally, wetland restoration and habitat improvement projects have been proposed, which can not only provide open spaces for the Island and the region, but may serve as a source of mitigation offsets for development elsewhere on the Island.

Many of these reuse proposals complement other existing and planned development envisioned for the Island. It should be noted, however, that meeting Island and regional recreational needs will probably not create revenue-generating uses; reuse of the recreational facilities and new sports development should be carefully balanced against financial viability of the Island as whole.

4.2.7 Educational Facilities

Overview of Existing Facilities and Reuse Concept

Mare Island currently contains the Combat Systems Technical Schools Command, housed in a variety of historic and non-historic structures totalling 477,500 square feet. This campus-style facility contains classrooms, meeting rooms, office space, and limited dormitory facilities in an attractively landscaped setting.

Reuse concepts proposed for the educational facilities have included attraction of a university extension, private college, vocational school, or consortium of secondary educational institutions. In addition, the following concepts have been considered for this report:

- **Corporate Training** - A number of private corporations in the Bay Area utilize training facilities for skill improvement and enhancement.

- **Union Training** - Labor organizations offer training classes in leased facilities and sites for members in Northern and Southern California. They also sponsor youth training programs. In another example, the Oregon, S.W. Washington, Utah, and Southern Idaho Laborers Training Trust, in cooperation with the Associated General Contractors, has reused the former Adair Air Force Station at Corvallis, Oregon to continuously retrain and certify nearly 1,200 highly skilled construction workers in the Pacific Northwest every year. Mare Island presents an attractive opportunity for such training facilities.

- **Research** - A major educational institution can utilize the current facilities for research. In addition, the Mare Island ecosystem provides an unparalleled opportunity to investigate the effects of contaminants on wetlands. The Island encompasses over 3,000 acres of wetlands, with partial contamination as well as habitats for a variety of endangered species. The contamination also makes Mare Island an ideal field site for the application of environmental remediation technologies developed by research institutions and industry.

Market Demand and Supply

Overall growth trends for institutions of higher education (e.g., universities, colleges, and community colleges) for California suggest that future market demand may be experienced for an educational facility on Mare Island. From 1988 to 1990, enrollment at these institutions in California increased only about one percent, from 1.754 to 1.77 million. Several universities in California, although currently experiencing shortages in operating funds, have embarked on long-term campus expansion; the University of California is proceeding with a Central Valley campus planning effort, and California State University is conducting preliminary campus planning for a new facility on the site of Fort Ord in Monterey County. In addition, U.C. San Francisco is currently seeking additional laboratory space (albeit within the borders of the City of San Francisco), and the U.C. Berkeley campus continues to complete new building construction at its Berkeley site. Due to expected increases in statewide population, it is anticipated that institutions of higher education will expand over the long term.

Expressions of Interest: Several educational institutions have expressed interest in reusing the Combat Systems facility. A consortium of education institutions have proposed a collaborative Mare Island Collage and University Center on Mare Island. As a component of the consortium's efforts, U.C. California at Davis (UCD)is proposing to establish a University of California Mare Island Research Site (UCMIRS) to support basic and applied research in wetlands ecosystems, environmental toxicology, materials science, genetic engineering, and environmental remediation technologies. The University is also interested in potential collaboration with industry in the areas of areas of environmentally-sensitive electroplating, polymer science and technology, biotechnology, and environmental remediation.

UCD is interested in Mare Island because of the presence of equipment and buildings, access to tidal and non-tidal wetlands, and the proximity of the site to the region's existing education and research communities. The overall approach to building UCMIRS programs would be through individual investigators securing funding for specific research projects. UCD anticipates that its initial infrastructure needs will be minimal; additional infrastructure would be developed as needed.

Conclusions

Although the ideal reuse of Mare Island's educational facilities may be as a university or college campus, the number and financial shortages facing existing educational institutions in the Bay Area will probably limit this possibility. In the short term however, the Mare Island College and University Center provides an opportunity to develop an educational presence on Mare Island.

The consortium of public education institutions, unions, and specialized research facilities which focus on unique attributes of Mare Island, such as that proposed by UCD, represent a more feasible education-related reuse option. The proposed educational facility would dovetail with other training and re-education activities which could take place on the Island, spurring future collaboration with private industry.

Other corporate and union training facilities, such as those described above, also will likely be attracted to Mare Island facilities, provided costs to rehabilitate the structures do not exceed purchase or lease opportunities available elsewhere.

4.2.8 Retail

Overview of Existing Facilities and Reuse Concept

Mare Island currently contains approximately 125,000 square feet of retail space, including the Navy Exchange, the Commissary, a McDonald's, the Farragut Inn, a gas station, Destinations (an entertainment and travel service), and related retail designed to serve on- and off-base personnel. The retail facilities are concentrated on the northern end of the Island, and are not well-located to serve existing housing units at Farragut and Coral Sea Villages.

Proposals for retail space have included retaining all existing retail as well as adding retail uses to serve visitors to the historic district, and future residents of the southern part of the Island. Region-serving retail has also been suggested.

The following describes the expected viability of both region-serving and local-serving retail facilities.

Market Demand and Supply

The market demand and supply analysis for retail reuse and new development opportunities on Mare Island involved exploration of both region-serving and local-serving retail. Region-serving retail depends on attracting shoppers from a 20 minute or greater distance, and typically involves comparison or value-priced shopping goods. Local-serving, which offers convenience goods and services such as groceries, hardware, and dry cleaners, generally serves a much smaller market area; in this case, local-serving retail is defined as the retail facilities need to support only the residents, workers, and visitors to the Island at buildout.

Regional Retail Market Analysis: There are three regional malls within a 20-mile radius/25 minute drive from Mare Island which serve southern Solano County and northern Contra Costa County: Hilltop Mall in Richmond; Sun Valley Mall in Concord; and Solano Mall in Fairfield. Each mall is anchored by four or five department stores and has between 130 and 150 retail tenants. Regional malls such as these typically require at least a 250,000 person base within a 20 mile radius. With three malls available, the market area appears to be sufficiently served.

Value-oriented retailers have mushroomed in recent years in Solano County. In Vallejo, these retailers include Wal-Mart, Home Depot, Target, and Costco (which is undergoing expansion). Wal-Mart, Price Club, Toys "R" Us, Home Depot, Target, and K Mart are located nearby in Fairfield. Vacaville provides a competing concentration of value-oriented retail market with the Factory Stores at the Nut Tree, Power Plaza, and Vacaville Commons; these three centers contain 150 retail outlets with major tenants such as Wal-Mart, Sam's Club, Target, Mervyn's and Ross. Proposed expansion of the Factory Stores at the Nut Tree will add 125,000 square feet of retail space between 1994 and 1998. There appears to be an abundance of established value-oriented shopping facilities serving the market area which Mare Island would also serve.

Both regional malls and value-oriented shopping centers require easy access (and preferably visibility) to major freeways. Since Mare Island does not offer sufficient access, it is not considered as a suitable site for these types of region-serving retail development.

Local-Serving Retail Market Analysis: In contrast to the unsuitability of Mare Island for region-serving retail, its future ability to serve local retail demands from residents, employees, and visitors will be critical to the market acceptance of non-retail uses on the Island. In the first period of reuse, 1994 through 1996, it is anticipated that retail facilities will be needed to serve primarily the new employees in the North Light Industry and Heavy Industry Subareas, as well as limited retail to serve residents associated with Travis AFB. Between 1996 and 2006, as leasing and sales of property accelerate following base closure, retail will need to be available to serve visitors the Historic District and newly added industrial, office, warehouse, and education-related employees. Finally, between 2006 and buildout (estimated at 2026), additional retail will need to be constructed at the southern end of the Island to serve expected new residents of the Marina Village Subarea.

Based on a review of estimated buildout population, employment, and visitors, it is estimated that total retail expenditures on Mare Island will be approximately $17 million per year. This expenditure will support approximately 200,700 square feet of retail and restaurant space.

To provide this space, Mare Island has been planned to contain three retail concentrations in the form of small convenience retail shopping facilities. The first will be located at the Navy Exchange building at the northern end of the Island, which is already configured as a 21,000 square foot shopping center. In addition, the "Destinations" building is recommended for conversion to a restaurant facility, so that new business coming to the North Light Industry Subarea have adequate lunch and dinner facilities.

The second concentration is recommended to be located so that convenient access is available to both Farragut Village and the Historic District; this 40,000 square foot facility will likely be located in a rehabilitated existing structure. This shopping facility should offer convenience grocery, take-out food, personal services, and visitor-oriented retail (e.g., small gift shop).

The third concentration is recommended for eventual construction as a 40,000 square foot facility in the new Marina Village. This shopping center will feature personal services, convenience retail, take-out food, restaurant, and marina-related items.

In addition to these three shopping centers, retention of the McDonald's and the Officer's Club are recommended. Both of these facilities offer a range of food service, and the Officer's Club is capable of holding banquets and special events.

Perhaps the most difficult type of local-serving retail to provide in new communities such as Mare Island is supermarkets. While the Island currently contains a supermarket, it serves a much larger population base than currently resides on the Island; military-sponsored commissaries typically provide grocery store goods to retired personnel as well as off-base active duty personnel. At buildout, Mare Island's residential population is estimated at only 5,175, far below the level needed to support a full service grocery store. Most modern full-service supermarkets are designed to serve a population base of 10,000 to 40,000 within a one-mile radius. Because there are mainland full service grocery stores available to serve Mare Island residents, such a facility is not recommended for location on the Island. Instead, the three shopping facilities described above are expected to contain small grocery stores that can meet day-to-day grocery needs; for major food purchases, residents will need to travel off the Island.

4.3 REFINED REUSE PLAN

Based on the market analysis described above, the City and Consultants assessed the marketability of certain individual buildings as well as existing and newly created (due to recommended demolition) development opportunities. The City and Consultants then formulated conceptual market-driven subareas in order to formulate the Final Reuse Plan, as described below and shown in Figure 4-1.

Following the subarea conceptualization process, assumptions regarding total square feet of reusable buildings, total acreage of new development sites, and total square feet of demolition were made. These aggregated building space and acreage assumptions, as well as the anticipated timing of absorption, are described in summary form in Section 4.3.2.

4.3.1 Recommendations for Subareas

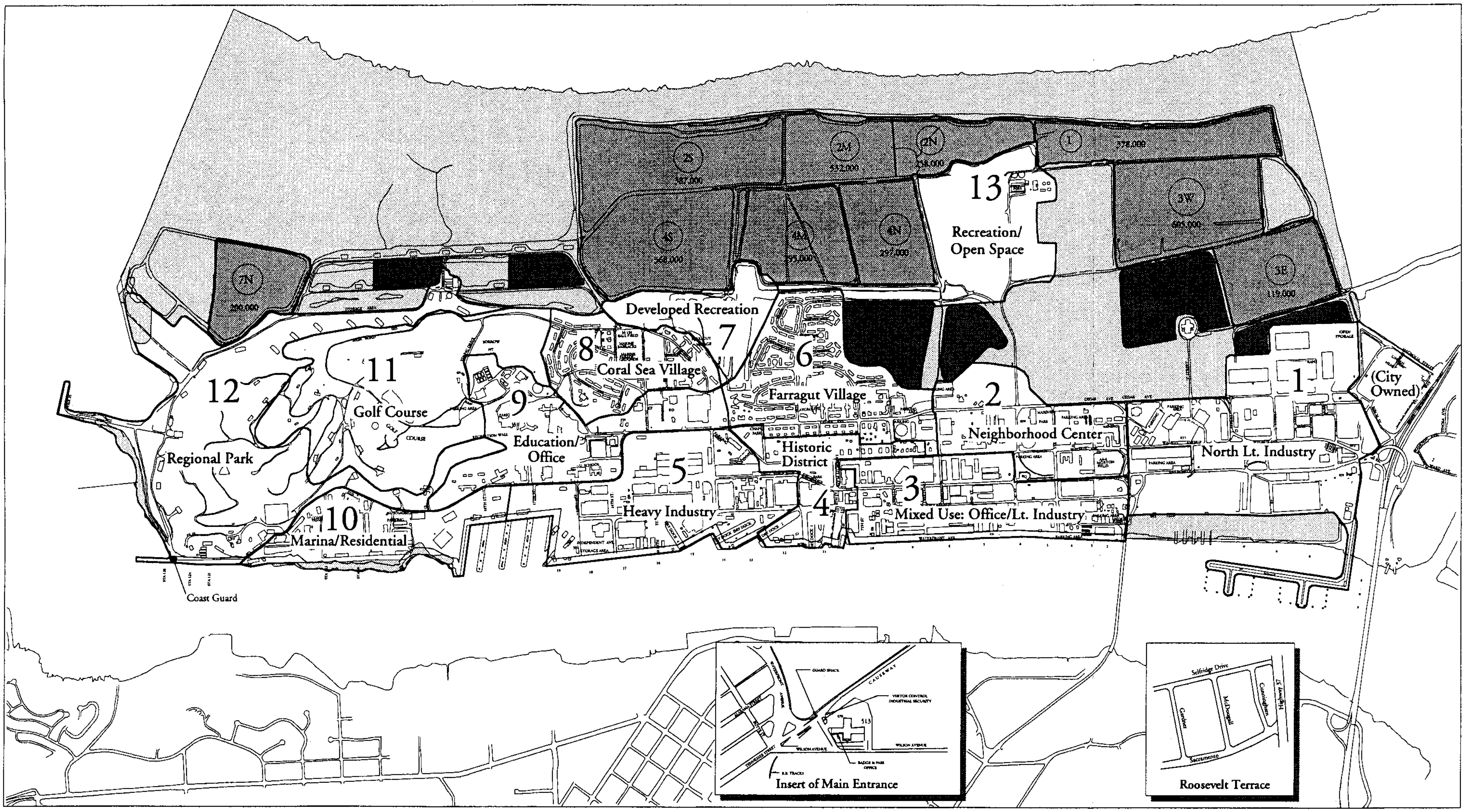
The following subareas are described in numerical order as they appear in Figure 4-1.

Subarea 1: North Light Industry

This area, which currently contains a mixture of industrial, warehouse, retail, and limited residential structures, offers substantial near-term (1994 to 1996) and longer-term opportunities. In combination, this area represents an opportunity to create an industrial park with the competitive advantage of a strategic location at Highway 37. The industrial park would be general purpose, targeted to primarily light industrial and warehouse users located elsewhere in Northern California.

Many of the existing buildings are considered reusable, and would likely experience moderate to strong market demand if rents/sale prices are competitive. A specific listing of the industrial/warehouse structures considered marketable is included in Appendix 4-G. In addition, it is recommended that the 21,000 square foot Navy Exchange retail facility be maintained to provide local-serving retail such as dry cleaning, deli, and a convenience store. These facilities will enhance the marketability of the industrial park. It should be noted that the existing Navy Commissary is recommended for retention, but for reuse as a light industrial building rather than a supermarket. This recommendation is made due to the expected lack of sufficient market support for an on-site grocery store.

For those buildings deemed not marketable, demolition is recommended, freeing up approximately 65 acres for new industrial/warehouse/office development over the long-term (beyond 2006). A fine-grained site planning effort for the entire North Light Industry subarea



1 Reuse Area

Wetlands/Open Space

Active Dredge Ponds

Inactive Dredge Ponds

Mare Island Final Reuse Plan

Figure 4-1

should also be conducted early in the conversion process, so that appropriately-placed parking, open space, and landscaping can be provided, especially for those structures made available for interim leasing.

Due to the expected near-term marketability of portions of this subarea, it is recommended that this area be given high priority for Navy environmental clean-up activities.

Subarea 2: Neighborhood Center

This subarea contains several key indoor recreational facilities as well as a mixture of office and business service-type facilities. It is recommended that this area be considered as mixed-use, providing opportunities to live, work, and shop in a pedestrian-oriented district. Except for near-term reuse of the Rodman and Field House recreational complexes, this subarea is considered a long-term opportunity (i.e., after 2006). It will include a 40,000 square foot local-serving retail center to be located in a renovated existing building. This retail center will serve residents and workers within this subarea, as well as visitors to the adjacent Historic District and residents of the nearby residential villages.

It is anticipated that substantial demolition and replacement new construction will occur in this subarea. It is recommended that this subarea be given a low priority for environmental clean-up, except for the two recreational complexes.

Subarea 3: Mixed Use Office/Light Industry

This subarea represents a challenge for reuse. It currently contains a mixture of historic and non-historic industrial and office buildings with primarily a waterfront orientation. It is assumed that buildings in this area could be subdivided and converted to facilities for small business or business incubators. Possible artists loft opportunities also are present in this subarea. Models for the kinds of activities envisioned are areas of South of Market in San Francisco and West Berkeley, where enterprising building owners have subdivided historic and non-historic buildings of primarily an industrial character to create interesting, visually appealing loft spaces for a mixture of professional and service businesses as well as continued light industrial uses. Although specific buildings have not been identified for demolition, it is expected that significant demolition will need to occur in order to allow sufficient parking and improve overall character of this subarea.

Although this subarea is considered a long-term opportunity (after year 2006) for purposes of analysis in this report, it could be marketed sooner. It is recommended for a high priority clean-up ranking.

Subarea 4: Historic District

This subarea presents a near-term opportunity to combine public historical park activities with commercial visitor-serving operations to create an enduring visitor attraction. The Historic

District has been envisioned as having two components: the area adjacent to the waterfront, including Drydock #1and #2, would be devoted to historic and non-historic ship repair and related interpretive activities, while the Captain's Row/Alden Park area would provide permanent historic residences, lodging, restaurant, and/or office spaces and as well as a visitor attraction to the Chapel and botanical garden in Alden Park.

Demolition in this area is likely to be minimal, due to the presence of numerous historic and complementary structures. This subarea is recommended for a high priority clean-up ranking.

Subarea 5: Heavy Industrial Area (CIA)

The CIA represents perhaps the greatest marketing challenge as well as opportunity. Given its status as a major potential economic development asset for the City of Vallejo, it is considered as a near-term (1994 through 1996) reuse subarea. Certain buildings have been identified for demolition (see Conclusion for Industrial/Warehouse/Office section), but the majority of existing buildings are considered potentially re-usable.

It is recommended that this subarea be given a high priority ranking for environmental evaluation and clean-up to enhance marketing and disposition. It is also recommended that the rail lines serving this subarea be maintained and preserved.

Subarea 6: Farragut Village

This subarea contains housing units that may be leased to Travis AFB. This area should be given a high priority environmental clean-up ranking.

Subarea 7: Developed Recreation

This subarea is envisioned as serving residents and visitors to Vallejo and surrounding communities in the mid-term (1996-2006). For the first three years after closure, the range is planned to continue to operate. During this three year period, the range operator will develop a plan to move the range to the southwest part of the Island. After the range is moved, the area could provide newly-developed active and passive recreational opportunities such as baseball and soccer fields. This subarea is recommended to be given a medium priority clean-up ranking.

Subarea 8: Coral Sea Village

Similar to Farragut Village, this subarea is slated for lease by Travis AFB. It represents a near-term opportunity for reuse, and should be given a high priority environmental clean-up ranking.

Subarea 9: Education/Office

This subarea contains a mix of classrooms, office space, and residential dormitories in a campus setting. Both historic and non-historic buildings are located in this subarea. This subarea will be focused around educational and related office uses in a serene setting, bringing training opportunities to Solano County residents and workers. In addition, portions of this subarea may be attractive to conference center operators. It is likely that relatively large amounts of space will be reused by interested educational institutions, but that further structural and environmental assessment will need to be completed prior to occupancy. In addition, the marketability of this subarea depends upon the financing capability of institutions of higher education.

Therefore, this subarea should be considered as a mid-term (1996 through 2006) opportunity, and as a medium priority clean-up location.

Subarea 10: Marina Village

This subarea has the potential for creating a lively waterfront community over the long-term. Market rate newly-constructed multifamily residences, a 40,000 square foot retail facility (new construction), a recreational marina, and related resident and visitor-serving uses will ultimately combine to create the Marina Village. Because of a substantial degree of potential environmental contamination, current limited access, and market constraints, this subarea is considered as a long-term (after 2006) opportunity. It is recommended for eventual clearing of all substandard structures.

It is considered as a low priority environmental clean-up location.

Subarea 11: Golf Course

This subarea is recommended for expansion into an 18-hole golf course serving residents and workers of the Island as well as Vallejo and surrounding communities. The Officer's Club will be maintained as a club house facility, but only limited new development will occur.

This subarea is considered a near-term opportunity, and should be given a high priority clean-up ranking.

Subarea 12: Regional Park

This subarea will draw visitors from surrounding communities and the entire Bay Area to enjoy waterfront views, restored natural habitats, and equestrian facilities. It is recommended for consideration as a mid-term opportunity (1996-2006), with a medium priority environmental clean-up ranking.

Subarea 13: Recreational/Open Space

Located on a landfill site between active dredge ponds and non-tidal wetlands, this area is west of the Neighborhood Center accessed via a dirt road extension of A Street. Due to its distance from the other more developed portions of the Island, this land is proposed for recreation and/or open space purposes.

Pursuant to environmental clean-up operations, the area would have potential for both passive and active recreation purposes. The final determination of its long-term intended use should be based on an Island-wide Specific Plan study of all recreation resources. This area is considered a long-term opportunity and should be given a medium priority clean-up ranking.

4.3.2. Quantified Summary of Land Use Plan Assumptions

Based on the market-driven subareas described above, the Mare Island Economics Team compiled a list of buildings that would be reused by 1996, 2006, and buildout by proposed land use type, as shown in Appendix 4-G-3. The data was then used by EDAW to quantify net developable acreage and potential developable square feet on the remaining land available after accounting for the inventory of reused buildings; these are based on assumptions regarding standard Floor Area Ratios (FARs).

It is important to note that the estimate of potentially reusable buildings does not represent an entire review of every building on Mare Island. Where reuse potential was not known, it has been assumed that the area is redeveloped; in reality some additional buildings would most likely be reused which have not been identified by this effort.

For this analysis it is important to assume that some existing barracks would be converted to multifamily uses. In addition, certain buildings have been identified for conversion to retail, office or other uses. Again, this may not be appropriate for certain buildings. The objective of this analysis is to quantify an amount of future development that would likely occur given market considerations rather than detailed building inventories and assessments. Thus, the list of buildings used for this analysis is meant to be used as a basis for quantifying net developable acreage rather than a final projection of reusable buildings.

Project Description

Table 4-4 provides a summary of the incremental development assumed to occur by year used in this analysis. In general, only existing buildings are assumed to be reused by 1996 and 2006; new development is assumed to occur after 2006. In reality, some new development may occur before 2006 if sites can be remediated and sold.

Industrial Uses: By 1996, about 700,000 square feet of existing industrial and warehouse space is assumed to be absorbed. By 2006 this amount increases to about 1.95 million square feet. Including redevelopment potential in areas designated for industrial use, a total of about

Table 4-4
Summary of Incremental Development by Land Use and Analysis Year
Mare Island Reuse Study

Land Use Category	**Incremental Development by Year (1)** 1996	2006	Existing-2026	New-2026	**Total Reuse Plan**
Non-Residential Uses (sqft)					
Heavy Industrial	291,200	514,200	128,900	0	934,300
Light Industrial	178,500	305,500	117,200	1,462,045	2,063,245
Warehouse	234,200	428,900	122,000	500,000	1,285,100
Office	169,600	360,000	114,300	192,000	835,900
Retail	61,100	59,600	0	80,000	200,700
Education	0	477,500	0	0	477,500
Total Non-Res. Space	934,600	2,145,700	482,400	2,234,045	5,796,745
Residential Uses (units)					
New Condos	0	0	0	800	800
Existing Duplexes	431	0	0	0	431
Existing Single Family Units	52	0	0	0	52
Multi-Family Units (Rehab)	0	470	0	0	470
Live/Work	0	43	40	0	83
Total Dwelling Units	483	513	40	800	1,836
Dormitory Beds	0	802	0	0	802
Civic/Recreation/Open Space (acres & sqft)					
Golf Course	157.0	0.0	0.0	0.0	157.0
Developed Park	77.6	53.0	0.0	0.0	130.6
Regional Park	150.0	0.0	0.0	0.0	150.0
Wetlands	2,000.0	22.6	0.0	0.0	2,022.6
Total Acreage	2,384.6	75.6	0.0	0.0	2,460.2
Civic/Recreation Space	154,850	26,900	0	0	181,750
Marina-slips (11.3 acres)	0	0	0	100	100

(1) All uses up to 2006 are assumed to utilize existing buildings.
Sources: EDAW; Bay Area Economics; Economic & Planning Systems, Inc.

4.3 million square feet of heavy and light industrial and warehouse space is estimated to be used by buildout. About 2.34 million square feet of this space would represent reuse of existing buildings.

Retail and Office Uses: By 1996, the Naval Exchange Store, gas station, McDonald's, golf club house and the Farragut Inn are assumed to be operating; this would total about 61,100 square feet. Whether McDonald's would continue to operate their current restaurant is uncertain but it is assumed some kind of fast-food business would locate in this building. The building identified as the Navy Exchange Store has been subdivided into several small shops. It is assumed that this building could house a convenience store and other personal services such as a laundry, or dry cleaners.

The Farragut Inn is assumed to be in operation given that this facility represents a unique asset for large banquets, wedding receptions and group presentations, which is not available elsewhere in the City. Thus, it is assumed that this facility in conjunction with the Chapel would be operating at base closure.

At buildout, a total of about 200,700 square feet of retail is forecast to be developed. This would include new retail totaling about 40,000 square feet in the Marina Housing District and 40,000 near the existing Farragut Village. It is not known how much retail space would be developed within the Historic District by the Park Service and thus, this space is not included in the total.

Some existing office space should be taken by other federal agencies though the conveyance process. It is assumed that about 170,000 square feet would be used by 1996. By 2006, an estimated 530,000 square feet is assumed to be occupied; however, not all of this space would necessarily be occupied by federal tenants. At buildout Mare Island is assumed to have a total of about 835,900 square feet of office space, including both new and existing space.

Residential Uses: At 1996, it is assumed that Travis Air Force Base would lease about 400 of the existing duplex units on the Island; Travis has indicated that they would not be interested in using any of the existing historic or single family housing on the Island. There are an estimated 431 duplex units on the Island; the remaining 31 units are assumed to be leased by the IDC to the public. In addition, all existing historic single family housing is assumed to be leased by the IDC for housing in the interim years for this analysis; some of these homes could convert to private or non-profit office space, bed and breakfasts or other non-residential uses. However, a more detailed market analysis of these homes is required to determine the potential for conversion.

Currently, there are about 1,500 dormitory beds on the Island, in approximately 12 buildings that could be reused. The Navy has identified several existing barracks buildings that are unusable and not worth renovating. This analysis assumes that these building would be demolished and these beds are not counted in the inventory. Some of the barracks buildings are assumed to be converted to multifamily units, which would eliminate about 697 beds

Thus, there are 802 beds that are assumed to be reused in some fashion. About 500 of these beds are part of the education complex; the other beds are located in four buildings in other parts of the Island.

In the Marina Housing District, about 800 new residential condo units are assumed to be developed at a range of from 8 to 15 units per acre. This is the only area assumed to have new residential development on the Island.

Currently the Navy owns 600 multifamily units in Roosevelt Terrace, which are not located on Mare Island but in the City of Vallejo, located at the intersection of Highway 37 and Sacramento Street. For this analysis, these units are counted but assumed to be reduced to 300 after renovation and reuse; the Urban Land Institute recommended that every other building be demolished to lower the overall density of the project. It is assumed that the IDC would not own these units but would first try to sell the property to a private developer.

In total at 1996, about 483 residential units are assumed to be occupied; by 2006, this figure would increase to about 996, and at buildout, about 1,836 units would be part of the Reuse Plan.

Recreation, Civic, Park and Open Space Uses: Most of the existing buildings and park acreage are assume to be reused. It is not certain which public entity or non-profit corporation would operate the parks and recreational facilities.

The gym and recreation facilities associated with the education complex would be retained for a new educational user; other facilities such as the Rodman Center, field house and theater would be used for public recreational activities. No new recreation or civic space is assumed to be constructed per se except that associated the Historic District and any structures associated with new ball fields and a new adult sports complex. This analysis assumes that an Adult Sports Complex is part of the Reuse Plan and is included in the 90 acre plots (Area 13).

Pier 35 is assumed to be converted to a 12.6 acre fishing pier/park. The existing hill/open space area at the southern end of the Island is assumed to be developed into an 150 acre regional park; this park would be passive in nature and include trails and picnic tables. The existing ball fields, historic parks and other parks are assumed to be used in their current capacity. Where possible new ball fields are assumed to be developed around existing ones. After the first three years of closure, the rifle range is assumed to be converted to either ball fields, a developed park or the Adult Sports Complex and in the long run would not be used as a rifle range, given the potential land use conflicts with the surrounding residential uses.

Some of the identified wetlands, excluding the dredge ponds, would be conveyed to the San Pablo Bay Wildlife Refuge, which is part of the U.S. Fish & Wildlife Service (USFWS). The USFWS has indicated that it would like to develop a wetlands observation center on the Island. This facility is assumed to be located in Building 501. The dredge ponds would be retained by the City and are assumed to be operated by either the City or IDC as a separate enterprise fund (see Section 4.8). Existing and future dredge spoil capacity is assumed to be first used by the Island as needed; any excess capacity would be sold to other cities or agencies in the Bay Area to help offset Island dredging costs not covered by other agencies.

The golf course is assumed to be expanded from its current 9-hole, 75-acre size to an 18-hole facility totaling about 157 acres. The marina would be developed with about 100 slips, some of which would be sized to accommodate yachts over 64 feet. Two finger piers would be retained for the development of the marina; the use of the other two finger piers has not be determined.

Streets and Intersections: According to data provided by Fehr & Peers, there are an existing 18.8 road miles of streets on the Island. By 2006, given the development levels assumed, an additional 2.8 new road miles would need to be added. By buildout, there would be a total of 25.8 road miles of streets on the Island or about seven new miles over the existing condition.

Currently, there are five signalized traffic intersections on the Island and one pedestrian signal. At 1996, one new signalized traffic intersection would be required; by 2006 another five new intersections would be required; and at buildout, a total of 14 signalized traffic intersections would be required or nine new intersections on the Island.

Net Developable Acreage and Square Feet: As shown on Table 4-5, a total of 229 acres are assumed to be redeveloped with new uses. Applying conventional Floor Area Ratios (FARs) to the developable acreage by land use indicates that, at buildout, approximately 2.2 million square feet of non-residential space will be developable, as well as 800 residential units. Certain subareas are assumed to not have any new private development, including the Historic, Education, Coral Sea Village, and Farragut Village.

4.4 ORGANIZATIONAL FRAMEWORK

The preceding section establishes the basic land use plan for Mare Island. This next discussion considers several organizational models for implementing this plan. Although there are several different organizational structures that could be appropriate, any of these models must accomplish the following: (1) attract the new civilian tenants; (2) receive title to the Mare Island property (or major portions) from the Navy; (3) maintain the common facilities, roads and utilities; (4) plan and finance the improved public facilities; and (5) provide the long-term property management for the former Shipyard facilities.

In contrast with many municipal activities across the country, the management of a former military base must be conducted on a competitive, bare-bones basis that will be responsive to new private sector tenants. The Mare Island land and buildings must be competitive with other private sector office and industrial parks throughout the region. At the same time, the Mare Island management entity should not duplicate and should, in fact, work in close

Table 4-5
Net Developable Acreage by District and Land Use
Mare Island Reuse Study

District	Net Developable Acreage by Land Use						
District	**Residential**	**Retail (2)**	**Office (2)**	**Light Industrial (3)**	**Heavy Industrial**	**Warehouse**	**Totals**
FAR Assumption	(1)	0.25	0.25	0.30	0.30	0.35	
Northern Industrial Area				32.8		32.8	65.6
Neighborhood Center			11.0				11.0
Mixed Use District			6.6	52.8			59.4
Farragut Village		0.4					0.4
Historic District							0.0
Heavy Industrial (CIA)					20.8		20.8
Coral Sea Village							0.0
Education							0.0
Marina Housing	71.2	0.4					71.6
Total Acreage	71.2	0.7	17.6	85.6	20.8	32.8	228.8

(1) 37.9 acres are assumed to develop at 8 units per acre and 33.3 at 15 untis per acre.
(2) Retail and office could be new development or rennovated existing buildings.
(3) Light Industrial FAR in the North Industrial Area is .35.

Sources: EDAW; Economic and Planning Systems, Inc.

concert with the existing City of Vallejo economic development and community development programs.

The Mare Island project should be professionally managed and should be guided by a public management body -- responsible to the City of Vallejo -- that will anticipate major changes in the region's economy and will guide the attraction of major new employers as well as new economic activity to the Island.

4.4.1 Organizational Models

There are four general organizational models that have been successful on a nationwide basis in guiding the civilian reuse of former military bases. The purpose of this section is to describe these various organizational structures and to summarize their strengths and possible weaknesses in managing the specific Mare Island properties for the future of Vallejo.

Internal City-Management Model

Some communities have integrated the management of the former military base within an existing city department. For instance, the City of Bangor, Maine undertook the reuse of the former Dow Air Force Base (AFB) in 1968 as the City's new municipal airport and a trans-Atlantic flight services and customs facility. The Airport Committee of the City Council hires the airport manager; the Committee also provides the policy guidance for the airfield operations/development at Bangor. The City Director of Economic Development assists the airport manager in attracting new tenants.

As another example, the Assistant City Manager for the City of Tustin is managing the redevelopment of the former Tustin Marine Corps Air Station in Orange County, California as a new mixed-use office/commercial/residential project. The City planning department provides the full range of support to the Assistant City Manager. Tustin plans to acquire the property from the Navy and to then "compete" major blocks of property for private development.

If the "Internal City-Management Model" were to be adopted for Mare Island project, this organizational model would suggest that the base reuse effort would be assigned by the Mayor and City Manager to the Director of Community Development and his or her staff. This approach would have the following strengths and potential weaknesses for the reuse of Mare Island:

Strengths:

- There would be a clear-cut assignment of responsibility within the City Government and the resulting elimination of any possible future conflict over the promotion, development, and management of the property.

Potential Weaknesses:

- It would be difficult to bring outside private business leaders into the reuse process and into attracting new business prospects.

- The operating and infrastructure costs for Mare Island would likely appear as an element in the City of Vallejo Budget -- with limited opportunity to manage the property on commercial maintenance standards.

- It may be difficult to retain "least-cost" bare-bones commercial operating standards over the years.

- There may be limited ability to secure long-term capital financing for public improvements, aside from pledging the "full faith and credit" of the City.

Joint State-Local Commission or Authority Model

The financial constraints on local government during the past decade have produced a new joint state-local organizational form for Pease AFB in New Hampshire and at Fort Devens in Massachusetts. Essentially, the local cities or towns were asked to assign development responsibility voluntarily to the Pease Development Authority and to the Devens Enterprise Commission in exchange for the state financing the reuse effort.

New Hampshire provided $50 million in Government Obligation bonds and $150 million in revenue bond authority for initial financing at Pease AFB; Massachusetts has appropriated $200 million in General Obligation (G.O.) bonding authority for the reuse of Fort Devens. A similar state-dominated process was initiated by Rhode Island at Quonset Point and Newport following the base closures in April 1973.

In view of the extraordinarily difficult budget constraints being faced in California and the desire to preserve the City of Vallejo independence, this model does not appear relevant to the reuse of Mare Island. No further discussion of strengths and weaknesses appears warranted.

Local "Authority" or "Commission" Model

Many communities have created "redevelopment authorities," housing authorities, economic development commissions or airport authorities to guide the reuse of former bases nationwide. The authority members are typically appointed by the local governing body and often include both public and private sector members. The authority then hires an executive director and provides the policy guidance for managing and developing the property.

For instance, the Blytheville-Gosnell Development Authority provides the policy oversight for the former Eaker AFB in Arkansas. Authority members are appointed by the two cities, the county and the State. The Authority initially hired a professional executive director and more recently retained the former county judge as his successor.

The Williams Partnership at the former Williams AFB in Mesa, Arizona is an intergovernmental authority comprised of the State, Maricopa County, and five surrounding cities. The Board members are appointed by the several jurisdictions and has retained a professional executive director and a minimum start-up staff. The Partnership contracts-out for services wherever possible, thereby keeping its direct overhead to a minimum.

A local development authority would have the following strengths and possible weaknesses in managing the reuse of Mare Island:

Strengths:

- Active participation by business leaders would be likely.
- The commission or authority maintenance costs for Mare Island would not be included in the City Budget.
- There would be a greater measure of freedom from political constraints in maintaining the Mare Island properties and in approving individual leases.
- There would be greater freedom of operations compared to a city department.

Possible Weaknesses:

- City Council approval would likely be needed for major public infrastructure improvements and key policy issues.
- It may be more difficult to operate under commercial operating cost standards.

Economic Development Corporation Model

The organizational structure used by communities to provide for maximum business-like operations and financing at former military bases is a quasi-public economic development corporation model. A quasi-public non-profit corporation would be structured under the provisions of Section 501 (c)(3) of the Internal Revenue Code.

The quasi-public corporation differs from an authority in that the corporation is a separate non-political entity that can technically function like any other private corporation. The quasi-public corporation can also incur debt for facility improvements.

The members of the Board of Directors would be appointed by the Mayor with the approval of the City Council. The Board members would be drawn largely from the private sector and would also include the City Manager or his/her designee(s) and at least one other member appointed from the public sector.

In turn, the Board of Directors would hire the Executive Director for the corporation and provide the policy guidance for the corporation management of the Island property. Unlike other organizational entities, the Economic Development Corporation model also allows for tax-deductible private sector contributions to the reuse process. The model structure also permits greater flexibility in the future for the corporation to borrow against its assets on the Island for capital improvements.

The economic development corporation model must be fine-tuned to the local Vallejo scene. One key element to maintaining a bare-bones operating cost structure will be the management entity's close working relationship with the City Department of Community Development. It will be important for the IDC staff to rely on the City for technical community development/economic development assistance wherever possible.

The Navy has already transferred its first property from the 1991 closure round at Chase Field Naval Air Station to a non-profit community economic development corporation in Beeville, Texas. The Beeville-Bee County Economic Development Corporation (BBCEDC) is a Section 501 (c)(3) entity, which purchased the 400 family housing units at Chase Field. The Mayor of Beeville appoints one of the seven members of the Board of Directors; the county Judges appoint another member; the County Community College Board appoints a third member, and four other business-citizen members are selected at-large. The Beeville Corporation hired its previous base reuse coordinator as its Executive Director.

The Corporation has been successful in attracting 1,500 jobs to the former Chase Field facilities, but it functions on a bare-bones operating cost basis. In round numbers, Beeville spends about $350,000 annually for airport operations, $400,000 in direct facility maintenance salary costs, and about $250,000 in supplies -- including termite control. The state prison system provides grass mowing services worth about $100,000 without cost to the Corporation -- all in relation to the $1.2 million which the Navy had previous allocated to care and custody costs at Chase Field.

As another example, the Westover Metropolitan Development Corporation manages the reuse of the former Westover AFB in Massachusetts that was closed in 1974. The Corporation was formed to "bridge" the boundaries between the City of Chicopee and the Town of Ludlow in central Massachusetts. Three of the private sector board members are appointed by the Governor from the region. The purpose of the Westover corporation was to insulate the base management from a difficult local political scene and the Corporation has highly effective in marketing the reuse of the Westover airfield.

Similarly, the "Joint Burlingtons" was created by the City of Burlington and Burlington Township to manage the reuse of the former Burlington Army Ammunition plant in 1976. Five private sector members are appointed by the City and five by the Township. The

Burlington corporation also promotes new industrial sites in the Township as well as marketing the Burlington "Commerce Square" at the former ammunition plant.

There is one minor lead-time consideration in creating a non-profit economic development corporation: the time period (about six-months) involved in securing IRS review of the corporation by-laws. This IRS review period, however, will not affect the Navy's ability to transfer the Mare Island property to the corporation.

The "Economic Development Corporation" model would have the following strengths and possible weaknesses in managing the reuse of the Mare Island property:

Strengths:

- Maximum ability to function under a least-cost commercial operating standards.
- Greater ability to attract private sector members who in turn can promote the property for new prospects.
- The Corporation would have the legal authority to accept private sector tax-free contributions.
- Maximum financial strengths for financing improvements.

Possible Weaknesses:

- Potential conflict in roles with the city administration, unless safeguards on coordination are built into the corporation structure (not a serious obstacle).

4.4.2 Recommendations and Implementing Actions

- *4.4(a) Form the Island Development Corporation (Vallejo City Council):* The City Council should take formal action to form the IDC as a non-profit public economic development corporation that will manage the overall development of Mare Island properties on behalf of the City of Vallejo.
- *4.4(b) Appoint IDC Board of Directors (Mayor and City Council):* The Mayor and City Council should appoint a Board of Directors for the IDC. Appointees should include various private sector individuals, some of whom are involved with real estate development.
- *4.4(c) Seek Tax-Exempt Status for the IDC (City staff):* Staff should take the steps necessary to ensure the IDC will qualify as a tax-exempt entity under provisions of Section 501(c)(3) of the Internal Revenue Code.

4.5 MARE ISLAND TRANSITION PROCESS

The Department of Defense (DoD) property transfer process for Mare Island and other surplus base facilities nationwide is in a state of major change as a result of the "Pryor Amendments" to the 1994 Defense Authorization Act. The new "Interim Final Rules," issued by the Department of Defense on April 6, 1994, to implement the Pryor Amendments offer several major problems to the City of Vallejo and other communities -- particularly those affected by the 1993 base closure decisions.

The City of Vallejo has already expressed its concerns over these rules, and it is likely that further rule revisions will be negotiated with DoD to make the property disposal process more responsive to the City and other communities.

Early job creation at Mare Island will depend largely upon "interim civilian reuse leases" through the City of Vallejo and its management entity (the Island Development Corporation) to private sector firms and some public agencies. With the environmental restoration and clean-up required on the Navy property before transfer, it is likely that interim use leases may be in place for several years.

This section will describe several options available to the City of Vallejo in leasing and then permanently acquiring the Mare Island properties from the Navy -- with the objectives of (1) a <u>least</u> <u>net</u> <u>local</u> <u>cost</u> property acquisition of the Mare Island properties by the City; and (2) maintaining maximum City control of the transfer process for the purpose of creating new jobs and new economic activity on the property as soon as possible.

4.5.1 Overview of the Property Disposal Process

Excess and surplus federal lands like the Mare Island Shipyard can be transferred or sold by DoD and the Navy under the provisions of the Federal Property & Administrative Services Act of 1949; the 1990 Defense Base Closure & Realignment Act; and the recent Pryor Amendments to the 1994 Defense Authorization Act.

In general, the available base facilities must first be "screened" for other federal uses (such as the proposals by Travis Air Force Base and the U.S. Coast Guard) before being declared "surplus" to federal needs. The suitable property (not identified for federal purposes) is then made available on a priority basis to "housing-for-the-homeless" providers under the Stewart B. McKinney Homeless Assistance Act. This McKinney Act screening by the Navy is to begin in early June 1994. It will be important for the City to work closely with any proposed McKinney Act providers.

Following the McKinney Act screening period, the City will have a one-year period to complete its final base reuse plan; the City's Work Group and the City Council are well underway toward meeting this planning objective.

There is a broad range of public purposes for which the Mare Island properties can be transferred without cost or a minimum cost to public agencies, as follows:

- Education
- Historic Preservation
- Park & Recreation
- Wildlife Preservation
- Public Health -- including water and sewer systems
- Economic Development (under the new Section 2903 provisions in the 1994 Defense Authorization Act)

The City can also purchase property through negotiation with the Navy, including purchases for (and then subsequent transfers to) private sector firms. The City can also request that the Navy sell individual parcels at open bid sale to the private sector --with the future uses subject to City zoning. The Navy cannot sell directly to individual private firms without an open public competitive bid process.

The public benefit conveyance authority for economic development deserves special discussion because it represents a promising property transfer authority for Mare Island. Under the authority of Section 2903 of the 1994 Defense Authorization Act, the City of Vallejo would be eligible to receive title to the Navy property for less than fair market value or for "consideration," such as assuming early maintenance responsibility for the property.

Section 2903 was intended to ease the burden on communities, like Vallejo, in acquiring the former base property for job-producing purposes. The community may receive fee-simple title to the property and may sell or lease parcels to private sector tenants. The community must submit a redevelopment plan to the Military Department describing its proposed economic development and job creation program. The Section 2903 conveyance mechanism requires that the Navy prepare an explanatory statement for its permanent files indicating why fair market value was not received. The interim final rules call for the community and DoD to share in any future <u>net</u> sales or lease profits on a 60 percent (community) - 40 percent (DoD) basis.

The major problem with the DoD Interim Final Rules, which the City of Vallejo is commenting upon to DoD, is the requirement that the Military Departments appraise and offer the property for sale to the private sector during the same period in which the community is completing its planning process. In addition, the DoD rules do not adequately describe the community's capital and operating cost contributions that can properly be deducted in arriving at the net sales proceeds for distribution between DoD and the community. The clear definition of allowable city development and operating costs is essential to Vallejo assuming responsibility for Mare Island properties under Section 2903.

4.5.2 Property Acquisition Strategy - New Authority

The recommended or preferred acquisition approach for the Mare Island properties is closely linked with the operations analysis outlined in Section 4.8 below. The need to maintain a positive long-term cash flow for the Mare Island properties must also link closely with the acquisition objectives of securing a least local cost transfer and controlling future leasing and development of the land.

In addition to the preferred property acquisition approach using the new authority of Section 2903, an alternative approach will also be outlined that applies many of the previous Federal property transfer authorities, involving public benefit conveyances and extensive purchases or public bid sale of commercial property.

The preferred acquisition approach anticipates that the major portion of the Mare Island property can be deeded to the City/IDC at minimum or no cost following the same Section 2903 Economic Development structure described in the Urban Land Institute report. The basic concept is that the City/IDC should accept title to the <u>entire</u> <u>Mare</u> <u>Island</u> <u>property</u> under the new Section 2903 authority, except for some very specific public benefit or direct transfer exceptions, as follows:

- Title to the elementary school grounds should be transferred to the Vallejo School District by the Department of Education.

- The area needed for an historic ship building and repair activity (Drydock # 1 and #2 and ancillary facilities) could be transferred by the Navy directly to the Department of the Interior/National Park Service. This area would be compatible with an adjoining historic district that would be maintained by the IDC.

- The Coast Guard pier and support facilities and the Fish and Wildlife Service area would also be leased permanently through the management entity to the Federal Agency. The federal agencies would not be required to pay rent, but would be responsible for their pro rata share of Island operating expenses (i.e., assessment for fire and police services). These facilities could also be transferred, however, directly to these federal agencies.

- The McKinney Act housing facilities would be transferred directly to the housing-the-homeless providers by the Department of Health & Human Services.

Under this preferred acquisition strategy, the IDC would promote Mare Island facilities for interim use tenants, who could then purchase their plant facilities from the IDC following the formal Navy deed transfer.

The water system could be transferred by the management entity to the City's Department of Public Works; the sanitary sewer system and the storm drainage system could be transferred to the Vallejo Sanitation and Flood Control District. The management entity could purchase power from the Western Area Power Association and the City's Public Works Department could assume responsibility for maintaining the electric system. The natural gas and the telephone systems could be transferred to PG&E and Pacific Bell respectively. It is not certain at this point whether the management entity would have to fund the cost of utility system upgrades before they are transferred to the various entities. Annual operating and maintenance costs would be the responsibility of the various entities.

The open space, Rodman Center, and the other park and recreational facilities at Mare Island (gyms, swimming pools, ball fields, etc.) would be included in the master Section 2903 deed transfer to the management entity. The open space and recreational facilities -- aside from the golf course -- would in turn be leased to a nonprofit operator.

The golf course would be leased by the IDC to a private developer/operator, who would be responsible for expanding the course to 18 holes. As demand dictates, the golf course can be expanded into the park and open space area.

Alden Park, St. Peter's Chapel, and the historic Captain's Row housing would also be included in the Section 2903 transfer but would be maintained as an historic park, compatible with the adjoining National Park Service area. The renovation of buildings constructed in this historic park before 1936 would be eligible for a ten percent Investment Tax Credit (ITC). The historic residences would initially be leased and ultimately sold to private homeowners.

There is another approach, however, for renovating these historic structures that requires further detailed study. The historic area could be included in an Historic Preservation conveyance through the Department of the Interior. Buildings within an Historic Preservation district are eligible for a twenty percent Historic Tax Credit, but the National Park Service (NPS) maintains close supervision over the external facades and uses. The degree of NPS supervision at Boston's Charlestown Naval Shipyard involved a significant additional local cost -- far beyond the incremental ITC available in Boston. There are no quick and simple answers on the conveyance of an historic area; this issue must be analyzed separately in cooperation with the National Park Service and in relation to the needed renovations.

Finally, there is one area -- the Roosevelt Terrace housing complex -- that could be designated for open public bid sale, subject to the building density at Roosevelt Terrace being reduced.

It is important to emphasize that the preferred acquisition strategy requires careful financial planning and the full and long-term involvement by the City of Vallejo and its designated management entity in guiding the reuse of Mare Island.

4.5.3 Property Disposal Strategy - Traditional Approach

An alternative property acquisition and disposal approach uses the traditional Federal land transfer mechanisms available prior to the 1994 Defense Authorization Act.

This traditional property transfer approach relies heavily on the several public benefit conveyance authorities in the 1949 Federal Property Act. The traditional approach also assumes that the City of Vallejo would purchase a number of strategic land parcels for which early tenants and private sector prospects had been identified. The City would then identify the balance of the Mare Island property for public bid sale -- subject to City zoning -- as the individual parcels are cleaned up fully by the Navy.

The major public benefit conveyances under the "traditional" acquisition approach can be summarized as follows:

- All of the open space as well as the recreational facilities -- including the golf course -- could be conveyed through the Department of the Interior to Greater Vallejo Recreation District.

- The educational facilities could be conveyed through the U.S. Department of Education.

- An Historic Preservation district could also be conveyed through the Department of the Interior's National Park Service.

- The San Pablo Bay wetlands and the spoils ponds could be transferred directly to the U.S. Fish & Wildlife Service.

The City management of the Mare Island reuse process under this traditional acquisition approach would be limited to promoting the industrial buildings; continuing to seek maximum federal grant assistance for infrastructure; and identifying the overall public improvements that would be needed from the private development community after Federal sale and in exchange for local zoning.

The open public bid process can be successful when the surplus federal property happens to be in a major growth corridor for industry, as occurred three decades ago at Benicia Arsenal with its large refinery and its foreign automobile off-loading facilities. However, the open public bid sale process and the traditional property disposal process can also leave large areas at a former base with a lasting "hodge-podge" development character. This hodge-podge experience is also evident at Benicia Arsenal today.

Since Mare Island is <u>not</u> in a major industrial growth corridor, this threat of piece-meal and uncoordinated development at Mare Island is real. For this reason, it is recommended not to follow the traditional acquisition approach but rather an acquisition approach under the new

Economic Development transfer authority in Section 2903 -- with strong local management of the redevelopment process.

4.5.4 Interim Civilian Use Leases

The primary mechanism for attracting new private sector jobs to Mare Island over the next few years will depend upon interim use leases. It may be several years, in fact, before major land areas at Mare Island have been fully cleaned of contamination. In the meantime, the Navy can lease facilities with a satisfactory baseline environmental survey to public agencies for job-generation purposes, after completing a Finding of Suitability to Lease (FOSL) with the approval of the State of California.

The DoD leasing authority in 10 USC 2667 permits the Navy to lease the Mare Island facilities to a public agency for subsequent use by the City's long-term tenants, pending the eventual deed transfer of the land to the City. The new provisions of Section 2903 in the 1994 Defense Authorization also permit interim use leases through the City at less than fair market value.

The Navy has perfected the interim use leasing mechanism for base closure communities in the form of a "Protection and Maintenance Agreement" or "P&M" Agreement. Under the P&M Agreement concept, the City would lease specific buildings in general zones and would use the lease proceeds to maintain the leased building itself together with some of the other buildings in the same zone. The Navy Facilities Engineering Command - Western Division has offered to finance overall common support services within the zones.

The advantage of the P&M Agreement is that the IDC would be able to secure operating experience on Mare Island properties and would be able to generate a cash flow to support its operations. The Protection and Maintenance Agreement will also permit the IDC to be highly responsive to new tenants and prospects.

On a nationwide basis, the Navy has extended its 10 USC 2667 P&M Agreement leasing experience to both Chase Field in Beeville, Texas and the Construction Battalion Center at Davisville, Rhode Island with strong support and cooperation from the impacted communities. The Navy's Protection and Maintenance Agreement approach, in fact, is far superior to the interim use arrangements provided to communities by the other Military Departments.

4.5.5 Care and Custody Maintenance

After the Shipyard formally closes and during the time that the environmental cleanup is in process, the Navy will still have the responsibility for maintaining the Shipyard facilities in a serviceable condition. The Navy will offer to contract with the IDC for maintaining the facilities to Navy caretaker standards. The maintenance standards will likely be in the range of $14 million per year, based on a preliminary base closure budget recently completed by the Navy.

The portions of the Shipyard property under the Navy "Care and Custody Agreement" will also be reduced as the community is able to lease additional facilities under the Protection and Maintenance Agreement" with the Navy. The Care and Custody period will also provide for a facility maintenance "learning" period for the IDC. It is also possible for the IDC to improve the quality of maintenance on certain facilities as long as the overall Navy maintenance standards are satisfied. The Interim Final Pryor Amendment Guidelines do specify the need for this custodial relationship on the part of the Navy, but ongoing pressure may be necessary to ensure that the Navy actually provides sufficient levels of funding to meet its obligation.

At such time as the property is deeded or transferred to the City, the IDC would then assume the full cost responsibility for maintaining the Mare Island properties.

4.5.6 Environmental Cleanup

The Navy will carry the obligation to correct any environmental contamination at the Shipyard. When a large area of the Shipyard has been cleaned up or the clean-up facility is in-place and demonstrated, the Navy can conclude its Finding of Suitability for Transfer (FOST) with the agreement of the State. Only then can specific parcels be transferred by deed to the City.

The major clean-up issue that must be monitored is the level of Navy Budget resources available to implement the Navy's Remedial Action Plan (RAP) at the Shipyard. At the time of the ULI visit in January 1994, the Navy had been able to program only about one-half of its total clean-up costs, then estimated at about $316 million. The bulk of the Navy clean-up resources were not programmed until the FY 1999 and FY 2000 budget years, thereby suggesting untimely delays in the Navy clean-up schedules and further delays in civilian reuse.

These budget constraints should be viewed as inappropriate for any community seeking early reuse of its surplus base property for job-producing purposes.

The Navy and the Department of Defense will indemnify the City of Vallejo and its clients for any environmental damage or clean-up requirements that may be identified in the future. This indemnification feature will simplify the "due diligence" requirements for most new industrial prospects considering locating on Mare Island in the future. Although indemnification may not be a part of a master lease agreement between the Navy and the City, the Navy will still be responsible for cleaning up any future discovery of toxic substances that can be attributed to Navy activities.

4.5.7 Recommendations and Implementing Actions

- *4.5(a) Create and Designate the Island Development Corporation as the Vallejo "development authority" (City Council):* This designation is required within the terms of Section 2903 of the 1994 Defense Authorization Act to receive title to the Mare Island properties for economic development purposes. The following additional actions should be taken in conjunction with this recommendation:

(1) Establish a mechanism whereby local zoning and other development entitlements are approved *after* the City/IDC takes title to the land.

(2) Establish a financial and accounting structure that will allow the City to share in the future net sales-lease profits (if any) from the redevelopment of the property in accordance with Section 2903 of the 1994 Defense Authorization Act.

(3) Ensure that Navy indemnification for environmental conditions are applicable to IDC.

- *4.5(b) Negotiate assessment agreements with other federal agencies (City/IDC):* Federal agencies, including the Coast Guard and the Fish and Wildlife Service, who may be interested in owning or leasing facilities at Mare Island should be required, as part of their leasehold, to pay an annual fee to cover the cost of local public services normally funded through property tax revenues.

- 4.5(c) *Work cooperatively with the Navy to negotiate a master lease between the City and Navy and to create discounted interim license agreements (Navy,IDC)*: It is important to negotiate a master lease between the City and Navy as soon as possible. Given the condition of facilities and need to quickly replace jobs it is necessary for the Navy to discount interim leases to private companies.

- 4.5(d) *Transfer personal property to City/IDC at no cost (Navy)*: The personal property on Mare Island will play a critical role in attracting new industries. The projected financial plan for the operation of the base requires that the City/IDC obtain personal property at no cost. This property would include, but not be limited to, industrial equipment, public safety equipment, general office and general classroom equipment.

4.6 FISCAL IMPACT ANALYSIS

As part of the evaluation of the Reuse Plan for Mare Island, a Fiscal Impact Model was prepared for the proposed Reuse Plan, as described in Section 4.3. The fiscal analysis will provide the City of Vallejo with the means to evaluate the Reuse Plan based on its potential net fiscal impact to the City. This analysis, as with other technical analyses prepared for the plan, is for three points in time: 1) 1996 or the first year of base closure; 2) 2006, or midway into the reuse of the Island; and 3) 2026, or stabilized reuse of the Island and buildout of the

Reuse Plan. The development assumptions and market issues related to the three points in time are discussed in more depth in Section 4.2.

The Mare Island Reuse Plan must be implemented to safeguard the fiscal solvency of the City of Vallejo. The reuse of Mare Island is a challenging undertaking that has major cost implications for the City. It is crucial that measures be taken to ensure that the City's fiscal health is not jeopardized. These measures should include efforts to control municipal service cost by ensuring that costs are allocated among the Navy, federal and other governmental tenants, and the City, and that costs are reduced by adopting efficient service delivery programs and reasonable service standards. Additionally, the IDC should be responsible for mitigating any negative fiscal impacts on a priority basis before investing in the capital requirements of the site.

This analysis does not assume any funding from the Navy, other federal tenants, or the IDC. The purpose of the fiscal analysis is to quantify the true fiscal impact of the Final Reuse Plan on the City's General Fund and ability to provide municipal services. Fiscal mitigations are proposed and prioritized. These potential mitigations will be a part of future negotiations between the Navy, other federal tenants, and more refined planning efforts concerning implementation of the plan. In particular, it should be noted that the projected fiscal deficits will vary over time, and their potential mitigation will change over time. For example, using part of the Navy's Care and Custody Agreement funding through the IDC to mitigate the General Fund deficit will only be an option in the early years of implementation. Other mitigations, once the Navy is no longer present will need to be identified.

This analysis assumes that the IDC would hold the City's General Fund neutral with certain important qualifications. First, other fiscal mitigations aside from IDC funding for projected fiscal deficits should be explored and implemented. The IDC should be considered a last source of fiscal mitigation. The IDC should not be considered a "cash cow" to fund municipal services. The IDC has an important agenda and role in implementing the Reuse Plan. Any revenue which is used to fund annual municipal services would not be available to fund important infrastructure requirements. Potential fiscal mitigations and their use are discussed in more depth at the end of this chapter.

The fiscal impact analysis is divided into three sections. Section 4.6.1 briefly describes the land use assumptions as they pertain to the fiscal analysis and the description outlined in Section 4.3. Section 4.6.2 provides a summary of the revenue and expenditure assumptions used in the analysis. Section 4.6.3. describes the fiscal impacts of the Reuse Plan as well as conclusions and potential fiscal mitigations. Appendix 4-H contains a full printout of the Fiscal Impact Model developed for the Reuse Plan.

4.6.1 Project Description and Overall Assumptions

The Fiscal Impact Model analyzes the land use plan. The plan is described in more detail in Section 4.3. A full description of the project description analyzed in the Fiscal Impact Model is shown in Table 4-6. These figures represent the cumulative amount of development by land use expected for each time period analyzed, which is slightly different than the information provided in Section 4.3, which represents the incremental development at each period. However, the overall amount of development assumed is consistent. Summary totals by land use are provided at the bottom of Table 4-6.

Information for the fiscal impact analysis has been obtained through interviews with City and other district staff, a review of the fiscal year 1993-94 Adopted City Budget, and review of other special district budgets. All projections are in constant 1994 dollars; no real cost increases are assumed.

The marina is assumed to be owned and operated by the City and the City's Department of Public Works. Thus, the marina would not generate property tax revenues directly. The marina is assumed to be self-sufficient from an operations standpoint and not require any general fund revenues. The Golf Course is assumed to be transferred to the IDC and leased to a private operator; it would also not receive any general fund revenues for operations.

About 400 of the existing duplexes on the Island are assumed to be leased by Travis Air Force Base and would not generate any property tax revenues to the City. The potential for reimbursement by Travis and other federal tenants for public services will need to be explored and quantified during implementation of the plan. Other uses assumed not to generate property tax revenues include the education complex and all civic and recreation uses.

For this analysis, no explicit assumptions about affordable residential units have been made. In reality, some of the multifamily units would be affordable given their potential size and location, but are not assumed to require any subsidies from either the City or the IDC.

4.6.2 Fiscal Analysis

The Final Reuse Plan will generate revenues for the City, the Vallejo Sanitation and Flood Control District and other public agencies. In turn, the Final Reuse Plan will require City services for new residents and employees associated with development and reuse of the Island. This section estimates the revenues received and the expenses incurred by the City. In particular it evaluates the fiscal impact to the City's General Fund and Gas Tax Fund, which is responsible for some street maintenance and other related costs. It also evaluates the cost of providing park maintenance for the existing and proposed parks compared to property tax revenues and park maintenance costs. A full evaluation of the impacts to the GVRD or any other non-profit recreational operator is not possible at this time, given the uncertainty as to which entity or entities will ultimately operate these facilities.

It is not possible to analyze the fiscal impact to the Vallejo Sanitation and Flood Control District, given that the district mainly operates with user fees. It is not known at this time exactly how many users will locate on the Island. The District has indicated that operations and maintenance costs should be able to be supported with user fees.

Table 4-6
Project Description by Phase
Mare Island Fiscal Impact Analysis

Land Uses	Unit of Measure	Cumulative Development: Base Closure 1996	Cumulative Development: Mid-Point 2006	Cumulative Development: Buildout 2026
Development Assumptions				
Single Family Historic	unit	52	52	52
Residential Duplex	unit	431	431	431
Multi-Family-Condo	unit	0	0	800
Multi-Family-Rental	unit	0	513	553
Dormitory	bed	0	802	802
Retail	sqft	61,100	120,700	200,700
Office	sqft	169,600	529,600	835,900
Light Industrial	sqft	178,500	484,000	2,063,245
Warehouse	sqft	234,200	663,100	1,285,100
Heavy Industrial	sqft	291,200	805,400	934,300
Education Complex	sqft	0	477,500	477,500
Marina	acre	0.0	0.0	11.3
Developed Parks	acre	77.6	130.6	130.6
Golf Course	acre	157.0	157.0	157.0
Regional Park	acre	150.0	150.0	150.0
Civic Space	sqft	154,850	181,750	181,750
Streets	mile	19.8	21.6	25.8
Summary Totals				
Residential Units		483	996	1,836
Industrial Space		703,900	1,952,500	4,282,645
Retail, Office, & Ed. Space		230,700	1,127,800	1,514,100
Total Non-Residential Space		934,600	3,080,300	5,796,745
Park, Golf & Open Space Acreage		384.6	437.6	437.6

Sources: City of Vallejo; EDAW; BAE; Economic & Planning Systems, Inc.

The financial operations of the IDC are discussed in Section 4.8 of this report. The project description and other assumptions are consistent between the fiscal impact analysis, the operations analysis and the financial evaluation, although it is presented in different formats and levels of detail. In general, it is assumed that the City would be responsible for public services such as police, fire, planning, building inspection, and public works. The IDC would be responsible for Island specific activities such as marketing and managing land disposition, private security of "mothballed" or reserved property and buildings, and maintenance of grounds surrounding IDC-owned buildings. Public Works would be responsible for maintenance of all streets, sidewalks, curbs, gutters, traffic signals and landscaped medians associated with new or existing streets. It would also be responsible for maintaining street trees but not trees within new or existing parks or adjacent to privately owned or IDC-owned buildings.

The Vallejo Police Department would provide police and emergency services and support the private security services provided by the IDC as needed. It would not provide building security services or security for mothballed areas or buildings or identified toxic sites. The Vallejo Fire Department would provide fire protection services and would contract with Solano County for hazardous materials emergencies services, as is currently the case.

Projected Population and Employment

Demographic assumptions used to generate estimates of new population and employment are based on standards typical of most cities in the Bay Area and information from the City of Vallejo. These assumptions are shown in Table 4-7. In the case of the education complex, data from the University of California were used for the employees per square foot assumption.

The Fiscal Impact Model includes an estimate of the new population and employment that would be generated by the Reuse Plan for the three periods of analysis. These projections are shown in Table 4-7. These estimates are the result of the projected cumulative development for each period (see Table 4-6) and the demographic assumptions shown in Table 4-7. At 1996, there would be an estimated 1,437 new residents living on the Island. By 2006, this figure would increase to 3,142. The figure for 2006 includes population that would be living at the Roosevelt Terrace project, which is not part of Mare Island. These residents would however, generate a demand for new services and new revenues and thus are included in the analysis. At buildout, there would be an estimated 5,175 residents associated with the Reuse Plan.

Estimates of projected employment are also shown in Table 4-8. In 1996, it is estimated that there would be a total of about 1,700 jobs; this figure would increase to about 5,170 at 2006. By buildout the Reuse Plan would imply a total of about 9,600 jobs. This figure includes jobs associated with private development and the parks and recreation facilities.

Table 4-7
Market Value and Demographic Assumptions
Mare Island Fiscal Impact Analysis

Land Use	Unit of Measure	Average Market Values (1) 1996	2006	Buildout	Demographics Persons per Unit	Space Use By Employees	
Single Family Historic	unit	$300,000	$300,000	$300,000	3.0	na	
Residential Duplex	unit	$75,000	$75,000	$75,000	3.0	na	
Multi-Family-Condo	unit	$220,000	$220,000	$220,000	2.5	na	
Multi-Family-Rental	unit	$55,000	$55,000	$55,000	2.5	na	
Dormitory	bed	$0	$0	$0	1.0	na	
Retail	sqft	$80	$113	$147	na	400	per sqft
Office	sqft	$65	$98	$132	na	275	per sqft
Light Industrial	sqft	$45	$45	$45	na	600	per sqft
Warehouse	sqft	$20	$20	$20	na	1,200	per sqft
Heavy Industrial	sqft	$33	$33	$33	na	800	per sqft
Education Complex	sqft	$0	$0	$0	na	780	per sqft(2)
Marina	acre	$0	$0	$0	na	0.16	per acre
Developed Parks	acre	$0	$0	$0	na	0.20	per acre
Golf Course	acre	$30,000	$30,000	$30,000	na	0.20	per acre
Regional Park	acre	$0	$0	$0	na	0.10	per acre
Civic Space	sqft	$0	$0	$0	na	1,500	per sqft

(1) Assumes rents and land values would be below market values in the interim years
(2) Based on data from the University of California.

Sources: City of Vallejo; Bay Area Economics; Economic and Planning Systems, Inc.

Table 4-8
Projected Population and Employment
Mare Island Fiscal Impact Analysis

Land Use	Fiscal Year Ending		
	1996	2006	2026
POPULATION (1)			
Single Family Historic	148	148	148
Residential Duplex	1,288	1,288	1,288
Multi-Family-Condo	0	0	1,900
Multi-Family-Rental	0	1,218	1,313
Dormitory	0	487	525
Cumulative Total	1,437	3,142	5,175
EMPLOYEES (1)			
Retail	145	287	477
Office	586	1,830	2,888
Lt. Industrial	283	766	3,267
Warehouse	185	525	1,017
Heavy Industrial	346	956	1,109
Education	0	612	612
Marina	0	0	2
Developed Parks	16	26	26
Golf Course	31	31	31
Regional Park	15	15	15
Civic Space	103	121	121
Cumulative Total	1,710	5,170	9,566

(1) Based on project description in Table 4-6 and demographic assumptions in Table 4-7.
Includes a vacancy rate of 5% for all uses except public uses and the 400 Travis units.

Source: Economic & Planning Systems, Inc.

These estimates of new population and employment are used in the fiscal analysis to forecast per capita costs and revenues as described below.

Revenue and Expenditures Assumptions

Both the revenue and expenditure projections are in constant 1994 dollars. No assumptions about real cost increases have been assumed; in reality, there will be real cost increases associated with salaries for City staff, but it is not possible to estimate such increases. The specific revenue and expense estimates are based on several forecasting methods developed through discussions with affected City departments, our review of the City Budget, and information gained from prior professional experience.

In general, whenever a particular revenue or expenditure item could be modeled on a marginal basis, this approach was used. For example, revenues such as property tax, and sales and use tax were modeled on a marginal basis. City expenditures for police and fire protection services, and park maintenance were also modeled on a marginal basis. All other revenues and expenditures were modeled using average costs and revenues either on a per capita or a per daytime population basis. Per daytime population is the sum of total population and half of total employment. The methods used and budget amounts assumed are consistent with information provided by City staff and other districts. A summary of the methods used for revenues and expenditures is provided below.

Projected Revenues

Table 4-H-6 of Appendix 4-H provides a summary of the revenue methods and amounts forecast for this analysis.

Property Tax Revenues: This analysis provides a projection of potential property tax revenues for three points in time given certain development assumptions. This is not an annual fiscal impact model. In order to estimate property tax revenues properly, an annual forecast with assumptions about turnover, appreciation, and inflation needs to be developed. Given the speculation at this point in time about potential absorption of uses on the Island, this detailed projection is not possible. For this analysis, average market values for each land use were developed with input from other team members. Certain values vary by time period, i.e., retail and office space. This is because in the early years the values for these uses are expected to be below market value to encourage leasing of this space. Sometime after 2006 and by buildout, the values for retail and office space would be at the prevailing market value for Vallejo and the region. The market values used to project property values are shown in Table 4-7.

The amount of development envisioned at each time period has been multiplied by the average value. An estimate of total market value is used to forecast property tax revenues. A reduction of five percent in the total projected market values, i.e., proxy for assessed value, was made to account for the restrictions of Proposition 13. The legislated one percent property tax rate is assumed. The City currently receives about 23 percent of total property tax revenue after the State transfers revenues to the Education Revenues Augmentation Fund (ERAF). It is assumed that the State will continue to shift a portion of the City's property tax revenues to ERAF at the current legislative rates; in reality, this amount may increase as the State struggles to balance its budget.

Sales Tax Revenues: Sales tax revenues are generated by sales in retail space, restaurants, and some industrial and office space. Sales which occur in office and industrial space are called non-retail sales. For this analysis, taxable sales from retail space are assumed to equal $125 per square foot. For office and industrial space, non-retail sales are assumed at $5 per square foot. No non-retail sales are assumed to be generated by warehouse, education or other civic and recreation space. Some small amount of retail sales will occur in civic and recreation space but it is not expected to be a significant amount. Sales will also result from visitors to the Historic District. It is assumed that the district would generate about 100,000 visitors per year and each visitor would spend an average of $5 each.

Sales tax revenues for the project would also be generated by population and employees on the Island. Sales tax revenue from population associated with Travis housing is not forecast. It is assumed that most of these household purchases would occur at military commissaries or outside the City. In order not to double count revenue from retail space and population and employees, this analysis estimates sales tax revenue from the following sources:

- Expenditures by Mare Island population and employees;
- Non-retail sales from office and heavy and light industrial space;
- City-serving retail space on the Island (i.e., officer's and golf course clubs); and
- Visitor expenditures within the Historic District.

Franchise, Business, Utilities Taxes: These taxes are forecast based on the amounts the City currently receives. For Franchise Tax, the per daytime population amount is forecast; daytime population includes total population and half of employment, with the assumption that revenue generated by employment uses is about half that generated by population. For Utilities Tax, the current per capita revenue for population and employment is used, given that all residential and non-residential uses would generate Utilities Tax revenue. For Business Tax, the current per employee amount is forecast.

Property Transfer Tax: For this analysis, only the new residential units in the Marina Housing district are assumed to turn over at buildout. In reality other non-residential and perhaps some of the other residential units would turn over, but given the uncertainty of property ownership, property transfer tax is not forecast for these other uses. Revenue from this source is assumed at the current rate of $3.30 per $1,000 of assessed value.

Construction Permits and Charges for Services: These revenues are assumed to offset costs incurred by the City for providing services to the public. In particular, construction permit revenues are assumed to offset some of the costs of providing building inspection services. Thus, the expenditures reflect net costs of these revenues.

State Shared Revenues: Motor vehicle in-lieu fees and other related tax revenue received from the State are forecast on a per capita basis. That is, the amount the City currently receives on a per capita basis is assumed to continue in the future and apply to new population associated with Mare Island.

Other Revenues and Use of Money: These revenues are not directly related to growth and would not increase from new land uses at Mare Island. Therefore, these revenues are not forecast for this analysis.

Projected Expenditures

Table 4-H-7 of Appendix 4-H provides a summary of the methods and amounts used in order to forecast expenditures for public services in this analysis.

General Government: General governmental services are partly a function of the amount of activity and expenditures from other City Departments. Other general governmental costs such as the City Attorney's Office and City Council functions do not directly increase with growth in population and employment. For this analysis general governmental services other than planning and building inspection are forecast as a percent of total other departmental costs. Currently, general governmental costs are 8.1 percent of all other general fund departmental costs. This ratio is used to forecast general governmental costs associated with the Reuse Plan, however, it is reduced by 50 percent to account for items that would not be impacted directly by growth.

Fire Department: The Fire Department has indicated during interviews and written memorandum that reuse of Mare Island would require the establishment of one fire station on the Island. The station would need one 3-person engine company and one 4-person truck company. Staff requirements for these two companies would entail 21 fire suppression staff. The average total cost per fire suppression staff is applied to the new staff requirements for a total annual cost of about $2.3 million. This cost includes all overhead, support staff, maintenance and minor equipment replacement and purchases.

This analysis assumes a minimum level of fire inspection service, which would include two fire inspectors at 1996 and 2006 and would increase to three fire inspectors by buildout. This assumes that the Fire Department is responsible for weed abatement and all building safety inspections.

This analysis assumes that the Department would utilize the existing main fire station on the Island and that all existing Mare Island fire service equipment owned by the Navy, including an engine and ladder truck, would be conveyed to the Fire Department in working order. To the extent that equipment conveyed is either old, outdated or not working, costs would be higher.

Police Department: The Police Department has provided an estimate of the cost of providing police services to the Island. They estimate that two new beats would be required with 10 sworn officers. The department has estimated the annual cost for the two beats at $1.13 million per year. This cost includes vehicle purchases and maintenance, support staff and overhead costs. This cost does not include providing private security services for mothballed buildings or areas of the Island.

Public Works: The Public Works Department (DPW) is responsible for maintaining the City's streets, signals, sidewalks, public grounds, and trees, street sweeping and other related activities. DPW also reviews capital improvement projects and prepares the City's Capital Improvement Plan. For this analysis, all additional engineering costs above the current per daytime population costs are assumed to be funded through individual contracts for capital improvements, which is how the City currently operates. The cost of administration is not expected to be impacted by growth or development of the Island.

Street maintenance and all related costs are forecast based on the current cost per road mile in the City, which is estimated at about $10,300. About 50 percent of this cost is funded though the General Fund and the other 50 percent through the Gas Tax Fund. This relationship is assumed for Mare Island. The cost of maintaining signalized intersections is $5,650 each. Street lights cost about $68 each to maintain. Both of these item's maintenance are funded through the Gas Tax Fund. The City currently has about 26 street lights per road mile; this average is assumed to be used on new streets on Mare Island and existing streets, to the extend that existing lighting is at a lower standard.

Currently there are 18.7 road miles of streets and five signalized intersections on the Island. In 1996, one new street mile and intersection would need to be added to the existing network; at 2006, 2.8 new road miles and four new intersections would be added over the 1996 network. And at buildout, new streets required by new development are estimated at 4.2 road miles with four new signalized intersections. Thus, at buildout, Mare Island would have a total of 25.8 road miles of streets and 14 signalized intersections.

Park Maintenance: It is not certain whether the Greater Vallejo Recreation District (GVRD) will operate and maintain existing parks and recreational facilities associated with Mare Island. Another regional parks district or some other entity may manage the existing and proposed parks. This analysis does not assume that GVRD is the primary operator; it does estimate the property tax revenue that would be generate at the GVRD current tax allocation rate of 6.5 percent. If GVRD is not responsible for parks it is assumed that the responsible entity would also receive the property tax revenues. Currently Mare Island is within the GVRD district boundaries and thus, the Island would need to be de-annexed from the district to another entity.

This analysis addresses only portions of the potential fiscal impact associated with parks and recreation facilities. Given the uncertainty of potential user fees and lease revenues for civic and recreation facilities that could offset maintenance costs, this analysis focuses on costs that would be funded by property tax revenues. According to the GVRD, all ball fields and recreation space should be self-supporting through lease revenues and user fees. The regional park, existing historic parks and fishing pier will need to be maintained with property tax revenues. Maintenance costs are based on existing costs per acre and estimates from GVRD and other parks districts.

Developed parks, except for the regional hill park, are assumed to cost about $3,055 per acre to maintain; the regional hill park is assumed to cost about $1,000 per acre to maintain, given the unimproved and passive nature of the park.

4.6.3 Fiscal Impacts and Potential Mitigation

The following describes the results of the fiscal impact analysis for the City's General Fund and Gas Tax Fund, and in terms of park maintenance costs.

General Fund

The estimated annual fiscal impact by revenue and expenditure item for the Reuse Plan is shown in Table 4-9. The City would experience a fiscal deficit at 1996 of about $3.4 million. The fiscal deficit associated with the Reuse Plan would be highest in the first year of reuse and would decline somewhat over time. At Year 2006, or midway into reuse of the Island, the fiscal deficit would be about $2.7 million. At buildout or 2026, the deficit would be about $1.4 million. Thus, at stabilized reuse of the Island, expected annual revenues would not be sufficient to fund project expenditures. These deficits do not assume any cost sharing for services by the Navy or other federal tenants on the Island. The potential to mitigate the deficits are discussed under the fiscal mitigations section below.

The projected deficits are partly a result of structural problems with local government and State taxing abilities and restrictions (i.e., Proposition 13, ERAF, etc.) and partly a function of the market potential and expected values for new and existing development on Mare Island. Local governments throughout California are experiencing difficulties funding required services for new large scale developments. Proposition 13 has restricted the ability of jurisdictions to increase assessed values to two percent annually since 1978, with the exception of when property turns over, at which point it can be reassessed at market value. Drastic reductions in federal and State aid to local governments has also exacerbated the fiscal situation of local governments. In recent years, the State legislature has shifted significant amounts of local property tax revenues to the newly created Education Revenue Augmentation Fund (ERAF) to help offset deficits in the State education system. This loss of property tax revenue at the local level is expected to occur indefinitely or at least until a substantial reorganization of the State's taxing system takes place.

Table 4-9
Summary of Fiscal Analysis Results
Mare Island Fiscal Impact Analysis

Revenue or Expenditure Item	Fiscal Year Ending 1996	2006	2026
GENERAL FUND REVENUES			
Property Tax	$123,115	$334,716	$994,003
Sales and Use Tax	$97,315	$232,538	$444,593
Franchisce Tax	$24,584	$61,441	$106,830
Business Tax	$39,360	$118,996	$220,180
Utilities Tax	$147,246	$388,971	$689,819
Property Transfer Tax	$0	$0	$55,176
Motor Vehicle In-Lieu Fees	$57,252	$125,232	$206,255
Motor Trailer/Other Taxes	$186	$407	$670
TOTAL GENERAL FUND REVENUES	$489,100	$1,262,300	$2,717,500
GENERAL FUND EXPENDITURES			
Building Inspection	$75,000	$75,000	$75,000
Planning	$84,000	$84,000	$84,000
All Other Services	$152,116	$153,617	$159,677
Fire Department	$2,355,505	$2,355,505	$2,450,205
Police Department	$1,131,600	$1,131,600	$1,131,600
Engineering	$9,348	$23,364	$40,624
Public Buildings	$11,682	$25,553	$42,085
Streets	$102,247	$111,542	$133,231
TOTAL EXPENDITURES	$3,921,500	$3,960,200	$4,116,400
GENERAL FUND SURPLUS (DEFICIT)	($3,432,400)	($2,697,900)	($1,398,900)
GAS TAX FUND			
Revenues	$28,200	$101,700	$101,700
Expenditures	$171,200	$257,900	$257,900
Fiscal Surplus (Deficit)	($143,000)	($156,200)	($156,200)
PARKS MAINTENANCE (2)			
Revenues	$34,800	$280,900	$280,900
Expenditures	$226,400	$226,400	$226,400
Fiscal Surplus (Deficit)	($191,600)	$54,500	$54,500

(1) Figures have been rounded to the nearest hundred.
(2) Only estimates park maintenance costs of existing and proposed developed parks excluding ball fields compared to property tax revenues at GVRD's current tax allocation rate.
Source: Economic & Planning Systems, Inc.

While these structural causes of the fiscal deficit are important, they are not responsible for all of the projected deficit. Given that Mare Island is more like a "redevelopment" project than a new subdivision, there are certain constraints to potential market values, timing of absorption, and other factors which will affect property values, rents and lease rates. In the initial years it is assumed that rents and land values for retail and office uses will need to be below market value to entice development to occur and new users to occupy existing space. In addition, many of the structures will require substantial tenant improvements to make them habitable for civilian uses. These costs reduce the net revenue available to fund public services on an annual basis and are discussed further in Section 4.8.

Another cause of the deficits is that federal tenants are assumed not to pay property taxes, while these users will generate a demand for public services. It will be important for the City to secure cost sharing agreements with future federal tenants on the Island, such as Travis Air Force Base, to fund their share of public services costs (see discussion in next section). The method for allocating municipal costs to federal tenants will need to be developed based on a "fair-share" policy.

The negative fiscal balance is mainly the result of providing fire and police services to the Island. Fire and police services costs represent stepped costs with little room for reduction. Currently, police and fire services represent about 75 percent of the City's total General Fund budget. For Mare Island, police and fire services costs in 1996 comprise about 90 percent the deficit. As development occurs, more revenue is generated which can help to offset these costs. However, there is still a projected deficit at buildout of about $1.4 million.

Gas Tax Fund

As shown in Table 4-9, the Gas Tax Fund would also experience a deficit in all three analysis years; however the magnitude of the deficits are small compared to the General Fund deficits. At 1996, there would be a shortfall of revenues from the gas tax of about $143,000; by 2006, this shortfall would increase to $145,000. By buildout, a deficit would still exist and equal about $156,000 or about 60 percent of the costs needed to be funded with gas tax revenues.

Park Maintenance

Property tax revenues available at the current GVRD rate would not be sufficient to fund park maintenance costs at both 1996 and 2006 (see Table 4-9). A funding shortfall for park maintenance of about $167,000 at 1996 and about $98,000 at 2006 would occur. By buildout or 2026, there should be sufficient revenues to maintain the public parks included in the Reuse Plan, irrespective of the operator. As discussed above, this analysis does not include the costs of maintaining and operating all the civic and recreation space on the Island and the proposed ball fields, which are assumed to total about 90 acres, including existing ball fields. It is assumed these uses could be self-supporting through user fees and lease revenue.

Potential Fiscal Mitigation

The estimated deficits discussed above, while large, are not totally unavoidable. The City has several options for mitigating these projected deficits, which are discussed below. In addition, it should be remembered that in reality these deficits would not occur because the City is required to balance its budget year to year; thus, no cumulative deficit would occur. If revenues are not identified to fund required services, service levels would have to be reduced, although in some cases this may not be possible. As discussed above this analysis assumes the minimum level of service necessary. Thus, it is important that one or more of the following mitigation measures be implemented to avoid the projected fiscal deficits.

Not all potential fiscal mitigation measures would be viable or available at all points in time. The net fiscal deficit would vary year to year, and potential fiscal mitigation measures would change over time. Potential fiscal mitigation options include:

- Negotiating a cost sharing agreement with the Navy for the early years while the Island transitions;
- Tried Assessing other federal tenants on the Island a pro-rata share of the public services they would generate;
- Adjusting the land use plan to include more revenue generating uses;
- Creating a Communities Services District to fund public services and/or some other type of special district;
- Reducing fire services staff requirements in early years with the acquisition of new capital equipment; and
- As a last resort, securing revenue for municipal services from the IDC.

Each of these potential mitigation measures are discussed below.

Cost Sharing with the Navy: As part of the Care and Custody Agreement for Base Closure between the Navy and the City of Vallejo, there is the potential to secure funding from the Navy for annual operations and maintenance costs associated with the Island during its transition to civilian use. The exact amount of this contract has not been determined. The Navy has estimated that care and custody at Navy standards would cost about $14 million upon closure of the base. The types of services included in the budget estimate include services which the IDC and existing City Departments would provide, including police and fire services. It is assumed that the Navy would contract with the IDC to provide the operations and maintenance services rather than provide these services directly. For this analysis it is assumed that the IDC would transfer the estimate fiscal deficit to the City's General Fund or the net cost of providing city services to the Island. In 1996, this amount equals about $3.4 million.

This mitigation measure is the most plausible solution to the projected fiscal deficit, given that part of the deficit is created by the difficulties in transitioning the Island into civilian uses. In particular, the high costs of providing police and fire services are partially attributable to the large amount of building space and open areas that will need to be mothballed in the early years. The Island is currently developed with both reusable buildings and buildings that will need to be demolished or renovated. This creates higher improvement and renovation costs for the IDC, which in turn reduce net revenue from rents and land sales, that could help to offset annual operations and maintenance costs.

It should be noted that the Care and Custody Agreement would not continue indefinitely. It is assumed that the Care and Custody contract amount would decline over time in proportion to the amount of land transferred from the Navy to the IDC. Once the Navy does not hold any land on the Island, revenue from the Navy for maintenance would no longer be available. However, a fiscal deficit would most likely exist, unless other fiscal mitigations are adopted, which are described below.

Cost Sharing with Other Federal Tenants: Some future tenants will be other federal agencies that will either occupy space on the Island through the conveyance process or lease space from the IDC. These users are assumed to be exempt from paying local property taxes that would cover some of the cost of providing public services such as police and fire protection. Potential federal tenants include Travis Air Force Base and the U.S. Coast Guard. These tenants should participate in a cost sharing agreement to pay for the amount of public services they generate.

The City and/or IDC should develop contracts with each federal tenant, which specifies what services would be impacted, their estimated cost and a method for payment. Payments could occur quarterly, semi-annually or yearly depending on the financial needs of the City or IDC. The results of the fiscal impact analysis presented above could be used as a basis for establishing this pro-rata share of costs. However, the actual amount of costs should be calculated each year based on the City's current budget and service levels. As an overall principle, federal tenants should always be assessed the current level of service provided to the rest of the City, except in those instances where access and other unique factors associated with Mare Island warrant different service levels.

Population associated with the 400 units Travis proposes to occupy would generate about \$155,900 in annual revenues (excluding property taxes, which are assumed to be exempted). At buildout, these units would represent about 12 percent of the per daytime population on the Island. Using this figure, this population's pro-rata share of costs are estimated at about \$494,000 at buildout. The unfunded portion of these costs or net fiscal deficit would equal about \$338,100 per year at buildout. This is only one method of estimating the "fair-share" of municipal costs on the Island.

Including More Revenue Generating Uses: The potential for fiscal mitigation through restructuring of the land use plan is somewhat limited. Fiscal zoning, as this technique is commonly called, often steals revenues and retail support from one part of town and lures it to another, with no net gain in revenue to the City. Therefore, use of this method should be considered carefully in relation to other existing retail uses and businesses in the City. However, there may be some additional revenue generating uses that could be implemented on the Island that may help reduce the expected deficit.

Revenue generating uses such as hotels, bed and breakfasts, conferences centers and restaurants should be encouraged on the Island. To be conservative, this analysis does not forecast these types of uses, given that more detailed market feasibility studies would be required. Regional serving retail or discount retail would probably not be competitive and would not be a wise choice given the traffic constraints associated with access to the Island. An opportunity does exist to encourage some specialty retail such as restaurants near the Marina or other visually appealing locations on the Mare Island. In addition, there may be the potential to convert some of the historic residences to bed and breakfasts. Bed and breakfast use would not only generate additional spending and sale tax revenue on Mare Island but it would generate transient lodging tax revenue. The potential for this use should be explored in more depth and pursued by the City and/or IDC in their marketing efforts.

Another potential revenue generating use would be some kind of specialized conference center. While the demand for these centers is limited and the financial feasibility questionable, it is recommended that the City or IDC pursue this potential use further.

Creation of a Community Services District: While community services districts have become a popular method of financing annual public services, this mechanism may not be feasible for Mare Island for two reasons. First, the service levels proposed for Mare Island are assumed at a level that is currently delivered to existing City residents and businesses as basic services. There are equity and legal issues concerning charging Mare Island residents and business for services which are being provided to the rest of the City through property tax and other adopted revenues sources via the General Fund. Second, burdening new residents and businesses with additional annual assessments may not be feasible from a marketing standpoint and could create a significant disadvantage to the competitiveness of the Island compared to other developments in the City and region. Most new industrial parks in the region do not have assessment districts. Even if the assessments could be adopted, they may hinder and slow absorption which could be in conflict with other objectives of the Reuse Plan. The Mare Island Economics Team recommends that the City seriously consider all the implications of a Community Services District as a means of fiscal mitigation, and use this method after all other methods have been fully explored and exhausted.

Reduce Fire Services Costs in Interim Years: The Fire Department has indicated that staffing requirements could be reduced for about the first ten years of development, from 21 fire suppression staff to 15, if the department were to acquire a "quint" or a combined engine company / ladder truck company. A quint would allow the department to provide the same services as an engine company and a ladder truck with less staff. The Department estimates that a quint would cost from between $600,000 to $800,000. At a cost of about $109,000 per year for each staff, this could result in a cost savings of about $650,000 per year; over ten years this translates into a net savings of about $5.7 million (after deducting the cost of the quint). The Department has indicated that by about 2006, the quint would need to function as one company and an additional engine or truck company would be required. At that point, the quint could be run with a 3-person company. The Mare Island Economics Team recommends that the City consider this cost savings fiscal mitigation in the interim years of plan implementation. This fiscal mitigation measure is highly feasible and would be relatively easy to implement.

Securing Revenue for Services from the IDC: One logical source of potential revenues would be from the IDC. In theory, the IDC should pay for some of the cost of providing public services. In reality, the financial demands the Island will place on the IDC will be significant as outlined in Section 4.8. As discussed in Section 4.8, it is a priority of the IDC to fund the net costs of providing municipal services the Island, (i.e., the fiscal deficit). A municipal services fee is included in the operations analysis as a line item cost. In the initial years, funds will be allocated from the IDC to the City from the Navy's Care and Custody Agreement. Due to the need to fund Island operation and maintenance costs as well as infrastructure and building rehabilitation costs, the IDC should be responsible for the net fiscal deficit only after all other fiscal mitigation measures have been explored and implemented.

Conclusions

As the analysis shows, the City's General Fund and Gas Tax Fund would experience a fiscal deficit without mitigation at all three periods analyzed. As discussed above this fiscal deficit would decrease over time as would the need for potential fiscal mitigations. In the initial years, funding through the Care and Custody Agreement with the Navy should be sufficient to fund the projected deficits. However, once this revenue source is no longer available, the plan would still generate a deficit. Therefore, it is critical that other fiscal mitigation measures be implemented before the Navy funding terminates.

At buildout, the Final Reuse Plan would have a fiscal deficit of about $1.4 million per year. This is common among most major mixed use projects in California. The uniqueness of Mare Island adds to an already existing structural problem regarding funding municipal services. Proposed fiscal mitigations in the form of securing funding from other federal tenants, increasing revenue generating uses on the island, reducing fire services cost to the extent possible, and securing funds from the IDC will all need to be considered and implemented. It is not recommended that a communities service district be used to fund municipal services.

4.6.4 Recommendations and Implementation Actions

The discussion above presents a list of potential mitigation measures which are recommended to help reduce and/or eliminate the projected fiscal deficit associated with the Reuse Plan. As discussed, in the early years much of the cost for public services will be borne by the Navy through the Care and Custody Agreement funding. Once this agreement and funding is terminated, the IDC will have an overall commitment to ensure that the City's General Fund and Gas Tax Fund are held neutral. However, other measures should be implemented immediately both to reduce the cost of public services and reduce the projected deficit both in the early years and by buildout of the Reuse Plan. These measures are summarized below.

- *4.6(a) Secure funding through Master Lease and Navy Care and Custody Agreement (City/IDC):* The City/IDC needs to secure funding for municipal services in early years of transition through the Care and Custody Agreement.

- *4.6(b) Assess Federal Tenants Municipal Services Fee (City/IDC):* Each federal tenant on the Island such as the U.S. Coast Guard should be assessed a pro-rata share of the public services they would generate. This amount will vary year to year depending on the City's current budget and adopted service levels. A formula acceptable to all parties for estimating the fee amount will need to be developed. A contract for the fee will need to be developed with each federal tenant.

- *4.6(c) Encourage Revenue Generating Uses on Island (City/IDC):* Aggressive marketing should take place by the City/IDC to encourage revenue generating uses locate on the Island.

- *4.6(d) Reduce Fire Staff Needs by acquiring a Quint (City Agency):* Reducing fire services staff requirements in early years with the purchase of "quint" which is a combined engine/ladder truck company. A quint would provide the same services as an engine company and truck company but require 15 fire suppression staff instead of 21, as is currently assumed. This could result in a savings of about $650,000 per year for the first ten years. At ten years, an additional engine or truck company would be require and thus, staffing would need to be increased to 21.

- *4.6(e) Secure funds to cover net fiscal deficit from IDC (City):* Once all the above fiscal mitigation measures have been explored and implemented to the extent possible, any remaining fiscal deficit should be funded by the IDC. An estimate of the annual fiscal deficit will need to be calculated year to year and a mechanism to transfer funds from the IDC to the City's General Fund will need to be developed. In order to ensure that the IDC has sufficient revenues to meet its obligations and objectives, it is important that the IDC be considered as a last rather than first source of funding for the General Fund deficit.

4.7 INFRASTRUCTURE COSTS AND FINANCING

This section presents estimates of the infrastructure upgrade costs and requirements associated with the Reuse Plan. It also presents a framework for financing Mare Island's capital improvements. This analysis sets the stage for further financing analyses by evaluating estimated costs of upgrading infrastructure, reviewing existing funding sources, and proposing an action plan that would allow for implementation of the Reuse Plan.

By organizing infrastructure costs, identifying agencies responsible for systems operation, and recommending options for funding, this section sets the stage for the Operations Analysis presented in Section 4.8. The Operations Analysis builds on this section to assess the financial feasibility of operating Mare Island and the Reuse Plan.

4.7.1 Methodology & Approach

Cost estimates are outlined in Section 6 and 7 of the Final Reuse Plan. It should be noted that cost estimates represent the estimated costs of <u>upgrading</u> existing infrastructure to current service standards, as defined by the City and other responsible entities. For backbone infrastructure and utilities systems, no additional capacity needs have been identified.

Information for the financial analysis has been obtained through interviews with City and other district staff, a review of the City current Capital Budget, and review of other special district budgets. All projections are in constant 1994 dollars; no real cost increases are assumed.

Following the cost analysis, existing funding sources which could offset a small portion of capital costs (e.g., Citywide impact fees) are estimated. The range of other potentially available funding mechanisms is also described. There are five major sources that could potentially contribute funds for financing infrastructure: 1) the City, 2) the IDC, 3) State and Federal grants, 4) special districts and utilities, and 5) revenue-based financing. Each of these potential revenue sources will be described in terms of capital financing responsibilities and associated financing techniques.

4.7.2 Organization of Section

The following subsection discusses infrastructure improvements that are needed to implement the Final Reuse Plan, including transportation, utilities, parks, and public facilities. Subsection 4.7.4 discusses phasing of costs and improvements. In subsection 4.7.5, agencies assumed to have responsibility for financing capital improvements are profiled. Subsection 4.7.6 identifies specific funding sources associated with the City's infrastructure upgrade responsibilities. Conclusions and recommendations are presented in subsection 4.7.7.

4.7.3 Mare Island Infrastructure Improvements

Capital improvements required to support the Reuse Plan, associated costs, and the agencies assumed to have responsibility for operating them are presented on Table 4-10 and Figure 4-3. These estimates represent the costs of bringing the existing systems up to current standards, as defined by the various entities involved with their operation. In terms of basic infrastructure systems, the water and transportation systems would be serviced by the City, wastewater treatment and storm drainage are assumed to be serviced by the Vallejo Sanitation and Flood Control District, and electrical, gas, and telephone systems would be provided by City of Vallejo, PG&E, and Pacific Bell, respectively. In terms of public facilities

Table 4-10
Total Infrastructure and Public Facilities Costs at Buildout
Mare Island Reuse Plan

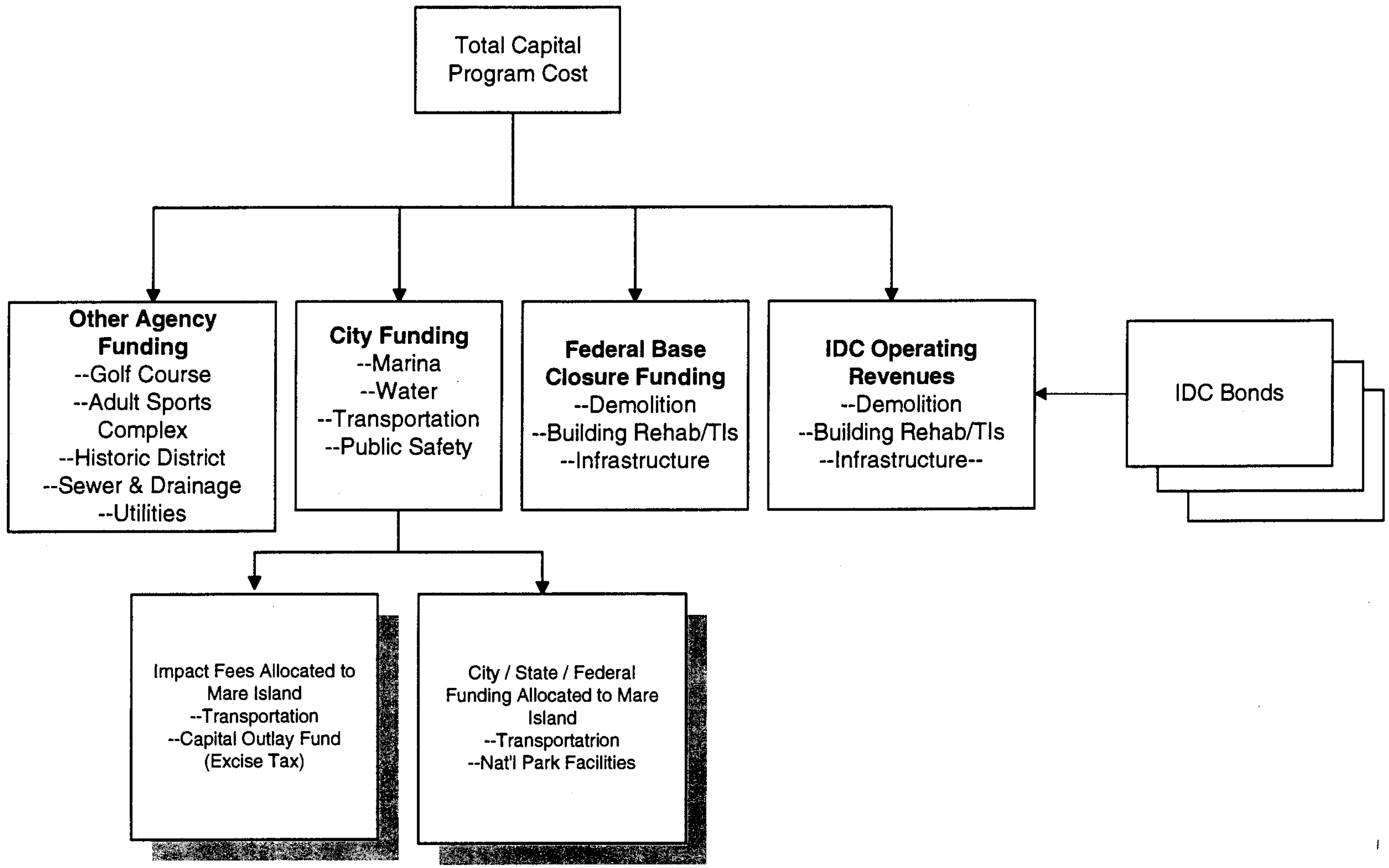
Cost by Entity	Total Estimated Cost (1)	Assumed Service Provider	Incidence of Capital Financing	Recommended Funding Approach
BASIC INFRASTRUCTURE SYSTEMS				
Water Supply & Dist.	$10,239,000	City of Vallejo	Users	Revenue Bonds Impact Fees Other
Wastewater Treatment & Storm Drainage (1)(2)	$24,108,000	Vallejo Sanitation & Flood Control District	Users	Revenue Bonds Impact Fees Other
On-site Transportation	$64,400,000	City of Vallejo	Local Development	Impact Fees Tax Increment (2) Assessments Other
Off-site Transportation	$106,000,000	City of Vallejo/ Federal Government	Citywide/Other	Grants Impact Fees Other
Electrical System	$17,250,000	City of Vallejo/ IDC/PG&E	Users	Rate Charges
Gas System	$1,153,000	PG&E or Other	Users	Rate Charges
Telephone System	$0 (4)	Pacific Bell or Other	Users	Rate Charges
PUBLIC FACILITIES				
Police Facilities	$533,000	City of Vallejo	Citywide	Capital Outlay
TOTAL COSTS (3)				
Including S. Crossing	**$223,683,000**			
Excluding S. Crossing	**$139,683,000**			

(1) It has not been determined whether each service provider or the IDC would pay for systems upgrade costs; this analysis assumes the IDC would fund system upgrades. No additional capacity requirements have been identified.
(2) District is moving toward a pay-as-you-go funding approach.
(3) Does not include park development, marina, historic district, or golf course costs. See Table VI-2 for a summary of these costs.
(4) Does not include cost of purchase or replacement of ATT switches.

Sources: Moffat & Nichol; Fehr & Peers; Economic & Planning Systems, Inc.

Figure 4–2
Financing Strategy Illustration
Mare Island Reuse Plan

Financing Structure



improvements, which are limited to police station rehabilitation, the City will assume service responsibility. Specific responsibilities for funding these costs have not yet been determined, but are likely to be shared by the respective agencies responsible for operation and the IDC.

Improvements to the golf course, the construction of the marina and the development of the maritime historic district facilities are assumed to be funded with revenue bonds which would be secured by user fees and other operating revenue. These improvement costs are not included in the estimate of total infrastructure costs because; 1) they have a potential funding source; 2) they are not required to implement the Final Reuse Plan; and 3) they are region-serving improvements. In addition, other park improvement costs are estimated and discussed separate from the infrastructure costs shown in Table 4-10 because these facilities would also be region-serving improvements and should be funded with some type of regional benefit assessment. Existing parks on the island should be able to meet the requirements for neighborhood parks serving the projected population.

A combination of local, State, and federal funding (other than Navy) will be necessary to fund transportation improvements and regional parks facilities.

Transportation

Significant transportation improvements will be necessary to serve the development associated with the reuse of Mare Island, at an estimated cost of $170.4 million at buildout (see Table 4-10). The cost estimates do not include Highway 37 upgrades. On-site improvements would include seven new road miles of streets and nine new signalized intersections, as well as other transit, rail, and parking improvements. Off-site improvements include the "Southern Crossing" bridge and its approach. Without the Southern Crossing the cost is $64.4 million. It is estimated the Southern Crossing will be required sometime between 2006 and buildout. At buildout, existing entrances to the island are projected to be capable of serving only 50 percent of demand. If the Southern Crossing is not built, potential adjustments would include a scaled-back land use program or a change in the mix of development to decrease the level of employment.

Water System

Water system improvements include additional gravity storage (6.5 million gallons), fire hydrants, replacement of the 20-inch main and other pipes, an upgrade of the pump station, and installation of water meters to all buildings. Total costs, including administration, demolition, and contingencies, is estimated to be $10.24 million.

Wastewater & Storm Drainage Systems

Wastewater and storm drainage facilities will require substantial upgrades to bring the system to the Vallejo Sanitation and Flood Control District's (VSFCD) standards. Together, as shown on Table 4-10, these systems are estimated to cost $24.1 million.

The overall existing condition of the wastewater system is poor, as there are several cross-connections between this system and the storm drainage system (resulting in unacceptable sewage outflow during periods of wet weather). Moreover, baseline knowledge regarding soil contamination is limited. Total estimated costs to replace and rehabilitate pipes and a major pump station are estimated to be $4.7 million. This cost does not include costs associated with lateral pipes (which service individual properties), connection fees, or additional areas of contaminated soils. A more precise phasing of improvements had not been developed at the time of the analysis.

The storm drainage system will require reconfiguration in order to comply with State and federal environmental regulations. Reconfiguration of eight outfalls and replacement of pipes is estimated to cost $19.4 million. No phasing recommendations have yet been made.

Electrical System

Cost estimates assume that the system will not be sold to PG&E. Major costs involve repair of collapsed ducts, substation upgrades, systems monitoring improvements, and the installation of meters. It is likely that the IDC or City of Vallejo will retain the system and assume service responsibility. Estimated capital costs are $17.25 million.

Gas System

This analysis assumes that PG&E would take over this system. Major costs in the capital improvement program are associated with repair and replacement of gas piping, and are estimated to be $1.15 million.

Telephone System

Currently, Pacific Bell owns the residential telephone system, while AT&T owns a state-of-the-art system serving the industrial and office areas of the base. The Navy has established a lease-purchase contract with AT&T, but the unpaid balance is approximately $15 million. Improvement costs have not been estimated. The Navy is in the process of buying out AT&T's interest as part of the closure process.

Parks

Several major parks and recreation facilities have been proposed for Mare Island. As shown on Table 4-11, major new facilities include an adult sports complex, maritime exhibits, a marina, and an expanded golf course. These facilities would be operated by a variety of entities, and have total estimated capital costs of approximately $14.8 million. These improvements and expansions are assumed to be funded with revenue bonds, which could be supported by user fees and other operations revenue.

Table 4-11
Park and Recreation Improvements and Capital Cost Estimates
Mare Island Reuse Plan

Item (1)	Size	Capital Cost (2)	Notes/Potential Funding Source
Non-Profit Recreational Operator Facilities			
Adult Sports Complex	38 acres	$3,800,000	EDAW acreage used. Average cost/acre is $100,000.
Fishing Pier	13 acres	$50,000	Minimal improvements.
Regional Park	150 acres	$150,000	Minimal improvements. Avg. cost/acre is $1,000.
Other Ball Fields/Developed Park	53 acres	$2,650,000	Assumes $50,000 per acre; costs may vary.
Rodman Center	71,379 s.f.	$100,000	Minimal rehabilitation.
Recreational Operator Subtotal		$6,750,000	
National Parks Service Facilities			
Historic Ship Exhibit	125,000 s.f.	$500,000	Assumes funding would be with revenue bonds.
Historic Exhibit Office	29,640 s.f.	$2,020,500	Assumes funding would be with revenue bonds.
Maritime Exhibit	9 acres	$2,000,000	Assumes funding would be with revenue bonds.
National Parks Subtotal		$4,520,500	
City of Vallejo Facilities			
Marina	100 slips	$800,000	To be funded with revenue bonds.
IDC Facilities			
Golf Course	157 acres	$2,750,000	To be funded with revenue bonds.
Grand Total		$14,820,500	

(1) Does not include boarding stable, which may have capital costs.
(2) All costs based on estimates by Ted Rust unless otherwise noted.
Source: Ted Rust; Greater Vallejo Recreation District; EDAW; Economic & Planning Systems, Inc.

Public Protection

The Reuse Plan will not require significant capital facilities related to police and fire protection. In terms of police facilities, the existing Mare Island main police station (Building #729) will require rehabilitation at $100 per square foot, which would total $553,000. The fire station is new and in good condition, and would not need renovation. Neither department will require other capital improvements assuming fire and police equipment is conveyed to the City of Vallejo in acceptable working order.

Costs for implementation of regional training or communications centers have not been estimated here, as they are not related to the Reuse Plan.

4.7.4 Phasing of Capital Improvements

Infrastructure phasing is a critical component of this capital financing on Mare Island. In order to implement the Reuse Plan, the initial infrastructure investment must be minimized to keep initial cost burdens within feasible limits. The City is applying for EDA grant funds of almost $4 million this year with an additional request planned for next year. This analysis was used a pro-rata distribution between the three analysis periods. This is a gross measure of the amount of infrastructure costs by phase as typically many improvements are required up front before development occurs.

A preliminary estimate of total costs associated with the first phase of development is $33.1 million, which include leasing related capital costs. Infrastructure costs were phased according to the proportion of development that would occur by 1996. Transportation improvements are estimated to cost about $6.8 million in the first phase, which includes one new road mile of streets and a new intersection and other related improvements .

At the time of this analysis, only the transportation improvements had been officially organized into phases. Including the Southern Crossing, 4.0 percent ($6.8 million) of transportation capital costs are included in the initial phase. Other infrastructure investments required in this initial phase include potable water ($10.3 million), and the police station ($533,000). It is assumed that all other improvements (including parks, sewer, and utilities) will be incurred at a rate commensurate with the island's development.

The above assumptions are preliminary in nature. Once costs and offsetting revenues are more precisely quantified, the City must prioritize improvements in a manner that minimizes up-front costs while providing an adequate level of service to property owners and tenants.

4.7.5 Agencies Responsible for Capital Improvements

This subsection profiles agencies assumed to have responsibility for financing capital improvements on Mare Island and discusses related issues. Table 4-12 illustrates potential

Table 4-12
Capital Improvement Matrix
Mare Island Reuse Plan

Item	City of Vallejo	Other State & Federal	IDC	Special District /Utilities (1)	Private Development
	Potential Funding Responsibility				
Water Supply & Distribution	X		X		
Wastewater Treatment & Storm Drainage (2)			X	X	
On-site Transportation	X	X	X	X	X
Off-site Transportation (3)	X	X	X		
Electrical System (2)			X	X	
Gas System (2)			X	X	
Telephone System (2)			X	X	
Police Facilities	X				
Fire Facilities	X				X
Recreational Facilities	X	X	X	X	X

(1) Includes the Greater Vallejo Recreation District, the Vallejo Sanitation and Flood Control District, Pacific Bell, Western Area Power, and PG&E.
(2) It is uncertain at this time which entity would fund improvement and upgrade costs.
(3) The IDC could potentially contribute up to approximately 25 percent of costs to secure Federal and/or State matching funds.
Source: Economic & Planning Systems, Inc.

funding responsibilities among entities involved with Mare Island. To the extent possible, the IDC will be allocating responsibility for certain capital facilities to other agencies.

Island Development Corporation (IDC)

The Island Development Corporation (IDC) would have overall responsibility for assuring that required infrastructure improvements are funded and provided in a timely fashion, commensurate with the absorption of new development. Transportation improvements are assumed to be funded with revenues from the IDC, which would include net operating revenue (see Section 4.8 for a detailed discussion of the amount and type of revenues generated from IDC operations). The IDC would have the overall responsibility for the transportation improvements, and initial utility system upgrades required for implementing the Reuse Plan; however, the IDC may not fund all the estimated costs shown in Table 4-10. In particular, it is not known at this time whether the Vallejo Sanitation and Flood Control District (VSFCD) would be able to fund require system upgrades and improvements though user and connection fees. To the extent that certain improvements could not be funded through the VSFCD, the IDC would need to fund these costs. The same situation holds true for the water system, and gas, electrical and telephone systems. The IDC operations analysis assumes that these costs would be funded through the IDC.

The golf course is assumed to be owned by the IDC and leased to a private operator. The cost of expanding the golf course is assumed to be borne by the private operator. The IDC will work with the golf course operator to obtain attractive terms (e.g., low interest revenue bonds) for financing the expansion. Estimates of golf course expansion and improvements costs are approximately $2.7 million.

City of Vallejo Department of Public Works

The City of Vallejo's Department of Public Works (DPW) is assumed to provide plan check and review functions for all infrastructure improvements, as required for all development in the City. The City would also provide technical assistance to the IDC as needed. DPW is assumed to construct, operate and maintain the proposed marina; DPW has indicated that the marina should be able to be funded with revenue bonds, which would be supported by user fees and lease revenues. The City or the IDC is also assumed to operate and oversee all dredging requirements and facilities, including managing sale of surplus dredge spoils capacity. It is assumed that the dredging activities could operate as a separate enterprise fund.

The water system is assumed to be operated and maintained by the City and DPW, as is the current City system. Whether the initial upgrade costs could be funded with user and connection fees is uncertain at this time; these costs are assumed to be funded through the IDC for this analysis. Finally, DPW is assumed to administrate the construction of transportation facilities required by the Reuse Plan. Associated revenue sources include the

Transportation Impact Fee, grants, and supplemental assessments as necessary and appropriate.

Vallejo Sanitation and Flood Control District (VSFCD)

It is assumed that the VSFCD will assume responsibility for managing the wastewater and storm drainage systems. The District does not currently encompass Mare Island. Ultimately, if land ownership is transferred to the City, a viable scenario would be a transfer of wastewater and stormwater system ownership to the District. A Master Plan would then be developed that would assess the condition of these systems in greater detail and recommend modifications that will facilitate service to the Reuse Plan's proposed land uses.

The City faces a critical issue as it enters negotiations with the Navy regarding disposition of the sanitary sewer and storm drainage system. Under the current agreement, if system ownership is transferred to the VSFCD, the District's ability to charge connection fees for a large portion of wastewater system capacity may be limited, as described in the following discussion:

- In 1977 and 1986, the Navy contributed approximately $8 million for wastewater treatment plant construction and modification, respectively. This investment corresponds to 2.5 million gallons per day (mgd) of average daily flow.

- Under the current agreement, 2.5 mgd of capacity belongs to the Navy, and any connection fees collected by the District from firms using this capacity would be returned to the Navy.

As the City approaches a master lease agreement with the Navy, the City should investigate the possibility for a transfer of this increment of capacity. The City's rights in terms of this capacity should be clearly identified.

In terms of funding mechanisms, the VSFCD has traditionally used a wide variety of methods to finance major capital improvements. These include bond proceeds from capitalized user fees and connection charges, impact fees, and State and federal grants. The District is slowly transitioning toward a "pay as you go" approach. In fiscal year 1994/95, the District will charge fees of between $19.00 and $20.00 per month per equivalent development unit (EDU) for sanitary and storm water service. A continuation of the District's current financing regime would be a practical approach to financing wastewater and storm drainage upgrades.

It should be noted that the system upgrade costs included in the Operations Analysis (Section 4.8) do not include the above-referenced cost reimbursement to the Navy.

Nonprofit Recreational Operator

With the exception of the golf course, marina, and historic district facilities, parks facilities are assumed to be developed and maintained by a nonprofit recreational operator. In reality, some other nonprofit entities may take-over some of the existing or new facilities.

Historically, the local park district has relied on five principal revenue sources: property taxes, user fees, park dedication fees, grants, and community fund raisers. Property tax revenues are primarily dedicated to maintenance of facilities, and there is little or no potential to bond these revenues for capital improvements; these revenues are assumed to fund future park maintenance costs as discussed in Section 4.6.

Typically, park dedication fees cover approximately 30 percent of total capital costs in Vallejo. New development on Mare Island is assumed to be subject to park dedication fees at the current adopted rates (see funding sources below). Since Mare Island is capable of generating significant revenues, the use of an instrument that capitalizes these revenues through bond issuance is logical. This analysis assumes that the nonprofit recreational operator would fund the adult sports complex and the ball fields using this method.

Regardless of the detailed financing approach, the operator should implement a mechanism that spreads the cost burden of facilities among all users (i.e., the entire city). To the extent that users provide the income stream to pay debt service on a revenue bond, this instrument is consistent with sound public policy. Another instrument that would accomplish the same goal could include a District-wide assessment.

Utility System Providers

It is assumed that rate-payers will be charged off-setting revenues to finance capital upgrades. The following discussion presents likely transfers of responsibility for utility systems.

- Electrical System. According to the City's Public Works Department, a Mare Island Utility District, in conjunction with Western Area Power, could provide electric service at approximately 50 percent of PG&E's rates. Therefore, this analysis assumes that the City of Vallejo will be responsible for maintaining the system. System upgrade costs are included in the IDC analysis.

- Gas System. PG&E is assumed to take-over the gas system. System upgrade costs are included in the IDC analysis.

- Telephone System. The details regarding the source of required capital investment are subject to ongoing negotiation. For this analysis, it is assumed that the system will be operated, maintained, and improved by Pacific Bell. No upgrade costs have been identified for the telephone system.

Other Agencies

Other agencies such as the National Park Service are assumed to be responsible for the historical maritime exhibits and open space included in the Reuse Plan. The San Pablo Bay Wildlife Refuge is assumed to manage the wetlands on Mare Island, except for the dredged materials ponds.

4.7.6 Funding Mechanisms

The following subsection identifies specific funding sources associated with the City's infrastructure upgrade responsibilities. This discussion is followed by an overview of Federal, State, and local revenue sources that should be pursued by the City as well as other entities in funding Mare Island's capital upgrades.

The major financing mechanisms appropriate for transportation capital funding include the recently developed transportation impact fee, which can potentially be adjusted to meet the requirements of major new projects. The Southern Crossing, however, is so costly that neither the City nor the properties on Mare Island can significantly off-set costs. Federal funding would be necessary to offset the bulk of associated costs for this bridge. In terms of on-site transportation improvements, a benefit assessment district should be considered in terms of financing major improvements that confer direct benefit to specific properties on Mare Island.

The City has traditionally utilized water revenue bonds secured by user fees to fund major water system improvements, as water service provides a stable flow of cash through metered user charges. Other than bonding user charges, applicable mechanisms include assessments and development impact fees.

Financing for the Marina may be best achieved through the use of revenue bonds. In addition, low interest loans are available from the Department of Boating and Waterways, a State agency dedicated to furthering public marina development throughout the State.

Public facilities such as police and fire stations are widely recognized as general benefits to the City. Therefore, these improvements are most appropriately financed through General Fund Accumulated Capital Outlay. Capital outlay funds should be sufficient to finance the police substation rehabilitation and other minor improvements.

Available Funding Sources

The financing and implementation of required improvements will depend on the availability of State and federal funds, the economic climate at the time the funding source is implemented, the willingness of governing bodies and local citizens to fund the region-serving improvements, and the success of the IDC to generate surplus operating revenues that can be leveraged to provide bonding capacity. Given the range of available instruments, this subsection profiles key sources of capital financing. Specific details regarding debt structure must be determined through subsequent analysis. The following represents a general discussion of each source and its potential for Mare Island capital improvement needs.

Local Revenue Sources

City-Allocated Funding: The City has access to several funding sources for financing Mare Island's infrastructure requirements. These sources include a new development Excise Tax and the Transportation Impact Fee. Other State and federal funding sources typically available to cities may become available. However, several of these programs are under-funded currently. Although State and federal sources are not assumed to be available for Mare Island, it is recommended that the City pursue such funding with all due diligence.

Excise Tax: An Excise Tax is a tax levied on new development with the purpose of raising revenues to pay for public improvements associated with Citywide growth. City of Vallejo has adopted an Excise Tax, and this tax is assumed to apply to new development on Mare Island. The City of Vallejo currently administers the tax at a rate of $3,394 per residential unit and $0.33 per square foot for commercial and office development; the tax does not apply to industrial development. Based on the new development assumed to occur on Mare Island, approximately $2.8 million could be raised from this source, as shown in Table 4-13. This revenue is assumed to be available to fund capital improvements on Mare Island.

Transportation Impact Fee: The City has adopted a Transportation Impact Fee to fund Citywide transportation improvements. This potential revenue source is assumed to apply to all new development on Mare Island; the potential revenue is estimated in Table 4-13. As shown, impact fee revenue from new development could total about $2.65 million. This estimate is based on the current adopted fee structure, which should be updated to include improvements associated with Mare Island, if needed. This revenue is assumed to be available to help offset transportation costs associated with the Reuse Plan.

State Revenue Sources

There are several State programs and funding sources for transportation improvements that could be targeted for funding Mare Island transportation improvements. These include the State Transportation Improvement Program (STIP), Inter-regional Road System (IRRS) Program, the Flexible Congestion Relief Program, the Congestion Management Program, and the State-Local Transportation Partnership. These programs are important sources of funding for local governments in California and are funds are very competitive and limited relative to need. This analysis does not assume that revenue from these sources would be available, but the City is encouraged to apply for any or all of these funds to the extent possible.

Federal Revenue Sources

Navy Funding: The Navy is responsible for the remediation of contaminated sites before conveyance. In addition, the Navy and other federal tenants are widely expected to pay a

Table 4-13
Existing Impact Fees and Charges
Mare Island Reuse Study

Impact Fee or Charge	Adopted Fee Amount	Unit of Measure	Estimated Revenue from New Development at Buildout
CITY OF VALLEJO FEES AND TAXES			
Transportation Impact Mitigation Fee (1)			
Multi-family	$1,649	unit	$1,319,200
Commercial Space	$1,450	1,000 s.f.	$394,400
Industrial Space	$480	1,000 s.f.	$941,782
Excise Tax (2)			
Residential	$3,394	unit	$2,715,200
Commercial/Office Space	$330	1,000 s.f.	$89,760
Total City Impact Fee Revenue			$5,460,342
GREATER VALLEJO RECREATION DISTRICT			
Park & Recreation Impact Fee (1,3)	$1,088	unit	$870,792

(1) Assumes only new development would be subject to impact fees.
(2) Assumes excise tax revenue could be used to fund infrastructure requirements on Mare Island.
(3) Assumes new condo units in the Marina Housing District would be two bedroom units on average.
Source: City of Vallejo; Economic & Planning Systems, Inc.

pro-rata share of operations and maintenance related to on-going tenancy on Mare Island. Since it is not expected that the Navy's continued presence on the island will result in additional capital improvements, the Navy is not assumed to fund any required improved backbone infrastructure.

Federal Base Closure-Related Funding: Research by the National Commission for Economic Conversion and Disarmament (ECD) suggests that communities hosting base closures in the 1990s have access to fewer federal economic development grants than did communities subject to base closures in the 1960s and 1970s. Compounding this issue is the recent emphasis on environmental clean-up -- which was not addressed to the same degree in the first generation of base closures in the 1960s and 1970s.

It is assumed that the federal government, via the Navy, will be responsible for funding environmental remediation. Beyond remediation, the availability of federal funds is unknown. Thus far, the City's receipt of federal funds for Mare Island Reuse has been limited to Office of Economic Adjustment (OEA) grants for "soft costs" such as surveys, land use planning, local staffing, and feasibility studies, in an accrued amount of $618,000 to date. Additionally, over a five-year period, the President's June 2, 1993 "Five-Point Program" calls for Department of Defense (DOD) planning assistance for upward of $3.5 million for each seriously impacted community, such as the City of Vallejo.

In addition, the City of Vallejo is currently applying for Economic Development Administration (EDA) funds. It is anticipated that the initial proposal to the EDA will be for an amount approaching $4.0 million. It is expected that the City will follow-up with additional proposals to the EDA, for subsequent funding as available.

Other potential federal revenues may become available as a result of source is to pursue special legislation from congress to appropriate federal transportation funds, to help finance the Southern Crossing. The magnitude of the federal funds that would be required to offset the cost of the bridge is approximately $86 million, which assumes the IDC could potentially fund about $20 million of this cost.

Other Federal Funding: As with State sources of revenue that are several potential federal funding sources for Mare Island improvements, which include the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), Surface Transportation Program (STP), and the National Highway System (NHS). These funding sources pertain to transportation related improvements. As with State sources, these revenues should be pursued to the extent possible; however, to be conservative, this analysis does not assume their availability.

Land-Based Funding

The IDC and other entities servicing Mare Island may use land-secured financing measures to fund infrastructure for which it is responsible. These measures potentially include Mello-Roos and assessment district financing.

Special Districts: Overall, this analysis assumes that it will be difficult to burden future property owners with traditional land secured assessments, given market considerations and potential values. The Operations Analysis, in Section 4.8, assumes that to the extent that assessments are used, they would be funded through net operating revenue from the IDC, as opposed to assessing future land owners and/or developers. As such, the land values assumed in the Operations Analysis assume fully improved and serviced land. The following discussion of special districts and assessments is for general information. The appropriateness of each individual item discussed will need to be considered in more depth once construction and financing are initiated.

Special districts can be used by a jurisdiction to obtain up-front financing for projects benefiting defined areas or developments. The two most commonly formed districts are assessment districts and Mello-Roos Community Facility Districts (CFDs). In addition, a Marks-Roos Bond Pooling Authority could be formed to pool the tax, assessment, or fee revenue from several jurisdictions or special districts for the purpose of selling bonds to construct public facilities.

The advantage of an assessment district or a Mello-Roos CFD is that facilities can be built ahead of the development that causes the need for those facilities. However, in many instances, funding provided through a special district is offset by a corresponding credit in development fees, such as school impact fees, for example.

Assessment Districts: Special assessments have been extensively used in California to fund public improvements and services. Assessments are not considered to be taxes, since they are used to pay for improvements that directly benefit land. As such, assessment methodologies should assess land owners in proportion to the benefits they derive from the subject improvement or service. General economic principles of special assessments include:

- Money raised must be for a public purpose.
- The subject improvement must benefit a defined and limited land area.
- The assessment should not exceed the cost of the improvement (including bond financing if applicable).
- The assessment on an individual parcel must be proportional to the benefit received.

The Benefit Assessment Act of 1982 allowed for the development of Citywide assessments for drainage, flood control, and street lighting. A 1989 amendment to the Act added street maintenance assessments. A special assessment district, encompassing the entire Plan Area (excluding or exempting existing residential units), could be formed to finance major backbone infrastructure including road, water, sewer, and drainage improvements. This method could be particularly useful for financing up-front costs.

It should be noted that the land values included in the Operations Analysis (section 4.8) reflect an assessment on land buyers, through the use of finished land values. The financing capability of this development could be realized either through:

- Selling land at unimproved prices and levying the assessment on users; or
- Selling the land at improved prices, with the IDC paying the costs that are over and above acceptable cost burden levels.

Mello-Roos CFD Special Tax: A Mello-Roos Community Facilities District (CFD) is similar to an assessment district, except that it is funded through a special tax rather than an assessment secured by a property lien. Also, Mello-Roos Districts can be used to finance improvements that are of "general benefit" such as schools and fire stations. Since a Mello-Roos tax is defined as a special tax under Article XIIIA of the State Constitution, it requires a two-thirds approval by landowners or registered voters in the District.

CFDs have and will continue to be used in Vallejo, and the city has expressed interest in forming a CFD on Mare Island. However, there are economic limits to the imposition of special taxes for regional improvements. This form of financing, like other methods that would raise the annual expenses incurred by tenants and landowners, may undermine the competitive advantages necessary to attract tenants to Mare Island.

Landscape and Lighting Maintenance District: Landscape and lighting districts (LLDs) may be used for installation, maintenance and servicing of landscaping and lighting through annual assessments on benefiting properties. LLDs can be used to fund the construction and maintenance of appurtenant features, including curbs, gutters, walls, sidewalks or paving and drainage facilities. LLDs are currently used in other parts of the City.

Redevelopment Tax Increment Funding: Redevelopment could also be used as a tool for providing needed capital and other revenues required under the Final Reuse Plan. Establishing a redevelopment project is an option available for funding redevelopment-related costs including infrastructure. However, a redevelopment project is not assumed in this analysis. Additional analysis would be necessary to precisely estimate the potential contribution of redevelopment.

Pending State legislation which will amend the Community Redevelopment Law to specifically address base closure projects will affect whether redevelopment is feasible, and should be considered in a specific analysis of the potential for a redevelopment area on Mare Island.

Enterprise Revenue-Based Funding: In addition, to land-secured techniques as discussed above, the IDC, the VSFCD, and other entities can capitalize user fees and/or lease revenue for purposes of funding capital improvements. Potential revenue sources for this purpose include the golf course green fees, marina lease revenues, monthly sewer and water charges, and user fees. This subsection briefly outlines several potential funding mechanisms for non-property-secured debt.

Lease Revenue Bonds: Non-profit corporations such as the IDC may issue lease revenue bonds to finance capital improvements for facilities that are leased to a public agency. For example, if the IDC enters into a long-term lease with a public agency on any part of Mare Island, lease revenue bonds could be issued to finance improvements whereby debt service is paid through lease revenue. The bonds are considered to be direct debt of the lessor and are payable solely from lease payments received from a public agency other than the issuer. Typically, full title to the improved facility reverts to the lessee after the debt is retired.

Public Enterprise Revenue Bonds: These bonds may be paid from the revenues of the enterprise that issues the bonds. Typical enterprises issuing such bonds include water and sewer districts and bridges. Revenues typically include connection fees and tolls. Issuers include public corporations, cities, counties, special districts, and public utility districts. In some cases a majority vote may be required.

4.7.7 Recommendations and Implementation Actions

This section presents a set of steps that will need to be undertaken to implement the Mare Island Reuse Plan's capital improvements. The IDC financing will embody an approach for organizing public and private financial resources towards successful development of Mare Island. Implementing this strategy requires that the City take an active role in the process, particularly in terms of prioritizing capital funding items to minimize upfront costs, setting realistic service standards and providing services efficiently.

There appears to be a wide variety of potential funding sources available to the City to fund the required improvements for the Mare Island Reuse Plan. The following section, which discusses the IDC Operations Analysis, provides an estimate of the potential phasing of infrastructure costs and a feasibility analysis. To the extent that other State and federal funds can be leveraged, the City should pursue such funds. However, this analysis assumes that the IDC will have the overall responsibility of funding required infrastructure improvements to the extent that existing Districts or utility company cannot do so.

Most crucial to the overall strategy, liaison should be maintained with parties interested in the development of Mare Island, including the City, the IDC, other affected districts, the property owners, developers, and others. The commitment of plan participants to cooperate with the plan process will determine the types of financing mechanisms that can be established to finance new development.

The sequence of actions listed below would be required to implement the Reuse Plan:

- Conduct subsequent financing analysis based on detailed phasing program.

- Establish contractual commitments among service entities (i.e. Navy, City, Utility Companies).
- Seek maximum regional, State, and federal funding for major infrastructure.
- Implement local financing mechanisms for major infrastructure, as necessary.

- *4.7(a) Conduct Subsequent Financing Analysis.* The financing analysis presented in this report provides a financing framework as well as an indication that the Reuse Plan can be successfully implemented. A more detailed financing analysis would require the following components:

  (1) More precise capital cost estimates, based on additional knowledge regarding contamination and other factors.

  (2) Prioritized infrastructure phasing assumptions developed through meetings among the City, engineering team, and other project team members.

  (3) Subsequent analysis of lease revenue potential, based on findings of initial financial feasibility analysis.

- *4.7(b) Establish contractual commitments among service entities.* The IDC, the VSFCD, the City, and other affected entities must establish funding and operations responsibilities based on negotiations with the Navy. Participants must seek specific contractual commitments from one another regarding infrastructure disposition, long-term development entitlements and financing of public improvements.

- *4.7(c) Seek Maximum Regional, State and Federal Funding for Major Infrastructure.* The IDC, the City, and other participants must actively pursue commitments from regional and State agencies to fund a large portion of transportation costs. Transportation is a critical infrastructure item affecting Mare Island. The City or the IDC will be required to provide a "local match" for the transportation costs in order to receive State and federal funds.

- *4.7(d) Create Comprehensive Local Financing for Major Infrastructure.* Establishment of comprehensive local financing is necessary to ensure that a financially feasible financing plan can be created to support development on Mare Island. Local financing should be comprised of both Mare Island property assessments as well as regionwide benefit assessments for region-serving infrastructure and public facilities. Subsequent analysis should be based on refined phasing and cost assumptions to more precisely estimate the need and capacity for additional financing.

4.8 OPERATIONS ANALYSIS

The purpose of the operations analysis is to assess the financial implications of managing, developing, and disposing of Mare Island's real estate assets, given reasonable estimates of rents, operating expenses, and capital requirements. The operations analysis is based on the recommended organizational structure for the operating entity and assumes that transfer of Mare Island occurs as outlined in Section 4.5. The operations analysis is based on the land use program described in Section 4.3 and also outlined in Table 4-14.

The results of the operations analysis will indicate the extent to which revenues generated from the lease and sale of real estate assets will cover the costs of maintaining the Island and provide debt capacity to finance needed infrastructure and other capital improvements. Given the preliminary nature of some of the inputs, the operations analysis is meant to provide general financial parameters and to identify potential funding shortfalls. However, using the operations framework developed here, subsequent refinements to absorption, costs, revenues, and sources of funding could be evaluated and adjusted on an ongoing basis.

This analysis incorporates and synthesizes research and analysis from several sources. The analysis reflects three points in time: 1996, 2006 and buildout. The operations analysis is presented in Tables 4-15 through 4-18. Key assumptions utilized in the analysis are summarized below. Then, projected revenues, operating expenses, and leasing-related capital costs are described. This is followed by a discussion of net operating income, supportable debt, available funds, and potential operating surpluses and/or shortfalls.

4.8.1 Key Assumptions

Operating revenues are based on the results of the market analysis (see Section 4.2) and on the professional judgment of the team's real estate brokers. Operating expenses are estimated based on comparable reuse projects and on Navy estimates. Cost estimates for upgrading Mare Island's utility systems are contained in Part II, Chapter 6 and 7. Key assumptions utilized in the operations analysis include the following:

- One of the primary objectives of the Island Development Corporation (IDC) will be to minimize initial capital and operating costs while leveraging available assets to implement the marketing program. To do this, costs have been allocated to other entities, including the Navy, public agencies, and the Island's future tenants where appropriate, based on their need for various operating and maintenance services.

- The analysis assumes that sales revenue generated from land sales are based on "finished" land values, i.e., with all infrastructure improvements in place. In other words, these land values include an assessment to the buyer for the cost of financing infrastructure improvements. In practice, the IDC may elect to use assessments to fund the costs of infrastructure in one of two ways: 1) by

Table 4-14
Summary of Operations (1994$)
Alternative 1
Mare Island Reuse Study

Item	Base Closure 1996	Transition through 2006	Buildout through 2026
Income from Operations			
Lease Revenue	5,553,783	16,194,039	20,999,583
Reimbursed Expenses	13,839,663	12,906,094	14,066,686
Total Annual Revenue	$19,393,446	$29,100,133	$35,066,269
Less Operating Expenses	15,869,326	18,951,121	20,021,891
Net Operating Income	$3,524,120	$10,149,012	$15,044,378
Supportable Debt (based on net operating income) (1)	$31,560,973	$90,891,539	$134,732,982

	Base Closure 1996	Transition 1997 - 2006	Buildout 2007 - 2026	Total
Capital Requirements				
Leasing-Related Capital Costs (2)	10,232,995	26,029,050	13,198,399	49,460,444
Upgrading of Utility Systems (3)	16,104,500	13,861,200	20,060,340	50,026,040
Transportation Improvements (3),(4)	6,800,000	13,000,000	147,944,618	167,744,618
Total Capital Requirements	$33,137,495	$52,890,250	$181,203,357	$267,231,102
Available Sources of Funds				
Revenue From Land Sales	0	7,332,000	44,236,050	51,568,050
Supportable Debt (5)	31,560,973	59,330,566	43,841,443	134,732,982
Total Sources of Funds	$31,560,973	$66,662,566	$88,077,493	$186,301,032
Total Surplus/(Shortfall)	($1,576,522)	$13,772,316	($93,125,864)	($80,930,070)

(1) Assumes: 8.5% interest
30 amortization
1.2 debt coverage ratio
Supportable debt shown here is cumulative.
(2) Includes building rehab, tenant improvements, lease commissions, and demolition costs.
(3) See the Infrastructure Cost Financing Analysis (Section 4.7) for more detail.
(4) Includes the proposed Southern Crossing bridge.
(5) Represents the debt that can be issued in each period, based on the net operating income generated.

Table 4-15
Project Description
Mare Island Reuse Study

		Base Closure - 1996	Transition -	2006	Buildout -	2026
Item	Unit of Measure	Cumulative Total	1996-2006 Total	Cumulative Total	2006-2026 Total	Cumulative Total
Existing Facilities - Market Uses						
Residential SF - Historic	units	52	0	52	0	52
Residential SF - Duplex (Travis)	units	400	0	400	0	400
Residential SF - Duplex (Market)	units	31	0	31	0	31
Residential Multi Family - Rental (1)	units	0	213	213	40	253
Residential Dorms (2)	units	0	802	802	0	802
Retail	sq. ft.	61,100	59,600	120,700	0	120,700
Office	sq. ft.	169,600	360,000	529,600	114,300	643,900
Light Industrial (3)	sq. ft.	178,500	278,560	457,060	144,140	601,200
Warehouse	sq. ft.	234,200	428,900	663,100	122,000	785,100
Heavy Industrial	sq. ft.	291,200	514,200	805,400	128,900	934,300
Education	sq. ft.	0	477,500	477,500	0	477,500
Golf Course and Clubhouse	acres	157.0	0.0	157.0	0.0	157.0
		782,117		3,053,517		
Existing and New Civic/Recreational Uses						
Rifle Range/Park	acres	14.6	0.0	14.6	0.0	14.6
Rodman Center	sq. ft.	0	0	0	0	0
Field Houses	sq. ft.	76,100	0	76,100	0	76,100
Developed Parks (4)	acres	63.0	44.0	107.0	0.0	107.0
Regional Park	acres	150.0	0.0	150.0	0.0	150.0
Marina	acres	0.0	0.0	0.0	11.3	11.3
Dry Dock #1 and Wood Shop	sq. ft.	76,705	0	76,705	0	76,705
Historic Ship Exhibit and Repair	sq. ft.	0	125,000	125,000	0	125,000
Historic Office	sq. ft.	0	26,940	26,940	0	26,940
Maritime Exhibits	acres	0.0	9.0	9.0	0.0	9.0
Open Space/Wetlands	acres	2000.0	0.0	2000.0	0.0	2000.0
New Development						
Residential Multi Family - Condo	acres	0.0	0.0	0.0	71.2	71.2
Retail	acres	0.0	0.0	0.0	0.7	0.7
Office	acres	0.0	0.0	0.0	17.6	17.6
Light and Heavy Industrial	acres	0.0	0.0	0.0	106.4	106.4
Warehouse	acres	0.0	0.0	0.0	32.8	32.8
Other Uses						
Mothball Space		2,780,040		509,340		0
Demolition (5)		0		2,130,278		4,260,555

(1) Excludes 300 units of Roosevelt Terrace housing.
(2) Includes 500 units in the educational complex, 302 units designated for McKinney Act and/or community service purposes; no revenue or expenses are assumed.
(3) Excludes Building 118 which is used for Park Services offices (see Historic Office).
(4) Includes existing playing fields, Chapel Park, Historic Park, Regional Park, new "active" recreational parks, the proposed fishing pier, and other new and existing "passive" parks; excludes the rifle range.
(5) Assumes that the 4.3 million sq. ft. of space that is not used is demolished.

Table 4-16
Project Revenues (1994$)
Mare Island Reuse Study

Item	Base Closure 1996	Transition 2006		Buildout 2026	
Lease Revenue (1)					
Residential SF - Historic	748,800	374,400		0	
Residential SF - Duplex (Travis)	0	0		0	
Residential SF - Duplex (Market)	316,200	316,200		316,200	
Residential Multi Family Rental	0	1,661,400		1,973,400	
Retail	549,900	1,448,400	13,542,036	1,810,500	18,409,980
Office	1,526,400	6,355,200		9,658,500	
Light Industrial	642,600	1,645,416		2,164,320	
Warehouse	421,560	1,193,580		1,413,180	1,216,986
Heavy Industrial	1,048,320	2,899,440		3,363,480	
Education	0	0		0	
Golf Course and Clubhouse	300,000	300,000		300,000	
Recreational Facilities	1	1		1	
Historic Complex and Dry Dock #1	1	1		1	
Marina	1	1		1	
Total Lease Revenue	$5,553,783	$16,194,039		$20,999,583	
Expense Reimbursements					
Travis Housing	1,036,800	1,036,800		1,036,800	
Retail	345,826	683,162		683,162	
Office	959,936	2,997,536		3,644,474	
Light Industrial	669,375	1,713,975		2,254,500	
Warehouse	878,250	2,486,625		2,944,125	
Heavy Industrial	1,092,000	3,020,250		3,503,625	
Navy Care and Custody Agreement (2)	8,857,476	967,746		0	
Total Expense Reimbursements	$13,839,663	$12,906,094		$14,066,686	
Land/Building Sales (3)					
Residential SF - Historic	0	7,332,000		7,332,000	
Residential Multi Family Rental	0	0		17,401,280	
Retail	0	0		143,312	
Office	0	0		3,603,283	
Industrial	0	0		13,070,091	
Warehouse	0	0		2,686,084	
Total Sale Revenue	$0	$7,332,000		$44,236,050	
TOTAL REVENUE	$28,250,922	$37,399,879		$79,302,319	

(1) With the exception of the Marina, all leases apply to existing facilities on the island.
(2) Reimbursement from the Navy for the maintenance costs of mothball space and, in 1996, for municipal services provided by the City; in 2006 and buildout, the Navy is not responsible for the municipal services fee.
(3) Net of sale commission.

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Table 4-16A
Revenue Assumptions

	Unit of Measure	Base Closure 1996	Transition 2006	Buildout 2026
Lease Revenue				
Residential SF - Historic (1)	per unit	$1,200	$1,200	$0
Residential SF - Duplex (Travis)	per unit	$0	$0	$0
Residential SF - Duplex (Market)	per unit	$850	$850	$850
Residential Multi Family Rental	per unit	$650	$650	$650
Residential Live Work	per unit		included in multi-family rental	
Retail	per sq. ft.	$0.75 NNN (2)	$1.00 NNN	$1.25 NNN
Office	per sq. ft.	$0.75 NNN	$1.00 NNN	$1.25 NNN
Light Industrial	per sq. ft.	$0.30 Ind. Gross (3)	$0.30 Ind. Gross	$0.30 Ind. Gross
Warehouse	per sq. ft.	$0.15 Ind. Gross	$0.15 Ind. Gross	$0.15 Ind. Gross
Heavy Industrial	per sq. ft.	$0.30 Ind. Gross	$0.30 Ind. Gross	$0.30 Ind. Gross
Education				
Golf Course and Clubhouse (4)	per year	$300,000	$300,000	$300,000
Recreational Facilities	per year	$1.00	$1.00	$1.00
Historic Complex and Dry Dock #1	per year	$1.00	$1.00	$1.00
Marina	per year	$1.00	$1.00	$1.00
Net Developable Acreage				
Multi-Family Residential		0.0	0.0	71.2
Retail		0.0	0.0	0.7
Office		0.0	0.0	17.6
Light Industrial		0.0	0.0	85.6
Light and Heavy Industrial		0.0	0.0	20.8
Warehouse		0.0	0.0	32.8
Land/Building Sales (5)				
Residential SF - Historic (1)	per unit	$0	$300,000	$300,000
Residential Multi Family	per acre	$260,000	$260,000	$260,000
Retail	per land sf	$5.00	$5.00	$5.00
Office	per land sf	$5.00	$5.00	$5.00
Industrial	per land sf	$3.00	$3.00	$3.00
Warehouse	per land sf	$2.00	$2.00	$2.00
Sale Commission on Improved Land		6%	6%	6%

(1) Assumes that historic homes are leased at base closure; in 2006, half are leased, half are sold; at buildout, all have been sold; sale prices are per BAE estimates.
(2) Triple net; tenants are responsible for all operating expenses.
(3) Industrial gross; tenants are responsible for all operating expenses with the exception of property taxes and insurance.
(4) Annual ground lease payment to the IDC from a private operator; assumes private operator funds the cost of expansion to 18 holes.
(5) Land values assume for "finished" land (with infrastructure improvements).

Table 4-17
Operating Expenses (1994$)
Mare Island Reuse Study

Item		Base Closure 1996	Transition 2006	Buildout 2026
Infrastructure Operations and Maintenance				
Utility Maintenance (1)		0	0	0
Bridge Operation (2)		500,000	500,000	500,000
Roads (3)		0	0	0
Subtotal Infrastructure		$500,000	$500,000	$500,000
General Operations				
Security		959,550	2,318,295	2,724,300
Cleaning		649,465	1,581,846	1,850,410
Trash Disposal		127,940	309,106	363,240
Building and Structural Maintenance		1,938,972	4,788,518	5,639,528
Utilities		794,410	2,189,481	2,622,420
Ground Maintenance (4)		202,972	180,020	181,620
Property Tax (5)		332,181	1,328,783	2,586,113
Insurance	$0.10	127,940	309,106	363,240
Pest Control Services (6)		464,000	464,000	464,000
Dredge Pond Inspection and Maintenance (6)		105,600	105,600	105,600
Overhead/Admin. (IDC staff/expenses) (7)		308,820	566,320	566,320
Subtotal General Operations		$6,011,850	$14,141,075	$17,466,791
Mothball Uses		$5,282,076	$967,746	$0
Expense Contingency Fund (8)		$500,000	$500,000	$500,000
Annual Municipal Services Fee (9)		$3,575,400	$2,842,300	$1,555,100
TOTAL OPERATING EXPENSES		$15,869,326	$18,951,121	$20,021,891

(1) It is assumed that the various districts and city departments taking over the utility systems will be responsible for annual maintenance costs. It is anticipated, as is typical, that annual maintenance costs will be funded with user fees.
(2) Based on Navy estimates.
(3) The Public Works Department will be responsible for road maintenance costs; these costs are included in the Fiscal Analysis (Section 4-6.2).
(4) A nonprofit recreational operator will be responsible for park maintenance; other grounds maintenance costs are included here.
(5) Derived from the Fiscal Analysis (Section 4.6).
(6) Based on the Navy's budget for caretaker status; costs should not change significantly with increased development activity.
(7) See additional detail on the following page.
(8) An additional allowance to account for a potential underestimation of operating expenses.
(9) An annual fee paid to the City for the costs of providing municipal services to the island.

Table 4-17A
Operating Expense Detail (1)

Expense Item	Unit of Measure	Office/ Retail	Indus. (2)	Resid. (3) 800	Mothball
		Annual Cost			
Security	per sq. ft.	$0.75	$0.75	$0.75	$1.00
Cleaning	per sq. ft.	$1.00	$0.35	$0.50	$0.00
Trash Disposal	per sq. ft.	$0.10	$0.10	$0.10	$0.00
Building Maint.	per sq. ft.	$1.90	$1.50	$1.29	$0.75
Electricity	per sq. ft.	$0.57	$0.57	tenants pay	$0.00
Gas	per sq. ft.	$0.18	$0.18	tenants pay	$0.00
Water and Sewer	per sq. ft.	$0.10	$0.10	$0.30	$0.00
Grounds Maintenance	per sq. ft.	$0.05	$0.05	$0.05	$0.05
Pest Control Services	per sq. ft.	$0.15	$0.15	$0.15	$0.00
Insurance	per sq. ft.	$0.10	$0.00	$0.10	$0.10
Property Taxes	per sq. ft.	$0.76	$0.00	$0.00	$0.00
Subtotal		**$5.66**	**$3.75**	**$3.24**	**$1.90**
Monthly Cost		**$0.47**	**$0.31**	**$0.27**	**$0.16**
Square Footage					
1996		230,700	703,900	344,800	2,780,040
2006		650,300	1,925,560	515,200	509,340
2026		764,600	2,320,600	547,200	0

(1) Tenants will be responsible for their pro rata share of the expenses as identified below.
(2) While no breakout is made here between industrial and warehouse space, it is assumed that operating expenses for warehouse space would be less, in proportion to rent.
(3) Assumes average residential unit size of 800 sq. ft; operating expenses are recovered from Travis tenants only.

Table 4-17B
IDC Staff and Admin. Budget (1)

Item	Base Closure 1996	Transition 2006	Buildout 2026
Salaries and Benefits (2)	$169,000	$390,000	$390,000
Occupancy Costs (3)	11,320	11,320	11,320
Equipment and Supplies	25,000	25,000	25,000
Communications (Telephone, Fax)	7,500	15,000	15,000
Travel (4)	6,000	15,000	15,000
Postage	5,000	5,000	5,000
Printing/Reproduction (5)	10,000	15,000	15,000
Professional/Consulting Services	75,000	90,000	90,000
Total	$308,820	$566,320	$566,320

(1) Annual allowances are used to provide an estimate of overall costs; in actuality, costs may be realloated among line item expenditures.

		1996	2006	2026
(2) Executive Director:		$100,000	$90,000	$90,000
Real Estate Manager		60,000	60,000	60,000
Admin./Personnel/Operations Manager		60,000	60,000	60,000
Financial Analyst		60,000	60,000	60,000
Administrative Assistant/Accountant		30,000	30,000	30,000
Subtotal Salaries		$130,000	$300,000	$300,000
Benefits	30%	$39,000	$90,000	$90,000
Total Salaries and Benefits		$169,000	$390,000	$390,000

(3) Assumes that office space is provided at no cost; IDC is responsible for its pro rata share of operating expenses, based on 2,000 sq. ft. of space.
(4) $3,000 allowance per employee per OEA funding parameters.
(5) Includes production of promotional materials.

Table 4-18
Leasing-Related Capital Costs (1994$)
Mare Island Reuse Study

Item	Base Closure 1996	Transition 2006	Buildout 2026
Building Rehabilitation			
Residential Rental	620,000	4,260,000	800,000
Industrial Rehab	1,407,800	2,443,320	790,080
Subtotal Building Rehab	$2,027,800	$6,703,320	$1,590,080
Tenant Improvements			
Retail	1,222,000	1,192,000	0
Office	5,936,000	12,600,000	4,000,500
Warehouse	0	0	0
Light and Heavy Industrial	0	0	0
Subtotal Tenant Improvements	$7,158,000	$13,792,000	$4,000,500
Lease Commissions	$1,047,195	$2,338,314	$1,216,986
Demolition	$0	$3,195,416	$6,390,833
TOTAL COSTS	**$10,232,995**	**$26,029,050**	**$13,198,399**

Table 4-18A
Leasing Related Capital Costs - Detail

	Cost		Units/Square Feet Base Closure 1996	Transition 1997-2006	Buildout 2007-2026	Total
Building Rehab						
Residential Residential	$20,000	/unit	31	213	40	284
Industrial Rehab (1)	$2.00	/sq. ft.	703,900	1,221,660	395,040	2,320,600
Tenant Improvements						
Retail	$20.00	/sq. ft.	61,100	59,600	0	120,700
Office	$35.00	/sq. ft.	169,600	360,000	114,300	643,900
Warehouse (2)	$0.00	/sq. ft.	234,200	428,900	122,000	785,100
Light and Heavy Industrial (2)	$0.00	/sq. ft.	469,700	792,760	273,040	1,535,500
Demolition	$1.50	/sq. ft.	0	2,130,278	4,260,555	6,390,833
Lease Commissions (3)	5%	of 1st 5 yrs. rent	$1,047,195	$2,338,314	$1,216,986	$4,602,495

(1) This is an average allowance; some buildings will be lease "as is"; some will require some rehabilitation.
(2) Tenants are responsible for tenant improvements.
(3) Applies to Retail, Office, Industrial and Warehouse space.

selling land at unimproved prices, issuing bonds to finance improvements and then levying annual assessments to the property owners to pay debt service on the bonds; or 2) by selling land at improved prices, issuing bonds, and using IDC operating revenues to pay debt service on the bonds. In sum, this analysis reflects the financing capability of development on Mare Island, while retaining flexibility regarding how this capability is used.

- The operating expenses reflected in this analysis include reimbursing the City for annual fiscal deficits which may occur. It is assumed that revenue from the Navy's Care and Custody agreement will help to cover fiscal deficits in the initial years. Before the City requests the IDC to reimburse fiscal deficits, all other mitigation measures, such as collecting municipal service fees from federal tenants, should be pursued.

- The Navy has prepared a budget which estimates the cost of operating Mare Island upon closure. This operating budget currently estimates total operating costs upon closure at approximately $14 million, and is based on the assumption that all buildings are in "mothball" status. This is not comparable to the Navy reimbursement presented in this chapter ($8.8 million), which is based upon our aggressive assumptions regarding partial reuse of the base by the IDC and its tenants.

- Leasing-related capital costs, such as building rehabilitation, tenant improvements, and demolition, were not based on a physical inspection of buildings and may vary significantly from the cost estimates used in this analysis.

- It is uncertain at this point whether the IDC or the various entities taking over the utility systems will be responsible for system upgrades. It is possible that the costs could be borne by the entities which would then be reimbursed through increases in district-wide user fees. Not included in this analysis is the cost of removing potentially abandoned utility systems, such as the industrial wastewater system. Clarifications regarding the amount and type of utility system costs borne by the IDC (i.e., upgrades and demolition) will have a significant impact the results of this analysis.

- All revenues, expenses and capital costs are reflected in constant (1994) dollars.

- Initially, some buildings may not be suitable for leasing due to health and safety regulations. These buildings will be "mothballed" and leased at a later date, after remediation is complete. While the IDC will oversee maintenance of mothballed property, the Navy will be responsible for the cost of maintenance.

- Of the total 8.1 million square feet of non-residential space (pgs. 16 and 17 of the Conceptual Reuse Plan), approximately 3.9 million square feet of existing buildings are projected to be occupied at buildout, including cultural and recreational facilities (see Table 4-15). An estimated 4.2 million square feet are projected to be demolished. The cost of demolition is assumed to be the IDC's responsibility.

4.8.2 Cash Flow Analysis

Revenues

Potential revenues are outlined in Table 4-16 and are comprised of lease revenue from existing buildings, operating expenses reimbursed by tenants, leasing of the historic homes on Captain's Row, ground lease revenue from the golf course, and land sales. Refer to the Table 4-16A for detail regarding project revenues (e.g., rents, sale prices and land values). Initial rents for office and retail uses are below prevailing market rates due to the competitive position of Mare Island relative to other regional office and retail markets. As occupancies increase, infrastructure improvements are constructed and amenities are put in place, rents for office and retail are expected to increase. Sale prices for retail, office and industrial land are based on "finished" land values, which include an assessment to the buyer for the cost of financing infrastructure improvements.

Lease revenue from tenants reflects the cost of renting the buildings. In addition, it is standard practice for tenants to be responsible for their pro rata share of operating expenses, which includes items such as private security services, cleaning, trash removal, grounds maintenance, and insurance. Tenants are also responsible for utilities; to the extent that their leased space is not separately metered, the IDC will pay the utility bills and then be reimbursed by the tenants. It is also customary for office and retail tenants to pay property taxes which are passed through by the owner. In the event that the owner is a public entity, the tenants are typically responsible for a "possessory interest" tax, which is approximately the same as property tax. In this analysis, the term "property tax" is used, although in reality, it may be either property tax or possessory interest tax. Industrial tenants do not typically reimburse owners for property taxes or insurance; to the extent that these expenses are incurred, they will be the responsibility of the IDC. All reimbursed expenses are reflected under "Reimbursed Operating Expenses" in Table 4-16; additional detail is provided in Table 4-16A.

Total annual gross revenues generated shortly after base closure, assuming approximately 900,000 square feet of leased non-residential space, are projected to equal $5.6 million, with an additional $13.8 million in reimbursed operating expenses. This assumes reimbursements from the 400 Travis-occupied housing units for (estimated at $1 million) for Island maintenance costs (excludes municipal service costs). It also includes reimbursements from the Navy for 2.8 million square feet of mothballed uses ($5.3 million) and for the net cost of providing municipal services to the Island (estimated at $3.6 million, which includes the

General Fund and Gas Tax fund deficits). Expense reimbursements are discussed in more detail in the following section. Total annual gross revenues are projected to equal to $28.2 million.

In 2006, with an estimated 2.6 million in leased non-residential space and about 970 residential rental units (including Travis housing), total annual gross revenues are projected at $37.4 million. Due to completion of some toxic remediation, approximately 2.3 million square feet is projected to be removed from mothball status and conveyed to the IDC, thus relieving the Navy from most of the maintenance responsibility. Expense reimbursements from the Navy are therefore reduced to $970,000. Approximately $7.3 million in sales revenue is estimated to be generated from the sale of 26 of the historic houses on Captain's Row. At buildout, with an estimated 3.1 million in leased non-residential space, and 229 acres of land sold for private development, total annual gross revenues are projected at $79.3 million.

No revenues are projected to be generated from the parks and recreational facilities that are leased to a nonprofit recreational operator. Land and historical facilities are assumed to be leased to the Parks Service for a nominal annual fee. The Educational Complex is also assumed to be conveyed to a private and/or nonprofit operator or leased for a nominal annual fee.

A potential source of revenue could be generated from storing dredge spoils and leasing the dredging equipment to other public or private entities. The Port of Oakland is currently in need of dredge spoil capacity. However, Mare Island's dredge ponds are not large enough at their current capacity to accommodate the large volume of dredge spoils from the Port of Oakland. Smaller users should be able to dispose of their dredge spoils at inland bay sites, which may reduce the demand for the Mare Island site. The dredging equipment is in fair condition but has a relatively short life span. Additional research regarding the potential sources of demand for the dredge ponds should be conducted.

It is estimated that approximately 200,000 cubic yards per year will need to be dredged in order to retain the use of Berths 16 through 19 for future maritime purposes. Some additional dredging (approximately 20,000 to 40,000 cubic yards) will be required for the historic ship berthing and repair activities and the marina. This assumes that the Army Corps of Engineers continues to dredge the channel to its current depth.

The current capacity of the existing ponds (estimated at 3.2 million cubic yards) could accommodate approximately ten additional years of Mare Island-related dredging, assuming that the Navy continues to dredge approximately 500,000 to 600,000 cubic yards per year in 1994 and 1995 and storage of 200,000 cubic yards per year occurs thereafter. The cost of increasing the ponds to 20 million cubic yards is roughly estimated at $8 million.

It is proposed that the City or IDC would manage the dredging operation as an enterprise fund. It is not expected that this will be a significant source of revenue to the City, due to the associated costs which will be incurred. It is recommended that a separate study be conducted regarding potential revenues from disposing of dredge spoils and renting the dredge equipment, the cost of increasing the ponds' capacity, and future dredging requirements.

Expenses

Operating expenses are outlined in Table 4-17, and are comprised of infrastructure operations and maintenance, general operations, and expenses associated with mothball uses. For detail regarding the components of operating expenses, refer to Table 4-17A.

Infrastructure Operations and Maintenance: It is assumed that the various districts and City departments taking over the utility and infrastructure systems (e.g., the Vallejo Water Department, Vallejo Sanitation and Flood Control District, PG&E, Public Works Department, etc.) will be responsible for the systems' annual operating and maintenance costs. The cost to operate the bridge on the causeway, based on Navy estimates, is projected at $500,000 per year.

General Operations: General operations expenses reflect the cost of operating and maintaining the grounds and buildings on the Island, but does not include the cost of providing municipal services. Most costs, such as security, cleaning, trash disposal, and utilities, are tenant related and thus increase with increased building occupancy. Other costs, such as pest control and dredge pond maintenance, are relatively fixed.

A detailed operating budget for the IDC is included in Table 4-17B. It is assumed that initially, the IDC will rely in part on staff from the City's Community Development Department for technical assistance where appropriate. Therefore, IDC staff members will initially include an Executive Director and an Administrative Assistant. Full staffing of the IDC will result in the addition of a Real Estate Manager, who will assist the Executive Director in overseeing overall project operations, including marketing, tenant improvements, leasing, and infrastructure construction; an Administrative/Operations Manager who will direct the administration and day to day operations of the staff and the Island; and a Financial Analyst, who will assist the Real Estate Manager with feasibility analysis, lease transaction analysis, grant writing, and operational budgets. Other administrative costs associated with the IDC, such as office equipment, printing/reproduction (i.e., marketing brochures), and consulting contracts, are outlined in Table 4-17B.

General operation expenses are projected at $6.0 million upon base closure, $14.1 million in 2006, and $17.5 million at buildout. General operating costs are mostly offset by operating expenses recovered (reimbursed expenses) from tenants. For example, of the $14.1 million in general operating expenses in 2006, $11.9 million (84 percent) is estimated to be recovered from tenants. Unreimbursed expenses include those incurred from the residential rental units and property taxes and insurance from industrial tenants. (Assuming that the residential rental units are leased to a private operator, the net revenue to the IDC would be comparable to the gross rent less operating expenses estimated in this analysis).

Mothball Uses: Buildings that will not be immediately utilized, due to environmental constraints or other factors, are assumed to be mothballed for future use. The costs associated with mothballed buildings include security, building maintenance, grounds maintenance, and insurance. Based on 2.8 million square feet of mothballed space at base closure, and 500,000 square feet in 2006, the cost to maintain this space is estimated at $1.90 per square foot, or $5.3 million at base closure and $970,000 in 2006. These costs are assumed to be the Navy's responsibility; the costs decrease over time as additional space is transferred to the IDC and then leased; at this point, the IDC takes over the financial responsibility of maintenance activities.

In addition to the maintenance costs associated with the mothballed buildings, the Navy is responsible for Mare Island operating costs during the initial years, including the costs of providing municipal services to the island, such as police and fire.

Total annual operating costs are estimated to total $15.8 million upon base closure, $19.0 million in 2006, and $20.0 million at buildout, including the costs of maintaining buildings in mothball status and the cost of reimbursing the City for providing municipal services to the Island. It should be noted that subsequent research and analysis regarding operating costs may result in some additional Island operating expenses. For this reason, an "expense contingency reserve" in the amount of $500,000 has been added as a line item expense.

Leasing Related Capital Costs

Table 4-18 and Table 4-18A provide an estimate of leasing-related costs, which are necessary in order to bring the buildings up to market standards so that they can be leased at market rental rates. Based on over 900,000 square feet of space at base closure, 1.6 million square feet in 2006, and 500,000 square feet at buildout, total capital costs associated with the leaseup of existing, revenue generating buildings are estimated at $10.2 million, $26.0 million and $13.2 million, respectively. The assumptions underlying these leasing-related capital costs are discussed below.

Building Rehabilitation: A number of physical improvements will need to be made to some of the residential units before they can be leased at the projected rental rates. The building rehabilitation costs are rough estimates, and should be refined based on a physical inspection of the units. Residential rental units are estimated to have rehabilitation costs of $20,000 per unit. The historic homes are leased as is, with relatively low rental rates to reflect the fact that no improvements are being made.

In addition to the residential rehabilitation costs, we have included an overall allowance for industrial building upgrades at $2.00 per square foot. Actual rehabilitation cost estimates will vary significantly depending on the condition of individual buildings; some buildings may be leased "as is" while some may require some upgrading.

Tenant Improvements: Building upgrades for retail and office uses have been included in the tenant improvement allowance. For retail tenants, it is expected that the buildings will be delivered in "shell" condition, and the tenants will be responsible for additional, specialized improvements. Improvements for office tenants includes building rehabilitation at $20.00 per square foot with an additional $15.00 allowance for tenant finishes, such as paint, carpet, and demising walls. The actual cost of improvements will vary depending on building condition; the costs provided here are average estimates of total improvement costs.

Lease Commissions: Lease commissions are included in this category because they are one-time costs incurred when the buildings are leased. Leasing commission have been estimated to be 5 percent of the first five years' rent. For ten year leases, an additional commission of 3 percent of the second five years' rent is typical, although we have not included it in this analysis, due to the uncertainty regarding lease terms.

Demolition: It will be necessary to demolish some of buildings which are not suitable for lease or sale. It is assumed that the 4.3 million square feet of space that is ultimately not used is demolished - half by 2006 and the remainder by buildout. The costs of demolition will vary widely between buildings depending on salvage value, type of construction, and other factors. In some cases the salvage value may result in net revenue to the IDC after demolition. An average allowance of $1.50 per square foot of demolished space is assumed.

Summary of Operations

The various components of the operations analysis are synthesized in Table 4-14. Income from operations includes lease revenue and reimbursed operating expenses, but excludes land and building sales revenue, which are one-time occurrences. Total annual operating income, net of expenses, is projected to equal to $3.5 million at base closure, $10.1 million in 2006, and $15.0 million at buildout. This annual income may be used to pay debt service on a loan or bond issue in order to finance leasing-related costs and other capital improvements. Based on a debt coverage ratio of 1.2, an 8.5% interest rate and a 30-year amortization, the annual net income generated from operations can support a loan amount or bond issue of $31.6 million at base closure, $90.9 million in 2006, and $134.7 million at buildout. The amount of supportable debt shown here is cumulative, based on an increasing net operating income over time.

Capital improvements costs include leasing-related costs, upgrading existing utility systems, and transportation improvements. The cost of these improvements is estimated at $33.1 million in 1996, $52.8 million in 2006, and $181.2 million at buildout, which includes the construction of the southern crossing bridge. It is uncertain at this point whether the IDC as opposed to various entities taking over the utility systems will be responsible for system upgrades. It is possible that the costs could be borne by the entities which would then be reimbursed through increases in district-wide user fees. Not included in this analysis is the cost of removing potentially abandoned utility systems, such as the industrial wastewater system. Clarifications regarding the amount and type of utility system costs borne by the

IDC (i.e., upgrades and demolition) will have a significant impact upon the results of this analysis.

Available funds to finance capital improvements include revenue from land sales and the debt capacity generated from net operating income. Additional infrastructure funding sources, such as federal and state infrastructure and transportation grants, citywide impact fees, and other sources, may also be used to fund capital improvements, and are discussed in detail in Section 4.7. In the early years, Navy funds from the Care and Custody Agreement are assumed to be available to pay for mothballed space and municipal services provided by the City (such as fire and police services).

The total surplus or shortfall for each of the time periods is based on the ability of the sale revenue, debt capacity and other funding sources generated in each period to finance the operating and maintenance costs as well as capital improvements constructed during that period. In 1996, a shortfall of $1.6 million is estimated because initial lease revenues are not sufficient to fund needed infrastructure improvements and the City's costs of providing municipal services to the Island. Infrastructure costs may need to be reduced slightly and/or deferred for a few years in order for there to be sufficient revenue to fund the necessary infrastructure improvements as well as the net cost of providing municipal services to the Island (i.e., the General Fund and Gas Tax Fund deficits of $3.6 million as estimated in the fiscal analysis). Another way to reduce the shortfall is to solicit Federal OEA funding for the IDC administrative expenses (estimated at approximately $300,000 in 1996).

It is assumed in this analysis that 1996 net operating revenues are leveraged to finance the capital expenditures. In reality, the capital expenditures will need to be made before the buildings begin to generate lease revenues. Therefore, some form of interim bridge financing, (possibly with EDA funding) will be needed.

In 2006, a surplus of $13.7 million in funding capacity is projected to be generated primarily due to debt capacity generated from lease and sale revenues outpacing interim period infrastructure improvements. During this period, the IDC should continue to pay a municipal services fee to the City to cover the costs of servicing the Island. Debt capacity generated from the net operating income should be reserved to fund the remaining infrastructure costs that will be incurred through buildout. To the extent that operating surpluses are reserved, additional funding in the form of interest income may also be available. If leaseup of space occurs at slower rates and/or actual rents are less than projected, the amount of the surplus will decrease correspondingly.

At buildout, a funding shortfall is projected in the amount of $93.1 million, primarily due to the proposed construction of the southern crossing bridge. To the extent that additional debt capacity is available from revenue generated during prior years, the deficit may be reduced to $80.9 million. Based on the estimated bridge cost of $106 million, the IDC could potentially provide matching funds of about 24 percent of the cost of the bridge, or $25 million.

In order to reduce this deficit, capital costs will need to be reduced and/or outside funding sources will need to be identified to finance some of the proposed capital improvements. If the General Fund is still experiencing a deficit at this point in time, the IDC should still be responsible for paying a municipal services fee to the City. It is estimated that this deficit will equal about $1.6 million per year at buildout, without proposed fiscal mitigation measures (see Section 4.6).

4.8.3 Conclusion

In 1996, project revenues are projected to be insufficient to cover Island operating expenses, to fund needed capital improvements and to reimburse the City for its fiscal deficit. A funding shortfall of $1.6 million exists after funding infrastructure and building improvements and paying the municipal services fee to the City (projected at $3.6 million). In order to reduce or eliminate the deficit that is projected to occur in this year, some capital expenditures may have to be deferred or reduced in scope. The City should also pursue Federal OEA funding for IDC administrative costs.

In 2006, revenues and debt capacity generated from the lease and sale of property exceed the cost of needed capital improvements. The surplus in debt capacity should be reserved to fund capital improvements in the following years.

At buildout, a funding deficit occurs primarily due to the proposed construction of the southern crossing bridge. Reserved debt capacity is not sufficient to fund the deficit; therefore, capital costs will need be reduced and/or outside funding sources will need to be identified to finance all of the proposed capital improvements during this period.

To the extent that leasing of buildings does not occur as quickly as projected in this analysis, it may have a significant negative effect on project's cash flow. Many of the capital improvements outlined in the initial phase are required before the buildings can be occupied. In addition, about 25 percent of general operating expenses will be incurred whether or not the buildings are occupied. Therefore, an aggressive marketing and leasing program is a critical component of the reuse strategy.

4.8.4 Recommendations and Implementation Actions

A framework has been developed for the operations analysis that should be refined as more specific information is obtained regarding toxic remediation, the physical condition of buildings, the timing of infrastructure improvements, and other factors. Listed below are a set of recommended steps that should be taken in order to improve future decision-making regarding the implementation of the reuse plan.

- *4.8(a) Refine the estimated costs of building rehabilitation, tenant improvements and demolition:* A building by building inspection will result in a much better sense of which buildings can be leased with a minimum amount of investment.

- *4.8(b) Refine the leasing and development phasing assumptions:* This should be based on a more detailed analysis of the number and timing of sites that will require environmental remediation as well as a thorough inspection of the site to determine which buildings have the greatest leasing potential at the lowest cost.

- *4.8(c) Coordinate the phasing of infrastructure improvements with the refined leasing and development program:* This will help to ensure the most efficient use of limited resources in order to match capital expenditures with increased revenue potential.

4.9 MARKETING AND DISPOSITION STRATEGIES

4.9.1 Overall Marketing and Disposition Strategy

As described earlier in this chapter, the IDC is recommended to have primary responsibility for marketing and ultimate disposition of property on Mare Island, except for those portions being conveyed directly to any educational institutions, federal agencies, or homeless service providers pursuant to the McKinney Act upon base closure in 1996. It is critical that marketing and disposition efforts for Mare Island property commence as soon as possible following the completion of the Final Reuse Plan. To begin the process of base conversion, generate new jobs, and start the flow of public revenues, the IDC must be formed and staffed as soon as possible.

This section suggests an overall strategy for marketing and ultimate disposition of Mare Island properties, as well as for individual subareas. It should be noted that in the near-term (1994 through 1996), Mare Island will still be an active military installation; therefore, the only disposition to end users during this period can be for those buildings and lands that have been master-leased by the IDC on an interim basis and have received a Finding of Suitable for Lease (FOSL), a form of environmental clearance which enables interim leasing. For these properties, it is assumed that the IDC will structure an interim sublease arrangement with sublessees, with terms matching the those under which the IDC has leased property from the Navy. To enhance marketability of these interim subleases, it is recommended that they be structured so that a "right of first refusal" to lease or purchase (depending on the circumstances) is incorporated, to be activated at some point soon after title has been conveyed to the IDC. The "right of first refusal" should incorporate as many of the terms and conditions of ultimate lease or purchase to the same tenant as will be possible at the point of interim lease negotiation.

Following base closure, environmental remediation, and a Finding of Suitability for Transfer (FOST), it is assumed that the Navy will convey properties to the IDC under either an economic development conveyance, a public benefit conveyance, or some combination of these forms of conveyance. If other forms of conveyance which require fair market values to be paid are utilized by the Navy, the recommendations contained in this section are not applicable, and the IDC's marketing and disposition strategy must be revised.

4.9.2 Disposition Options

Target Markets

Mare Island offers a substantial marketing and disposition challenge due to the range and complexity of types of property, as well as the need for substantial environmental remediation. Based on the recommendations given in this report, the IDC will be targeting a wide variety of lessees and buyers over a long period of time until disposition is completed. Parts of the Island will be leased to other public agencies. Other portions, including large industrial buildings, will be leased on an interim basis and ultimately sold to multiple "end user" companies, including those located across the U.S. and potentially overseas. Developable land will be sold to industrial, warehouse, office, and residential developers. Finally, some interim and/or final disposition transactions may involve investors in a multiplicity of partnership arrangements.

Each target market demands a marketing and disposition strategy tailored to its particular needs and ways of doing business. In addition, the quasi-public nature of the IDC, with public sector oversight, will require a degree of public input which can counteract the traditionally private nature of most real estate transactions.

Types of Ultimate Disposition

Until Mare Island has been closed and title to property conveyed to the IDC, interim subleasing will be the only method of disposition available to the IDC. This kind of subleasing can be utilized for both buildings and grounds. Following property conveyance to the IDC, it will be able to utilize three types of disposition: ground lease, building lease, and outright sale. This section describes these forms of ultimate disposition which must be selected for each property by the IDC after title has been conveyed by the Navy to it.

Disposition by Ground Lease: Ground leases would involve periodic (usually annual) payments to the IDC by a lessee for the right to occupy and build improvements on developable land. In certain cases, the IDC should consider disposition by ground lease instead of outright sale. These cases should include properties which consist primarily of developable land, none or limited improvements scheduled for demolition, and anticipated development costs that are high relative to the value of the finished product. In these cases, the project can be made more economically feasible if the developer does not need to pay for or finance outright land acquisition. Hence, a ground lease allows the developer to minimize up-front costs for land. Ground leases also allow for the IDC to receive a steady stream of income, which may yield higher returns than alternative forms of investment. Ground leases would also permit the IDC to maintain some level of control and oversight over the development project.

Ground leases are typically structured as a periodic payment representing a percentage of total land value; eight to ten percent of value per year, with five year adjustments, is typical. Such leases can be structured to defer payments until a project is generating an income stream to the developer, thereby indirectly subsidizing projects where market risk may be relatively high.

A disadvantage of ground leases is that the lessee can have difficulty obtaining financing for improvements, particularly in the case of for-sale housing units.

Disposition by Building Lease: For many of the buildings at Mare Island, a straightforward lease of the buildings (with or without equipment) will be most desirable, and will be the required form of disposition prior to conveyance of title by the Navy to the IDC. Leases should be carefully structured so that the tenant is responsible for as much building maintenance, grounds maintenance, and pro-rate share of Island operating expenses (for public services and common areas) as possible - a triple net arrangement, with tenants paying all expenses, is a common way to achieve this goal. In some cases, it is expected that in order to market the building and generate new employment opportunities, the lease rates may be set to only cover IDC pro-rata share operating expenses; any requirement for lease payments above this level may render the building unmarketable.

It should be noted that for those lessees not subject to normal property tax payments (e.g., non-profit organizations and other public agencies), a minimal rent charge is still anticipated to cover the provision of public services and Island pro-rata share operating expenses.

Since the IDC will seek to lease marketable buildings on an interim lease basis as soon as possible, and will also need to seek operating capital for site and infrastructure improvements, it may be possible to request pre-payment of the entire lease, subject to transfer of the property upon conveyance of title to the IDC. In this way, buildings could be quickly occupied, and ultimate disposition to commence in a manner that is advantageous to both the IDC and the lessee/eventual buyer.

For example, one of the more modern shell structures in either the CIA or the northern industrial area could be marketed at below market rents (say $0.30 per square foot per month) for an interim lease period of three years. The lessee agrees to pay the entire lease amount in year one, providing operating capital to the IDC. The IDC, in return, would agree to sell the building to the lessee at the end of the lease term, when conveyance to the IDC is completed. The agreed-upon sale price would likely reflect a discount for pre-paid lease payments as well the willingness of the lessee to assume the risk of committing to an eventual sale during a period of some uncertainty.

Disposition by Sale: Eventually, the IDC will probably seek to dispose of most Mare Island property through some form of sale of buildings and/or land. To effect sale transactions, the Island will need to be "parcelized" into individual land parcels that are surveyed and have legally recorded descriptions.

For some property on the Island, a bulk sale may be appropriate. In a bulk sale, more than one parcel is sold in bulk, typically at a discount from the total market value of individual parcels. A bulk sale of recorded or unrecorded parcels may be appropriate for large portions or all of the northern industrial area, so that it can be developed as a master-planned industrial/business park. Other examples of bulk sales may include apartments/barracks buildings and potentially all or part of the CIA.

Bulk sales enable the buyer to acquire land and/or buildings at a discount. This kind of sale also enables partnerships utilizing various forms of investor equity to be formed. The bulk property buyer may choose to hold and develop (e.g., for the north light industry subarea), develop and sell off individual parcels (in the case of redeveloped parts of the CIA), and other variations.

Disposition Methods

For public benefit development corporations such as the proposed IDC, there are four basic methods for achieving interim and final disposition: through direct marketing and negotiation by IDC staff and end buyers/lessees, Requests for Proposals, working with the real estate brokerage community, or through an auction process (e.g., public bid). Each of these methods will probably utilized at Mare Island. Each of the methods has advantages and disadvantages, as profiled below.

Disposition Through Direct Marketing and Negotiation: The IDC is recommended to be staffed with real estate marketing and disposition professionals; some members of its Board of Directors will also provide this type of expertise. In this way, much of the marketing and disposition transacting can be conducted in-house, with clear representation on behalf of the IDC and the City of Vallejo.

Assuming that the IDC has staff with marketing and disposition experience, one option for conducting property disposition is to work directly with potential buyers/lessees. This method will certainly be appropriate for those new users that are other public agencies such as Travis AFB and the Greater Vallejo Recreation Department; in these cases, marketing will not be needed, but a concentrated effort toward negotiating pro-rata share of operating costs and other lease terms will be critical.

Direct marketing and disposition may also be effective for users represented by corporate management who prefer dealing directly with representatives of the facility owner (i.e., the IDC). An example of this could be a large lease transaction for portions or all of the Heavy Industrial Area (formerly the CIA).

Disposition Through Requests for Proposals: Requests for Proposals (RFPs) are a disposition mechanism utilized by many public agencies and non-profit development corporations. Their primary advantage is the ability to allow for multiple "offers" at the same time, and to provide for public oversight of the process. RFPs are especially useful in situations when the selection of the successful buyer/lessee involves more than just the best financial offer. For example, RFPs can achieve public purpose goals such as requiring the inclusion of affordable housing within a residential project, or a special small business incubator with services to disadvantaged minority business start-ups. RFPs can also be an effective way for public benefit corporations to ensure high quality development in cases involving new development sites.

The primary disadvantage of RFPs is the "level playing field" nature of the process, resulting in the perceived need for proposers to prepare elaborate proposals, drawings, models, and presentation materials as well as to meet certain pre-determined criteria for financial solvency. This competition aspect of RFPs can discourage buyers/lessees who are not organized to conduct their business in a public manner, or who do not want to invest up-front funds to "win" the competition. The RFP process can also be very labor-intensive on the part of the IDC staff, who will need to work directly with prospective respondents throughout the process.

The choice of an RFP process to dispose of Mare Island property could limit the pool of prospective buyers/lessees. The use of RFPs should be carefully considered, but will likely be the most appropriate disposition method in certain cases (see Subarea discussion below).

Disposition Through Brokers: The brokerage community, with many national firms active in the Bay Area, can provide invaluable assistance to public benefit development corporations facing the challenge of marketing substantial pieces of property. Real estate brokers have continual sources of buyers/lessees, as well as connections to a large network of other brokers.

In some cases, brokerage assistance is not tapped by such corporations because of concern over the payment of commissions, which is the way private real estate brokers are compensated for their efforts in marketing property. In transactions involving two private sector parties, the seller/lessor typically pays the commission out of proceeds from the sale/lease. Because some public benefit corporations have organizational or legal constraints prohibiting them from paying commissions, it is difficult to interest brokers to work on transactions. Without the ability for the public benefit corporation to pay a commission for services rendered, the broker must rely on the buyer/lessee to pay the commission. This situation results in either a smaller commission and/or less active interest in marketing the property on the part of the brokerage community.

If possible, the IDC should be organized to offer commissions to the brokerage community; in this way, disposition through brokers will be a potentially viable method, especially for the industrial land and buildings in the former CIA and the northern industrial area.

Disposition Through Auction/Public Bid: The auction or public bid process has been used successfully by public agencies ranging from school districts to the Resolution Trust Corporation (the federal agency charged with disposition of real property acquired from failed financial institutions during the 1980s). Both of these mechanisms are appropriate for sale of real property, but do not fit the constraints of most lease transactions.

Auctions generally are most effective in situations where the terms of the disposition are relatively straight-forward, and do not require significant negotiation to complete the transaction. Auctions can also be effective when the marketability of the property is not clear. In these cases, the strategy is to set the minimum bid price relatively low, and let market demand determine the sale price through interactions among competing buyers. Public bids eliminate interaction from the process, with each prospective buyer making his/her best offer in writing, with only the anticipation of competing parties' offers to help determine the bid price.

A distinct advantage of the auction or public bid process from the standpoint of an organization such as the proposed IDC is the open, fair nature of the process. Price is the determining factor, and the opening of the bid or the auction itself are typically carried out in a public setting. A major disadvantage is also the openness of the process, which may limit the pool of willing participants. In addition, the "final" nature of this mechanism does not allow for much, if any, negotiation between seller and buyer, which might result in a decrease in potential net proceeds to the IDC.

4.9.3 General Marketing Strategy

In general, the marketing strategy for Mare Island should begin with a prioritization of efforts towards the overarching goal of attracting job-generating users as rapidly as possible.

Marketing entire communities such as Mare Island requires a blend of several techniques, all of which must be aimed at attracting the desired target markets which will generate jobs and provide revenue for the IDC. A good model for the recommended marketing strategy would be the approach taken by master developers of large master-planned mixed use communities. In this kind of marketing system, there are typically overall promotional efforts and collateral marketing pieces as well as focused prospectuses for individual buildings or development sites. The entire package of marketing materials is designed to function as a complementary system, with consistent logos and graphic styles.

To market the overall Island, the marketing strategy should include a series of brief and more detailed brochures, a press kit, an on-going press campaign, and special promotional events such as "Mare Island Grand Re-Opening Day" and invitation-only broker tours. In general, overall marketing for the Island should stress the range of real estate leasing and buying opportunities, the conversion of a closed base to a new community joining Vallejo. The theme should project an image of proactive property planning, management, and physical improvement.

A marketing package should be prepared for the marketing of each property or building. The package should contain an overview piece, as well as a more detailed "prospectus" with terms and conditions, and specific building and site data.

An effective marketing tool is a carefully designed entryway to the Island, which "announces" arrival and the image being projected. An information center near the entry, with marketing brochures, videos, and displays/copies of the Final Reuse Plan graphics should be constructed as soon as the IDC is formed.

Depending on the property being marketed and its target markets, additional marketing efforts may be initiated by the IDC. These may include advertisements in widely-circulated newspapers such as the Wall Street Journal, announcements to the brokerage community/press releases whenever a property is leased/sold, and articles about the successful conversion of Mare Island.

4.9.4 Recommendations and Implementation Actions

Near- and Mid-Term Subarea Marketing and Disposition Strategies

Table 4-19 summarizes the recommended marketing and disposition strategies for each subarea of the Island with near- and mid-term reuse potential, commencing with an interim lease arrangement and resulting in final disposition following conveyance of title to the IDC. The Table is provided as a framework for future strategic operations of the IDC; its recommendations should be considered as preliminary, subject to further analysis and findings regarding environmental constraints, building conditions, and market interest in Mare Island property. It is important to note that since markets change over time, any marketing and disposition strategy for Mare Island should be flexible; even though this Chapter recommends a sequence of subarea marketing and disposition efforts, the IDC's marketing emphasis should be capable of shifting to respond to rapid new demands from unanticipated users.

- *4.9(a) Commence Immediate Marketing and Interim Subleasing of North Light Industry Subarea (IDC):* The North Light Industry Subarea offers near-term (now to 1996) and mid-term (1996 to 2006) opportunities for the IDC to market and lease individual existing structures as identified in Appendix 4-G. It is recommended that interim leasing commence immediately. Staff of the IDC, if possible, would notify industrial brokers active in Solano County and the Bay Area at large about leasing opportunities in this subarea. This action should include immediate preparation of marketing materials for each building.

  At the same time that interim leasing commences, the IDC should undertake a master planning effort for the entire North Light Industry Area. The Master Plan would assess the condition and needed code improvements for every building, determine those buildings that should be demolished, site parking lots and circulation systems, and generally configure the subarea to function as a

Table 4-19 : Marketing/Disposition Matrix

Near- / Mid-Term (1994 - 2006)	Environmental Clean-Up Priority	Target Markets	Disposition Structure	Disposition Method
North Light Industry	High	Developers	Interim lease/ Bulk sale	Brokerage
Historic District	High	Public agency Private operator	Interim lease	RFP
Heavy Industrial Area	High	Corporations	Interim lease/ Parcel sales	Brokerage
Farragut Village	High	Travis AFB	Interim lease/ Long-term lease	Direct negotiation
Developed Recreation	Medium	Public agency	Transfer	Public benefit conveyance
Coral Sea Village	High	Travis AFB	Interim lease/ Long-term lease	Direct negotiation
Education/Office	Medium	Public agency Private institution	Transfer Lease	Public benefit conveyance RFP
Golf Course	High	Public/Private operator	Ground lease	RFP
Regional Park	Medium	Public agency	Transfer	Public benefit conveyance
Roosevelt Terrace	Medium	Private developers	Bulk sale	Public bid RFP
Long-Term (2006-2026)				
Neighborhood Center	Low	Developers	Bulk sale	Brokerage
Mixed Use/ Light Industry	High	Private or Non-profit organizations	Parcel sales	RFP
Marina Village	Low	Developers	Bulk sale/ Parcel sales	Brokerage

modern industrial park. This Master Plan effort will also assist in marketing the property, especially if the Plan provides for graphics and three-dimensional models of the Industrial Park as it will look and function at buildout. Finally, the Master Plan would enable fine-grained recommendations regarding parcelization.

- *4.9(b) Eventual Bulk Sale of North Light Industry Subarea (IDC):* As clean-up occurs and title is conveyed, it is recommended that the IDC consider a bulk sale of the entire North Light Industry Subarea (probably after 2006) with appropriate covenants and development restrictions. At that point, the presence of leased existing buildings will improve the marketability of the entire subarea, and developable land opportunities should be in demand, as some of the other County business/industrial parks will have built out. If parcelization has not occurred, the buyer should be notified that the City fully intends to cooperate with parcelization requests at a future date, subject to normal land planning and subdivision requirements.

- *4.9(c) Conduct Building-Specific Assessments in Heavy Industry Subarea (IDC, City of Vallejo):* This subarea will require intensive marketing efforts over the next three years if new employment opportunities are to be realized. To market the Heavy Industry Subarea, a fine-grained analysis of the marketability of individual buildings should be conducted. Buildings slated for demolition should be demolished, and site planning and implementation should commence to provide adequate parking and circulation for the remaining buildings.

- *4.9(d) Commence Intensive Marketing for Interim Subleasing of Heavy Industrial Subarea (IDC):* At the same time as detailed building assessments are occurring, interim leasing should commence. Marketing brochures for the subarea as a whole, including descriptions of available buildings, land, and equipment, should be prepared. A marketing campaign should be developed, involving target markets located in the region, the state, across the U.S., and overseas. To accomplish this, one or more experts in marketing of heavy industrial properties should be retained by the IDC to assist its own staff. The retention of these experts should be on an hourly basis. These experts should organize a targeted marketing campaign to corporations, trade organizations, and economic development organizations for those industries identified previously in this chapter. The campaign may involve traveling to call directly on potential users of the subarea, and preparation of a video profiling the area and its competitive advantages (rail and barge access, available equipment and fixtures, a location near skilled labor force, and expressed commitments from the IDC and the City of Vallejo).

- *4.9(e) Explore Possibility of Public Agency Creating an Historic Ship Repair Facility in Portion of Historic District (IDC, Navy):* For the portion of the Historic District devoted to historic ship repair and interpretative exhibits, discussions with an agency such as the National Park Service should commence immediately upon formation of the IDC to arrange for a near-term interim lease of all property receiving a FOSL. This may involve building strong congressional support for the project so as to secure the appropriations necessary for the National Park Service to operate the historic activities. Once conveyance is possible, this portion should be conveyed to the public agency.

- *4.9(f) Prepare for Eventual Bulk Sale of Captain's Row/Alden Park Portion of Historic District (IDC):* A portion of the Historic District is recommended for eventual sale in bulk to a private organization for re-sale or use as either residences, lodging, visitor-serving retail, restaurants, and/or small offices (i.e., includes Captain's Row houses and Alden Park). This portion should be part of the interim lease to the IDC; as soon as conveyance to the IDC has occurred, the IDC should prepare to either auction or hold a public bid offering on the subject properties.

- *4.9(g) Commence Marketing and Interim Subleasing of Golf Course (IDC):* This subarea is recommended for ground lease disposition (interim and final) as soon as the IDC is formed. It is likely that the golf course will be leased directly to a public or private operator who will desire to commence golf course expansion as soon as environmental clearance and development approvals can be obtained.

- *4.9(h) Complete Interim Sublease of Farragut Village/Coral Sea Village (IDC):* For purposes of the Final Reuse Plan, it is assumed that both Farragut Village and Coral Sea Village will be acquired by the IDC and leased to Travis AFB, first on an interim lease basis if necessary, and eventually on a long-term lease basis. While rent revenue will likely be minimal, the lease transaction must involve charging a pro-rata share of public service provision costs as well as other Island operating costs.

- *4.9(i) Prepare for Eventual Leasing of Balance of Education/Office Subarea (IDC):* The IDC should incorporate the subarea into its master interim lease with the Navy, as well as ultimate conveyance for purposes of eventual long-term leasing to other public or private educational users. A portion of this subarea could also be marketed as a conference center, depending on an analysis of building suitability, building renovation costs, and market demand.

- *4.9(j) Commence Discussions with Public Agency for Public Benefit Conveyance of Developed Recreation Subarea (City of Vallejo, Navy):* Disposition for this subarea will likely be directly to a public agency and will occur following base closure through a sublease or public benefit conveyance. The City of Vallejo should assist the Navy in identifying and initiating discussions with the appropriate public agency to ensure that the disposition process proceeds smoothly.

- *4.9(k) Commence Discussions with Public Agency for Public Benefit Conveyance of Regional Park Subarea (City of Vallejo, Navy):* Disposition for this subarea will be directly to a public agency, and will occur following base closure through a public benefit conveyance. The City of Vallejo should assist the Navy in identifying and initiating discussions with the appropriate public agency to ensure that the disposition process proceeds smoothly.

Long-Term Subarea Marketing and Disposition Strategies

Table 4-19 also provides a summary of recommended longer-term final disposition strategies for those subareas anticipated to experience more moderate market demand until after the year 2006. These recommendations should be considered preliminary, subject to further building assessments and environmental remediation planning.

- *4.9(l) Prepare for Eventual Parcel Sales of Mixed Use Office/Light Industry Subarea (IDC):* This area is considered a long-term opportunity as a location for subdivided historic and non-historic structures into facilities for small businesses and emerging industries along the lines of San Francisco's South of Market neighborhood. Ultimate disposition is recommended in the form of individual building sales to private and/or non-profit organizations, including groups dedicated to providing incubator support services.

  If the IDC has the resources to devote to it, certain marketing activities could occur sooner. The IDC should commence marketing this subarea by directly issuing a Request for Proposals to business incubator specialists and others with demonstrated track records in rehabilitating historic and non-historic industrial buildings for small business use. The first transaction should be conducted on a deep-discount basis, to "kick off" the inception of this redevelopment activity. Once a developer has been selected, renovations have been completed, and the subarea has gained its new image for small business activity with a waterfront view, subsequent transactions could be handled either through an auction mechanism or by working with brokerage firms.

- *4.9(m) Prepare for Lease/Sale of Recreational Facilities in Neighborhood Center Subarea (IDC):* This subarea contains a mixture of facilities which may have near- or mid-term recreation potential, as well as structures and new development sites (from demolition of existing buildings) with longer-term potential for reuse. The recreational facilities should be considered as candidates for IDC leasing or sale as soon as conveyance is completed.

- *4.9(n) Conduct Master Planning and Demolition for Non-Recreational Portions of Neighborhood Center Subarea (IDC):* For the balance of this subarea, a longer-term disposition strategy should involve more fine-grained building assessment, site and subarea master planning (for parking, landscaping, circulation, and parcelization), and demolition.

- *4.9(o) Eventual Bulk Sale of Non-Recreational Portions of Neighborhood Center Subarea (IDC):* After title has been conveyed to the IDC and remediation has been completed, this portion of the subarea is recommended for eventual bulk sale to a master developer with expertise in creating a mixed-use pedestrian-oriented neighborhood center. If parcelization has not occurred at that point, the City of Vallejo should express a commitment to work with the eventual purchaser to achieve appropriate parcelization.

- *4.9(p) Clear Site and Prepare for Eventual Bulk Sale of Marina Residential Subarea (Navy, IDC):* This subarea offers the opportunity to create an entirely new residential community with a waterfront orientation. It is likely that environmental remediation needs, as well as market conditions, will cause this subarea to not be marketable for ultimate disposition until after 2006. When the IDC has resources to devote to it, the subarea should be cleared of all non-historic structures and those historic structures deemed not re-usable. This subarea should ultimately be marketed as a bulk sale, with master planning to be carried out by the buyer in cooperation with the City of Vallejo. This is recommended because the longer-term nature of the marketplace will make it difficult to complete detailed master planning in advance of disposition, and the ultimate buyer may desire to explore a range of options for site planning and design.

  It should be noted that this subarea has been assumed to contain a 40,000 square foot retail facility to serve new residents, marina visitors, and nearby regional park visitors. The facility has been sized to enable incorporation of a junior full-service grocery store to enhance marketability of the new residential units as well as serve the balance of the Island upon buildout.

Appendix 4-A: Bay Area Military Base Closures

Land Use	Units	Mare Island	Alameda NAS	Treasure Island	Presidio
Dormitory	beds	2,000	2,500	2,200	1,415
Residential	du	1,083	1,513	1,009	1,144
Retail	sq. ft.	125,000	80,000	110,000	166,000
Industrial	sq. ft.	3,100,000	1,512,000	n.a.	734,000
Warehouse	sq. ft.	2,900,000	6,900,000	156,000	452,000
Office/Education	sq. ft.	1,700,000	260,000	473,000	1,460,000
Special features					
Clean Room		x	x		
Electronics Shop		x			
Sheet Metal Shop		x			
Pipe Shop		x			
Paint and Blast Facility		x	x		
Engine Repair Facility			x		
Metal Plating Facility			x		
Runways			x		
Hangars			x	x	x
Deep Water Port		x	x		
Marina			x	x	
Conference Center				x	
Firefighting School				x	
Medical/Research Center					x
Historic Buildings		x		x	x
Golf Course		x			x

(a) Roosevelt Terrace

Source: Bay Area Economics; Mare Island Base Reuse Plan; Presidio Draft General Management Plan Amendment; Base Conversion Offices: Mare Island, Alamed

Appendix 4-B: Existing and Planned Industrial Projects, Primary Market Area

Project Name	Acres	Usage	Open Date	Total Sq. Ft. Approved	Sq. Ft. Completed	Asking rent/ Land Prices	Major Tenants	Comments
VALLEJO								
South Vallejo Business Park	20	Office, light industrial	1990	400,000	400,000	NA	Meyer Cookware Petrochem Herguth O.I.	No rail. No Vacancy. All custom build-to-suit. Undeveloped 4 acres due to lack of financing.
BENICIA								
Fleetside Commerce Center	8	Industrial, office	1991	155,000	155,000	NA	Fresenius USA Babcock/Wilcox	No rail. No vacancy. No TI allowances. Lease rates down 20% from 2 yrs ago. Market relatively soft. Mostly local entrepreneurs.
Benicia Commerce Center Ph I	10	Office, industrial	1979	160,000	160,000	NA	Campbells Carpets	No rail. No vacancy. No TI allowances. Lease rates down 20% from 2 yrs ago, market soft. Primarily small local businesses.
Phase II	20	Office, industrial	NA	225,000	0			
Drake Industrial Park	13	R&D incubator	1991	40,000	40,000	$.45-.95/SF $3/SF land	DWIP TMC Tool Calibration	No rail. Occupancy 86%. Sale pending on remaining 4 acres. Anticipating 800,000 SF to come back on market if warehouse for wine relocates out of center.
Benicia Industrial Park	NA	Heavy industrial	1975	1,900,000	1,900,000	NA	Post Trucking Meyer Cookware Burke Furniture	Rail access. Occupancy 80% with 40 tenants. Little turnover; vacancy reflects existing tenants scaling up and down.
FAIRFIELD								
Fairfield Corporate Commons	18 65	Office, R&D	1986	70,000 858,000	70,000 0	$.60NNN/SF	State Farm Ins. Marshalls Aetna	No rail. Tenant allowance is $12/SF. No on site amenities.
Nova Business Park	10 12	Light industrial	1981	150,000 264,000	150,000 0	$2.40/SF land	Mosquito Abating Solano County	All owner occupied, no spec space. No rail.
Busch Corporate Center	260	Office, R&D, light industry, retail	1977	2,600,000	670,000	$3-4.5/SF land * $9-12/SF land **	Walmart Air Co. Spieker Partners	* price for office and light industrial uses. ** price for retail. No rail.
2349/2351 N. Watny Way	5	Office, lt. industrial	1981	175,000	175,000	$.45/SF gross	Solano County	No TI allowances. No vacancy. Build-to-suit. Class A office space. No rail.
459 Edison Ct.	5	Office, Lt. industrial	1981	175,000	96,800	$.30-.35/SF gross	none	No TI allowances. No vacancy. Small service businesses. Class B office space. No rail.

Appendix 4-B: Existing and Planned Industrial Projects, Primary Market Area

Project Name	Acres	Usage	Open Date	Total Sq. Ft. Approved	Sq. Ft. Completed	Asking rent/ Land Prices	Major Tenants	Comments
VACAVILLE								
VacaValley Business Park	400	Office, R&D, ind.	1979	4,000,000	0	NA	NA	No rail.
	50	Regional Med. Ctr.	1994	720,000	142,000 *	$3-$5/SF land	Kaiser	* 142,000 SF in construction, expected to open Fall 1994.
	5	Financial offices	1995	60,000	30,000 *	$3-$5/SF land	NA	* First Phase contingent on escrow closing.
	3	Insurance offices	1995	18,000	18,000 *	$3-$5/SF land	NA	* Contingent on escrow closing.
Other Vacaville Industrial and Office Space				6,500,000	1,800,000			Numbers are approximate.
UNINCORPORATED SOLANO COUNTY								
Lambie Industrial Park	1100	Heavy industrial	1982	10,000,000	200,000	$.01-.05/SF*	Greenhill	* Rate for unimproved land. ** Rate for improved land.
						$.20-.25/SF**	Precast Steelworks	*** Office building lease rate.
						$.50-.60/SF***	Schneider Trucks	900 acres still available. Rail Access.
PLANNED PROJECTS								
Casa Verde Planned Employment Center	128	Office, R&D, light industrial	NA	0	NA	NA	NA	Tenant lease can occur only after the Master Plan is adopted Initial tenant must be for at least 20 acres. No rail.

SUMMARY OF INDUSTRIAL/OFFICE SPACE IN SOLANO COUNTY

TOTAL APPROVED / BUILT	28,470,000 sf
TOTAL BUILT	6,006,800 sf
NET APPROVED / NOT BUILT	22,463,200 sf

Appendix 4-C
Mare Island Target Industry Analysis

The purpose of the Mare Island target industry analysis is to analyze the industries that demonstrate the greatest potential for growth in the nation, state, and region. Vallejo will have the greatest chance of success in recruiting firms to Mare Island by focusing on the attraction of industries that show growth potential and are outperforming the other manufacturing sectors.

GROWTH SECTORS MOST LIKELY TO BE ATTRACTED TO VALLEJO DO NOT MATCH MARE ISLAND BUILDING TYPES

A careful review of Table 7 shows that most industries that indicate a growth potential do not match the types of buildings that will be available in Mare Island. Thus, Table 7 provides a set of economic indicators on the performance of specific industries that the City may try to recruit into Mare Island.

Column (1) is a measure of employment changes in U.S manufacturing between 1987 and 1991.[1] The data shows that employment in U.S. manufacturing actually declined by 888,400 jobs during the four year period. On an average each sector declined by 6,473 jobs. The manufacturing sectors ranked (1) showed an actual growth of more than 1,000 jobs. The manufacturing sectors ranked (2) also demonstrated some positive job growth of between 1 and 1,000 jobs. Sectors with a rating of (3) declined in total employment by between 1 and 3,266 jobs. However, these sectors still outperformed the total of U.S. manufacturing. Sectors with a rating of (4) declined between 3,267 and 6,532 jobs, straddling the median of U.S. manufacturing decline. Sectors rated (5) declined by more than 6,533 jobs, and performed well below the U.S. manufacturing total.

Column (2) combines separate indicators of value added manufacturing and value of shipments, and adjusts the data for inflation in order to measure the changes in constant dollars.[2] The data shows that value added manufacturing and shipments also declined in real dollars by more than $226 trillion. On average, each the real change in combined value added manufacturing and shipping declined by $1.7 trillion per sector. Sectors that showed any real positive growth were ranked (1). Sectors that declined by less than $830 billion were given a ranking of (2). Sectors that declined by more than $830 billion, but less than $1.7 trillion (the average decline) were ranked (3). Sectors that declined by more than $1.7 trillion, but less than $2.5 trillion

[1] Employment data is published by the U.S. Department of Commerce in the Annual Survey of Manufacturers report.

[2] Value added manufacturing and value of shipments data is published by the U.S. Department of Commerce in the Annual Survey of Manufacturers report.

performed below average and were ranked (4). Finally, sectors that declined by more than $2.5 billion performed well below the U.S. average and were ranked (5).

The data in columns (3), (4), and (5) are measures of each industrial sector's performance in California relative to the U.S. Column (3) measures each sector's location strength in California relative to the U.S.[3] On average, 11.3 percent of all U.S manufacturing employment was in California. The strongest sector was computer and office equipment where California firms captured 29.4 percent of all U.S. employment. The weakest sectors were in textiles where California firms captured only 2.6 percent of all U.S. employment. Sectors where California firms captured more than 14 percent of U.S. employment were ranked (1). Sectors where California firms captured between 11.2 percent and 14 percent of employment were ranked (2). Sectors where California firms captured between 8.4 and 11.2 percent of employment were ranked (3). Sectors where California firms captured between 8.4 and 5.6 percent of employment were ranked (4). Finally, sectors that captured less than 5.6 percent of U.S. employment were ranked (5).

Column (4) measures the shift of manufacturing employment in California compared to the U.S between 1988 and 1991. During that time period the U.S. and California both lost jobs.[4] The shift share measurement of 1.01 means that California manufacturing lost jobs at a slightly slower rate than did U.S. manufacturing. Manufacturing in iron and steel foundries (SIC 332) was the fastest growing sector in California where employment more than doubled from 2,601 jobs in 1988 to 5,906 jobs in 1991. During the same time period U.S. employment in this sector actually declined. The worst performing sector was in the manufacture of farm and garden machinery where California firms experienced nearly a 30 percent employment decline during a time when U.S. employment in that sector actually expanded by 3.2 percent. Firms where California's shift-share was greater than 1.12 were ranked (1). Firms where California's shift-share was between 1.11 and 1.05 were ranked (2). Firms where California's shift-share were between .98 and 1.04 were ranked (3). Firms where California's shift-share was between .91 and .97 were ranked (4). Firms where the shift-share dropped below .9 were ranked (5).[5]

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[3] Location quotient calculations are made by ADE using data published by the U.S. Department of Commerce in 1991 County Business Patterns Reports.

[4] Shift-share calculations are made by ADE using data published by the U.S. Department of Commerce in the 1988 and 1991 County Business Patterns Reports.

[5]. The shift-share calculation for five sectors in column (4) was not made because actual data has been withheld by the U.S. Department of Commerce.

Column (5) is a measure of projected growth rather than a measure of past performance. The California Employment Development Department projects that California firms will create 88,000 new manufacturing jobs between 1990 and 2005.[6] On average there will be 647 new jobs created in each manufacturing sector. Sectors that were projected to create more than 970 jobs were ranked (1). Sectors that were projected to create between 647 and 970 net new jobs were ranked (2). Sectors projected to create between 323 and 647 net new jobs were ranked (3). Sectors projected to create between 1 and 323 net new jobs were ranked (4). Finally, sectors projected to experience a net decline in employment were ranked (5).

The data in columns (6) and (7) are measures of each industrial sector's performance in the three county area of Solano, Napa, and Contra Costa relative to California. Column (6) measures the shift of manufacturing employment in California compared to the U.S between 1988 and 1991. The shift share measurement of 1.04 means that the three county area gained manufacturing jobs at a slightly faster rate than did California manufacturing. Sectors where the three county region's shift-share was greater than 1.31 were ranked (1). Sectors that have a shift-share between 1.3 and 1.1 were ranked (2). Sectors that have a shift-share between .89 and 1.09 were ranked (3). Sectors where the shift-share was between .69 and .88 were ranked (4). Sectors where the shift-share dropped below .69 were ranked (5).[7]

Column (7) measures each sector's location strength in the three county area relative to California.[8] On average, only 4 percent of all California manufacturing employment was located in the three county area. The strongest sector was petroleum refining where firms in the three county area captured 17.5 percent of all California employment in that sector. Conversely, there were a number of manufacturing sector's that had no firms in the three county area. Sectors where the three county area captured more than 4.1 percent of California employment were ranked (1). Sectors where the three county area captured between 3.1 percent and 4.1 percent of employment were ranked (2). Sectors where the region captured between 2 and 3 percent of California employment were ranked (3). Sectors where the region's firms captured some employment, but less than 2 percent of California's employment were ranked (4).

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[6] Data published by the California Employment Development Department, <u>Projections of Employment in California 1990 - 2005.</u>

[7]. Shift-share calculations are made by ADE using data published by the U.S. Department of Commerce from the 1988 and 1991 County Business Patterns Reports. The analysis is a measure of shift-share among establishments rather than employment as measured in column (4). The shift-share calculation for nearly half of the sectors in column (6) was not made because actual data has been withheld by the U.S. Department of Commerce. In some cases, however, the shift-share could not be calculated because of the complete absence of firms in the region during 1988 or 1991. If the region grew from 0 firms in 1988 to some firms in 1991 then the sector would be give a ranking of (1). If the region declined from some firms in 1988 to 0 firms in 1991 then the sector would be give a ranking of (5).

[8] Location quotient calculations are made by ADE using data published by the U.S. Department of Commerce in 1991 County Business Patterns Reports.

Finally, sectors where there were no firms in the three county area were ranked (5).

RECOMMENDED TARGET INDUSTRIES

Table 8 summarizes the target industry analysis by analyzing past and future performances of the manufacturing sector by 3 digit SIC code and assigning a numerical rating system that compares the performance of each sector with the other manufacturing sectors. The numerical ratings were based on the composite scores provided in column (8). In summary, the sectors that have lower composite scores are more likely to be attracted to Vallejo based on national, state, and regional performance indicators.

The average composite score for each sector is 10.27. Sectors given a numerical rating of (1) have a composite score of less than 8.75. Sectors with a composite score of between 8.76 and 9.76 also perform above the all manufacturing industries and are given a composite score of (2). Sectors with a composite score of between 9.77 and 10.77 have performed around the median of all industries and are rated (3). The remaining sectors perform well below the median of all industries. They are not give any rating score.

The indicators suggest that efforts to attract industries that are not give a rating will be difficult, although not impossible. That is, the indicators measure a net growth or decline in each sector. Even sectors in decline have expanding firms. In addition, declining sectors are often being restructured through mergers and acquisitions that leads to plant closings and expansions in other facilities. These events may create opportunities for Mare Island to attract industries in an overall decline and consolidation. These efforts, however, have to be achieved through a case by case individual basis.

In summary, sectors given the rating of (1) or (2) in column (9) are the targeted industries that Vallejo would most likely be able to recruit into the area. Industries that are designated with either a (1) or (2) have all demonstrated a growth track record that exceeds: the performance of U.S. manufacturing, exceeds the performance of California manufacturing relative to U.S. manufacturing, is projected for strong growth in California, and exceeds the recent performance of the three County region relative to manufacturing growth in California.

With these criteria in place an effort to recruit the following industries to Vallejo will have the greatest chance of success.

<u>Food and kindred products</u>

- SIC 203 Preserved fruits and vegetables (1)

- SIC 204 Grain Mill Products (2)
- SIC 206 Sugar and confectionery products (1)
- SIC 207 Fats & oils (2)
- SIC 208 Beverages (1)
- SIC 209 Miscellaneous food & kindred products (1)

Apparel & Other Textiles

- SIC 238 Miscellaneous Apparel (2)
- SIC 239 Miscellaneous textile products (2)

Lumber and wood mill products

- SIC 243 Milwood, plywood, structural (2)
- SIC 244 Wood containers (1)

Furniture and fixtures

- SIC 253 Public building furniture (2)
- SIC 254 Partitions and fixtures (1)
- SIC 259 Miscellaneous furniture & fixtures (2)

Paper and allied products

- SIC 265 Paperboard containers and boxes (1)
- SIC 267 Miscellaneous converted paper products (1)

Printing and publishing

- SIC 271 Newspaper publishing & printing (2)
- SIC 272 Periodical publishing and printing (1)
- SIC 273 Books (1)
- SIC 274 Miscellaneous publishing (1)
- SIC 275 Commercial printing (1)
- SIC 278 Blankbooks and bookbinding (1)
- SIC 279 Printing trade services (1)

Chemicals and allied products

- SIC 281 Industrial inorganic chemicals (1)
- SIC 283 Drugs (1)
- SIC 284 Soaps, cleaners, and toilet bowls (1)
- SIC 286 Industrial organic chemicals (1)
- SIC 287 Agriculture chemicals (1)
- SIC 289 Miscellaneous chemical products (1)

Petroleum and coal products

- SIC 291 Petroleum refining (1)
- SIC 295 Asphalt paving & roofing (2)
- SIC 299 Miscellaneous petroleum & coal products (1)

Leather products

- SIC 311 Leather tanning & finishing (2)
- SIC 313 Footwear, cut stock (2)
- SIC 319 Leather goods, not elsewhere classified (2)

Stone, clay, and glass products

- SIC 323 Products of purchased glass (1)
- SIC 325 Structural clay products (1)
- SIC 326 Pottery & related products (1)

Primary metal industries

- SIC 339 Miscellaneous metal products (1)

Fabricated metal products

- SIC 341 Metal cans & shipping containers (2)
- SIC 347 Metal services, n.e.c. (1)
- SIC 349 Miscellaneous fabricated products (1)

Industrial machinery & equipment

- SIC 355 Special industry machinery (2)
- SIC 356 General industry machinery (1)
- SIC 357 Computer and office equipment (2)
- SIC 359 Industrial machinery n.e.c. (2)

Electronic equipment

- SIC 361 Electric distribution equipment (2)
- SIC 365 Household audio and video equipment (2)
- SIC 367 Electrical components (2)

Transportation equipment

- SIC 375 Motorcycles, bicycles & parts (1)

Instruments and related products

- SIC 382 Measuring and controlling devices (1)
- SIC 384 Medical instruments and supplies (1)
- SIC 385 Ophthalmic goods (1)

Miscellaneous manufacturing

- SIC 391 Jewelry, silverware, & plated ware (2)
- SIC 393 Musical instruments (2)
- SIC 394 Toys and supporting goods (1)
- SIC 395 Office and art supplies (1)
- SIC 399 Miscellaneous manufacturing (2)

TABLE I

U.S. Manufacturing Industry Trends, 1987 - 1991

SIC	Description	1987 US Empl (000)	1987 # PrHr (mil)	1987 ValMfr ($91mil)	1987 ValShip ($91mil)	1987 Val/Emp ($)	1987 LabProd ($)	Change US Empl 87-91	% Change US Empl 87-91	% Change Ship 87-91	% Chang ValM 87-91
	ALL INDUSTRIES	18,950.3	24,300.6	$1,397,664.7	$2,968,465.8	$73,754	$57.52	(888,400)	-4.7%	-4.8%	-6.0
20	Food & Kindred	1,448.8	2,019.2	$145,795.0	$395,322.2	$100,632	$72.20	25,900	1.8%	-2.0%	-0.3
201	Meat Products	340.5	571.5	$16,596.1	$92,321.4	$48,740	$29.04	49,500	14.5%	-3.2%	5.3
202	Dairy Products	141.5	174.6	$14,059.8	$53,658.8	$99,362	$80.53	(5,500)	-3.9%	-7.1%	-1.5
203	Preserved Fruits & Vegetables	208.4	327.6	$20,818.8	$43,573.0	$99,898	$63.55	7,600	3.6%	7.4%	-7.6
204	Grain Mill Products	89.1	126.4	$16,871.3	$38,069.0	$189,352	$133.48	1,200	1.3%	10.1%	9.3
205	Bakery Products	217.1	248.9	$18,239.9	$28,387.7	$84,016	$73.28	(8,200)	-3.8%	-6.4%	-9.8
206	Sugar & confectionary products	90.4	140.4	$10,150.6	$22,644.3	$112,286	$72.30	1,400	1.5%	-3.0%	-0.4
207	Fats & oils	29.6	41.3	$3,849.0	$19,039.8	$130,033	$93.20	(1,400)	-4.7%	-1.6%	-0.9
208	Beverages	152.8	154.4	$27,077.9	$56,742.6	$177,211	$175.38	(7,900)	-5.2%	-3.8%	-0.9
209	Misc Food & kindred products	155.9	213.0	$16,385.0	$34,908.9	$105,099	$76.92	700	0.4%	-6.6%	-9.0
21	Tobacco products	44.7	61.3	$17,101.5	$24,886.6	$382,584	$278.98	(4,800)	-10.7%	28.7%	43.2
22	Textile mill products	672.0	1,175.6	$30,765.0	$75,277.4	$45,781	$26.17	(74,100)	-11.0%	-12.7%	-12.5
221	Broadwoven fabric mills, cotton	72.3	137.9	3129.5	6604.1	43285	22.69	(6,400)	-8.9%	-13.8%	-20.8
222	Broadwoven fabric mills,manmade	88.3	163.2	4311.3	9650.2	48825	26.42	(10,000)	-11.3%	-13.8%	-17.6
224	Narrow fabric mills	18.5	31.6	695.5	1361.6	37595	22.01	(2,400)	-13.0%	-8.4%	0.3
225	Knitting mills	203.3	341.9	7504.9	16211.3	36915	21.95	100	-11.0%	-4.7%	-3.5
226	Textile finishing	56.3	95.1	2803.6	8466.9	49798	29.48	(500)	-13.3%	-24.9%	-5.8
227	Carpets & rugs	53.3	85.2	3668.6	11743.7	68830	43.06	(4,800)	-9.0%	-23.5%	-22.4
228	Yarn & mills	113.9	213.3	4629.4	12302.5	40644	21.7	200	-17.1%	-13.1%	-20.4
229	Misc. textiles	47.8	75	2890.2	6392	60464	38.54	(2,700)	-6.5%	-3.4%	-5.0
23	Apparel & other textiles	1,080.6	1,615.5	$38,984.4	$77,023.3	$36,077	$24.13	(121,000)	-11.2%	-15.2%	-14.2
231	Men's & boy's suits, coats, overcoats	55.2	85.8	$2,111.6	$3,432.9	$38,253	$24.61	(11,600)	-21.0%	-28.1%	-33.7
232	Men's & boy's furnishings	279.9	441.9	$10,159.5	$18,512.6	$36,297	$22.99	(27,700)	-9.9%	-13.6%	-14.6
233	Women's outerwear	628.5	926.7	$21,772.5	$41,759.0	$34,642	$23.49	(68,900)	-11.0%	-15.2%	-14.4
234	Women's undergarments	67.5	103.6	$2,405.0	$4,481.9	$35,629	$23.21	(10,000)	-14.8%	-17.8%	-9.7
235	Hats, caps, millinery	17.2	26.5	$441.2	$794.5	$25,652	$16.65	(1,300)	-7.6%	0.8%	3.2
236	Girl's outerwear	71.7	107.0	$2,378.3	$4,499.8	$33,171	$22.23	(12,900)	-18.0%	-20.5%	-19.8
237	Fur goods	2.1	2.7	$157.3	$506.7	$74,905	$58.26	(600)	-28.6%	-49.2%	-55.6
238	Misc. apparel	40.8	59.1	$1,380.1	$2,672.9	$33,826	$23.35	(4,200)	-10.3%	-16.1%	-15.4
239	Misc. textile products	197.8	304.6	$8,338.3	$18,876.0	$42,155	$27.37	(11,700)	-5.9%	-10.5%	-8.5
24	Lumber & Wood mill products	698.4	1,151.2	$34,367.2	$83,622.4	$49,209	$29.85	(67,900)	-9.7%	-15.6%	-21.5
241	Logging	85.8	131.4	$4,894.7	$13,114.3	$57,048	$37.25	(7,700)	-9.0%	-12.8%	-16.3
242	Sawmills & planning mills	180.2	329.1	$9,198.4	$23,044.1	$51,046	$27.95	(22,600)	-12.5%	-15.8%	-26.0
243	Millwork, plywood, structural members	240.0	395.9	$11,864.0	$27,112.9	$49,433	$29.97	(30,100)	-12.5%	-23.4%	-25.1
244	Wood containers	37.0	55.6	$1,049.0	$2,481.1	$28,350	$18.87	2,800	7.6%	15.4%	14.7
245	Wood buildings & mobile homes	65.3	98.9	$2,984.2	$7,882.6	$45,699	$30.17	(11,200)	-17.2%	-24.5%	-27.2
249	Miscellaneous Wood products	78.3	123.6	$3,713.2	$7,386.0	$47,423	$30.04	800	1.0%	-7.2%	-14.5
25	Furniture & fixtures	510.8	804.8	$24,351.0	$44,914.7	$47,672	$30.26	(45,100)	-8.8%	-10.9%	-15.1
251	Household furniture	284.3	470.6	$11,373.2	$22,250.7	$40,004	$24.17	(25,700)	-9.0%	-17.0%	-14.5
252	Office furniture	80.7	118.0	$5,684.4	$9,037.3	$70,439	$48.17	(14,600)	-18.1%	-19.6%	-27.4
253	Public building furniture	21.8	33.0	$1,080.4	$2,503.8	$49,558	$32.74	4,100	18.8%	25.3%	16.5
254	Partitions & fixtures	74.1	110.1	$3,730.9	$6,638.8	$50,349	$33.89	(7,200)	-9.7%	-10.7%	-14.0
259	Misc furniture & fixtures	49.9	73.1	$2,482.1	$4,484.2	$49,741	$33.95	(1,600)	-3.2%	-6.3%	-5.4

TABLE 1 (cont'd)

U.S. Manufacturing Industry Trends, 1987 – 1991

SIC	Description	1987 US Empl (000)	1987 # PrHr (mil)	1987 ValMfr ($91mil)	1987 ValShip ($91mil)	1987 Val/Emp ($)	1987 LabProd ($)	Change US Empl 87-91	%Change US Empl 87-91	%Change Ship 87-91	%Change ValMfr 87-91
26	Paper & allied products	611.3	972.1	$60,533.2	$130,671.3	$99,024	$62.27	9,400	1.5%	-1.4%	-3.7%
261	Pulp mills	14.2	23.9	$2,735.3	$5,171.9	$192,625	$114.45	2,600	18.3%	3.0%	-10.6%
262	Paper mills	129.1	210.4	$16,814.3	$34,671.1	$130,243	$79.92	1,200	0.9%	-3.8%	-7.8%
263	Paperboard mills	52.3	88.5	$8,289.9	$16,461.1	$158,506	$93.67	(1,700)	-3.3%	-8.8%	-12.5%
265	Paperboard containers & boxes	193.4	304.2	$11,774.3	$31,007.9	$60,881	$38.71	5,200	2.7%	-1.4%	-2.1%
267	Misc. converted paper products	222.1	345.0	$20,919.4	$43,359.7	$94,189	$60.64	2,100	0.9%	45.1%	2.9%
27	Printing & publishing	1,494.0	1,537.6	$108,099.4	$163,290.9	$72,356	$70.30	(6,000)	-0.4%	-4.0%	-4.0%
271	Newspaper publishing & printing	434.4	262.4	$29,147.9	$38,186.5	$67,099	$111.08	(6,000)	-1.4%	-11.7%	-10.5%
272	Periodical publishing & printing	110.0	32.4	$13,730.4	$20,776.7	$124,822	$423.78	600	0.5%	-2.1%	0.5%
273	Books	113.6	96.4	$13,316.9	$19,034.2	$117,226	$138.14	12,200	10.7%	8.9%	5.7%
274	Misc publishing	69.5	43.3	$7,221.2	$9,363.2	$103,903	$166.77	(4,500)	-6.5%	4.3%	1.8%
275	Commercial printing	553.5	794.4	$29,996.6	$53,696.0	$54,194	$37.76	2,400	0.4%	2.3%	-13.7%
276	Manifold business forms	53.3	77.3	$4,668.8	$8,868.7	$87,595	$60.40	(7,000)	-13.1%	-18.4%	-17.8%
277	Greeting card publishing	21.5	21.7	$2,642.4	$3,490.2	$122,900	$121.77	2,400	11.2%	9.2%	10.7%
278	Blankbooks & bookbinding	68.8	105.8	$3,509.2	$4,891.6	$51,006	$33.17	1,600	2.3%	-6.5%	-8.3%
279	Printing trade services	69.4	103.8	$3,866.1	$4,983.8	$55,708	$37.25	(7,800)	-11.2%	-8.2%	-7.3%
28	Chemicals & allied products	814.0	944.7	$144,805.5	$275,212.8	$177,894	$153.28	32,400	4.0%	6.2%	6.9%
281	Industrial inorganic chemicals	93.6	101.5	$13,476.6	$23,708.0	$143,981	$132.77	10,400	11.1%	11.8%	16.7%
282	Plastics materials & synthetics	122.6	176.5	$21,266.1	$48,978.5	$173,460	$120.49	6,800	5.5%	-5.6%	-7.5%
283	Drugs	171.9	155.2	$33,763.0	$47,075.1	$196,411	$217.54	12,300	7.2%	29.2%	28.1%
284	Soaps, cleaners, & toilet goods	119.3	145.6	$25,959.3	$41,660.3	$217,597	$178.29	3,600	3.0%	0.5%	-2.3%
285	Paints & allied products	55.2	56.3	$7,458.3	$15,229.5	$135,114	$132.47	(4,100)	-7.4%	-6.4%	-9.0%
286	Industrial organic chemicals	125.7	154.1	$25,361.5	$61,335.6	$201,762	$164.58	1,300	1.0%	5.0%	5.4%
287	Agricultural chemicals	40.4	51.0	$7,601.1	$17,105.7	$188,145	$149.04	300	0.7%	8.3%	6.8%
289	Misc chemical products	85.5	104.3	$9,919.1	$20,120.9	$116,013	$95.10	1,600	1.9%	-2.2%	-4.9%
29	Petroleum & coal products	115.9	158.0	$22,202.4	$156,359.0	$191,565	$140.52	(2,600)	-2.2%	1.1%	8.2%
291	Petroleum refining	74.6	103.3	$17,047.7	$141,698.6	$228,521	$165.03	(700)	-0.9%	2.6%	16.1%
295	Asphalt paving & roofing	28.1	41.1	$3,461.4	$9,290.7	$123,180	$84.22	(1,800)	-6.4%	-22.2%	-26.5%
299	Misc petroleum & coal products	13.1	13.7	$1,693.5	$5,369.7	$129,275	$123.61	(100)	-0.8%	1.5%	-0.5%
30	Rubber & misc. products	831.4	1,283.4	$53,277.2	$103,869.6	$64,081	$41.51	8,300	1.0%	-3.1%	-5.6%
301	Tires & inner tubes	65.4	103.7	$6,665.4	$12,501.9	$101,918	$64.28	100	0.2%	-5.0%	-0.2%
302	Rubber & plastics footwear	10.9	16.6	$378.6	$668.1	$34,736	$22.81	800	7.3%	13.3%	1.4%
305	Hose, belting, gaskets, packing	51.6	74.0	$3,185.6	$5,572.1	$61,736	$43.05	1,800	3.5%	-5.9%	-10.7%
306	Fabricated rubber	103.9	161.1	$5,772.9	$11,062.5	$55,562	$35.83	(5,700)	-5.5%	-6.3%	-8.3%
308	Misc. plastics products	599.5	928.2	$37,274.7	$74,065.1	$62,176	$40.16	11,400	1.9%	-2.2%	-5.8%
31	Leather	129.0	205.9	$5,248.9	$10,889.3	$40,689	$25.49	(22,900)	-17.8%	-16.0%	-18.2%
311	Leather tanning & finishing	14.6	24.6	$896.1	$2,660.0	$61,376	$36.43	(3,100)	-21.2%	-17.9%	-20.8%
313	Footwear, cut stock	5.0	8.5	$169.5	$388.6	$33,906	$19.94	200	4.0%	-1.6%	7.4%
314	Footwear	71.1	116.9	$2,580.8	$4,882.8	$36,299	$22.08	(18,000)	-25.3%	-22.7%	-24.8%
315	Leather gloves & mittens	3.1	4.9	$89.4	$221.6	$28,852	$18.25	(600)	-19.4%	-36.3%	-35.0%
316	Luggage	11.4	15.1	$606.5	$1,113.7	$53,206	$40.17	1,100	9.6%	3.0%	-1.4%
317	Handbags & personal leather goods	16.7	25.5	$635.7	$1,129.5	$38,065	$24.93	(4,500)	-26.9%	-19.8%	-22.1%
319	Leather goods, NEC	7.1	10.4	$270.7	$493.1	$38,130	$26.03	2,100	29.6%	23.1%	13.6%

TABLE 1 (cont'd)

U.S. Manufacturing Industry Trends, 1987 – 1991

SIC	Description	1987 US Empl (000)	1987 # PrHr (mil)	1987 ValMfr ($91mil)	1987 ValShip ($91mil)	1987 Val/Emp ($)	1987 LabProd ($)	Change US Empl 87-91	%Change US Empl 87-91	%Change Ship 87-91	%Chang ValMf 87-91
32	Stone, clay, and glass products	523.7	832.6	$40,024.5	$73,707.0	$76,426	$48.07	(48,000)	-9.2%	-19.1%	-20.5
321	Flat glass	14.6	25.0	$1,940.4	$3,056.5	$132,902	$77.61	(1,400)	-9.6%	-31.2%	-35.4
322	Glass & glassware	77.4	129.4	$6,072.9	$10,000.1	$78,461	$46.93	(10,000)	-12.9%	-12.5%	-15.5
323	Products of purchased glass	51.1	79.9	$3,401.5	$6,509.2	$66,566	$42.57	900	1.8%	-5.4%	-2.6
324	Cement, hydraulic	19.1	30.2	$2,762.5	$5,197.9	$144,633	$91.47	(2,700)	-14.1%	-27.3%	-29.9
325	Structural clay products	34.6	56.3	$2,086.2	$3,494.7	$60,294	$37.05	(2,900)	-8.4%	-20.4%	-23.1
326	Pottery & related products	38.1	60.3	$2,021.7	$2,896.5	$53,062	$33.53	(1,400)	-3.7%	-11.7%	-13.0
327	Concrete, gypsum, & plaster products	203.2	322.8	$14,141.8	$29,286.5	$69,595	$43.81	(23,600)	-11.6%	-23.3%	-24.8
328	Cut stone & stone products	12.5	19.8	$540.1	$1,008.1	$43,210	$27.28	(300)	-2.4%	-5.1%	7.8
329	Misc nonmetalic mineral products	73.1	109.0	$7,057.6	$12,260.8	$96,547	$64.75	(6,400)	-8.8%	-18.0%	-20.2
33	Primary metal industries	701.1	1,114.0	$55,296.6	$144,170.8	$78,871	$49.64	(24,100)	-3.4%	-7.9%	-15.7
331	Blast furnace & basic steel products	252.7	407.5	$24,561.8	$62,123.6	$97,197	$60.27	(6,700)	-2.7%	-9.3%	-19.9
332	Iron & steel foundries	129.8	212.7	$7,457.1	$12,742.0	$57,450	$35.06	(4,400)	-3.4%	-12.3%	-16.9
333	Primary nonferrous metals	31.6	48.3	$3,594.4	$13,031.4	$113,748	$74.42	3,600	11.4%	6.2%	-0.0
334	Secondary nonferous metals	12.5	19.3	$1,135.8	$5,313.0	$90,861	$58.85	700	5.6%	-5.1%	-28.2
335	Nonferrous rolling & drawing	163.1	252.8	$12,387.0	$39,903.5	$75,947	$49.00	(13,100)	-8.0%	-9.0%	-11.6
336	Nonferrous foundries	79.5	128.9	$4,080.6	$7,571.6	$51,328	$31.66	(4,600)	-5.8%	-11.6%	-15.4
339	Misc metal products	31.8	44.7	$2,090.5	$3,485.8	$65,738	$46.77	500	1.6%	-1.1%	-8.7
34	Fabricated metal products	1,458.0	2,183.4	$89,869.6	$176,683.7	$61,639	$41.16	(99,500)	-6.8%	-11.1%	-14.7
341	Metal cans & shipping containers	48.1	83.5	$5,051.6	$14,523.5	$105,023	$60.50	(6,800)	-14.1%	-6.1%	-21.1
342	Cutlery, handtools, & hardware	145.3	217.5	$9,628.2	$16,162.6	$66,265	$44.27	(13,700)	-9.4%	-11.2%	-15.3
343	Plumbing & heating	45.6	66.5	$3,421.7	$6,333.8	$75,037	$51.45	(3,600)	-7.9%	-9.5%	-13.3
344	Fabricated structural metal products	407.2	584.4	$22,400.0	$48,455.5	$55,010	$38.33	(28,300)	-6.9%	-12.2%	-14.6
345	Screw machine products	94.7	153.4	$5,714.5	$9,459.9	$60,343	$37.25	(4,100)	-4.3%	-10.3%	-12.6
346	Metal forgings & stampings	255.3	419.0	$15,796.1	$34,061.7	$61,873	$37.70	(23,800)	-9.3%	-18.0%	-19.4
347	Metal services, n.e.c.	112.6	177.0	$5,549.9	$9,339.2	$49,289	$31.36	(2,300)	-2.0%	-6.2%	-13.7
348	Ordnance & accessories	87.7	108.0	$6,413.1	$9,164.2	$73,126	$59.38	(19,000)	-21.7%	-27.2%	-31.7
349	Misc. fabricated metals	261.6	374.5	$15,894.9	$29,182.0	$60,760	$42.44	2,300	0.9%	-0.8%	-3.4
35	Industrial machinery & equipment	1,898.0	2,437.2	$155,073.5	$291,655.8	$81,704	$63.63	(124,300)	-6.5%	-16.5%	-19.9
351	Engines & turbines	89.8	122.7	$9,244.7	$19,450.5	$102,948	$75.34	(11,700)	-13.0%	-14.6%	-18.2
352	Farm & garden machinery	88.5	126.1	$7,922.1	$16,257.8	$89,516	$62.82	1,000	1.1%	-6.7%	-10.0
353	Construction & related machinery	197.0	250.2	$16,202.6	$33,270.0	$82,247	$64.76	(6,600)	-3.4%	-16.7%	-22.7
354	Metalworking machinery	274.0	410.7	$18,119.6	$29,212.9	$66,130	$44.12	(8,200)	-3.0%	-12.9%	-14.4
355	Special industry machinery	169.1	194.1	$11,575.2	$20,497.1	$68,452	$59.64	(5,300)	-3.1%	0.9%	-6.0
356	General industry machinery	240.4	302.1	$16,524.7	$28,919.1	$68,738	$54.70	15,100	6.3%	6.5%	1.9
357	Computer & office equipment	327.7	251.1	$38,830.2	$72,687.8	$118,493	$154.64	(62,600)	-19.1%	-19.2%	-29.4
358	Refrigeration & service machinery	190.4	266.2	$13,740.7	$27,857.3	$72,168	$51.62	(16,700)	-8.8%	-10.0%	-14.5
359	Industrial machinery, n.e.c.	291.9	456.1	$15,778.3	$23,884.6	$54,054	$34.59	100	0.0%	-3.3%	-7.3
36	Electronic equipment	1,564.7	1,959.3	$114,877.1	$205,362.7	$73,418	$58.63	(137,300)	-8.8%	-3.6%	-7.1
361	Electric distribution equipment	77.0	104.8	$5,400.2	$9,827.5	$70,132	$51.53	(7,000)	-9.1%	-5.6%	-8.5
362	Electric industrial apparatus	165.5	215.4	$10,669.6	$18,303.4	$64,469	$49.53	(12,400)	-7.5%	-3.0%	-7.9
363	Household appliance	282.2	395.3	$19,585.3	$38,083.1	$69,402	$49.55	(24,700)	-8.8%	-6.9%	-12.0
364	Electric lighting & wiring	166.7	242.2	$12,301.0	$21,585.8	$73,791	$50.79	(22,800)	-13.7%	-16.0%	-24.6
365	Household audio & video equipment	44.2	65.6	$3,673.9	$9,391.1	$83,120	$56.00	400	0.9%	4.6%	-8.3
366	Communications equipment	260.2	246.1	$23,937.5	$40,764.9	$91,997	$97.27	(22,700)	-8.7%	-6.9%	-11.1
367	Electronic components	546.3	652.1	$36,945.9	$60,256.0	$67,629	$56.66	(27,100)	-5.0%	8.3%	4.6
369	Misc. Electronic equipment	188.1	258.4	$13,031.4	$25,453.9	$69,279	$50.43	(33,800)	-18.0%	-13.5%	-15.4

TABLE 1 (cont'd)

U.S. Manufacturing Industry Trends, 1987 – 1991

SIC	Description	1987 US Empl (000)	1987 # PrHr (mil)	1987 ValMfr ($91mil)	1987 ValShip ($91mil)	1987 Val/Emp ($)	1987 LabProd ($)	Change US Empl 87-91	%Change US Empl 87-91	%Change Ship 87-91	%Change ValMfr 87-91
37	Transport equipment	1,817.4	2,443.6	$164,346.6	$399,171.1	$90,430	$67.26	(183,900)	-10.1%	-8.8%	-7.5%
371	Motor vehicles & equipment	751.3	1,234.8	$79,570.4	$246,890.1	$105,910	$64.44	(98,300)	-13.1%	-16.5%	-7.8%
372	Aircraft & parts	596.6	666.6	$48,919.9	$92,683.3	$81,998	$73.39	(28,700)	-4.8%	10.5%	0.3%
373	Ship building & repair	177.4	272.4	$9,180.1	$16,613.6	$51,748	$33.70	(15,800)	-8.9%	-12.6%	-13.3%
375	Motorcycles, bicycles & parts	7.4	12.1	$441.0	$1,274.0	$59,591	$36.44	3,400	45.9%	50.2%	68.0%
376	Guide missles & space	213.6	159.2	$21,888.9	$31,514.4	$102,476	$137.49	(35,900)	-16.8%	-8.1%	-21.9%
379	Misc transport equipment	49.0	69.3	$2,793.5	$7,232.9	$57,011	$40.31	(12,900)	-26.3%	-21.2%	-24.6%
38	Instruments & related	982.4	1,003.6	$85,094.5	$128,676.4	$86,619	$84.79	(81,100)	-8.3%	-1.2%	-3.0%
381	Engineering & rel. instruments	369.4	314.4	$29,660.3	$43,481.9	$80,293	$94.34	(89,600)	-24.3%	-16.7%	-20.2%
382	Measuring & controlling devices	284.2	301.2	$20,191.5	$31,222.9	$71,047	$67.04	(16,300)	-5.7%	3.3%	-0.5%
384	Medical instruments & supplies	203.8	247.1	$17,682.4	$27,414.2	$86,763	$71.56	37,200	18.3%	22.5%	23.7%
385	Ophthalmic goods	24.2	31.0	$1,382.3	$2,025.5	$57,118	$44.59	2,000	8.3%	14.2%	19.0%
386	Photographic equipment & supplies	88.0	92.1	$15,476.0	$23,068.3	$175,863	$168.03	(10,000)	-11.4%	-7.2%	-5.6%
387	Watches, clocks & parts	11.8	17.8	$700.9	$1,463.8	$59,399	$39.38	(3,400)	-28.8%	-5.9%	-7.9%
39	Misc. manufacturing	374.3	520.8	$20,925.0	$38,380.6	$55,904	$40.18	(11,200)	-3.0%	-3.2%	-4.4%
391	Jewelry, silverware, & plated ware	49.5	68.4	$2,843.3	$6,659.1	$57,440	$41.57	(3,900)	-7.9%	-20.8%	-13.5%
393	Musical instruments	12.2	18.5	$601.7	$976.1	$49,324	$32.53	(700)	-5.7%	-9.7%	-10.9%
394	Toys & supporting goods	88.9	126.2	$5,828.7	$10,548.7	$65,564	$46.19	4,400	4.9%	7.4%	4.4%
395	Office & art supplies	28.8	41.0	$1,717.0	$3,040.4	$59,618	$41.88	500	1.7%	8.7%	4.1%
396	Costume jewelry	31.8	43.4	$1,488.2	$2,472.1	$46,800	$34.29	(5,500)	-17.3%	-10.9%	-13.6%
399	Misc. manufacturing	163.2	223.3	$8,446.4	$14,686.3	$51,755	$37.83	(6,300)	-3.9%	-3.8%	-7.1%

Source: Applied Development Economics. Based on Annual Survey of Manufacturing, 1987 and 1991 filename: 3digit

TABLE 2

U.S. Manufacturing High Performing Sectors

SIC	Description	1987 US Empl (000)	1987 # PrHr (mil)	1987 ValMfr ($91mil)	1987 ValShip ($91mil)	1987 Val/Emp ($)	1987 LabProd ($)	Change US Empl 87-91	%Change US Empl 87-91	%Change Ship 87-91	%Chang ValMf 87-91
	ALL INDUSTRIES	18,950.3	24,300.6	$1,397,664.7	$2,968,465.8	$73,754	$57.52	(888,400)	-4.7%	-4.8%	-6.0
20	Food & Kindred										
201	Meat Products	340.5	571.5	$16,596.1	$92,321.4	$48,740	$29.04	49,500	14.5%	-3.2%	5.3
203	Preserved Fruits & Vegetables	208.4	327.6	$20,818.8	$43,573.0	$99,898	$63.55	7,600	3.6%	7.4%	-7.6
204	Grain Mill Products	89.1	126.4	$16,871.3	$38,069.0	$189,352	$133.48	1,200	1.3%	10.1%	9.3
206	Sugar & confectionary products	90.4	140.4	$10,150.6	$22,644.3	$112,286	$72.30	1,400	1.5%	-3.0%	-0.4
209	Misc Food & kindred products	155.9	213.0	$16,385.0	$34,908.9	$105,099	$76.92	700	0.4%	-6.6%	-9.0
24	Lumber & Wood mill products										
244	Wood containers	37.0	55.6	$1,049.0	$2,481.1	$28,350	$18.87	2,800	7.6%	15.4%	14.7
249	Miscellaneous Wood products	78.3	123.6	$3,713.2	$7,386.0	$47,423	$30.04	800	1.0%	-7.2%	-14.5
25	Furniture & fixtures										
253	Public building furniture	21.8	33.0	$1,080.4	$2,503.8	$49,558	$32.74	4,100	18.8%	25.3%	16.5
259	Misc furniture & fixtures	49.9	73.1	$2,482.1	$4,484.2	$49,741	$33.95	(1,600)	-3.2%	-6.3%	-5.4
26	Paper & allied products										
261	Pulp mills	14.2	23.9	$2,735.3	$5,171.9	$192,625	$114.45	2,600	18.3%	3.0%	-10.6
262	Paper mills	129.1	210.4	$16,814.3	$34,671.1	$130,243	$79.92	1,200	0.9%	-3.8%	-7.8
265	Paperboard containers & boxes	193.4	304.2	$11,774.3	$31,007.9	$60,881	$38.71	5,200	2.7%	-1.4%	-2.1
267	Misc. converted paper products	222.1	345.0	$20,919.4	$43,359.7	$94,189	$60.64	2,100	0.9%	45.1%	2.9
27	Printing & publishing										
272	Periodical publishing & printing	110.0	32.4	$13,730.4	$20,776.7	$124,822	$423.78	600	0.5%	-2.1%	0.5
273	Books	113.6	96.4	$13,316.9	$19,034.2	$117,226	$138.14	12,200	10.7%	8.9%	5.7
274	Misc publishing	69.5	43.3	$7,221.2	$9,363.2	$103,903	$166.77	(4,500)	-6.5%	4.3%	1.8
275	Commercial printing	553.5	794.4	$29,996.6	$53,696.0	$54,194	$37.76	2,400	0.4%	2.3%	-13.7
277	Greeting card publishing	21.5	21.7	$2,642.4	$3,490.2	$122,900	$121.77	2,400	11.2%	9.2%	10.7
278	Blankbooks & bookbinding	68.8	105.8	$3,509.2	$4,891.6	$51,006	$33.17	1,600	2.3%	-6.5%	-8.3
28	Chemicals & allied products										
281	Industrial inorganic chemicals	93.6	101.5	$13,476.6	$23,708.0	$143,981	$132.77	10,400	11.1%	11.8%	16.7
282	Plastics materials & synthetics	122.6	176.5	$21,266.1	$48,978.5	$173,460	$120.49	6,800	5.5%	-5.6%	-7.5
283	Drugs	171.9	155.2	$33,763.0	$47,075.1	$196,411	$217.54	12,300	7.2%	29.2%	28.1
284	Soaps, cleaners, & toilet goods	119.3	145.6	$25,959.3	$41,660.3	$217,597	$178.29	3,600	3.0%	0.5%	-2.3
286	Industrial organic chemicals	125.7	154.1	$25,361.5	$61,335.6	$201,762	$164.58	1,300	1.0%	5.0%	5.4
287	Agricultural chemicals	40.4	51.0	$7,601.1	$17,105.7	$188,145	$149.04	300	0.7%	8.3%	6.8
289	Misc chemical products	85.5	104.3	$9,919.1	$20,120.9	$116,013	$95.10	1,600	1.9%	-2.2%	-4.9
29	Petroleum & coal products										
291	Petroleum refining	74.6	103.3	$17,047.7	$141,698.6	$228,521	$165.03	(700)	-0.9%	2.6%	16.1%
299	Misc petroluem & coal products	13.1	13.7	$1,693.5	$5,369.7	$129,275	$123.61	(100)	-0.8%	1.5%	-0.5%
30	Rubber & misc. products										
301	Tires & inner tubes	65.4	103.7	$6,665.4	$12,501.9	$101,918	$64.28	100	0.2%	-5.0%	-0.2%
302	Rubber & plastics footwear	10.9	16.6	$378.6	$668.1	$34,736	$22.81	800	7.3%	13.3%	1.4%
305	Hose, belting, gaskets, packing	51.6	74.0	$3,185.6	$5,572.1	$61,736	$43.05	1,800	3.5%	-5.9%	-10.7%
308	Misc. plastics products	599.5	928.2	$37,274.7	$74,065.1	$62,176	$40.16	11,400	1.9%	-2.2%	-5.8%
31	Leather										
313	Footwear, cut stock	5.0	8.5	$169.5	$388.6	$33,906	$19.94	200	4.0%	-1.6%	7.4%
316	Luggage	11.4	15.1	$606.5	$1,113.7	$53,206	$40.17	1,100	9.6%	3.0%	-1.4%
319	Leather goods, NEC	7.1	10.4	$270.7	$493.1	$38,130	$26.03	2,100	29.6%	23.1%	13.6%

TABLE 2 (cont'd)

U.S. Manufacturing High Performing Sectors

SIC	Description	1987 US Empl (000)	1987 # PrHr (mil)	1987 ValMfr ($91mil)	1987 ValShip ($91mil)	1987 Val/Emp ($)	1987 LabProd ($)	Change US Empl 87-91	%Change US Empl 87-91	%Change Ship 87-91	%Change ValMfr 87-91
32	Stone, clay, and glass products										
323	Products of purchased glass	51.1	79.9	$3,401.5	$6,509.2	$66,566	$42.57	900	1.8%	-5.4%	-2.6%
328	Cut stone & stone products	12.5	19.8	$540.1	$1,008.1	$43,210	$27.28	(300)	-2.4%	-5.1%	7.8%
33	Primary metal industries										
333	Primary nonferrous metals	31.6	48.3	$3,594.4	$13,031.4	$113,748	$74.42	3,600	11.4%	6.2%	-0.0%
334	Secondary nonferous metals	12.5	19.3	$1,135.8	$5,313.0	$90,861	$58.85	700	5.6%	-5.1%	-28.2%
339	Misc metal products	31.8	44.7	$2,090.5	$3,485.8	$65,738	$46.77	500	1.6%	-1.1%	-8.7%
34	Fabricated metal products										
349	Misc. fabricated metals	261.6	374.5	$15,894.9	$29,182.0	$60,760	$42.44	2,300	0.9%	-0.8%	-3.4%
35	Industrial machinery & equipment										
352	Farm & garden machinery	88.5	126.1	$7,922.1	$16,257.8	$89,516	$62.82	1,000	1.1%	-6.7%	-10.0%
355	Special industry machinery	169.1	194.1	$11,575.2	$20,497.1	$68,452	$59.64	(5,300)	-3.1%	0.9%	-6.0%
356	General industry machinery	240.4	302.1	$16,524.7	$28,919.1	$68,738	$54.70	15,100	6.3%	6.5%	1.9%
359	Industrial machinery, n.e.c.	291.9	456.1	$15,778.3	$23,884.6	$54,054	$34.59	100	0.0%	-3.3%	-7.3%
36	Electronic equipment										
365	Household audio & video equipment	44.2	65.6	$3,673.9	$9,391.1	$83,120	$56.00	400	0.9%	4.6%	-8.3%
367	Electronic components	546.3	652.1	$36,945.9	$60,256.0	$67,629	$56.66	(27,100)	-5.0%	8.3%	4.6%
37	Transport equipment										
372	Aircraft & parts	596.6	666.6	$48,919.9	$92,683.3	$81,998	$73.39	(28,700)	-4.8%	10.5%	0.3%
373	Ship building & repair	177.4	272.4	$9,180.1	$16,613.6	$51,748	$33.70	(15,800)	-8.9%	-12.6%	-13.3%
375	Motorcycles, bicycles & parts	7.4	12.1	$441.0	$1,274.0	$59,591	$36.44	3,400	45.9%	50.2%	68.0%
38	Instruments & related										
382	Measuring & controlling devices	284.2	301.2	$20,191.5	$31,222.9	$71,047	$67.04	(16,300)	-5.7%	3.3%	-0.5%
384	Medical instruments & supplies	203.8	247.1	$17,682.4	$27,414.2	$86,763	$71.56	37,200	18.3%	22.5%	23.7%
385	Ophthalmic goods	24.2	31.0	$1,382.3	$2,025.5	$57,118	$44.59	2,000	8.3%	14.2%	19.0%
39	Misc. manufacturing										
394	Toys & supporting goods	88.9	126.2	$5,828.7	$10,548.7	$65,564	$46.19	4,400	4.9%	7.4%	4.4%
395	Office & art supplies	28.8	41.0	$1,717.0	$3,040.4	$59,618	$41.88	500	1.7%	8.7%	4.1%
399	Misc. manufacturing	163.2	223.3	$8,446.4	$14,686.3	$51,755	$37.83	(6,300)	-3.9%	-3.8%	-7.1%

Source: Applied Development Economics. Based on Annual Survey of Manufacturing, 1987 & 1991. filename:usover

TABLE 3

California Manufacturing Exports to the Pacific Rim, 1992

SIC	Industry	Japan	Mainland China	Other Pacific Rim Countries	Total	% of Total
20	Food and Kindred Products	$967,332,004	$5,532,400	$953,471,201	$1,926,335,605	6.7
21	Tobacco Manufactures	892,439	0	841,109	1,733,548	0.0
22	Textile Mill Products	26,194,978	838,227	42,905,650	69,938,855	0.2
23	Apparel and Other Textile Products	293,358,543	456,574	52,634,274	346,449,391	1.2
24	Lumber and Wood Products	82,599,745	701,380	48,613,874	131,914,999	0.5
25	Furniture and Fixtures	31,132,875	2,697,492	35,090,816	68,921,183	0.2
26	Paper and Allied Products	106,202,670	15,393,967	179,351,691	300,948,328	1.1
27	Printing and Publishing	40,458,517	4,710,788	73,393,509	118,562,814	0.4
28	Chemicals and Allied Products	404,009,814	21,406,116	560,338,428	985,754,358	3.4
29	Petroleum and Coal Products	224,959,570	109,250,116	769,685,461	1,103,895,147	3.9
30	Rubber and Misc. Plastics Products	76,711,473	4,359,102	182,099,213	263,169,788	0.9
31	Leather and Leather Products	45,549,394	897,107	37,821,055	84,267,556	0.3
32	Stone, Clay, and Glass Products	40,306,349	2,074,530	144,952,147	187,333,026	0.7
33	Primary Metal Industries	129,400,817	19,581,048	235,153,613	384,135,478	1.3
34	Fabricated Metal Products	181,199,502	22,884,843	334,800,795	538,885,140	1.9
35	Industrial Machinery, Computer Equipment	2,231,976,742	177,598,187	3,360,347,867	5,769,922,796	20.2
36	Electronic, Electric Equip, exc. Computer	1,350,947,077	173,828,009	6,521,464,814	8,046,239,900	28.2
37	Transportation Equipment	1,144,829,684	609,266,018	4,009,841,265	5,763,936,967	20.2
38	Instruments and Related Products	905,793,195	177,159,542	958,556,656	2,041,509,393	7.1
39	Misc. Manufacturing Industries	245,770,674	7,002,605	194,123,828	446,897,107	1.6
	TOTAL MANUFACTURING EXPORTS	$8,529,626,062	$1,355,638,051	$18,695,487,266	$28,580,751,379	91.4
	TOTAL EXPORTS	$9,703,562,208	$1,453,373,519	$20,099,630,949	$31,256,566,676	100.0

Pacific Rim countires include Korea, Singapore, Hong Kong, Australia, Taiwan, Malaysia, Thailand, Phillipines, Indonesia, New Zealand and Brunei

filename:exports

Source: Applied Development Economics. Based on data provided by the California World Trade Commission.

TABLE 4

Employment by Industry Trends
California and the U.S., 1988-1991

SIC	Industry	U.S. 1988 Tot Est	U.S. 1988 Tot Emp	California 1988 Tot Est	California 1988 Tot Emp	U.S. 1991 Tot Est	U.S. 1991 Tot Emp	California 1991 Tot Est	California 1991 Tot Emp	Cal. 1988-91 Emp % Change	U.S. 1988-91 Emp % Change	Employment Location Quotient 1991
	TOTAL	6,018,600	87,881,632	716,949	10,436,477	6,200,650	92,301,543	747,688	11,019,609	5.6%	5.0%	11.94%
	MANUFACTURING	362,906	19,261,691	49,010	2,140,959	373,999	18,383,368	51,070	2,055,402	-4.0%	-4.6%	11.18%
20	Food and kindred products	20,323	1,438,668	2,529	156,433	20,256	1,471,535	2,644	165,971	6.1%	2.3%	11.28%
201	Meat products	3,129	349,919	228	15,678	3,029	389,012	220	18,484	17.9%	11.2%	4.75%
202	Dairy products	2,260	143,154	196	11,432	2,061	138,838	195	12,571	10.0%	-3.0%	9.05%
203	Preserved fruits and vegetables	1,877	181,468	378	37,538	1,885	187,698	374	39,788	6.0%	3.4%	21.20%
204	Grain mill products	2,560	103,801	186	7,511	2,492	106,481	186	8,053	7.2%	2.6%	7.56%
205	Bakery products	2,854	216,852	365	23,071	3,009	214,582	400	23,389	1.4%	-1.0%	10.90%
206	Sugar and confectionery	1,091	89,997	131	12,446	1,155	92,075	143	12,522	0.6%	2.3%	13.60%
207	Fats and Oils	595	30,472	62	2,361	559	28,295	57	1,972	-16.5%	-7.1%	6.97%
208	Beverages	2,181	160,692	462	23,392	2,026	147,593	478	23,870	2.0%	-8.2%	16.17%
209	Misc. food and kindred products	3,679	162,114	500	22,952	3,718	163,815	535	25,027	9.0%	1.0%	15.28%
21	Tobacco products	144	46,619	1	32 *	142	37,867			-100.0%	-18.8%	0.00%
22	Textile mill products	6,325	682,674	461	17,044	6,233	621,591	446	16,467	-3.4%	-8.9%	2.65%
221	Broadwoven fabric mills, cotton	279	71,691	27	479	317	62,838	34	384	-19.8%	-12.3%	0.61%
222	Broadwoven fabric mills, manmade	431	91,189	32	338	434	79,270	34	321	-5.0%	-13.1%	0.40%
223	Broadwoven fabric mills, wool	121	14,286	5	113	107	12,164	7	164	45.1%	-14.9%	1.35%
224	Narrow fabric mills	276	19,659	15	532	263	18,526	16	345	-35.2%	-5.8%	1.86%
225	Knitting mills	2,096	203,842	100	4,884	1,996	189,979	98	5,995	22.7%	-6.8%	3.16%
226	Textile finishing, except wool	918	57,178	103	1,978	804	55,574	76	2,227	12.6%	-2.8%	4.01%
227	Carpets and rugs	455	54,040	55	4,647	456	49,423	46	3,264	-29.8%	-8.5%	6.60%
228	Yarn and thread mills	622	112,846	15	1,447	622	98,655	16	675	-53.4%	-12.6%	0.68%
229	Miscellaneous textile goods	1,050	57,410	87	2,580	955	53,329	87	2,827	9.6%	-7.1%	5.30%
23	Apparel and other textile products	22,143	1,070,973	4,785	128,036	23,515	973,229	5,914	136,353	6.5%	-9.1%	14.01%
231	Men's and boys' suits and coats	323	55,728	24	1,223	304	47,267	25	936	-23.5%	-15.2%	1.98%
232	Men's and boys' furnishings	2,130	280,158	236	13,426	2,027	236,833	215	11,771	-12.3%	-15.5%	4.97%
233	Women's and misses' outerwear	8,791	342,417	2,699	75,726	8,485	300,151	3,131	77,726	2.6%	-12.3%	25.90%
234	Women's and children's underwear	534	64,432	57	3,254	504	57,664	64	3,836	17.9%	-10.5%	6.65%
235	Hats, caps, and millinery	509	17,666	53	1,373	361	17,363	35	1,021	-25.6%	-1.7%	5.88%
236	Girls' and children's outerwear	770	65,332	84	4,103	684	56,305	79	4,054	-1.2%	-13.8%	7.20%
237	Fur goods	355	1,851	13	130	238	1,129	11	19	-85.4%	-39.0%	1.68%
238	Miscellaneous apparel & accessories	1,047	43,329	171	4,655	985	40,730	155	5,853	25.7%	-6.0%	14.37%
239	Misc. fabricated textile products	6,670	195,050	1,012	22,305	7,119	194,244	1,060	22,059	-1.1%	-0.4%	11.36%
24	Lumber and wood products	32,860	712,498	2,599	65,141	34,458	635,024	2,814	55,038	-15.5%	-10.9%	8.67%
241	Logging	11,378	87,926	501	4,772	12,409	82,452	515	3,620	-24.1%	-6.2%	4.39%
242	Sawmills and planing mills	6,507	186,565	275	15,975	6,234	162,703	242	12,989	-18.7%	-12.8%	7.98%
243	Millwork, plywood, structural mem	7,624	239,180	1,091	25,099	8,220	209,031	1,326	20,887	-16.8%	-12.6%	9.99%
244	Wood Containers	2,159	39,326	204	4,313	2,295	39,540	207	4,669	8.3%	0.5%	11.81%
245	Wood buildings and mobile homes	1,034	63,766	82	5,083	972	51,852	77	3,616	-28.9%	-18.7%	6.97%
249	Miscellaneous wood products	3,880	94,845	418	9,597	3,530	85,917	380	8,981	-6.4%	-9.4%	10.45%
25	Furniture and fixtures	11,564	519,911	1,775	64,084	11,253	458,531	1,760	51,828	-19.1%	-11.8%	11.30%
251	Household furniture	5,308	289,490	827	34,619	5,059	249,383	819	25,319	-26.9%	-13.9%	10.15%
252	Office furniture	961	80,685	191	9,342	900	69,904	181	7,846	-16.0%	-13.4%	11.22%
253	Public building & related furniture	480	22,124	44	2,446	462	23,920	46	2,148	-12.2%	8.1%	8.98%
254	Partitions and fixtures	2,360	75,080	361	8,569	2,307	69,857	365	7,961	-7.1%	-7.0%	11.40%
259	Miscellaneous furniture & fixtures	1,752	49,826	243	8,496	1,386	40,532	204	7,550	-11.1%	-18.7%	18.63%

TABLE 4 (cont'd)

Employment by Industry Trends California and the U.S., 1988–1991

SIC	Industry	U.S. 1988 Tot Est	U.S. 1988 Tot Emp	California 1988 Tot Est	California 1988 Tot Emp	U.S. 1991 Tot Est	U.S. 1991 Tot Emp	California 1991 Tot Est	California 1991 Tot Emp	Cal. 1988–91 Emp %Change	U.S. 1988–91 Emp %Change	Employ Locati Quotie 1991
26	Paper and allied products	6,328	625,238	611	37,614	6,364	622,656	619	39,697	5.5%	-0.4%	6.
261	Pulp mills	42	13,709	3	353 *	51	14,971	4	1,101 *	211.8%	9.2%	7.
262	Paper mills	338	130,035	17	2,001 *	346	131,277	17	2,234	11.6%	1.0%	1.
263	Paperboard mills	231	53,311	18	2,122	228	52,411	17	1,879	-11.5%	-1.7%	3.
265	Paperboard containers and boxes	2,750	197,383	251	17,217	2,710	194,160	246	16,971	-1.4%	-1.6%	8.
267	Misc converted paper products	2,899	230,041	318	15,921	2,828	227,335	314	15,529	-2.5%	-1.2%	6.
27	Printing and publishing	60,434	1,524,887	7,773	159,729	62,249	1,502,760	8,267	160,026	0.2%	-1.5%	10.
271	Newspapers	8,748	441,254	723	53,792	8,581	432,300	685	52,654	-2.1%	-2.0%	12.
272	Periodicals	4,061	116,488	562	8,505	4,294	111,916	597	10,181	19.7%	-3.9%	9.
273	Books	2,717	115,356	405	8,199	2,807	121,415	426	9,342	13.9%	5.3%	7.
274	Miscellaneous publishing	2,254	66,843	323	7,743	2,529	66,962	384	7,879	1.8%	0.2%	11.
275	Commercial Printing	34,379	569,216	4,582	59,142	33,374	557,782	4,635	57,580	-2.6%	-2.0%	10.
276	Manifold business forms	842	53,501	98	5,431	853	48,575	98	4,356	-19.8%	-9.2%	8.
277	Greeting cards	153	19,152	25	304	157	22,043	29	327	7.6%	15.1%	1.
278	Blankbooks and bookbinding	1,511	71,366	213	7,941	1,529	65,028	216	7,690	-3.2%	-8.9%	11.
279	Printing trade services	4,551	69,489	636	8,415	4,078	62,146	566	7,742	-8.0%	-10.6%	12.
28	Chemicals and allied	12,027	831,621	1,443	58,451	12,224	865,888	1,418	59,362	1.6%	4.1%	6.
281	Industrial inorganic	1,374	92,811	119	2,690	1,505	103,852	144	4,202	56.2%	11.9%	4.
282	Plastics materials and synthetics	694	126,645	62	1,694	704	129,332	81	2,377	40.3%	2.1%	1.
283	Drugs	1,349	174,440	215	21,673	1,382	192,255	206	22,649	4.5%	10.2%	11.
284	Soap, cleaners, and toilet goods	2,350	124,532	349	12,075	2,308	123,436	328	11,610	-3.9%	-0.9%	9.
285	Paints and allied products	1,411	55,450	203	6,400	1,407	52,691	200	5,992	-6.4%	-5.0%	11.
286	Industrial organic chemicals	946	123,129	66	3,198	931	130,513	56	2,943	-8.0%	6.0%	2.
287	Agricultural chemicals	908	40,929	73	1,826	882	43,780	78	1,955	7.1%	7.0%	4.
289	Miscellaneous chemical products	2,879	90,552	325	7,648	2,699	88,237	292	7,497	-2.0%	-2.6%	8.
29	Petroleum and coal products	2,217	118,263	238	14,943	2,235	114,872	226	15,293	2.3%	-2.9%	13.3
291	Petroleum refining	336	79,263	40	11,306	343	77,207	40	11,926	5.5%	-2.6%	15.4
295	Asphalt paving and roofing materials	1,338	25,858	142	2,365	1,350	24,693	137	2,228	-5.8%	-4.5%	9.0
299	Misc. petroleum and coal products	542	13,141	56	1,272	479	12,788	46	1,137	-10.6%	-2.7%	8.8
30	Rubber and misc. plastics products	14,632	869,856	1,997	84,144	15,397	846,320	2,084	83,092	-1.3%	-2.7%	9.8
301	Tires and inner tubes	153	65,338	10	966 *	150	66,258	8	909	-5.9%	1.4%	1.3
302	Rubber and plastics footwear	67	12,730	8	1,208 *	60	11,867	7	1,384 *	14.6%	-6.8%	11.6
305	Hose & belting & gaskets	678	59,915	84	3,189	701	52,415	96	3,176	-0.4%	-12.5%	6.0
306	Fabricated rubber products, nec	1,644	105,702	191	9,041	1,657	102,732	190	8,690	-3.9%	-2.8%	8.4
308	Misc. plastics products, nec	12,507	629,099	1,693	69,740	16,078	823,937	1,735	67,990	-2.5%	31.0%	8.2
31	Leather and leather products	2,123	129,561	221	6,886 *	1,990	108,028	218	5,072	-26.3%	-16.6%	4.7
311	Leather tanning and finishing	349	15,004	21	750 *	332	14,922	29	548	-26.9%	-0.5%	3.6
313	Footwear cut stock	127	5,755	5	10 *	106	5,225	6	51 *	410.0%	-9.2%	0.9
314	Footwear, except rubber	475	72,320	48	2,346	420	55,494	34	1,156	-50.7%	-23.3%	2.0
315	Leather gloves and mittens	74	2,979	6	175 *	74	2,932	7	140	-20.0%	-1.6%	4.7
316	Luggage	226	10,304	35	1,292	240	9,615	39	1,236	-4.3%	-6.7%	12.8
317	Handbags and personal leather good	504	16,384	57	1,157	396	12,358	50	683	-41.0%	-24.6%	5.5
319	Leather goods, nec	352	6,754	46	1,156	355	7,122	43	1,215	5.1%	5.4%	17.0

TABLE 4 (cont'd)

Employment by Industry Trends
California and the U.S., 1988-1991

SIC	Industry	U.S. 1988 Tot Est	U.S. 1988 Tot Emp	California 1988 Tot Est	California 1988 Tot Emp	U.S. 1991 Tot Est	U.S. 1991 Tot Emp	California 1991 Tot Est	California 1991 Tot Emp	Cal. 1988-91 Emp % Change	U.S. 1988-91 Emp % Change	Employment Location Quotient 1991
32	Stone, clay, and glass products	15,872	518,820	1,613	51,500	15,962	476,986	1,650	47,622	-7.5%	-8.1%	9.98%
321	Flat glass	89	14,478	16	1,294	139	13,242	25	1,351	4.4%	-8.5%	10.20%
322	Glass and glassware, pressed or blo	508	76,222	91	8,932	538	69,619	99	7,267	-18.6%	-8.7%	10.44%
323	Products of purchased glass	1,418	52,033	225	5,435	1,402	50,099	206	5,007	-7.9%	-3.7%	9.99%
324	Cement, hydraulic	211	18,413	19	2,346	220	16,889	23	2,112	-10.0%	-8.3%	12.51%
325	Structural clay products	599	35,809	55	2,224	608	31,438	74	2,335	5.0%	-12.2%	7.43%
326	Pottery and related products	912	36,880	183	4,458	1,004	35,629	189	4,063	-8.9%	-3.4%	11.40%
327	Concrete, gypsum, & plaster produc	9,575	195,366	765	20,856	9,435	175,085	748	19,460	-6.7%	-10.4%	11.11%
328	Cut stone and stone products	756	12,421	57	725	820	13,074	82	945	30.3%	5.3%	7.23%
329	Misc. nonmetallic mineral products	1,753	77,001	191	5,201	1,602	71,116	180	4,981	-4.2%	-7.6%	7.00%
33	Primary metal industries	6,715	725,201	713	36,907	6,867	688,280	686	31,579	-14.4%	-5.1%	4.59%
331	Blast furnace and basic steel product	1,243	266,435	107	6,885	1,343	249,906	115	6,433	-6.6%	-6.2%	2.57%
332	Iron and steel foundries	1,216	132,153	43	2,601	1,211	128,789	81	5,906	127.1%	-2.5%	4.59%
333	Primary nonferrous metals	173	33,075	16	243	177	36,188	13	126	-48.1%	9.4%	0.35%
334	Secondary nonferrous metals	385	13,809	43	1,443	394	14,850	45	1,606	11.3%	7.5%	10.81%
335	Nonferrous rolling and drawing	1,056	161,991	109	8,391	1,079	150,873	112	8,046	-4.1%	-6.9%	5.33%
336	Nonferrous foundries	1,661	83,661	235	10,555	1,656	75,264	220	6,892	-34.7%	-10.0%	9.16%
339	Miscellaneous primary metal produc	961	34,064	109	3,039	913	32,009	90	2,527	-16.8%	-6.0%	7.89%
34	Fabricated metal products	35,743	1,491,640	4,650	149,050	35,967	1,383,586	4,581	134,554	-9.7%	-7.2%	9.73%
341	Metal cans and shipping	526	48,153	75	7,191	499	42,915	75	6,765	-5.9%	-10.9%	15.76%
342	Cutlery, handtools, and hardware	2,334	147,370	329	14,598	2,332	132,706	318	11,527	-21.0%	-10.0%	8.69%
343	Plumbing and heating, exc. electric	796	45,228	116	7,373	746	42,430	116	6,802	-7.7%	-6.2%	16.03%
344	Fabricated structural metal products	12,260	409,960	1,548	42,110	12,474	385,068	1,560	37,275	-11.5%	-6.1%	9.68%
345	Screw machine products, bolts, etc.	2,507	97,594	282	15,123	2,404	90,636	260	14,758	-2.4%	-7.1%	16.28%
346	Metal forgings and stampings	4,025	258,592	443	14,707	4,032	232,811	438	13,121	-10.8%	-10.0%	5.64%
347	Metal services, nec	5,080	115,587	856	19,677	5,115	110,467	848	18,316	-6.9%	-4.4%	16.58%
348	Ordnance and accessories, nec	377	91,396	48	5,984	388	73,376	53	3,708	-38.0%	-19.7%	5.05%
349	Misc. fabricated metal products	7,655	277,233	905	22,167	7,689	272,229	855	22,116	-0.2%	-1.8%	8.12%
35	Industrial machinery and equipment	51,101	1,924,409	7,178	221,088	52,534	1,854,527	7,041	202,753	-8.3%	-3.6%	10.93%
351	Engines and turbines	339	87,840	52	7,110	338	84,762	46	7,456	4.9%	-3.5%	8.80%
352	Farm and garden machinery	1,773	91,419	180	3,808	1,806	94,328	170	2,692	-29.3%	3.2%	2.85%
353	Construction and related machinery	3,367	197,518	290	7,561	3,317	198,724	272	6,812	-9.9%	0.6%	3.43%
354	Metalworking machinery	11,176	278,755	1,032	14,664	11,548	277,969	1,011	14,699	0.2%	-0.3%	5.29%
355	Special industry machinery	4,545	176,432	520	17,624	4,563	168,995	481	15,331	-13.0%	-4.2%	9.07%
356	General industrial machinery	3,896	245,572	448	16,400	3,978	248,648	436	17,129	4.4%	1.3%	6.89%
357	Computer and office equipment	2,258	338,369	702	96,157	2,268	287,629	676	84,493	-12.1%	-15.0%	29.38%
358	Refrigeration and service machinery	2,095	196,750	318	11,541	2,090	176,096	317	10,824	-6.2%	-10.5%	6.15%
359	Industrial machinery, nec	21,440	311,185	3,593	46,044	22,310	316,039	3,589	43,028	-6.6%	1.6%	13.61%
36	Electronic & other electric equipme	16,110	1,595,832	3,522	267,080	16,810	1,481,703	3,640	251,690	-5.8%	-7.2%	16.99%
361	Electric distribution equipment	742	78,293	84	4,737	766	74,211	90	4,505	-4.9%	-5.2%	6.07%
362	Electrical industrial apparatus	2,159	170,822	294	15,424	2,034	160,469	264	13,641	-11.6%	-6.1%	8.50%
363	Household appliances	469	117,729	52	3,592	492	102,809	60	2,714	-24.4%	-12.7%	2.64%
364	Electric lighting and wiring equipme	1,928	170,005	348	15,605	1,918	150,960	341	13,025	-16.5%	-11.2%	8.63%
365	Household audio and video equipme	843	44,391	218	8,293	820	50,296	193	10,829	30.6%	13.3%	21.53%
366	Communications equipment	1,530	258,986	348	45,260	1,766	236,149	375	41,233	-8.9%	-8.8%	17.46%
367	Electronic components and accessori	5,939	557,993	1,706	144,390	6,399	529,562	1,823	138,163	-4.3%	-5.1%	26.09%
369	Misc. electrical equipment & suppli	2,455	197,277	462	29,747	2,132	172,285	399	27,114	-8.9%	-12.7%	15.74%

TABLE 4 (cont'd)

Employment by Industry Trends
California and the U.S., 1988-1991

SIC	Industry	U.S. 1988 Tot Est	U.S. 1988 Tot Emp	California 1988 Tot Est	California 1988 Tot Emp	U.S. 1991 Tot Est	U.S. 1991 Tot Emp	California 1991 Tot Est	California 1991 Tot Emp	Cal. 1988-91 Emp % Change	U.S. 1988-91 Emp % Change	Employm Locatio Quotie 1991
37	Transportation equipment	10,389	1,847,865	1,643	302,249	10,571	1,643,264	1,611	269,248	-10.9%	-11.1%	16.
371	Motor vehicles and equipment	4,406	739,044	649	34,831	4,467	635,269	627	29,362 *	-15.7%	-14.0%	4.
372	Aircraft and parts	1,626	614,338	387	126,595	1,763	574,990	409	123,384	-2.5%	-6.4%	21.
373	Ship and boat building	2,688	191,038	295	12,741	2,700	166,989	289	11,928	-6.4%	-12.6%	7.
374	Railroad equipment	182	25,342	9	184	194	28,271	6	94 *	-48.9%	11.6%	0.
375	Motorcycles, bicycles, and parts	243	8,075	112	1,681	248	10,978	112	1,543 *	-8.2%	36.0%	14.
376	Guided missiles, space vehicles, par	153	219,623	56	118,279	135	186,418	48	96,988	-18.0%	-15.1%	52.
379	Misc. transportation equipment	1,076	50,373	133	7,917	939	39,803	111	5,948 *	-24.9%	-21.0%	14.
38	Instruments and related products	10,196	1,002,522	2,043	195,199	10,310	926,047	2,003	180,272	-7.6%	-7.6%	19.
381	Search and navigation equipment	1,010	359,401	230	93,668	831	289,106	192	74,836	-20.1%	-19.6%	25.
382	Measuring and controlling devices	4,151	300,456	913	55,505	4,029	273,301	857	52,386	-5.6%	-9.0%	19.
384	Medical instruments and supplies	3,405	215,552	624	37,682	3,592	240,746	665	42,786	13.5%	11.7%	17.
385	Ophthalmic goods	497	26,282	81	3,167	546	31,198	79	4,529	43.0%	18.7%	14.
386	Photographic equipment	791	87,124	138	4,641	814	81,986	139	5,352	15.3%	-5.9%	6.
387	Watches, clocks,	199	13,404	27	452	176	8,494	25	281	-37.8%	-36.6%	3.
39	Miscellaneous	16,393	386,761	2,266	39,597	16,912	368,948	2,329	39,552	-0.1%	-4.6%	10.
391	Jewelry, silverware, and	2,837	48,680	339	3,554	2,736	44,212	355	3,805	7.1%	-9.2%	8.
393	Musical instruments	398	12,867	63	1,578	430	12,443	74	1,966	24.6%	-3.3%	15.
394	Toys and sporting goods	2,626	93,672	441	9,867	2,816	91,697	460	9,656	-2.1%	-2.1%	10.
395	Pens, pencils, office, & art supplies	960	29,111	145	4,444	980	30,028	146	4,428	-0.4%	3.2%	14.
396	Costume jewelry and notions	982	32,456	101	2,287	1,060	30,247	114	2,648	15.8%	-6.8%	8.
399	Miscellaneous manufactures	7,724	166,351	1,057	17,054	7,431	154,410	988	16,023	-6.0%	-7.2%	10.

Source: ADE. Based on County Business Patterns.

TABLE 5

California Employment Projections, 1990 – 2005

SIC	Industry	California 1991 Total Est	California 1991 Total Emp	California 1990–2005 Change in Jobs	California 1990–2005 % Change
	TOTAL	747,688	11,019,609	2,988,900	23.9%
	MANUFACTURING	51,070	2,055,402	88,000	4.3%
20	Food and kindred products	2,644	165,971	19,900	11.0%
201	Meat products	220	18,484	2,200	10.7%
202	Dairy products	195	12,571	(1,100)	-7.6%
203	Preserved fruits and vegetables	374	39,788	9,100	17.2%
204	Grain mill products	186	8,053	(700)	-7.2%
205	Bakery products	400	23,389	2,800	13.6%
206	Sugar and confectionery	143	12,522	2,333	8.7%
207	Fats and Oils	57	1,972	367	8.7%
208	Beverages	478	23,870	3,300	12.2%
209	Misc. food and kindred products	535	25,027	1,700	38.6%
22	Textile mill products	446	16,467	900	5.6%
221	Broadwoven fabric mills, cotton	34	384	6	1.3%
222	Broadwoven fabric mills, manmade	34	321	5	1.3%
223	Broadwoven fabric mills, wool	7	164	2	1.3%
224	Narrow fabric mills	16	345	5	1.3%
225	Knitting mills	98	5,995	(400)	-8.7%
226	Textile finishing, except wool	76	2,227	32	1.3%
227	Carpets and rugs	46	3,264	1,200	30.0%
228	Yarn and thread mills	16	675	10	1.3%
229	Miscellaneous textile goods	87	2,827	41	1.3%
23	Apparel and other textile products	5,914	136,353	26,000	19.6%
231	Men's and boys' suits and coats	25	936	(44)	-7.0%
232	Men's and boys' furnishings	215	11,771	(556)	-7.0%
233	Women's and misses' outerwear	3,131	77,726	21,500	24.2%
234	Women's and children's undergarments	64	3,836	(300)	-8.3%
235	Hats, caps, and millinery	35	1,021	145	14.4%
236	Girls' and children's outerwear	79	4,054	1,200	37.5%
237	Fur goods	11	19	3	14.4%
238	Miscellaneous apparel and accessories	155	5,853	829	14.4%
239	Misc. fabricated textile products	1,060	22,059	3,124	14.4%
24	Lumber and wood products	2,814	55,038	0	0.0%
241	Logging	515	3,620	(262)	-6.1%
242	Sawmills and planing mills	242	12,989	(938)	-6.1%
243	Millwork, plywood & structural members	1,326	20,887	3,900	14.4%
244	Wood Containers	207	4,669	(500)	-10.9%
245	Wood buildings and mobile homes	77	3,616	(603)	-14.1%
249	Miscellaneous wood products	380	8,981	(1,497)	-14.1%

TABLE 5 (cont'd)

California Employment Projections, 1990 - 2005

SIC	Industry	California 1991 Total Est	California 1991 Total Emp	California 1990-2005 Change in Jobs	California 1990-2005 % Change
25	Furniture and fixtures	1,760	51,828	5,000	9.1%
251	Household furniture	819	25,319	400	1.3%
252	Office furniture	181	7,846	1,297	17.4%
253	Public building & related furniture	46	2,148	355	17.4%
254	Partitions and fixtures	365	7,961	1,600	19.8%
259	Miscellaneous furniture & fixtures	204	7,550	1,248	17.4%
26	Paper and allied products	619	39,697	5,800	14.3%
261	Pulp mills	4	1,101 *	0	0.0%
262	Paper mills	17	2,234	0	0.0%
263	Paperboard mills	17	1,879	0	0.0%
265	Paperboard containers and boxes	246	16,971	1,300	7.3%
267	Misc converted paper products	314	15,529	4,500	27.6%
27	Printing and publishing	8,267	160,026	46,900	29.0%
271	Newspapers	685	52,654	10,400	20.0%
272	Periodicals	597	10,181	4,435	44.1%
273	Books	426	9,342	4,070	44.1%
274	Miscellaneous publishing	384	7,879	3,432	44.1%
275	Commercial Printing	4,635	57,580	15,800	25.2%
276	Manifold business forms	98	4,356	1,898	44.1%
277	Greeting cards	29	327	142	44.1%
278	Blankbooks and bookbinding	216	7,690	3,350	44.1%
279	Printing trade services	566	7,742	3,373	44.1%
28	Chemicals and allied	1,418	59,362	16,000	22.7%
281	Industrial inorganic	144	4,202	300	4.1%
282	Plastics materials and synthetics	81	2,377	(200)	-5.7%
283	Drugs	206	22,649	11,200	48.9%
284	Soap, cleaners, and toilet goods	328	11,610	4,100	28.7%
285	Paints and allied products	200	5,992	0	0.0%
286	Industrial organic chemicals	56	2,943	592	16.7%
287	Agricultural chemicals	78	1,955	(1,400)	-50.0%
289	Miscellaneous chemical products	292	7,497	1,508	16.7%
29	Petroleum and coal products	226	15,293	600	2.3%
291	Petroleum refining	40	11,926	500	2.2%
295	Asphalt paving and roofing materials	137	2,228	66	2.9%
299	Misc. petroleum and coal products	46	1,137	34	2.9%
30	Rubber and misc. plastics products	2,084	83,092	17,700	23.1%
301	Tires and inner tubes	8	909	0	0.0%
302	Rubber and plastics footwear	7	1,384 *	(121)	-8.7%
305	Hose & belting & gaskets	96	3,176	(279)	-8.7%
306	Fabricated rubber products, nec	190	8,690	800	9.0%
308	Misc. plastics products, nec	1,735	67,990	17,200	27.8%

TABLE 5 (cont'd)

California Employment Projections, 1990 - 2005

SIC	Industry	California 1991 Total Est	California 1991 Total Emp	California 1990-2005 Change in Jobs	California 1990-2005 % Change
31	Leather and leather products	218	5,072	(2,300)	-39.0%
311	Leather tanning and finishing	29	548	(251)	-39.0%
313	Footwear cut stock	6	51 *	(23)	-39.0%
314	Footwear, except rubber	34	1,156	(529)	-39.0%
315	Leather gloves and mittens	7	140	(64)	-39.0%
316	Luggage	39	1,236	(565)	-39.0%
317	Handbags and personal leather goods	50	683	(312)	-39.0%
319	Leather goods, nec	43	1,215	(556)	-39.0%
32	Stone, clay, and glass products	1,650	47,622	(1,400)	-2.6%
321	Flat glass	25	1,351	0	0.0%
322	Glass and glassware, pressed or blown	99	7,267	(1,200)	-15.2%
323	Products of purchased glass	206	5,007	100	1.7%
324	Cement, hydraulic	23	2,112	400	23.5%
325	Structural clay products	74	2,335	(100)	-3.4%
326	Pottery and related products	189	4,063	(300)	-6.0%
327	Concrete, gypsum, and plaster products	748	19,460	300	1.4%
328	Cut stone and stone products	82	945	(96)	-7.3%
329	Misc. nonmetallic mineral products	180	4,981	(504)	-7.3%
33	Primary metal industries	686	31,579	1,100	2.8%
331	Blast furnace and basic steel products	115	6,433	100	1.2%
332	Iron and steel foundries	81	5,906	700	13.0%
333	Primary nonferrous metals	13	126	3	2.2%
334	Secondary nonferrous metals	45	1,606	38	2.2%
335	Nonferrous rolling and drawing	112	8,046	(200)	-1.7%
336	Nonferrous foundries	220	6,892	500	5.1%
339	Miscellaneous primary metal products	90	2,527	59	2.2%
34	Fabricated metal products	4,581	134,554	(4,000)	-3.1%
341	Metal cans and shipping	75	6,765	(1,500)	-23.1%
342	Cutlery, handtools, and hardware	318	11,527	(1,100)	-8.1%
343	Plumbing and heating, exc. electric	116	6,802	(200)	-2.5%
344	Fabricated structural metal products	1,560	37,275	(2,000)	-5.1%
345	Screw machine products, bolts, etc.	260	14,758	(600)	-4.6%
346	Metal forgings and stampings	438	13,121	(300)	-2.3%
347	Metal services, nec	848	18,316	900	4.5%
348	Ordnance and accessories, nec	53	3,708	172	6.9%
349	Misc. fabricated metal products	855	22,116	1,028	6.9%
35	Industrial machinery and equipment	7,041	202,753	14,200	6.7%
351	Engines and turbines	46	7,456	236	3.6%
352	Farm and garden machinery	170	2,692	500	17.9%
353	Construction and related machinery	272	6,812	200	2.3%
354	Metalworking machinery	1,011	14,699	1,100	6.3%
355	Special industry machinery	481	15,331	0	0.0%
356	General industrial machinery	436	17,129	100	0.5%
357	Computer and office equipment	676	84,493	10,700	10.6%
358	Refrigeration and service machinery	317	10,824	0	0.0%
359	Industrial machinery, nec	3,589	43,028	1,364	3.6%

TABLE 5 (cont'd)

California Employment Projections, 1990 - 2005

SIC	Industry	California 1991 Total Est	California 1991 Total Emp	California 1990-2005 Change in Jobs	California 1990-2005 % Change
36	Electronic & other electric equipment	3,640	251,690	(28,500)	-11.3%
361	Electric distribution equipment	90	4,505	1,300	12.9%
362	Electrical industrial apparatus	264	13,641	500	4.7%
363	Household appliances	60	2,714	(600)	-16.2%
364	Electric lighting and wiring equipment	341	13,025	300	1.3%
365	Household audio and video equipment	193	10,829	(100)	-0.7%
366	Communications equipment	375	41,233	(1,400)	-4.6%
367	Electronic components and accessories	1,823	138,163	(28,300)	-20.4%
369	Misc. electrical equipment & supplies	399	27,114	(200)	-1.0%
37	Transportation equipment	1,611	269,248	(36,800)	-12.7%
371	Motor vehicles and equipment	627	29,362 *	1,600	5.4%
372	Aircraft and parts	409	123,384	(15,200)	-9.4%
373	Ship and boat building	289	11,928	(2,400)	-19.0%
374	Railroad equipment	6	94 *	17	16.5%
375	Motorcycles, bicycles, and parts	112	1,543 *	285	16.5%
376	Guided missiles, space vehicles, parts	48	96,988	(22,400)	-29.6%
379	Miscellaneous transportation equipment	111	5,948 *	1,098	16.5%
38	Instruments and related products	2,003	180,272	6,300	2.9%
381	Search and navigation equipment	192	74,836	(23,700)	-23.9%
382	Measuring and controlling devices	857	52,386	3,800	5.5%
384	Medical instruments and supplies	665	42,786	2,101	50.4%
385	Ophthalmic goods	79	4,529	222	50.4%
386	Photographic equipment	139	5,352	263	50.4%
387	Watches, clocks,	25	281	14	50.4%
39	Miscellaneous	2,329	39,552	1,000	2.8%
391	Jewelry, silverware, and	355	3,805	13	0.4%
393	Musical instruments	74	1,966	7	0.4%
394	Toys and sporting goods	460	9,656	1,000	8.5%
395	Pens, pencils, office, & art supplies	146	4,428	15	0.4%
396	Costume jewelry and notions	114	2,648	9	0.4%
399	Miscellaneous manufactures	988	16,023	56	0.4%

Note: * indicates estimates

filename:project

Source: Applied Development Economics. Data collected from U.S. County Business Patterns and the California Employment Development Department.

TABLE 6

Employment Trends in Solano, Napa and Contra Costa Counties, 1988 & 1991

SIC	Industry	Region		Region		Solano		Solano		Napa		Napa		Contra Costa		Contra Costa	
		1988 Est	1988 Empl	1991 Est	1991 Empl	1988 Est	1988 Empl	1991 Est	1991 Empl	1988 Est	1988 Empl	1991 Est	1991 Empl	1988 Est	1988 Empl	1991 Est	1991 Empl
	TOTAL	27,567	339,585	29,821	378,202	5,457	62,105	6,084	76,541	3,032	29,969	3,223	36,406	19,078	247,511	20,514	265,255
	MANUFACTURING	1,196	40,347	1,264	42,317	231	7,008	262	7,778	199	5,042	216	6,173	766	28,297	786	28,366
20	Food and kindred products	151	7,165	160	7,201	23	1,973	21	1,555	99	3,069	105	3,801	29	2,123	34	1,845
201	Meat products	1	112	0	0	1	112 *										
203	Preserved fruits and	11	656	8	494	6	544	3	319 *					5	112	5	175
204	Grain mill products	1	101	1	175	1	101 *	1	175 *								
205	Bakery products	6	131	7	336									6	131 *	7	336 *
206	Sugar and confectionery	5	1,846	7	1,028	3	251 *	4	175 *					2	1,595 *	3	853 *
207	Fats and Oils	3	105	2	69									3	105 *	2	69 *
208	Beverages	102	3,750	106	4,604	5	696 *	4	855 *	94	2,979	99	3,665	3	75 *	3	84 *
209	Misc. food and kindred	8	227	11	463					3	99 *	4	136 *	5	128 *	7	327 *
23	Apparel and other textile	24	370	30	473					5	265 *	6	318	19	105	24	155
233	Women's and misses'	2	249	1	222					2	249 *	1	222 *				
238	Miscellaneous apparel and	2	80	0	0												
239	Misc. fabricated textile	10	60	18	191					2	80 *	3	96 *	10	60	15	95
24	Lumber and wood products	60	1,088	78	1,050	20	496	23	368	11	137	12	106	29	455	43	576
242	Sawmills and planing mill	2	164	1	223									2	164 *	1	223 *
243	Millwork, plywood &	24	450	40	411	10	275	13	123					14	175	27	288
244	Wood Containers	11	166	6	99			2	47 *	5	69	4	52	6	97		
245	Wood buildings and mobile	1	30	4	114	1	30 *	1	49 *							3	65 *
249	Miscellaneous wood	8	125	6	148	8	125	6	148 *								
25	Furniture and fixtures	31	545	36	571	9	245	13	289					22	300	23	282
251	Household furniture	9	203	13	273	2	101 *	3	117 *					7	102 *	10	156
252	Office furniture	0	0	0	0												
254	Partitions and fixtures	18	223	18	287	5	86	8	172 *					13	137	10	115
26	Paper and allied products	14	897	16	1,030	6	107 *	7	149					8	790 *	9	881 *
263	Paperboard mills	2	530	1	230									2	530 *	1	230 *
265	Paperboard containers and	5	202	6	422	1	72	1	64 *					4	130 *	5	358 *
267	Misc. converted paper	0	0	5	85			5	85								

TABLE 6 (cont'd)

Employment Trends in Solano, Napa and Contra Costa Counties, 1988 & 1991

		Region		Region		Solano		Solano		Napa		Napa		Contra Costa		Contra Costa	
SIC	Industry	1988 Est	1988 Empl	1991 Est	1991 Empl	1988 Est	1988 Empl	1991 Est	1991 Empl	1988 Est	1988 Empl	1991 Est	1991 Empl	1988 Est	1988 Empl	1991 Est	1991 Empl
27	Printing and publishing	239	4,170	250	3,685	40	797	42	811	21	323	26	383	178	3,050	182	2,491
271	Newspapers	26	2,332	23	1,807	5	457	5	479	4	169 *	5	187 *	17	1,706 *	13	1,141 *
272	Periodicals	7	69	13	127											13	127
273	Books	5	99	10	65									7	69	10	65
274	Miscellaneous publishing	5	99	12	92									5	99 *	12	92
275	Commercial Printing	157	1,407	150	1,231	27	298	29	253	16	118	19	196	114	991	102	782
276	Manifold business forms	1	33	0	0					1	33						
278	Blankbooks and bookbindin	3	121	4	135									3	121 *	4	135 *
279	Printing trade services	13	181	12	149									13	181	12	149
28	Chemicals and allied products	53	2,660	54	2,676	10	141	12	174			5	209 *	43	2,519	37	2,293
281	Industrial inorganic	13	445	14	486									13	445	14	486
283	Drugs	4	249	1	110							1	110 *	4	249 *		
284	Soap, cleaners, and	2	66	2	71	2	66 *	2	71 *								
286	Industrial organic	5	1,001	4	1,215									5	1,001 *	4	1,215 *
287	Agricultural chemicals	5	390	4	343									5	390 *	4	343 *
289	Miscellaneous chemical	8	249	7	249									8	249 *	7	249 *
29	Petroleum and coal products	20	4,587	23	4,711	1	377 *	1	375 *			1	68 *	19	4,210	21	4,268
291	Petroleum refining	7	4,209	7	4,271	1	377 *	1	375 *					6	3,832	6	3,896
295	Asphalt paving and	9	251	11	304							1	68 *	9	251 *	10	236
299	Misc. petroleum and coal	4	101	5	136									4	101 *	5	136
30	Rubber and misc. plastics	33	616	35	679	12	369	17	479					21	247	18	200
308	Miscellaneous plastics	26	541	26	560	9	341	12	419					17	200 *	14	141
31	Leather	4	249	6	107					4	249 *	6	107				
311	Leather tanning and finishing	2	165	3	57					2	165 *	3	57 *				
32	Stone, clay, and glass	62	1,644	54	1,655	20	331	16	473	11	296	8	341	31	1,017	30	841
322	Glass and glassware,	2	258	3	295									2	258 *	3	295 *
323	Products of purchased	5	130	6	230	5	130	6	230								
325	Structural clay products	0	0	3	118											3	118 *
326	Pottery and related products	0	0	4	52											4	52
327	Concrete, gypsum, and plaster	34	924	26	947	8	138	7	238	8	288	5	333 *	18	498	14	376
329	Misc. nonmetallic mineral	2	45	0	0									2	45 *		

TABLE 6 (cont'd)

Employment Trends in Solano, Napa and Contra Costa Counties, 1988 & 1991

		Region		Region		Solano		Solano		Napa		Napa		Contra Costa		Contra Costa	
SIC	Industry	1988 Est	1988 Empl	1991 Est	1991 Empl	1988 Est	1988 Empl	1991 Est	1991 Empl	1988 Est	1988 Empl	1991 Est	1991 Empl	1988 Est	1988 Empl	1991 Est	1991 Empl
33	Primary metal industries	11	1,849	10	2,056					1	99 *	1	306 *	10	1,750 *	9	1,750 *
331	Blast furnace, basic steel	5	1,808	3	1,988					1	99 *	1	306 *	4	1,709 *	2	1,682 *
339	Miscellaneous primary metals	0	0	2	68											2	68 *
34	Fabricated metal products	92	2,855	102	3,453	23	1,127	29	1,713			3	105	69	1,728	70	1,635
341	Metal cans and shipping	6	665	7	474	2	251 *	3	271 *					4	414 *	4	203
342	Cutlery, handtools, and	4	70	0	0									4	70		
344	Fabricated structural	44	930	41	835	10	426	11	392					34	504	30	443
347	Metal services, nec	5	114	7	151									5	114 *	7	151 *
348	Ordnance and accessories,	1	348	1	349	1	348 *	1	349 *								
349	Misc. fabricated metal	23	699	30	1,429	5	123	9	701			2	52 *	18	576	19	676
35	Industrial machinery & equipment	107	1,396	115	1,657	19	310	28	521	10	139	13	74	78	947	74	1,062
352	Farm and garden machinery	0	0	0	0												
353	Construction & related machinery	0	0	0	0												
354	Metalworking machinery	0	0	6	50			6	50								
355	Special industry machinery	7	82	13	161			5	91 *					7	82	8	70
356	General industrial machinery	6	180	8	382			2	79 *					6	180	6	303
357	Computer and office equipment	8	278	11	308									8	278	11	308
358	Refrigeration, service machinery	2	188	2	182	2	188	2	182 *								
359	Industrial machinery, nec	48	462	41	415	7	99	10	120 *	4	59			37	304	31	295
36	Electronic equipment	49	1,243	50	1,552	10	91	8	205	5	101 *	5	87	34	1,051	37	1,260
361	Electric distribution	3	125	3	126					1	67 *	1	50 *	2	58 *	2	76 *
362	Electrical industrial	0	0	4	287			1	175 *							3	112 *
364	Electric lighting	2	99	2	114									2	99 *	2	114 *
366	Communications equipment	3	189	3	191									3	189	3	191 *
367	Electronic components	12	582	20	794			3	30 *					12	582	17	764
369	Misc. electrical	7	82	0	0									7	82		
37	Transportation equipment	43	851	43	903	7	140	10	150	2	67 *			34	644	33	753
371	Motor vehicles and equipment	13	274	14	208	4	108	6	125 *	2	67 *			7	99 *	8	83 *
372	Aircraft and parts	4	417	4	418									4	417	4	418
373	Ship and boat building	21	144	19	252									21	144	19	252

TABLE 6 (cont'd)

Employment Trends in Solano, Napa and Contra Costa Counties, 1988 & 1991

SIC	Industry	Region 1988 Est	Region 1988 Empl	Region 1991 Est	Region 1991 Empl	Solano 1988 Est	Solano 1988 Empl	Solano 1991 Est	Solano 1991 Empl	Napa 1988 Est	Napa 1988 Empl	Napa 1991 Est	Napa 1991 Empl	Contra Costa 1988 Est	Contra Costa 1988 Empl	Contra Costa 1991 Est	Contra Costa 1991 Empl
38	Instruments and related products	70	4,236	61	3,551					7	83	8	68	63	4,153	53	3,483
381	Search and navigation	6	56	5	134									6	56	5	134
382	Measuring and controlling devices	33	2,520	27	1,893									33	2,520	27	1,893
384	Medical instruments and supplies	22	1,593	16	1,420					4	55 *			18	1,538	16	1,420
39	Miscellaneous	57	433	60	673	15	181	17	176					42	252	43	497 *
393	Musical instruments	1	36	1	27	1	36	1	27 *								
394	Toys and sporting goods	0	0	8	55											8	55
395	Office & art supplies	2	46	2	61									2	46 *	2	61 *
399	Miscellaneous manufacturing	24	115	34	169			9	62					24	115	25	107
----	Administrative and Auxiliary	35	3,446	50	5,687	5	175 *	5	375 *			2	200 *	30	3,271	43	5,112

Note: * indicates estimate employment. Actual data has been witheld by the U.S. Department of Commerce.

Source: Applied Development Economics. Based on data collected from U.S. County Business Patterns, 1988 & 1991

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TABLE 7

Economic Indicators and Target Industry Ratings

SIC	Description	Change US Empl 87-91 (1)	Ratings (1)	Real Change Value Added Manufacturing & Shipping 87-91 ($91mil) (2)	Ratings (2)	California Employment Location Quotient 91 (3)	Ratings (3)	Shift Share California compared to U.S. (4)	Ratings (4)	California Projected Change in Jobs (5)	Ratings (5)	Shift Share 3 Counties compared California (6)	Ratings (6)	3 County Establishment Location Quotient 91 (7)	Ratings (7)
	ALL MANUFACTURING	(888,400)		($226,094.4)		11.2%		1.01		88,000		1.04		0.04	
20	Food & Kindred Products	25,900		($8,180.3)		11.3%				19,900					
201	Meat Products	49,500	1	($2,051.0)	4	4.8%	5	1.06	2	2,200	1		5	0.000	5
202	Dairy Products	(5,500)	4	($4,011.2)	5	9.1%	3	1.13	1	(1,100)	5			0.000	5
203	Preserved Fruits & Vegetabl	7,600	1	$1,658.2	1	21.2%	1	1.02	3	9,100	1	0.74	4	0.021	3
204	Grain Mill Products	1,200	1	$5,403.3	1	7.6%	4	1.05	2	(700)	5	1.00	3	0.005	5
205	Bakery Products	(8,200)	5	($3,592.4)	5	10.9%	3	1.02	3	2,800	1	1.06	3	0.018	4
206	Sugar & confectionary produ	1,400	1	($729.2)	2	13.6%	2	0.98	3	2,333	1	1.28	2	0.049	1
207	Fats & oils	(1,400)	3	($338.4)	2	7.0%	4	0.90	5	367	3	0.73	4	0.035	2
208	Beverages	(7,900)	5	($2,371.2)	4	16.2%	1	1.11	2	3,300	1	1.00	3	0.222	1
209	Misc Food & kindred produc	700	2	($3,780.7)	5	15.3%	1	1.08	2	1,700	1	1.29	2	0.021	3
21	Tobacco products	(4,800)		$14,528.0		0.0%				0					
22	Textile mill products	(76,400)		($13,411.5)		2.6%				900					
221	Broadwoven fabric mills, cot	(6,400)	5	($1,558.9)	3	0.6%	5	0.91	4	6	4			0.000	5
222	Broadwoven fabric mills,ma	(10,000)	5	($2,095.8)	4	0.4%	5	1.09	2	5	4			0.000	5
224	Narrow fabric mills	(2,400)	3	($111.6)	2	1.9%	5	0.69	5	5	4			0.000	5
225	Knitting mills	(22,300)	5	($1,023.4)	3	3.2%	5	1.32	1	(400)	5			0.000	5
226	Textile finishing	(7,500)	5	($2,269.7)	4	4.0%	5	1.16	1	32	4			0.000	5
227	Carpets & rugs	(4,800)	4	($3,578.2)	5	6.6%	4	0.77	5	1,200	1			0.000	5
228	Yarn & mills	(19,500)	5	($2,560.1)	5	0.7%	5	0.53	5	10	4			0.000	5
229	Misc. textiles	(3,100)	3	($359.8)	2	5.3%	5	1.18	1	41	4			0.000	5
23	Apparel & other textiles	(121,000)		($17,230.5)		14.0%				26,000					
231	Men's & boy's suits, coats	(11,600)	5	($1,678.0)	4	2.0%	5	0.90	5	(44)	5			0.000	5
232	Men's & boy's furnishings	(27,700)	5	($4,003.8)	5	5.0%	5	1.04	3	(556)	5			0.000	5
233	Women's outerwear	(68,900)	5	($9,477.4)	5	25.9%	1	1.17	1	21,500	1	0.45	5	0.000	5
234	Women's undergarments	(10,000)	5	($1,031.4)	3	6.7%	4	1.32	1	(300)	5			0.000	5
235	Hats, caps, millinery	(1,300)	3	$20.0	1	5.9%	4	0.76	5	145	4			0.000	5
236	Girl's outerwear	(12,900)	5	($1,391.9)	3	7.2%	4	1.15	1	1,200	1			0.000	5
237	Fur goods	(600)	3	($336.7)	2	1.7%	5	0.24	5	3	4			0.000	5
238	Misc. apparel	(4,200)	4	($642.0)	2	14.4%	1	1.34	1	829	2		5	0.000	5
239	Misc. textile products	(11,700)	5	($2,693.3)	5	11.4%	2	0.99	3	3,124	1	1.72	1	0.017	4
24	Lumber & Wood mill produc	(67,900)		($20,425.8)		8.7%				0					
241	Logging	(7,700)	5	($2,477.3)	4	4.4%	5	0.81	5	(262)	5			0.000	5
242	Sawmills & planning mills	(22,600)	5	($6,029.7)	5	8.0%	4	0.93	4	(938)	5	0.57	5	0.004	5
243	Millwork, plywood, structur	(30,100)	5	($9,336.6)	5	10.0%	3	0.95	4	3,900	1	1.37	1	0.030	3
244	Wood containers	2,800	1	$537.3	1	11.8%	2	1.08	2	(500)	5	0.54	5	0.029	3
245	Wood buildings & mobile ho	(11,200)	5	($2,742.1)	5	7.0%	4	0.87	5	(603)	5	4.26	1	0.052	1
249	Miscellaneous Wood product	800	2	($1,067.8)	3	10.5%	3	1.03	3	(1,497)	5	0.83	4	0.016	4
25	Furniture & fixtures	(45,100)		($8,569.5)		11.3%				5,000					
251	Household furniture	(25,700)	5	($5,442.8)	5	10.2%	3	0.85	5	400	3	1.46	1	0.016	4
252	Office furniture	(14,600)	5	($3,330.5)	5	11.2%	3	0.97	4	1,297	1			0.000	5
253	Public building furniture	4,100	1	$811.4	1	9.0%	3	0.81	5	355	3			0.000	5
254	Partitions & fixtures	(7,200)	5	($1,230.1)	3	11.4%	2	1.00	3	1,600	1	0.99	3	0.049	1
259	Misc furniture & fixtures	(1,600)	3	($418.5)	2	18.6%	1	1.09	2	1,248	1			0.000	5

TABLE 7 (cont'd)

Economic Indicators and Target Industry Ratings

SIC	Description	Change US Empl 87-91 (1)	Ratings (1)	Real Change Value Added Manufacturing & Shipping 87-91 ($91mil) (2)	Ratings (2)	California Employment Location Quotient 91 (3)	Ratings (3)	Shift Share California compared to U.S. (4)	Ratings (4)	California Projected Change in Jobs (5)	Ratings (5)	Shift Share 3 Counties compared California (6)	Ratings (6)	3 County Establishment Location Quotient 91 (7)	Ratings (7)
26	Paper & allied products	9,400		($4,099.7)		6.4%				5,800					
261	Pulp mills	2,600	1	($131.6)	5	n/a	n/a	n/a	n/a	0	5			0.000	
262	Paper mills	1,200	1	($2,631.1)	5	1.7%	5	1.11	2	0	5			0.000	
263	Paperboard mills	(1,700)	3	($2,480.7)	4	3.6%	4	0.90	5	0	5	0.53	5	0.059	
265	Paperboard containers & box	5,200	1	($674.5)	2	8.7%	4	1.00	3	1,300	1	1.22	2	0.024	
267	Misc. converted paper produ	2,100	1	$20,164.0	1	6.8%	4	0.99	3	4,500	1		1	0.016	
27	Printing & publishing	(6,000)		($10,934.8)		10.6%				46,900					
271	Newspaper publishing & pri	(6,000)	4	($7,539.6)	5	12.2%	2	1.00	3	10,400	1	0.93	3	0.034	
272	Periodical publishing & print	600	2	($367.7)	2	9.1%	3	1.25	1	4,435	1	1.75	1	0.022	
273	Books	12,200	1	$2,456.3	1	7.7%	4	1.08	2	4,070	1	1.90	1	0.023	
274	Misc publishing	(4,500)	4	$531.2	1	11.8%	2	1.02	3	3,432	1	2.02	1	0.031	
275	Commercial printing	2,400	1	($2,852.2)	5	10.3%	3	0.99	3	15,800	1	0.94	3	0.032	
276	Manifold business forms	(7,000)	5	($2,464.2)	4	9.0%	3	0.88	5	1,898	1		5	0.000	
277	Greeting card publishing	2,400	1	$602.7	1	1.5%	5	0.93	4	142	4			0.000	
278	Blankbooks & bookbinding	1,600	1	($612.5)	2	n/a	n/a	1.06	2	3,350	1	1.31	1	0.019	
279	Printing trade services	(7,800)	5	($689.0)	2	12.5%	2	1.03	3	3,373	1	1.04	3	0.021	
28	Chemicals & allied products	32,400		$27,100.0		6.9%				16,000					
281	Industrial inorganic chemical	10,400	1	$5,049.8	1	4.0%	5	1.40	1	300	4	0.89	3	0.097	
282	Plastics materials & syntheti	6,800	1	($4,337.3)	5	1.8%	5	1.37	1	(200)	5			0.000	
283	Drugs	12,300	1	$23,242.0	1	11.8%	2	0.95	4	11,200	1	0.26	5	0.005	
284	Soaps, cleaners, & toilet goo	3,600	1	($391.0)	2	9.4%	3	0.97	4	4,100	1	1.06	3	0.006	
285	Paints & allied products	(4,100)	4	($1,648.7)	3	11.4%	2	0.99	3	0	5			0.000	
286	Industrial organic chemicals	1,300	1	$4,476.7	1	2.3%	5	0.87	5	592	3	0.94	3	0.071	
287	Agricultural chemicals	300	2	$1,935.7	1	4.5%	5	1.00	3	(1,400)	5	0.75	4	0.051	
289	Misc chemical products	1,600	1	($927.2)	3	8.5%	4	1.01	3	1,508	1	0.97	3	0.024	
29	Petroleum & coal products	(2,600)		$3,538.6		13.3%				600					
291	Petroleum refining	(700)	3	$6,440.9	1	15.4%	1	1.08	2	500	3	1.00	3	0.175	
295	Asphalt paving & roofing	(1,800)	3	($2,976.2)	5	9.0%	3	0.99	3	66	4	1.27	2	0.080	
299	Misc petroleum & coal prod	(100)	3	$73.7	1	8.9%	3	0.92	4	34	4	1.52	1	0.109	
30	Rubber & misc. products	8,300		($6,183.7)		9.8%				17,700					
301	Tires & inner tubes	100	2	($630.6)	2	1.4%	5	0.93	4	0	5			0.000	
302	Rubber & plastics footwear	800	2	$94.2	1	n/a	n/a	n/a	n/a	(121)	5			0.000	
305	Hose, belting, gaskets, packi	1,800	1	($673.2)	3	6.1%	4	1.14	1	(279)	5			0.000	
306	Fabricated rubber	(5,700)	4	($1,172.7)	3	8.5%	3	0.99	3	800	2			0.000	
308	Misc. plastics products	11,400	1	($3,801.4)	5	8.3%	4	0.74	5	17,200	1	0.98	3	0.015	
31	Leather	(22,900)		($2,703.0)		4.7%				(2,300)					
311	Leather tanning & finishing	(3,100)	3	($662.9)	2	3.7%	5	0.73	5	(251)	5	1.09	3	0.103	
313	Footwear, cut stock	200	2	$6.4	1	n/a	n/a	n/a	n/a	(23)	5			0.000	
314	Footwear	(18,000)	5	($1,747.3)	4	2.1%	5	0.64	5	(529)	5			0.000	
315	Leather gloves & mittens	(600)	3	($111.8)	2	4.8%	5	0.81	5	(64)	5			0.000	
316	Luggage	1,100	1	$25.6	1	12.9%	2	1.03	3	(565)	5			0.000	
317	Handbags & personal leather	(4,500)	4	($363.7)	2	5.5%	5	0.78	5	(312)	5			0.000	
319	Leather goods, NEC	2,100	1	$150.8	1	17.1%	1	1.00	3	(556)	5			0.000	

TABLE 7 (cont'd)

Economic Indicators and Target Industry Ratings

SIC	Description	Change US Empl 87-91 (1)	Ratings (1)	Real Change Value Added Manufacturing & Shipping 87-91 ($91mil) (2)	Ratings (2)	California Employment Location Quotient 91 (3)	Ratings (3)	Shift Share California compared to U.S. (4)	Ratings (4)	California Projected Change in Jobs (5)	Ratings (5)	Shift Share 3 Counties compared California (6)	Ratings (6)	3 County Establishment Location Quotient 91 (7)	Ratings (7)
32	Stone, clay, and glass produc	(48,000)		($22,281.6)		10.0%				(1,400)					
321	Flat glass	(1,400)	3	($1,638.6)	3	10.2%	3	1.14	1	0	5			0.000	5
322	Glass & glassware	(10,000)	5	($2,189.1)	4	10.4%	3	0.89	5	(1,200)	5	1.38	1	0.030	3
323	Products of purchased glass	900	2	($443.6)	2	10.0%	3	0.96	4	100	4	1.31	1	0.029	3
324	Cement, hydraulic	(2,700)	3	($2,245.8)	4	12.5%	2	0.98	4	400	3			0.000	5
325	Structural clay products	(2,900)	3	($1,194.5)	3	7.4%	4	1.20	1	(100)	5		1	0.041	1
326	Pottery & related products	(1,400)	3	($601.8)	2	11.4%	2	0.94	4	(300)	5		1	0.021	3
327	Concrete, gypsum, plaster pr	(23,600)	5	($10,330.8)	5	11.1%	3	1.04	3	300	4	0.78	4	0.035	2
328	Cut stone & stone products	(300)	3	($9.9)	5	7.2%	4	1.24	1	(96)	5			0.000	5
329	Misc nonmetalic mineral pro	(6,400)	4	($3,630.5)	5	7.0%	4	1.04	3	(504)	5		5	0.000	5
33	Primary metal industries	(24,100)		($20,025.9)		4.6%				1,100					
331	Blast furnace & basic steel p	(6,700)	5	($10,673.0)	5	2.6%	5	1.00	3	100	4	0.56	5	0.026	3
332	Iron & steel foundries	(4,400)	4	($2,833.5)	5	4.6%	5	2.33	1	700	2			0.000	5
333	Primary nonferrous metals	3,600	1	$804.8	1	0.3%	5	0.47	5	3	4			0.000	5
334	Secondary nonferous metals	700	2	($593.1)	2	10.8%	3	1.03	3	38	4			0.000	5
335	Nonferrous rolling & drawin	(13,100)	5	($5,017.2)	5	5.3%	5	1.03	3	(200)	5			0.000	5
336	Nonferrous foundries	(4,600)	4	($1,505.8)	3	9.2%	3	0.73	5	500	3			0.000	5
339	Misc metal products	500	2	($218.6)	2	7.9%	4	0.88	5	59	4		1	0.022	3
34	Fabricated metal products	(99,500)		($32,806.3)		9.7%				(4,000)					
341	Metal cans & shipping conta	(6,800)	5	($1,949.6)	4	15.8%	1	1.06	2	(1,500)	5	1.17	2	0.093	1
342	Cutlery, handtools, & hardw	(13,700)	5	($3,281.8)	5	8.7%	3	0.88	5	(1,100)	5		5	0.000	5
343	Plumbing & heating	(3,600)	4	($1,057.6)	3	16.0%	1	0.98	3	(200)	5			0.000	5
344	Fabricated structural metal p	(28,300)	5	($9,182.9)	5	9.7%	3	0.94	4	(2,000)	5	0.92	3	0.026	3
345	Screw machine products	(4,100)	4	($1,694.0)	4	16.3%	1	1.05	2	(600)	5			0.000	5
346	Metal forgings & stampings	(23,800)	5	($9,202.4)	5	5.6%	4	0.99	4	(300)	5			0.000	5
347	Metal services, n.e.c.	(2,300)	3	($1,343.8)	3	16.6%	1	0.97	4	900	2	1.41	1	0.008	5
348	Ordnance & accessories	(19,000)	5	($4,526.3)	5	5.1%	5	0.77	5	172	4	0.91	3	0.019	4
349	Misc. fabricated metals	2,300	1	($756.2)	2	8.1%	4	1.02	3	1,028	1	1.38	1	0.035	2
35	Industrial machinery & equi	(124,300)		($79,014.6)		10.9%				14,200					
351	Engines & turbines	(11,700)	5	($4,526.7)	5	8.8%	3	1.09	2	236	4			0.000	5
352	Farm & garden machinery	1,000	2	($1,880.9)	4	2.9%	5	0.69	5	500	3			0.000	5
353	Construction & related mach	(6,600)	5	($9,214.8)	5	3.4%	5	0.90	5	200	4			0.000	5
354	Metalworking machinery	(8,200)	5	($6,361.6)	5	5.3%	5	1.01	3	1,100	1		1	0.006	5
355	Special industry machinery	(5,300)	4	($508.8)	2	9.1%	3	0.91	4	0	5	2.01	1	0.027	3
356	General industry machinery	15,100	1	$2,197.5	1	6.9%	4	1.03	3	100	4	1.37	1	0.018	4
357	Computer & office equipmen	(62,600)	5	($25,343.9)	5	29.4%	1	1.03	3	10,700	1	1.43	1	0.016	4
358	Refrigeration & service mac	(16,700)	5	($4,784.8)	5	6.1%	4	1.05	2	0	5	1.00	3	0.006	5
359	Industrial machinery, n.e.c.	100	2	($1,935.8)	4	13.6%	2	0.92	4	1,364	1	0.86	4	0.011	4
36	Electronic equipment	(137,300)		($15,691.4)		17.0%				(28,500)					
361	Electric distribution equipme	(7,000)	5	($1,012.7)	3	6.1%	4	1.00	3	1,300	1	0.93	3	0.033	2
362	Electric industrial apparatus	(12,400)	5	($1,395.4)	3	8.5%	3	0.94	4	500	3		1	0.015	4
363	Household appliance	(24,700)	5	($4,985.9)	5	2.6%	5	0.87	5	(600)	5			0.000	5
364	Electric lighting & wiring	(22,800)	5	($6,486.6)	5	8.6%	3	0.94	4	300	4	1.02	3	0.006	5
365	Household audio & video eq	400	2	$127.4	1	21.5%	1	1.15	1	(100)	5			0.000	5
366	Communications equipment	(22,700)	5	($5,470.1)	5	17.5%	1	1.00	3	(1,400)	5	0.93	3	0.008	5
367	Electronic components	(27,100)	5	$6,681.0	1	26.1%	1	1.01	3	(28,300)	5	1.56	1	0.011	4
369	Misc. Electronic equipment	(33,800)	5	($5,434.0)	5	15.7%	1	1.04	3	(200)	5		5	0.000	5

TABLE 7 (cont'd)

Economic Indicators and Target Industry Ratings

SIC	Description	Change US Empl 87-91 (1)	Ratings (1)	Real Change Value Added Manufacturing & Shipping 87-91 ($91mil) (2)	Ratings (2)	California Employment Location Quotient 91 (3)	Ratings (3)	Shift Share California compared to U.S. (4)	Ratings (4)	California Projected Change in Jobs (5)	Ratings (5)	Shift Share 3 Counties compared California (6)	Ratings (6)	3 County Establishment Location Quotient 91 (7)	Ratin (7)
37	Transport equipment	(183,900)		($47,507.1)		16.4%				(36,800)					
371	Motor vehicles & equipment	(98,300)	5	($47,027.0)	5	n/a	n/a	n/a	n/a	1,600	1	1.11	2	0.022	
372	Aircraft & parts	(28,700)	5	$9,823.9	1	21.5%	1	1.04	3	(15,200)	5	0.95	3	0.010	
373	Ship building & repair	(15,800)	5	($3,310.1)	5	7.1%	4	1.07	2	(2,400)	5	0.92	3	0.066	
375	Motorcycles, bicycles & part	3,400	1	$939.9	1	n/a	n/a	n/a	n/a	285	4			0.000	
376	Guide missles & space	(35,900)	5	($7,335.6)	5	52.0%	1	0.97	4	(22,400)	5			0.000	
379	Misc transport equipment	(12,900)	5	($2,221.8)	4	n/a	n/a	n/a	n/a	1,098	1			0.000	
38	Instruments & related	(81,100)		($4,075.3)		19.5%				6,300					
381	Engineering & rel. instrume	(89,600)	5	($13,256.5)	5	25.9%	1	0.99	3	(23,700)	5	1.00	3	0.026	
382	Measuring & controlling dev	(16,300)	5	$944.3	1	19.2%	1	1.04	3	3,800	1	0.87	4	0.032	
384	Medical instruments & suppl	37,200	1	$10,372.2	1	17.8%	1	1.02	3	2,101	1	0.68	5	0.024	
385	Ophthalmic goods	2,000	1	$550.4	1	14.5%	1	1.20	1	222	4			0.000	
386	Photographic equipment & s	(10,000)	5	($2,543.1)	5	6.5%	4	1.23	1	263	4			0.000	
387	Watches, clocks & parts	(3,400)	4	($141.6)	2	3.3%	5	0.98	3	14	4			0.000	
39	Misc. manufacturing	(11,200)		($2,172.2)		10.7%				1,000					
391	Jewelry, silverware, & plate	(3,900)	4	($1,769.1)	4	8.6%	3	1.18	1	13	4			0.000	
393	Musical instruments	(700)	3	($160.2)	2	15.8%	1	1.29	1	7	4	0.85	4	0.014	
394	Toys & supporting goods	4,400	1	$1,043.4	1	10.5%	3	1.00	3	1,000	1		1	0.017	
395	Office & art supplies	500	2	$336.2	1	14.7%	1	0.97	4	15	4	0.99	3	0.014	
396	Costume jewelry	(5,500)	4	($471.9)	2	8.8%	3	1.24	1	9	4			0.000	
399	Misc. manufacturing	(6,300)	4	($1,166.0)	3	10.4%	3	1.01	3	56	4	1.26	2	0.034	

Source: Applied Development Economics.

filename:ratings

Note: (1) is the higest rating and (5) is the lowest rating for each industrial sector.

TABLE 8

Ranking of Targeted Industries that could be attracted to Mare Island

SIC	Description	Change US Employ. 87-91 (1)	Real Change Value Added Manufacturing & Shipping 87-91 ($91mil) (2)	California Employment Location Quotient 91 (3)	Shift Share California compared to U.S. (4)	California Projected Change in Jobs (5)	Shift Share 3 Counties compared California (6)	3 County Establishment Location Quotient (7)	Composite Scores	Recommended Targets
20	Food & Kindred Products									
201	Meat Products	1	4	5	2	1	5	5	9.8	3
202	Dairy Products	4	5	3	1	5		5	13.0	
203	Preserved Fruits & Vegetables	1	1	1	3	1	4	3	6.0	1
204	Grain Mill Products	1	1	4	2	5	3	5	9.0	2
205	Bakery Products	5	5	3	3	1	3	4	10.5	3
206	Sugar & confectionary products	1	2	2	3	1	2	1	4.8	1
207	Fats & oils	3	2	4	5	3	4	2	9.3	2
208	Beverages	5	4	1	2	1	3	1	7.8	1
209	Misc Food & kindred products	2	5	1	2	1	2	3	7.3	1
22	Textile mill products									
221	Broadwoven fabric mills, cotton	5	3	5	4	4		5	13.3	
222	Broadwoven fabric mills,manmade	5	4	5	2	4		5	13.3	
224	Narrow fabric mills	3	2	5	5	4		5	12.0	
225	Knitting mills	5	3	5	1	5		5	13.0	
226	Textile finishing	5	4	5	1	4		5	13.0	
227	Carpets & rugs	4	5	4	5	1		5	12.3	
228	Yarn & mills	5	5	5	5	4		5	14.5	
229	Misc. textiles	3	2	5	1	4		5	11.0	
23	Apparel & other textiles									
231	Men's & boy's suits, coats, overcoats	5	4	5	5	5		5	14.5	
232	Men's & boy's furnishings	5	5	5	3	5		5	14.5	
233	Women's outerwear	5	5	1	1	1	5	5	11.0	
234	Women's undergarments	5	3	4	1	5		5	12.8	
235	Hats, caps, millinery	3	1	4	5	4		5	11.3	
236	Girl's outerwear	5	3	4	1	1		5	10.8	
237	Fur goods	3	2	5	5	4		5	9.5	
238	Misc. apparel	4	2	1	1	2	5	5	9.5	2
239	Misc. textile products	5	5	2	3	1	1	4	9.3	2
24	Lumber & Wood mill products									
241	Logging	5	4	5	5	5		5	14.5	
242	Sawmills & planning mills	5	5	4	4	5	5	5	14.5	
243	Millwork, plywood, structural members	5	5	3	4	1	1	3	9.3	2
244	Wood containers	1	1	2	2	5	5	3	8.5	1
245	Wood buildings & mobile homes	5	5	4	5	5	1	1	10.8	
249	Miscellaneous Wood products	2	3	3	3	5	4	4	10.5	3
25	Furniture & fixtures									
251	Household furniture	5	5	3	5	3	1	4	11.0	
252	Office furniture	5	5	3	4	1		5	12.3	
253	Public building furniture	1	1	3	5	3		5	9.5	2
254	Partitions & fixtures	5	3	2	3	1	3	1	7.8	1
259	Misc furniture & fixtures	3	2	1	2	1		5	8.8	2
26	Paper & allied products									
261	Pulp mills	1	5	n/a		5		5	10.5	3
262	Paper mills	1	5	5	2	5		5	12.3	
263	Paperboard mills	3	4	4	5	5	5	1	11.3	
265	Paperboard containers & boxes	1	2	4	3	1	2	3	6.3	1
267	Misc. converted paper products	1	1	4	3	1	1	4	5.8	1

TABLE 8 (cont'd)

Ranking of Targeted Industries that could be attracted to Mare Island

SIC	Description	Change US Employ. 87-91 (1)	Real Change Value Added Manufacturing & Shipping 87-91 ($91mil) (2)	California Employment Location Quotient 91 (3)	Shift Share California compared to U.S. (4)	California Projected Change in Jobs (5)	Shift Share 3 Counties compared California (6)	3 County Establishment Location Quotient (7)	Composite Scores	Recommend Targets
27	Printing & publishing									
271	Newspaper publishing & printing	4	5	2	3	1	3	2	8.8	2
272	Periodical publishing & printing	2	2	3	1	1	1	3	5.5	1
273	Books	1	1	4	2	1	1	3	5.0	1
274	Misc publishing	4	1	2	3	1	1	2	5.8	1
275	Commercial printing	1	5	3	3	1	3	2	7.5	1
276	Manifold business forms	5	4	3	5	1	5	5	12.0	
277	Greeting card publishing	1	1	5	4	4		5	10.3	3
278	Blankbooks & bookbinding	1	2	n/a	2	1	1	4	5.0	1
279	Printing trade services	5	2	2	3	1	3	3	8.3	1
28	Chemicals & allied products									
281	Industrial inorganic chemicals	1	1	5	1	4	3	1	6.5	1
282	Plastics materials & synthetics	1	5	5	1	5		5	12.0	
283	Drugs	1	1	2	4	1	5	5	8.0	1
284	Soaps, cleaners, & toilet goods	1	2	3	4	1	3	5	7.8	1
285	Paints & allied products	4	3	2	3	5		5	12.3	
286	Industrial organic chemicals	1	1	5	5	3	3	1	7.0	1
287	Agricultural chemicals	2	1	5	3	5	4	1	8.5	1
289	Misc chemical products	1	3	4	3	1	3	3	7.3	1
29	Petroleum & coal products									
291	Petroleum refining	3	1	1	2	3	3	4	7.8	1
295	Asphalt paving & roofing	3	5	3	3	4	2	1	9.0	2
299	Misc petroleum & coal products	3	1	3	4	4	1	1	6.8	1
30	Rubber & misc. products									
301	Tires & inner tubes	2	2	5	4	5		5	11.8	
302	Rubber & plastics footwear	2	1	n/a		5		5	9.0	2
305	Hose, belting, gaskets, packing	1	3	4	1	5		5	10.8	
306	Fabricated rubber	4	3	3	3	2		5	11.0	
308	Misc. plastics products	1	5	4	5	1	3	4	9.3	2
31	Leather									
311	Leather tanning & finishing	3	2	5	5	5	3	1	9.5	2
313	Footwear, cut stock	2	1	n/a		5		5	9.0	2
314	Footwear	5	4	5	5	5		5	14.5	
315	Leather gloves & mittens	3	2	5	5	5		5	12.5	
316	Luggage	1	1	2	3	5		5	9.8	3
317	Handbags & personal leather goods	4	2	5	5	5		5	13.0	
319	Leather goods, NEC	1	1	1	3	5		5	9.5	2
32	Stone, clay, and glass products									
321	Flat glass	3	3	3	1	5		5	11.5	
322	Glass & glassware	5	4	3	5	5	1	3	11.0	
323	Products of purchased glass	2	2	3	4	4	1	3	7.8	1
324	Cement, hydraulic	3	4	2	4	3		5	11.5	
325	Structural clay products	3	3	4	1	5	1	1	7.8	1
326	Pottery & related products	3	2	2	4	5	1	3	8.5	1
327	Concrete, gypsum, & plaster products	5	5	3	3	4	4	2	11.5	
328	Cut stone & stone products	3	5	4	1	5		5	12.8	
329	Misc nonmetalic mineral products	4	5	4	3	5	5	5	13.8	

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TABLE 8 (cont'd)

Ranking of Targeted Industries that could be attracted to Mare Island

SIC	Description	Change US Employ. 87–91 (1)	Real Change Value Added Manufacturing & Shipping 87-91 ($91mil) (2)	California Employment Location Quotient 91 (3)	Shift Share California compared to U.S. (4)	California Projected Change in Jobs (5)	Shift Share 3 Counties compared California (6)	3 County Establishment Location Quotient (7)	Composite Scores	Recommended Targets
33	Primary metal industries									
331	Blast furnace & basic steel products	5	5	5	3	4	5	3	13.0	
332	Iron & steel foundries	4	5	5	1	2		5	12.0	
333	Primary nonferrous metals	1	1	5	5	4		5	10.5	3
334	Secondary nonferous metals	2	2	3	3	4		5	10.5	3
335	Nonferrous rolling & drawing	5	5	5	3	5		5	14.5	
336	Nonferrous foundries	4	3	3	5	3		5	12.0	
339	Misc metal products	2	2	4	5	4	1	3	8.3	1
34	Fabricated metal products									
341	Metal cans & shipping containers	5	4	1	2	5	2	1	9.3	2
342	Cutlery, handtools, & hardware	5	5	3	5	5	5	5	14.5	
343	Plumbing & heating	4	3	1	3	5		5	12.0	
344	Fabricated structural metal products	5	5	3	4	5	3	3	12.3	
345	Screw machine products	4	4	1	2	5		5	12.3	
346	Metal forgings & stampings	5	5	4	4	5		5	14.5	
347	Metal services, n.e.c.	3	3	1	4	2	1	5	8.3	1
348	Ordnance & accessories	5	5	5	5	4	3	4	13.0	
349	Misc. fabricated metals	1	2	4	3	1	1	2	5.3	1
35	Industrial machinery & equipment									
351	Engines & turbines	5	5	3	2	4		5	13.3	
352	Farm & garden machinery	2	4	5	5	3		5	12.0	
353	Construction & related machinery	5	5	5	5	4		5	14.5	
354	Metalworking machinery	5	5	5	3	1	1	5	10.5	3
355	Special industry machinery	4	2	3	4	5	1	3	9.3	2
356	General industry machinery	1	1	4	3	4	1	4	7.3	1
357	Computer & office equipment	5	5	1	3	1	1	4	9.0	2
358	Refrigeration & service machinery	5	5	4	2	5	3	5	13.0	
359	Industrial machinery, n.e.c.	2	4	2	4	1	4	4	9.0	2
36	Electronic equipment									
361	Electric distribution equipment	5	3	4	3	1	3	2	8.8	2
362	Electric industrial apparatus	5	3	3	4	3	1	4	9.8	3
363	Household appliance	5	5	5	5	5		5	15.0	
364	Electric lighting & wiring	5	5	3	4	4	3	5	12.8	
365	Household audio & video equipment	2	1	1	1	5		5	9.5	2
366	Communications equipment	5	5	1	3	5	3	5	12.5	
367	Electronic components	5	1	1	3	5	1	4	9.0	2
369	Misc. Electronic equipment	5	5	1	3	5	5	5	13.5	
37	Transport equipment									
371	Motor vehicles & equipment	5	5	5		1	2	3	10.5	3
372	Aircraft & parts	5	1	1	3	5	3	5	10.5	3
373	Ship building & repair	5	5	4	2	5	3	1	11.0	
375	Motorcycles, bicycles & parts	1	1	1		4		5	8.5	1
376	Guide missles & space	5	5	1	4	5		5	13.8	
379	Misc transport equipment	5	4	1		1		5	10.5	3

TABLE 8 (cont'd)

Ranking of Targeted Industries that could be attracted to Mare Island

SIC	Description	Change US Employ. 87-91 (1)	Real Change Value Added Manufacturing & Shipping 87-91 ($91mil) (2)	California Employment Location Quotient 91 (3)	Shift Share California compared to U.S. (4)	California Projected Change in Jobs (5)	Shift Share 3 Counties compared California (6)	3 County Establishment Location Quotient (7)	Composite Scores	Recommen Targets
38	Instruments & related									
381	Engineering & rel. instruments	5	5	1	3	5	3	3	11.5	
382	Measuring & controlling devices	5	1	1	3	1	4	2	7.5	
384	Medical instruments & supplies	1	1	1	3	1	5	3	6.5	
385	Ophthalmic goods	1	1	1	1	4		5	6.0	
386	Photographic equipment & supplies	5	5	4	1	4		5	13.3	
387	Watches, clocks & parts	4	2	5	3	4		5	12.0	
39	Misc. manufacturing									
391	Jewelry, silverware, & plated ware	4	4	3	1	4		4	9.0	
393	Musical instruments	3	2	1	1	4	4	4	9.0	
394	Toys & supporting goods	1	1	3	3	1	1	4	5.5	
395	Office & art supplies	2	1	1	4	4	3	4	8.3	
396	Costume jewelry	4	2	3	1	4		5	11.0	
399	Misc. manufacturing	4	3	3	3	4	2	2	9.0	

Note: 1 - Industries most likely to be attracted to Mare Island
2 - Industries second most likely to be attracted to Mare Island
3 - Industries third most likely to be attracted to Mare Island

Source: Applied Development Economics.

filename:score

Appendix 4-D-1: Inventory of Residential Supply - Currently Selling/Planned For-Sale Multifamily Projects

Project / Location Developer	Units at Build-out	Sales Opened	Units Released	Units Sold	Absorption/ Month	Floor Plans	Square Feet	Price	Price/ Square Foot	Comments
Glen Cove Landing	256	1990	256	100	2.08	1 BR/1BA	1000	$67,000 to $73,000	$70	Auction held in 1993 due to lack of sales.
1201 Glen Cove Pkwy						2 BR/2 BA	1500	$90,000 to $97,000	$62	Units dropped in price by 30 to 40 %
Vallejo Corona Partnership										
Clearpoint	77	Oct-91	77	72 *	2.48	3BR/2.5BA	1500	$147,000	$98	77 of the floorplan units are built as attached duets
276 Clearpoint Drive	[157]		[157]	[152]		4BR/2.5BA	1870	$170,000	$91	Remaining 80 are identical in plan but detached.
Centex										* Proportion of duets to total units sold is approx.
Seaport Village - I	34	1991	34	9	0.38	1BR/1BA	1000	$65,000 and up	$65	Auction currently underway. Units have dens,
136 Sea Crest Circle						2BR/2BA	1500	$105,000 and up	$70	fireplaces, patios, decks, and vaulted ceilings.
Bill Weaks										Complex has a recreation area and pool.
Seaport Village - II	30	NA	0	0	0.00	NA	NA	NA	NA	
136 Sea Crest Circle										
Sky Valley	132	1996	0	0	0.00	N/A	N/A	N/A	N/A	Specific Plan approved for condos & townhouses
Vallejo	488	1996	0	0	0.00	N/A	N/A	N/A	N/A	Arnold Palmer 18-hole Golf Course was to be
Misawa Homes										semi-private. But may be private as result of
										litigation currently in process.
CURRENT TOTAL	367									
FUTURE TOTAL	1017									

Source: Bay Area Economics, 1994.

Appendix 4-D-2: Inventory of Residential Supply - Currently Renting Multifamily Residential Projects

Project/Address	# Units	Floor Plans	Vacancy	Rents	Open Date	Comments
Bay Village 1107 Porter Vallejo	260	1BR/1BA 1BR/1BA/DEN 2BR/1BA 2BR/2BA	5%	$585 and up $635 and up $685 and up $725 and up	1989	Apartments have fireplaces, vaulted ceiling, W/D/ hookups. Complex has pool and spas. Near Maritime Academy, has good waterfront views.
Village View Condos 2851 Redwood Pkwy Vallejo	136	1BR/1BA 2BR/2BA	2%	$627 to $727 $767 to $822	1988	Apartments have fireplaces, lofts, W/D hookups, and enclosed garages. Complex has heated pool, clubroom, spa/sauna, and weight room.
Quail Ridge 60 Rotary Way Vallejo	400	1BR/1BA 2BR/1BA 2BR/2BA	N/A	$600 to $675 $695 to $735 $735 to $800	1987	Apartments have fireplaces, W/D hookups, A/C, gourmet kitchens, and views. Complex has 3 pools and 3 jacuzzis.

Source: Bay Area Economics, 1994.

Appendix 4-E-1: Existing Golf Courses Open to the Public, Primary Market Area

Name/ Location	Number of Holes	Green Fees: Weekday	Green Fees: Weekend	Annual Rounds	Comments
Franklin Canyon Golf Course *Hercules*	18	$21	$32	90,000	The rounds number includes complimentary play for employees. Land is privately leased. Seventy five percent of the users come from within a 25 mile radius though some people come from as far away as San Jose (60 miles) and Sacramento (80 miles). The representative maintains that a pretty strong market for golf courses exists.
Chardonnay Club *Napa*	36	Non-members: $55	$70	50,000	18 public holes, 18 private holes. Price includes mandatory golf cart.
Blue Rock Springs Municipal Golf Course *Vallejo*	18	Resident: $11 Nonresident: $13	$14 $16	100,000	By the end of May 1994, this course will be expanded to 36 holes. Golfers come here from all over the Bay Area. Residents of Vallejo receive a discount.
Joe Mortara Golf Course Fairgrounds *Vallejo*	9	$6	$5	73,000	This privately owned golf course has an average of 200 players per day. After the initial round each additional round costs $2. People utilizing this court come from as far as 50 miles away. The owner feels that business is doing well but dropped ever since NAFTA was ratified.
Los Arroyos Golf *Sonoma*	9	$8	$10	33,000	An 18-hole round costs $12 during the week and $15 on the weekend. Prices are discounted for juniors and seniors. People who golf here generally come from within a 20 mile radius mostly from Petaluma, Novato, Santa Rosa, Sonoma, and Napa. This golf course is privately owned and operated. The representative believes that recent television exposure has increased the public's general interest in golfing which in turn has helped the industry.
Green Tree Golf Course *Vacaville*	18 9	$13 $7	$18 $9	135,000	People come from 100 miles away to golf at either the 18-hole course or the 9-hole executive course. The manager states that business is doing very well and that it would be difficult to build enough courses to meet the demand.
Paradise Valley Golf Course *Fairfield*	18	Resident: $17 Non-resident: $22	$23 $31	NA	New golf course. Opened June, 1993.
Rancho Solano Golf Course *Fairfield*	18	Resident: $21 Non-resident: $31	$32 $42	70,000	

Source: Bay Area Economics 1994

Appendix 4-E-2: Existing and Planned Golf Courses, Primary Market Area

	Name	City	Public/ Private	County	Number of holes
1	Franklin Canyon Golf Course	Hercules	Public	Contra Costa	18
2	Pine Meadow Golf Course	Martinez	Public	Contra Costa	18
3	Indian Valley Golf Club	Novato	Public	Marin	18
4	Marin Country Club	Novato	Private	Marin	18
5	Chardonnay Club	Napa	Public	Napa	36
6	Napa Municipal Golf Course	Napa	Public	Napa	18
7	Napa Valley Country Club	Napa	Private	Napa	18
8	Blue Rock Golf Course	Vallejo	Public	Solano	18
9	Green Valley Country Club & Golf Course	Solano County	Private	Solano	18
10	Green Tree Golf Course	Vacaville	Public	Solano	27
11	Joe Mortara Golf Course	Vallejo	Public	Solano	9
12	Paradise Valley Golf Course	Fairfield	Public	Solano	18
13	Rancho Solano Golf Course	Fairfield	Public	Solano	18
14	Los Arroyos Golf	Sonoma	Public	Sonoma	9
15	Sonoma Golf Club	Sonoma	Public	Sonoma	18

Planned Golf Courses

1	Blue Rock Golf Course	Vallejo	Public	Solano	Additional 18 holes to open 5/31/94
2	Hiddenbrook Golf Course	Vallejo	Private	Solano	18-hole course under construction
		Total equivalent 18-hole courses:			**15.5**

Source: Bay Area Economics, 1994.

N A I D

National Association of Installation Developers

Jane English
President

April 21, 1994

Initial NAID Comments

Interim DoD Final Rules on "Revitalizing Base Closure Communities and Community Assistance"

Introduction

The National Association of Installation Developers (NAID) is pleased to provide comments on the Interim DoD Final Rules on "Revitalizing Base Closure Communities and Community Assistance" published in the Federal Register on April 6, 1994. Since President Clinton announced his Five Part Program on July 2, 1993, and the subsequent passage of Title XXIX of the Defense Authorization Act for Fiscal Year 1994, there has been anticipation on the part of the base closure impacted communities that the Federal government would finally marshall its considerable resources to aid the affected communities in the reuse of the property and the creation of replacement jobs. Senior Defense officials have toured the country extolling the virtues of the program and have thereby raised expectations that the much maligned base reuse process would be revamped to remove the bureaucratic impediments that have plagued us in the past.

NAID's General Comments

Based on community comments NAID has received to date on the Interim Final Rules issued by the Department of Defense in the Federal Register on April 6, 1994, NAID believes that these interim rules offer little incentive or flexibility for joint DoD-community cooperation in the early civilian reuse and job generation at former military bases, as called for in the President's July 2, 1993 statement on "Revitalizing Base Closure Communities."

The interim rules themselves are unnecessarily complex and do not communicate easily to a local mayor or a county commissioner. The rules also reflect limited recognition as to the normal economic development role of state and local government in working with the private sector development community to create real estate value and new jobs in the reuse of property.

Note: These initial NAID comments were based on community input received through April 19th and have been prepared to encourage further community input into our final NAID comments to the Office of the Secretary of Defense after the four DoD public meetings. (Please fax further member comments to: 703-836-8273).

1725 Duke Street, Suite 630 Alexandria, Virginia 22314 (703) 836-7973 Fax: (703) 836-8273

While several of the rules appear well intended, the actual language itself will, in many instances, lead to misunderstanding and conflict between the DoD disposal agents at the working level and the impacted communities. Finally, the interim rules will likely create an unnecessary adversarial climate: (1) in the proposed immediate sales offer for high value property, and (2) in retaining personal property equipment needed for the early civilian reuse of the base property.

The NAID member communities to date have several overall concerns with Interim Final Rules which are summarized as follows:

- **DoD Returns to Priority Property Sales Goal**: Despite the enactment of Section 2903, DoD has returned to a priority high value property sales approach. DoD's purpose is no longer to generate large sales returns; now, DoD presumes that early sales will automatically cause new jobs to be created. NAID has seen no evidence that property sales without a local plan and zoning will prompt new jobs; to the contrary, we believe this priority property sales approach will continue to delay local recovery. DoD will even force property sales when the initial sales efforts fail to generate private sector interest. In fact, DoD's process flow chart suggests that sales even take precedence over public benefit conveyances. DoD would also be able to sell off the more valuable properties (a "substantial part") and leave the balance as unusable property. In summary, DoD's priority sales approach conflicts with the President's July 2nd assurance that local base reuse plans will be the preferred alternative in property disposal decisions. DoD's approach also conflicts with the Secretary of Defense's assurance to several seriously impacted California communities that they would be able to receive property at less than fair market value for economic development purposes.

- "**Fair Market Value**:" There are two different descriptions for fair market value in the Interim Final Rules: (1) a broad definition for "readily marketable" property; (2) and a narrow "proposed reuse" definition in the section on Economic Development Conveyances. Neither definition indicates that the surplus base property is actually being transferred in an "as-is, where-is" condition -- often without local zoning or adequate infrastructure being in place.

- **Economic Development Discount - Value**: The conveyance procedures are based solely on the future "planned reuse" of the base property. The valuation process does not discuss the current condition of the facilities or local zoning -- two of the key elements in real estate appraisals. The DoD definition presumes that the infrastructure to support the future planned use will appear automatically. Under the DoD interim rules, the community's "proposed reuse" by itself will set the fair market value basis for the "explanatory statement" required by Section 2903 for any discount below fair market value. As a result, it may be difficult to document the proposed discount below an artificially inflated value. In effect, the community will be penalized for planning. DoD is actually transferring property in an "as-is, where-is" condition -- not some ideal redeveloped future land use. Current facility conditions (including the needed infrastructure improvements) as well as existing local zoning must in fairness be included in the DoD definition of "fair market" value along with the proposed reuse.

- **Net Operating Costs**: The interim final rules will hopefully allow the community property resale value to be adjusted to compensate communities for their offsetting capital and operating costs to redevelop the former bases. But, the actual allowable operating costs are undefined in the proposed interim rules and have been left to negotiations with the disposal agents based on Part 31 of the Federal Acquisition Regulations (FARs). Part 31 of the FARs is an inappropriate yardstick that was designed to allocate costs across profit-making activities. Few communities have ready access to or understanding of the FARs and are thereby placed at a large disadvantage in negotiating with the Military Departments. The DoD rules should cite normal allowable community operating and capital costs.

- **Personal Property**: The new interim rules do not present a joint DoD-community cooperative approach to retaining personal property. Control of the personal property process will now be placed in the hands of the base commander and the major command. This will likely result in a repetition of the situations at Fort Ord (where even the church pews and irrigation lines were relocated by the base commander) or at Chanute AFB (where all the personal property was removed). The DoD rules will allow any federal office to pick over the equipment without control. The rules should emphasize DoD cooperation with the community in working out an agreeable list of equipment to be retained or removed. Mission-related and military unique equipment should be relocated immediately. Thereafter, the listing of retained equipment worked-out by the base commander and the community should be preserved wherever possible -- including appropriate substitute equipment items. At this point, the removal of other equipment should require approval at the Assistant Secretary level both in the Military Departments and the Federal agencies.

- **Readily Marketable Properties**: The Interim Final Rules provide for a six-month period for advertising the property for sale to the private sector which will duplicate and add major confusion to the community base reuse planning process. The proposed private sector advertising period will also occur at a very confusing time when the McKinney Act, public benefit conveyances, facility condition and environmental issues are still being resolved. In fact, the rules would authorize the Military Departments to impose their reuse and zoning judgements on the property -- much like the ill-fated 1990 Army approach for the 9,000 acres at Fort Meade. NAID believes this DoD-determined early sales approach conflicts directly with the objective in the President's July 2nd policy on using the community's base reuse plan as the basis for DoD's property disposal decisions.

- **Forced Sale of Properties**: In the same section, DoD proposes to sell readily marketable property without local zoning and without provision for future infrastructure. NAID believes such quick sales will yield less than 10-to-15 percent of the likely present value from competitive incremental sales through the communities, supported by local zoning. Several communities have already offered full (100 percent) returns of all net sales values to DoD. The proposed DoD appeal process should allow for the community to offer alternative development proposals with the preponderance of value (based on local zoning) being returned to DoD.

Specific Comments

The following specific NAID comments are organized in the same order as the text of the Interim Final Rules, as published on April 6, 1994. The comments do not suggest the importance of the individual comment. In some instances, a brief parenthetical notation accompanies the statement to explain the significance of the proposed NAID comment.

Para 90.4 e. and Para. 91.3 - Definition (f). Redevelopment Authority: Add the following two sentences: "Typical redevelopment authorities in the economic development and community development profession include: economic development authorities, airport authorities, housing authorities, state and local port authorities, and publicly-owned non-profit economic development corporations organized under Section 501 (c)3 of the Internal Revenue Code. The Secretary of Defense should base his recognition decision for the development authority organization on the recommended organization (if any) adopted in the approved community base reuse plan."

[This additional identification of the normal types of economic development organizations is intended to address the differing interpretations among the Military Departments. The Navy has already sold the Chase Field NAS family housing to the Beeville-Bee County Economic Development Corporation, a Section 501 (c)3 non-profit publicly-owned corporation. The Army has initially declined to work with a similar non-profit corporation at Pueblo and the Air Force has indicated that it cannot work with a joint Denver-Aurora non-profit corporation to purchase Lowry AFB].

Para. 91.3 - Definition (b). Rural: The definition of rural areas should be refined to include jurisdictions that also include small communities with less than 50,000 persons which do not have strong real estate markets -- irrespective of whether they are located in Metropolitan Statistical Areas.

[Many Metropolitan Statistical Areas are "over-bounded," and sometimes include outlying counties that are largely rural in character and often lack economic recovery opportunities; e.g., the rural Tooele Army Depot is located in the Salt Lake City MSA].

Para. 91.2 - New Definition for "Estimate Fair Market Value": There is a critical need for a common definition for "Fair Market Value" to cover consistently both "ready market" property sales and "economic development conveyance property." The definition for fair market value should include at least:

"Fair Market Value is the most probable price that a property should bring in its current 'as-is, where-is' condition, based on current local zoning and its planned reuse (adjusted for the offsetting cost of public infrastructure to support the planned reuse) in a competitive and open market under all conditions requisite to a fair sale with the buyer and seller each acting prudently and knowledgeably, assuming the price is not affected by undue stimulus. The effect of the base closure on the market shall be taken into account in estimating fair market value."

Para. 91.7 - Real Property Screening (a) (3): Revise the final sentence to read: "Transfer of real property at closing bases between any Military Department or retention of real property at a closing base by a Military Department must be approved by the Assistant Secretary of Defense for Economic Security, unless the transfer has already been approved by the Secretary of the Military Department concerned prior to April 6, 1994."

[It must be very clear that the retention of small military parcels in the middle of a community reuse plan must always be referred to the ASD (ES) for approval. There are case examples where the retention of DoD enclaves imperils the economic feasibility of the community reuse plan. In other instances (e.g., an Army Reserve request at Williams AFB), military requests have been received after the community reuse plan has been completed. It is important for the Military Departments to recognize that "what is closed is closed," unless a mutually agreeable property solution is worked out with the affected community reuse planning committee].

Para. 91.5 - Responsibilities - Add a new sub-paragraph (c): The Military Departments shall secure the approval of the Assistant Secretary of Defense for Economic Security and the DoD General Counsel for any Military Department legal opinion questioning a decision or jurisdiction by the Base Closure and Realignment Commission.

[This new paragraph is needed to correct an internal Department of the Army effort to question the final decision of the Base Closure & Realignment Commission in four cases through operating-level staff legal opinions; these opinions have frustrated community efforts to secure reuse of the closed property without being official Department of the Army positions].

Para. 91.7 (a) - Property Screening: An additional element in subparagraph (9) should call for the affected community to be advised by the Military Department when the base structures are located on public domain land.

[There are a few cases where DoD facilities were located on public domain lands, which normally revert to the Department of the Interior. In these few instances, it will be important for the community, DoD and Interior to find a workable solution to the public domain issue].

Para. 91.7 (b) - McKinney Act Screening: The Interim Rules are well written and presume that the Secretary of Defense does not have any discretion to reject McKinney Act proposals that impair the overall property reuse. The NAID members believe that DoD should have discretionary authority and we propose to seek legislative authority on behalf of the Secretary of Defense.

Para. 91.7 (c) (1) - Local Redevelopment Plan: The word "generally" should be dropped and words "wherever possible" should be substituted therein.

[The Military Department disposal agents should not be in the role of selecting what portions of the community base reuse plan they wish to follow. The President's guidance calls for the community base reuse plan to be the preferred alternative in the EIS].

Para. 91.7 9 (d) - Jobs-Centered Property Disposal: NAID members believe this entire section will place DoD and the impacted communities in a direct adversarial position. This section should be rewritten to encourage the Military Departments, in cooperation with the impacted community, to seek an early opportunity to test the market for those few readily marketable properties once: (1) the facility and environmental conditions at the base are known; (2) the community has completed its base reuse plan: (3) the community has identified the likely required public infrastructure for the property; and (4) the local jurisdiction has indicated the likely local land use zoning the property will receive.

The Military Departments should also be authorized to approve joint venture offers from redevelopment authorities where the net present value of the property substantially exceeds its current value in an "as-is, where-is" condition. The redevelopment authority must secure local zoning and provide the necessary supporting infrastructure as well as an assurance that the predominant portion of the net sales proceeds will be remitted to DoD.

[The approach in the previous two paragraphs will preclude the conflicting six-month private sector sales initiative at the very time that the community is attempting to complete its base reuse plan. This approach will also provide the community with an alternative to the "forced-sale" of readily marketable properties without local control].

Any public notice for all sales of high value property under this section should identify the current local zoning for the surplus property and should contain the community's estimate (when provided by the community) of the supporting infrastructure required for normal reuse of the property.

[This is intended as a "Surgeon General's Warning" to any possible uninformed investor].

Finally, the definition of "fair market value" in this section should be consistent with that used in the Economic Development Conveyance section.

NAID believes that the Department of Defense should not attempt itself to reach conclusions as to what properties enjoy a "ready market." DoD has very limited capacities in commercial real estate markets. We recommend that DoD turn to an outside independent group like the Urban Land Institute or the American Society of Real Estate Counselors to provide this independent judgement.

NAID is especially concerned that the guidance in Subparagraph (d) would encourage priority property sales without regard to the community's base reuse plan -- when the Military Department decides the property is "readily marketable," and even after private sector sales initiatives have been unsuccessful. NAID believes that Section (d) is in direct conflict with the President's Five-Point program and that this priority property sales approach will place the Military Departments in a direct adversarial conflict with the impacted communities. NAID recommends that this entire subparagraph be rewritten to emphasize property disposals (including sales supported by local zoning) that are based on the community's approved reuse plan.

Para. 91.7 (e) - Economic Development Conveyances: Subparagraph (4) should be revised to read: "Before making an economic development conveyance of real property, an appraisal or other estimate of the property's current fair market value in an 'as-is, where-is' condition will be made, based on current local zoning and the proposed use of the property, adjusted by the offsetting estimated value of infrastructure improvements to support the proposed reuse."

An additional sentence should be added to subparagraph (d) as follows: "The written explanation should identify any "consideration" provided to the DoD for the property transfer, such as the community assuming normal DoD care and custody costs for the property."

[Section 2903 authorizes "the transfer of property . . . for consideration at or below fair market value of the property transferred or without consideration." DoD has interpreted "fair market value" to mean "planned use." NAID members believe this is not a reasonable interpretation, and that this section should comply with the precise language in Section 2903].

Para. 91.7 (f) - Profit Sharing: Subparagraph (1) should be amended to allow the Secretary of the Military Department to accept local community proposals for a longer payback period to DoD in unusual cases -- not to exceed 20 years.

Subparagraph (c) is unnecessary; the fair market value of the property should be based on its "as-is, where-is" condition at the time of transfer, current local zoning, and the proposed use of the property, adjusted by the offsetting estimated value of infrastructure improvements to support the reuse. Most communities will not have problems sharing the upside net proceeds from the long-term development process, including that value created by local zoning and local development entitlements. Paragraph (c) should be dropped entirely.

The control-oriented DoD approach in the DoD interim rules is especially evident in subparagraph (4) (iii) in particular and this subparagraph should be deleted: i.e., "The deed provisions will forbid 'straw' transactions (sales or leases to a cooperating party at a nominal or lease price) and other devices designed to circumvent the Government's recovery of its share of the net profits."

[This selection of words will be highly inflammatory to most communities and the two sentences are unnecessary. The regulations in 41 C.F.R. 101-47.4908 already describe the reporting process for communities quite adequately. As an aside, local economic development today is a highly competitive field. Many communities and private developers sometimes subsidize new prospects to attract jobs. DoD should recognize that the community must "carry" the overall project while creating new jobs. It is inappropriate to presume that the community's motive is to circumvent the Government's recovery of its share of the net profits"].

Subparagraph (4) (iv) (A) should be revised to recognize that off-site capital improvements directly related to reuse of the surplus base property are an allowable cost, even though off-site capital costs are not recognized in 41 C.F.R. 101-47.4908.

[Closed DoD bases usually are not individual buildings located in the middle of an already developed urban area. Most DoD facilities lack adequate road access both on-site and off-site necessary to reasonably develop the property and to create new jobs].

Subparagraph (4) (iv) (B) will be very confusing to most communities. The reference (48 CFR part 31) refers to Part 31 of the Federal Acquisition Regulations (FARs) in terms of identifying allowable local redevelopment authority costs. Most communities do not have easy access to the FARs and they will be in a decided disadvantage in negotiating with the Military Departments. The final sentence in this Paragraph should be revised to give examples of specific eligible ". . . costs of capital and operations for the local redevelopment authority with regard to that property, such as the state-local expenses for financing on-site and off-site infrastructure improvements related to reuse of the site; demolition costs; design and engineering expenses; planning and marketing expenses -- including brokerage fees; federal relocation costs, if any; the costs for upgrading or relocating McKinney Act housing on-site or off-site; direct capital interest or borrowing costs; and local facility care and custody deficits for maintaining the former base."

Subparagraph (4) (v) should be retained. It is important that the DoD reporting requirement, now called for in 41 C.F.R. 101-47.4908 be on the basis of an annual report for the entire property; not a report on each individual sale or lease transaction as now implied in the DoD rules.

[Reporting to DoD on each and every lease or sale will be an unnecessary burden; the GSA reporting process is reasonable and should be retained].

Para. 91.7 (h) - Personal Property: The interim rules leave the base equipment wide-open for wholesale removal -- the very problem that prompted this Pryor Act amendment in the first instance. The specific elements of concern to NAID are as follows:

- The lack of a strong emphasis on reaching a consensus at the local level between the base commander and the base reuse planning committee on an acceptable listing of personal property needed for early reuse of the property.

- The exclusion in subparagraph (h) (1) of "equipment that the base does not own." [In the case of Navy facilities, this exception includes critical items located at the base but technically "owned" by other "claimant commands," such as airfield radars, ground support equipment and electronic equipment that are essential to the civilian reuse of a military airfield].

- The broad exemption of any community review of equipment shipped under subparagraph (h) (5) even after an agreed upon listing of personal property has been arrived at cooperatively by the base commander and the community.

- The expansion in subparagraph (h) (5) (i) of equipment relocating with a transferred unit to include: "the major command having jurisdiction over the installation (e.g., Forces Command or the Air Force's Air Combat Command), or a major claimant having jurisdiction over the installation (e.g. the Navy's U.S. Atlantic fleet) may also remove property that is needed immediately and is indispensable to an organization under its jurisdiction at another installation for carrying out the organization's primary mission." [In a practical sense, this new exemption means that all personal property can now be easily removed].

- The elimination of low-cost equipment from transfer. In a practical sense, the new guidance means that low-cost equipment items can be removed and placed on shelves at other bases for future use.

NAID members believe that the current interim rules for personal property will place DoD and the communities in an on-going, unnecessary adversarial position.

The emphasis in subparagraph (h) (7) on identifying appropriate substitute equipment items should be moved forward in the process. The revised guidance should stress that retaining equipment in place allows the community to take over early management and operations of the surplus base promptly -- with a resulting savings to DoD care and custody costs. Finally, the DoD rules should be revised to require, once the base commander and community have reached agreement on a listing of retained equipment, that those few differences not solved by substitute items should be reviewed at the Assistant Secretary level of the affected Military Department. The community should be allowed to include its comments in the Military Department decision process.

<u>Paragraph 91.7 (i) - Minimum Level of Maintenance and Repair to Support Non-Military Purposes</u>: Subparagraph (2) should be amended to require the Military Departments to maintain

the base closure facilities for up to two-years after the final base closure or 18 months after the property is available for civilian reuse, whichever is the later date, or until the community enters into an interim use lease for the property.

[As currently worded, DoD's maintenance responsibilities could end as early as one week after the completion of the community base reuse plan -- or considerably earlier than the actual closure itself.]

Subparagraph (3) (iii) should be amended by adding: "or necessary and cost-effective for the community to assume early maintenance for a portion of the base."

[It may be necessary to alter a fence line or to modify a water line connection (e.g., Philadelphia Shipyard) for the community to assume early care and custody responsibility with resulting costs savings to DoD].

An additional paragraph should also be added as follows: "(4) he Military Departments are encouraged to arrange for the phased transfer of surplus real property to the community over a one-to-two year period, and to avoid imposing the entire care and custody financial burden on the redevelopment authority until it can become self-sustaining."

[This guidance is needed to avoid the situations at England AFB and Eaker AFB where the Air Force is insisting on the community absorbing the entire base at one time -- after long delays in the Air Force approval of interim use leases for community prospects].

It would be helpful if DoD would also identify what portions of the interim rules will apply to the reuse of property in DoD "retained areas" or facilities to be held by DoD for future mobilization purposes, such as Government-Owned, Contractor Operated facilities.

Conclusion: The overall impression from a broad range of NAID member communities is that the DoD Interim Final Rules are far too complex and complicated to be at all useful to most impacted communities. The DoD interim rules do not provide the market flexibility needed for the communities to attract new firms and private developers to the former bases -- and to reduce DoD's base maintenance and operating costs in the process.

It will be very difficult for the communities affected by the 1988, 1991, and 1993 closures to work within these proposed interim rules. It will be even more difficult for DoD to encourage the new 1995 round of military base closures on the grounds that the property disposal process has been corrected by these interim rules as proposed.

The National Association of Installations Developers believes the DoD interim final rules are well intentioned but should be substantially revised on a priority basis in cooperation with the impacted communities.

Table 4-G-1
1996 Project Description excluding Net Developable Acreage
Mare Island Reuse Plan Fiscal/Financial Analysis

Land Use & Building No.	DUs/SqFt/ Acres	Navy Description	Land Use Category
Residential			
Duplex Units	431	Duplex Housing	Residential - Existing
SF Historic	52	Captin's Row	Residential - Existing
Total Residential	483		
Retail			
897	21,500	Naval Ex Store	Retail
993	6,000	Gas Station	Retail
1330	5,000	McDonalds (size is a guess)	Retail
658	1,500	Golf Club House	Retail
396	27,100	Officers Club	Retail
Total Retail	61,100		
Office			
1324	113,000	New Office Concrete Bldg.	Office
755	56,600	warehouse-retraining uses	Office
Total Office	169,600		
Industrial			
751	234,200	Warehouse	Warehouse
1001	32,900	Naval Commissary	Light Industrial
1310	105,600	Sheet Metal Shop	Heavy Industrial
126	131,000	Machine Shop	Heavy Industrial
118	48,700	Joiner/Plastics Shop	Light Industrial
750	4,600	Paint & Blast Shop	Heavy Industrial
390	50,000	structural shop	Heavy Industrial
866 (25%)	96,900	Industrial	Light Industrial
Total Industrial	703,900		
Total Space	934,600		
Cultural/Recreation/Open Space			
658	3,000	Golf Club House	Civic/Recreation
545	71,400	Rodman Center	Civic/Recreation
523	59,900	Field House	Civic/Recreation
791	12,200	Field houses	Civic/Recreation
793	4,000	Field houses	Civic/Recreation
Chapel	3,200	Chapel	Civic/Recreation
Stable	1,250	Stable	Civic/Recreation
Total SqFt	154,950		
Ex. 5 Ballfields	14.6	ballfields	Developed Parks
Pier 35	12.6	Pier 35	New Fishing Pier/Dev. Park
Rifle Range	38.0	Rifle Range	Developed Parks
Golf Course	157.0	Expanded	Golf Course
Existing Parks	12.4	Existing Parks	Developed Parks
Total Acreage	234.6		
Wetlands	2,000.0	Existing & Restored	Open Space

(1) Assumes only 25 percent of this building is used in 1996.
Sources: US Navy; Bay Area Economics; Economic & Planning Systems, Inc.

Table 4-G-2
2006 Project Description excluding Net Developable Acreage
Mare Island Reuse Plan Fiscal/Financial Analysis

Land Use & Building No.	DUs/SqFt/ Acres	Navy Description	Land Use Category
Residential Uses (1)			
543	40	Barracks	Res. Multi-Family
1294	50	Barracks	Res. Multi-Family
995,997,999	80	Barracks	Res. Multi-Family
409,489,455	43	Warehouse	Live/Work - units
Total Residential	213		
Retail			
New or Rehab.	40,000	na	Retail
991	14,600	Destinations	Retail
New or Rehab.	5,000	na	Retail
Total Retail	59,600		
Office			
483	360,000	Office Building	Office
Industrial			
759	120,000	Radio/Heavy Target	Warehouse
627	245,400	Warehouse	Warehouse
629	63,400	Warehouse	Warehouse
866 (25%)	96,900	Industrial	Light Industrial
50	8,500	Rubber Shop	Light Industrial
390	133,500	structural shop	Heavy Industrial
388	69,800	structural shop	Heavy Industrial
382	31,000	structural shop	Heavy Industrial
112	151,000	Offices/Work Area	Heavy Industrial
58	62,300	Rubber Shop	Light Industrial
680 (50%)	128,900	Machine Shop	Heavy Industrial
Total Industrial	1,110,700		
Education	477,500 (2)	Complex Bldgs.	Education
Total Space	2,007,800		
Cultural/Recreation/Open Space			
Regional Park	138.5	Hill Area	Developed Parks
Ball Fields (3)	60.4	na	Developed Parks
Maritime Exhibits	9.0	na	Civic/Recreation
Total Acreage	207.9		
Historic Office	26,900	na	Civic/Recreation
Wetlands	22.0	restored wetlands	Open Space

(1) Assumes Roosevelt Terrace Housing would be sold after Base Closure.
(2) Assumes EDAW's total sqft for complex of 545,500 minus building #1324, at 113,000 sqft.
(3) Assumes existing ball fields are reused; and new ball fields are near existing ones.
Sources: US Navy; City of Vallejo; Bay Area Economics; Economic & Planning Systems, Inc.

Table 4-G-3
Buildout Project Description excluding Net Developable Acreage
Mare Island Reuse Plan Fiscal/Financial Analysis

Land Use & Building No.	DUs/SqFt/ Acres	Navy Description	Land Use Category
Residential			
new dev.	800	MFat 8 and 15 units/ac	Residential-New
M-37 (1)	40	Marine Reserve Bldg.	Res. Live/Work - Rehab
Total Residential	840		
Retail			
new or rehab	40,000	na	Retail
new or rehab	40,000	na	Retail
Total Retail	80,000		
Office			
new or rehab	120,000	na	Office
new or rehab	72,000	na	Office
527	114,300	Warehouse	Office
Total Office	306,300		
Industrial			
503	33,100	Navy Reserve Train.	Light Industrial
601	80,000	Storage	Warehouse
499	42,000	Haz. Mat. Storage	Warehouse
866 (50%)	193,800	Industrial	Light Industrial
680 (50%)	128,900	Machine Shop	Heavy Industrial
386	84,100	forge shop	Light Industrial
Total Industrial	561,900		
Total Space	948,200		
Cultural/Recreation/Open Space			
505	20,400	Country Store	Civic/Recreation (USFWS)

(1) Assume this building would be converted into live/work units.
Sources: US Navy; City of Vallejo; Bay Area Economics; Economic & Planning Systems, Inc.

Table 4-H-1
General Assumptions and Existing Conditions
Mare Island Fiscal Impact Analysis

General Assumptions		Existing Conditions		Sources
Start Year - Base Closure	1996	Total Dwelling Units	40,773	DOF, 1993
Partial Reuse	2006	Single Family Units	28,355	DOF, 1993
30 years - Stabilized Reuse	2026	Multi-Family Units	11,083	DOF, 1993
Current Year	1994	Mobile Homes	1,169	DOF, 1993
		Total Occupied Units	38,601	DOF, 1993
		Res. Vacancy Rate	5.3%	DOF, 1993
		Road Miles (center line)	274	Public Works Dept.
		Population	115,873	DOF, 1993
		Employees	36,928	ABAG 1993 EST.

Sources: DOF; ABAG; City of Vallejo; Economic & Planning Systems, Inc.

Table 4-H-2
Land Use Assumptions
Mare Island Fiscal Impact Analysis

Land Use	Descriptive Unit	Average Market Values (1) 1996	2006	Buildout	Demographics Persons per DU	Space Use By Employees
Res-SF-Historic	unit	$300,000	$300,000	$300,000	3.0	NA
Res-SF-Duplex	unit	$75,000	$75,000	$75,000	3.0	NA
Residential-MF-Condo	unit	$220,000	$220,000	$220,000	2.5	NA
Residential-MF-Rental	unit	$55,000	$55,000	$55,000	2.5	NA
Residential-Dorm	bed	$0	$0	$0	1.0	NA
Retail	sqft	$80	$113	$147	NA	400 sqft
Office	sqft	$65	$98	$132	NA	275 sqft
Lt. Industrial	sqft	$45	$45	$45	NA	600 sqft
Warehouse	sqft	$20	$20	$20	NA	1,200 sqft
Heavy Industrial	sqft	$33	$33	$33	NA	800 sqft
Education	sqft	$0	$0	$0	NA	780 sqft (2)
Marina	acre	$0	$0	$0	NA	0.16 acre
Developed Parks	acre	$0	$0	$0	NA	0.20 acre
Golf Course	acre	$30,000	$30,000	$30,000	NA	0.20 acre
Regional Park	acre	$0	$0	$0	NA	0.10 acre
Civic Space	sqft	$0	$0	$0	NA	1,500 sqft
Streets	mile	$0	$0	$0	NA	0.00 mile

(1) Assumes rents and land values would be below market values in the interim years to help market these uses, per BAE.
(2) Based on data from the University of California.
Sources: City of Vallejo; Bay Area Economics; Economic and Planning Systems, Inc.

Table 4-H-3
Project Description by Phase
Mare Island Fiscal Impact Analysis

Land Uses	Unit of Measure	Base Closure 1996	Mid-Point 2006	Buildout 2026
Development Assumptions				
Res-SF-Historic	unit	52	52	52
Res-SF-Duplex	unit	431	431	431
Residential-MF-Condo	unit	0	0	800
Residential-MF-Rental	unit	0	513	553
Residential-Dorm	bed	0	802	802
Retail	sqft	61,100	120,700	200,700
Office	sqft	169,600	529,600	835,900
Lt. Industrial	sqft	178,500	484,000	2,063,245
Warehouse	sqft	234,200	663,100	1,285,100
Heavy Industrial	sqft	291,200	805,400	934,300
Education	sqft	0	477,500	477,500
Marina	acre	0.0	0.0	11.3
Developed Parks	acre	77.6	130.6	130.6
Golf Course	acre	157.0	157.0	157.0
Regional Park	acre	150.0	150.0	150.0
Civic Space	sqft	154,850	181,750	181,750
Streets	mile	19.8	21.6	25.8
Summary Totals				
Residential Units		483	996	1,836
Industrial Space		703,900	1,952,500	4,282,645
Retail, Office, & Ed. Space		230,700	1,127,800	1,514,100
Total Non-Residential Space		934,600	3,080,300	5,796,745
Park, Golf & Open Space Acreage		384.6	437.6	437.6

Sources: City of Vallejo; EDAW; BAE; Economic & Planning Systems, Inc.

Table 4-H-4
Property Tax Revenues
Mare Island Fiscal Impact Analysis

		Fiscal Year Ending		
Item	TAFs	1996	2006	2026
Market Value by Land Use				
Res-SF-Historic		$15,600,000	$15,600,000	$15,600,000
Res-SF-Duplex	(1)	$2,325,000	$2,325,000	$2,325,000
Residential-MF-Condo		$0	$0	$176,000,000
Residential-MF-Rental		$0	$28,215,000	$30,415,000
Residential-Dorm		$0	$0	$0
Retail		$4,888,000	$13,639,100	$29,502,900
Office	(2)	$3,679,000	$27,079,000	$46,988,500
Lt. Industrial		$8,032,500	$21,780,000	$92,846,025
Warehouse		$4,684,000	$13,262,000	$25,702,000
Heavy Industrial		$9,609,600	$26,578,200	$30,831,900
Education		$0	$0	$0
Marina		$0	$0	$0
Golf Course		$4,710,000	$4,710,000	$4,710,000
Total Market Value		$53,528,100	$153,188,300	$454,921,325
Prop. 13 Adjustment Factor	5%			
Estimated Assessed Value for 2006 & 2026			$145,528,885	$432,175,259
PROPERTY TAX REVENUES (3)				
Total Property Tax Revenues	1.0%	$535,281	$1,455,289	$4,321,753
City's ERAF Adjusted TAF	23.0%	$123,115	$334,716	$994,003
Parks & Recreation District	6.5%	$34,793	$94,594	$280,914
Other Agencies & Solano County	70.5%	$377,373	$1,025,979	$3,046,836

(1) 400 of these units are assumed to be leased to Travis Air Force and thus, would not generate property tax.
(2) Roughly reflects the effect of Proposition 13 on assessed values over time.
(3) Does not include 113,000 square feet of office space which is assumed to be occupied by a federal tenant.
sources: City of Vallejo; Economic & Planning Systems, Inc.

Table 4-H-5
Demographics
Mare Island Fiscal Impact Analysis

Item		1996	2006	2026
		Fiscal Year Ending		
POPULATION (1)				
Res-SF-Historic		148	148	148
Res-SF-Duplex		1,288	1,288	1,288
Residential-MF-Condo		0	0	1,900
Residential-MF-Rental		0	1,218	1,313
Residential-Dorm		0	487	525
Cumulative Totals		1,437	3,142	5,175
EMPLOYEES (1)				
Retail	sqft	145	287	477
Office	sqft	586	1,830	2,888
Lt. Industrial	sqft	283	766	3,267
Warehouse	sqft	185	525	1,017
Heavy Industrial	sqft	346	956	1,109
Education	sqft	0	612	612
Marina	acre	0	0	2
Developed Parks	acre	16	26	26
Golf Course	acre	31	31	31
Regional Park	acre	15	15	15
Civic Space	sqft	103	121	121
Cumulative Total		1,710	5,170	9,566

(1) Based on demographic assumptions in Table 4-H-2.
Includes a vacany rate of 5%
for all uses, except public uses and the 400 Travis units.

Table 4-H-6
Operating Revenues
Mare Island Fiscal Impact Analysis

ITEM	1993-94 ADOPTED REVENUES	PERCENT OF TOTAL REVENUES	ESTIMATING PROCEDURE	BUDGET MULTIPLIER	Fiscal Year Ending 1996	2006	2026
TAXES							
Property Tax	$6,763,900	18.5%	(See Table 4-H-4)		$123,115	$334,716	$994,003
Sales and Use Tax	8,031,000	22.0%	(See Note 4-H-3)		97,315	232,538	444,593
Transient Lodging Tax	1,100,000	3.0%	Not Evaluated				
Franchise Tax	1,441,161	3.9%	Per Daytime Pop. (1)	$10.73	24,584	61,441	106,830
Business Tax	850,000	2.3%	Per Employee	$23.02	39,360	118,996	220,180
Utilities Tax	7,150,500	19.6%	Per Emp & Pop	$46.80	147,246	388,971	689,819
Property Transfer Tax	850,000	2.3%	(See Note 4-H-2)		0	0	55,176
LICENSES & PERMITS							
Construction Permits	500,000	1.4%	Offsets Costs				
USE OF MONEY & PROPERTY	2,001,000	5.5%	Not Impacted by Growth				
STATE SHARED REVENUES							
Motor Vehicle In-Lieu Fees	4,618,000	12.6%	Per Capita	$39.85	57,252	125,232	206,255
Motor Trailer/Other Taxes	15,000	0.0%	Per Capita	$0.13	186	407	670
CHARGES FOR SERVICES							
Administration	289,000	0.8%	Offsets Costs				
Development Services	100,000	0.3%	Offsets Costs				
Fire	528,000	1.4%	Offsets Costs				
Police	130,000	0.4%	Offsets Costs				
Public Works	440,000	1.2%	Offsets Costs				
OTHER REVENUES	1,500,000	4.1%	Not Impacted by Growth				
TRANSFERS	244,000	0.7%	Not Impacted by Growth				
TOTAL GENERAL FUND REVENUES	$36,551,561	100.0%			$489,057	$1,262,301	$2,717,526
Gas Tax Revenue Fund (2)	2,277,208	na	Per Capita	$19.65	$28,232	$61,754	$101,708
PARK MAINTENANCE							
Property Tax Revenue	na	na	(See Table 4-H-4)		$34,793	$94,594	$280,914

(1) Daytime population is the sum of population and one-half of employment (see Note 4-H-1).
(2) The Gas Tax Revenue Fund funds certain public works costs, as estimated in Note 6.
(3) The Recreation Facilities are assumed to be supportable with user fees.

Sources: City of Vallejo; Economic & Planning Systems, Inc.

Table 4-H-7
Operating Expenditures
Mare Island Fiscal Impact Analysis

DEPARTMENT/ACTIVITY	1993-94 ADOPTED BUDGET	EXPENDITURES OFFSET BY FEES & CHARGES	TOTAL NET EXPENDITURES	PERCENT OF TOTAL NET EXPENDITURES	ESTIMATING PROCEDURE	BUDGET MULTIPLIER	Fiscal Year Ending 1996	Fiscal Year Ending 2006	Fiscal Year Ending 2026
GENERAL FUND									
General Government									
Building Inspection	$713,927	$500,000 (2)	$213,927	0.6%	(See Note 4-H-8)		$75,000	$75,000	$75,000
Planning	$737,013	$100,000 (3)	$637,013	1.8%	(See Note 4-H-8)		$84,000	$84,000	$84,000
All Other Services	$2,879,897	$289,000	$2,590,897	7.5%	(See Note 4-H-8)		$152,116	$153,617	$159,677
Fire Department	$9,605,010	$528,000	$9,077,010	26.2%	(See Note 4-H-7)		$2,355,505	$2,355,505	$2,450,205
Police Department	$17,712,987	$130,000	$17,582,987	50.7%	(See Note 4-H-5)		$1,131,600	$1,131,600	$1,131,600
Public Works									
Director	$105,911	$0	$105,911	0.3%	Not Impacted by Growth				
Engineering	$988,030	$440,000	$548,030	1.6%	Per Daytime Pop. (1)	$4.08	$9,348	$23,364	$40,624
Landscape Maintenance	$30,000	$0	$30,000	0.1%	(Included in St. Maint.)				
Maintenance Adm.	$40,184	$0	$40,184	0.1%	Not Impacted by Growth				
Public Buildings (4)	$942,271	$0	$942,271	2.7%	Per Capita	$8.13	$11,682	$25,553	$42,085
Streets	$815,151	$0	$815,151	2.3%	(See Note 4-H-6)		$102,247	$111,542	$133,231
Grounds	$612,663	$0	$612,663	1.8%	(Included in Street Maint.)				
Fixed Charges	$1,495,599	$0	$1,495,599	4.3%	Not Impacted by Growth				
TOTAL GENERAL FUND	$36,678,643	$1,987,000	$34,691,643	100.0%			$3,921,500	$3,960,200	$4,116,400
GAS TAX FUNDED DPW COST	2,276,382	na	na		(See Note 4-H-6)		$171,154	$206,231	$257,946
PARK MAINTENANCE	$850,000	na	na		(See Note 4-H-4)		$226,375	$226,375	$226,375

(1) Daytime population is the sum of population and one-half of employment (see Note 1).
(2) Construction permit revenue is assumed to off-set building inspection costs.
(3) Fees for development services are assumed to off-set planning costs.
(4) It has not yet been determined how much occupied space City departments will use on the Island; thus, average per capita costs are assumed.
Sources: City of Vallejo; Economic & Planning Systems, Inc.

Table 4-H-8
Operating Revenues and Expenditures
Mare Island Fiscal Impact Analysis

REVENUE OR EXPENDITURE ITEM	Fiscal Year Ending 1996	2006	2026
GENERAL FUND REVENUES			
Property Tax	123,115	334,716	994,003
Sales and Use Tax	97,315	232,538	444,593
Franchisce Tax	24,584	61,441	106,830
Business Tax	39,360	118,996	220,180
Utilities Tax	147,246	388,971	689,819
Property Transfer Tax	0	0	55,176
Motor Vehicle In-Lieu Fees	57,252	125,232	206,255
Motor Trailer/Other Taxes	186	407	670
TOTAL GENERAL FUND REVENUES (1)	$489,100	$1,262,300	$2,717,500
GENERAL FUND EXPENDITURES			
Building Inspection	75,000	75,000	75,000
Planning	84,000	84,000	84,000
All Other Services	152,116	153,617	159,677
Fire Department	2,355,505	2,355,505	2,450,205
Police Department	1,131,600	1,131,600	1,131,600
Engineering	9,348	23,364	40,624
Public Buildings	11,682	25,553	42,085
Streets	102,247	111,542	133,231
TOTAL EXPENDITURES (1)	$3,921,500	$3,960,200	$4,116,400
GENERAL FUND SURPLUS (DEFICIT)	($3,432,400)	($2,697,900)	($1,398,900)
GAS TAX FUND			
Revenues	$28,232	$61,754	$101,708
Expenditures	$171,154	$206,231	$257,946
Fiscal Surplus (Deficit)	($142,922)	($144,477)	($156,238)
PARK MAINTENANCE (2)			
Revenues	$34,793	$94,594	$280,914
Expenditures	$226,375	$226,375	$226,375
Fiscal Surplus (Deficit)	($191,582)	($131,781)	$54,539

(1) Figures have been rounded to the nearest hundred.
(2) Represents analysis of park maintenance costs of existing and regional park only.

Economic and Planning Systems, Inc. 20-May-94

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Table 4-H-9
Summary of Revenues and Expenditures
Mare Island Fiscal Impact Analysis

YEAR	General Fund	Gas Tax Fund	Park Maintenance Costs
YEAR 1996			
Total Revenues	$489,100	$28,232	$34,793
Total Expenditures	$3,921,500	$171,154	$226,375
Fiscal Surplus (Deficit)	($3,432,400)	($142,922)	($191,582)
YEAR 2006			
Total Revenues	$1,262,300	$61,754	$94,594
Total Expenditures	$3,960,200	$206,231	$226,375
Fiscal Surplus (Deficit)	($2,697,900)	($144,477)	($131,781)
YEAR 2026 (1)			
Total Revenues	$2,717,500	$101,708	$280,914
Total Expenditures	$4,116,400	$257,946	$226,375
Fiscal Surplus (Deficit)	($1,398,900)	($156,238)	$54,539

(1) Year 2026 is the estimated year of buildout of all non-residential, residential and other land uses.

Source: Economic & Planning Systems, Inc.

Note 4-H-1
Daytime Population Calculation
Mare Island Fiscal Impact Analysis

Item	Assumptions	1996	2006	2026
Existing Population	115,873			
Existing Employment	36,928			
Existing Daytime Population (1)	134,337			
Total Population & Employment	152,801			
New Cumulative Population		1,437	3,142	5,175
New Cumulative Employment		1,710	5,170	9,566
New Cumulative Daytime Population (1)		2,292	5,727	9,958
Total Population & Employment		3,147	8,312	14,741

(1) Daytime population is the sum of population and one-half of new employment.

Note 4-H-2
Property Transfer Tax
Mare Island Fiscal Impact Analysis

Item	Assumptions	Fiscal Year Ending 1996	2006	2026
Tax Rate per $1,000 Assessed Value	$3.30			
Turnover Rate	10.0%			
Estimated AV of Market Rate Condos (1)		$0	$0	$167,200,000
Market Value of Turnover Units		$0	$0	$16,720,000
Total Real Property Transfer Tax Revenue		$0	$0	$55,176

(1) Only the new residential units are assumed to turnover in the buildout year; it is not know exactly how much non-residential land will be sold or retained by the Island Development Corporation (IDC).

Note 2

Note 4-H-3
Sales and Use Tax

Sales Tax Rate	Assumptions 1.00%	Fiscal Year Ending 1996	2006	2026
SALES TAX FROM NEW SPACE (with 5% vacancy)				
Citywide Serving Retail Space (1)	$125.00	28,600	28,600	28,600
Sales Tax Revenues		$3,575,000	$3,575,000	$3,575,000
Cumulative Office Space	$5.00	161,120	503,120	794,105
Sales Tax Revenues		$805,600	$2,515,600	$3,970,525
Cumulative Lt. & H. Industrial Space	$5.00	455,140	1,249,130	2,950,830
Sales Tax Revenues		$2,275,700	$6,245,650	$14,754,150
Total Taxable Sales		$6,656,300	$12,336,250	$22,299,675
Total Sales Revenues		$66,563	$123,363	$222,997
REVENUE FROM PROJECT POP & EMP. & VISITORS				
Cumulative Households excluding Travis (2)		59	546	1,344
Mean Household Income (3)	$43,900			
Total Household Retail Expend. (4)	$14,294	$841,192	$7,807,295	$19,213,780
Expenditures Captured on site	10%	$84,119	$780,730	$1,921,378
Exp. Captured in Rest of City	40%	$336,477	$3,122,918	$7,685,512
Sales Tax Revenue -- On Site		$841	$7,807	$19,214
Sales Tax Revenue -- Remainder of City		$3,365	$31,229	$76,855
New Employees (Cumulative)		1,710	5,170	9,566
Daily Sales per new employee	$6.30			
Work days per year	250			
Total Employee Retail Expenditures		$2,693,234	$8,142,366	$15,065,895
Expenditures Captured on site	60%	$1,615,941	$4,885,419	$9,039,537
Exp. Captured in Rest of City	20%	$538,647	$1,628,473	$3,013,179
Sales Tax Revenue -- On Site		$16,159	$48,854	$90,395
Sales Tax Revenue -- Remainder of City		$5,386	$16,285	$30,132
Total Sales Tax From Pop & Emp		$25,752	$104,175	$216,596
Visitor Expenditures				
Average Annual Visitors	100,000			
Average per person expenditures	$5.00			
Taxable Sales from Visitors		$500,000	$500,000	$500,000
Sales Tax Revenue		$5,000	$5,000	$5,000
Total Sales Tax Revenue to City (5)		$97,315	$232,538	$444,593

(1) Includes the officers club and golf course retail.
(2) Includes a 5% vacancy rate.
(3) Based on the 1990 ABAG estimate; ABAG's 1995 estimate declines to $41,000 apparantly to account for the closure of Mare Island. We do not think this deline will occur.
(4) Assumes expenditures are 88% of total income; taxable expenditures are then assumed to be about 37% of total expenditures, according to BLS data.
(5) Includes sales tax revenue from pop. & emp., special citywiding serving retail, non-retail space and visitors.

Note 4-H-4
Park Maintenance Costs
Mare Island Fiscal Impact Analysis

Item	Assumptions	Fiscal Year Ending 1996	2006	2026
PARK AND OPEN SPACE MAINTENANCE COSTS				
Estimated Park Maint./acre (1)	$3,055			
Open Space Maint. Costs/Acre (2)	$1,000			
Existing Developed Park Acres	12.4	12.4	12.4	12.4
Existing & New Ball Fields	14.6	52.6	90.6	90.6
Fishing Pier		12.6	12.6	12.6
New Regional Hill Park		150.0	150.0	150.0
Total Park Acreage		227.6	265.6	265.6
Annual Maintenance of Existing Parks		$37,882	$37,882	$37,882
Annual Maintenance of Fishing Pier		$38,493	$38,493	$38,493
Annual Regional Park Maintenance Costs		$150,000	$150,000	$150,000
Total Annual Maintenance Costs (3)		$226,375	$226,375	$226,375
Building Maintenance Costs (4)				
Civic/Recreation Space assumed to be conveyed to Parks District (sq.ft.)		151,650	151,650	151,650
Average Bldg Main. Costs/sqft	$1.50			
Estimated Building Maint. Costs		$227,475	$227,475	$227,475

(1) Based on maintenance cost data from the Greater Vallejo Recreation District.
(2) Based on average costs from East Bay Regional Park District.
(3) Excludes Chapel (3,200 sqft) and Historic District uses (26,900 sqft).
and ball fields; ball fields are assumed to be self supporting through lease revenues and user fees,
per Dennis Beardsley, Greater Vallejo Parks & Recreation District, May 3, 1994.
These costs represent costs that will need to funded through property tax revenues.
(4) These costs would be charged to tenants and/or covered by user fees.
and would not be funded through property tax revenues.

Sources: Greater Vallejo Recreation District; Economic & Planning Systems, Inc.

Note 4-H-5
Police Services Expenditures
Mare Island Fiscal Impact Analysis

Item	Assumptions	Fiscal Year Ending 1996	2006	2026
Required New Officers (2 new beats)		10	10	10
ESTIMATED EXPENDITURES (1)				
Salaries and Benefits				
10 Sworn Officers	$800,000			
Clerical Support	$46,000			
Communications Operator	$62,000			
Vehicles (purchase & maintenance)				
2 patrol cars	54,000			
1 unmarked vehicle	22,000			
Materials, Supplies, Services (15% of Costs)	147,600			
Total Costs	$1,131,600			
Total Annual Police Services Costs		$1,131,600	$1,131,600	$1,131,600

(1) Based on cost estimates prepared by the Police Department and Chief Galvin, dated April 27, 1994.

Sources: City of Vallejo; Economic & Planning Systems, Inc.

Note 5

Note 4-H-6
Street Maintenance & Other Public Works Costs
Mare Island Fiscal Impact Analysis

Item	Assumptions	Fiscal Year Ending 1996	2006	2026
Street Maintenance Costs				
Total Existing Road Miles	274			
Average cost per road mile (1)	$10,328			
Portion Covered by General Fund	50.0%			
Portion Covered by Gas Tax	50.0%			
Existing Road Miles on Mare Island	18.8			
New road miles added to Island (2)				
Cummulative Road Miles		19.8	21.6	25.8
TOTAL GENERAL FUND STREET MAINTENANCE COSTS		$102,247	$111,542	$133,231
TOTAL COSTS FUNDED BY GAS TAX		$102,247	$111,542	$133,231
Other Gas Tax Funded Maintenance Costs (1)				
New & Existing Intersections (signals)	5	6	10	14
New & Existing Street Lights (per mile)	26	515	562	671
Intersection Maintenance	$5,650	$33,900	$56,500	$79,100
Street Light Maintenance Costs	$68	$35,006	$38,189	$45,614
Total Other Maintenance Costs		$68,906	$94,689	$124,714
TOTAL GAS TAX FUNDED COSTS		$171,154	$206,231	$257,946

(1) Includes overlay, sidewalk, street sweeping, street tree and some median landscape maintenance costs, per Mike Feenan, Maintenance Superintendent, City of Vallejo, Department of Public Works, phone conversation, May 3, 1994.
(2) Per Michael Jones, Fehr & Peers Associates.

Sources: City of Vallejo; Economic & Planning Systems, Inc.

Note 6

Note 4-H-7
Fire Services Expenditures
Mare Island Fiscal Impact Analysis

Item	Assumptions	Fiscal Year Ending 1996	2006	2026
FIRE PROTECTION SERVICES EXPENDITURES				
1993-94 Adopted Operating Costs	$9,077,010			
1993-94 Sworn Personel	88			
Current cost per firefighter	$103,148			
Staff Requirements (1)	21			
Total Staff Requirements		21	21	21
New Service Costs		$2,166,105	$2,166,105	$2,166,105
Navy's Share of Fire Services Costs (3)	0.0%			
Fire Inspection Costs				
Average Cost and staff needs	94,700	2	2	3
		189,400	189,400	284,100
Total Fire Services Costs		$2,355,505	$2,355,505	$2,450,205

(1) Assumes a 3-person engine and a 4-person truck company, per Chief Magliocco.

Sources: City of Vallejo; Economic & Planning Systems, Inc.

Note 7

Note 4-H-8
Estimate of General Government Expenditures
Mare Island Fiscal Impact Analysis

Item	Assumptions	Fiscal Year Ending 1996	2006	2026
General Government Cost Estimate				
Current Net General Government Costs	$2,590,897			
All Other Net Dept. Costs	$32,100,746	$3,769,382	$3,806,564	$3,956,745
General Gov. as % of Other Costs	8.1%			
Estimated Future Gen. Gov. Costs(1)	50.0%	$152,116	$153,617	$159,677
Projected Total Other Departmental Costs				
Planning & Building Inspection Costs (2)				
New Planning Staff Costs (1 staff)	$84,000	$84,000	$84,000	$84,000
New Bldg. Inspection Costs (1 staff)	$75,000	$75,000	$75,000	$75,000

(1) Future general government service costs are assumed to be 50% of the current cost, which assumes some activities would not increase with growth in population and employment.
(2) Based on estimates from Ken Campo, Finance Director, City of Vallejo.

Sources: City of Vallejo; Economic & Planning Systems, Inc.

Note 8

5.0 PREFERRED REUSE ALTERNATIVE

This section presents the land use component of the Final Reuse Plan for Mare Island. Section 5.1 provides an overview of the planning process; Section 5.2 portrays the City's overall concepts for Island-wide reuse and development—the vision of Mare Island as a vibrant new district in Vallejo and the region; Section 5.3 details the land use patterns and sub-areas of the Plan.

5.1 PLANNING PROCESS

The land use planning process for Mare Island began immediately after the 1993 BRAC closure list was accepted by the President with the creation of the Mare Island Futures Project by the City of Vallejo. It is the task of the Futures Project's Work Group to develop a reuse plan, and the most significant element of this plan is land use.

The first step in this process was the development of the Conceptual Reuse Plan. This began in August 1993 with an introduction and orientation by City staff for the Work Group to the reuse planning process. In September and October the Work Group developed the scope and outline for the Plan, and in October and November, the complete Plan itself was developed. Both these phases included public input through the use of the Resource Groups and community forums. The Plan was approved by the Work Group in November; it was approved by the City Council in December.

With the start of 1994, the City began an even more intensive reuse planning process. The first effort was hiring the Urban Land Institute (ULI), a group of real estate and development professionals, to evaluate the Conceptual Reuse Plan in terms of market feasibility. ULI's findings and recommendations were similar to those of the Conceptual Reuse Plan, but gave the City and Work Group more direction in developing a realistic land use plan for Mare Island. The ULI report was released in April, 1994.

The second effort was the use of the Resource Groups to develop recommendations from the community on specific aspects of reuse. The groups formed by the City include: Employment Development; Human Services; Retraining; Educational Facilities; and Recreation, Open Space and the Arts. The groups established by the Navy include Historic Resources and the Restoration Advisory Board. Many of the recommendations that were developed by these groups did address directly land use issues, and many indirectly affected land use decisions. The recommendations of the Resource Groups were presented to the Work Group in May, 1994.

The third effort was the hiring of three groups of consultants to assist the City in the development of the Final Reuse Plan. Using grant funds from the Department of Defense's Office of Economic Adjustment, the City hired a team headed by EDAW, Inc. to complete land use, transportation, and infrastructure studies and a team headed by Bay Area Economics and Economic and Planning Systems for market feasibility studies and fiscal analyses. These two teams worked with City staff through an iterative process to develop preliminary recommendations for reuse. A third group led by Harder Kibbe was hired to conduct a social services study. These recommendations were revised to reflect those of the Resource Groups and the input of the Work Group. The revised recommendations are included in this draft Final Reuse Plan.

5.2 FRAMEWORK FOR CHANGE

The Final Reuse Plan for Mare Island focuses on the economic components of the successful reuse of the base. At the same time however it provides a framework of principles which will guide the redevelopment and reuse of the base far into the future. This is not a rigid plan or a final picture; instead it is a process to guide design and planning decisions that must be made as economic opportunities present themselves. These design and planning strategies therefore provide a framework within which there is wide flexibility to respond to particular economic development opportunities.

The Reuse Plan proposes a framework of guiding principles in the areas of Access, Buildings and Places, and Open Space.

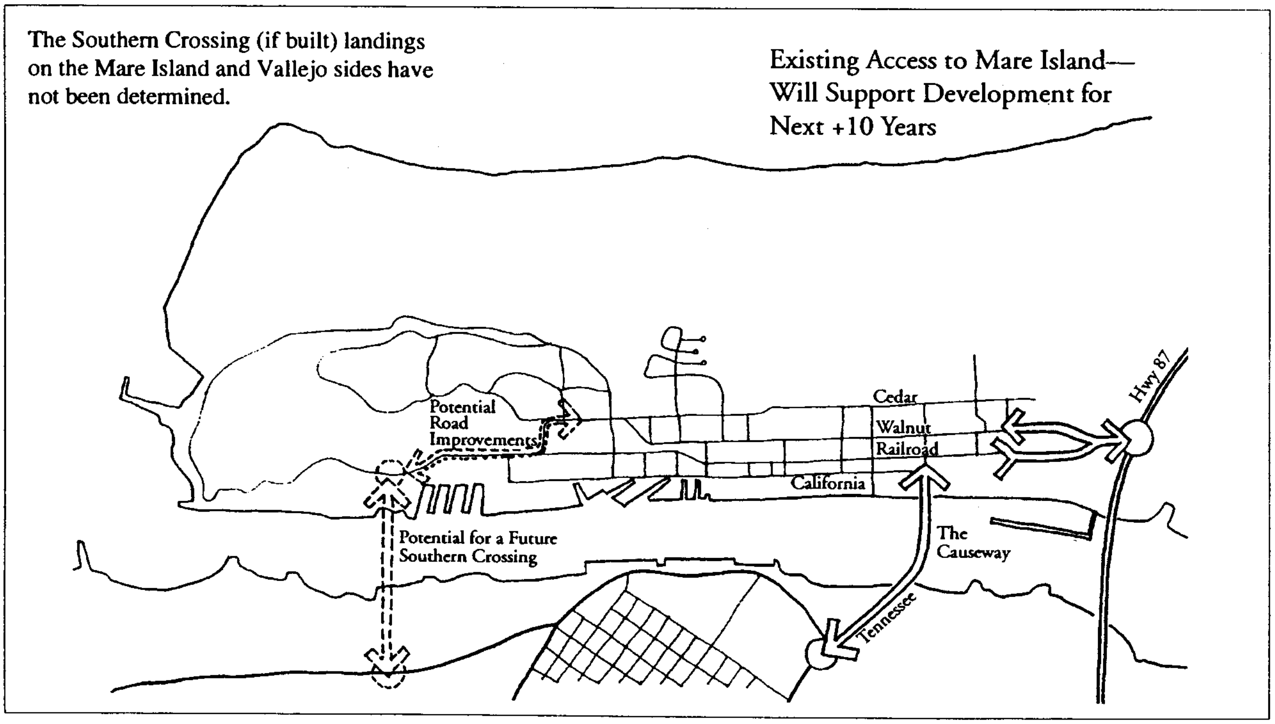
Access

Concept

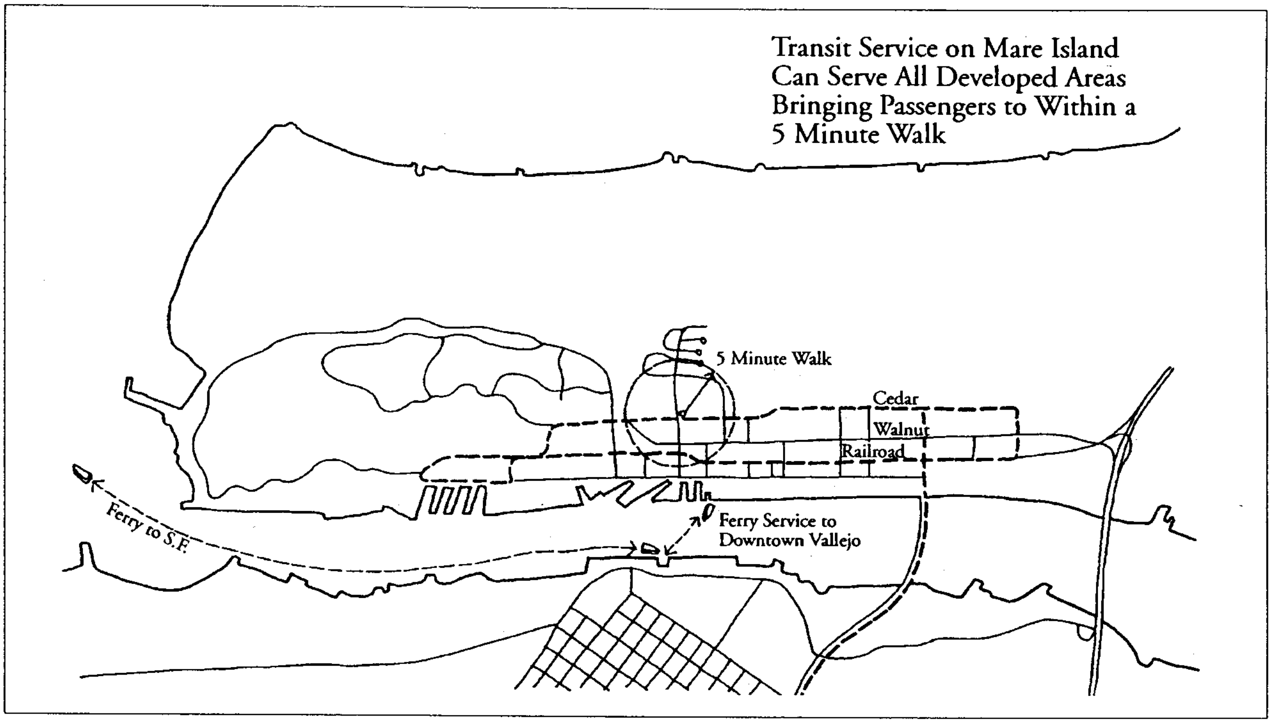
Access to and on Mare Island should achieve a balance between automobile, transit, and pedestrian modes. The existing fine grain network of streets and the layout of the Island encourages pedestrian movement and transit usage and should therefore be reinforced. Transit systems of various kinds—bus, light rail, ferry—can be evaluated and implemented throughout the course of development of the Island. The existing system of roadways will be adequate in the near term and will be progressively upgraded throughout the course of development of the Island. Vehicular travel will, however, be supplemented by encouragement of alternative modes, and remote parking utilizing on-Island transit, as well as auto-restricted areas such as the Historic Area, will be evaluated.

Elements

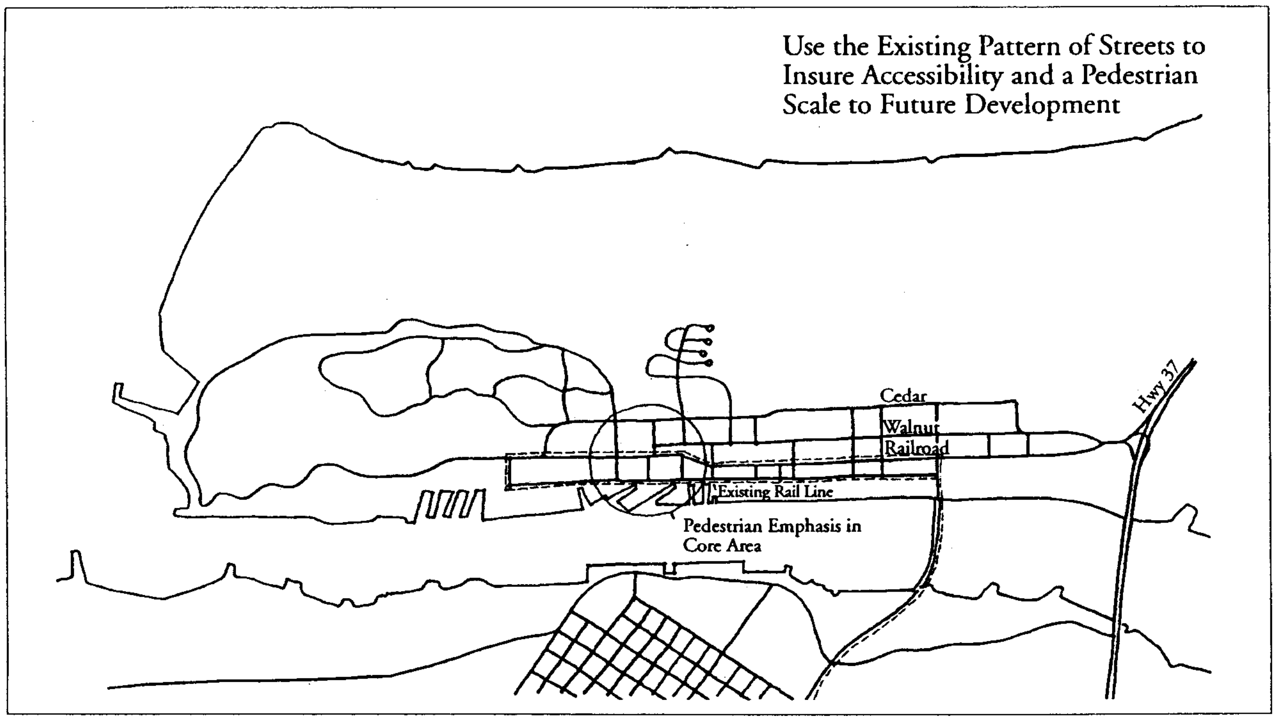
- Existing means of accessing the island will be sufficient for projected implementation of the plan through 2006 with minor enhancements. The two current access points—the northern entry at State Route 37 and the Causeway, and existing roadways on the island can serve projected access needs with minor roadway expansion, signalizations and signage. In the longer term, a southern crossing may be required, although its specific location has not been set. Right of way will be set aside for it and for other roadway improvements needed at the southern end of the island. Ultimately, the roadway system will ensure adequate access to employment centers and service areas, while encouraging walking, cycling, and transit use within the central part of the island. California Street is envisioned to be the main service route for industrial areas, Cedar and Railroad will be the primary automobile routes across the island, and Walnut will be preserved as a low volume, more pedestrian oriented street.



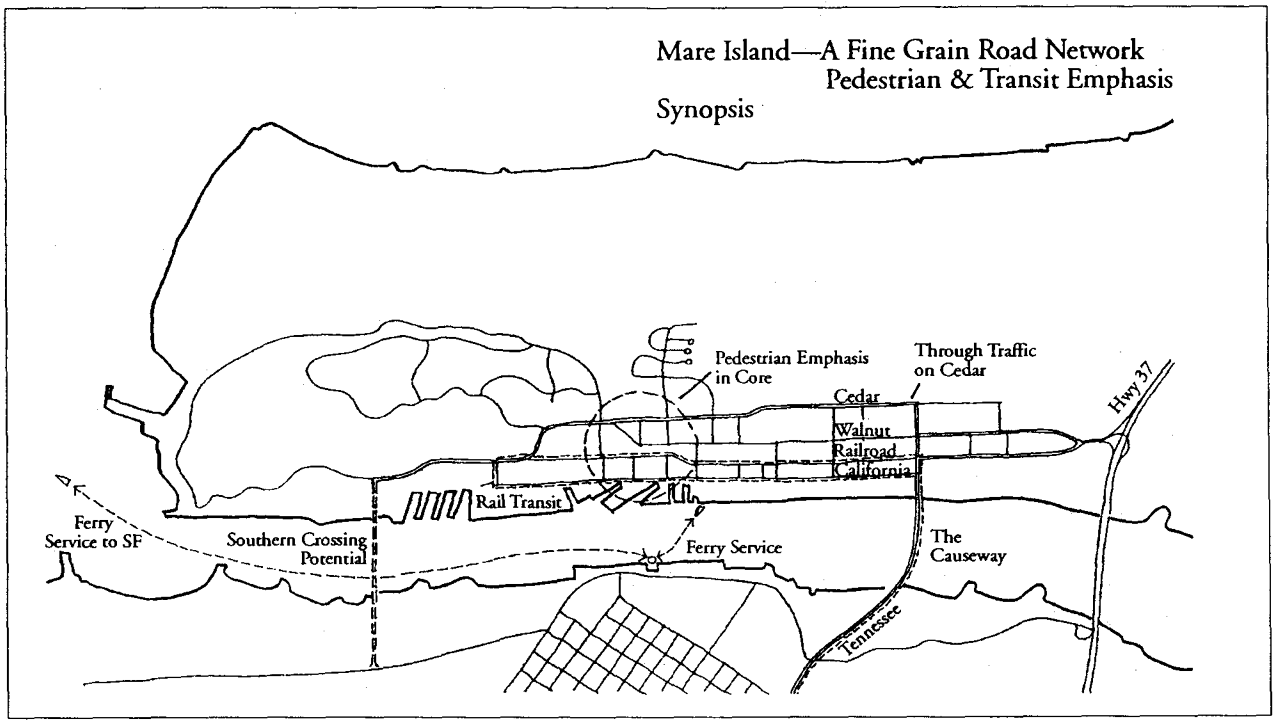
- Mare Island is particularly well configured to support transit service and usage. Rail or bus service will operate efficiently along two major north-south streets, Cedar or Walnut and Railroad, traversing the length of the Island and bringing passengers within a five-minute walk of virtually every developed area on the island. Remote parking may be warranted both on and off the Island. Ferries can serve the Island from the downtown Vallejo side of Mare Island Strait, running rapid shuttles across the narrow strait to serve visitors and employees. The Historic Center, focused around Alden Park, the Chapel, the Captains Row houses, and headquarters building, is envisioned to be largely auto-free to allow a better experience of the remarkable historic buildings and landscape.



- A fine grain roadway network will be the basis of vehicular and pedestrian circulation on Mare Island throughout its development. Similar to the scale of nearby downtown Vallejo, the narrower roadways, smaller block sizes, and regular grid overlaid on the developable portion of the island will provide a clear, straightforward circulation system. Distances between destinations will be relatively short, encouraging walking or bicycle riding, and transit will easily and efficiently serve the employment and residential areas. Bicycle lanes will be incorporated into roadway improvement throughout the island. Sidewalks and trails will be added where needed. The extensive island open space system will be readily accessible to on- and off-island users via the transit systems and an extensive trail and interpretive system.



- The ultimate circulation system for Mare Island will be a model of pedestrian- and transit-oriented planning. The layout of the island is uniquely suited to minimizing automobile trips and providing alternative travel modes.



Buildings and Places

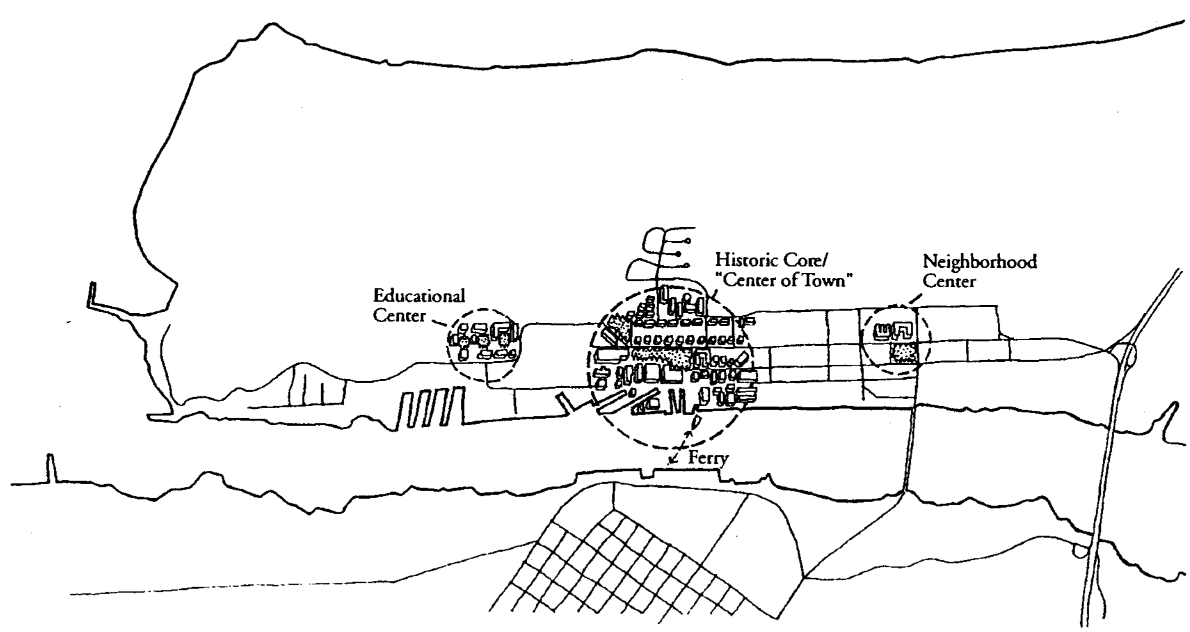
Concept

Mare Island will be a special district of Vallejo comprised of unique pedestrian-scaled neighborhoods. The neighborhoods will include a full range of land uses: employment, residential, commercial, recreation and open space. The neighborhoods of Mare Island will be focused around neighborhood centers which will provide a unique identity for the neighborhoods and that will provide services and amenities for residents, workers and visitors alike. Neighborhoods will be of a small and walkable scale, and will be linked to one another by the island-wide roadways, transit, bicycle and pedestrian networks. The special historical heritage of Mare Island which is expressed in its historic buildings and parks will be preserved and made accessible to a wide public.

Elements

- Mare Island will be a special district of Vallejo oriented around several unique town centers. At the core of the island, the Historic Center includes many of the historic buildings of the island such as St. Peter's Chapel, the Captain's Row houses, and the large historic industrial buildings along California Street at the waterfront. Alden Park and the arboretum will provide a village square for the community and location for special events. This center will serve local residents as well as being a visitor destination accessible by ferry.

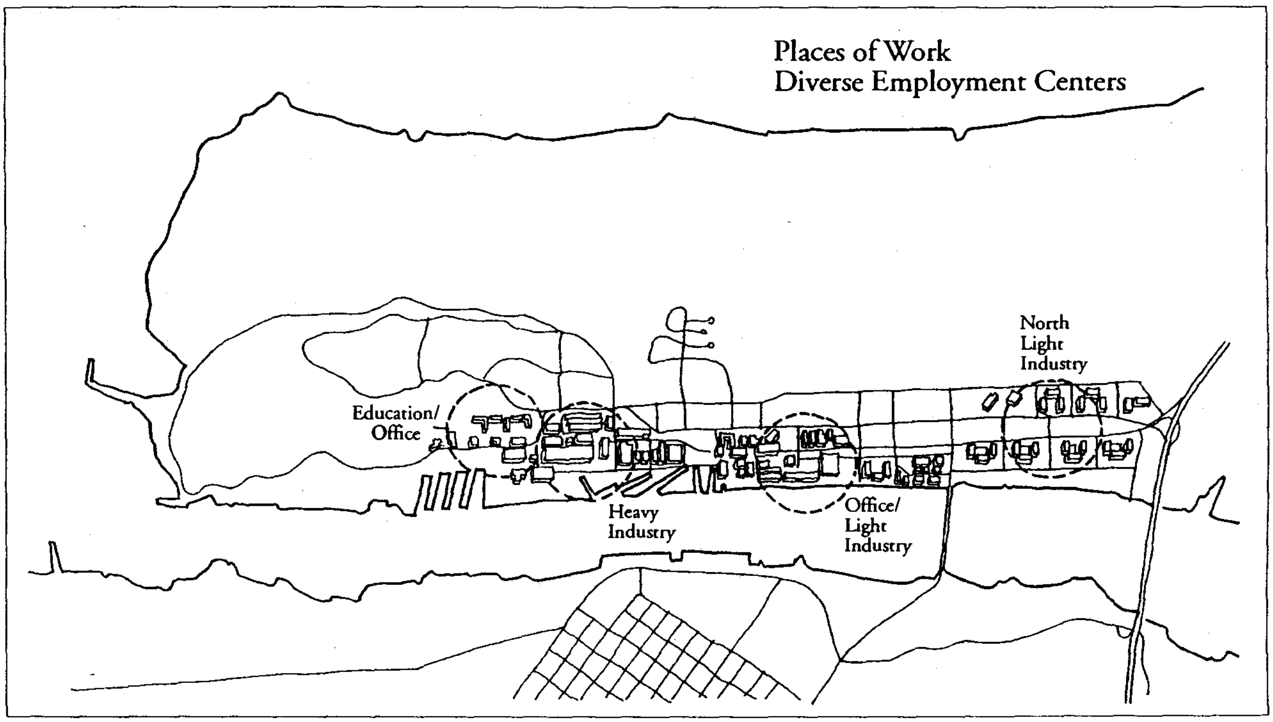
Centers of Unique Use and Character



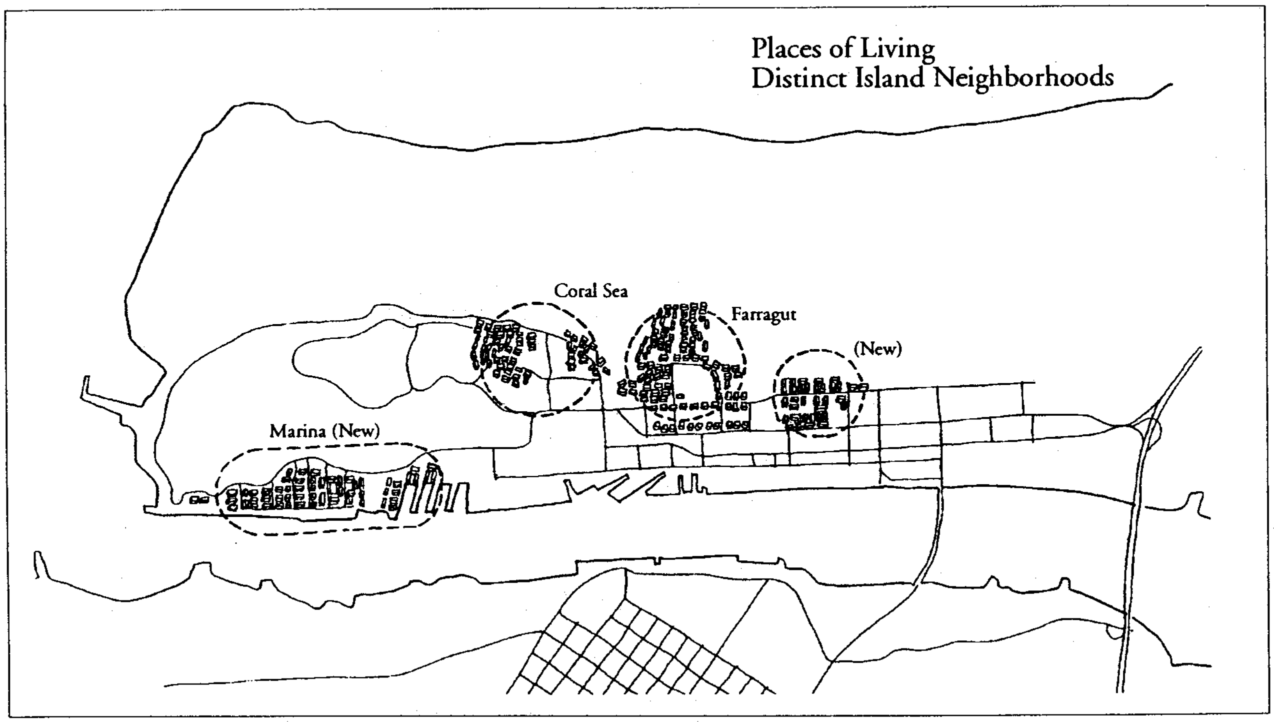
To the north, the Neighborhood Center will function as more of a civic and eommunity core, and includes the Rodman theatre, gymnasium, police facilities, and substantial recreation amenities. This mixed-use area will provide island-wide services and expanded recreation facilities including ballfields and soccer fields will serve greater Vallejo as well.

To the south a third center will occur focusing on the education complex and marina and residential uses. This Education/Office Center will anchor the southern end of the developed portion of the island. The historic buildings and grounds of the Combat Systems Technical School will provide a gracious setting for community events.

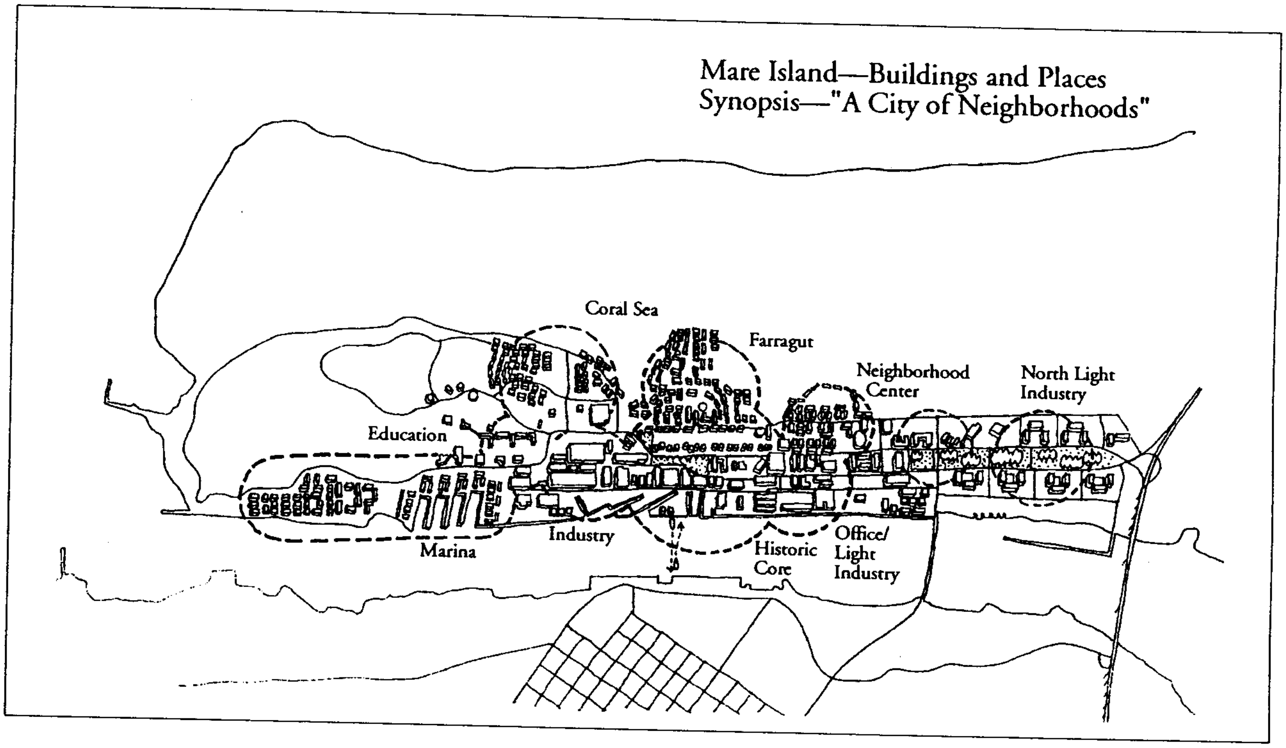
- Places of employment and work will be located throughout the island. Easily accessible from within the Island by foot, bicycle or transit, and accessible from greater Vallejo, the employment centers will employ a diverse cross section of local and regional residents. Since employment will be distributed throughout the Island, an active 24-hour community will be possible.



- As places of living, the residential areas on Mare Island will be a varied, eclectic group of small-scaled neighborhoods. The pattern of streets and alleys in existing areas, and the provision of pedestrian, bicycle and transit movement, will facilitate more traditionally scaled and friendly places to live. Each existing residential area—Farragut Village and Coral Sea Village—has a distinct character. New residential areas around the southern marina and near the Neighborhood Center to the north will be distinctive as well. Each neighborhood will be close to employment and service areas, as well as the island's extensive open space system. The existing newly constructed elementary school will be available for educational and recreational use.



- In summary, the Mare Island community will be a lively mix of uses and neighborhoods. The intimate, walkable scale of the developed areas of the island will allow for a pedestrian-first community while providing easy access via a variety of modes. Distinctive neighborhoods will be adjacent both to employment centers and to local and regional open space. The core of the island, with its history and remarkable buildings and landscape, will be an attraction for residents and visitors.



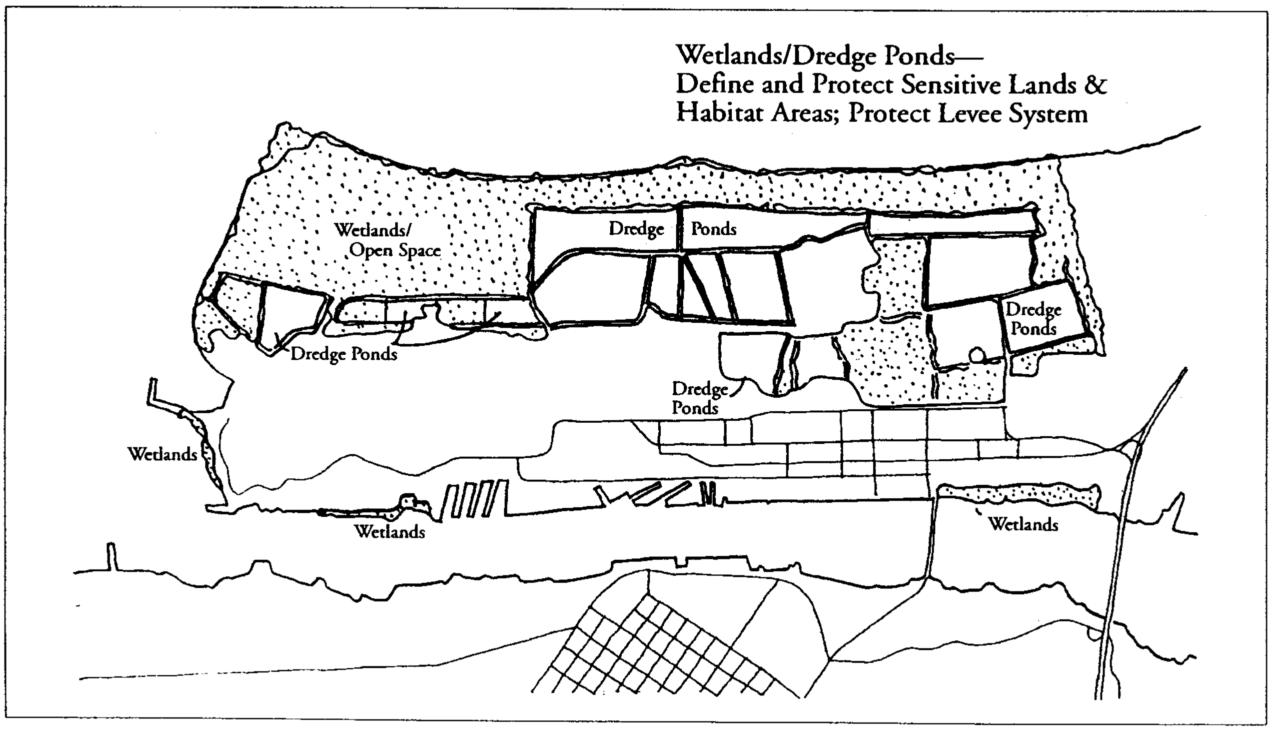
Open Space

Concept

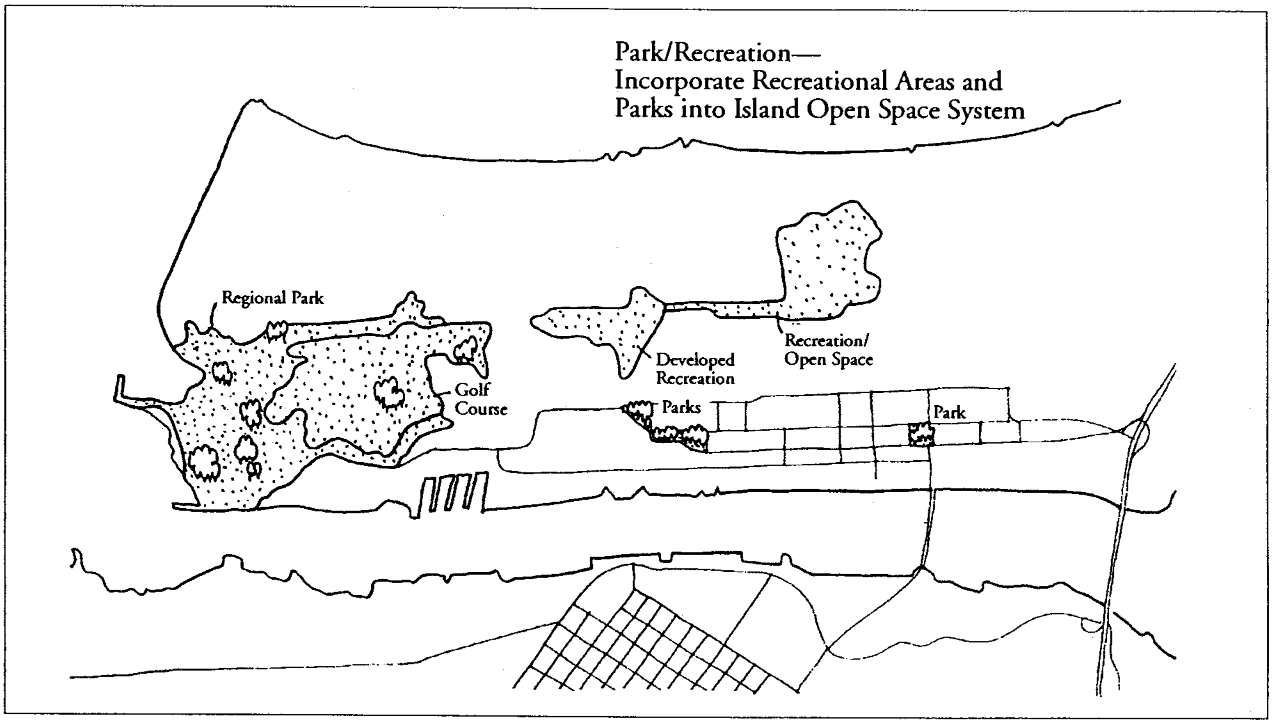
The Mare Island community will be characterized by the remarkable extent and quality of its open space and recreation amenities, and by its natural resource areas. The plan will preserve and expand open space already existing and provide access and interpretation to a regional and local populace. The island's location in San Pablo Bay provides spectacular vistas of the Bay Area.

Elements

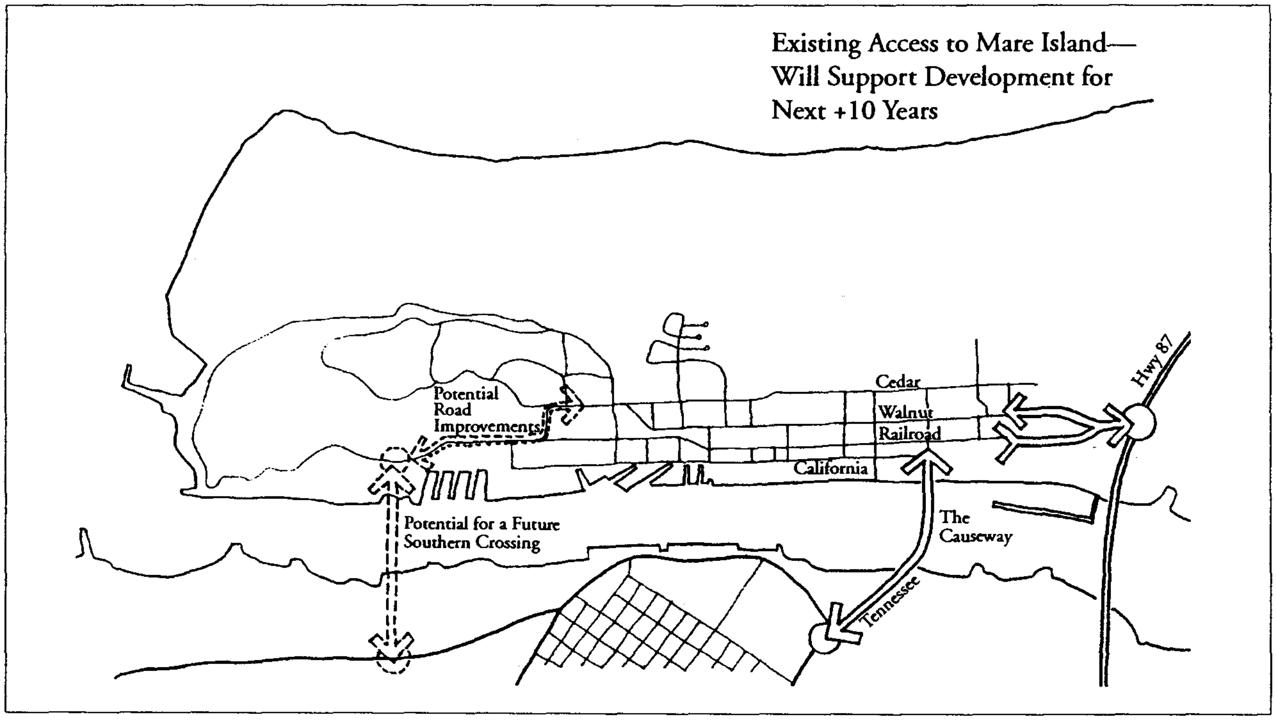
- Throughout the western extent of the island, a large natural habitat area will be created encompassing existing wetlands and the dredge ponds as the latter reach the end of their useful life. These areas will provide important natural habitat for a variety of species and will allow interpretive opportunities. Bicycle and pedestrian trails will be threaded throughout the area, utilizing the levee system where feasible, to provide access through these areas and to the edge of the Bay.



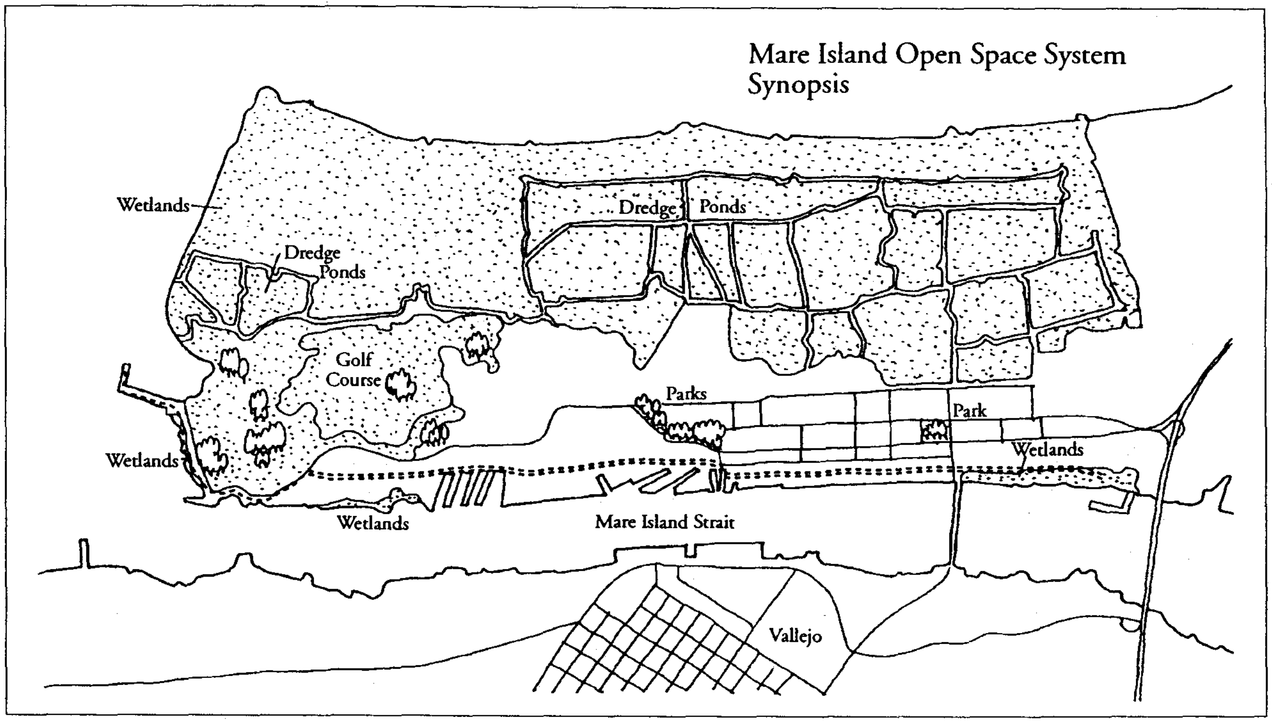
- Park and recreation uses will be found throughout the island and will include a full array of active and passive opportunities. A major regional park will be provided at the southern end of the island; with commanding views of San Pablo Bay and beyond, this park will be a major regional asset. Community parks will be provided in various locations as will active recreation fields and sports facilities. The existing golf course will be expanded to 18 holes. The Historic Center will include important historic buildings and landscape and will be a visitor destination as well as a community resource for civic events.



- Open space of a more urban character will be created along Mare Island Strait. This urban waterfront will include a range of active uses such as marinas and boat berthing, possible ship repair, and the Vallejo-Mare Island ferry. In other areas, industrial and office development will provide public waterfront access and opportunities for waterfront dining and activities. The narrow Strait provides a special opportunity to view an active waterway and to link this new Vallejo community with the downtown core of the city. A Waterfront Promenade is proposed to run along the western edge of Mare Island. Public access through industrial water front areas will be determined persuant to permit requirements of the San Francisco Bay Conservation and Development Commission (BCDC).



- In summary, Mare Island will provide a unique open space amenity for the City of Vallejo and the region. The extent of open space and recreation area available on the island is remarkable, and will provide a special character to the community. The combination of natural, protected areas; active recreation opportunities: historic parks; and urban waterfront is unmatched in the Bay Area and is an asset that will establish the island as a memorable place to live and work.



5.3 LAND USE PLAN

Introduction

The Final Reuse Plan identifies thirteen distinctive land use zones on Mare Island, plus the broad wetland and dredge pond areas located on the west side of the Island. Two additional areas—the Main Entrance and Roosevelt Terrace—are separated from the island and will require their own special analysis and management for future reuse. This section describes the land use zones and discusses important physical characteristics, themes, and recommendations for reuse. The Final Reuse Plan is shown on Figure 5-1; land use quantities within the Plan areas are shown on Table 5-1.

The land use zones are defined as a vehicle for the City to institute a rationale for understanding the complex nature of Mare Island, and a "way of thinking" about its management and disposition. Additionally, the marketing of sub-areas can be achieved if the site is conceived in distinct land use and management zones. The boundaries of the zones may evolve over time; however, the identification and naming of them responds to a rational order where site character and land use changes occur across the Island.

Identifying where to draw the zone boundaries is clear in areas such as the Coral Sea Village (Reuse Area #8) and the rifle range, depicted as Developed Recreation (Reuse Area #7). The character of the buildings, and landscape within those zones is distinct, and topographical changes set them apart from neighboring land use areas. Conversely, attempting to make a clear distinction between the Neighborhood Center (Reuse Area #2) and Farragut Village (Reuse Area #6) is more difficult because residential and commercial uses may be located on the adjoining edges of both areas, and there is no topographical change or other space-defining boundary present. In this latter regard, the Plan is expected to be flexible over time as market conditions and reuse realities evolve.

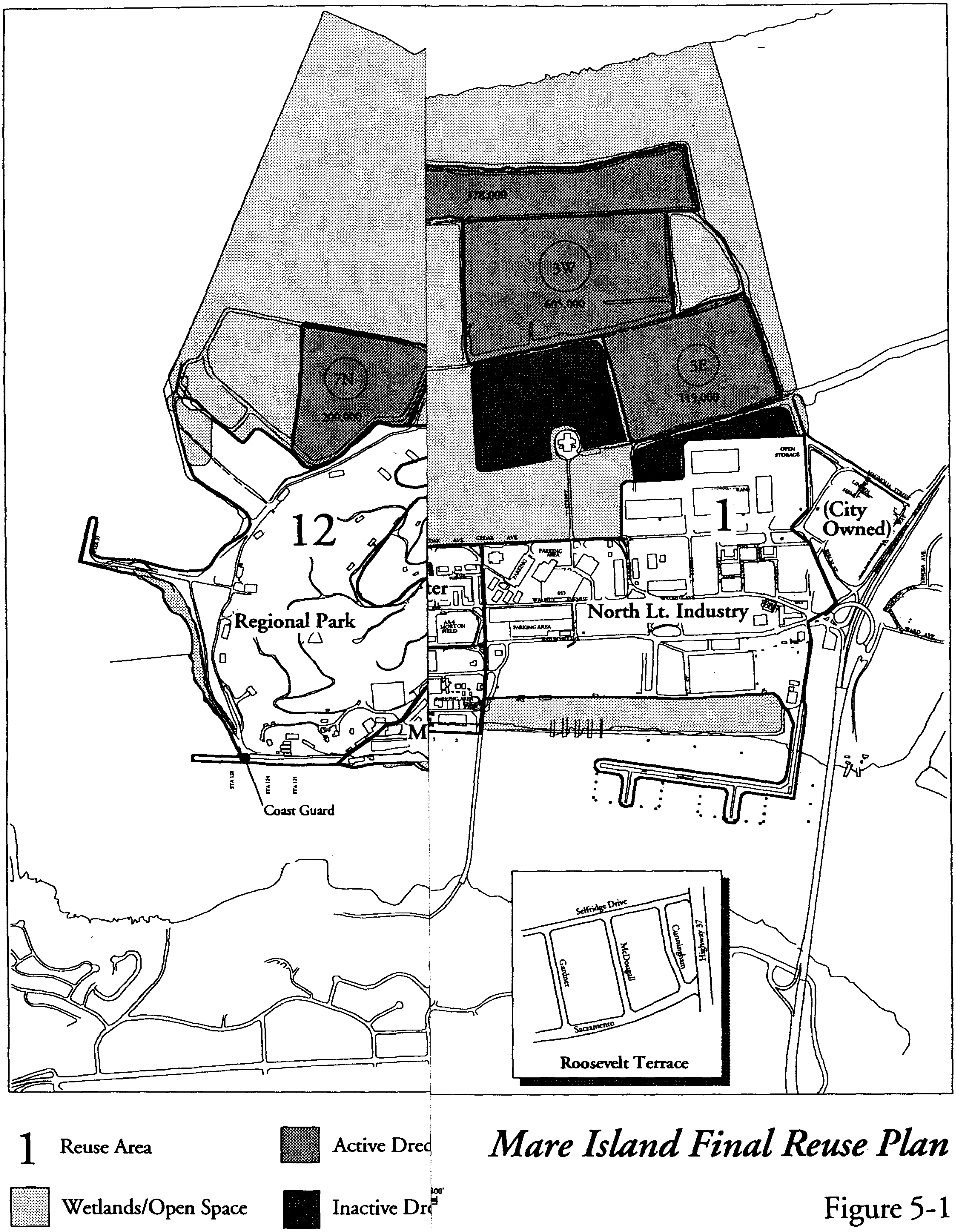
Each of the broad land use zones can be further sub-divided into smaller zones and parcels as more information becomes available, particularly with respect to building condition and the potential for removal of existing sub-standard structures. Likewise the boundaries themselves may change with further study; an example is the Golf Course (Reuse Area #11) that is proposed to be expanded to 18 holes; this boundary of this area will almost certainly be changed as the golf course expansion is further defined.

The Final Reuse Plan will be the point of departure for the City to begin focussing on the details necessary for successful implementation. The following text and diagrams discuss the land use zones in greater detail.

Table 5.1
Estimated Land Use Account*

Planning Area		Total Area	Light Industry	Warehouse	Heavy Industry	Office	Education/Office	Retail	Residential	Live/Work	Dormitory	Civic/Recreation	Marina	Developed Recreation	Wetlands	Active Dredge Ponds	Inactive Dredge Ponds
	Land Account	Ac	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	Sq. ft.	du	du	Beds	Sq. ft.	Slips	Ac	Ac	Ac	Ac
1	North Light Industry	192	566,000	1,285,100		56,600		42,100	80			16,200					
2	Neighbor-hood Center	85				234,300		40,000	40	43	45	131,200		25			
3	Mixed Use: Office/Lt. Industry	111	690,000			432,000								9			
4	Historic District	47						5,000	25		257	30,100		7			
5	Heavy Industry	119	419,500		934,300												
6	Farragut Village	107						40,000	222								
7	Developed Recreation	48												48			
8	Coral Sea Village	70						27,100	230	40				4			
9	Education/ Office	101	387,700			113,000	477,500	1,500	50		500			8			
10	Marina / Residential	94						45,000	800				100				
11	Golf Course	172										3,000		172			
12	Regional Park	228							6			1,250		163			
13	Open Space/ Recreation	92												92			
Other Planning Areas	Wetlands	685													685		
Other Planning Areas	Dredge Ponds	789														464	325
Other Planning Areas	Roosevelt Terrace	29							300								
Other Planning Areas	Main Gate	18				26,200											
	Totals	2,987	2,063,200	1,285,100	934,300	862,100	477,500	200,700	1,753	83	802	181,750	100	528	685	464	325

* Table presents land use quantities at Plan buildout, including existing facilities and new development.



Mare Island Final Reuse Plan

Figure 5-1

c.

Final Reuse Plan

1. North Light Industry

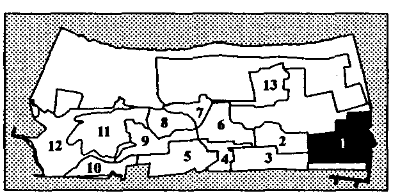
Located in the northern-most part of the Island, this zone lies between Highway 37 and Gate #2 to the north and G Street to the south. Wetlands border the area to the east and west ~~and an active~~ dredge pond lies ~~westerly of~~ Building 751.

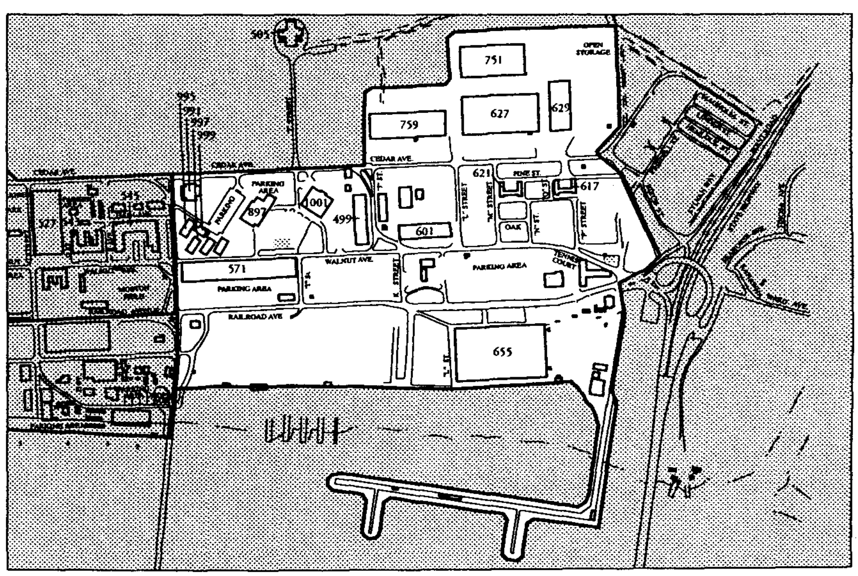
The area is characterized by concentrations of buildings surrounded by vast areas of open space either paved, covered with ornamental grasses, or disturbed open field grasslands. This part of the Island is visually and spatially distinct because of the greater amounts of open space overall and between buildings. In contrast to the historic and industrial core of the Island, the northern industrial area more closely mirrors typical suburban industrial parks found in other Bay Area cities.

The predominant use is warehouse activity with lesser amounts of light industrial, retail, office, residential, and recreation uses. Buildings 751, 627, 759, and 655 are examples of the large warehouse structures available in this area. These buildings are located on the western periphery of the zone bordering the wetland sites.

A concentration of smaller buildings is located between Cedar and Walnut Avenues, north of G Street. Several retail buildings occur between G and J Streets. The Commissary (Building 1001), houses the base grocery store and the Navy Exchange (Building 897) contains several retail outlets including a barber shop, clothing store, and fast food restaurant. The Commissary could be reused for light industrial purposes, and the retail shops converted to office/R&D spaces. Adjoining the retail outlets is a clustering of dormitory buildings (e.g.. 997, 995).

East of Walnut Avenue, a long linear strip of land separates Walnut and Railroad Avenues as the two streets diverge heading south from the north gate. Located approximately 400 feet apart, these streets define an area which is primarily open grassland between Building 755 at the gate





and Building 571, a low warehouse building at G Street. Considerable development potential exists in this strip of land.

The opportunity for reuse of this overall zone for light industrial/warehouse purposes as an Industrial Park is excellent due to its location between the ~~only~~ two existing access points to the Island. Large amounts of land are available for development, particularly east of Railroad Avenue, and in the 400 foot strip mentioned above. Additional lands suitable for development parcels are west of Walnut Avenue in the vicinity of Buildings 617 and 621, removing the existing ballfields. The ballfield uses can be relocated adjacent to Morton Field or in other areas on ~~the Island~~ designated for recreation.

The majority of buildings are considered suitable for reuse, and would not require extensive infrastructure improvements. Buildings that would be considered viable for reuse in the early phases of the build-out include 897, 991, 1001, 499, 751, 629, 505, 759, 627, and 571.

Circulation concepts for the Island suggest utilizing the one way couplet between the Highway 37 entrance and G Street. Access to the Industrial Park will be from Highway 37 via the off ramps provided southbound onto Walnut Avenue. Access to Highway 37 will be via northbound on Railroad Avenue. Strong landscape statements will be applied to the entry as well as along both Walnut and Railroad Avenues. The Causeway entrance onto the Island will receive the same level of landscape upgrade.

Immediately east of this zone, along the Mare Island Strait waterfront, is a wetland area (200-300' in width), that would preclude development. The waterfront promenade noted in the previous section would end at the Causeway, and an informal trail would traverse the wetlands behind the industrial sites in this area. The pier located at the far northern end of the Island would be used for public recreation purposes such as fishing.

2. Neighborhood Center

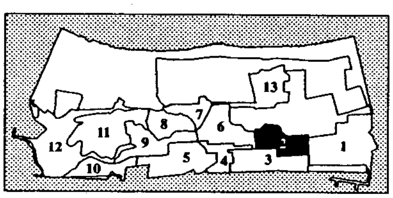
Located south of the North Light Industry area, is an area that bridges the central housing complex (Farragut Village), and the central recreation fields and retail activities along G Street. The Neighborhood Center is bounded by G Street to the north, the PWC area (Public Works Center) to the south, Walnut and Railroad Avenues to the east and wetlands to the west.

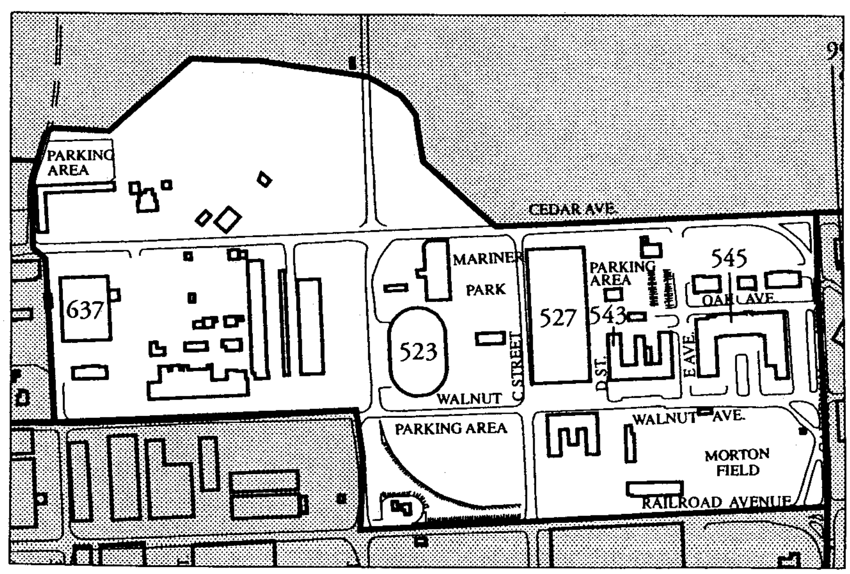
This part of the Island is planned to be the civic and community core centered on the Rodman theater and other functions such as gymnasium, community social services, police facilities, child care center, and Mariner Park. In addition, Morton Field—a significant nightlighted ballfield complex—anchors the area as approached westbound from the Causeway.

The visual character of this zone is defined by (1) the existing civic core building area and (2) the PWC maintenance complex that contains many older wood siding buildings. While the emphasis in the civic core will be on reuse of existing facilities, the long-term strategy for the PWC complex is complete building removal. In the interim period of reuse, Building 637 which houses the train locomotive and repair shop will remain. The two areas of open space within this zone are the lands occupied by Morton Field and the adjacent parking areas north of A Street, and lands immediately west of Cedar Avenue.

The concept for reuse within the Neighborhood Center is the creation of a mixed-use center that provides Island-wide community and social services and additional residences. Linkages among workplace, home, shopping, and community services is achievable within this zone in a pedestrian oriented environment. Retail services that currently are provided in the Commissary and Base Exchange can be replaced in this area over time by new services closer to the residential population.

Removal of aging facilities in the PWC maintenance area will create an opportunity for redevelopment consistent with the surrounding public facilities. The area is approximately 18 acres and





is envisioned to be a mixture of residential, commercial, and retail activities. The extension of housing close to the civic and retail core of the Island will reinforce a desirable neighborhood relationship. Adequate pedestrian and bicycle linkages can be provided in this zone, with the possibility of a civic "green" giving focus to the public and residential nature of the proposed reuse.

Expansion of recreation opportunities in the vicinity of Morton Field is proposed, including ballfields and soccer fields. The Greater Vallejo Recreation District has identified a shortage of developed recreation sites within the City, and there could be a shortfall of such facilities on Mare Island for the existing residential population. The existing parking area located north of A Street is planned to be converted to developed recreation fields, extending the "green corridor" established in Area 1 between Walnut and Railroad Avenues.

Buildings that are considered viable for reuse in the early phases of the project include Building 543, the Rodman Center (Building 545), Field House (Building 523), and Building 527, a warehouse that could be converted to office or other uses.

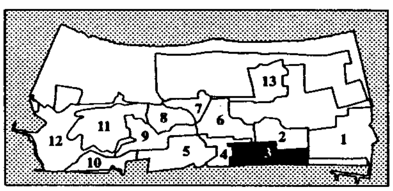
3. Mixed Use: Office/Light Industry

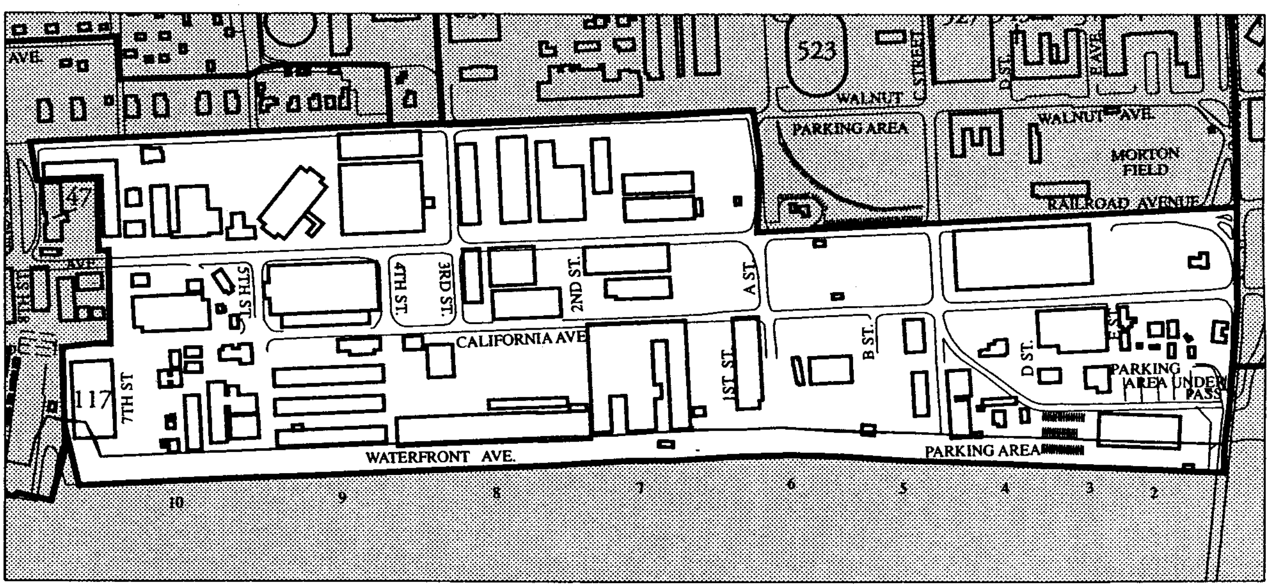
Located east of the Neighborhood Center, this zone spans approximately 3900 feet between the Historic District and the Causeway. Bounded by the Causeway to the north, Building 117 to the south, the Mare Island Strait to the east and Railroad and Walnut Avenues to the west, the reuse of this portion of the Island will be the most challenging. Following a detailed structural analysis of the buildings of Mare Island, removal of many sub-standard structures may be necessary.

The character of this zone is defined by clusters of industrial and office buildings and large open expanses of paved surfaces used for parking, lay-down storage and miscellaneous uses. Included within the zone are several historic buildings and the medical dispensary.

The opportunity to focus building and site orientation on the waterfront exists in this zone. Through extension of the grid street network to the water edge, parcels can be created that allow for access in the east-west direction, with frontage created along the waterfront. Possible reuse of the existing structures include development of a small business incubation complex, and creation of loft spaces by subdividing both the historic and non-historic structures.

A waterfront promenade is proposed to extend the entire length of Zone 3, and landscape treatments that enhance pedestrian linkages from the promenade to the neighborhood center and historic district would be developed.





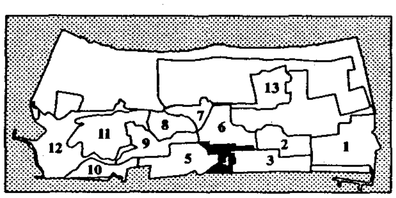
4. Historic District

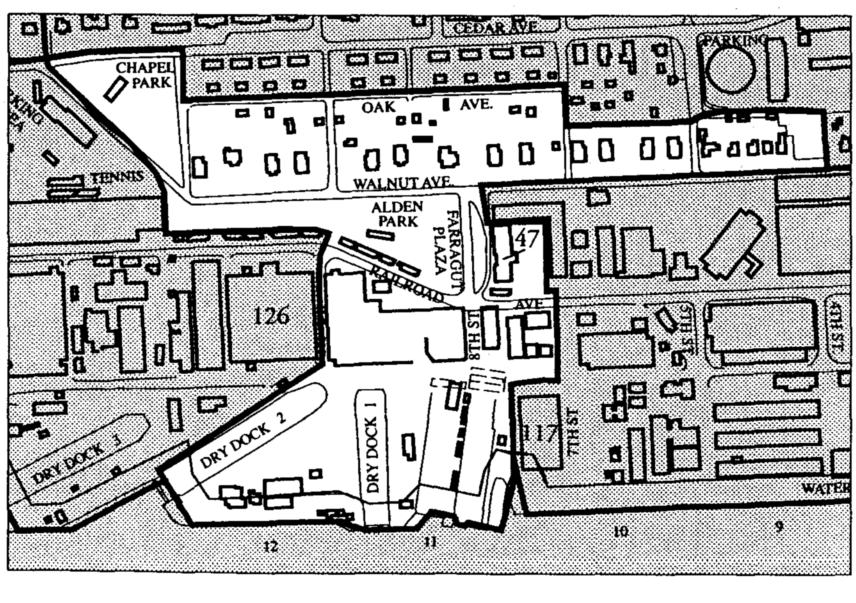
The central core of Mare Island is the Historic District which includes National Historic Landmarks such as Alden Park, St. Peter's Chapel and the Classic Revival houses along Captains Row. Located centrally on the island and fronting the waterfront, the boundaries on the north and south are adjoined by large industrial buildings (#117 and #126 respectively); the western boundary is Oak Avenue.

The Historic District is well defined by virtue of having been the ceremonial heart of Mare Island since the mid 1850's. Building 47 has been the administrative core and headquarters center since the beginning of the Mare Island mission. Development of the historic residences and arboretum within Alden Park have given this area an ambience and character unequaled in many Bay Area neighborhoods. Adding to the historical heritage is dry dock #1, the oldest drydock on the west coast and a significant component of the Mare Island story.

The opportunities for reuse in this area are exciting, both from a working waterfront perspective and as a visitor attraction. An overlay of a historic seaport district allows for maintaining of historic vessels, training in ship restoration, and preserving the history of Naval shipbuilding on the west coast. The Historic District could be either a National or State Park, and allow for private companies to operate in historical buildings subject to preservation regulations. The 21 historic residences could be sold as private residences or offices, operated by small non-profit organizations or used as guest lodging to complement the historic park. Showcasing the arboretum and gardens in Alden Park, and tours of/events in St. Peter's Chapel would further enhance the visitor attraction possibilities.

Vehicular circulation and parking will be limited within the Historic District due to the potential numbers of visitors and workers coming together in a small confined zone with few parking spaces. The establishment of remote parking areas and shuttles into the District will be explored. The City will study the possibility of creating Mare Island designated parking on the downtown





waterfront edge, and providing alternatives to the personal vehicles for accessing the Historic District. In this regard, the Plan proposes establishment of ferry service from the Vallejo Ferry Terminal across the river. The ferry landing location would ideally occur north of the buildingways. Ferry shuttles will need to operate on a regular schedule.

Pedestrian and bicycle linkages through the Historic District connecting to surrounding residential and open space areas will be developed. Trails connecting the ferry terminus with on-island routes will provide for an exciting alternative means of travel. In addition, a long-term possibility exists to provide a commuter rail system on-island along the Railroad Avenue corridor. The timing and accessibility of the service would be linked to the ferry service and connected to the waterfront by adequate trails and signage. Obviously the financial viability of both rail and ferry service require further study; however, the long-term success of Mare Island may depend on use of as many modes of alternative transportation as possible.

Overall, the implementation of the Historic District will require careful planning to ensure compatibility with adjacent industrial uses in Zones 3 and 5. The District and the waterfront promenade will need to be designed to ensure adequate safety protection for visitors as well as waterfront area workers.

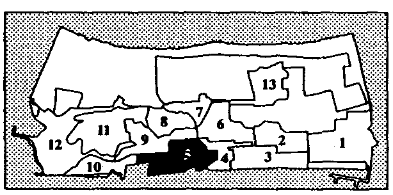
5. Heavy Industry

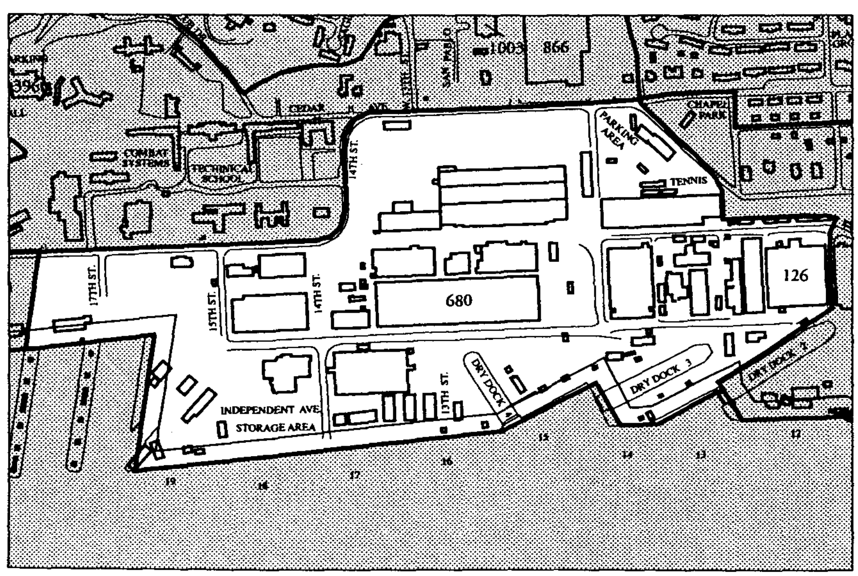
Throughout the last century, Mare Island has developed capabilities in ship building, maintenance, and repair. The industrial infrastructure required to perform those capabilities is immense, as evidenced by the numerous equipment shops, overhead cranes, and industrial machinery found on the site. The zone south of the Historic District from ninth Street south to Fifteenth Street, and from the waterfront west to Cedar Avenue encompasses large machine shops and industrial equipment of all types.

The character of the area is defined by some of the largest buildings on the island, two working dry docks, and several overhead cranes. Rail freight service is available—lines currently traverse both Railroad and California Avenues. Several historic structures are within this zone, including the machine shop (Building 680), a facility of over 250,000 square feet. Most of the historic buildings are large brick facade shops, and resemble the headquarters building (Building 47).

The opportunities to reuse the existing shops, either with their highly specialized equipment or as "shells" is dependent upon the market response and acceptance of Mare Island as a suitable place to do business. The likelihood of using the area for the manufacturing of large goods such as ships or rail cars is not considered strong, however, the manufacturing of smaller items such as scientific instruments, metal processing/fabrication, and chemical/biotechnology testing is possible.

This part of the Island contains an elaborate infrastructure system that was necessary to provide services for shipbuilding. Streets and areas between buildings are criss-crossed by utility lines, including steam, compressed air, potable water, pure water, salt water, sewer, storm water, industrial waste water, gas, electric, telephone, telecommunications and others. Mare Island may have a decided advantage over newer industrial parks that do not offer their tenants access to such highly specialized utilities. In addition, the heavy rail lines serving the area will be main-





tained until it is proven that there is no longer the need for rail shipments. The ability to parcelize the area will be partly based on the need to avoid major disruption or redevelopment of essential systems.

Circulation through the zone is currently restricted by the fencing that controls access to the Controlled Industrial Area (CIA). Railroad Avenue does not extend northbound from 14th Street, but is diverted westward. Removing the sensitive nature of the operations performed by the Navy, will allow reestablishment of through traffic on Railroad Avenue. Service to the majority of users that might occupy space in this zone will occur from California Avenue. Parking for the tenant operations may be at the individual sites, depending on the amount of sub-standard building space that is cleared. Similar strategies for encouraging workers to utilize bicycle or shuttles that is employed by the Navy may be warranted if parking/outdoor storage areas are not adequate.

Pedestrian circulation will be along Railroad Avenue and the waterfront promenade. As noted earlier, public access through industrial areas will be determined pursuant to permit requirement of BCDC. Numerous linkages east-west would be created with the extension of the grid east of Railroad Avenue.

Finally, historic buildings and landmarks in this zone will be preserved to the extent feasible.

6. Farragut Village

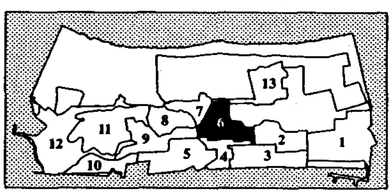
Located to the west of the Historic District is an area dominated by residential uses. Farragut Village lies west of Oak Avenue, south of the PWC complex, north of Building 866, and east of several active dredge ponds. In addition to the predominately duplex style residences are dormitories and an elementary school.

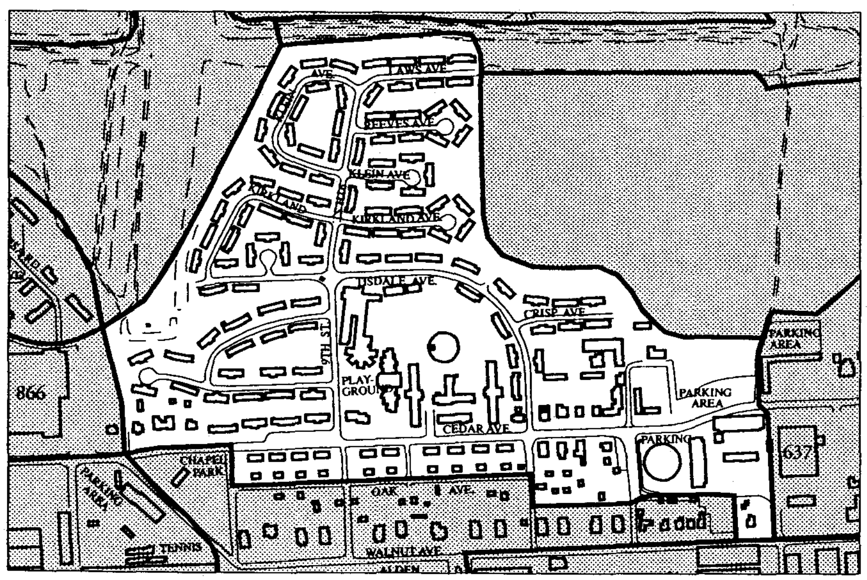
Most of the residences west of Cedar Avenue are one-story 1960's duplexes laid out within typical suburban street patterns of curvilinear form and terminating in cul-de-sacs. This pattern is a departure from the historical grid layout and precludes flexibility for expansion or roadway connections.

Located east of Cedar Avenue are two-story duplexes that have garage and in-law units accessed from Oak Avenue. These units date from the 1930's and have a distinct and handsome architectural style reminiscent of art deco structures of the period.

The Air Force has indicated a need for the family housing duplex units following departure of the Navy for personnel stationed at Travis Air Force Base. The dormitories could be converted to rental housing and leased at market rates. The City/IDC or the Vallejo City Unified School District would assume control of the newly constructed elementary school and adjacent playgrounds.

Opportunities for new residential and retail construction are located between 5th Street and 3rd Street. Removal of buildings that are part of the PWC complex would allow for integration of land uses between Farragut Village and the Neighborhood Center.

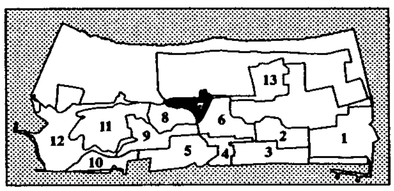


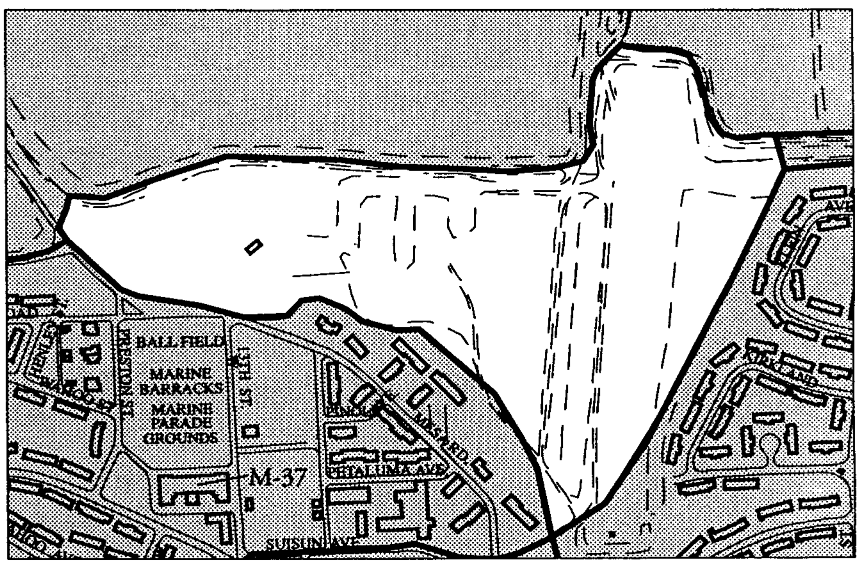


7. Developed Recreation

The area currently occupied by the rifle range is designated as developed recreation. The range currently contains facilities for both rifle and pistol shooting, plus a small unheated classroom building, storage sheds and two observation towers.

The range area is located west of Mesa Road adjacent to the Farragut and Coral Sea residential areas. For the first three years after closure, the range is planned to continue in operation. During this three year period, the range operators will develop a plan and financing to move the range to the southwestern part of the Island (e.g., as part of area 12).
Upon relocation of the shooting range, recommended use of this area will be for other developed recreation, such as play fields or other facilities.





8. Coral Sea Village

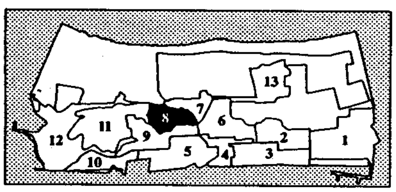
The Coral Sea housing area is located south of the rifle range and is higher in elevation than Farragut Village. The area is bounded by Mesa Drive to the north and west, Club Drive to the south, and Building 866 to the east.

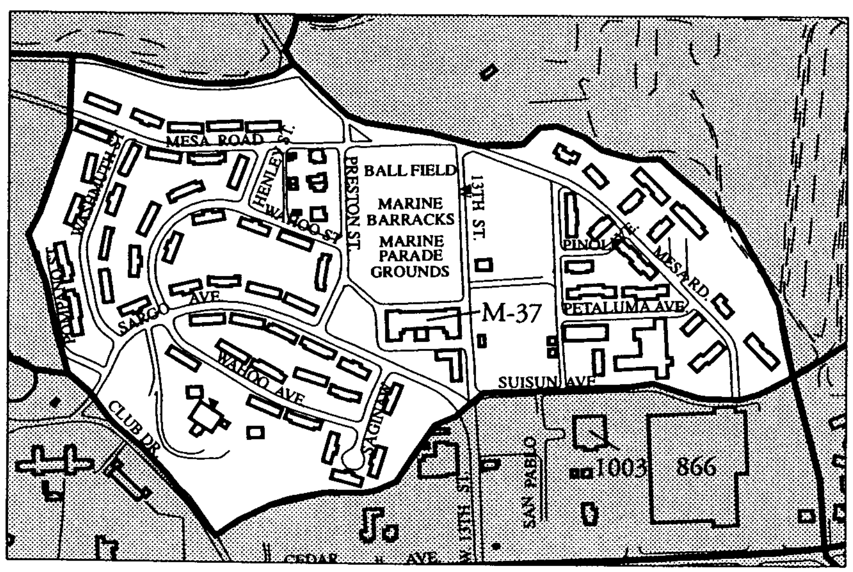
The residential housing type is predominately duplex units similar to those found in Farragut Village. Topographical differences define the character of this zone due to its elevation above the Historic Core, and there are views available to the wetland areas and San Pablo Bay.

The central core of the Village is the Marine Barracks (Building M-37) and parade grounds located between 13th Street and Preston Street. This handsome building and grounds provide a central focus within the housing areas.

Similar to Farragut Village, the Air Force has expressed interest in retaining the single family duplex units. The Marine Barracks and other smaller multi-family housing units could be converted to market rate apartment units or condominiums. The parade ground could be redeveloped for recreation purposes with the possible addition of both active and passive play areas.

Infill of residential uses is possible north of 13th Street between the Marine Barracks and the multi-family housing units. Residential densities should mirror those found in the multi-family units fronting Mesa Drive.





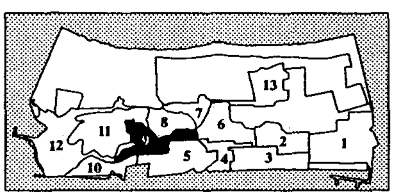
9. Education/Office

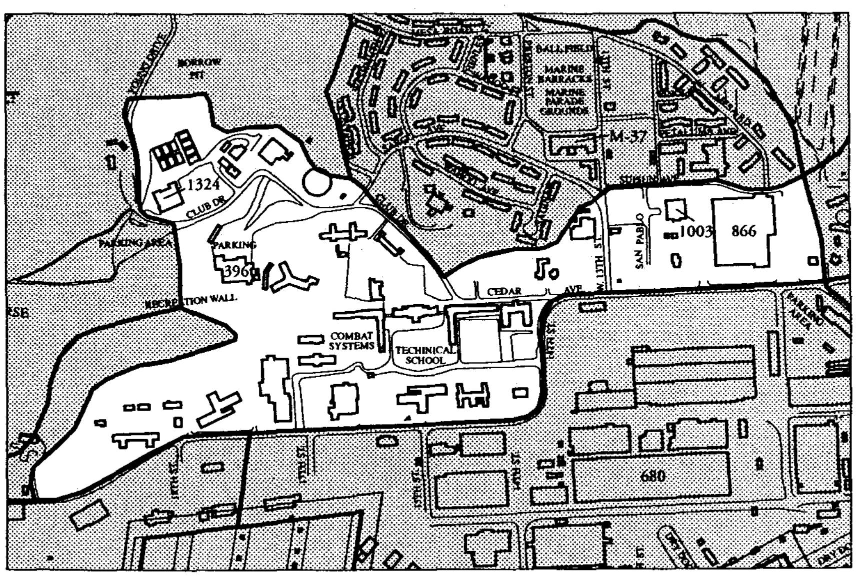
Mare Island has been the home of the Navy's Combat Systems Technical School, a campus of both modern and historic structures located south of the Heavy Industry area. The campus is located south of 14th Street, east of Club Drive and west of Railroad Avenue. Additional lands that provide a similar office/classroom function are located west of Cedar Avenue in the vicinity of 11th Street and west of Club Drive overlooking the Golf Course.

The central core of the campus is defined by the structures that line both sides of the main entry between Railroad Avenue and Cedar Avenue. Landscaped courtyards and formal open spaces provide the character which defines this unique area of Mare Island. Parking for the campus buildings tends to be on the periphery, accessed from Club Drive, further reinforcing a pedestrian orientation. Dormitory buildings for students are located south of the gymnasium (Building H-86).

Located up the slope from the campus is the Officers Club (Building 396) and Building 1324, a modern 113,000 square foot office building. Both of these structures are stand alone facilities with their own parking. They are included within the campus zone because of the special nature of their facilities which would lend themselves well to teaching/training and special event functions.

Additional facilities of significance are the Child Care Development Center (Building 1003), and Electrical Shop (Building 866). Although the functions that currently take place in the Electrical Shop have more in common with the Heavy Industry Area, the location of this facility is problematic. Located west of Cedar Avenue, one of the two main north-south arterials on the Island, the facility is surrounded by residential uses. Long-term reuse should be as residential, office and/or research and development functions.





The opportunities for reuse of the Education/Office zone are potentially very exciting. A consortium of education institutions has expressed strong interest in establishing a Mare Island College and University Center on Mare Island. This group, operating as the Mare Island Educational Consortium, and through the Educational Facilities Resource Group, includes the University of California at Davis (which has proposed operating a research station on Mare Island), California Maritime Academy, Sonoma State University, Solano and Napa Community Colleges, Vallejo City Unified School District, and other institutions including the Vallejo Educational Association (VEA), occupational program teachers, and vocational education teachers. Mare Island presents opportunities for evaluation of hazardous material remediation techniques, vocational training, wetlands research and other educational curricula. The consortium has developed a plan to locate a variety of programs on Mare Island which take advantage of the unique features of the facilities and environment. Disposition agreements should be pursued to encourage educational uses on the Island.

Portions of this zone may also be attractive to conference facility operators. The buildings and lands should be marketed for education purposes first since general office functions could locate in other zones of the Island.

The phasing of the education area will be gradual over time, with reuse occurring slowly as education institutions find the capital for improvements and expansion within constrained budgets. It will be important for the City to hold onto the vision of this zone over a long period of time.

10. Marina Residential

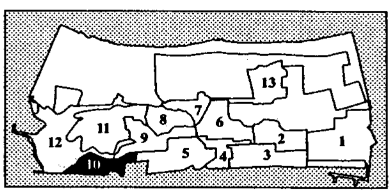
Facing the waterfront south of the Heavy Industry area is a section of Mare Island that is surrounded by hillsides with potential for water orientation and recreation. Views of the Mare Island Strait, downtown Vallejo, and San Pablo Bay are possible in the southern portion of the Island. The zone is bounded by a proposed regional park to the south and golf course to the west.

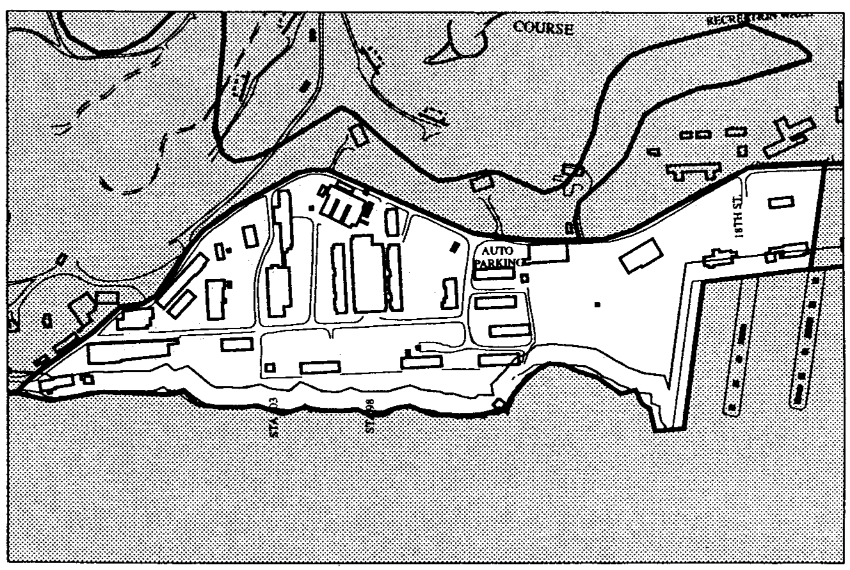
Three finger piers between 17th and 18th Streets are potentially viable as a new small marina of up to 80 berths. Pending clean-up operations of the area and development of the housing market, this part of the Island could be ideal for new residential construction, particularly multi-family housing at a slightly higher density than typical suburban subdivisions. Housing densities of 8-15 dwelling units to the acre should be marketable. The opportunity exists to "step" the housing into the hillside offering view possibilities for some units.

The character of this zone may be impacted by the potential future southern bridge crossing. Land will be reserved for this crossing pending further studies; however, the exact location would be determined at a future date. Should the crossing occur, access to the units and marina would be excellent; however, trade-offs in terms of visual quality and noise must be addressed as planning proceeds.

The waterfront promenade could be less formal and natural in this zone or more highly developed similar to the Marina Green in San Francisco.

Due to the extent of building demolition and environmental clean-up required in this area, the new housing and marina are considered long-term developments.





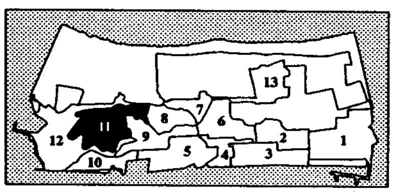
11. Golf Course

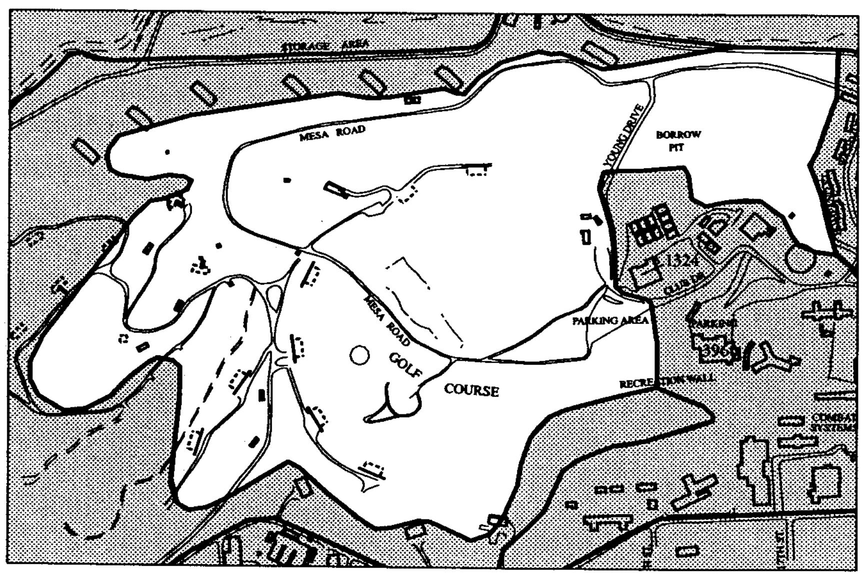
Mare Island has an existing nine-hole golf course and small clubhouse facility accessed from Club Drive, south of the Education/Office area. The course is very popular and levels of use exceed 40,000 rounds per year. Included in the clubhouse is a small kitchen food service and retail sales of clothing and equipment. Expansion of the course to 18 holes would necessitate an enlargement of the clubhouse and parking areas.

The addition of nine holes has been tested and proven feasible. There are only two directions for the expansion, northward from Young Drive to the edge of the Coral Sea Village and possibly into the existing rifle range area, and south into the sloped region that has been historically used for ammunition bunkers. The benefit of providing golf to the range site is the increased value that would be placed on the housing sites of both residential villages.

Parking for the course is now limited to a small lot in front of the clubhouse and up-slope in the lot adjacent to Building 1324. The addition of nine holes and increased access to the course will necessitate evaluating alternative parking solutions.

The market demand for a public golf course on Mare Island is strong, and expansion could occur in an early phase of the Reuse Plan.



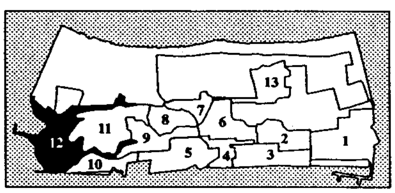


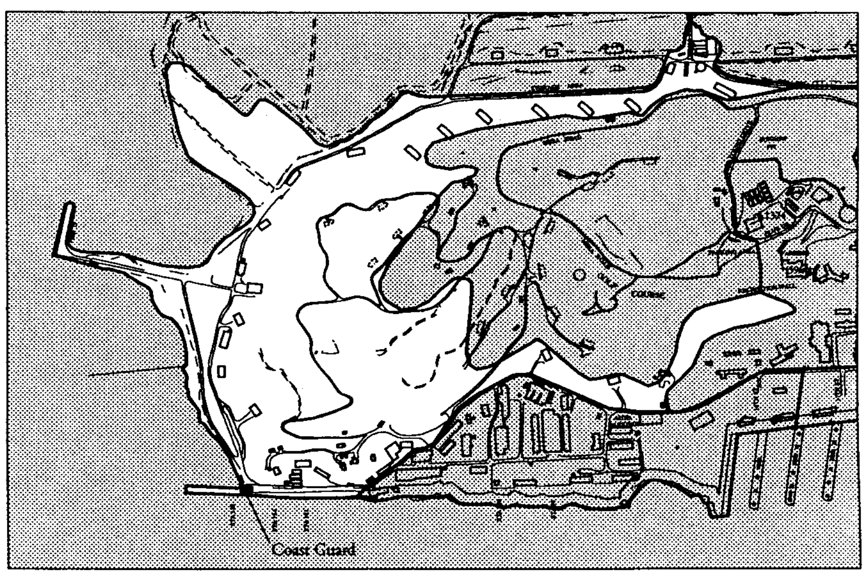
12. Regional Park

The southernmost portion of the Island is proposed to be a regional park. The highest point on the site and surrounding hillside areas would be reserved for open space assuring views of the City and San Pablo Bay for generations to come. Access to the shoreline for hiking and cycling and piers for fishing would be reserved. The Coast Guard will maintain its current station at the southeastern corner of the area (i.e., at Pier 34).

The character of this part of the Island is markedly different from the lands adjacent to Highway 37. The open, grassland zone is defined by the original hill that extends several hundred feet above sea level. Slope areas exceed 25% in some locations precluding traditional development. A large portion of the regional park and golf course would occur on lands between 8 and 15%. Exposed to the winds from the Bay, the forces of nature are more present on the southern tip of Mare Island.

Opportunities for public recreation that is more passive in nature makes this part of the Island unique. Walking, cycling, and equestrian trails would be linked to other areas as appropriate, particularly the wetland/dredge pond system and waterfront promenade. The equestrian facility that is existing in the wetland/dredge pond area could be relocated to the Regional Park. The character of the promenade should be natural looking on this end of the Island, and the surface of the trail should be different from sections in the more heavily used portions of the Island.

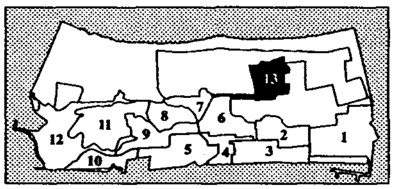


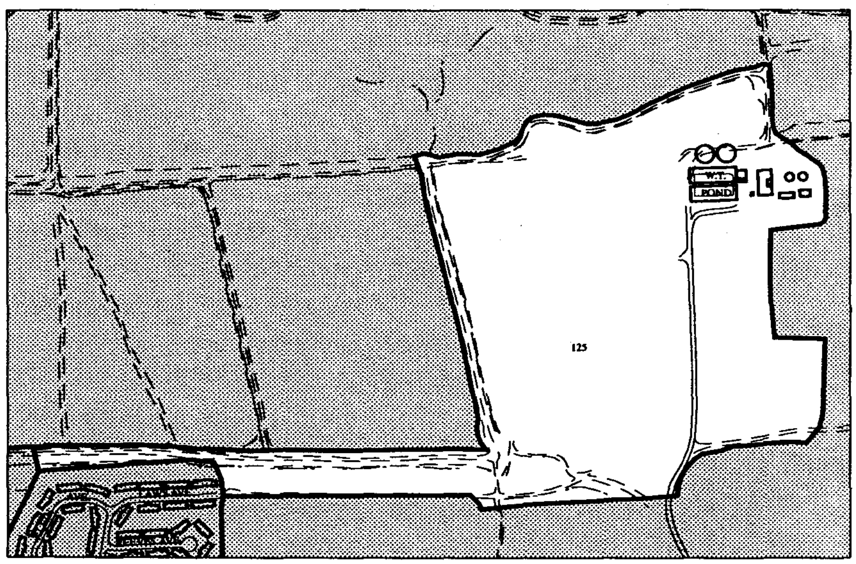


13. Recreation/Open Space

Located on a landfill site between active dredge ponds and non-tidal wetlands, this area is west of the Neighborhood Center accessed via a dirt road extension of A Street. Due to its distance from the other more developed portions of the Island, this land is proposed for recreation and/or open space purposes.

Pursuant to environmental clean-up operations, the area would have potential for both passive and active recreation purposes. The final determination of its long-term intended use should be based on an Island-wide Specific Plan study of all recreation resources.





Wetlands and Dredge Ponds

The entire western half of Mare Island is open space lands that are either tidal/non-tidal wetlands, or active and non-active dredge ponds. The majority of the acreage is dredge ponds; and there are 10 active sites, and 6 inactive sites. The levees of the ponds are proposed to be raised by four feet, thus ensuring at least a 25 year supply of available dredged sediment storage space. The inactive ponds may be reactivated again in the future. Overall, the dredge pond system represents an economic resource for the City.

The largest amount of wetlands on Mare Island are tidal, with the greatest concentration being in the southern portion. The City may enter into a memorandum of understanding with the US Fish and Wildlife Service (USFWS) regarding the maintenance and protection of this wetland resource. In addition the USFWS promises to develop an interpretive facility within the wetland/dredge pond area, reusing Building 505, which is accessed via I Street.

Main Entrance and Roosevelt Terrace

Mare Island contains two areas which are not contiguous to the Island proper and will be part of the closure process. The Main Entrance is located on the City side of the Causeway, and currently houses pass and identification, security, and administrative operations in Building 513. Roosevelt Terrace is a higher density housing area located adjacent to Highway 37 east of the north gate across the river.

The reuse of Building 513 and its associated parking would most likely be as retail or professional office space. The site has a definite advantage of being located next to the only direct City connection to the Island.

Roosevelt Terrace is an older 600 unit multi-family housing area located in Vallejo, south of Highway 37 and east of the Napa River. The potential reuse of the buildings is for affordable housing or market rate apartment units. Potential redevelopment of the area to diminish the "high-density" appearance of the units is possible, removing up to one-half of the total unit count to provide landscaping, recreation areas, and additional parking in the space between buildings.

5.4 RECOMMENDATIONS AND IMPLEMENTATION ACTIONS

As noted in Chapter 12, the City will follow the Final Reuse Plan with the required effort to integrate this Plan into the City's General Plan. The City will also conduct more detailed planning studies in order to prepare a Specific Plan and apply relevant zoning to the Island as necessary steps toward future private sector development entitlements.

As part of these more detailed land use planning and urban design efforts, additional guidance and strategies will be developed related to such concerns as public access; circulation and parking; open space and natural resources; recreational facilities; land use mix; and development design standards. These more detailed planning and design efforts will occur prior to or immediately after the Navy's full departure from Mare Island; they are expected to include:

1. North Light Industry Area Plan
2. Historic District Plan
3. Recreation, Open Space and Natural Resources Plan
4. Waterfront Plan
5. Neighborhood Center Plan
6. Industrial Areas Plan

6.0 INFRASTRUCTURE

6.1 GENERAL SYSTEM AND CONDITION DESCRIPTION

6.1.0 Introduction

Operations at Mare Island are supported by a complex utility infrastructure. Many of the existing utility systems will be needed to support the Reuse Plan. The City has reviewed the condition and capacity of existing utility systems on the Island, as well as the capital improvement requirements and expected annual operations and maintenance costs for each system. This chapter provides general information about the utility system.

6.1.1 Potable Water

The potable water is supplied to Mare Island by the City of Vallejo's Public Works Department, Water Division through two transmission mains which cross the Mare Island Strait. One main is a 14" cast iron pipe that crosses via the causeway bridge. The other main is a 20" pipe that is submerged across the strait in a concrete encasement and enters just south of Pier 23.

The potable water distribution system currently provides consumptive water use including drinking water, industrial uses, fire protection, and landscape irrigation. A separate salt water distribution system currently provides cooling water service and augments the fire protection requirements for MINSY.

The potable water distribution system, including all water service connections, is estimated at over 62 miles of piping. However, for purposes of this study, only pipes eight inches in diameter and larger are analyzed.

The potable water distribution system pipe network that was analyzed is comprised of approximately 27 miles of pipe. Existing pipe materials include cast iron, transite (asbestos cement), galvanized iron, and steel. The ages of the pipes vary (and are not well documented). Conversations with Navy base personnel responsible for the maintenance and repair of the system indicate very little of it is less than ten years old and most of it is probably much older than this, possibly up to 45 years old.

A tally of the potable water distribution pipelines by length and material has been determined and tabulated in Table 6.1.1-1.

The Navy owns property outside the Mare Island Naval Base known as Roosevelt Terrace. The utilities, including the water system, serving this subdivision are provided by others. The water system serving this area is maintained and operated by the City of Vallejo.

Table 6.1.1-1 Potable Water Distribution System Piping	
Pipe Material	**Length**
6″ Cast Iron	32,492 LF
8″ Cast Iron	30,160 LF
10″ Cast Iron	13,860 LF
12″ Cast Iron	19,520 LF
14″ Cast Iron	8,920 LF
16″ Cast Iron	1,060 LF
20″ Cast Iron	4,640 LF
6″ Transite	5,820 LF
8″ Transite	18,900 LF
12″ Transite	2,400 LF
16″ Transite	1,440 LF
8″ Galvanized Iron	1,680 LF
14″ Steel	1,360 LF
System Total	**26.9 Miles**

The current water distribution system contains four water storage tanks as described in Table 6.1.1-2. Two distinct pressure zones exist for the current water system. A pressure zone serving the elevated area along Club Drive and Young Drive operates from Tank No. 920. The remaining island is served by the second pressure zone which has Tanks No. 774, 188B and 645 connected to it. Currently, only Tank No. 188B can gravity feed into the this pressure zone. Available storage from Tanks No. 774 and 645 can only be utilized by pumping operations.

Table 6.1.1-2 Potable Water Storage Tanks			
Tank No.	**Location**	**Capacity (mg)**	**Operating Elevations (ft.)***
774	Pampano St. & Sargo Avenue	3.0	110-130
920	Club Drive near Bldg. 1324	0.12	205-245
188B	On Golf Course	2.0	140-172
645	6th and Walnut St.	3.0	15-35

*City of Vallejo datum.

There are five water pumping stations on Mare Island as listed in Table 6.1.1-3. The Causeway pump station can boost system pressure in the event of low pressure from the City of Vallejo's 14" transmission main. Pump station 774 pumps water from the lower pressure zone up to Tank No. 920 serving the upper pressure zone. Pump station 774 also contains a booster pump in the event of low system pressure in the lower pressure zone. Pump station 880 is a dedicated fire protection station. Due to insufficient storage in Tank No. 920, Pump Station 880 provides the additional fire flow and pressure in the event of a fire in the upper pressure zone. Pump Station 645 is for emergency use to access the water stored in Tank No. 645 in the event of low system pressures. Pump Station 188B is a booster pump serving the golf course irrigation system.

Table 6.1.1-3 Potable Water Pump Stations			
Station I.D.	**Location**	**Intended Use**	**Capacity**
Causeway	G St. & California St.	Boost System Pressure	2@3,000 gpm @ 93 psi 1@2,400 gpm @ 70 psi
774	Pampano Ave. & Wasmuth St.	Filling Tank No. 920 Emergency Pressure Boosting	2@350 gpm @ 70 psi 1@3,000 gpm @ 70 psi
880	Club Dr. & Sargo Ave.	Fire Protection for upper water system served by Tank No. 920	1@1,000 gpm @ 143 psi.
188B	On Golf Course	Booster for golf course irrigation	N/A
645	6th St. & Walnut St.	Emergency Use	1-750 gpm @ 100 psi

6.1.2 Pure Water

The pure water production system consists of a series of demineralizers and filters that polish boiler feedwater from the Power Plant (Building 121) demineralizers, and is dependent on their operation for feedstock. The capacity of the system to produce pure water is about 30 gpm, but the system includes two 15,000 gallon storage tanks to help meet peak flow requirements. The system also includes pumps and distribution piping. All wetted surface materials consist of 300 series stainless steel. The system is maintained grade "A" clean at all times.

The distribution piping begins at the Power Plant and goes north to serve Berths 7 through 10 and goes south to serve the building ways, Drydock #1, Drydock #2 and Berth 11. A separate line goes south to serve Building 126. Each outlet is equipped with a 40-80 micron edge type filter and appropriate isolation valves.

The system is in very good condition and is certified for the delivery of pure water which is used as make up water for nuclear (submarine) propulsion systems.

6.1.3 Salt Water

The salt water distribution system at Mare Island serves two main purposes: 1) fire protection for the island, and 2) flushing and cooling for ships and submarines at the piers and drydocks. Salt water is also used in various industrial capacities. There are nearly 20 miles of salt water distribution system piping. Portions of the system are inoperable or not connected to each other. The system serves most of the industrialized areas of the island, especially the Controlled Industrial Area and the Weapons Station Annex. Table 6.1.3-1 delineates the various types, sizes, and lengths of pipes that make up this system.

Table 6.1.3-1
Salt Water Distribution System Piping

Pipe Material/Size	Length
6″ Cast Iron	4,740 LF
8″ Cast Iron	6,120 LF
10″ Cast Iron	4,130 LF
14″ Cast Iron	1,140 LF
* 6″ FRP	2,820 LF
* 8″ FRP	3,180 LF
* 10″ FRP	760 LF
* 12″ FRP	7,620 LF
* 14″ FRP	3,180 LF
6″ Transite	1,440 LF
8″ Transite	38,000 LF
10″ Transite	3,320 LF
12″ Transite	12,940 LF
14″ Transite	6,620 LF
8″ Ductile Iron	960 LF
System Total	**18.3 Miles**

* Some FRP (fiberglass reinforced pipe) is currently being replaced with PVC pipe. Lengths are currently unavailable.

The salt water distribution system is pressurized from the various pump stations listed in Table 6.1.3-2. There are no active gravity salt water storage tanks supplying the system. The salt water system is totally dependant on mechanical-electrical pumping equipment to pressurize and deliver the necessary consumptive uses and fire flow protection.

Table 6.1.3-2
Salt Water Pump Stations

Station I.D.	Location	Intended Use	Capacity
Bldg. 121	Building 121, 5th and California	Boost System Pressure	3@1,500 gpm @ 160 psi 2@4,000 gpm @ 160 psi
Berth 2	Berth 2, east side of island just south of causeway bridge	Boost System Pressure	2@1,500 gpm @ 160 psi
Pier 21	Pier 21, east side of island at approximately 17th St.	Boost System Pressure	unknown
Berth 55	Berth 55, northeast corner of MINSY	Boost System Pressure	1@1,800 gpm @ 315 psi.
Pumphouse A252	Bldg 252, south of golf course in quad b3	Boost System Pressure	N/A
Pier 35	Bldg 153, Pier 35, southern end of MINSY	Boost System Pressure	N/A
Pier 34	Pier 34, southeastern most corner of MINSY	Boost System Pressure	N/A

N/A - Not available from the Navy.

6.1.4 Sanitary Wastewater

The sanitary wastewater system is a gravity flow system supplemented by thirty-six pump stations, an overflow pond, a chlorination station, and an emergency generation station as shown on Figure 6.1.4-1. The main trunk sewer is in Railroad Avenue and serves the whole island. Most pump stations are either near the berths for ship-to-shore operations, or act as lift stations along the trunk system. The flow converges on the main pump station, Domestic Pump Station #4 (DOM-4), at 'A' Street and is pumped off the island through an 18-inch force main across Mare Island Strait to the Vallejo Sanitation and Flood Control District (VSFCD) collection system for treatment at the VSFCD's treatment plant. No sanitary sewage treatment is provided on the island.

A system has been installed at the main pump station DOM-4 that continually monitors and telemeters to the VSFCD the temperature, pH level, and hydrocarbon content of the sewage being sent off the island. The sewage pump stations are operated on automatic control mode.

The smaller pipe branches flow by gravity into the main trunk in Railroad Avenue. The trunk pipe varies in size from 27 inches, nearest the main pump station, to 12 inches at the northern and southern limits of the island. The lateral sewers generally range in size from 4 to 15 inches. There are about 33 miles of gravity and forced mains in the system. The system, including building laterals, is maintained by the Navy Public Works Center San Francisco Bay (NPWCSFB). The various sizes and lengths of the pipe are shown on Table 6.1.4-1. The various pump stations are listed on Tables 6.1.4-2 and 6.1.4-3.

Table 6.1.4-1
Sanitary Wastewater System Piping

Pipe Size	Length (LF)
4"	19,205
6"	33,240
8"	48,365
10"	22,730
12"	20,865
15"	8,190
18"	4,820
21"	7,260
24"	1,920
27"	4,900
System Total	32.5 Miles

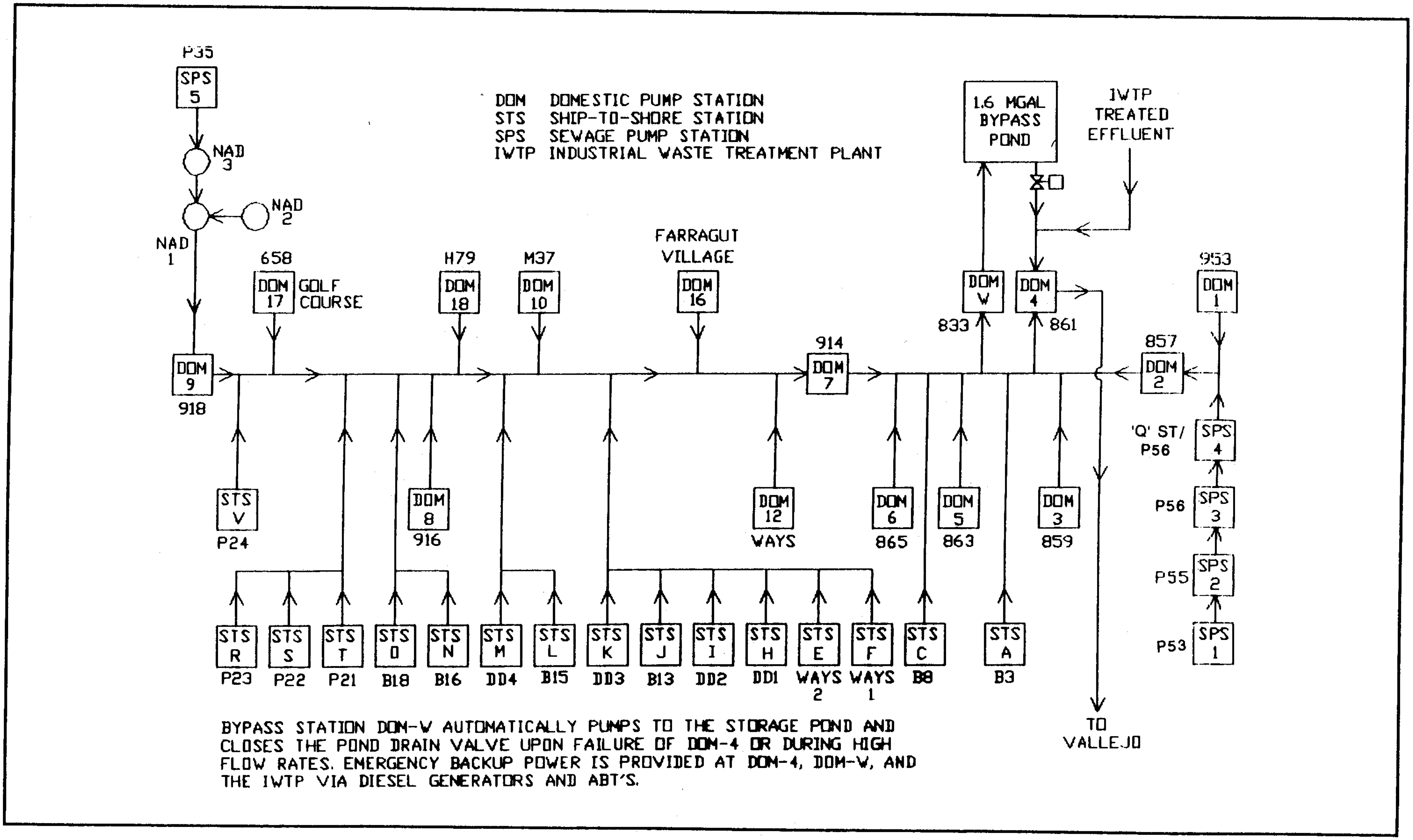


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Figure 6.1.4-1

Sanitary Wastewater Flow Diagram

Moffatt & Nichol, Engineers
Draft May 27, 1994

Table 6.1.4-2 Sanitary Wastewater Landside Pump Stations				
Pump Station	**Location**	**Number Of Pumps @ Horsepower Rating**	**Pump Capacity (GPM)**	**Condition of Station & Pumps**
DOM-1	Bldg. 653 "Q" St. & Walnut	2 Pumps @ 7.5 HP	400	Fair
DOM-2	Bldg. 857 "I" St. & Railroad	2 Pumps @ 7.5 HP	1070	Poor
DOM-3	Bldg. 859 "E" St. East of California	2 Pumps @ 3 HP	N/A	Fair
DOM-4	Bldg. 861 "A" St. & Railroad	1 Pump @ 15 HP 3 Pumps @ 60 HP	1600 4600	Fair
DOM-W	Bldg. 833 "A" St. & Railroad	3 Pumps @ 40 HP	1800	Good
DOM-5	Bldg. 863 1st St. East of California	2 Pumps @ 7.5 HP	650	Poor
DOM-6	Bldg. 865 5th St. East of California	2 Pumps @ 10 HP	850	Poor
DOM-7	Bldg. 914 9th St. & Railroad	3 Pumps @ 20 HP	460	Good
DOM-8	Bldg. 916 15th St. East of California	2 Pumps @ 3 HP	350	Good
DOM-9	Bldg. 918 South End of California	2 Pumps @ 10 HP	600	Good
DOM-10	Basement of Bldg. M-37	2 Pumps @ 0.5 HP	N/A	Good
DOM-12	Between Ways #1 & #2	2 Pumps @ 5 HP	240	Good
DOM-16	9th St. & Klein (Housing)	2 Pumps @ 5 HP	315	Good
DOM-17	South of Bldg. 658 (Golf Course)	1 Pump @ 3 HP	N/A	Good
DOM-18	South Side of Bldg. H-79	2 Pumps @ 1.5 HP	N/A	Good
SPS-1	West Side of Pier 53	2 Pumps @ 7.5 HP	300	No Power
SPS-2	West Side of Pier 55	2 Pumps @ 7.5 HP	300	No Power
SPS-3	Northeast Corner of Pier 56	2 Pumps @ 7.5 HP	300	No Power
SPS-4	"Q" St. West of Pier 56	2 Pumps @ 7.5 HP	250	Good
SPS-5	North of Pier 35	2 Pumps @ 3 HP	82.3	N/A

Table 6.1.4-3 Sanitary Wastewater Ship-to-Shore Pump Stations				
Pump Station	**Location**	**Number Of Pumps @ Horsepower Rating**	**Pump Capacity (GPM)**	**Condition of Station & Pumps**
STS-A	Waterfront Ave. At Berth 4	2 Pumps/15 HP	1000	Fair
STS-C	Waterfront Ave. At Berth 8	2 Pumps/15 HP	N/A	Good
STS-E	South Side of Ways #1	1 Ejectors	250	Good
STS-F	North Side of Ways #2	1 Ejectors	250	Good
STS-H	West End of Dry Dock #1	2 Ejectors	100	Good
STS-I	Northwest End of Dry Dock #2	3 Pumps/15 HP	350	Poor
STS-J	Northwest of Berth 13	2 Pumps/3 HP	500	Poor
STS-K	Southwest Side of Dry Dock #3	2 Pumps/15 HP	500	Good
STS-L	Northwest of Berth 15	2 Pumps/3 HP	300	Fair
STS-M	North Side of Dry Dock #4	2 Pumps/15 HP	440	Fair
STS-N	Waterfront Ave. at Berth 16	2 Pumps/7.5 HP	900	Good
STS-O	Waterfront Ave. at Berth 18	2 Pumps/10 HP	1000	Good
STS-R	Center of Pier 21	2 Pumps/7.5 HP	880	Good
STS-S	Center of Pier 22	2 Pumps/7.5 HP	880	Good
STS-T	Center of Pier 23	2 Pumps/7.5 HP	1000	Good
STS-V	Southwest of Berth 24	2 Pumps/7.5 HP	500	Fair

The gravity sewer pipe materials consist of one of the following: reinforced concrete, vitrified clay, corrugated metal, cast iron, transit concrete, or asbestos cement. The trunk is mostly reinforced concrete, and the primary laterals are mostly vitrified clay. Several pipes in the system have been replaced recently with other materials such as polyvinylchloride (PVC). The force mains consist of either steel, cast iron, or PVC pipe.

Originally, the MINSY sewage collection system on Mare Island was a combined sanitary wastewater and storm water collection system. The system also received industrial wastewater. Separation of the systems started in 1957, and substantial separation was achieved in 1974. However, a portion of the sanitary wastewater system north of 'A' Street includes a significant number of storm water inflows as identified in a recent study (Harris, 1987).

The average daily flow of sanitary sewage to VSFCD was approximately 1.5 mgd in 1993. The flow during the rainy season has peaked above 7.0 mgd due largely to inflow and infiltration. The exact volume of the peak flow, however, cannot be determined since it exceeds the capacity of the existing flow meter. The peak flow exceeds the maximum flow rate of 6.5 mgd provided in the sewage service agreement with the VSFCD.

A bypass pond is used to help reduce peak flows. When flows exceed the capacity of DOM-4, wastewater is diverted to DOM-W and automatically pumped to the overflow pond near the Industrial Waste Treatment Plant. The capacity of the overflow pond is approximately 1.6 million gallons. Manual gates are opened to permit the wastewater to return by gravity to DOM-4 to be pumped off the island when pump station capacity is available.

The problem of inflow and infiltration has been the subject of numerous studies and repair projects. A number of "cross-connections" with the storm drain system still exist, serving as sources of inflow or as emergency wastewater overflows to the storm drains (PWCSFB, 1993).

The sanitary wastewater system is considered to be in poor condition because of the significant inflow and infiltration problems. The system does not receive any regular maintenance or cleaning. Repairs in the system are made only at times of failure, so any potential problems in the existing pipes are difficult to identify. Portions of the system are more than 60 years old.

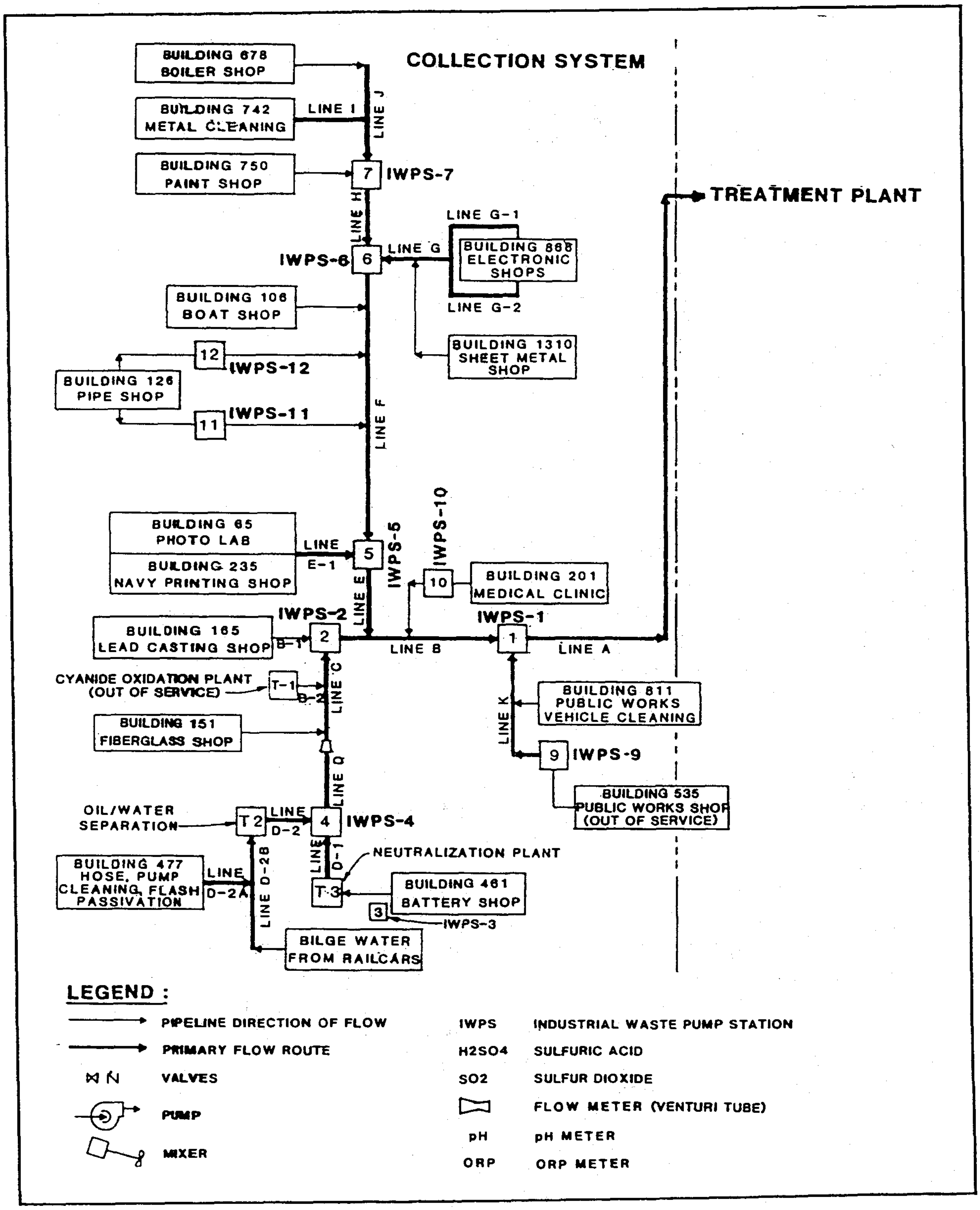
6.1.5 Industrial Wastewater

Industrial wastewater is collected separately from the MINSY sanitary wastewater and storm water, and conveyed by a system of underground piping and pump stations to an Industrial Wastewater Treatment Plant (IWTP), collectively referred to as the Industrial Wastewater System (IWS). Treated effluent from the IWTP flows to the sanitary wastewater system's Domestic Pump Station No. 4 (DOM-4) and discharged to the Vallejo Sanitation and Flood Control District (VSFCD) collection system for treatment at VSFCD's treatment plant.

The IWS was constructed in 1972 and at the present time consists of approximately 22,000 linear feet of force mains and gravity sewers ranging in size from 4 to 12 inches in diameter, and ten pump stations as shown on Figure 6.1.5-1. The average daily flow varied between 20,000 and 40,000 gallons during 1993. The wastewater treatment plant was designed to treat 150,000 gals of wastewater during an eight hour period. The IWTP utilized physical/ chemical treatment to remove oil, solids and heavy metals. In addition to the IWTP, two sources require on-site treatment of the industrial waste prior to discharge to the IWS. These pretreatment facilities include Acid Neutralization (Plant T-3) and Oil Separation (Plant T-2).

In 1988 the IWTP was upgraded to meet increasingly stringent regulatory requirements. The Blending and Sludge Ponds at the IWTP were closed by order of the Department of Health Services for failure to meet the requirements of the Toxic Pits Cleanup Act of 1984. The blending and sludge ponds were replaced with leased, above ground equalization tanks and sludge processing equipment.

The MINSY industrial wastewater is a composite of wastes from a large number of industrial operations. The activities that discharge to the IWS include metal cleaning, electro-plating and electrical repair shops, oil reclamation and classified research facilities, and photographic



Mare Island Final Reuse Plan

Figure 6.1.5-1

Moffatt & Nichol, Engineers

Industrial Wastewater System

laboratories, among others. There are approximately 16 buildings connected to the IWS with 98 sources of industrial wastewater. The flow from each source is highly variable depending on whether or not a particular process is in operation. More detailed information on existing industrial wastewater sources is provided in The Operations and Maintenance Manual for the IWS by Ace Pacific (1992b).

The MINSY operates under the VSFCD Pretreatment Permit to discharge to the VSFCD collection system. This permit is renewable yearly and any change in operations that may significantly change the quantity and/or quality of discharge must be reported to VSFCD. Discharges to the IWS must be carefully controlled to insure that the concentration of metals and other pollutants can be adequately removed by the IWTP to insure compliance with the VSFCD Pretreatment Permit. Furthermore, in order to prevent damage or hazardous conditions, certain types of wastes cannot be discharged to the IWS because of their toxic, corrosive, flammable or explosive nature.

The Industrial Wastewater Treatment Plant (IWTP) is located at the west side of the island near San Pablo Bay. It is designed to treat wastewater containing heavy metals (non chelated), floating oils (not emulsified), suspended solids and low or high pH. The influent wastewater flows to the primary sedimentation tank for removal of settleable solids and floatable oil or other material. Then the wastewater flows to a surge tank. Blending of the wastewater occurs during filling of the tank and results in a wastewater of more uniform chemical composition to facilitate further treatment. The blended wastewater undergoes chemical treatment in a mixing tank for removal of heavy metals. The wastewater is neutralized and passes into the final sedimentation tank where the heavy metal flocculate settles and is removed.

The oil and floatable matter from the sedimentation tanks is transported to the MINSY oil reclamation facility. Sludge from the sedimentation tanks is disposed off the MINSY as hazardous waste due to heavy metals contamination.

The IWS is in poor condition. A condition survey revealed extensive corrosion and deterioration throughout the IWS (Harris & Associates, 1986). The underground piping was found to be heavily damaged and replacement of 8,460 feet of ductile iron force main was recommended. Approximately 1000 feet of damaged vitrified clay pipe was discovered in 1992 by MINSY personnel and is also in need of replacement. The pump station wet wells need new corrosion protection coatings. The IWTP tanks have cracks in walls, holes in coatings and heavy surface pitting. There is evidence of leakage from the primary sedimentation tank into the basement area.

The existing IWS is not equipped with secondary containment or any type of monitoring for leakage. Leakage of wastewater from the IWS could contaminate groundwater.

The MINSY recognized the need to either upgrade the existing IWS or provide an alternative means of handling industrial wastes that can meet the more stringent wastewater requirements of the future. As a result, the Shipyard investigated the feasibility of phasing out the existing IWTP and converting to a "Point Source Wastewater Treatment System", as described in the Wastewater Point Source Configuration Concept Study (Ace Pacific, 1992a). The new system will treat wastewater as close to the source as possible to achieve the highest treatment efficiency along with minimizing the amount of wastewater generated.

6.1.6 Storm Water

The storm water collection and disposal system consists of a network of catch basins, pipes, manholes, and pump stations that intercept rain water and other surface water runoff and convey the water to Mare Island Strait through outfall pipes with flapper valves that prevent backflow of tidal water into the system. The storm water system discharge capacity is a function of the tide stage in the Strait. The system covers all developed areas and is presently maintained by the Navy Public Works Center. Pipes within the storm drain system consist of different types of material, including: Vitrified Clay, Cast Iron, Asphalt Concrete Lined Corrugated Metal, Transite Concrete, Corrugated Metal, and Non-Reinforced Concrete. Pipe sizes range from about 3 inches to 48 inches. The various sizes and lengths of pipe are shown on Table 6.1.6-1. The various pump stations are shown on Table 6.1.6-2. The storm drain pump stations are operated on an automatic control model.

The existing condition of the storm water collection system is poor. Although, the system is able to drain the island with only few areas subject to flooding, considerable run-off is carried overland in streets and gutters. The storm drain piping is not arranged into a trunk system, rather, it is a conglomeration of smaller, interconnected subsystems leading to over 48 outlets to Mare Island Strait. Many of the flapper valves are deteriorated and no longer functional. Additionally, many of the storm drain pipes have settled resulting in adverse pipe grades and manhole surcharging.

There is also a problem of inflow from the wastewater systems caused by cross-connections that still exist between the sewer and storm water systems. There are 6 known sanitary wastewater emergency overflows (EOF) connected to the storm water system. There also are a number of suspected industrial wastewater EOF's. Although the emergency overflows were provided to relieve peaks in the wastewater system, they are suspected of allowing flow reversal, that is storm water flow to the wastewater system, when peaks occur in the storm water system.

Some of the storm water lines do not follow a logical sequence of increasing pipe diameter as the flow nears the outlet, and some branches have been connected or routed without regard to hydraulic efficiency. These are probably the result of the manner in which the original combined sewer system on Mare Island was divided into separate sanitary and storm systems as noted Section 6.1.4. The system operates under a National Pollutant Discharge Elimination System (NPDES), Statewide General Industrial Storm Water Discharge Permit that requires sampling and monitoring of discharges.

Under the current permit for the MINSY, monitoring on the island consists of a sampling program for selected outfalls during the rainy season, and a visual monitoring program for all outfalls. The sampling program consists of a total of six outfalls; four outfalls that are located in the Controlled Industrial Area; one outfall near the causeway, and one near a paint shop. These six sampling points are considered representative of the shipyard's total storm water flow.

Table 6.1.6-1 Storm Water System Piping	
Pipe Size	**Length (LF)**
3″	400
4″	6,250
5″	800
6″	23,355
8″	36,680
10″	19,950
15″	7,400
18″	7,800
21″	5,430
24″	7,770
27″	2,830
30″	5,430
33″	3,115
36″	4,360
39″	3,370
42″	150
45″	610
48″	3,970
54″	2,960
6 x 8	350
7 x 8	450
7 x 9	750
10 x 6	800
12 x 8	150

Table 6.1.6-2 Storm Water Pump Stations				
Pump Station	**Location**	**Number Of Pumps @ Horsepower Rating**	**Pump Capacity (GPM)**	**Condition of Station & Pumps**
SDPS-13	South Side of Bldg. H-79	2 Pumps @ 1.5 HP	N/A	N/A
SDPS-14	Bldg. 878 "L" St. Northwest of Bldg. 601	2 Pumps	300	N/A
SDPS-15	Bldg. 547 West of North Gate	2 Pumps @ 25 HP	N/A	N/A

6.1.7 Electric

Mare Island's primary electrical distribution system consists of a network of twenty-six major and a significant number of minor 12 KV substations scattered throughout the geographical confines of the island, both inside and outside the controlled industrial area.

Normally, incoming power is received via two 115 KV circuits from Pacific Gas and Electric Company (PG&E) Ignacio Substation in Marin County. This power is transformed down to the primary distribution level 12 KV at Substation "H" by two 20 MVA transformers. The two transformers are operated with both their primaries and secondaries in paralleled for reliability. Both transformers are equipped with secondary load tap changers for automatic voltage regulation.

Power is distributed from Substation "H" by a series of loops connecting all other 12 KV substations. In the event of loss of main Substation "H", the capability exists through switching operations to supply Mare Island via Substation "N", which was completed in 1985. This station also receives power at 115 KV from Ignacio but has only a single selectable feed point located just south of Skaggs Island. Substation "N" has one 20 MVA transformer with secondary load tap changer.

There is a steam turbine generator (TG#4) capable of producing 5000 KW of power located in Building 121, the Central Power Plant.

Primary distribution cables are shown below and list the classifications, construction types and total lengths of cable which make up the 12 KV primary electrical system on Mare Island. Except where indicated, all feeders are installed under ground in manholes and concrete-encased ductlines.

Type of Circuit	Lineal Ft.
Primary Loop Fdrs (PILC)	137,600
Secondary Loop Fdrs (PILC)	31,340
Primary Radial Fdrs (PILC)	25,060
Housing Overhead Feeders (Bare CU)	26,000
NAD Annex Primary Feeders (PILC)	27,750
Total	247,750

There are two 2400 KVAR capacitor banks on the 12 KV distribution system for a total capacity of 4800 KVAR. The capacitors are used to correct the power factor on the 12 KV system to reduce the electrical power factor penalty costs.

6.1.8 Telephone

There are two telephone systems at Mare Island Naval Shipyard. One system is provided by Pac Bell and serves the residential customers and the other system is provided by two telephone switches and is maintained by AT&T and serves the industrial and office areas of the base.

Pac Bell brings their telephone cables on to the island via an underwater conduit below the causeway. The cables end up at Building 605A. From this building Pac Bell delivers service to the military housing and the AT&T switches located in Building 605A.

Pac Bell has a 1,500 pair cable into Mare Island, to serve both housing and pay telephones. Residential (housing) telephone service is served directly by Pac Bell, on separate cable plant. There are currently 491 residential telephone services.

Pay telephones throughout Mare Island are provided by Sprint, which contracts to Pac Bell for services and maintenance. The pay phones are owned by the Morale and Welfare organization, which receives the revenue. They are served primarily by the new CATS cable (at no charge by the Navy), although there is also some old Pac Bell cable in place.

Pac Bell provides service and maintenance to the Minimum Point of Entry (MPOE) which is to the exterior of each residence and the resident is responsible for the interior wire and telephone hand sets.

The AT&T telephone system at Mare Island Naval Shipyard is one of the most modern telephone systems within the Department of Defense.

AT&T installed two Definity G2.1 switches in Building 605A, on November 13, 1992. The combination of the switches has an ultimate capacity of approximately 15,000 lines. The two switches are configured so that there is number interchangeability between them.

These switches are the property of NavTelCom, and are not under the direct control of Mare Island. There is $13,000,000 yet to be paid in the contract, which will terminate February 14,

1999. The contract is #N 62474-85-D-5502. The decision has not yet been made on their disposition. One or both may be used to replace a switch at some other Navy base.

These G2.1 switches are unique for military usage. Some fetchers are classified. As a result, they are quite costly to maintain. The Navy quotes $46 per month per line for maintenance. The switches are capable of Autovon.

One switch has the capacity of 10,000 lines, and serves 7,000 lines in the shipyard. The other has a capacity of 5,000 lines, and serves 3,000 lines, primarily tenants.

There are also three remote switching units, one at the North Remote in Building 663, and two at the South Remote in Building 662. These are driven by software in the main switches. One of the north remotes serves DID, DOD, and FTS2000 services.

The switches have 4 hour emergency battery back-up power.

All outside cable was replaced by AT&T in July of 1992. All cables are in conduit, except for a few aerial runs on the outskirts of the property. Three conduits were installed throughout, two are active and one is spare. All cable is jelly-filled 24 ga. The cost of the cable was approximately $6,500,000 and the Navy personal currently maintain the cable plant. The Navy charges tenants $22 per month per circuit for the use of cable plant by the tenants.

There is fiber-optic cable between the two remote buildings and the main switch building, installed by AT&T and is all 62.5 micron. The cable runs from Switch A where there are 16 spans of T-1 Carrier to the South Remote, also from Switch B where there are 12 spans of T-1 Carrier to the South Remote and 12 spans to the North Remote.

The Local Area Network connects 51 shipyard buildings, using fiber, T-1 Carrier, and 56 Kbps circuits. This system may or may not have value, depending on the needs of the new tenants. It would seem to have significant value only to some large firm or organization with a requirement for inter-building communications.

6.1.9 Dredge Lines

The Navy's requirement for dredging of Mare Island Strait is accomplished by the U.S. Army Corps of Engineers (COE) and MINSY. The COE dredges the Navy navigational portion of the Strait to a project depth of 36 feet below Mean Lower Low Water (MLLW) once a year. Disposal of dredged materials is at the Carquinez Strait aquatic site. MINSY dredges the waterfront area at the berths, docks, and finger piers using its own dredge. Dredging is generally accomplished to 36 feet below MLLW. Dredged materials are pumped through a floating pipeline to the shore side underground system and then into the dredge ponds on the west side of Mare Island. A cross pond distribution piping system allows deposition of the dredge material into any pond selected. Dredging accomplished by MINSY is authorized by a COE permit. The current five year permit will expire in May 1994. The COE has granted a one year extension. A new permit is being persued. The present permit includes a Memorandum of Understanding (MOU) with the U.S. Fish and Wildlife Service. The MOU delineates the measures to be taken to promote the conservation of the Salt Marsh Harvest Mouse and its habitat, and the conditions for dredging activities.

The essential assets for the Shipyard's dredging operations are:

- Dredge: The Shipyard's dredge is a 195-foot-long Ellicott hydraulic cutterhead dredge built in 1990, in very good condition.

- Floating Dredge Pipelines: These pipelines are used to connect the dredge discharge to the cross island pipelines. There are currently 1400 linear feet of usable 16 inch steel pipeline, and 600 linear feet of usable 22 inch polyethylene pipeline.

- Cross Island Dredge Pipelines: These pipelines extend from the shore side dredge connections to the dredge ponds. The lines total 33,900 linear feet of pipe ranging in size from 16 inch to 22 inch and of various materials (steel, ductile, iron and polyethylene). The cross island dredge lines with connections at Pier 55 and Berth 6 are not usable; those with connections at Berth 8 and Pier 20/Berth 15 are in fair condition and those with connections at Pier 23 and Piers 34/35 are in good condition.

- Cross Pond Distribution System: This piping system consists of 126,000 linear feet of 18 inch ductile iron and 20 inch polyethylene pipe and includes a booster pump station. This system is in very good condition.

- Pond Maintenance and Conditioning Equipment: This equipment consists of two caterpillar tractors with harrows and plows in good condition, and a paddle wheel scraper and grader in need of major repairs.

- Dredge Ponds: The dredge ponds on the west side of Mare Island consist of ten ponds totaling 510 acres with a combined capacity of 3,519,000 cubic yards. The earthen levees surrounding each pond have an average height of about four feet. The dredge ponds require high maintenance to condition dredged material and periodically raise the earthen levees.

6.1.10 Drydock Flood and Drain

The drydock flood and drain system consists of a series of flooding and discharge tunnels, sluice gates and pumping stations to permit filling and draining of the drydocks. A single pumping station serves Drydocks No. 1 and No. 2, and a single pumping station serves Drydocks No. 3 and No. 4. Regular certification of the drydocks by an authorized inspector in accordance with NAVFAC MIL STD 1625C is required for operation. All four dry docks are currently certified and are in good condition. The relevant parameters for the maximum ship that can be accommodated in each drydock are listed on Table 6.1.10-1.

Table 6.1.10-1 Maximum Ship Dimensions For Drydocks				
DD	Length of Ship (Feet)	Beam of Ship (Feet)	Sill Elevation (Feet MLLW)	Super Flood Elevation (Feet MHW)
1	499	68	-30	3.3
2	719.2	90.25	-25.5	0
3	672.3	79	-30	0
4	419.6	81.5	-17	5.3

6.1.11 Steam System

The primary steam systems on Mare Island consist of the 600 PSIG high pressure system and the 165 PSIG medium pressure system. Steam is provided to these systems from two 150,000 pounds per hour (PPH), 600 PSIG, 750 degree Fahrenheit boilers located in the Power Plant, Building 121. Annual certification of these boilers by an authorized inspector in accordance with NAVFAC Maintenance and Operation Manual 324 is required for operation. Continuous operator attendance is required during operation of these boilers due to their pressure and capacity.

The high pressure steam is utilized to operate the standby, 5,000 KW steam turbine emergency generator located in Building 121, and also goes directly through an above ground system with expansion loops to shore side reducing stations for testing ships systems at Berths 7, 8, 9, and 10, and to a valve test station located in Building 855.

The medium pressure steam is furnished at three steam reducing Stations (No. 1, No. 2 and No. 8) where 600 PSIG steam is reduced to 165 PSIG for use throughout the Shipyard. This steam is utilized for industrial processes, space heating and generation of domestic hot water through remote heat exchanger. The medium pressure steam distribution system is divided to serve two geographical areas. The North Loop supplies steam to the northern end of the Shipyard and is installed below grade. The South Loop provides steam to the southern end of the Shipyard, including the Berths, Building Ways, Piers, Drydocks, and various facilities for industrial processes, and is installed both above and below grade. The 165 PSIG steam is generally also reduced at each facility to an operating pressure of 45 PSIG. Condensate is returned from the medium pressure steam system to the Power Plant through the condensate return system and 112 condensate pumping units.

The steam distribution system is constructed of steel piping in sizes from 1 1/2 inches to 12 inches. The condensate return system consists of steel piping ranging in sizes from 1 1/4 inches to 4 inches.

Several problems have been identified at the Power Plant that would have to be remedied in order to insure long term operation at current capacity. The 205 foot masonry stack is not seismically safe. Boiler No. 2 was retubed in 1993, and the second boiler (No. 1) also needs to be retubed. Controls for both boilers need replacement in order to allow compliance with 1996 California NOX Emission Standards. The Bay Area Air Quality Management District had set a January 1994 deadline for obtaining construction permits to make these modifications. Since Navy activity requiring continued operation of the Power Plant will cease prior to 1996, the required upgrade of the controls is not being undertaken.

The high pressure steam piping to the reducing stations and the berths was replaced in 1990 and is in good condition. Water hammer is experienced in some high pressure steam condensate return lines which will require modification to eliminate this condition.

Significant portions of the medium pressure steam piping were replaced in 1979. Additional repairs will be required to extend the life of this system. The medium pressure steam system is considered to be in fair condition. MINSY had a project authorized to restore select sections of the system and additionally install satellite boilers to allow abandonment of portions of the North Loop. This project is not being implemented, with the exception of installing a satellite boiler in Building 545. Due to the short life expectancy of buried steam lines on Mare Island, the entire system must be monitored on a regular basis to detect areas of deteriorated insulation and broken pipelines.

6.1.12 Hot Water

A hot water circulating system (referred to as the Hot Water Loop) is utilized on Mare Island for both space heating and domestic hot water production through heat exchanger. This system originates in the Power Plant, Building 121 and is comprised of two heat exchanger, two circulating pumps, a make up water/expansion tank and approximately 14,400 linear feet of supply and return piping. The system is designed to capture waste heat from the Steam Reducing Stations in the Power Plant and operates at a temperature ranging between 180 and 200 degrees Fahrenheit. This system supplies hot water to Buildings 47, 99, 103, 104, 229, 497, 521, and 605, and to 34 living quarters located on Cedar and Walnut Avenues.

The pumping units, heat exchanger, and make-up water/expansion tank which support the Hot Water Loop are in good condition. The supply and return piping is in poor condition. While the system is operational, frequent repairs are required. As a result, MINSY is implementing a project to abandon the distribution system and install individual boiler units at the facilities served by the system.

6.1.13 Compressed Air System

There are two separate Compressed Air Systems on Mare Island; a 5,000 PSIG High Pressure System, and a 100 PSIG Low Pressure System. The High Pressure Air System has two air compressors located in the Power Plant (Building 121), each capable of providing 270 standard cubic feet per minute. Air is delivered through a stainless steel line to four air receivers at the Power Plant and to outlets at Berths 7, 8, 9, and 10, Building Ways 1 and 2, Drydock 1 and Building 126. The piping for this system is located both above and below grade. The air receivers require annual certification in accordance with NAVFAC Maintenance and Operation Manual 324.

The High Pressure Air System is initially started on a manual basis depending on the need of the Shipyard and is then automatically controlled to maintain the desired operating pressure as required.

The High Pressure Air System is considered to be in good condition.

The low pressure compressed air system has two compressor stations. One is located in the Power Plant and has a capacity of 20,000 standard cubic feet per minute (SCFM). The other is located in Building 146 and has a capacity of 15,000 SCFM. The compressed air for this system is produced to meet breathing air standards.

The low pressure compressed air distribution system consists of approximately 23 miles of combined above ground and buried piping system. Portions of this system were replaced in 1991 with stainless steel piping. Air receivers are installed at various locations in this system. The compressed air system terminates at Building 577 located on the north end of the Shipyard and Building 900 located on the south end of the Shipyard. The air receivers for this system also require certification on an annual or biannual basis depending on their age and internal condition.

The low pressure compressed air system is operated in an automatic control mode.

The low pressure compressed air system on Mare Island is considered to be in good condition.

6.1.14 Gas System Description

Natural gas is supplied to Mare Island from Pacific Gas and Electric (PG&E) Company distribution lines at 100 pounds per square inch (psig) float (within a range up to 100 psig) through a 10 inch main line which crosses the causeway bridge. The PG&E meter is located near the main gate. PG&E also meters the gas consumed by the central power plant (steam plant). This gas is used to generate steam from the power plant boilers. Presently, the difference between the main meter reading and the power plant meter reading is called "yard gas," which is "un-interruptible;" the gas to the power plant is "interruptible." The natural gas consumption of Mare Island has been declining in the past couple of decades. The gas usage in recent years have been approximately 629,300 therms per month; in comparison, the gas demand was 1,700,000 therms for the month of December 1974.

The primary use of natural gas at Mare Island is for space heating, hot water heating and some industrial furnace operations. Also, the housing (or living quarters) on Mare Island use gas for space heating, domestic water heating, clothes drying and cooking. Presently, for most of the industrial and administrative facilities, space heating (and some industrial processing) is provided by the central steam plant via the steam distribution system (see the Steam System section of this report for more details). Approximately 45% of the gas consumption at Mare Island goes directly to the power plant. However, there are many problems with the central steam plant and steam distribution system: the cost to repair the central steam plant alone is around $5.7 million. Therefore, for a conservative and realistic approach, the analysis of the gas system will assume the abandonment of the central steam system. See Section 6.3.5 "Gas System Evaluation" of this report for more details.

The gas distribution system consist of 8 inch and smaller mains which cross connects to form loops; the mains are sectionalized by valves to permit isolation and/or bypassing of line failures with a minimum of service interruption. More specifically, a 10 inch line operating at 100 psig delivers gas to four pressure regulating stations. The steam plant has a regulating station that regulates the gas pressure from approximately 100 psig to approximately 48 psig for the boilers. The other three regulating stations reduces the pressure from 100 psig to 30 psig for service to the rest of Mare Island. The locations and service areas of the three 30 psig regulating stations are:

- Station #1, on the west side of the causeway, serves the north end of Mare Island.

- Station #2, by the central steam plant, serves the east side of Mare Island (mostly Industrial Areas).

- Station #3, by building 201 (Dispensary or Medical Clinic), serves the west side of Mare Island (mostly housing and administrative areas).

All distribution pipelines are operated at 30 psig nominal; gas pressure is further reduced by individual pressure regulators installed at building service lines to a pressure required by the heating equipment in the building. The Gas distribution system diagram is shown on Figure 6.3.5-1; this drawing was based on existing gas utility drawings.

6.1.15 Fuel Oil

The fuel oil system consists of fuel oil and diesel oil storage tanks, pumps and piping. The fuel oil system provided a backup fuel source for the Power Plant (Building 121) which operates on an interruptible natural gas supply. Piping also serves Berths 3 through 10 to permit transfer of fuel oil and diesel oil to and from Shipyard craft.

The fuel lines are in poor condition, and several have leaked; the system is presently secured (abandoned in place), with the exception of a small section which remains operational at Berth 4 to serve yard craft. Fuel has been removed from the main 2 million gallon storage tank (Tank 772). The storage tank and fuel lines do not have secondary containment or leak detection equipment as required by current regulations, and complete replacement would be necessary to bring the system into compliance.

6.2 UTILITY SYSTEM CLASSIFICATION

6.2.1 Classification

A utility system classification was developed to define the level of effort for evaluating each system and is based on the reuse potential for the system.

The classifications are:

Class	Reuse Potential	Study Effort
Essential	High	Report on system condition and capacity to support reuse plan, and provide cost analysis of O&M and needed capital improvements.
Alternate	Uncertain	Report on system condition and cost analysis of system O&M and capital improvements based on available Shipyard information.

6.2.2 Essential Systems

Potable Water
Sanitary Wastewater
Storm Water
Electrical
Telephone
Gas

6.2.3 Alternate Systems

Salt Water
Industrial Wastewater
Dredge Lines
Drydock Flood and Drain
Steam (High Pressure and Medium Pressure)
Compressed Air (High Pressure and Low Pressure)
Fuel Oil
Pure Water
Hot Water

6.3 ESSENTIAL UTILITY SYSTEM EVALUATION

6.3.1 Potable Water System

Model Description

The existing MINSY potable water distribution system was modeled utilizing "Waterworks" by Synex Systems Corporation. The "Waterworks" version used works within AutoCAD Release 12. The basic input data includes:

Pipe Length
Pipe Diameter
Friction Coefficient
Water Demand at Nodes

Water Source Pressure (Elevation)
Node Identification
Node Elevations

Output reports include tabular reports and graphical presentations.

The model analyzes the steady state condition based on the input elevations of the water sources. The model does not provide time variant analysis with changing water source elevations.

Figure 6.3.1-1 illustrates the existing potable water system.

Schematic Layout of the System

An existing AutoCAD water system base map prepared by Moffatt & Nichol for the 1988 Master Plan of MINSY was utilized to prepare the skeletized water system model. The existing pipe data was updated based on a recently completed potable water system mapping project for MINSY by Harris & Associates.

In reviewing the Merged CRP-UL1 Plan for proposed development, the existing water system was skeletized to incorporate major looped piping connections. Typically, pipes 8-inches in diameter and larger were incorporated into the model. Existing 6-inch diameter pipes were added to the model where they provided additional looping of the system. All existing dead-end mains and large service mains to major buildings were not included in the model.

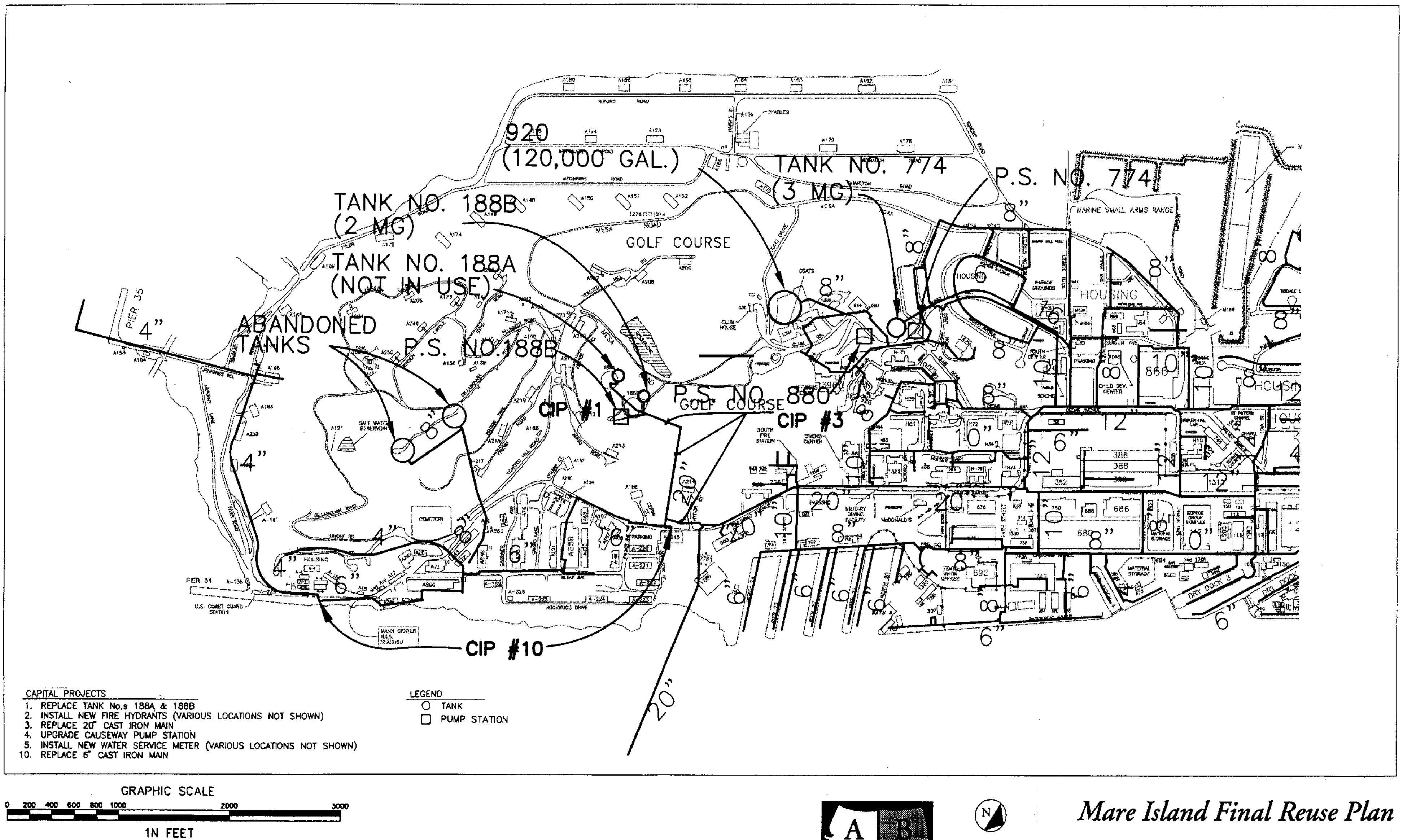
The elevated pressure zone served by Tank 920 was not modeled. This single 8-inch looped system was analyzed separately. (See Volume 3, Chapter 7 (Technical Appendix)).

The sources of water modeled included the two transmission mains from the City of Vallejo and Tank No. 188B. Since Tank Nos. 774 and 645 do not gravity feed into the system, they were not included in the model. This criteria was discussed with the City of Vallejo's Water Division. Useable water storage should only include gravity feed tanks, not pumped storage.

From information obtained from the City of Vallejo's Water Division, the 20" and 14" transmission mains were modeled as fixed grade nodes providing 212 feet of elevation (92 psi). Tank No. 188B was set at 160 feet elevation. This fixed grade was established based on the anticipated normal operations of the potable water system. The two sources (i.e. 14" and 20" mains) from the City of Vallejo provide the majority of the daily water demands. The water tanks provide for peak hour flows and emergency water flows such as fire flows.

Estimated Water Demands

Utilizing the Merged CRP-UL1 Plan, average daily water use was estimated using the City of Vallejo's Water Use Factors as listed in Table 6.3.1-1. These demands were distributed according to the corresponding land use map.

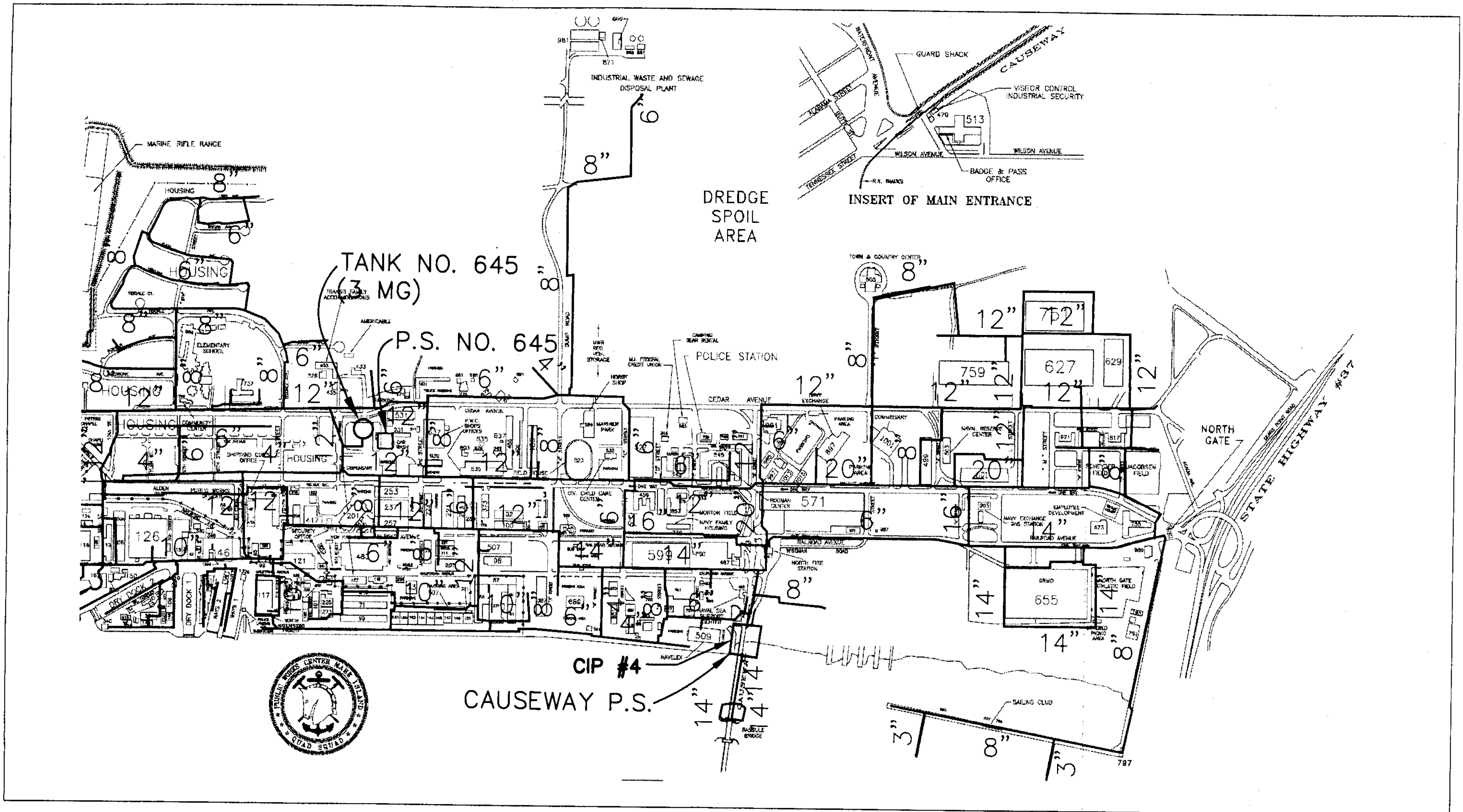


Mare Island Final Reuse Plan

Figure 6.3.1-1a

Potable Water System

N:3s091:047



GRAPHIC SCALE

0 200 400 600 800 1000 2000 3000

IN FEET

Mare Island Final Reuse Plan

Figure 6.3.1-1b

Potable Water System

N:3s091:047

Table 6.3.1-1 Portable Water Demands by Land Use	
Land Use	**Average Day Demand**
Single Family Dwelling Unit	0.563 gpm/unit
Multiple Family Dwelling Unit	0.500 gpm/unit
Commercial, Business Park etc.	0.625 gpm/10,000 sq. ft.
Restaurant	4.735 gpm/1,000 sq. ft.
Parks & Schools	2.50 gpm/acre

Description of Modeled Water Demand Scenarios

- Average Daily Demand: The model analyzed pressure and flow conditions based on the average daily water demands as described above.

- Maximum Daily Demand: The maximum daily demand was calculated based on the City of Vallejo's Water Use Factors. Using a multiplier of 1.6 times the average daily demand, the model analyzed pressure and flow conditions. The maximum daily demand model served as the basis for modeling the anticipated fire flow conditions. This condition is consistent with the City of Vallejo's water modeling criteria.

- Peak Hour Demand: The peak hour demand was modeled using a multiplier of 2.65 times the average daily demand. This condition reflects normally anticipated maximum hourly flowrates.

- Maximum Daily Demand Plus Two Fire Flow Demand: The maximum daily demand was used as the basis for superimposing the fire flow conditions. In discussion with the City of Vallejo Water Division, a reasonable fire scenario was modeled. This scenario included two simultaneous fires, one a residential structure fire and the other a commercial structure fire. Fire flow rates were consistent with the City of Vallejo's Fire Flow Criteria presented in Table 6.3.1-2. The residential fire was simulated at the southern tip of Mare Island. The commercial fire was simulated at the northern end of the island. These areas were selected based on what appeared to be the worst case based on available pipe capacities.

Table 6.3.1-2 Vallejo Fire Flow Criteria			
Land Use	**Fire Flow (gpm)**	**Duration (hrs.)**	**Fire Storage Required (gal.)**
Residential			
Single-Family	1,500	2	180,000
Multiple-Family			
Medium Density	3,000	3	540,000
High Density	4,500	4	1,080,000
Commercial	3,500	3	630,000
Schools	2,500	2	300,000
Industrial	3,500	3	630,000

Modeling Results

- Average Daily Demand: Two low pressure conditions were noted in this analysis. The irrigation water demand node for the golf course showed low pressure of less than 10 psi. This was consistent with the current conditions which require a booster pump (Pump Station No. 188B) for the golf course irrigation system. The second low pressure condition was at the proposed residential land use at the southern tip of Mare Island, which as now been removed from the Merged CRP-ULI plan. The existing six and four-inch dead end water line serving this area appears insufficient in providing the required flow and pressure at average daily demand. Pressure was noted at less than 20 psi. Average daily demand was met with 1,726 gpm from the 20″ main, 553 gpm from the 14″ main and no flow from Tank No. 188B.

- Maximum Daily Demand: The low pressure condition to the southern residential area was further exacerbated with this higher flow condition. Negative pressures were reported along the six and four-inch dead end main. The 20-inch source main supplied 2,757 gpm, the 14-inch source main supplied 886 gpm and no flow from Tank No. 188B.

- Peak Hour Demand: The southern residential area continued to show negative pressures while the remaining parts of the island demonstrated ample pressure and flow requirements. The peak hour demand was met by a flow of 4,574 gpm from the 20-inch main, 1,467 gpm from the 14-inch main and no flow from Tank No. 188B.

- Maximum Daily Demand Plus Fire Flow Demand: Knowing that the existing six and four-inch dead end main would not meet the demand to the southern residential area, the model was modified to use the existing 8-inch saltwater pipeline in lieu of the six and 4-inch lines. With a fire flow of 1,500 gpm in the southern residential area the 8-inch would not provide sufficient capacity and maintain a minimum 25 psi residual pressure. It appears that the remaining system can support a commercial structure fire flow of 3,500 gpm without significant losses in system pressures. Approximately a 25 psi drop in pressure (from 91 psi at average daily demand to 70 psi at maximum day plus fire flows) occurred in the northern area of the island in the immediate vicinity of the commercial structure fire.

- Maximum Daily Demand Plus Fire Flows Using A New 12-Inch Water Main: The model was modified to incorporate a new 12-inch dead end main in place of the six and four-inch dead end main serving the southern area of the island. This proposed new waterline will provide the necessary flow and maintain system pressures above the required 25 psi minimum residual pressure. The source flows provided 5,082 gpm from the 20-inch main, 3,566 gpm from the 14-inch main and no flow from Tank No. 188B.

Conclusions

The existing potable water distribution system can support the envisioned land uses developed by this report. The existing potable water system is capable of providing domestic consumptive use, as well as fire protection. Hence, the existing saltwater distribution system could be abandoned if new fire hydrants are installed along the existing potable water distribution system to replace the existing salt water fire hydrants.

Water storage requirements on Mare Island do not meet the City of Vallejo's general operating and sizing criteria. Generally, water storage for consumptive, emergency and fire protection uses should be available from gravity flow sources. Water storage should be equivalent to one days' use at maximum daily demand for operational and emergency use. Fire flows should also be added to the storage capacity. Using this criteria Mare Island would required over six million gallons of storage at or above 212 feet in elevation (City datum). (See Volume 3, Chapter 7 (Technical Appendix)).

Potable Water System Condition Evaluation

The existing condition of the potable water distribution system was evaluated based on the data provided by the Navy through Mr. John Cerini. The list of references utilized in this evaluation are documented in the List of References.

The potable water distribution system consists of many components. Each will be discussed separately below. These components include:

- Water Storage Tanks
- Pumping Stations
- Chlorination Stations
- Valves and Hydrants
- Transmission and Distribution Piping
- Water Service Lines
- Water Meters
- Backflow Prevention Devices

Water Storage Tanks

There are four existing water storage tanks on the potable water system. Tank No. 920 serves a small high elevation pressure zone near Club Drive. This above-ground welded steel tank is in fair condition. However, it is not known if preventive maintenance schedules have been maintained for this tank. Items which may require future maintenance include interior and exterior coating systems; installing, checking or maintaining a corrosion protection system and maintaining/replacing automatic valves and level controls. Another potential concern is the tanks' seismic stability. A structural analysis of this tank and its piping connections is recommended.

Tank No. 188B is the only tank that gravity feeds into the main Mare Island pressure zone. This tank is in poor condition. This is evidenced by the adjacent Tank No. 188A which is completely out of service due to severe corrosion problems. Both these above-ground riveted steel water tanks will require replacement.

Tank Nos. 774 and 645 are below-ground tanks and do not normally gravity feed into the system. Their condition is not known.

In discussions with the City of Vallejo's water engineering staff, their water storage criteria would require Mare Island to have full gravity storage meeting the City's requirements. This would require constructing water storage facilities of over six million gallons. Once this storage capacity is available, all existing water storage tanks can be abandoned.

Pumping Stations

The five existing water pumping stations are listed in Table 6.1.1-3. The Causeway pump station and Station Nos. 188B and 774 appear to be in fair condition. It is not known if preventative maintenance is being performed on these systems.

Station No. 880 was recently constructed (within the last 5 years). It appears to be in very good working condition. Serving as an emergency fire boosting station for the higher pressure zone,it currently receives routine inspection by the naval base fire department and the public works crew.

Station No. 645 appears to be in a state of disrepair. Its equipment is old and does not appear to be operating. Serving as an emergency source from Tank No. 645, its reliability is in question.

If the new storage facilities are constructed, Station Nos. 645, 774 and possibly 880 could be abandoned. Station No. 188B which serves as the golf course irrigation system may still need to be maintained.

Chlorination Stations

There are two chlorination stations, one on each of the main waterlines from the City of Vallejo's system. It is not known what the general condition of these two systems are. These systems will require further investigation.

Valves and Hydrants

The Navy has documented that the existing valves and hydrants generally are in fair condition except where new pipe replacements are recommended. There are sections of piping that have been identified by the Navy as requiring replacement. It is typical to install new valves and fittings along with the new piping. This piping replacement is discussed further below.

The Navy's Design Criteria includes provisions for sectional valves spaced every 500 feet along waterlines. A review of the existing potable water system indicates that sectional valves do exist every 500 to 800 feet. This is considered satisfactory from an operational viewpoint.

It is not known whether valves and hydrants are routinely exercised for proper operations. Thus, there could be a significant number of sectional valves that will not operate in an emergency condition such as a watermain break. It is recommended that the valves and hydrants be exercised to determine their condition.

Since the primary fire fighting system is the salt water system, there are a limited number of fire hydrants off of the potable water system. If the decision is made to abandon the salt water system, a significant investment in installing new fire hydrants on the potable water system will be necessary.

Transmission and Distribution Piping

The Navy has identified certain sections of water transmission and distribution piping that require replacement. It appears that these sections were determined from the number of reported work orders for leak repairs. This is a common practice for water utilities to use in developing their annual pipe rehabilitation programs. However, it is unclear how current the reported data is. Another reasonable source of information for water piping condition is the age of the piping. No data has been provided on the age of the various sections of piping.

The most significant area of pipe replacement is on the southern portion of the island. The section of 20 inch cast iron transmission piping from The City of Vallejo's point of connection to the Tank No. 188B requires replacement. In addition, all of the southern portion of the island's 2, 3, 4, 6 and 8 inch distribution piping needs replacement. This is the same section identified from the capacity modeling as being deficient.

There are several sections of 6 and 8 inch distribution piping identified for replacement on the northern portion of the island. These lines should be placed high on the priority for cyclic replacement.

Water Service Lines

The condition of the existing water service lines from the distribution piping to each building is not known. One concern, given the age of the naval base, would the existence of lead service piping. Without past records of construction it would be impossible to estimate the extent of which this condition exists.

Water Meters

In reviewing the Navy's records on water consumption, it appears that approximately 170 buildings and other facilities (piers, etc.) have water meters. It is most likely that these meters are contained within each building rather than being installed in a separate water meter enclosures outside of each building. It is not known if these meters are maintained, tested and replaced routinely. It is recommended that further studies be performed to determine the extent and condition of these water meters.

The total number of buildings and facilities that may require water metering is estimated at 2,000. With only 170 known meters of unknown condition, a significant cost will be to install water meters throughout Mare Island.

Backflow Prevention Devices

In order to protect the community water supply, certain water services will require backflow prevention devices that prevent contaminated water from backflowing into the community water supply. These water services may include industrial uses, laboratories, and landscape irrigation.

There are a reported 190 backflow prevention devices installed in and around the naval base. It is not known whether every required service connection has an approved and operable backflow prevention device. The Navy has indicated that these 190 devices require annual inspection and testing. However, the testing records have not been audited to confirm these tests. It is recommended that further investigations be made to assure confidence that the potable water supply system is adequately protected.

Potable Water System Capital Improvements

The capital improvement projects for the Potable Water System are identified in Table 6.3.1-3. These projects are based on the findings and conclusions of the water system analyses and the City of Vallejo's design criteria for water systems. A more detailed description of these capital projects can be found in the report appendix. Phasing of the capital improvement projects was made to conform with the assumed sequence of development in Chapter 5, Economic Feasibility.

Table 6.3.1-3 Summary Of Potable Water System Capital Projects						
Project Code	**Project Number**	**Project Title**	**Total Cost (1994 $1000)**	**Phased CIPs**		
				Phase I 1996	**Phase II 2006**	**Phase III Build Out**
FW	01	Replace Tank Nos. 188A & 188B	5,000	2,500	2,500	
FW	02	Install New Fire Hydrants	885	568	317	
FW	03	Replace 20" Cast Iron Main	600	600		
FW	04	Upgrade Causeway Pump Station	500		500	
FW	05	Install New Water Service Meters	4,000	1,333	1,333	1,334
FW	06	Water Storage Tank Evaluations	20	20		
FW	07	Valve & Hydrant Condition Study	80	80		
FW	08	Review Cross Connection Control Program	30	30		
FW	09	Leak Detection & Pipe Condition Study	200	200		
Total			11,315	5,331	4,650	1,334

The following criteria are used to develop these capital projects and their estimated 1994 project costs.

- Replace Tank Nos. 188A & 188B: Provide gravity storage for the proposed "build-out" water demands for Mare Island. Using the City of Vallejo water storage criteria, 6.5 million gallons (MG) of water storage is projected for Mare Island. A phased program envisions one 3.25 MG reinforced concrete tank to be built in the near future and the other 3.25 MG tank built by 2006. Project costs include engineering, administration, demolition, construction, and contingencies.

- Install New Fire Hydrants: The existing salt water system provides an additional source for fire protection. There are 127 active salt water fire hydrants. It was assumed that by abandoning this salt water system, 127 new fire hydrants would have to be installed along the potable water system. Fifty existing hydrants are assumed to need immediate replacement. The project cost includes engineering, administration, construction, and contingencies.

- Replace 20" Cast Iron Main: The size of this main is not deficient for the "build-out" water demands. However, the Navy has earmarked this main replacement as a priority due to a significant increase in the number of costly leak repairs. The capital costs are developed using the cost basis for pipeline replacements as stated in Table 6.3.1-4.

Table 6.3.1-4
Potable Water System Pipe Costs ($/LF)

Pipe Dia (in)	Base Cost	Traffic Control, Pavement Removal and Replacement	Utility Interference	Valves & Fittings	Total Cost
8	$70	$15	$10	$5	$100
12	90	15	10	5	120
20	150	20	20	10	200
24	190	20	20	10	240

Base cost includes material installation, excavation, labor, bedding and backfill, contractor's overhead and profit, plus 30% for engineering, administration, and contingencies.

- Upgrade Causeway Pump Station: The Navy has identified the need to upgrade the pumping capacity of this station due to lower system pressures on the City's supply system during periods of high water demands. Although it may be possible to eliminate this pumping station in the future (after the new storage tank is operational), upgrading this station is a Navy priority. This priority could shift as Mare Island transitions from government use to its proposed reuse. Water demands should decrease until new reuse tenants come on time on Mare Island. The project costs include engineering, administration, demolition, construction, and contingencies.

- Install New Water Service Meters: For planning purposes, it was assumed that 2,000 additional water meters would need to be installed to all buildings and facilities requiring potable water. These meters would be of various sizes ranging from residential meters to large industrial meters.

- Water Storage Tank Evaluations: Tanks No. 188B and 920 are above ground steel water tanks. Their useful life and seismic stability should be evaluated. Effects of interior and exterior corrosion could severely limit their useful life unless proper corrosion protection systems are maintained.

- Valve and Hydrant Condition & Exercising Study: All existing sectional valves and hydrants should be exercised (operated through their full range of motion) to determine their operational usefulness. Inoperable and leaking valves and hydrants would be located and then replacement costs can be established.

- Review and Implement a Cross Connection Control Program: Protecting potable water quality from contamination is required by State & Federal laws. An engineering audit of the current cross connection control program is recommended. It should review the need for backflow preparation, ensure the proper degree of protection, and review test records of the installed backflow prevention devices.

- Leak Detection and Pipe Condition Evaluation: All 62 miles of pipeline and service connections should be investigated for leaks. In addition, to help prioritize annual pipeline replacement, the pipelines should be non-destructively evaluated for useful life expectancy.

Potable Water System Operation and Maintenance

The estimated operation and maintenance costs are based on data provided by the Navy. Analyzing the Navy's historical cost data for labor, material and other costs associated with the potable water system operation and maintenance, the projected 1994 costs are estimated in Table 6.3.1-5. Looking at the annual percentage increase in labor, material and other costs, a 25 percent increase from 1993 costs for labor and materials is used to project the 1994 costs.

Table 6.3.1-5
Navy Historical Potable Water System O&M Costs

Fiscal Year	Manhours	Labor Costs	Percent Increase	Material Costs	Percent Increase	Other Costs	
1990	5,898	$268,400		$38,651		$1,237,543	
1991	6,599	300,300	12%	66,104	71%	1,311,596	6%
1992	8,780	399,500	33%	91,629	39%	1,202,483	-8%
1993	10,718	487,700	22%	93,652	2%	1,013,247	-16%
1994	**13,400**	**$609,600**	**25%**	**$117,065**	**25%**	**$1,094,247**	**8%**

Note: Labor costs based on City's cost of labor. Other costs include cost of purchased water.

The "other costs" category represents primarily contract costs. This includes cost of purchased water, as well as service contracts. It is believed that purchased water costs have been significantly reduced due to curtailed base activities. This is reflected in the negative annual percent change in "other costs". It is further believed that the cost of service contracts has increased. Thus, projected "other costs" for 1994 are based on an 8 percent increase.

The estimated 1994 O&M costs are presented in Table 6.3.1-6.

Table 6.3.1-6
Projected 1994 Potable Water System O&M Costs

Fiscal Year	Labor Costs	Material Costs	Other Costs	Contract Costs	Total Costs
Purchased Water				980,000	980,000
PM to Distribution System	216,000	14,400			230,400
System Test Analysis	81,900	34,200	6,600	38,000	160,300
PM Pumping Equipment	1,100	400	100		1,600
Service Work Distribution System	0			3,800	3,800
Minor Work Distribution System	301,000	68,100	2,600	18,000	390,100
Meter Reading	178,000				178,000
Total	778,000	117,100	9,300	1,039,800	1.944,200

Note: Labor costs based on City of Vallejo's labor rates.

To develop labor costs, average hourly rates of a six man utility crew are used. The six man crew is based on the projected 13,400 person-hours of labor for 1994. With 2,080 available hours per year per employee, it is estimated the Caretaker will operate the potable water system with a crew of six employees. This assumes 10 percent of these hours are overtime charges. The average hourly rates of the City of Vallejo's waterworks crew is used to determine labor costs.

Potable Water System Cyclic Replacement Costs

The cyclic replacement costs for the potable water system are based on a 50-year design life. Based on a 50-year design life, a two percent of total replacement costs represents an annual expenditure rate. Table 6.3.1-7 tabulates the estimated potable water distributing system replacement costs for piping only. This total distribution piping costs is added into Table 6.3.1-8 tabulating the annual cyclic replacement costs for all potable water system facilities.

Table 6.3.1-7 Potable Water Distribution System Replacement Costs			
	Length (ft.)	**Unit Costs $**	**1994 Costs $**
6″ CI	29,400	$100	$2,940,000
6" CI w/12" PVC	**3,100**	**120**	**372,000**
8″ CI	30,160	100	3,016,000
10″ CI	13,860	120	1,663,200
12″ CI	19,520	120	2,342,400
14″ CI	8,920	150	1,338,000
16″ CI	1,060	150	159,000
20″ CI	3,040	200	608,000
20" CI w/WSP	**1,600**	**200**	**320,000**
6″ Transite	5,820	100	582,000
8″ Transite	14,900	100	1,490,000
10″ Transite	4,000	120	480,000
12″ Transite	2,400	120	288,000
16″ Transite	1,440	150	216,000
8″ Galv. I	1,680	100	168,000
14″ Steel	1,360	150	204,000
<6″ Pipe	91,940	50	4,597,000
4" Pipe w/12" PVC	**3,100**	**120**	**372,000**
Sub Total			$21,155,600

Table 6.3.1-8 Potable Water Cyclic Replacement Costs				
Facility	**Quantity**	**Unit Costs $**	**1994 Costs $**	**Annual Costs $**
Dist. Piping	1	$21,155,600	$21,155,600	$423,100
6.5 MG Tank	1	4,500,000	4,500,00	90,000
Tank No. 920	1	200,000	200,000	4,000
Water Meters	1,500	1,500	2,250,000	45,000
Hydrants	243	5,000	1,215,000	24,300
Hydrants	127	5,000	635,000	12,700
Pump Station 880	1	75,000	75,000	1,500
Pump Station 188B	1	25,000	25,000	500
Causeway P.S.	1	500,000	500,000	10,000
Annual Cyclic Replacement Costs				$611,100

Note: Bolded items are 1994 Capital Projects

Potable Water System Caretaker Issues

From the findings reported above, a list of caretaker issues has been developed. These are summarized below:

- Water Storage: New water storage facilities will need to be developed and constructed to meet the requirements of the City of Vallejo. Over six million gallons of storage must be located high enough in elevation to gravity feed the system. The obvious tank sites would be on the southern end of Mare Island atop the hill within the current Naval Weapons station.

- Pump Stations: Some system analysis by the City of Vallejo water department could determine whether or not all of the existing pump facilities could be abandoned if and when the new water storage facilities are operational. In particular the Causeway pump station may not be required if the City is planning for improved transmission facilities.

- Chlorination Stations: It appears that the existing potable water distribution system may have some stagnation problems requiring additional chlorine for proper disinfection practices of maintaining a chlorine residual of 0.2 parts per million. These stations may need to be maintained and operational due to Mare Island being on the extreme terminus of the City's transmission system.

- Valves and Hydrants: A valve and hydrant exercising program should be put into effect to determine the condition of these facilities. Certain valves will be replaced with the identified pipe replacement schedule. A significant investment will need to be made to install new fire hydrants along the existing potable water system.

- Transmission and Distribution Piping: Certain sections of piping have been identified to be replaced. Additional sections will require replacement as the system continues to age.

- Water Meters: A meter replacement program needs to be implemented to assure accuracy and reliability of these meters. Meters may have to be relocated in public right of way if real estate is sold to new property owners.

- Backflow Prevention Devices: Continuing an effective cross connection control program will be required to assure a safe drinking water supply. As the base is converted to other uses it will be important for the caretaker (City of Vallejo) to monitor and enforce a cross connection control program.

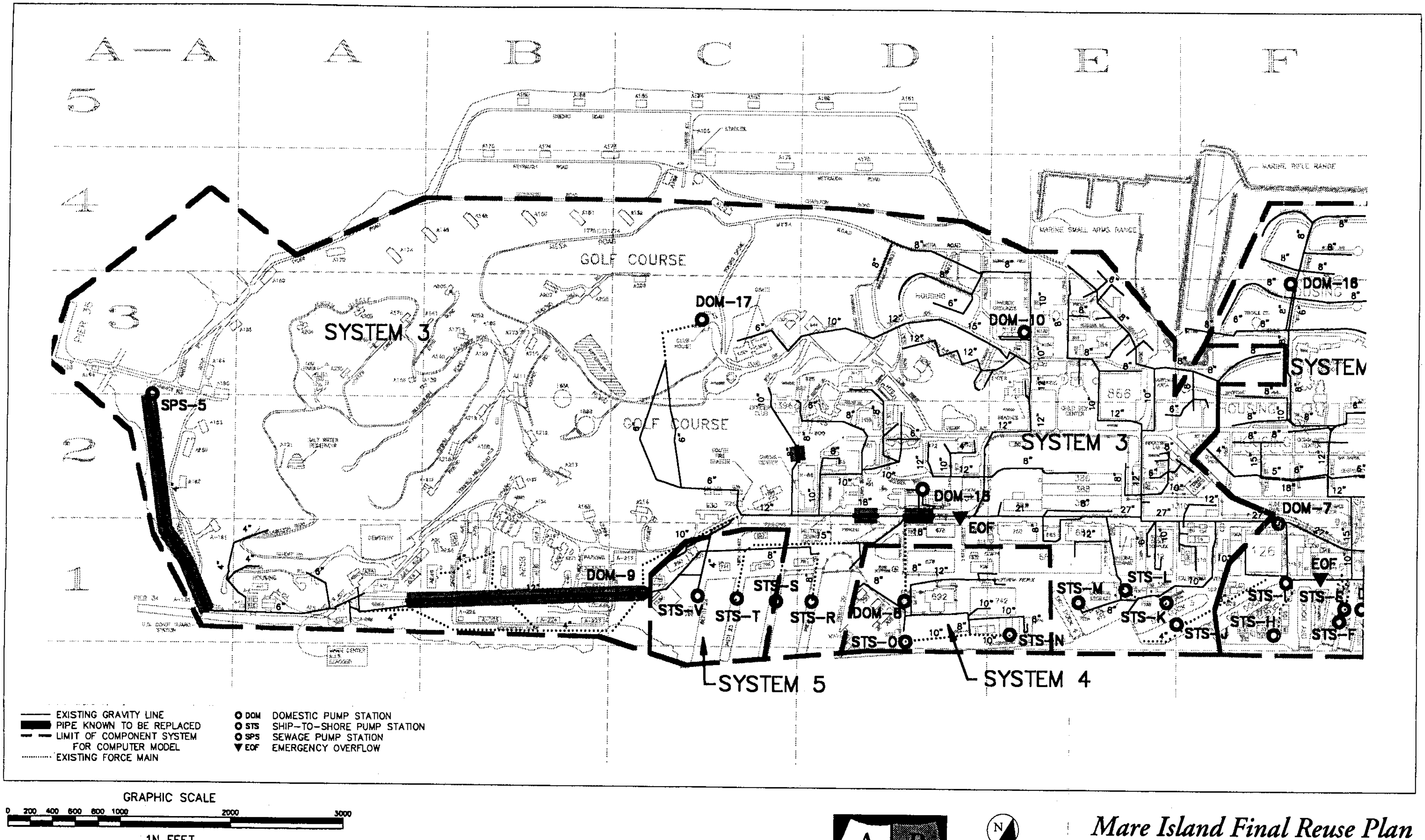
6.3.2 Sanitary Wastewater

Capacity Analyses

The sanitary wastewater system was modeled using the Civilsoft computer program "Sewer System Analysis." The program provides a comprehensive and readily interpretable analysis of the existing sewer system. The program determines where flow deficiencies exist and recommends replacement pipe size or parallel relief pipe size adequate for the flows.

The program requires that the pipes flow by gravity; it does not recognize the addition of energy to the system from a pump station. Therefore, flows tributary to a pump station must be analyzed as a separate model, and the resulting flow added to the downstream system where the pump station discharges. Seven component systems were modeled. The sanitary wastewater system, is shown on Figure 6.3.2-1, including the delineation of the component systems. In some cases, the wastewater flows through more than one component system before arriving at the main pump station (DOM-4).

The input sewage flows in the model are determined based on the merged CRP-ULI land use plan and flow coefficients for the respective uses. These values are listed on Table 6.3.2-1. The coefficients for the industrial land use are considered to include a component due to industrial wastewater flow, as well as a per capita allocation. For wet weather calculations, all flow coefficients in developed areas are given an additional inflow and infiltration (I&I) coefficient of 0.006 cubic foot per second (cfs) per acre. The coefficient is based on VSFCD policies for aging (pre-1970) sewer systems. Open spaces and recreation areas did not receive an I&I contribution because of the relatively short length of pipe in these areas compared to the acreage. The condition of the aging sewer system is not fully known, and the actual I&I flows in certain areas could exceed the value assumed in the model.



Mare Island Final Reuse Plan

Figure 6.3.2-1a

Sanitary Wastewater

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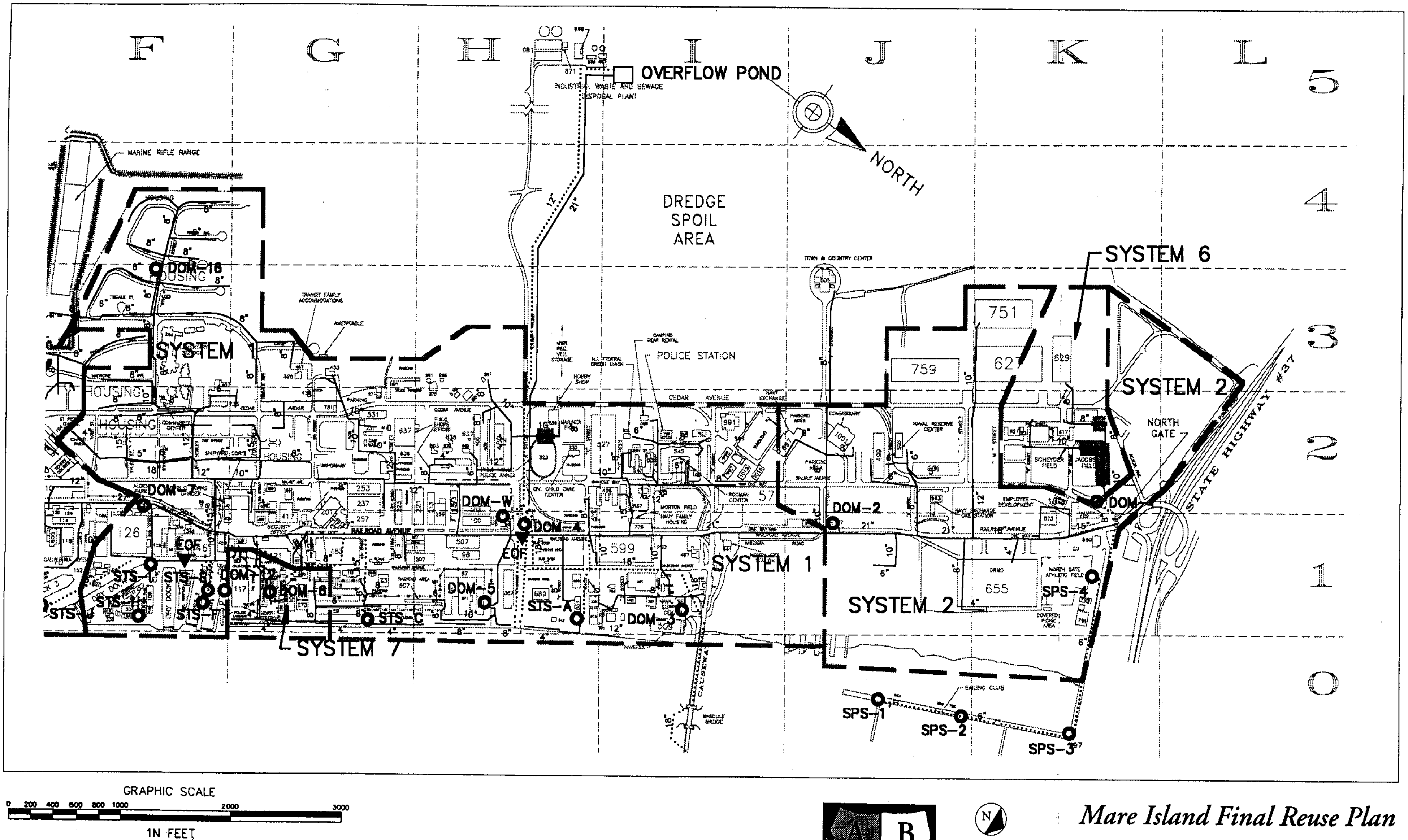

Mare Island Final Reuse Plan

Figure 6.3.2-1b

Sanitary Wastewater

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Sewer pipe capacity is governed by a maximum depth ratio, which is the ratio between sewage flow depth in a pipe and the inside pipe diameter. According to VSFCD policies, pipes with an inside diameter of 15 inches or less shall not exceed a 0.7 depth ratio, and those over 15 inches shall not exceed 0.8.

Two scenarios were analyzed in the computer model. The first scenario was a dry weather analysis that omitted the I&I contribution. The results showed that all pipes have adequate capacity, except those with an adverse slope. This indicates that the existing sewer system would have sufficient capacity for the proposed land uses under dry weather conditions if the adverse slopes in the system are corrected.

The second scenario was a wet weather analysis and included the I&I contribution. The results of this analysis showed that all pipes had adequate capacity (excluding those pipes with an adverse slope) if I&I problems are corrected to the extent required by VSFCD policies. An analysis of the existing system that reflects the excessive rate of I&I actually experienced was not performed because information on the actual I&I contribution was not available.

Table 6.3.2-1 Sanitary Wastewater Flow Coefficients			
		Flow Coefficient, cfs/Acre	
Land Use Area	**Acres**	**Dry Weather**	**Wet Weather**
Residential	220	0.004	0.010
Recreation	372	0.0003	0.0003
Open Space	84	0.0003	0.0003
Education	67	0.004	0.010
Education/Office	16	0.004	0.010
Office	32	0.005	0.011
Office/R&D	31	0.005	0.011
Office/Mixed Use	15	0.005	0.011
Office Commercial	9	0.005	0.011
Retail Commercial	26	0.005	0.011
Light Industry	162	0.004	0.010
Heavy Industry	130	0.004	0.010
Marina	11	0.003	0.009
Civic	10	0.005	0.011
O&M	2	0.005	0.011

The tributary flow in each of the systems modeled is tabulated on Table 6.3.2-2. The average flows are derived from the flow coefficients, and the peak flows are calculated using VSFCD policies.

Condition Evaluation

Information about the condition of the sanitary wastewater pipes is minimal. The current system has no periodic maintenance, cleaning, or videotaping in order to assess the existing pipe conditions. Pipes are replaced only at the time of failure.

An Inflow and Infiltration Study (PWCSFB, 1993) included physical inspection of 48 manholes. The study revealed the following:

- Thirteen manholes exhibited significant inflow and infiltration.

Table 6.3.2-2 Sanitary Wastewater System Flows				
System	Dry Weather (CFS)		Wet Weather (CFS)	
	Average	Peak	Average	Peak
1	3.23	4.36	7.84	10.32
2	0.48	0.69	1.17	1.63
3	1.56	2.15	3.73	5.01
4	0.09	0.24	0.23	0.34
5	0.33	0.48	0.74	1.05
6	0.15	0.22	0.34	0.49
7	0.04	0.11	0.09	0.24
TOTAL OUTFLOW	3.23	4.36	7.84	10.32
	(2.1 MGD)	(2.8 MGD)	(5.1 MGD)	(6.7 MGD)

- Twenty-seven known or suspected (primary) and 21 likely (secondary) storm to sanitary system cross-connections were identified.

A study of the sanitary wastewater system north of 'A' Street covering 328 acres was completed in 1987. A total of 27,600 linear feet of sanitary sewer and 6,700 linear feet of force main was inspected, including manholes and catch basins. The study recommended:

- Replacement of 16,096 linear feet of pipe. The pipe was corrogated metal and considered unsatisfactory for use in sanitary wastewater systems.

- Elimination of numerous storm water inflows to the sanitary wastewater system.

PWCSFB Maintenance Shop began Phase 1 of a pipe replacement program for the area north of 'A' Street. Phases 2 and 3 have been postponed.

The system is functional, but is considered to be in poor condition because of: The significant inflow and infiltration problems; suspected subsidence and corrosion of the sewer lines, some of which are constructed of materials unsatisfactory for use in sanitary sewers; and the overall age of the system.

Capital Improvements

The capital improvement projects for the sanitary wastewater system are identified on Table 6.3.2-3. These projects are based on the findings and conclusions of the system capacity and condition evaluation and the VSFCD policies for design of wastewater systems.

The determination of the needed capital improvement projects is complicated by the high rate of inflow and infiltration (I&I) experienced during periods of heavy rainfall. Available studies that identify the portions of the system that are in need of repair to correct the I&I problem cover only very limited areas. Furthermore, there are both known and suspected cross-connections between the sanitary wastewater system and the storm drains that serve as emergency overflows, which must also be corrected.

The Capital Improvement Program attempts to include the cost for correction of the I&I and sewage overflow problems, notwithstanding the uncertainty surrounding the extent of the problems. The corrective work was estimated by assuming that the reported system conditions in the available studies are representative of conditions in the remainder of the system. Pipe rehabilitation and pipe replacement are estimated at 20% of the total length of pipe in the system. The validity of this assumption can only be verified by a systematic study of sewer condition for the areas not covered by existing documentation. The Capital Improvement Program includes such a study as a separate project. The remaining projects are generally categorized as follows:

- Replace Known Adversely Sloping or Damaged Pipe: This pipe is known to have an adverse slope or damage and must be replaced.

- Pipe Rehabilitation: This pipe is assumed to experience a high rate of I&I due to storm drain cross-connections or leaking pipe joints, but is otherwise structurally sound and cost-effective to repair. Typical pipe repairs consist of slip lining or sealing joints of these leaking pipes in place. Pipe repair costs are assumed to be equal to the base cost, in Table 6.3.2-4.

- Pipe Replacement: This pipe is assumed to be deteriorated or damaged beyond the point of economic repair; or it has insufficient capacity due to adverse gradient. Pipe replacement unit costs are developed in Table 6.3.2-4 and include allowance for elimination of storm water cross-connections.

- Pump Station: A pump unit has been identified with serious operational problems (pump replacement only).

The projects are further defined by geographic location in terms of the component systems idenfitied on Figure 6.3.2-1.

Phasing of the capital improvement projects was made to conform with the assumed sequence of development described in Chapter 5, Economic Feasibility. Scheduling of the rehabilitation and replacement projects within each phase will be governed by priorities established in the sewer system study (Project DW 02).

Table 6.3.2-3
Summary of Sanitary Wastewater Capital Projects

Project Code	Project Number	Project Title	Total Cost (1994 $1000)	Phase I 1996	Phase II 2006	Phase III 2016
DW	01	Replace Adversely Sloping Pipe	185	185	0	0
DW	02	Investigate Inflow/Infiltration	750	750	0	0
DW	03	System 1 Replacement	839	839	0	0
DW	04	System 1 Rehabilitation	435	0	218	217
DW	05	System 2 Replacement	174	174	0	0
DW	06	System 2 Rehabilitation	88	0	44	44
DW	07	System 3 Replacement	771	771	0	0
DW	08	System 3 Rehabilitation	380	0	190	190
DW	09	System 4 Replacement	83	83	0	0
DW	10	System 4 Rehabilitation	42	0	21	21
DW	11	System 5 Replacement	113	113	0	0
DW	12	System 5 Rehabilitation	55	0	27	28
DW	13	System 6 Replacement	33	33	0	0
DW	14	System 6 Rehabilitation	16	0	8	8
DW	15	System 7 Replacement	62	62	0	0
DW	16	System 7 Rehabilitation	30	0	15	15
DW	17	Rehabilitate/Replace South Annex Pipe	635	635	0	0
DW	18	System 2 Pump Replacement	12	12	0	0
DW	19	System 3 Pump Replacement	30	30	0	0
DW	20	System 7 Pump Replacement	16	16	0	0
Total			4,749	3,703	523	523

The individual project descriptions and costs are presented in the Appendix. The project costs include engineering, administration, demolition, construction and contingencies, and are expressed in 1994 dollars.

The Capital Improvement Program does not include any of the following:

- Cost to repair or replace laterals (typically small diameter pipe that connects individual users to the sewer system).
- Cost of any VSFCD sewer connection fees that my be due if the connection fees previously paid for the Federal operations on Mare Island are not transferred to the new operations.
- Cost of any Survey and Recording Fees that may be needed to create Wastewater system easements within the parcelization plan for Mare Island.
- Special costs associated with construction involving contaminated soils or hazardous materials.

Table 6.3.2-4
1994 Sanitary Wastewater Pipe Unit Replacement Costs ($/LF)

Pipe Dia. (In.)	*Base Cost	Traffic Control, Pavement Removal and Replacement	Utility Interference	Clean Outs, Manholes, Other Appurtenances	Total Cost
6	50	15	35	10	110
8	55	15	35	10	115
10	60	15	35	10	120
12	70	15	40	10	135
15	80	20	40	10	150
18	90	20	40	10	160
21	105	20	40	10	175
24	120	20	40	10	190
27	135	25	40	10	210

* Base cost includes material, installation, excavation, labor, bedding and backfill, contractor's overhead and profit, soil treatment, plus 30% for engineering, administration, and contingencies.

Operation and Maintenance

The estimated operation and maintenance costs are based on data provided by MINSY. The historical cost data for labor, material and other costs for years 1990 through 1993 associated with the Sanitary Wastewater system operation and maintenance are presented in Table 6.3.2-

5. The labor costs are based on labor hours provided by MINSY and the City of Vallejo labor rates, using the City's published pay rates and a multiplier for salary fringe and general overhead of 2.5.

The estimated 1994 operation and maintenance costs are presented in Table 6.3.2-6. These costs consist of the following:

- Labor: Considering the fluctuation of labor costs in Table 6.3.2-5, a 5 percent increase from 1993 costs is used to project 1994 costs.

- Material: Considering the fluctuation of material costs in Table 6.3.2-5, a 5 percent increase from 1993 costs is used to project 1994 costs.

- Other: 'Other' Cost Category represents primarily contract costs. The cost for the VSFCD service fee is listed separately because the assumption is made that these fees would be paid directly by the new users on Mare Island. The remaining 'Other' costs are largely for service contracts, which are expected to increase from 1993 at a percentage rate of 5%.

The projected 1994 O&M cost for the Sanitary Wastewater System on Mare Island per mile of pipe is approximately $13,500/mile. This figure may be compared to the 1993 O&M cost reported by the VSFCD for its Sanitary Wastewater System of $5,230/mile.

Table 6.3.2-5
Navy Historical Sanitary Wastewater O&M Costs ($)

Fiscal Year	Labor Costs	Material Costs	Other Costs	Total Costs
90	541,550	82,473	718,411	1,342,434
91	225,600	23,147	576,578	825,325
92	60,750	4,229	558,967	623,946
93	530,300	84,702	754,514	1,369,516

Cyclic Replacement Cost

The cyclic replacement cost for the Sanitary Wastewater system is based on an assumed 50 year useful life. Table 6.3.2-7 presents the estimated replacement costs for system pipe only. Table 6.3.2-8 presents the estimated Sanitary Wastewater System annual cost for cyclic replacement of the entire system with the exception of unneeded ship to shore pump stations (only those in the marina area remain). The annual expenditure for system replacement is estimated to be 2% of the total system cost. Replacement of the Capital Improvement Projects is included. Inflation and interest factors are not considered.

Caretaker Issues

In 1955, the City of Vallejo entered into an agreement to transfer all its sanitary sewer facilities and easements, together with its storm drain system to the Vallejo Sanitation and Flood Control District (VSFCD). The VSFCD, for its part, agreed to provide all sewage disposal and storm drainage for the City. At the time, the Shipyard owned and operated its own sewage and storm drain systems, and was not included within the VSFCD boundardies.

Table 6.3.2-6
Projected 1994 Sanitary Sewer O&M Costs ($)

System	Labor Costs	Material Costs	Other Costs	Contract Costs	Total Costs
Inter Utility Transfer Electrical	0	0	17,300	0	17,300
Operations Sewage System	257,100	300	0	0	257,400
PM Sewer Pump Station Facilities	3,700	5,300	1,900	20,500	31,400
Minor Work Sewer Pump Station Facilities	8,700	2,500	0	0	11,200
PM Sewer Collection System	3,500	15,100	1,100	8,600	28,300
Service Work Sewer Collection System	0	0	1,100	8,600	9,700
Minor Work Sewer Collection System	18,600	61,200	400	300	80,500
Repairs to Variable Frequency Drive Units	2,800	0	0	0	2,800
Chemicals of Sewer System	0	4,500	0	0	4,500
Disposal of Hazardous Waste	0	0	0	3,200	3,200
Subtotal W/O VSFCD Service Fee	$294,400	$88,900	$21,800	$41,200	$446,300
VSFCD Service Fee			$770,400		$770,400
Total					$1,216,700

In 1974, the Federal Government entered into an agreement to receive sanitary sewer service from the District. The service was to dispose of sanitary sewage originating at MINSY up to an average daily flow rate of 2.5 mgd, or a maximum flow rate of 6.5 mgd. MINSY continued to operate and maintain its own sewage systems on Mare Island for collection of raw sewage and pretreatment of industrial wastes prior to discharge to the VSFCD facilities.

There appear to be two options for future wastewater collection and disposal at the Shipyard:

- The Federal Government could assign its interest in the agreement with the VSFCD to another agency of the Federal Government. The successor agency could assume responsibility to operate and maintain the existing sewage systems on Mare Island, and the respective contractual responsibilities of the Federal Government and the District would not change.

Table 6.3.2-7
Sanitary Wastewater Pipe Replacement Costs ($)

	Length of Existing Pipe (Cost per Foot)									($1,000) Replacement Total Cost 1994
Sewer System	6" ($110)	8" ($115)	10" ($120)	12" ($135)	15" ($150)	18" ($160)	21" ($175)	24" (190)	27" ($210)	
1	17,775	19,480	5,205	5,130	3,920	2,450	4,690	1,780	3,610	8,410
2	3,560	3,680	2,690	960	670	980	1,250			1,743
3	23,790	17,180	8,125	8,280	2,800	1,010	1,320	140	1,290	7,796
4	990	1,625	1,010	3,065						831
5	3,360	1,120	3,320	900	340	380				1,130
6	550	1,440	1,260	10						379
7	480	3,150	320	700	460					617
Annex	1,940	690	800	1,820						634
Total										$21,539

- The Federal Government could transfer its interest in the agreement with the VSFCD to the City or other public or private entity. In this case, the VSFCD would permit the entity to discharge sewage from Mare Island into the District's system in accordance with the agreement. In the event that activity on the Island resulted in a average daily discharge of more than 2.5 mgd, the activity would be subject to the District's standard connection charges. Furthermore, the entity would pay a user fee, which is renegotiated annually, under the terms of the agreement with the Federal Government.

The responsibility for maintenance and operation of the wastewater collection systems on Mare Island would be transferred by the Federal Government to the entity as well. If the entity is the City, the VSFCD would then be obligated under the terms of its agreement with the City to operate and maintain the sewage systems on Mare Island.

If the Federal Government transfers its interest in the agreement with VSFCD to the County of Solano rather than the City, the previous discussion would also apply.

Table 6.3.2-8 Sanitary Wastewater System Cyclic Replacement Costs ($)				
Facility	**Quantity**	**Unit Costs**	**1994 Costs**	**Annual Costs**
Collection Piping	1	21,539,000	21,539,000	430,800
Domestic Pump Station 1	1	60,900	60,900	1,200
Domestic Pump Station 2	1	73,100	73,100	1,500
Domestic Pump Station 3	1	24,400	24,400	500
Domestic Pump Station 4	1	365,600	365,600	7,300
Domestic Pump Station 4W	1	288,000	288,000	5,800
Domestic Pump Station 5	1	60,900	60,900	1,200
Domestic Pump Station 6	1	81,300	81,300	1,600
Domestic Pump Station 7	1	177,000	177,000	3,500
Domestic Pump Station 8	1	24,400	24,400	500
Domestic Pump Station 9	1	81,300	81,300	1,600
Domestic Pump Station 10	1	4,100	4,100	100
Domestic Pump Station 12	1	40,600	40,600	800
Domestic Pump Station 16	1	40,600	40,600	800
Domestic Pump Station 17	1	19,500	19,500	400
Domestic Pump Station 18	1	12,200	12,200	200
Sewage Pump Station 1	1	60,900	60,900	1,200
Sewage Pump Station 2	1	60,900	60,900	1,200
Sewage Pump Station 3	1	60,900	60,900	1,200
Sewage Pump Station 4	1	60,900	60,900	1,200
Sewage Pump Station 5	1	24,400	24,400	500
Ship to Shore Station N	1	60,900	60,900	1,200
Ship to Shore Station S	1	60,900	60,900	1,200
Ship to Shore Station T	1	60,900	60,900	1,200
Ship to Shore Station V	1	60,900	60,900	1,200
Annual Cyclic Replacement Costs				$467,900

6.3.3 Storm Water

Capacity Analyses

The storm water collection system was modeled utilizing a program called "Sewer System Analysis" by Civilsoft. The program calculates the flows in a network of pipes and manholes and identifies deficient pipe reaches and determines the required replacement pipe or parallel relief pipe. The program requires the input of invert elevation of manholes, length of the pipe, pipe diameter, and friction loss coefficient. The contributing storm flows are input at manholes, and the program calculates the resulting flow through the system.

The program requires that the pipes flow by gravity; it does not recognize the addition of energy to the system from a pump station. Therefore, flow contributing to a pump station must be modeled as a separate system, and the resulting flow is added to a manhole of the downstream system.

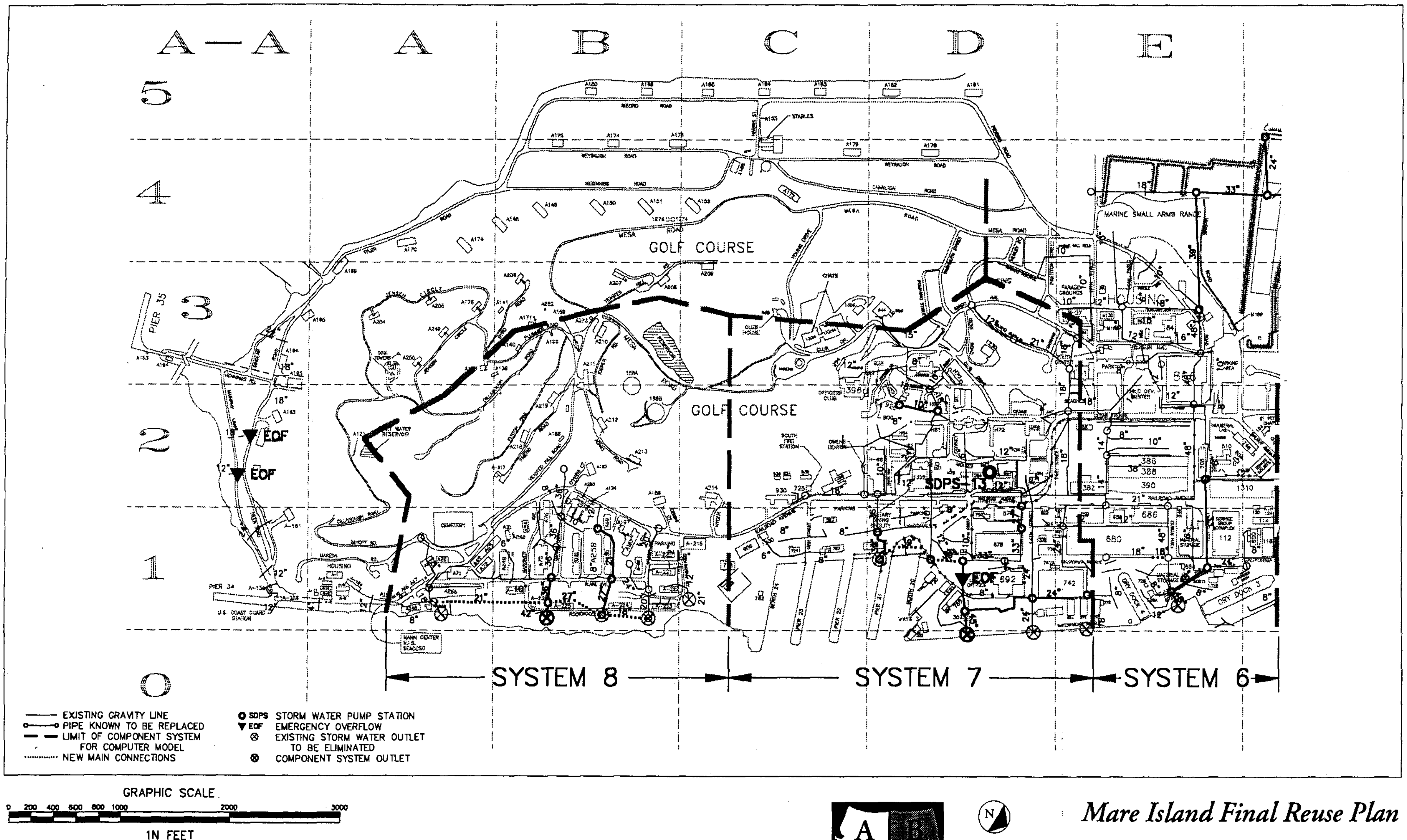
An objective of the storm water system analysis was to reduce the number of outlets into Mare Island Strait. To accomplish this, the system was modified in the model as follows:

- The island was divided into 8 drainage areas, each less than 250 acres, and each comprising a separate system with a single outlet.
- Some rerouting of pipes was necessary.
- New pipes were added to connect lines within an area, while pipes connecting adjoining areas were removed.
- Some pipe flows were reversed to direct the flow to the proper outlet. This shows up as a negative slope in the model.
- Where a pump station exists, all pipes upstream of the pump station were modeled as a separate system.
- The flapper valves at the outfalls were not considered in the model, however, the hydraulic loss of the valves and submerged discharges was evaluated separately.

The storm water system is shown on Figure 6.3.3-1, including delineation of the drainage subareas and component systems.

The storm water flowing into each system was calculated using the Rational Method. Rainfall was based on a 15 year design storm with a duration of 3 hours in accordance with VSFCD policies. The calculated rainfall intensity was 0.72 inch/hour.

The flow into each manhole is determined based on the size of its drainage area, the rainfall intensity and a runoff coefficient. The runoff coefficients are as follows:



Mare Island Final Reuse Plan

Figure 6.3.3-1a

Storm Water

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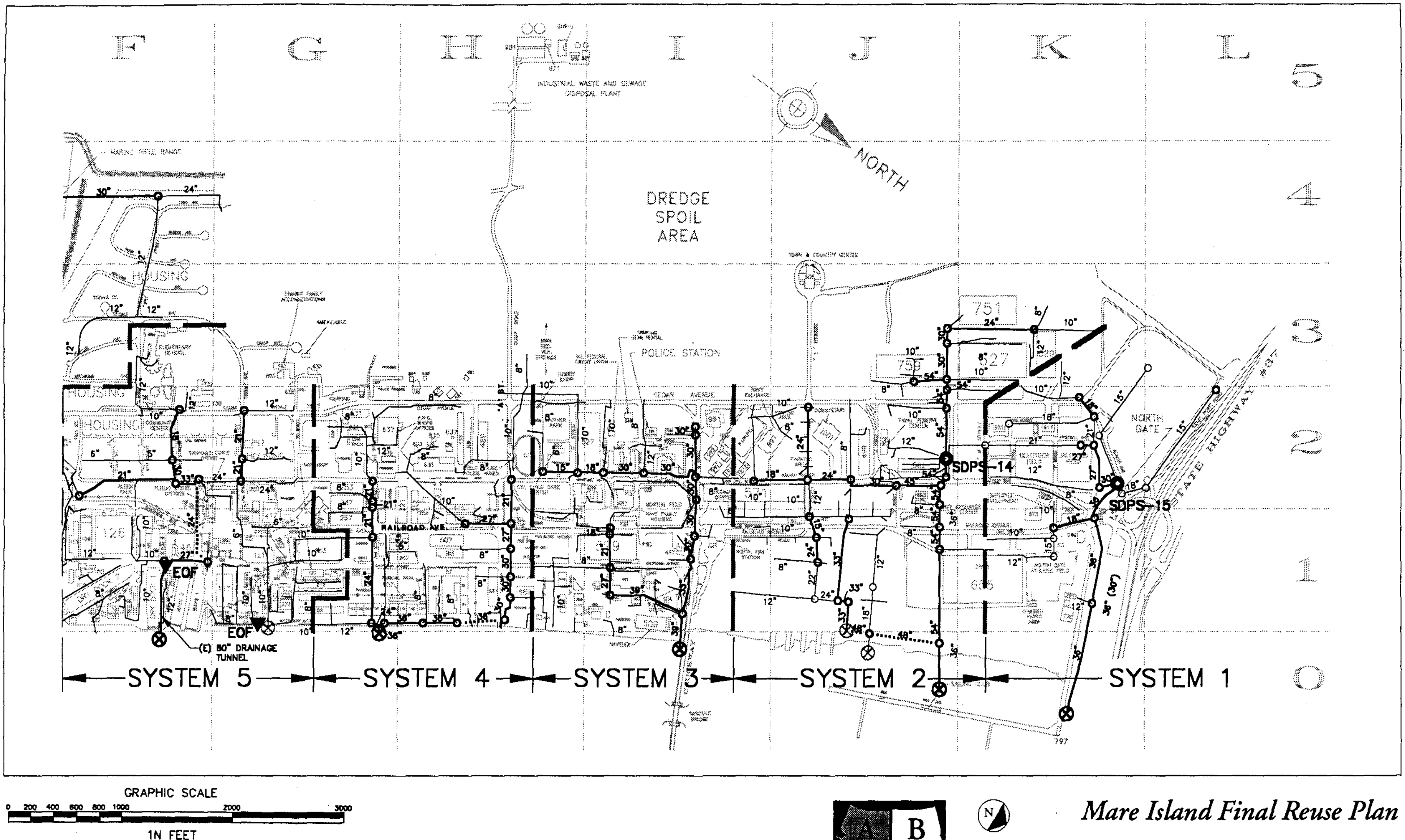

A B

Mare Island Final Reuse Plan

Figure 6.3.3-1b

Storm Water

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COEFFICIENT, C	LAND USE
0.2	Generally open undeveloped land.
0.5	Residential and light commercial.
0.7	Light industrial areas.
0.8	Heavy industrial areas.

The results of the model indicate that most of the pipes need replacement because of capacity problems. The four systems located north of 4th Street are generally inadequate with most pipes being undersized. A large part of the land served by these systems is classified as heavy industrial and commercial. The following tables (Table 6.3.3-1 through Table 6.3.3-8) summarizes the required pipe replacement for each system.

Table 6.3.3-1
Storm Water System 1 Pipe Replacement

Existing Pipe (Inch)	Replacement Pipe (Inch)	Length (Feet)
15	18	220
15	18	400
24	27	120
21	27	390
24 x 24	30	145
21 x 21	33	20
18	36	360
30	36	690
30	36	360

Table 6.3.3-2 Storm Water System 2 Pipe Replacement		
Existing Pipe (Inch)	**Replacement Pipe (Inch)**	**Length (Feet)**
16	18	490
15	21	190
18	24	200
18	24	640
18	24	775
24	30	140
24	30	330
24	30	480
24	33	95
15	33	580
24	45	360
30	48	600
24	54	80
24	54	95
36	54	140
24	54	150
36	54	160
24	54	175
36	54	230
36	54	400
24	54	430
36	54	800

Table 6.3.3-3 Storm Water System 3 Pipe Replacement		
Existing Pipe (Inch)	**Replacement Pipe (Inch)**	**Length (Feet)**
10	15	300
12	18	50
15	18	280
16	21	280
12	27	240
21	30	200
24	30	225
15	30	230
21	30	280
15	30	350
15	30	430
24	33	510
30	39	300
24	39	700

Table 6.3.3-4 Storm Water System 4 Pipe Replacement		
Existing Pipe (Inch)	**Replacement Pipe (Inch)**	**Length (Feet)**
12	21	40
12	21	180
15	21	260
10	21	360
12	24	40
15	24	770
18	27	210
15	27	410
18	30	205
18	30	220
18	30	250
21	36	20
21	36	40
18	36	310
18	36	370
18	36	420

Table 6.3.3-5 Storm Water System 5 Pipe Replacement		
Existing Pipe (Inch)	**Replacement Pipe (Inch)**	**Length (Feet)**
15	18	440
15	21	160
15	21	400
16	21	920
21	30	210
21	33	240
15	36	390
24	36	700

Table 6.3.3-6 Storm Water System 6 Pipe Replacement		
Existing Pipe (Inch)	**Replacement Pipe (Inch)**	**Length (Feet)**
12	18	470
18	30	945
15	33	510
24	33	600
36	39	1020
36	48	140
36	48	380

Table 6.3.3-7 Storm Water System 7 Pipe Replacement		
Existing Pipe (Inch)	**Replacement Pipe (Inch)**	**Length (Feet)**
4	10	260
10	24	500
24	27	190
8	27	610
30	39	230
33	39	310
15	39	310
10	39	500
33	45	250

Table 6.3.3-8 Storm Water System 8 Pipe Replacement		
Existing Pipe (Inch)	**Replacement Pipe (Inch)**	**Length (Feet)**
8	18	425
12	21	520
12	21	1100
24	27	160
8	27	500
36	36	230
36	42	150

Data for the storm water collection system were obtained from the survey recorded on quad maps from NPWCSFB at Mare Island Naval Shipyard, dated April, 1993.

Condition Evaluation

Subsidence has occurred on Mare Island, especially on the north end which has affected the storm water system. Some manholes were labeled "inaccessible" and included the label "surcharged" on the System Survey Maps.

Interviews held with NPWCSFB Engineers and Maintenance Personnel at Mare Island responsible for the storm water system revealed the following information:

- A replacement program for the flapper valves was never completed. There are flapper valves which do not operate properly, causing the system to cycle with the tide.

- The existing system drains the Island adequately with a few areas subject to flooding during heavy storms.

- Known cross-connections between the storm water and sanitary and industrial wastewater systems have been eliminated with the exception of emergency overflows.

- There is no periodic maintenance program and repairs are made only when necessary.

- The system layout and construction is not standardized, with much of the pipes undersized. Pipes in areas where settlement of the ground occurred have been allowed to surcharge or are rerouted.

The VFSCD policies require a minimum storm water pipe diameter of 12 inches. There are over 90,000 linear feet of existing pipe that are less than 12 inches in diameter. Table 6.3.3-9 is an estimate of pipe not conforming to this requirement.

Table 6.3.3-9
Storm Water - Existing Pipes Smaller Than 12 Inches

System	5"	6"	8"	10"	3" Cast Iron	4" Cast Iron	7 x 8 Wood	7 x 9 Wood	10 x 6 Wood	7 x 9 Brick	3 Brick	12 x 8 Brick	6 x 8 Wood
1		420	1730	1400									
2		1435	8100	4300		150							
3		1900	5950	2700			450	550	800				
4		2450	5100	2450	200	1200				200			
5	600	8300	3950	1200		1300					500	150	
6		4450	6250	3150		1400					600		
7		2750	3500	3250	200	1800							350
8	200	1650	2100	1500		400							
Total	800	2335 5	3668 0	19950	400	6250	450	550	800	200	1100	150	350

The VFSCD policies also require a minimum of 2 feet from rim elevation to the water surface in surcharged manholes. An analysis was done for the outfall flapper valves on each system outlet. The tide level was assumed at mean high tide, and the coefficient for head loss in the flapper valves was taken from valve manufacturer's data. The results of the analysis indicate that water surface in the surcharged manholes do not reach within 2 feet of the rim elevation. Other manholes in the system were also checked and found to conform to the VSFCD surcharge policies.

Table 6.3.3-10 below shows the outlet sizes and discharge for each system. The minimum required size of the outlet will prevent excessive surcharge of the last system manhole.

Table 6.3.3-10
Storm Water Outlet Size

System No.	Discharge CFS	Minimum Required Outlet Size (Inches)	*Existing Outlet Size (Inches)
1	28.7	25	36
2	59.8	34	54
3	35.3	26	39
4	32.5	14	36
5	49.7	29	80
6	58.1	26	48
7	49.7	20	45
8	40.2	24	42

*Used For Modelling

Capital Improvements

The capital improvement projects for the storm water system are identified on Table 6.3.3-11. The projects are based on the findings and conclusions of the storm water system evaluation and the VSFCD policies for design of storm water systems.

The determination of the need for capital improvement projects is complicated by the configuration of the collection system that consists of numerous subsystems discharging through nearly 65 separate outfalls into Mare Island Strait. In order to facilitate compliance with new environmental regulations regarding control of storm water runoff, the system was reconfigured to consolidate the outfalls at 8 locations. This required addition of new interceptor pipe, and rerouting some existing lines. Although there are problems due to cross-connections between the sanitary and industrial wastewater systems and the storm water system that must be corrected, the cost to identify and eliminate the cross-connections are included with the respective wastewater system cost.

The capital improvement projects for the storm water system are generally categorized by subsystem and include the following improvements:

- System Additions: This pipe is required to reconfigure the storm water system as discussed above.

- Pipe Replacement: This pipe is deteriorated or damaged beyond the point of economic repair; or it is of a type or (small) size not permitted under VSFCD policies; or it has been identified as having insufficient capacity (including adverse gradient). Pipe replacement unit costs are developed in Table 6.3.3-12.

The individual project descriptions and costs are presented in the Appendix. The project costs include engineering, administration, demolition, construction and contingencies, and are expressed in 1994 dollars.

The Capital Improvement Program does not include any of the following:

- Cost of any Survey and Recording Fees that may be needed to create storm drain easements within the Parcelization Plan for Mare Island.

- Special costs associated with construction involving contaminated soils or hazardous materials.

Phasing of the capital improvement projects was made to conform to the assumed sequence of development described in Chapter 5, Economic Feasibility.

Table 6.3.3-11
Summary of Storm Water Capital Projects

Project Code	Project Number	Project Title	Total Cost (1994 $1000)	Phase I 1996	Phase II 2006	Phase III 2016
SD	01	System 1	1,357	1,357	0	0
SD	02	System 2	4,595	4,595	0	0
SD	03	System 3	3,072	0	3,072	0
SD	04	System 4	2,718	0	2,718	0
SD	05	System 5	3,229	3,229	0	0
SD	06	System 6	3,528	3,528	0	0
SD	07	System 7	2,627	2,627	0	0
SD	08	System 8	1,521	0	0	1,521
Total			22,647	15,336	5,790	1,521

Table 6.3.3-12 Storm Drain Pipe Construction Costs ($/LF)					
Pipe Dia. (In.)	***Base Cost**	**Traffic Control, Pavement Removal and Replacement**	**Utility Interference**	**Catch Basins, Manholes, Other Appurtenances**	**Total Cost**
15	80	20	40	15	155
18	90	20	40	15	165
21	105	20	40	15	180
24	120	20	40	15	195
27	135	25	40	15	215
30	155	25	40	15	235
33	175	25	40	15	255
36	195	25	40	15	275
39	210	30	40	15	295
42	230	30	40	15	315
45	245	30	40	15	330
48	260	30	40	15	345
54	280	35	40	15	370

* Base cost includes material, installation, excavation, labor, bedding and backfill, contractor's overhead and profit, soil treatment, plus 30% for engineering, administration, and contingencies.

Operation Maintenance

The estimated operations and maintenance costs reported by MINSY are minimal. The historical cost data for labor, material and other costs for years 1990 through 1993 associated with the storm water system operation and maintenance are presented on Table 6.3.3-13. The labor costs are based on labor hours provided by MINSY and the City of Vallejo labor rates, using the City's published pay rates and a multiplier for salary fringe and general overhead of 2.5.

The estimated 1994 operation and maintenance cost could not be based on the data provided by MINSY, as the costs appear unrealistically low for a system of such size. Instead, the projected 1994 O&M costs for the storm water system are based on the per mile of pipe cost reported by the VSFCD for its storm water system, and the miles of pipe on Mare Island. The resulting storm water annual O&M cost is $45,000.

Table 6.3.3-13 Navy Historical Storm Water O&M Costs ($)				
Fiscal Year	**Labor Costs**	**Material Costs**	**Other Costs**	**Total Costs**
90	23,500	3,159	3,683	30,342
91	-	548	-	548
92	-	400	8,151	8,551
93	8,675	1,056	230	9,961

Cyclic Replacement Cost

The cyclic replacement cost for the storm water system is based on an assumed 50-year useful life. Table 6.3.3-14 presents the estimated replacement costs for system pipe only. Table 6.3.3-15 presents the estimated Storm Water System cyclic replacement cost in 1994 dollars. The annual expenditure for system replacement is estimated to be 2% of the total cost. Replacement of the capital improvement projects is included. Inflation and interest factors are not considered.

Table 6.3.3-14
Storm Water System Pipe Replacement Costs

Length of Remaining Pipe (Cost Per Foot)								($1,000) Remaining Pipe Cost	($1,000) New Pipe Cost	($1,000) Replacement Total Cost
Storm System	15" ($155)	18" ($165)	21" ($180)	24" ($195)	33" ($255)	36" ($275)	48" ($345)			
1	2,100	1,000	1,100	-	-	-	-	689	1,357	2,046
2	-	420	-	520	-	-	-	171	1,357	1,528
3	-	-	-	-	-	-	-	0	3,072	3,072
4	-	-	-	-	-	-	-	0	2,718	2,718
5	-	-	-	400	-	-	-	78	3,229	3,307
6	650	2,070	580	350	-	-	2,850	1,598	3,528	5,126
7	500	1,500	-	2,800	800	-	-	1,075	2,627	3,702
8	-	-	820	400	-	950	-	487	1,521	2,008
Total								$4,097	$19,409	$23,506

Table 6.3.3-15 Storm Water Cyclic Replacement Costs ($)				
Facility	**Quantity**	**Unit Costs**	**1994 Costs**	**Annual Costs**
Collection Piping	1	26,744,000	26,744,000	534,900
Pump Station 13	1	9,800	9,800	200
Pump Station 14	1	40,600	40,600	200
Pump Station 15	1	184,400	184,400	3,700
Annual Cyclic Replacement Costs				$539,000

Caretaker Issues

The storm water system is not covered by the agreement between the Federal Government and the VSFCD noted in Section 6.3.2. However, if Mare Island is ceded to the City (or the County of Solano), then the District would be obligated under the terms of its agreement with the City (or County) to operate and maintain the storm water system. In this case, the VSFCD would need to revise its Storm Water Management Plan to include Mare Island.

MINSY storm water discharges are governed by the National Pollutant Discharge Elimination System (NPDES), which requires regular monitoring of discharges. The Shipyard currently operates under a State General Industrial Activities Storm Water Discharge Permit. The general permit requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The permit on Mare Island is for a single industrial operation. If multiple owners perform operations on definable sites, each will be required to obtain an individual industrial storm water NPDES permit, specific to their operation. If the Navy remains responsible for the public storm water system, the Navy may need to amend its current permit to reflect the change from a single industry permit to a system permit.

If the City of Vallejo elects to continue the general industrial uses, the activities would most likely continue to fall under the State General Industrial Permit. The State Water Resources Control Board requires new owners or operators of an existing facility to submit a Notice of Intent to comply with the terms of the General Industrial Permit. If the Vallejo Sanitation and Flood Control District owns and operates this storm water system, the District would need to amend its agency system permit to reflect the inclusion of the MINSY system. Each industrial activity operating on the island would then be required to obtain, when applicable, a specific industrial permit for discharge of storm water into the District's storm drain system.

6.3.4 Electric

Capacity Analyses

The computer program used to evaluate the electrical system was developed by SKM Corp. "Dapper" computer programs (Version 3.5, Level 2.1, Revision 1.11) and used load flow.

Load flow computer runs simulate the behavior of electrical networks under steady state conditions. The information obtained from these runs consists of voltages at electrical nodes (buses) and real and reactive power flows in the network elements (feeders and transformers). The computer program used in this study is "Dapper" (see Paragraph above). The data used by the program are the voltage at the source, transformer turns ratios and impedances, feeder impedances, shunt capacitor ratings and the real and reactive components of the loads. The computer model of the of the existing network includes 40 feeders, 5 transformers, 40 buses and 2 shunt capacitor banks. The electrical system is shown on Figure 6.3.4-1.

The maximum demand for the reuse plan of Mare Island is estimated to be 26,500 KW using a diversity factor of 33%. The maximum demand that was recorded on the base in 1986 was 26,469 KW. Reasons for justifying this demand are that the square footage of buildings in use in 1986 was about 8,000,000 sq. ft. and the reuse plan is predicting about 7,170,800 sq. ft. which is less. Also equipment has become more efficient and there will be more open space in the reuse plan.

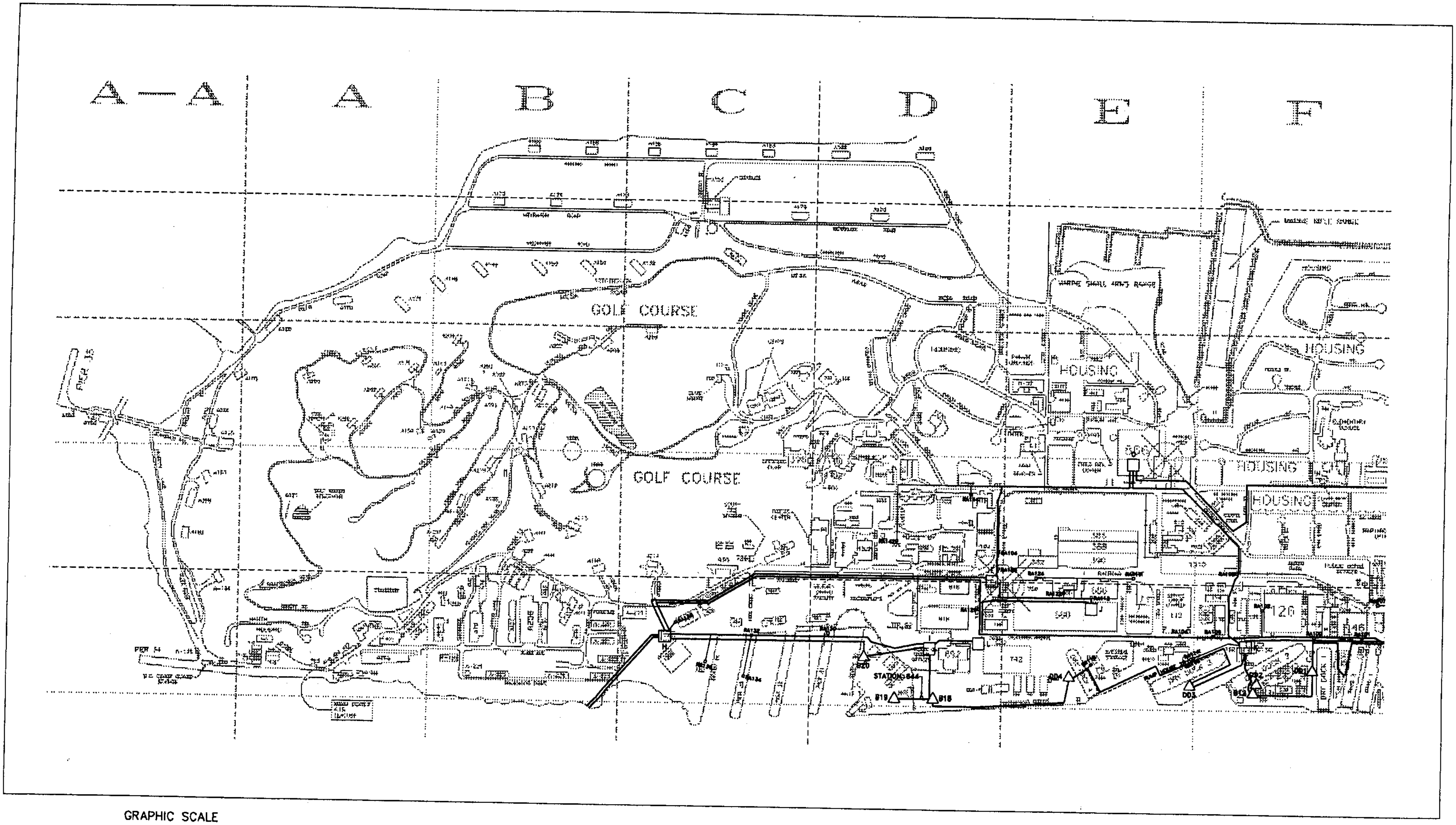
The results of the load flow computer runs indicate that the network is adequate for the projected loads based on the reuse plan, i.e., equipment is not overloaded and the voltages are generally within acceptable limits. This conclusion is based on the premise that power at nominal voltage is delivered by PG&E to Substation "H" under conditions of peak load. A voltage drop at this location would, of course, be reflected throughout the network.

Condition Evaluation

The overall condition of the electrical distribution system is very good. Much of the present distribution system has been recently upgraded and dated to no later than 1975.

The primary electrical distribution system has proven to be a very reliable network and has experienced relatively few failures in the past 10 years. The system coordination and short circuit studies have been continuously updated to reflect current system conditions. The system is considered to be in very good condition.

There are small portions of the system which are in need of upgrading to comply with current electrical standards. Most underground electrical vaults have water intrusion from tidal waters. This presents water disposal problems when work must be done in these vaults. The overhead distribution system in the Mare Island housing area is beyond the point of economical repair and requires replacement.



GRAPHIC SCALE

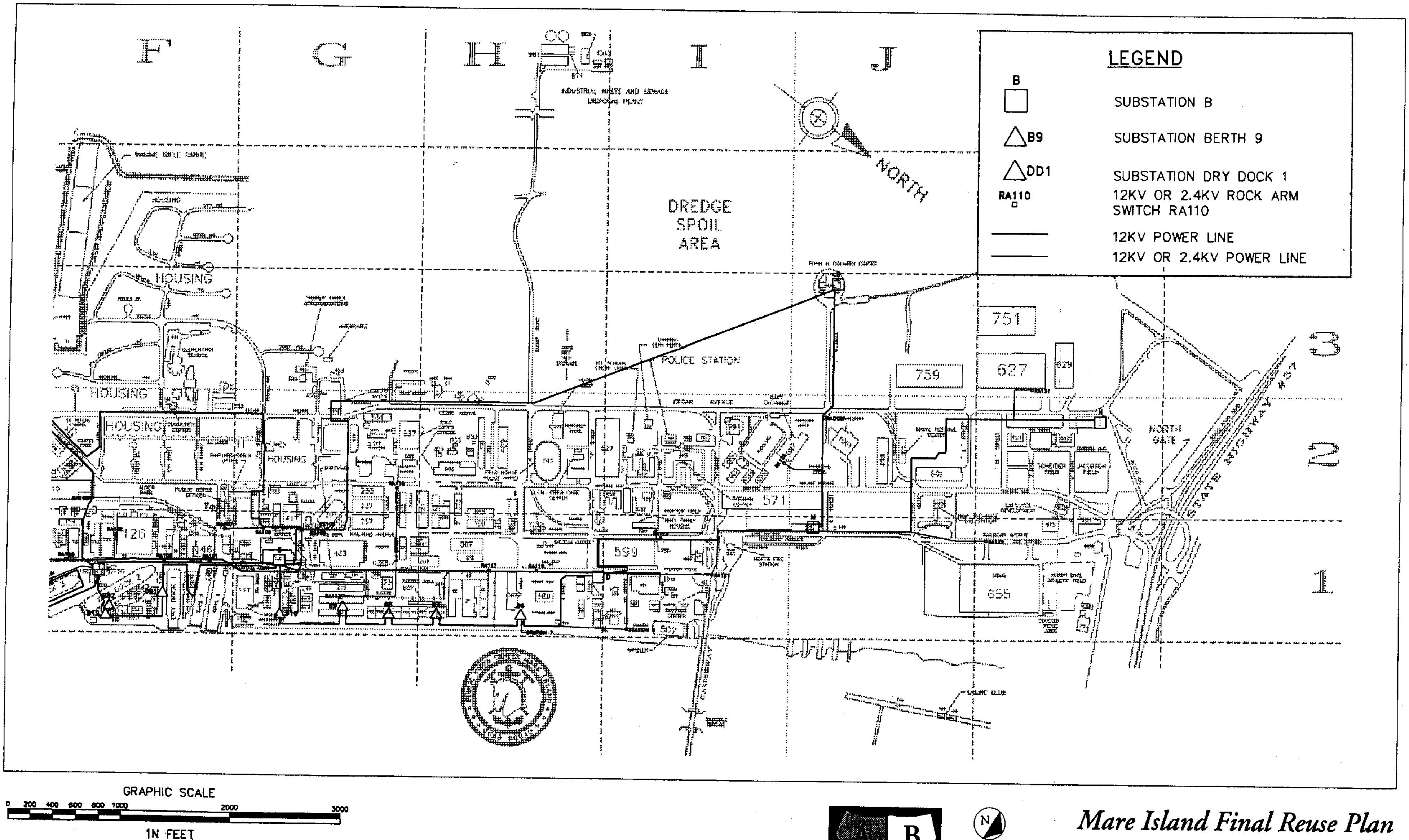
0 200 400 600 800 1000 2000 3000

IN FEET

Mare Island Final Reuse Plan

Figure 6.3.4-1a

Electrical System



Mare Island Final Reuse Plan

Figure 6.3.4-1b

Electrical System

All transformers on Mare Island will have less than 50 ppm of PCB's by the end of 1994 and because of the recent conversion of the 2.4 KV to 12 KV distribution system most of the 12 KV transformers are non PCB transformers.

Capital Improvements

The capital improvement projects for the Electrical Distribution System are identified in Table 6.3.4-1. These projects are based on the findings and conclusions of the electrical system analyses and information provided by Mare Island personal. A description of these capital projects can be found in the report appendix. These capital improvements are based on the assumption that the City of Vallejo or other entity will take over the electrical distribution system and reuse the existing equipment and not sell the system to PG&E.

Table 6.3.4-1
Electrical System - CIP Summary Sheet

Project Code	Project Number	Project Title	Total Cost (1994 $1000)	Fiscal Year Distribution		
				1996	2006	2016
EL	01	Utility Study	466	466		
EL	02	Duct Banks	1,200		600	600
EL	03	Upgrade "F"	950			950
EL	04	Conduit & Wire	50			50
EL	05	Capacitor Bank	150			150
EL	06	SCADA System	1,000		1,000	
EL	07	Seal Manholes	6,000		3,000	3,000
EL	08	15KV Housing	1,000		500	500
EL	09	Asbestos Abatement	6,000		3,000	3,000
EL	10	Electrical Meters	2,000	600	700	700
		Totals	18,816	1,066	8,800	8,950

The following criteria are used to develop these capital projects and their estimated 1994 project costs.

- Electrical-Utility Technical Study: Prepare GIS utility map on 1:50 scale base map showing manholes, transformers, substations, switch stations, overhead lines, underground ducts. Record nameplate data of equipment and prepare data base for GIS. Preform underground verification of electrical systems. Prepare single line diagrams for existing and future conditions. Prepare a master plan for electrical distribution system.

- Repair Collapsed Electrical Ducts: Through the years the land fill areas of Mare Island has settled and has collapsed electrical duct banks in various areas throughout the land fill area. Project cost include engineering, administration, demolition, construction, and contingencies.

- Upgrade Substation "F": This substation was not upgraded in the base conversion project to 12KV. The equipment is old and replacement parts are not available. The equipment should be replaced with new 15KV equipment. Project cost include engineering, administration, demolition, construction, and contingencies.

- Repair Electrical Distribution form Substation "F": Along with the upgrade of Substation "F" the electrical feeders, transformers, duct banks and manholes from Substation "F" need to be upgraded or replaced to accommodate the higher voltage level. Project cost include engineering, administration, demolition, construction, and contingencies.

- Install Capacitor Bank at Building 121: The power factor at Mare Island can be as low as 82% when the base is in full service. There is a cost penalty added to the electrical bill for the low power factor. The installation of these capacitors will reduce the electrical billing. However the low electrical demand currently experienced at Mare Island is low due to the cutback in work load at the Island. This project may not be necessary until the electrical load picks up again. Project cost include engineering, administration, demolition, construction, and contingencies.

- Replace SCADA System: The existing SCADA system is old and not reliable for safe control and monitoring the electrical system. The new SCADA system will be state-of-the-art and will monitor and control all of the electrical distribution system at Mare Island. Project cost include engineering, administration, demolition, construction, and contingencies.

- Seal Electrical Manholes and Vaults: Water intrudes into the manholes and vaults in the lowest areas of Mare Island. Any time access is required into the manholes or vaults, the water must be pumped out. The water is considered contaminated and must be contained. It cannot be pumped directly into the storm drains or sewers. Therefore sealing the manholes and vaults would reduce the labor for pumping the manholes and vaults and reduce the time required to enter the manhole of vault. Project cost include engineering, administration, demolition, construction, and contingencies.

- Replace 15KV Distribution System in Housing: The overhead power distribution system in the housing area is very old and has numerous electrical clearance violations and needs replaced to correct the violation and ageing equipment. Project cost include engineering, administration, demolition, construction, and contingencies.

- Asbestos Abatement of Electrical Vaults: The electrical cables in the manholes and vaults are fire retarded with a material which contains asbestos and needs to be removed to allow maintenance of the cables without the involvement of hazardous materials. Project cost include engineering, administration, demolition, construction, and contingencies.

- Metering: Install electrical meters to an estimated 2,000 individual consumers. Each consumer connection will need a meter. Project costs include the purchase, and installation of these meters. This project is a requirement for the development of Mare Island per the proposed Merged CRP-ULI Plan.

Operation and Maintenance

The estimated operation and maintenance costs are based on data provided by the Navy. Analyzing the Navy's historical cost data for labor, material and other costs associated with the electrical distribution system operation and maintenance, the projected 1994 cost are estimated in Table 6.3.4-2. The electrical charges for 1993 were $3,296,329 for 127,677 MW of power. The operation and maintenance cost do not include the purchase of electricity from the utility company. It also reflects the smaller population and fewer projects by the Navy. The estimated costs assume that the City of Vallejo or other entity will take over the electrical distribution system and reuse the existing equipment and not sell the system to PG&E.

Table 6.3.4-2
Projected 1994 Electrical Power Distribution O&M Costs

Fiscal Year	Labor Cost	Material Cost	Other Cost	Contract Cost	Total Cost
Operations AC Generating Equip.	1,732	0			1,732
PM AC Generating Equipment	24,616	1,870			26,486
Minor Repairs AC Generating Equip.	49,604			5,200	54,804
Operations AC Distribution System	1,173,542	6,092			1,179,634
PM AC Distribution System	356,503	31,668			388,171
Minor Maintenance AC Dist. System	538,095	50,274	4,320	5,228	597,917
Management of Water in Manholes	866		6290	47794	54,950
PM Street Light System	31,296	68			31,364
Emergency Service Street Light Sys.			7774		7,774
Minor Maintenance Street Light Sys.	13,112	1382			14,494
PCB Inspection Program	2,227				2,227
Electrical Meter Reading	206,284	6,527			212,811
Totals	2,397,877	97,881	18,384	58,222	2,572,364

Note: Labor cost based on City of Vallejo's labor rates.

The historical cost data for years 1990, 1991, and 1992 were provided in one format and the data for 1993 and 1994 were in another format. Other cost for 1990 - 1992 include the cost of purchased electricity where 1993 and 1994 did not. Therefore comparing the years form 1990 to 1994 is not totally compatible. The labor cost and material cost form 1990 to 1994 show a trend of the base reducing its staff equipment repairs as the base has cut back its operations. Table 6.3.4-3 show the historical cost data.

Table 6.3.4-3
Navy Historical O&M Costs

Fiscal Year	Labor Costs	Percent Change	Material Costs	Percent Change	Other Costs	Percent Change
1990	$2,817,206		$274,160		$5,891,083	
1991	$2,863,037	2%	$339,414	24%	$7,948,000	35%
1992	$2,386,606	-17%	$351,417	4%	$5,042,856	-37%
1993	$2,624,357	10%	$141,872	-60%	$3,518,964	-30%
1994	$2,199,262	-16%	$89,972	-37%	$74,650	-66%

The Navy reported labor in hours. The pay rate used for the labor hours was extracted from the City of Vallejo's Salary Pay Scale. The electrician rate at the maximum step was used for all labor cost calculation except for the electrical meter reading labor costs, which was extracted from the meter reader pay rate at the maximum step.

Cyclic Replacement Cost

The cyclic replacement cost for the electrical distribution system is based on a 50-year design life except for the cyclic replacement cost for the transformers which is based on a 25-year design life. Based on a 50-year design life, a two percent of total replacement cost represents an annual expenditure rate and based on a 25-year design life, a four percent of total replacement cost represents an annual expenditure rate. The total electrical distribution costs in Table 6.3.4-4 tabulated the annual cyclic replacement costs for all the electrical distribution system.

Table 6.3.4-4 Cyclic Replacement Costs				
Facility	Quantity	Unit Costs $	1994 Costs$	Annual Costs$
Station "B"	1	400,000	400,000	8,000
Station "B-10"	1	600,000	600,000	12,000
Station "B-18"	1	500,000	500,000	10,000
Station "B-19"	1	400,000	400,000	8,000
Station "B-20"	1	500,000	500,000	10,000
Station "B-7"	1	600,000	600,000	12,000
Station "B-8"	1	600,000	600,000	12,000
Station "B-9"	1	600,000	600,000	12,000
Station "DD-1"	1	500,000	500,000	10,000
Station "DD-2"	1	500,000	500,000	10,000
Station "DD-3"	1	500,000	500,000	10,000
Station "DD-4"	1	500,000	500,000	10,000
Station "D"	1	500,000	500,000	10,000
Station "E"	1	3,600,000	3,600,000	72,000
Station "F"	1	1,600,000	1,600,000	32,000
Station "G"	1	500,000	500,000	10,000
Station "H"	1	2,000,000	2,000,000	40,000
Station "I"	1	600,000	600,000	12,000
Station "J"	1	1,000,000	1,000,000	20,000
Station "K"	1	1,000,000	1,000,000	20,000
Station "M"	1	500,000	500,000	10,000
Station "N"	1	1,000,000	1,000,000	20,000
Station "O"	1	900,000	900,000	18,000
Station "P"	1	500,000	500,000	10,000
Station "S"	1	600,000	600,000	12,000
15KV Cable	221,750	60	13,305,000	266,100
Duct Banks and Manholes	73,917	250	18,479,167	369,583
15KV Switches	39	25,000	975,000	19,500
Transformer KVA (25yr)	120,000	20	2,400,000	96,000
Power Poles	300	1,000	300,000	6,000
Over Head Lines	45,000	15	675,000	13,500
Annual Cyclic Replacement Costs				1,180,683

6.3.5 Gas System Evaluation

Capacity Analyses

Load Estimation: The primary use for natural gas at Mare Island is for space heating of offices, shops, residential housing and other commercial and industrial facilities. Presently, most of the buildings are provided with steam for heating; this steam is generated at the Central Steam Plant in building 121. For this analysis, it is assumed that the steam plant will be discontinued and the individual buildings will have their own (local site) boilers for heating. Additional gas consumers include dryers, water heaters, industrial furnaces/ovens, and boilers supplying process steam or hot water. It is unlikely that all equipment would be operating at the same time, therefore, a 25 percent coincidence of peak gas loads was assumed as a worst case situation for gas system analyses performed as part of this report; this factor is also referred to as a diversity factor.

Industrial/Administration Area: Most system peak gas loads were determined using reference books (Means Estimating Manual and Navy Manuals) and these estimate gas demands were verified with data from similar existing facilities. For example, Means Estimating Manual has a Table of "Heat Loss Factors" for various Building Types; the heat loss factor is multiplied by the building volume to get the approximate heat loss which must be made up to maintain the indoor design temperature: 60°F for warehouses and 70°F for other buildings. Similarly, the NAVFAC MO-303 Utilities Target Manual provides another method for estimating the space heating load for various building types and occupancies. NAVFAC MO-303 Table 4-8 gives allowable Btu's/cubic foot of building volume/degree day. A peak Btu's/cubic foot heat load factor was then obtained using an approximate building and ceiling height and the Mare Island 98 percent winter design temperature of 33°F. Peak building space heating load was then determined using the building floor area.

Housing Area: The housing area gas loads are estimated at a space heating load of 40 BTUH/square foot, and 155 CFH (cubic feet per hour of gas) for water heating, clothes drying and cooking in each housing unit.

Network Analysis Methodology: The KYGAS computer program was used to analyze the Mare Island gas system. This program is designed to analyze steady state flows and pressures in gas distribution systems. The program can accommodate any piping configurations and any component which produces significant pressure loss such as bends, meters and pressure regulating valves. The program output provides printouts of systems characteristics such as flow rates (CFH), pressures at flowing nodes (PSIG), pressure losses (PSIG), and line velocities (FPS), etc. More detailed information about the program and modeling are described in the Technical Appendix, titled "Gas Network Analysis Methodology."

System Modeling: The input data for the existing conditions gas network modeling was based on estimated peak gas loads for all facilities using the gas capacity model demand factors (GAS TABLE 5 in the Technical Appendix) and on pipe data shown on the gas distribution system Node Diagram drawing (Plate M1 in the Technical Appendix). The entire gas piping network was modeled as one interconnected system with one supply point (source node): at the causeway on the Main Gate. The gas supply pressure was assumed to be maintained at 100 psig downstream of the main PG&E supply (source node) pressure regulator and 35 psig downstream of the pressure regulators serving the majority of Mare Island. Estimated gas loads for the facilities were assigned to the existing piping system at the closest junction nodes.

The Network flow analysis using the KYGAS computer program was used to determine the adequacy of the existing gas distribution system to satisfy the gas demands of existing and future facilities throughout Mare Island. The available pressures at each junction node, pressure drop across individual pipe sections and the corresponding flow rates are shown in the computer output in the Technical Appendix.

Discussion of Flow Studies: A simulation was performed using the capacity model gas demand (shown on Gas Table 5, Gas Model Demand Factors by Land Use, in the Technical Appendix) with a diversity factor of 25 percent; the demand for Land Use Area 62, 63, 64 and 65 were reduced to zero for the analysis because the development in these areas were deleted on the latest Land Reuse Plan (May 94). The supply pressure for the ten inch line was assumed to be 60 psig; 60 psig is the industry standard maximum operating pressure for polyethylene pipes. Initial simulations showed that the existing configuration of the piping system is not adequate for the proposed Re-use Land Use Plan. However, if the gas mains are operated at 35 psig (versus 30 psig) and several pipelines are increased in size, then the gas system will be adequate. The gas lines that need to be increased are the ones on the south side of Mare Island- Pipe Numbers 125 and 126 (see the node diagram Plate M1 in Volume 3, Chapter 7 (Technical Appendix)).

The criteria to be met was set at 2 psig at the lowest pressure point in the system, which would provide sufficient pressure to the individual building regulators. The lowest supply pressure indicated by the program output for the simulation was 11.83 psig to a group of buildings at the south end of Mare Island (junction node #127, see computer printout in Volume 3, Chapter 7 (Technical Appendix)). Although this pressure meets the set criteria, these results do indicate that this portion of the gas distribution system must be reviewed more carefully and in detail if any construction is planned in this area.

The calculated node pressures for buildings around the industrial and commercial areas vary from 15 psig to 32 psig. The computer network analysis of natural gas distribution for future conditions (Reuse Plan) indicated that with some pipe replacements, the existing gas distribution system can handle the worst case future gas loads while providing sufficient residual supply pressure at all junction nodes. This system analysis shows that some additions/upgrade to the Main Base gas distribution system will be required to support planned construction for the Merged CRP-ULI Plan. If in the future any significant changes to this plan is implemented or if special gas demand facilities are planned for Mare Island, then that portion of the gas distribution system should be reviewed, analyzed in more detail and improved if necessary.

Condition Evaluation

The gas distribution piping system throughout Mare Island appears to be in generally good condition. The gas system is shown on Figure 6.3.5-1. Most of the underground gas lines are polyethylene and all of the aboveground lines are steel; most of the steel are cathodically protected either by rectifier-impressed current type or by the sacrificial anode type. The polyethylene gas lines are inserted inside (polyethylene) coated steel pipes (see referenced Public Works Drawings below for more details). Per Mare Island Public Works personnel and historical records (work order system), the gas system has been a "low maintenance" utility system. Generally, the serviceable life expectancy of equipments are 15 to 20 years depending on equipment, maintenance and environment; and the serviceable life expectancy of utility pipelines are 30 years or more. Most of the distribution system have been replaced in the past fifteen years:

- The 10 inch (100 psig) gas line from the PG&E meter to the central power (steam) plant was replaced in 1985 under NAVFAC contract number N62474-81C-2335, as-built drawings by Johnson Engineering Corporation of Orinda, CA, Mare Island Public Works drawing numbers 10860-252 to 10860-266.

- Pressure regulating stations (Power Plant station, causeway station, 5th street station, etc.) were replaced in 1981 under NAVFAC contract number N62474-79C-4589, Mare Island Public Works drawing numbers 10860-195 to 10860-199.

- The main gas lines and gas service lines to the industrial areas, office areas and some housing were replaced in 1980 under NAVFAC contract number N62474-79C-4589, Mare Island Public Works drawing numbers 10860-163 to 10860-169.

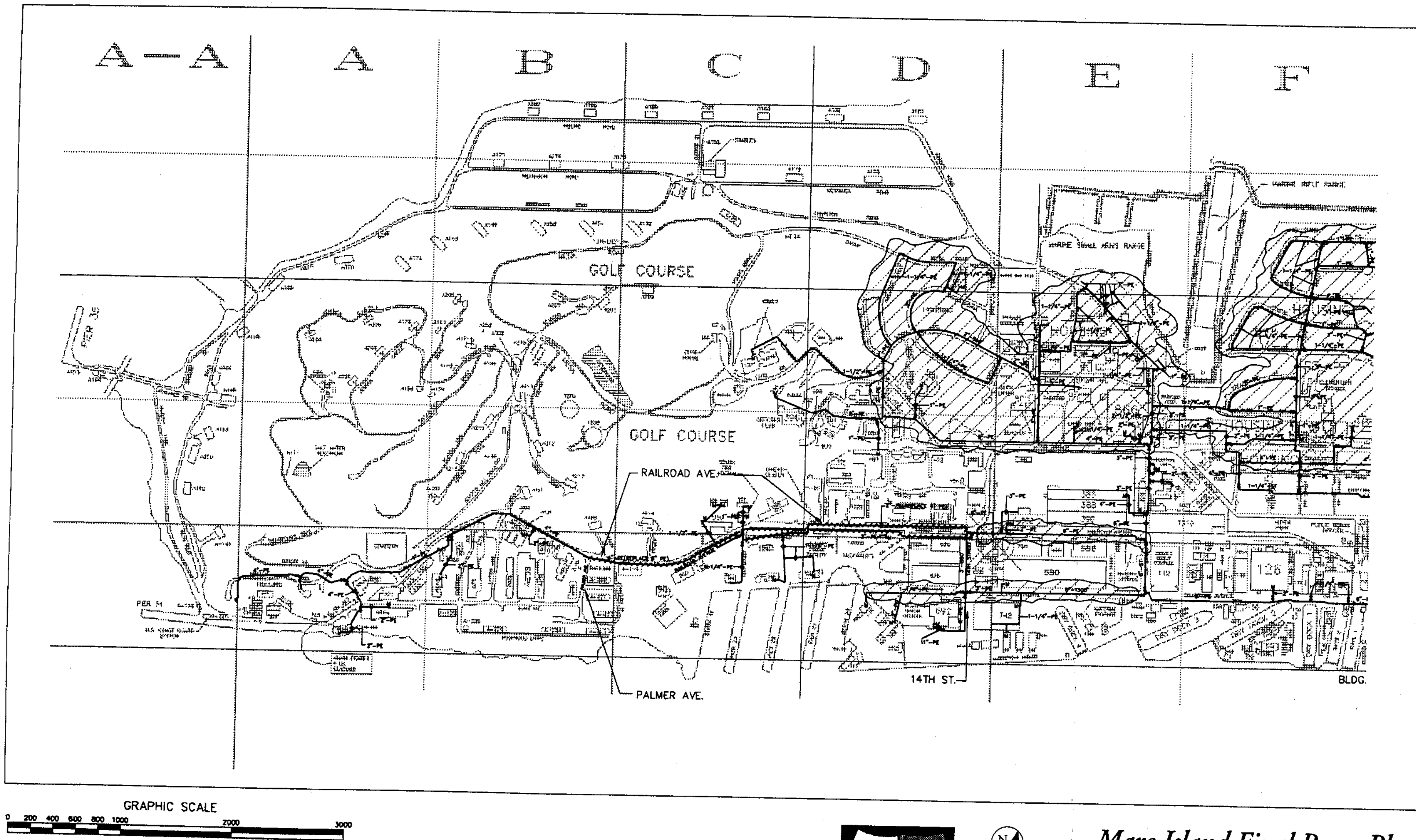
- Most of the other gas lines were replaced in 1977 under NAVFAC contract number N62474-77C-3228, Mare Island drawing numbers 10860-123 to 10860-141.

During a field survey of the gas system, a gas company employee had some concerns on one type of polyethylene pipe called IDILL-A. It seems that the local gas company has a policy to replace this pipe material whenever a repair is required for that section of pipe. Presently, the only area with this type of pipe is in the housing area near the rifle range.

Also, most polyethylene pipe are only rated at around 60 psig. Therefore, the operating pressure for the 10 inch polyethylene pipe should be 60 psig. Also, any new facility (as part of the Reuse Plan) with a high pressure gas demand will have to be located near the 10 inch high pressure line.

Capital Improvements

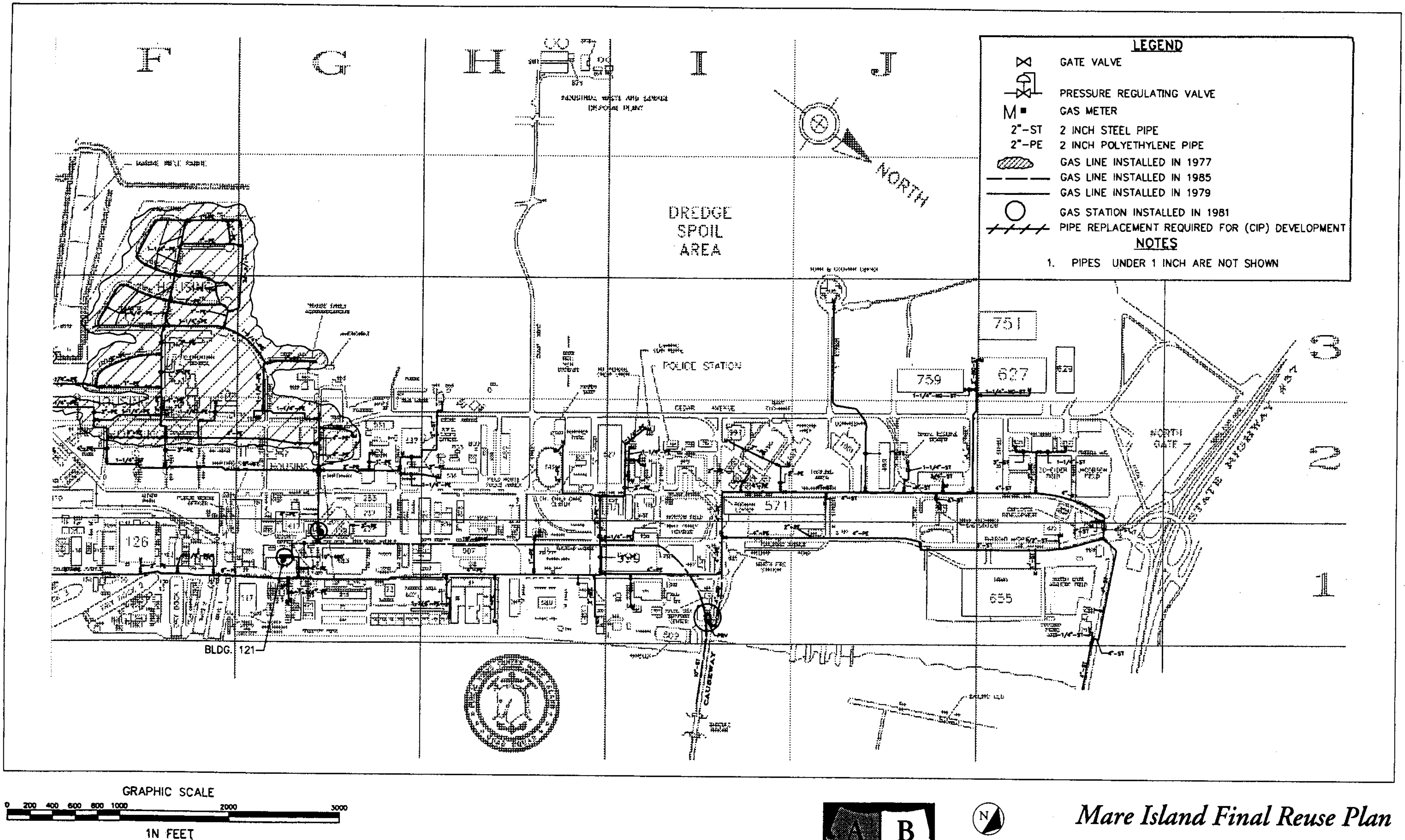
The capital improvement projects for the Natural Gas System are identified in Table 6.3.5-1 below. These projects are based on the findings and conclusions of the natural gas system



Mare Island Final Reuse Plan

Figure 6.3.5-1a

Gas System



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Mare Island Final Reuse Plan

Figure 6.3.5-1b

Gas System

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analyses and information provided by Mare Island personnel. A more detailed description (i.e., location, pipe lengths, cost) of these capital projects can be found in the report appendix. These capital improvements are based on the assumption that the City of Vallejo or other entity will take over the natural gas distribution system and reuse the existing equipment.

Table 6.3.5-1
Natural Gas System - Capital Improvement Program Summary Sheet

Project Code	Project Number	Project Title	Total Cost (1994 $1000)	Phase I 1996	Phase II 2006	Phase III 2016
GA	01	UTS- Gas System Study	$453	$453		
GA	01	Install Gas Meters	$3,000	$1,000	$1,000	$1,000
GA	02	Gas Piping- System 1	$284		$284	
GA	03	Gas Piping- System 2	$588			$588
		Totals	$4,325	$1,453	$1,284	$1,588

The following is a short description of the scope and the basis (or justification) for these capital projects.

- UTS - Gas System Study: Prepare GIS utility map on 1:50 scale base map showing valve covers/pits, valves, meters, and underground pipe routing. Record nameplate data of equipment and prepare database for GIS. Perform underground verification of piping and a leak survey test. Perform a comprehensive network analysis for existing and future conditions. Prepare single line diagrams for existing and future conditions. Prepare a master plan for the gas distribution system.

- Install Gas Meters: Install gas meters to an estimated 2,000 individual consumers. Each consumer connection will need a meter. Project costs include the purchase and installation of these meters. This project is a requirement for the development of Mare Island per the proposed Merged CRP-ULI Plan.

- Gas piping - South End System 1: Replace an existing 2 inch gas pipeline with a new 4 inch polyethylene gas pipeline; the 2 inch pipeline to be replaced is between intersections 14th Street/Railroad Avenue and 18th Street/Railroad Avenue. This pipe replacement is required for the development of the "Marina/Residential Area" (residential area by berth 24) per the Merged CRP-ULI Plan. The computer model simulation of the gas system showed that the existing pipeline (2 inch) presently serving this area does not have the capacity to provide the gas flow required by the proposed development; low pressures, pilot lights going out and choked gas flows will occur in the gas system if this project is not implemented. Project cost include engineering, administration, demolition, construction, and contingencies.

- Gas piping - South End System 2: Replace an existing 4 inch gas pipeline with a new 6 inch polyethylene gas pipeline; the 4 inch pipeline to be replaced is between intersections 14th Street/Railroad Avenue and Palmer Avenue/Railroad Avenue. This pipeline replacement is required for the development of the "Marina/Residential Area" (residential area by the Cemetery area) per the Merged CRP-ULI Plan. The computer model simulation of the gas system showed that the existing pipelines (4 inch) presently serving this area does not have the capacity to provide the gas flow required by the proposed development; low pressures, pilot lights going out and choked gas flows will occur in the gas system if this project is not implemented. Project cost include engineering, administration, demolition, construction, and contingencies.

Operation and Maintenance

The estimated operation and maintenance costs are based on data provided by the Navy. Analyzing the Navy's historical cost data for labor, material and other costs associated with the natural gas system operation and maintenance, the projected 1994 cost are estimated in Table 6.3.5-2 below. The operation and main finance cost reflects the smaller population and fewer projects by the Navy due to the planned base closure. The cost assume that the City of Vallejo or some other entity is going to take over the gas distribution system and reuse the existing equipment and not sell the system to PG&E.

Table 6.3.5-2
Projected 1994 Natural Gas System O&M Costs

Fiscal Year	Labor Cost	Material Cost	Other Cost	Contract Cost	Total Cost
PM to Distribution System	$574	$80			$654
Minor Maintenance to System	$17,228	$5,746			$22,974
Gas Meter Reading	$196,040	$0		$0	$196,040
Repair/Operations Dist. System	$4,594	$0		$0	$4,594
Cost of Gas			$2,480,000		$2,480,000
Totals	$218,436	$5,826	$0	$0	$2,704,262
Note: Labor cost based on City of Vallejo's labor rates.					

Historical Costs: The historical cost data is shown on Table 6.3.5-3 below; this data was provided by the Navy. The amounts shown in the "Other Costs" column (Table 6.3.5-3) for

1990 - 1992 include the cost of purchased gas whereas the amounts shown for 1993 and 1994 does not; therefore, this information should be taken into consideration when comparing the O&M "Other Costs" for years 1990 to 1994. The labor cost from 1990 to 1994 shows a decline due to the base closure: MINSY is reducing its staff as the base cut back its operations.

Table 6.3.5-3
Navy Historical O&M Costs

Fiscal Year	Labor Costs	Percent Change	Material Costs*	Percent Change	Other Costs*	Percent Change
1990	$39,207		$4,566		$3,314,828	
1991	$17,945	-54%	$3,217	-30%	$3,376,447	2%
1992	$37,125	107%	$6,730	109%	$3,016,248	-11%
1993	$20,214	-46%	$1,444	-79%	$2,480,430	-18%
1994	$17,687	-13%	$5,826	303%	NA	NA

Other Costs includes gas consumed and contract work; 1993 Other Costs is gas consumed cost only.
* Data provided by the Navy.

Labor costs are based on labor hours provided by MINSY and the City of Vallejo labor rates. The calculations for the labor costs are shown on the Technical Appendix (Gas Table 4); the salary rate (or position titles) used were "Meter Reader" and "Utility Mechanic" or gas utility technician, at the maximum step for a given salary range.

Cyclic Replacement Cost

The cyclic replacement costs for the natural gas system is shown in Table 6.3.5-4 below. The cyclic replacement cost is based on a 50 year design life and includes all of the equipment and piping in the natural gas system; pipeline replacement that are part of the Capital Improvement Plan (CIP) projects are not included in the cyclic replacement costs. Based on a 50-year design life, two percent of the total replacement cost represents an annual expenditure rate. Table 6.3.5-4 shows the estimated gas distribution replacement costs for piping that were not included in the CIP projects.

Table 6.3.5-4 Cyclic Replacement Costs*				
Facility	Quantity	Unit Costs $	1994 Costs$	Annual Costs$
Distr. Piping	1	10,646,105	10,646,105	212,922
Laterals to Bldgs.	1	8,500,000	8,500,000	170,000
Press. Regulation Sta.	10	15,000	150,000	3,000
Gas Meters	2,000	1,500	3,000,000	60,000
Annual Cyclic Replacement Costs Total				445,922
* The costs given are based on data for existing facilities/system.				

Caretaker Issues

The future caretaker for the gas system at Mare Island will be PG&E, the City of Vallejo or other entity, i.e., Municipal or Independent Utility. The issue is being evaluated and no decision has been made. There is a strong possibility that PG&E will become the future caretaker; therefore, PG&E is currently performing a separate preliminary evaluation of the gas system. This study is being coordinated with PG&E to ensure that the results will be of some use to them. However, due to the close tolerance requirements by PG&E, the results of this study will only serve as a guide to them in their preliminary evaluation. If PG&E becomes the caretaker of the system, they will perform a detailed study (including an extensive network analysis) of the gas system. Several factors that will affect the future caretaker are: sub-metering is generally unauthorized except for a utility company; special resources (manpower and equipment) are required for gas system operations (meter reading) and maintenance; type of gas service to different users/tenants will have to be determined- "interruptible/un-interruptible," direct purchase/delivery charge, cost schedules, etc.

6.3.6 Telephone

Capacity Analyses

There is no computer model for the telephone system. The number of telephone lines in service at Mare Island's peak was about 10,000. The reuse plan is proposing a less building area in the future than existed in Mare Island's peak. Therefore the existing system should be more than adequate to handle the telephone load established by the reuse plan.

Condition Evaluation

The telephone system installed at Mare Island is leased from AT&T and was put into service in 1992. The telephone system is shown on Figure 6.3.6-1. It consists of two new switches at Building 605A and new jelly filled underground copper cables. There are also fiber optic cables between the two remote buildings, one at the north end and the other at the south end of the base, and the maim switch at Building 605A. All this equipment is new and in excellent condition.

The residential telephone system is serviced and maintained by Pac Bell up to the MPOE which is to the exterior of each residence. The interior wire and phone equipment is the responsibility of the owner/landlord and its condition will vary from unit to unit. However, the repair cost to the owner/landlord would be minimal and limited to the wiring. The tenant would normally provide the phone equipment or lease it from Pac Bell, at their own discretion.

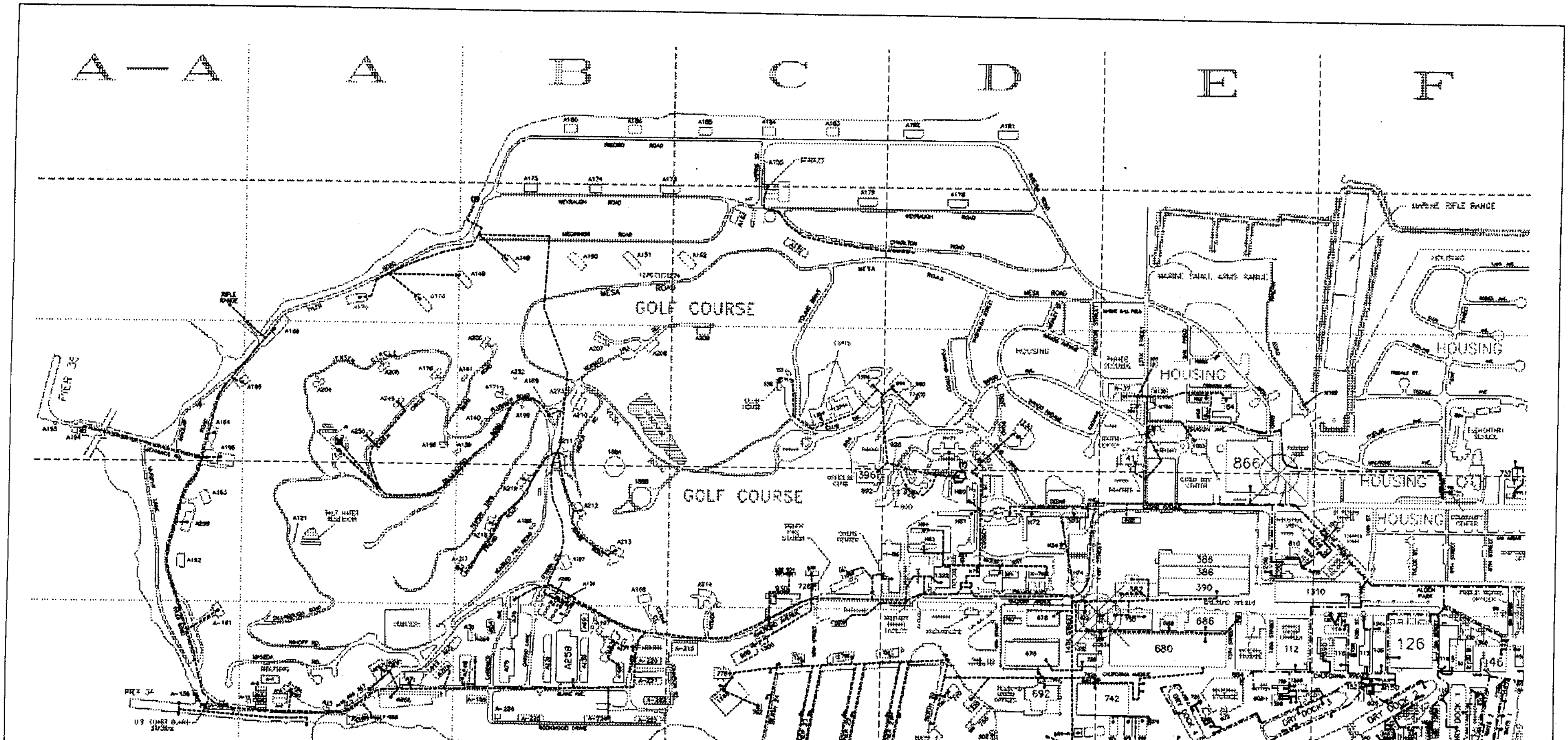
Capital Improvements

There are no capital improvement projects for the Telephone System anticipated. The telephone system was replaced in for the AT&T system was replaced in 1992 with new cables and switches. The Pac-Bell system serving the housing is owned and maintained by Pac-Bell and therefore would require no capital improvements by the Navy or any new owner. However a Utility Technical Study should be preformed on MINSY. The Utility Technical Study should include, but is not limited to, the following:

- Telephone-Utility Technical Study: Prepare GIS utility map on 1:50 scale base map showing telephone routing with cable identification. Prepare a cable schedule. Record equipment nameplate data and prepare database for GIS. Perform underground verification of communication cabling system. Prepare a cabling diagram. Prepare a master plan for communication system.

Table 6.3.6-1
Telephone System - Capital Improvement Program Summary Sheet

Project Code	Project Number	Project Title	Total Cost (1994 $1000)	Fiscal Year Distribution		
				1996	2006	2016
TE	01	Utility Study	398	398		
		Totals	398	398		



NOTES

1. THE COMMUNICATION CABLE SYSTEM AND SWITCH EQUIPMENT SHOWN ON THIS MAP WAS INSTALLED BY AT&T (IN JULY 1992) AND THE NAVY IS CURRENTLY LEASING FROM AT&T WITH AN OPTION TO PURCHASE. EXACT CABLE TYPES, PAIRS AND ROUTING CAN BE OBTAINED FROM AT&T's CABLE RECORD DRAWINGS.
2. PACIFIC BELL IS SERVICING THE HOUSING AREA AND RECORD DRAWINGS ARE NOT AVAILABLE AT THIS TIME.
3. THE INTENT OF THIS DRAWING IS TO ONLY SHOW THE GENERAL ROUTING OF THE EXISTING COMMUNICATION CABLE SYSTEM.

GRAPHIC SCALE

0 200 400 600 800 1000 2000 3000

1N FEET

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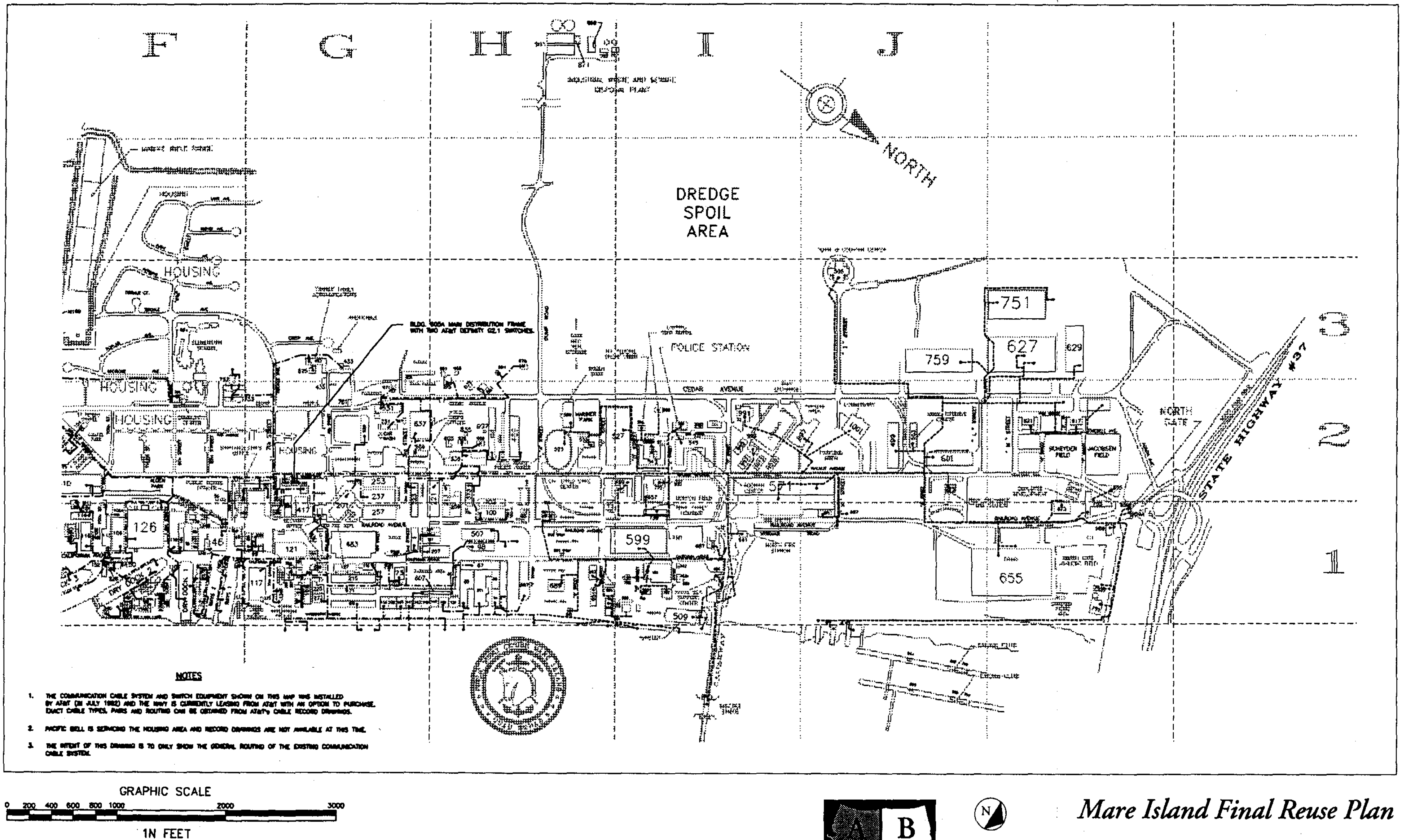
Mare Island Final Reuse Plan

Figure 6.3.6-1a

Telephone Plan



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Mare Island Final Reuse Plan

Figure 6.3.6-1b

Telephone Plan

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Operation and Maintenance

The estimated operation and maintenance costs are based on data provided by the Navy. Analyzing the Navy's cost data for labor, material and other costs associated with the telephone system operation and maintenance, the projected 1994 cost are estimated in Table 6.3.6-2. The cost assume that the City of Vallejo or other entity will take over the telephone system and reuse the existing equipment and not sell the AT&T switches.

Table 6.3.6-2
Projected 1994 Telephone O&M Costs

Fiscal Year	Labor Cost	Material Cost	Other Cost	Contract Cost	Total Cost
Maintain AT&T Switches				120,000	120,000
Maintain Cable Plant	514,592				514,592
Administrative Function	398,528				398,528
	514,592	0	0	0	514,592
Note: Labor cost based on City of Vallejo's labor rates.					

The historical cost data was not provided by the Navy for the telephone system.

Cyclic Replacement Cost

The cyclic replacement cost or the telephone system is based on a 50-year design life for the cable plant and a 25-year cyclic replacement cost for the switches. Based on a 50-year design life, a two percent of total replacement cost represents an annual expenditure rate and based on a 25-year design life, a four percent of total replacement cost represents an annual expenditure rate. The total telephone system costs in Table 6.3.6-3 tabulated the annual cyclic replacement costs for the telephone system.

Table 6.3.6-3
Cyclic Replacement Costs

Facility	Quantity	Unit Costs $	1994 Costs $	Annual Costs $
AT&T Switches (25Yr)	10,000	1,000	10,000,000	400,000
Cable (50Yr)	1	6,500,000	6,500,000	130,000
Annual Cyclic Replacement Costs				530,000

Caretaker Issues

- Reuse existing AT&T switches if available.

- Reuse the Local Area Network that connects 51 shipyard buildings, using fiber, T-1 Carrier, and 56 Kbps circuits.

- Maintaining (repairing, updating, and changing) the telephone cable plant. The cost will depend heavily on the type of development that takes place. Heavy industry will have low telephone density (per unit of building space) while small offices may have quite heavy telephone density.

  Administering the AT&T system on a continuing basis. This would include handling requests for service, making changes to the switch for connects, disconnects, changes in features, etc. (generally software updates), handing services complaints and repairs, administering a billing system for services, and managing the interfaces with multiple long-distance companies.

  Pac Bell presently owns and maintains the phone system in the residential area and should continue to be owned and maintained by Pac Bell.

6.4 UTILITY INFRASTRUCTURE SUMMARY

6.4.1 General

Operations at MINSY are supported by a complex utility infrastructure. Many of the existing utility systems will be needed to support the Reuse Plan. Section 6.1 provides a General Description and Statement of Condition for the various systems, which are summarized on Table 6.4.1-1. Section 6.2 relates the reuse potential for each system to the need of the Reuse Plan and classifies the systems as follows:

- Essential Systems: These systems are absolutely necessary for reuse plan implementation. They are evaluated in detail in Section 6.3 to determine system capacity and condition, which is compared to the Reuse Plan requirements to identify deficiencies. A Capital Improvement Program (CIP) is formulated to correct deficiencies associated with insufficient capacity, failed components, or non-conformance with design standards of the entity likely to assume responsibility for the system from the Navy. An annual Operation and Maintenance (O&M) cost estimate is provided that includes labor, material and other costs for utility distribution based on recent Navy cost accounts. The cost of purchased water, gas, electric and sewer service is listed separately. The annualized cost for a cyclic replacement program is also provided because the existing systems have a finite life. If cyclic replacement of the utility infrastructure does not occur, then the costs for O&M can be expected to increase as the systems continue to age.

Table 6.4.1–1
Utility System Summary (1)

Utility	Capacity	Description	Serves	Server	Conditions	(2) CIP Costs–$K	(3) Annual O+M Cost–$K	(4) Annual C.R. Costs–$K
Potable Water	**6.2 MGD @70 PSI**	**62 MI. Pipe to 20" 7 Tanks (10.5 MG) Chlorinator, Boosters**	—	**VWD VIA 14" & 20" MAINS**	**Fair; Usage (2.8 MGD Winter –3.3 MGD Summer)**	**11,316**	**864** **980 ***	**611**
Pure Water	30 GPM	2 Tanks (30,000 G) Demineralizer, Filter	Ship Berths	POWER PLANT	Very Good (Grade A Pure)	165	44	NA
Salt Water	2000 GPM @ 100 PSI	29 MI. Pipe to 16" 2 V.S. Pumps Standby/Emerg. Pumps	Industrial & NAD	POWER PLANT 2–48" INTAKES TO WW	Fair/Poor	3,200	1,011	NA
Sanitary Wastewater	**2.5 MGD Avg.**	**33 MI. Pipe to 27" 36 Pump Sta. Overflow pond.**	—	**VSFCD VIA 18" F.M.**	**Poor; Usage (1.5MGD ADWF 5 MGD AWWF)**	**4,749**	**448** **770 ***	**468**
Industrial Wastewater	.15 MGD Per 6 Hr. Period	4 MI Pipe 12 Pump Sta. 3 Pretreat. FAC.+IWTP	Industrial	VSFCD	POOR; Usage (.02–.04 MGD WDP–064M100)	5,500	400	NA
Storm Drain	—	**Pipe to 48" 3 Pump Sta.**	—	—	**Poor; (SWRCB–SGIA SWD Permit)**	**22,647**	**45**	**539**
Electrical	**40 MVA @ 115 KV**	**2–20 MVA XFMR, Sta. H 1–20 MVA XFMR, Sta. N**	—	**WAPA (VIA PG&E Lines)**	**Very Good; Usage 22 MW Peak**	**19,716**	**2,572** **NA ***	**1,181**
Electrical Distribution	**192,000 KVA @ 12 KV**	**247,000 L.F. Cable 45 Substations 5 MW Emergency Gen. 2–2400 KVAR Capacitors**	—	—	**Very Good**	**Incl. Above**	**Incl. Above**	**530**
Telephone	**1,500 Pair 15,000 Switches**	**PacBell to MPOE/and Residential: AT&T or other**	**Residential Other**	**PacBell AT&T**	**Very Good; Usage 491 Residential 10,000 Other**	**398**	**514**	**NA**
Dredge Lines	600,000 CY PER YR 250 CY/HR	5 Slurry Lines to 19" (4 ACTIVE)	Ship Berths	—	GOOD/Fair RWQCB 91–127 COE 17641E24 FWS MOU	9,550	942	NA
Drydock Flood and Drain	—	2 Pumping Stations (1–DD 1 & 2), (1–DD 3 & 4)	Drydocks	—	Fair RWQCB 91–122	NA	NA	NA
Steam High Pressure	300,000 PPH 600 PSI 750° F	Pipe to 12" Reducing Sta. for MP Steam	Ship Berths Standby Gen.	Power Plant (2 Boilers)	Good; Usage 100,000 PPH	5,310	3,916	NA
Steam Medium Pressure	165 PSI 100,000 PPH	Pipe to 12" 112 Cond. Return Pumps Heat Exch. For Hot W.	North & South Industrial Loop	3 Reducing Sta. & Steam Exhaust	FAIR; Usage 95,000 PPH Winter 25,000 PPH Summer	Incl. Above	Incl. Above	NA
Hot Water	70 PSI 200° F 4,000 PPH	2.7 MI. Pipe to 8" 2 Pumps Expans. Tanks	Limited Residential	Power Plant (2 Heat Exch.)	POOR; Usage 5,000 PPH Winter	695	332	NA
Comp. Air HP	540 SCFM 4500 PSI	Pipe to 1"	Ship Berths	Power Plant (2 Compress.)	Poor	575	108	NA
Comp. Air LP	35,000 SCFM 100 PSI	23 MI. PIPE TO 12"	Industrial	2 Compress. Sta. (3 Compress. EA.)	Good (Breathing Air Quality)	0	366	NA
Gas HP	**100 PSI Float**	**Pipe to 10" Reducing Sta.**	—	**PG&E**	**Good; Usage 630 Ktherms/Month**	**1,159**	**224** **2,480 ***	**445**
Gas LP	**30 PSI**	**Pipe to 8"**	—	**Reducing Sta.**	**Good**	**Incl. Above**	**Incl. Above**	**NA**
Fuel Oil	2 MG		Power Plant Ship Berths	Tank 772	Inoperative	NA	NA	NA

1. Essential Systems shown in bold.

2. Essential Systems – Projected 1994 Costs as developed in Section 6.3.
   Alternate Systems – Based on reported MINSY information.

3. Essential Systems – Projected 1994 Distribution Costs as developed in Section 6.3.
   * Purchase Cost of water, sewer service, electrical or gas reported by MINSY 1993.
   Alternate Systems – Based on reported MINSY costs.

4. Essential Systems – Projected 1994 Cyclic Replacement Costs developed in Section 6.3.

- Alternate Systems: These systems, many of which are specialized for shipyard operation, have an uncertain reuse potential. Their future use will be dependent on the market demand and the cost of service within the Reuse Plan framework. The summary of system capacity and condition, and the costs provided for the CIP and O&M, are taken from Navy sources.

6.4.2 Essential Utility Systems

- Potable Water: The potable water system is considered to be in fair condition, and the distribution system can support the land uses envisioned by the Reuse Plan for both consumptive use and fire protection. The major projects in the CIP consist of new water tanks to meet the storage requirements of the City of Vallejo's Public Works Department; new fire hydrants to permit abandonment of the existing salt water fire protection system; and new water service meters throughout the island. Water is purchased by the Navy from the City of Vallejo.

- Sanitary Wastewater: The sanitary wastewater system is considered to be in poor condition because of documented inflow and infiltration during periods of heavy rainfall, and suspected settlement and corrosion of collection system piping. Information regarding specific problems is minimal because the piping receives no regular maintenance or cleaning, other than repair at time of failure. There are known cross-connections between the sanitary sewer and the storm drains serving as emergency overflows that must be corrected. Although the collection system can support the land uses envisioned by the reuse plan, rehabilitation or replacement of nearly 20% of the system is assumed to be necessary to correct the known or suspected problems, accounting for 80% of the CIP.

  Treatment of wastewater generated on Mare Island is provided by the Vallejo Sanitation and Flood Control District (VSFCD) under a service agreement with the Navy. Transfer of the agreement and the "Connection Fee" paid by the Navy must be considered along with the transfer of the wastewater collection system itself. An annual Service Fee is also paid by the Navy to VSFCD.

- Storm Water: The storm water system discharges rainwater and other surface runoff to Mare Island Strait at about 65 locations. Although the system is able to drain the developed areas on the island so that flooding is infrequent, considerable runoff is carried overland in streets and gutters. There are also problems due to cross connections between the wastewater and storm water systems; failure of the flapper valves that prevent backflow of tidal water into the system; and undersized pipe not conforming to VSFCD design policies. Substantial rebuilding of the existing system is necessary to correct the known deficiencies; the CIP amounts to 84% of the estimated total system replacement cost. The CIP projects reconfigure the existing system to improve hydraulic efficiency, and reduce the number of outfalls to 8 locations to facilitate compliance with current regulations for control of storm water pollution.

The discharge of storm water is governed by the National Pollutant Discharge Elimination System (NPDES) Program. MINSY operates under a blanket Statewide General Industrial Activities Storm Water Discharge Permit; as the transition is made to the multiple tenancies envisioned by the Reuse Plan, new permits and a revised Storm Water Pollution Prevention Plan will be required to bring the storm water system into full compliance with regulations.

- Electric: The electric system is considered to be in good condition, and the existing system can support the land uses envisioned by the Reuse Plan. The system has proven to be very reliable, and only small portions of the system are in need of upgrading to comply with current electrical standards. The major projects in the CIP consist of sealing underground electrical vaults against water intrusion; asbestos abatement related to cable insulation; and new electrical service meters throughout the Island.

  Federal Power is purchased at a favorable rate under a contract between the Navy and the Western Area Power Administration. Transfer of the contract must be considered along with the transfer of the electric system itself. Incoming power is received via PG&E lines, which receive a fee for this service.

- Gas: The gas system is considered to be in good condition. Currently, the primary use of natural gas is for space and hot water heating, and some industrial processing. Heating for many industrial and administrative buildings is provided by the steam system; about 45% of the gas consumption goes to the power plant for steam production. Due to problems with the power plant and steam distribution system, the Navy planned to phase-out the steam system and provide local site boilers to meet requirements for heating and processing (see Steam System). The gas system evaluation considered this scenario and found that the main distribution piping can support the land uses envisioned by the Reuse Plan. The major CIP project is the installation of new gas service meters throughout the Island. Gas is purchased from PG&E.

- Telephone: The telephone system is considered to be in good condition and the existing system can support the land uses envisioned by the Reuse Plan. Pac Bell delivers service to the residential customers and to the AT&T switches that serve the remainder of the Island. The AT&T system is one of the most modern in the Department of Defense and is both unique for military use and relatively costly to maintain. The AT&T switches are being purchased by the Navy under a contract that extends to 1999, with $13 million yet to be paid. The transfer of the contract must be considered along with the transfer of the telephone system itself. There are no major CIP projects for the telephone system. Pac Bell owns and maintains its portion of the system, and the Navy maintains its portion.

6.4.3 Alternate Systems

- Pure Water: The system delivers relatively small quantities of pure water to be used as make up water for nuclear submarine propulsion systems. The system is in good condition.

- Salt Water: The system delivers salt water pumped from Mare Island Strait to be used for fire protection and flushing and cooling of industrial equipment. It serves the Controlled Industrial Area (CIA) and the Naval Weapons Station Annex (NAD). The system is in fair to poor condition.

- Industrial Wastewater: The system collects and treats industrial wastewater from approximately 98 sources in the industrialized areas of the Island. The sources must be carefully controlled to insure that the concentration of wastes can be adequately removed by the Industrial Wastewater Treatment Plant (IWTP) prior to discharge to the sanitary wastewater system, where it is combined with the sewage pumped to the VSFCD Treatment Plant. The system is in poor condition because of deterioration in both the collection system and the IWTP. Due to the cost required to upgrade the system to meet current regulations, the Navy planned to remove the system and implement a point source control program.

- Dredge Lines: The system facilities Navy dredging of the shipyard berths and consists of a series of slurry pipelines and a total of 510 acres of active dredge material disposal ponds. The system is in good to fair condition.

- Drydock Flood and Drain: The system consists of a series of flood and drain tunnels and two pump stations, to serve the drydocks. The system is in good to fair condition.

- Steam System: The steam system includes the high pressure (600 PSIG) and the medium pressure (165 PSIG) systems. Steam for both systems is produced at the Central Power Plant. The high pressure system can deliver large quantities, of steam for testing ship propulsion systems and equipment, operating the power plants standby emergency generator, and feeding the medium pressure system through steam reducing stations. It serves the CIA and is in good condition.

  The medium pressure system delivers steam for heating and processing in the industrialized areas of the Island. The system is in fair condition.

  The steam boilers in the Central Power Plant require upgrade to meet current air quality emission control regulations; the stack requires seismic upgrade. Rather than make the necessary upgrades, the Navy planned to close the central steam plant and furnish steam for heating and processing by means of local site boilers.

- Hot Water: The system delivers hot water for space and hot water heating to a limited number of buildings and residences. The system is in poor condition and the Navy is implementing a program to replace the system with individual boiler units.

- Compressed Air: The system consists of separate high pressure (4500 PSI) and low pressure (100 PSI) systems. The high pressure air is produced at a compressor station in the Central Power Plant and delivered to a limited waterfront area for testing of submarine pneumatic systems and equipment. The system is in good condition.

  The low pressure air is produced at two compressor stations to meet breathing air standards and is delivered to the industrialized areas of the Island to support various operations. The system is in good condition.

- Fuel Oil: The system provided a backup source of fuel for the Central Power Plant and fuel handling for shipyard craft. The system is in poor condition, and except for very limited use at Berth 4, is inoperative.

6.5 CAPITAL IMPROVEMENT PROJECTS

See Table 6.5-1.

TABLE 6.5-1: CAPITAL IMPROVEMENTS PROJECT

Item	Quantity	Unit	Unit Price	Total
3.25 MG storage tanks - Project 01	2	EA	$2,500,000	$5,000,000
Fire Hydrants & Appurtenances - Project 02	177	EA	5,000	885,000
20″ Welded (CMCL) Steel Pipe - Project 03	3,000	LF	200	600,000
4,000 gpm Pump & Appurtenance - Project 04	2	EA	250,000	500,000
New Water Service Meters - Project 05	2,000	EA	2,000	4,000,000
Engineering Study - Project 06, Code FW	1	LS	20,000	20,000
Engineering Study - Project 07, Code FW	1	LS	80,000	80,000
Engineering Study - Project 08, Code FW	1	LS	30,000	30,000
Engineering Study - Project 09, Code FW	1	LS	200,000	200,000
Pipe - Project 01, Code DW	Various	LF	Various	185,200
Study - Project 02, Code DW	1	LS	750,000	750,000
Pipe - Project 03, Code DW	Various	LF	Various	839,400
Pipe - Project 04, Code DW	Various	LF	Various	435,120
Pipe - Project 05, Code DW	Various	LF	Various	174,325
Pipe - Project 06, Code DW	Various	LF	Various	88,205
Pipe - Project 07, Code DW	Various	LF	Various	770,870
Pipe - Project 08, Code DW	Various	LF	Various	379,825
Pipe - Project 09, Code DW	Various	LF	Various	83,200
Pipe - Project 10, Code DW	Various	LF	Various	41,500

TABLE 6.5-1: CAPITAL IMPROVEMENTS PROJECT

Item	Quantity	Unit	Unit Price	Total
Pipe - Project 11, Code DW	Various	LF	Various	113,010
Pipe - Project 12, Code DW	Various	LF	Various	55,320
Pipe - Project 13, Code DW	Various	LF	Various	33,140
Pipe - Project 14, Code DW	Various	LF	Various	15,990
Pipe - Project 15, Code DW	Various	LF	Various	61,695
Pipe - Project 16, Code DW	Various	LF	Various	30,225
Pipe - Project 17, Code DW	Various	LF	Various	635,000
Pipe - Project 18, Code DW	Various	LF	Various	12,000
20 Horsepower Pump, Project 19	1	EA	30,000	30,000
10 Horsepower Pump, Project 20	1	EA	16,000	16,000
Pipe - Project 01, Code SD	Various	LF	Various	1,357,000
Pipe - Project 02, Code SD	Various	LF	Various	4,595,000
Pipe - Project 03, Code SD	Various	LF	Various	3,072,000
Pipe - Project 04, Code SD	Various	LF	Various	2,718,000
Pipe - Project 05, Code SD	Various	LF	Various	3,229,000
Pipe- Project 06, Code SD	Various	LF	Various	3,528,000
Pipe - Project 07, Code SD	Various	LF	Various	2,627,000
Pipe - Project 08, Code SD	Various	LF	Various	1,521,000
Utility Mapping, Project 01, Code EL	160	EA	1,800	288,000
Survey - Project 01, Code EL	40	MD	700	28,000
Study - project 01, Code EL	1	LS	150,000	150,000

TABLE 6.5-1: CAPITAL IMPROVEMENTS PROJECT

Item	Quantity	Unit	Unit Price	Total
Duct Bank - Project 02	4800	LF	250	1,200,000
Switchgear - Project 03	1	EA	950,000	950,000
Conduit, Wire & Switches - Project 04	1	EA	950,000	950,000
Capacitor - Project 05	2	EA	75,000	150,000
SCADA - Project 06	1	EA	1,000,000	1,000,000
Manholes & Vaults - Project 07	2000	EA	3,000	6,000,000
15KV Distribution - Project 08	20,000	LF	50	1,000,000
Vaults - Project 09	2,000	EA	3,000	6,000,000
Electrical Meters - Project 10	2,000	EA	1,000	2,000,000
Utility Mapping - Project 01, Code GA	160	EA	1,800	288,000
Survey - Project 01, Code GA	35	MD	700	24,500
Study - Project 01, Code GA	1	LS	140,000	140,000
Gas Meters - Project 02	2,000	EA	1,500	3,000,000
4" Pipe - Project 03, Code GA	2,090	LF	136	284,240
6" Pipe - Project 04, Code GA	3,500	LF	168	588,000
Utility Mapping - Project 01, Code TE	160	EA	800	288,000
Survey - Project 01, Code TE	50	MD	700	35,000
Study - project 01, Code TE	1	LS	75,000	75,000

NOTE: Capital Improvement descriptions and "Various" amounts are shown in Vol. III, Attachment 8.

6.6 RECOMMENDATION AND IMPLEMENTATION ACTION

6.6.1 Potable Water

6.6.1(a) Leak Detection & Pipe Condition Study (City): A field condition survey of all pipeline and service connections will be conducted to investigate for leaks. Pipelines will also be non-destructively evaluated to assist with prioritizing pipeline replacement.

6.6.1(b) Review Cross Connection Control Program (City): An engineering audit of the current cross connection control program will be conducted to review the need for backflow prevention, ensure the proper degree of protection, and review test records of the installed backflow prevention devices.

6.6.1(c) Valve & Hydrant Condition Survey (City): A condition survey will be conducted of all existing sectional valves and hydrants to determine their operational usefulness. The valves and hydrants will be exercised (operated through their full range of motion) and inoperable and leaking valves and hydrants would be located and identified for replacement.

6.6.1(d) Storage Tank Evaluations (City): Tanks No. 188B and 920 are above ground steel water tanks. An evaluation will be conducted to determine the tanks' useful life and seismic stability. Corrosion protection will be also be addressed.

6.6.2 Sanitary Wastewater

6.6.2(a) Sewer System Studies (VSFCD): An inflow and infiltration (I&I) study will be conducted in order to identify portions of the collection system subject to excessive infiltration and to locate overflows/cross connections between the sanitary sewer and the storm drain. A study of the sewage pump stations will also be needed to verify the function and condition of the stations. The studies will establish a priority for implementation of the required repairs/replacements. The scope of the study would exclude those areas that have been previously investigated and corrected by the Navy.

6.6.2(b) Negotiate Transfer of Sewage Service Agreement (City): The U.S. Navy will negotiate a transfer of the sewage service agreement with the VSFCD in order to provide sewage treatment service for Mare Island. Responsibility for the maintenance and operation of the wastewater collection systems on Mare Island will also be transferred by the Federal Government to a new caretaker, which must also be negotiated.

6.6.3 Storm Water

6.6.3(a) Negotiate Transfer of Storm Water Service (City): The U.S. Navy will negotiate the transfer of the storm water system and existing NPDES Discharge Permits on Mare Island to a new caretaker.

6.6.3(b) Incorporate Mare Island into VSFCD Territory (VSFCD): After Mare Island is ceded to the City or County, the VSFCD will revise its Storm Water Management Plan and include Mare Island in it's territory to facilitate transfer of storm water service responsibility.

6.6.4 Electrical

6.6.4(a) Utility Study (City): The City will conduct a comprehensive study of the existing electrical system on Mare Island. The study will verify the condition of the system, including underground duct work, and condition and capacity of major equipment for the system and prepare a master plan for the electrical distribution system.

6.6.4(b) Negotiate Transfer to New Owner (City): The City will negotiate with the utility company for the transfer of the electrical system.

6.6.5 Gas

6.6.5(a) Utility Study (City): The City will conduct a comprehensive study of the existing gas system on Mare Island. The study will verify the condition of the underground main lines and service laterals, and condition and capacity of major equipment for the system and prepare a master plan for the gas distribution system.

6.6.5(b) Negotiate Transfer to New Owner (City): The City will negotiate with the utility company for the transfer of the gas system.

6.6.6 Telephone

6.6.6(a) Utility Study (City): The City will conduct a comprehensive study of the existing telephone system to verify the condition of the communication cabling system. The study will include identifying major telephone equipment and preparing a master plan for the communication system.

6.6.6(b) Negotiate Transfer to New Owner, and AT&T Equipment Agreement (City): The City will negotiate with the utility company for the transfer of the telephone system on Mare Island and the equipment agreement.

6.7 REFERENCES

See Appendix 4.0, Volume III

7.0 TRANSPORTATION

7.0.1 Introduction

The ability of local and regional transportation facilities and services to accommodate future travel demand will play an integral role in the redevelopment of Mare Island. As such, this section focuses on the transportation related constraints to the reuse of Mare Island as well as the transportation improvements that would be required to serve the island after conversion to civilian uses.

7.0.2 Purpose

The purpose of the transportation section is to identify the transportation improvements that would be required to accommodate future traffic levels on Mare Island and on regional access routes to the island. This effort included the following components:

- Identification of existing transportation system conditions and constraints affecting Mare Island circulation and access;
- Estimation of Mare Island reuse plan traffic levels and patterns;
- Determination of future transportation impacts caused by Mare Island traffic;
- Identification of improvements to mitigate Mare Island transportation impacts; and
- Estimation of costs for transportation improvements.

Each one of these components is discussed below in sections 7.1 through 7.6.

7.0.3 Study Area

Figure 7.1 shows the reuse plan transportation study area. Although most of the reuse plan concentrates solely on Mare Island, the transportation section also focuses on the local and regional transportation routes that serve the island (or could serve the island in the future). These routes include:

- Interstate 80;
- Interstate 780;
- State Route 37;
- State Route 29;
- Tennessee Street;
- Wilson Avenue;
- Curtola Parkway;
- Mare Island Way;
- Mare Island Causeway; and
- Sacramento Street

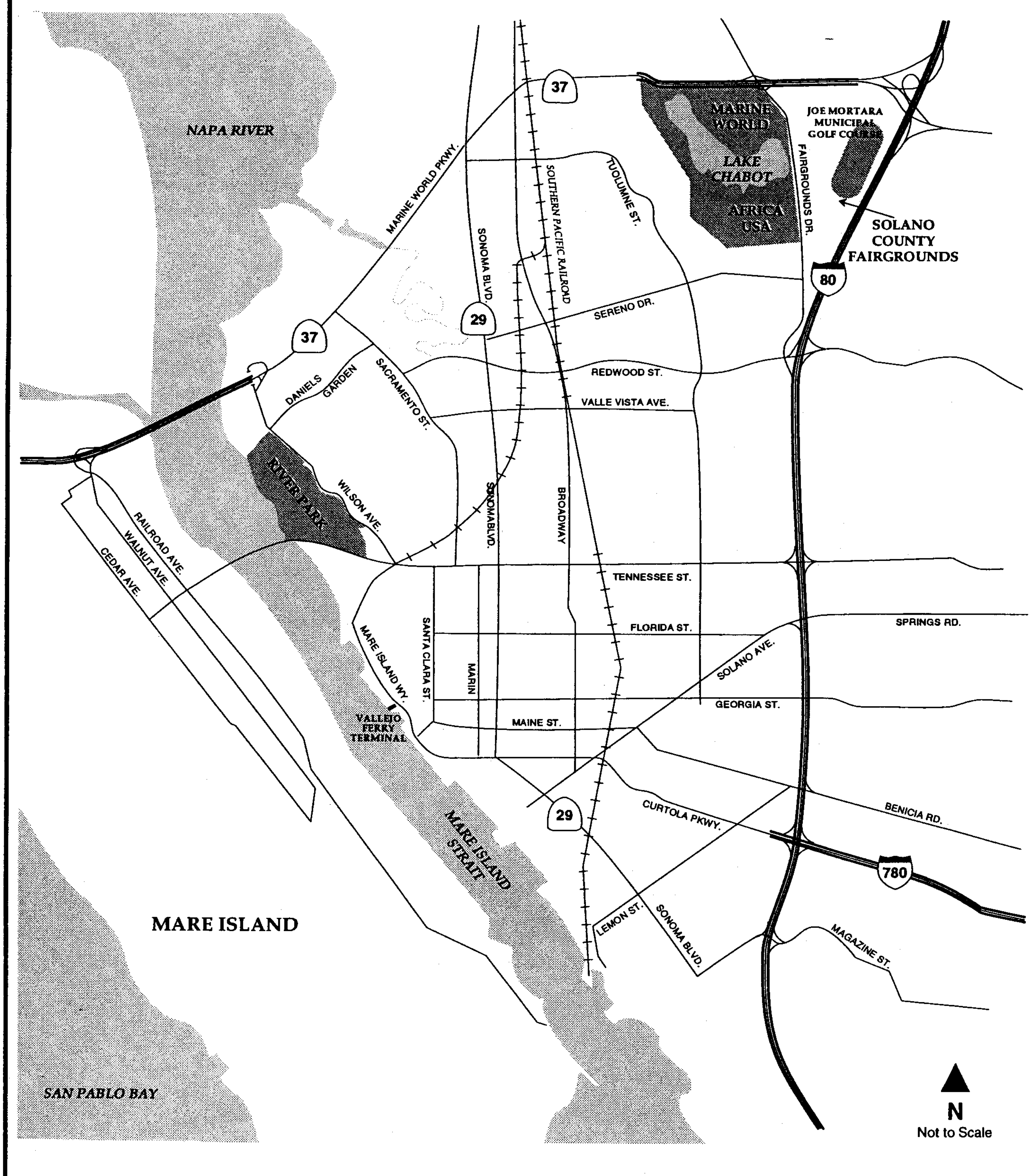

FIGURE 7.1

TRANSPORTATION STUDY AREA

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7.1 EXISTING CONDITIONS

The existing conditions analysis was used to identify existing transportation constraints affecting Mare Island circulation and access. It includes the following transportation system components:

- Street System;
- Transit System;
- Bicycle and Pedestrian System;
- Aviation System; and
- Freight System.

The street system includes roadway facilities that serve automobile traffic and is by far the most extensive transportation system component both on and off the island. Bus and ferry service constitute the transit system while walking and bicycling routes are the key parts of the bicycle and pedestrian system. The final system dedicated to the transport of people is the aviation system, which consists of helicopter facilities on Mare Island. The last system is the freight system, which includes goods movement by truck and by train. Existing conditions are described for each system component below.

7.1.1 Street System

This section describes existing conditions for street and parking facilities on Mare Island as well as for the primary routes that connect the island to local arterials and regional highways/ freeways. Existing conditions include the physical condition of the street network and in specific cases it also includes operational conditions.

Mare Island Street System

The Mare Island street system (see Figure 7.2) includes arterials, collectors, and residential streets. As shown in the figure, most of the major streets run north-south (Cedar, Walnut, Railroad, California), while the Mare Island Causeway (G Street) provides the primary east-west link with the City of Vallejo. Walnut Avenue provides the second access point for the island, connecting directly to State Route 37 (SR 37). In order to accommodate the heavy directional peak hour traffic flows in the past, much of the arterial roadway system consists of one-way streets or two-way streets with reversible center lanes.

The North and Main gates provide the only vehicle access onto Mare Island. Both gates are reduced to one in-bound lane and two-outbound lanes at the control points. Only those vehicles with identification stickers can use the North Gate, including civilian employees and U.S. Navy personnel. All others, including visitors and deliveries must proceed to the Main Gate to obtain a pass.

Most of the collector streets are short and provide connections to residential areas or east-west connections between the arterials. Other streets include residential streets, alleys, and a large

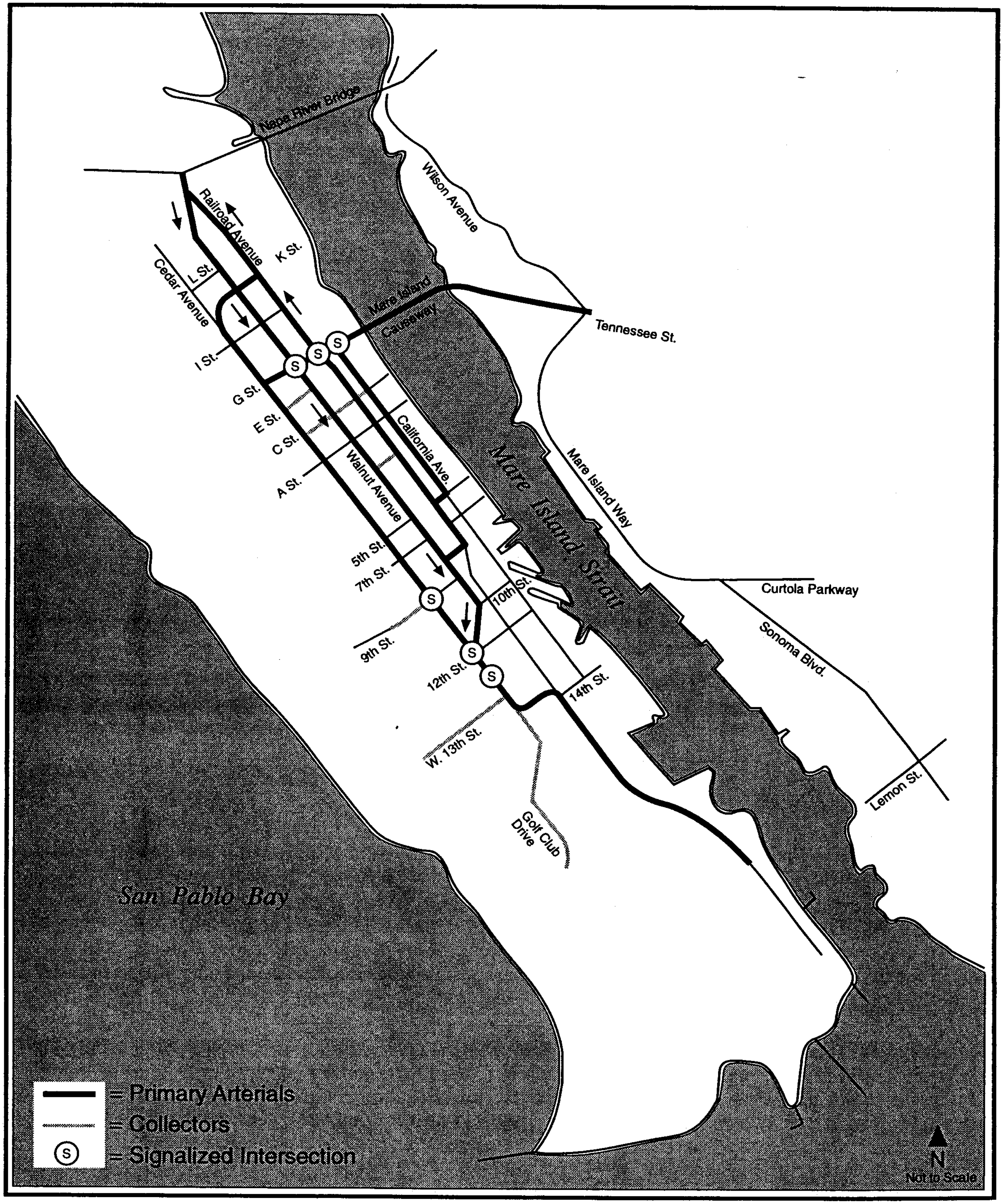

FIGURE 7.2

MARE ISLAND STREET SYSTEM

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Transportation Consultants

number of service roads that are largely unstriped. Some of the original roadway network including parts of Railroad Avenue and California Avenue are in the Controlled Industrial Area (CIA), and not accessible to through vehicles.

Mare Island Street System Inventory and Condition:

Streets on Mare Island have been classified as major arterial, major collector, residential, alley, and service roads (see Figure 7.2). The classification approximates existing City of Vallejo standards in function only: few Mare Island streets meet current City design standards. The classification system also indicates general existing condition.

Mare Island streets and roads evolved over the 140-year history of the base, and as such there are no "as-built" drawings which show the structural cross section of the streets according to the Mare Island Naval Shipyard (MINSY) Public Works staff. Generally the pavement surfaces appear in fair condition, indicating that the sections have been constructed substantial enough to accommodate heavy trucks. There are some areas where the pavement needs immediate replacement, but this is confined to a few specific areas. Although as-built drawings were not available, Table 7.1 lists each Mare Island street indicating street length, number of lanes and width of lanes.

There are a total of 8.8 miles of arterial streets on the Island, functioning as conduits for through traffic and generally carrying ADTs over 5,000 vehicles. The arterials range from 2 to 4 lanes, with a three lane configuration being most common. Lane widths range from 8.5 feet to 19.5 feet, with most being in the 10 to 11 feet range.

The collector system is 5.8 miles long, and consists of shorter sections of two-lane roadway with lane widths between 8 and 15 feet wide. The residential streets total 3.5 miles and generally conform to consistent geometries: two unstriped lanes, total curb-to-curb width of 30 feet with on-street parking. Alleys are limited to the older residential areas between Walnut and Cedar Avenues, and are used as connectors between the one-way streets and residential access. They generally measure 20 feet in width.

In the unclassified or "other" category are many roads on Mare Island which either serve little functional purpose, are sub-standard, or should otherwise be closed to the public once the Island is opened to civilians. These roads are typically 20 to 25 feet wide, unstriped, and vary from fair to poor pavement condition. The arterial, collector, and residential street system can be opened to civilian traffic with relatively minor modifications.

City of Vallejo standards for primary arterials call for an 80-foot right of way including sidewalks, curb and gutter, bike lanes, four travel lanes (12' and 13'), and a 12 foot wide median strip. Currently, no streets on Mare Island meet this standard. Most of the current arterials on Mare Island have 10 to 12 foot-wide lanes with no curb, bike lane, sidewalk, or median island.

Table 7.1
INVENTORY OF EXISTING STREETS

Street Name	Length (ft.)	Lanes	Lane Width Min.	Lane Width Max.	Pavement Area (sq. ft.)
Arterial System					
G Street/causeway	6,100’	3-4	10’	11’	194,900
Cedar Avenue	11,850	2-3	9	19.5	435,900
Railroad Avenue	15,200	2-3	10.5	15.5	488,600
Walnut Avenue	10,000	2	8.5	15.5	290,200
California Avenue	3,600	2	10	12.5	147,100
Subtotal	46,750				1,556,700
Collector System					
3rd Street	800	2	12	12	19,200
4th Street	400	2	12	12	9,600
5th Street	1,250	2	12	12	30,000
10th Street	550	2	12	12	22,000
13th Street	1,600	2	10.5	15	39,500
A Street	5,500	2	12	12	132,000
C Street	1,850	2	12	12	44,400
D Street	650	2	12	12	15,600
E Street	1,300	2	12	12	31,200
J Street	650	2	12	12	15,600
K Street	400	2	12	12	9,600
L Street	650	2	12	12	15,600
M Street	650	2	12	12	15,600
P Street	400	2	12	12	9,600
Combat Systems TSC	3,000	2	12	12	72,000
Friedell Street	600	2	12	12	14,400
Golf Club Drive	2,450	2	10	10	55,400
Mesa Road	4,550	1-2	8	12	115,800
San Pablo	1,200	2	12	12	28,800
Suisun Avenue	1,000	2	12	12	24,000

Table 7.1
INVENTORY OF EXISTING STREETS

Street Name	Length (ft.)	Lanes	Lane Width Min.	Lane Width Max.	Pavement Area (sq. ft.)
Young Drive	1,300	2	10	10	26,000
Subtotal	30,750				745,900
Residential					
9th Street	1,800	2	8	8	54,000
Crisp Avenue	450	2	8	8	13,500
Kirkland Avenue	1,400	2	8	8	42,000
Klein Avenue	1,300	2	8	8	39,000
Laws Avenue	550	2	8	8	16,500
Madrone Avenue	950	2	8	8	16,500
Navfak Road	1,900	2	11	11	41,800
Petaluma Avenue	500	2	8	8	15,000
Pompano Street	500	2	8	8	15,000
Poplar Avenue	800	2	8	8	24,000
Preston	700	2	8	8	21,000
Reeves Avenue	450	2	8	8	13,500
Saginaw	400	2	8	8	12,000
Sargo Avenue	1,700	2	8	8	51,000
Tisdale Avenue	2,300	2	8	8	69,000
Wahoo Avenue	1,900	2	8	8	57,000
Wasmuth Street	800	2	8	8	24,000
Subtotal	18,400				536,800
Alley					
7th Street	550	2	10	10	11,000
Nameless	1,100	2	10	10	22,000
Oak Avenue	1,500	2	10	10	30,000
Subtotal	3,150				63,000
Grand Total	99,050				2,902,400

Collector streets for the city have a standard cross section of 50 feet, with sidewalks, curb and gutter, and two travel and parking lanes on each side for a 40-feet wide pavement section. Most secondary or collector streets on Mare Island currently have two 12-foot wide lanes and no parking lane, curb, or sidewalk.

Residential city streets have a standard width of 50 feet, with sidewalks, curb and gutter, and 36 feet of pavement for two travel lanes and two parking lanes. Residential streets on Mare Island have 30 feet of pavement with on-street parking permitted, curb and gutter, and sidewalks often on one side only.

Sub-standard Areas:

Aside from narrower streets and right of ways, there are other features which do not meet City of Vallejo or Caltrans standards, including the setback of trees and buildings and line of sight along some roadways, lack of protected railroad crossings, the diagonal left turn lane at the G Street/Railroad intersection, and limited street lighting. Only about 30 percent of the classified streets on Mare Island have curb and gutter. As such, a formal water drainage system is provided in limited areas only. In general, traffic signing such as STOP signs and speed limits are adequate.

Perhaps the greatest immediate concern are the reversible lane systems on G Street, the Mare Island Causeway, and California Avenue, which are currently unsigned and unsignaled. It would not be appropriate to allow the public to use the reversible lane system without proper signing, signaling, and other measures.

Another area of concern is the existing one-way street system, which was designed to accommodate high volumes of peak period traffic. While the one-way system does provide high capacity and help organize internal circulation, it also results in higher vehicle miles traveled as vehicles negotiate side streets to complete loops.

Mare Island Street System Operations:

Facilities analyzed for the street system operations include both streets and intersections. In general terms, the difference between traffic volumes and available street capacity is used to gauge traffic operations for streets. As the amount of available street capacity is reduced, congestion tends to occur resulting in slower travel speeds and longer travel times between trip origins and destinations. For intersections, "levels of service (LOS)" are used to measure traffic operations. Service levels vary from "A", the best, to "F", the worst. Table 7.2 relates the LOS letter designation to a general description of traffic operations.

Table 7.2 LOS DESCRIPTION	
LOS	**Description**
A	Represent free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.
B	Stable flow, but the presence of other users in the traffic stream begins to be noticeable.
C	Stable flow, but marks the beginning of the range of flow in which that operation of individual users becomes significantly affected by interactions with others in the traffic stream.
D	Represents high-density, but stable flow.
E	Represents operating conditions at or near the capacity level.
F	Represents forced or breakdown flow.
Source: *Highway Capacity Manual, Special Report 209,* Transportation Research Board. 1985.	

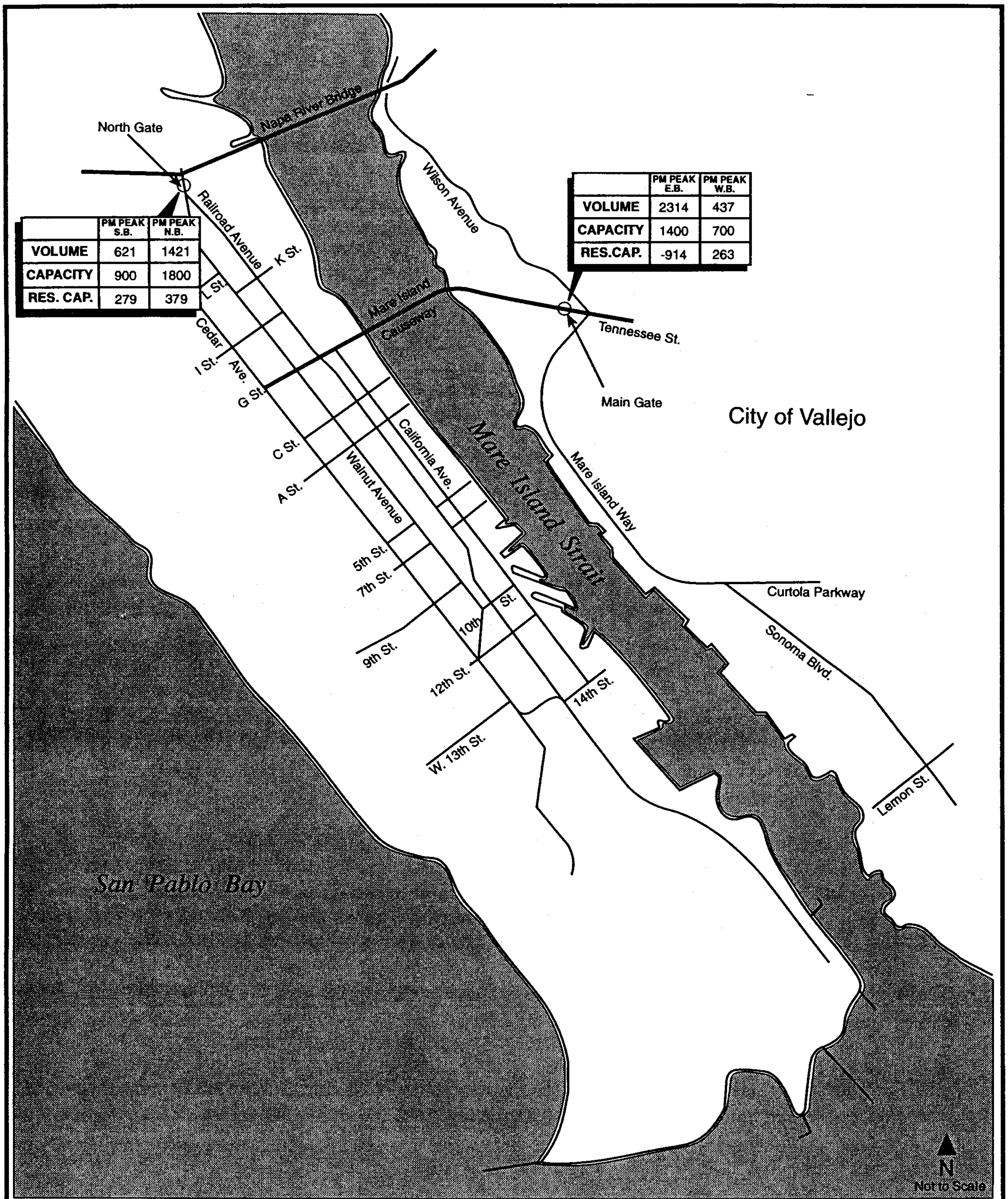
The reader should note that various methods are used to determine service levels for intersections depending on the type of traffic control device present and the amount of data that is available regarding traffic and geometric characteristics. Further, the specific LOS criteria may also differ for each method. Nevertheless, the general descriptions of service levels in Table 7.2 still apply.[1]

Entrance Operations:

Two of the most important streets on Mare Island are G Street and Walnut Avenue because they provide access to the two island entrances. Therefore, the capacity of these two streets is one of the most significant factors affecting reuse of the island. In 1988, a total of 4,793 P.M. peak hour trips were measured entering and exiting Mare Island. Fifty-seven percent used the main gate and 37 percent used the north gate. The peak period occurred from about 3:30 to 4:30 P.M. with 78 percent of the vehicles headed outbound and 22 percent headed inbound. Figure 7.3 displays the P.M. peak hour volumes at each access along with the estimated capacity of each entrance.

The three-lane north entrance is directly off of SR 37 and the three-lane main entrance is an extension of Tennessee Street called Mare Island Causeway. The three lanes on Mare Island Causeway are striped for reversible use during peak hours. As a result, there can be as many as four one-direction lanes entering or exiting the island at one time from the Main Gates.

[1] For more information regarding specific methodologies please refer to the *Circular 212 Interim Materials on Highway Capacity* and the *1985 Highway Capacity Manual.*



	PM PEAK S.B.	PM PEAK N.B.
VOLUME	621	1421
CAPACITY	900	1800
RES. CAP.	279	379

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	2314	437
CAPACITY	1400	700
RES.CAP.	-914	263

FIGURE 7.3

1988 PM PEAK HOUR RESERVE CAPACITY FOR MARE ISLAND ENTRANCES

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Given roadway capacities from the City of Vallejo MINUTP model, the one-way capacity onto or off of the island (assuming a reversible lane on Mare Island Causeway) would be about 3,200 vehicles per hour. Directional capacity can be increased to accommodate higher volumes by converting all three lanes on the Mare Island Causeway to one direction during peak periods. According to 1988 traffic counts, up to 3,700 vehicles were able to exit the island during the p.m. peak hour under this configuration. One drawback to having this many vehicles exit the island during one hour, however, is that it creates congestion on the local street system. Affected routes include Tennessee Street, Wilson Avenue and SR 37.

Intersection Operations:

To analyze intersections on Mare Island, traffic and geometric data was collected. Traffic counts were available for 1988 when the island had a daytime population of about 17,000 people. Since activity levels in 1988 were much higher than today, it was decided to use these counts for the existing conditions analysis since they would be more likely to indicate if traffic problems (constraints) existed at that time.

There are five signalized and a number of unsignalized intersections on Mare Island as shown earlier in Figure 7.1. Table 7.3 contains P.M. peak period service levels for selected key intersections using the 1988 traffic count data.

Table 7.3
MARE ISLAND STREET SYSTEM
P.M. PEAK HOUR INTERSECTION LOS

Intersection	Control	LOS	PM Peak Hour
Walnut/G	Signalized	A	3:30 - 4:30
Railroad/G	Signalized	D	3:30 - 4:30
12th/Cedar	Signalized	B	3:30 - 4:30
Railroad/C	Unsignalized	F	3:30 - 4:30
14th/Cedar	Unsignalized	D	3:30 - 4:30
5th/Cedar	Unsignalized	E	3:30 - 4:30

The Railroad/G Street intersection operated at LOS D, while the minor approach legs at two of the unsignalized intersections experienced LOS E and F conditions. Overall operation of these two intersections, however, would be somewhat better than the minor approaches.

Off-Island Roadways:

Roosevelt Terrace and Building 513 at the main gate are part of the Mare Island Reuse Plan. The main gate area is served by both Wilson Avenue and Mare Island Causeway. Circulation patterns here and through the parking lot are unique due to Navy operations.
Roosevelt Terrace is located on the corner of Sacramento Street and SR 37 in Vallejo. Access into the residential area is provided off Sacramento Street on three residential streets.

Mare Island Parking Facilities

Parking on Mare Island consists of on-street spaces, formal surfaced parking lots, and informal parking. An inventory of formal off-street parking spaces totalled 8,580 spaces (see Figure 7.4). Most of the lots are small (50-100 spaces), while other parking areas such as the assemblage of lots south of the CIA contain over 800 spaces. The primary characteristic of parking on Mare Island is the location of perimeter lots around the CIA and the lack of parking within the CIA. Most of the paved surface lots are in fair to good condition, with the geometrics meeting most City and industry standards. On-street parking regulations and curb markings are unique to the U.S. Navy and would need to be adjusted for civilian use.

Primary Access Routes

The primary access routes that link Mare Island to surrounding communities in the region includes local arterials, state highways, and interstate freeways (see Figure 7.5). Direct highway access to Mare Island is available from State Route 37 (SR 37). Indirect access is possible from SR 37 using Wilson Way or from Interstate 80 (I-80) using Tennessee Street and Curtola Parkway. Regardless of the travel route, however, there are only two locations where vehicles can access Mare Island.

Although there are a number of routes to Mare Island from regional roadways, the most direct routes experience congested conditions at certain locations during peak travel periods. On some street sections, there is little or no reserve capacity (see Figure 7.6). This is especially true on SR 37 where 1993 eastbound p.m. peak hour volumes were near capacity levels. It should not be a surprise then that two of the three major intersections on this route are currently operating at LOS E and F as shown in Table 7.4.

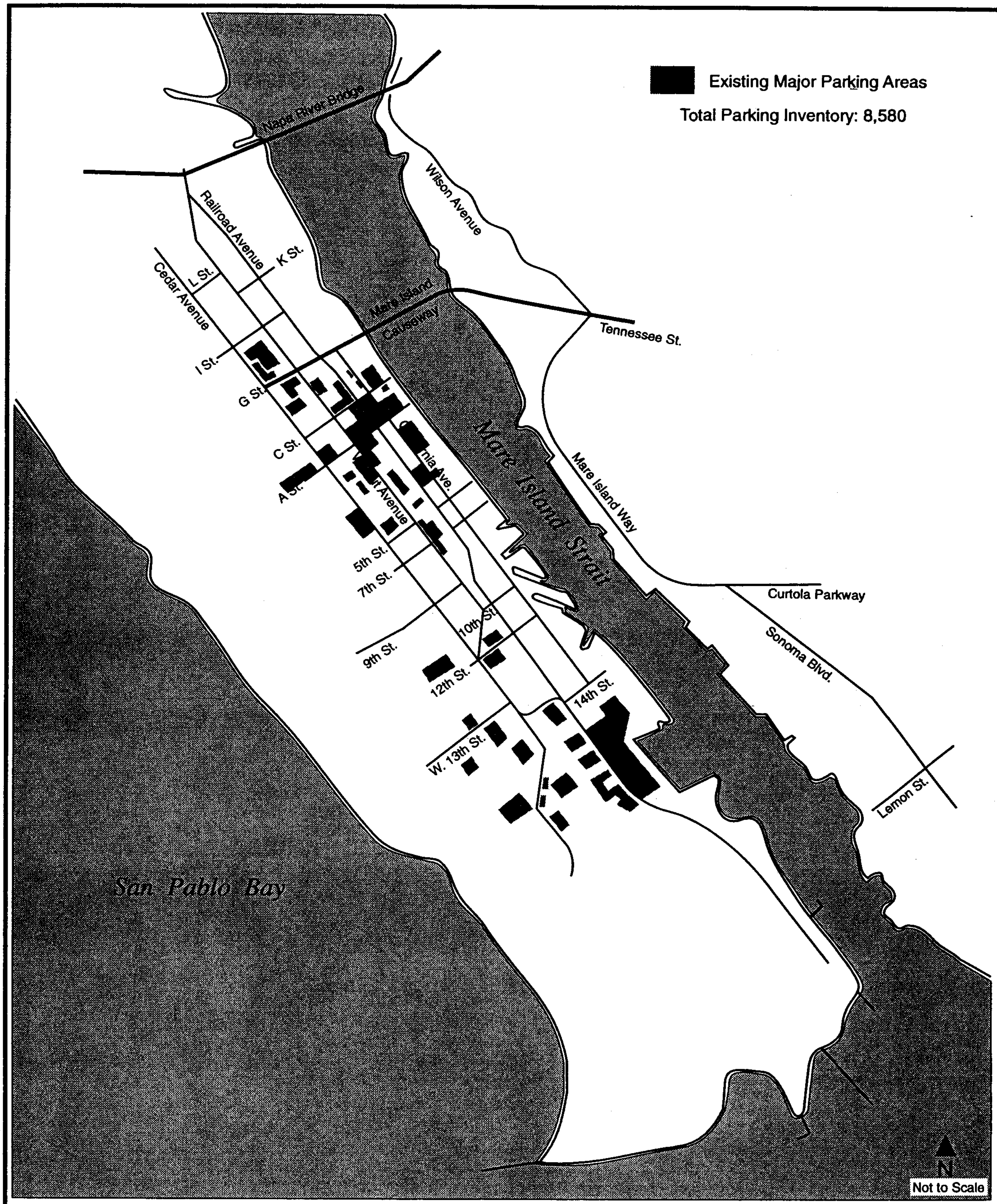

FIGURE 7.4	***EXISTING PARKING FACILITIES***	**Fehr & Peers Associates, Inc.** Transportation Consultants

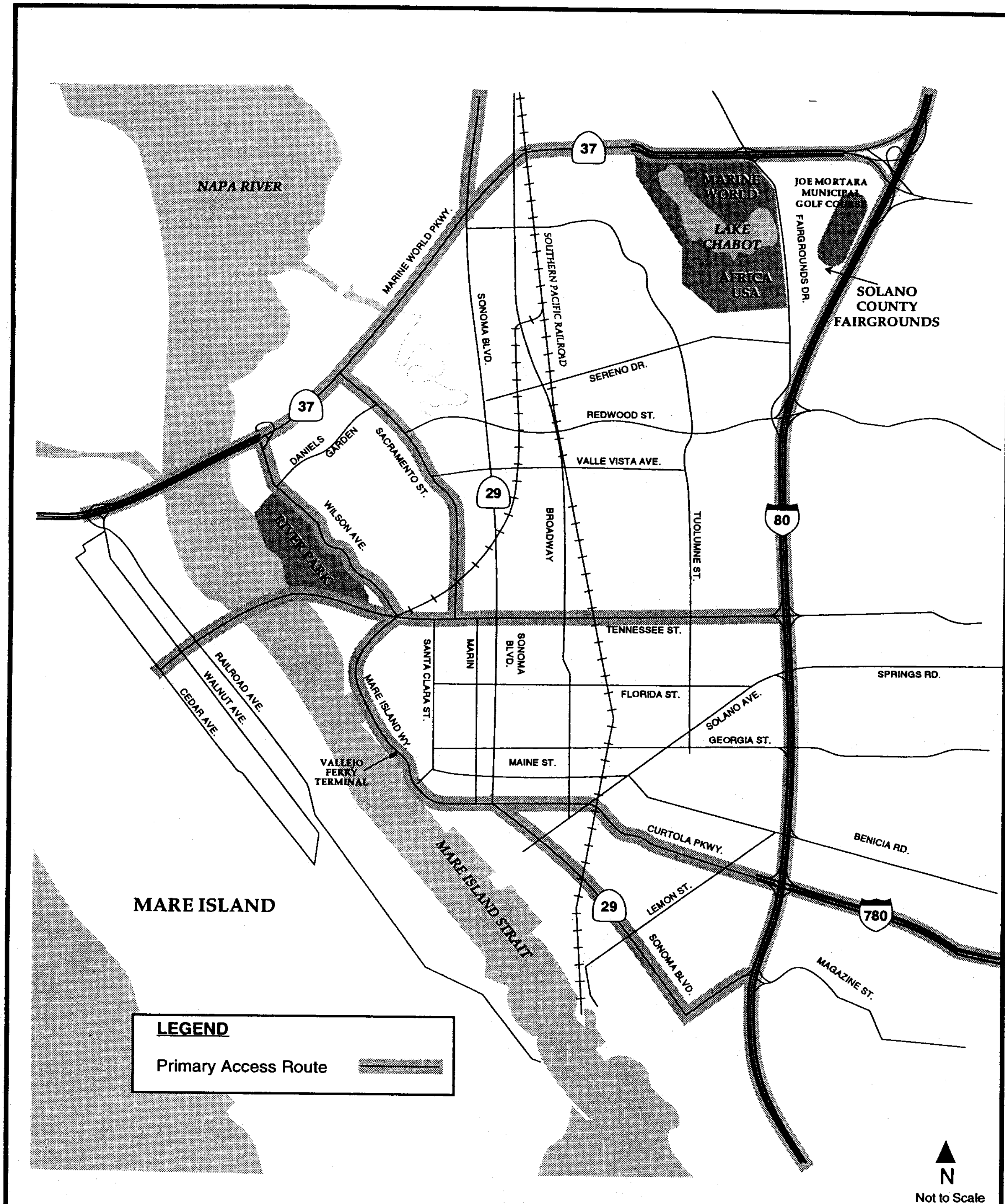

FIGURE 7.5

EXISTING PRIMARY ACCESS ROUTES TO MARE ISLAND

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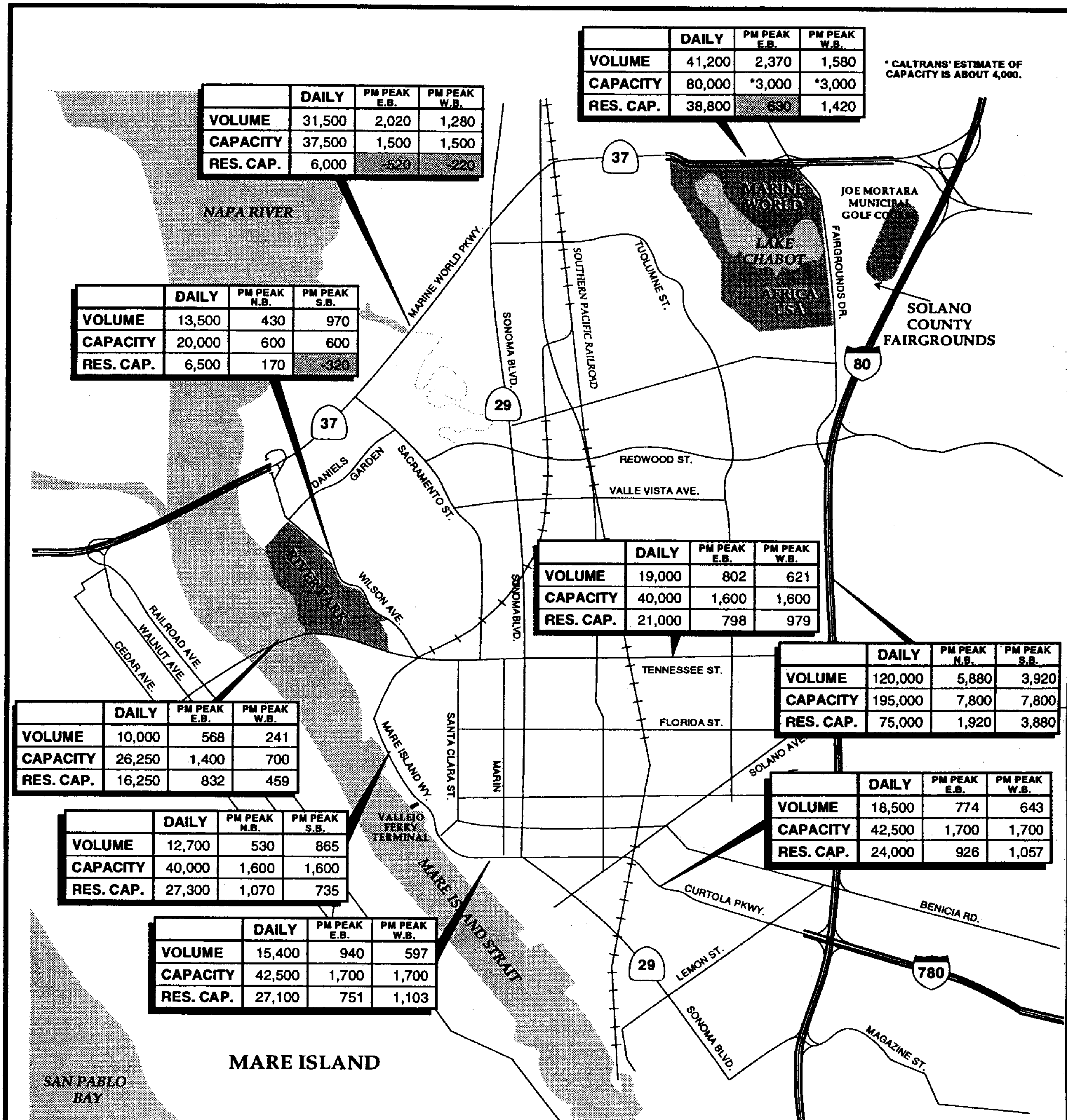

	DAILY	PM PEAK E.B.	PM PEAK W.B.
VOLUME	41,200	2,370	1,580
CAPACITY	80,000	*3,000	*3,000
RES. CAP.	38,800	630	1,420

* CALTRANS' ESTIMATE OF CAPACITY IS ABOUT 4,000.

	DAILY	PM PEAK E.B.	PM PEAK W.B.
VOLUME	31,500	2,020	1,280
CAPACITY	37,500	1,500	1,500
RES. CAP.	6,000	-520	-220

	DAILY	PM PEAK N.B.	PM PEAK S.B.
VOLUME	13,500	430	970
CAPACITY	20,000	600	600
RES. CAP.	6,500	170	-320

	DAILY	PM PEAK E.B.	PM PEAK W.B.
VOLUME	19,000	802	621
CAPACITY	40,000	1,600	1,600
RES. CAP.	21,000	798	979

	DAILY	PM PEAK N.B.	PM PEAK S.B.
VOLUME	120,000	5,880	3,920
CAPACITY	195,000	7,800	7,800
RES. CAP.	75,000	1,920	3,880

	DAILY	PM PEAK E.B.	PM PEAK W.B.
VOLUME	10,000	568	241
CAPACITY	26,250	1,400	700
RES. CAP.	16,250	832	459

	DAILY	PM PEAK E.B.	PM PEAK W.B.
VOLUME	18,500	774	643
CAPACITY	42,500	1,700	1,700
RES. CAP.	24,000	926	1,057

	DAILY	PM PEAK N.B.	PM PEAK S.B.
VOLUME	12,700	530	865
CAPACITY	40,000	1,600	1,600
RES. CAP.	27,300	1,070	735

	DAILY	PM PEAK E.B.	PM PEAK W.B.
VOLUME	15,400	940	597
CAPACITY	42,500	1,700	1,700
RES. CAP.	27,100	751	1,103

NOTES:

ROADWAY CAPACITIES TAKEN FROM THE CITY OF VALLEJO MINUTP MODEL.
SHADING DENOTES LOCATIONS WITH LESS THAN 25% PM PEAK HOUR RESERVE CAPACITY

SOURCES:

CALTRANS 1992 TRAFFIC VOLUMES
CITY OF VALLEJO 1993 TRAFFIC DATA REPORT
CITY OF VALLEJO PUBLIC WORKS DEPARTMENT TRAFFIC COUNTS

FIGURE 7.6

EXISTING RESERVE CAPACITY FOR PRIMARY ACCESS ROUTES

Fehr & Peers Associates, Inc.
Transportation Consultants

Table 7.4 1993 P.M. PEAK HOUR LOS FOR SELECTED PRIMARY ACCESS ROUTE INTERSECTIONS		
Intersection	**Control**	**LOS[1]**
Tennessee and Wilson	Signalized	C/D[2]
Tennessee and Sacramento	Signalized	B
Tennessee and SR 29 (Sonoma)	Signalized	C
Tennessee and Tuolumne	Signalized	C/D[2]
Georgia and SR 29 (Sonoma)	Signalized	B
Curtola and SR 29 (Sonoma)	Signalized	B
Curtola and Solano	Signalized	B
SR 37 and Sacramento	Signalized	B
SR 37 and SR 29 (Sonoma)	Signalized	F
SR 37 and Broadway	Signalized	E

Notes: 1 LOS was determined using the Signal 85 Software program and turning movement counts from the City of Vallejo 1993 Traffic Data Report.
2 LOS borders the C/D threshold.

As shown in the table, the failing intersections in the PM peak period are Highway 37/Sonoma Boulevard and Highway 37/Broadway. Outside of this corridor, other selected intersections operate at or better than the City of Vallejo's standard of LOS D.

To some extent, the existing locations experiencing poor operating conditions can be attributed to existing Mare Island traffic. Table 7.5 contains an estimate of the traffic contribution on the primary access routes from the 1988 City of Vallejo traffic model.

Table 7.5 PRIMARY ACCESS ROUTE UTILIZATION BY MARE ISLAND TRAFFIC			
Primary Access Route	**P.M. Peak Hour Volume**	**Mare Island Traffic**	**Percent Contribution**
Mare Island Causeway	2,175	2,175	100%
Mare Island Way at Florida Way	1,941	605	31%
Wilson Avenue at Benson Ave.	1,630	52	3%
Tennessee Street at Sonoma Blvd.	1,558	398	26%
S.R. 37 at Sacramento Street	3,266	1,254	38%

The table shows that model estimates of 1988 Mare Island traffic accounts for between 3 and 38 percent of the 1988 roadway segment volumes. Contribution levels are much lower today since the daytime base population is about 1/4 of the 1988 level of 17,000 people.

7.1.2 Transit System

The City of Vallejo's transit system includes regional bus service, local bus service, paratransit service and ferry service. Table 7.6 briefly describes each service, while Figure 7.7 identifies the Vallejo Transit routes. The table shows that bus service is the primary public transit mode in Vallejo.

Table 7.6
VALLEJO TRANSIT SERVICE DESCRIPTION

Route	Description	Headway	Avg. Ridership (March 1994)
	Regional Bus Service		
80	Operates from Vallejo to the El Cerrito Del Norte BART station	10-15 Min. Peak 30 Min. Off-peak/Sat.	38,086
85	Operates between Vallejo and El Cerrito Del Norte BART station.	30 Min. Peak 60 Min. Off-peak/Sat.	16,923
90	Operates between the Fairfield/Suisun City area and the El Cerrito Del Norte BART station.	30 Min. Peak 120 Min. Off-Peak	8,128
Napa Valley Transit	Operates from the City of Napa to Vallejo, terminating at the ferry.	60 Min. Peak 90 Min. Off-Peak	N/A
	Local Bus Service		
1	Operates between South Vallejo and Rancho Vallejo.	30 Min.	39,775
2	Serves Country Club Crest, Walnut Avenue, the Vista area and Sacramento Street.	30 Min. M-F 60 Min. Sat.	34,176
3	Serves Georgia Street and Glen Cove.	30 Min. Peak 60 Min. Off-peak/Sat.	9,322
4	Serves north-central Vallejo.	30 Min. M-F 60 Min. Sat.	14,337
5/7	Serves Mare Island Way, Wilson Avenue, Florida Street, Springs Road, Ascot Parkway, and Redwood Parkway.	30 Min. M-F 60 Min. Sat.	5 - 15,533 7 - 13,923
6	Operates along Tennessee Street, Springs Road, Ascot Parkway.	30 Min. M-F 60 Min. Sat.	16,803
9, 10 & 12	Operate during school commute hours.	N/A	5,193
	Ferry Service		
I-80 Corridor	Vallejo to San Francisco	Five daily round trips	Annual FY 92/93 221,222
	Paratransit Service		
Half-Fare Taxi	Door-to-Door	Upon request	Annual FY 92/93 66,692
Solano Paratransit	Door-to-Door	Upon request	Not available

Source: Vallejo Transit. 1994.

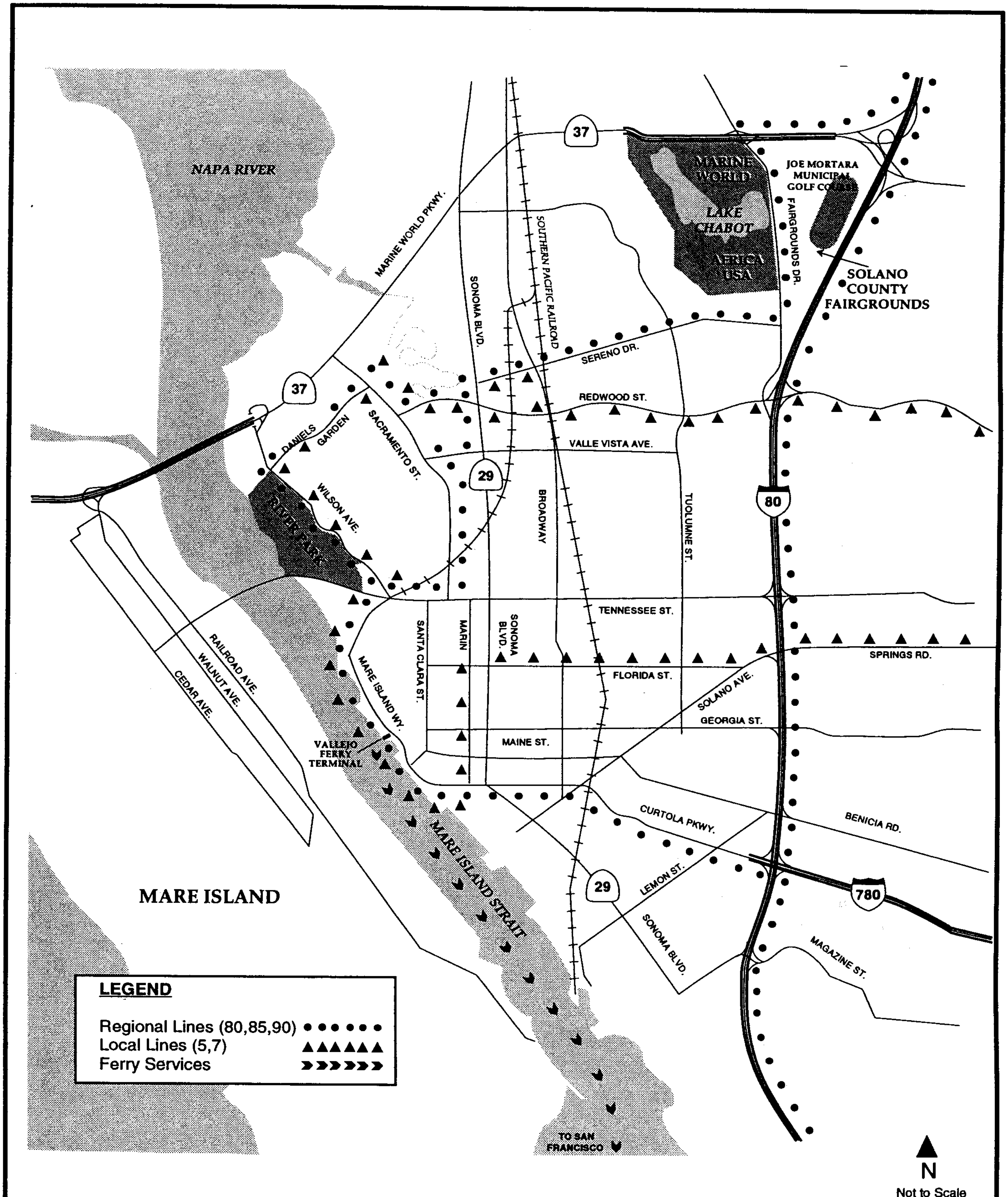

FIGURE 7.7	*EXISTING CITY OF VALLEJO TRANSIT ROUTES*	Fehr & Peers Associates, Inc. Transportation Consultants

Bus Service

Currently, only two local bus routes serve Mare Island. Vallejo Transit routes 5 and 7 both stop near the main gate. Since these routes also stop at the downtown York & Marin and the Sereno Transit Centers, transfers are available from other local and regional routes. In March of 1994, route 5 carried about 15,530 passengers. Route 7, which operated during school commute hours only, carried about 13,920 passengers. According to a 1993 survey of Mare Island commuters, about one percent used transit. One of the reasons for this low use is that the current bus routes do not travel onto the island. The additional time it would take to walk from the bus stop near the main gate to destinations on the island would likely discourage transit as an alternative mode to private vehicles.

Ferry Service

Ferry service was historically provided between Mare Island and Vallejo across Mare Island Straight. While this system was discontinued in the early 1980s, there is currently ferry service between Vallejo and San Francisco from a new ferry terminal directly opposite the MINSY. The service provides five round trips per day and carried 221,000 patrons in 1992. The ferry service is contracted out by the City of Vallejo and was originally financed by the 1990 Clean Air and Transportation Improvement Act. The 25-mile route to San Francisco is completed in just over one hour, which is competitive with comparable driving times.

7.1.3 Bicycle and Pedestrian System

According the *1982 Bicycle Use Study for MINSY* and the *1993 Mare Island Commuter Survey*, bicycles are used for commuting and internal island travel. The following discussion describes the conditions of the on-island and off-island facilities.

Mare Island Bicycle and Pedestrian System

Bicycles are described as an "important mode of transportation on Mare Island" in the *1982 Bicycle Use Study for MINSY*. Bicycles are used on the island primarily because of the dense industrial areas, lack of close in parking, and closure of the CIA to vehicles. The Navy has made bicycling convenient by providing government-owned bicycles for use on the island. In 1982, there were about 3,400 of these bicycles available on the island. In 1993, bicycles were also used by about 3 percent of the island's commuters. Currently, bicycle traffic is restricted to the causeway sidewalk.

The existing Mare Island bicycle lanes and paths total about 1.6 miles, and are largely found on California and Railroad Avenues (see Figure 7.8). Most of the bike lanes meet Caltrans minimum standards for width, while the bike path on the north end of the Island is poorly maintained, narrow, and unstriped. Table 7.7 compares the extent of the existing bicycle and pedestrian system with the island's street system.

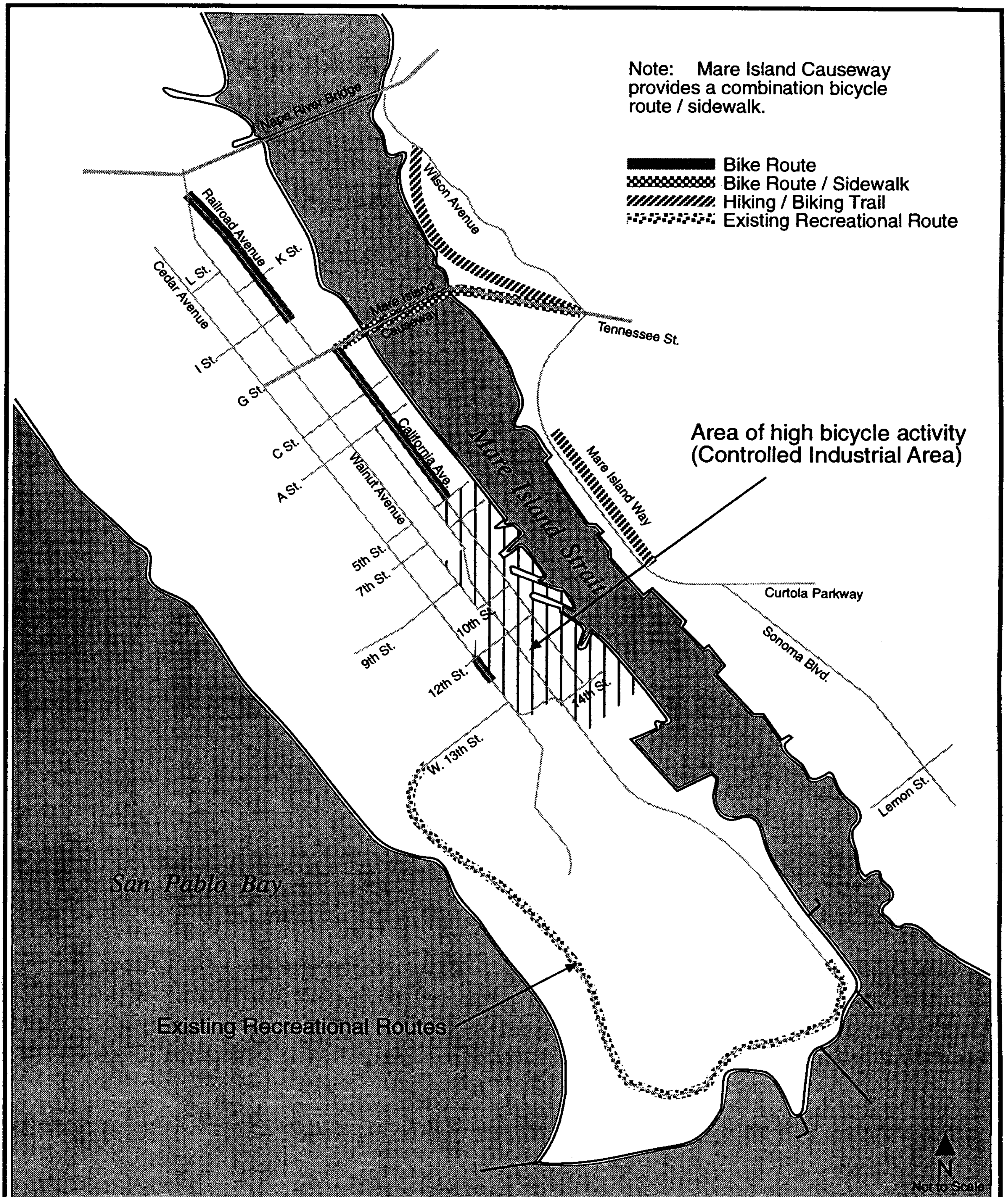

FIGURE 7.8	*EXISTING BIKE LANES AND PATHS*	Fehr & Peers Associates, Inc. Transportation Consultants

Table 7.7 EXISTING BICYCLE AND PEDESTRIAN SYSTEM		Width	
Facility Type	Length (ft.)	Minimum	Maximum
Existing Primary & Secondary Street System	92,100	8'	19.5
Existing Bike Lanes/Paths	8,600	2.5'	6'
Existing Sidewalks (Sidewalk on one or both sides of street)	44,300	3.5'	12.5'

Table 7.7 shows that the island has a relatively short dedicated bike lane/path system when compared to the street system and sidewalks. Bicycle circulation on the island, however, is not restricted since bicycles can also travel on the street system. There is some concern, though, regarding safety at intersections and rail crossings.

There are an estimated 44,300 linear feet (8.3 miles) of sidewalk on Mare Island, translating into less than 24 percent of the existing streets having sidewalks on both sides of the street. Sidewalks are provided on at least one side of all of the residential streets: they also are present on many of the central Island streets. On the north and south ends of the Island, sidewalks are virtually non-existent. Pedestrian activated signals and crosswalks are provided at all signalized intersections and other crosswalks are plentiful throughout the Island.

City of Vallejo Bicycle and Pedestrian System

A main characteristic of the City of Vallejo bicycle/pedestrian system is that it takes advantage of the existing street system. Most of the bicycle routes are on-street Class III facilities and the most common pedestrian facilities are sidewalks adjacent to the streets. The system, however, also has two Class I facilities near Mare Island. Hiking and bicycling trails extend along the boundaries of River Park and along the waterfront near the ferry terminal (see Figures 7.7 and 7.8).

Given the distance between Mare Island and Vallejo, walking would not likely be a preferred travel mode. Bicycling, however, is already an accepted travel mode even though the Mare Island Causeway to use a relatively narrow sidewalk.

7.1.4 Freight System

Goods movement to Mare Island depends on the freight system, which consists of both truck routes and rail lines. The following section describes the location and condition of these facilities.

Truck Facilities

Figure 7.9 shows that trucks transport freight directly to and from Mare Island through Vallejo and the surrounding area. The truck routes are flexible allowing access to either Mare Island entrance. Currently, the freight system is not constrained although truck traffic is subject to delay on some travel routes during peak periods. An estimated 4 trucks per day (excluding small delivery vans) enter Mare Island through the Main Gate, according to visitors permit data. The number of trucks, however, is also dependent on Naval Ship Yard activities.

Railroad Facilities

The Mare Island Naval Shipyard (MINSY) is served by a private U. S. Navy-owned railroad that is operated and managed by shipyard employees. Maintenance and construction work is divided between shipyard forces and a private contractor. At present, the Navy has an annually-negotiated contract with Western Railroad Builders for rail construction and major maintenance work provided on an as-needed basis.

Trackage:

The Mare Island Naval Shipyard railroad (hereafter referred to as the MINSY railroad) has an elaborate network of trackage on Mare Island designed to serve heavy shipyard operations. At present, there are about 22 miles of active track and 24 miles of inactive track (see Figure 7.10). Historically, rail operations were at a significantly higher level four or five decades ago when MINSY constructed surface ships compared to the level currently required to support submarine overhauls. Consequently, rail trackage in service has been reduced over the years.

Trackage is generally in excellent condition. With the exception of certain yard storage and classification tracks, trackage on the Island was re-laid with 115 pound continuous welded rail (CWR) in 1992 and 1993. Although the MINSY railroad is not subject to Federal Rail Administration (FRA) regulations and does not undergo FRA inspections, the MINSY trackage is generally maintained to at least FRA Class II standards. The Navy has their own internal track condition standards that specify two grades: Special Purpose, which is qualified for the passage of heavy, oversize nuclear loads; and General Purpose, suitable for all other movements. The MINSY railroad has a 75 foot, 625,000 lb Test Car, which is periodically passed over shipyard trackage to verify clearances and weight capability. Generally, all in-service MINSY railroad trackage has successfully accommodated passage of the Test Car within the last year, except a few locations discussed below where curvature and/or clearances do not permit passage of such a large freight car.

An overview of the network of rail trackage and rail facilities on Mare Island is as follows. The spine or main line of the railroad extends north-south along Railroad Avenue from Causeway Street to Building 900 at the south end of the industrial area. Along some stretches, the tracks are

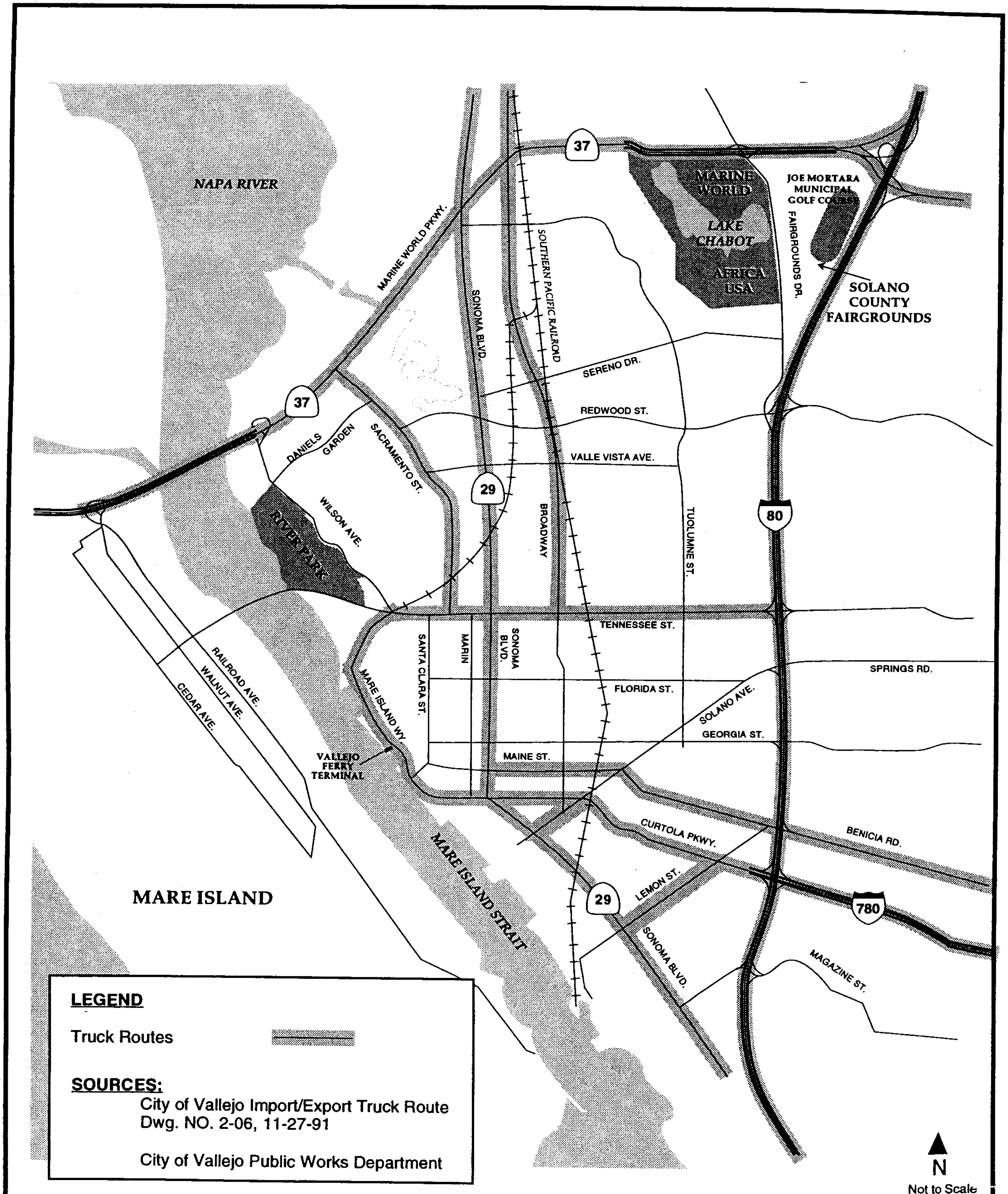

FIGURE 7.9	*EXISTING TRUCK ACCESS TO MARE ISLAND*	Fehr & Peers Associates, Inc. Transportation Consultants

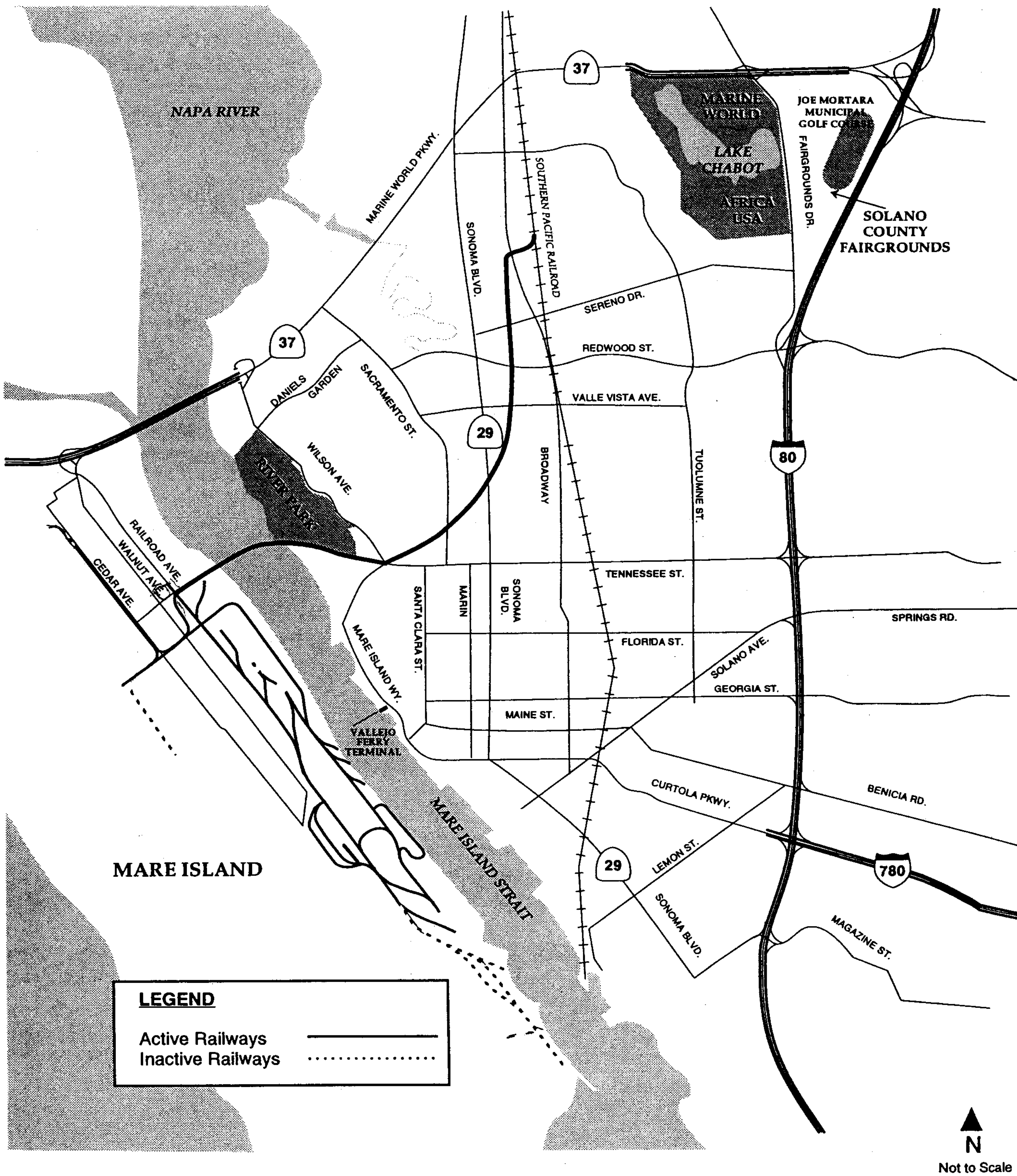

FIGURE 7.10 | ***EXISTING RAIL FACILITIES***

Fehr & Peers Associates, Inc.
Transportation Consultants

in the street; along others, the tracks are alongside the street. The line crossing the drawbridge on Causeway Street is not directly connected to the Railroad Avenue main line. There is a switchback connection accommodating a locomotive and 3-4 cars at E Street; in addition, the Drawbridge line crosses the main line on a diamond at E Street, paralleling the main line for 2 blocks southward before turning westward along A Street.

The Drawbridge line terminates at the main classification and storage yard for the MINSY railroad. The yard is aligned with A Street, extending westerly from Walnut Avenue. This facility (hereafter referred to as the A Street yard) includes three 1000-foot storage tracks plus a run-around track, with about 500 feet of tail room on the west end. (Trackage actually extends further, but is fenced off and out of service due to lead contamination of the area.) Beyond the east of the yard is a "Y" connection with the Railroad Avenue main line. A track scales is located in the tail extension of the A Street yard.

Extending southeasterly from the track scales towards Building 637 (the rail and road vehicle maintenance facility) is a scrap unloading track paralleling a lead track. This lead track continues around Building 637 and eastward down 3rd Street to a "Y" connection with the main line at Railroad Avenue.

A second through route utilizing Waterfront Avenue and California Avenue parallels the Railroad Avenue line from A Street to the southern end of the industrial area. Crossover or "Y" connections between these lines exist at A Street, 12th Street, 14th Street, 15th Street and 18th Street. There also is a switchback connection between the lines in the vicinity of 5th Street - 7th Street, passing three sides of Building 121; the tail of the switchback is quite short, only accommodating a locomotive and 2 cars.

The Waterfront Avenue/California Avenue line is directly connected to the A Street classification and storage yard, so that movements between the yard and this line do not need to make use of the Railroad Ave. line. This connection runs along A Street, crossing the Railroad Avenue main line at grade using a diamond positioned in the pavement.

Numerous spurs extending off both the Railroad Avenue and the Waterfront Avenue/California Avenue lines serve various industrial shop buildings, piers and drydocks. Along piers and drydocks, one rail is shared by the MINSY railroad and the shipyard crane tracks. Between 12th and 14th Streets along Railroad Avenue, there is a 4-track steel plate storage yard adjacent to Shop 11 (the structural shop, also known as Building 390). This yard is inactive at present, as recent submarine overhauls have not required rail movement of steel plates. Another rail facility of interest is an overhead sand hopper loader adjacent to building 678.

The final rail line of significance on the Island is a 4800-foot spur running along Cedar Avenue northward from a "Y" connection to the A Street classification yard. On rare occasions, nuclear fuel is hauled to and from Building 759 over this spur; otherwise, it is inactive.

A connection with the common carrier railroad network is accomplished using a single-track line crossing the Napa River drawbridge into Vallejo, continuing for about 1 mile to a connection with the California Northern Railroad (CFNR) just north of the intersection of Sereno Drive and Broadway in northern Vallejo. Track on this connecting line is also in excellent condition. Over the drawbridge, jointed girder rail is used; beyond the bridge, the line was re-laid with 119 lb CWR in

1988. The connection with the CFNR is known as Flosden station. To accomplish the connection, the MINSY railroad enters a jointly-used 1250 foot siding of CFNR. In addition, there is a run-around track and mid-siding crossover at Flosden to facilitate interchange switching maneuvers.

Rolling Stock:

The MINSY railroad at present has two 80-ton switching locomotives and a single self-propelled "lokie" railroad crane. The MINSY railroad also has a fleet of freight rolling stock used for intra-yard operations. This equipment, generally quite old, is not interchanged for common carrier operation and may not be suitable for long-distance line haul use. The rolling stock fleet includes about 30 tank cars for hauling fuel oil, 2 flat cars for hauling ship batteries, and one scrap gondola. There also are a number of other freight cars that are presently out of service and/or have not seen use for a long period of time.

Maintenance of rolling stock and locomotives is performed in Building 637, which has a single-track drop pit for running repairs. The building also includes facilities for maintenance of road vehicles.

Rail Traffic:

At present, the MINSY railroad is primarily utilized for intra-shipyard transport of materials related to submarine overhaul projects. At present, there is rail transport of fuel oil from pier, berth or drydock unloading to either the storage yard or to a fuel recycling facility in Building 471; scrap movement from Shop 11 to the scrap yard; and transport of submarine batteries to and from the battery shop (Building 461).

Spent nuclear fuel and new nuclear fuel for refueling overhauls are the only traffic moving to and from common carrier connection in recent times. Nuclear fuel is hauled in tall containers mounted on 85-foot flat cars. These loads are the heaviest loads as well as the largest-dimensioned shipments handled by the MINSY railroad. Most weekdays see two or three intra-yard rail car movements; rail movements to and from Flosden average about one inbound and one outbound car-move per month.

Clearance and Weight Constraints:

The 75-foot, 625,000 pound Test Car has traversed most of the MINSY railroad lines, including the line to the common carrier connection at Flosden. Most spur, "Y" and lead tracks also have been tested. However, certain "Y" tracks, spurs and leads to industrial shops and dock trackage do not accommodate this car due to clearance limitations, summarized as follows.

- Extreme curvature on the tracks at the head of each drydock will not accommodate the 75-foot Test Car.
- Curvature on the spur entering Building 271 also is too sharp to accommodate this car.

- The combination of sharp curvature and a narrow door opening to Building 87 also prohibit movement of the Test Car.

- Curvature on the southwest leg of the "Y" of the track connecting Building 390 to the Railroad Avenue main line also is too sharp to accommodate a 75-foot car.

Other locations with clearance concerns include the switchback connection at 6th Street between the Railroad Avenue line and the Waterfront/California Avenue line, which allows passage of the Test Car, but just barely. The 75-foot car clears the corner of Building 121 by only one inch. Clearance is also very close passing Building 223 on the northwest leg of the "Y" at Railroad Avenue and 3rd Street. Inside many shop buildings, there are close clearances. In general, the Test Car is not used to test trackage inside buildings.

Except for the trackage noted above, the MINSY railroad is well-suited to common carrier carload freight service.

Safety Devices:

The line to Flosden passing through northern Vallejo has nine crossings-at-grade with city streets. All are protected by flashing signals and automatic crossing gates. These safety devices are maintained by a private company under contract to the Navy. The Drawbridge line crosses one lane of road traffic at either end of the Napa River drawbridge; these crossings are protected by flashing signals that must be manually activated by the bridge tender.

In contrast, on the Island, there are no electrical safety devices protecting street traffic from rail movements at the numerous at-grade crossings.

7.1.5 Aviation System

The Mare Island aviation system consists of two existing helicopter landing areas, one on the former Marine Corps parade grounds and the other on a converted parking lot on Walnut Avenue on the north end of the Island. The MINSY reports that helicopter use is infrequent. The Federal Aviation Administration (FAA) reports that there are no barriers or restrictions to civilian use of the Island once the U.S. Navy has vacated the Island. There are specific criteria for heliport sittings including a prohibition against being closer than 1,000 feet to a residential areas or schools. The FAA should be included in the review process of the Reuse Plan if heliport facilities are proposed.

7.2 SUMMARY OF CONSTRAINTS

Transportation may act as a constraint to future land use proposals by (a) not providing adequate internal and external capacity, and (b) not providing the level of accessibility needed for certain types of land uses. Also, with most of the future Mare Island trips linked through the City of Vallejo, thresholds of acceptable numbers of cars and trucks through the City may impact land use proposals.

This section identifies constraints to both reuse of the existing transportation infrastructure in the near term, and constraints to ultimate reuse plans for the Island. As Mare Island is currently an active community many parts of the transportation infrastructure can be reused by civilians with minor modifications and upgrades. Physical constraints such as sub-standard roadways or lack of pedestrian and bicycle facilities exist on Mare Island that, while being programmed for improvement to meet City standards, will provide adequate short term circulation.

7.2.1 Street System

Street system constraints include the physical and operational conditions of the Mare Island street system and the primary access routes to the island.

Mare Island Street System Constraints

Constraints currently exist with regards to the condition and operation of the Mare Island street system. The following discussion describes each constraint.

Street System Condition:

The following street system conditions should be improved as reuse occurs. Otherwise, these conditions could affect traffic safety and operation to an extent that is undesirable from the City's point of view as well as potential users of the island after conversion.

- Substandard setback of trees and buildings and limited line of sight along some roadways.
- Lack of protected railroad crossings.
- Poor geometrics for the diagonal left turn lane at the G Street/Railroad intersection.
- Limited street lighting.
- Less than about 30 percent of the classified streets on Mare Island have curb and gutter (As such, a formal water drainage system is provided in limited areas only).
- Lack of traffic control devices for reversible lane systems on G Street, the Mare Island Causeway, and California Avenue (It would not be appropriate to allow the public to use the reversible lane system without proper signing, signaling, and other measures).

Street System Operation:

The street system operation constraints for Mare Island begin with the two gates, which are shown in Figure 7.11 (Main Gate) and Figure 7.12 (North Gate). Currently, all inbound vehicles must slow at the control points (one lane) for identification, thus an artificial constraint exists, which will not be in place in the future. With those control points removed, the constraint becomes the number of lanes themselves.

Using conservative estimates of capacity from the City of Vallejo traffic model, the main gate would have a one-way capacity of about 1,400 vehicles per hour. The north gate would have a somewhat higher one-way capacity of about 1,800 vehicles per hour because the entrance connects directly to SR 37 ramps. This assumes that with the control points removed, the north gate will function as a four-lane facility with two lanes entering and two lanes existing the island. Total one-way capacity for Mare Island during the p.m. peak hour would be about 3,200 with modest improvements to the North Gate. When traffic volumes reach this level, the entrances will act as a constraint to further development.

Other entrance capacity constraints include the existing drawbridge and railroad tracks on the Causeway. Either rail or drawbridge activity during peak periods essentially shuts down over half of the capacity onto the Island and would result in extensive congestion. With regards to intersection operations, most of the island's intersections operated at or above LOS D under 1988 traffic conditions. Nevertheless, there are a number of geometric conditions at or near many of the intersections that are substandard. These locations are identified as constraints in Figure 7.13, which summarizes the Mare Island street system constraints.

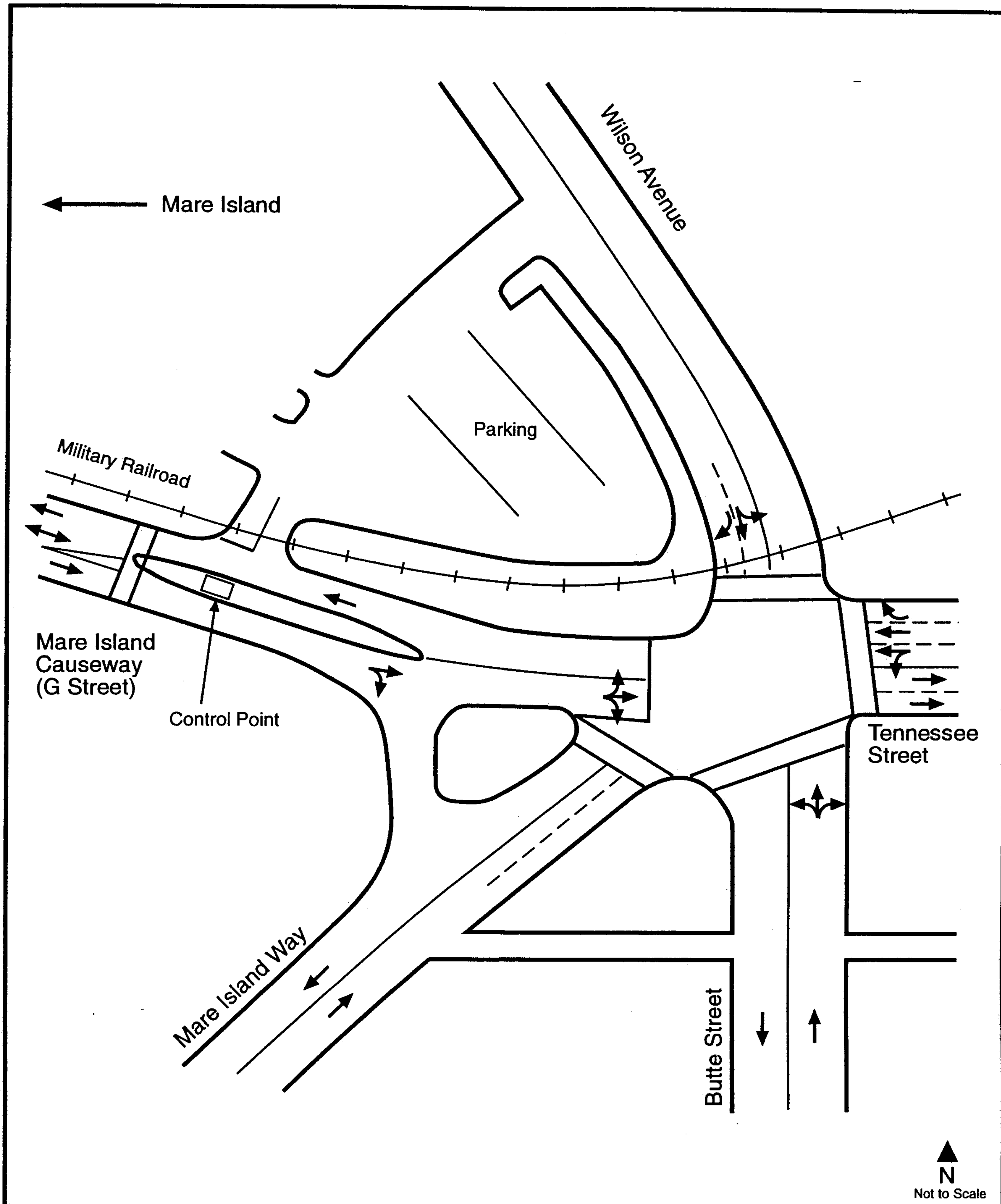

FIGURE 7.11

1994 MAIN GATE GEOMETRICS

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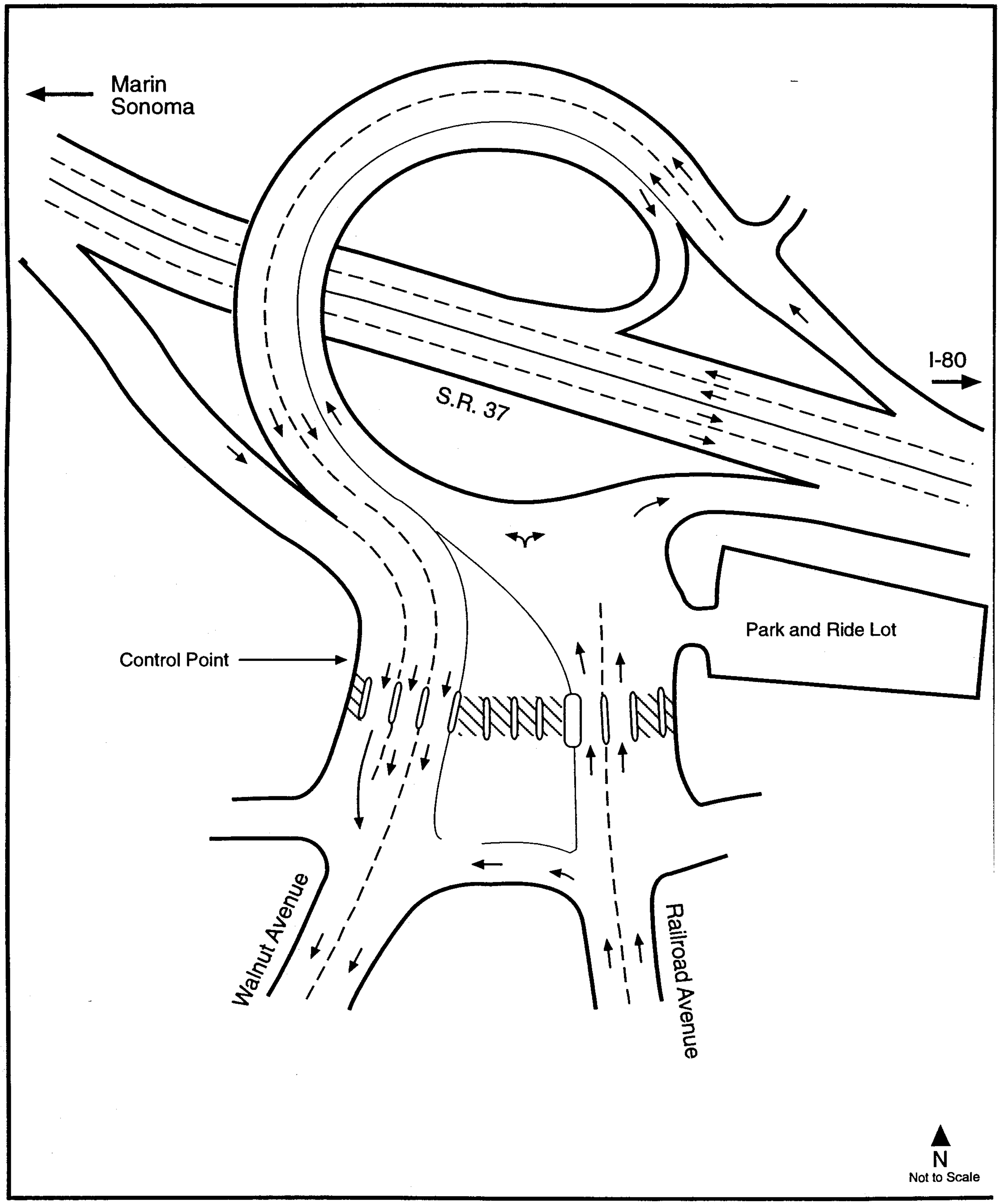

FIGURE 7.12

02

1994 NORTH GATE GEOMETRICS

Fehr & Peers Associates, Inc.
Transportation Consultants

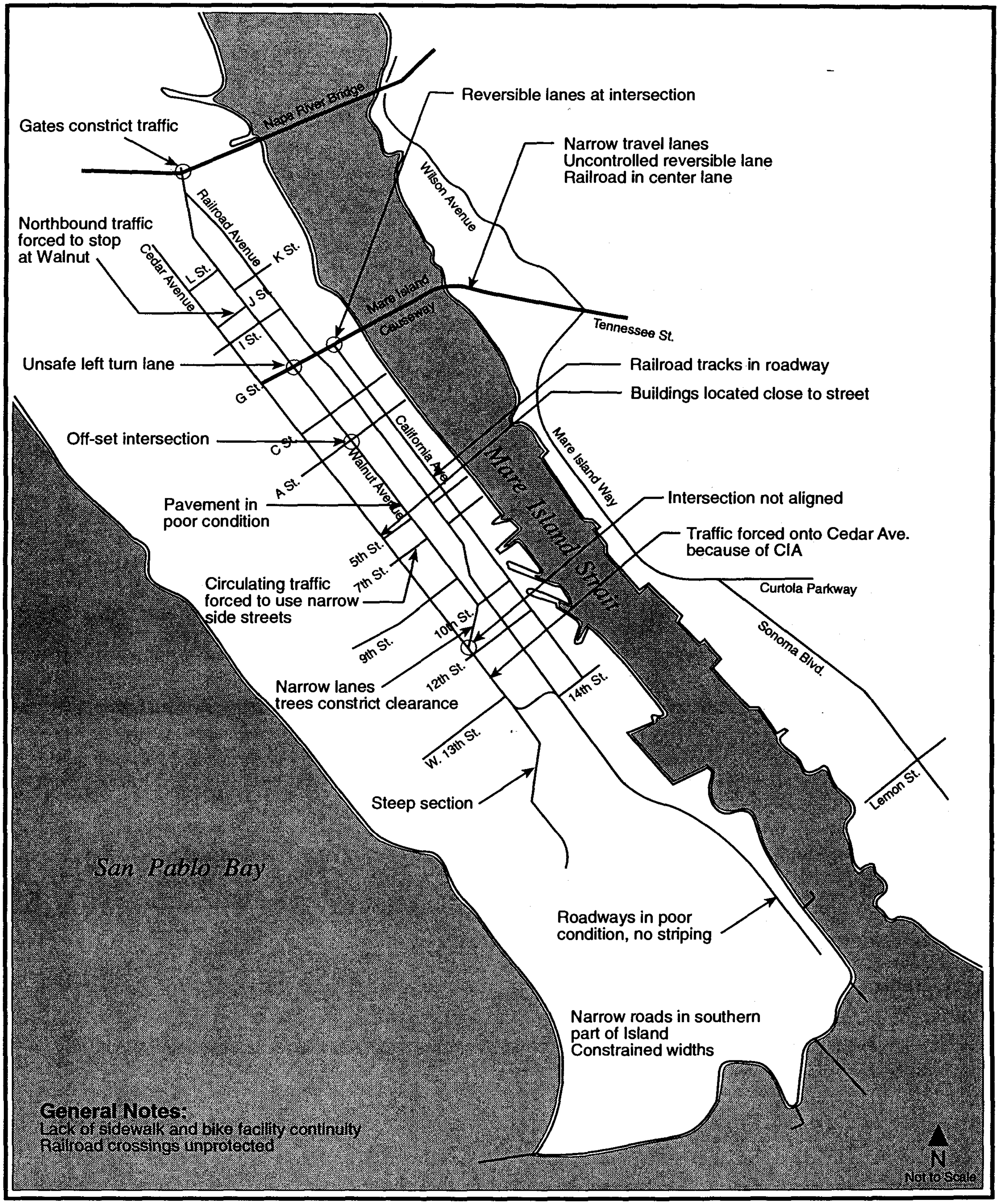

FIGURE 7.13 | ***EXISTING MARE ISLAND STREET SYSTEM***

Fehr & Peers Associates, Inc.
Transportation Consultants

Primary Access Route Constraints

Locations with little reserve capacity or poor levels of service constrain traffic flow through the study area (see Figure 7.14). These areas cause delay and inconvenience for street system users. The most notable locations include:

- State Route 37 and State Route 29 (Sonoma Blvd.) intersection;
- State Route 37 and Broadway intersection; and
- State Route 37 between State Route 29 and Sacramento Street.

One of the regional traffic characteristics that affects some of the locations above is the fact that State Route 37 is a major connector between I-80 and U.S. 101. As such, it will continue to attract large volumes of regional traffic passing through the area regardless of development actions taken on Mare Island.

For traffic approaching from the south (I-80) or southeast (I-780), the regional access system to Mare Island is less than ideal. One option, taking Curtola Parkway-Mare Island Way to the Main Gate involves using 3.7 miles of City streets, passing through eight signalized intersections, and taking an elapsed time of about 11 minutes during peak periods at an average speed of 20 mph. The other alternative, the I-80 to S.R 37 to North Gate alternative totals 8.7 miles, four signalized intersections, and an elapsed time of about 18 minutes during peak periods. The differential, 5 miles and 7 minutes, may be a major constraint to some future land uses. Also, limitations on truck traffic on City streets through Vallejo in the future may force trucks to use the more congested and less direct route to the Island.

Although not listed above, it is also important to mention that some other facilities present potential constraints. Streets such as Wilson Avenue and Tennessee Street, which provide direct access to the Mare Island main entrance, are limited in their ability to accommodate traffic. Wilson Avenue suffers from poor sight distances and substandard geometrics. Tennessee Street lacks left turn bays at most intersections and has inefficient traffic signal progression along the corridor.

In some cases, the City of Vallejo is already addressing these existing problems through improvement plans that would add travel lanes to facilities such as SR 37 and Wilson Avenue and that would improve signal coordination on facilities such as Tennessee Street. The degree then to which these constraints will affect the reuse of Mare Island depends on the implementation of improvement plans and the amount of new traffic the island will generate after conversion.

7.2.2 Transit System Constraints

Expanded bus service to Mare Island after conversion to civilian use could face constraints related to island accessibility, service levels and ridership.

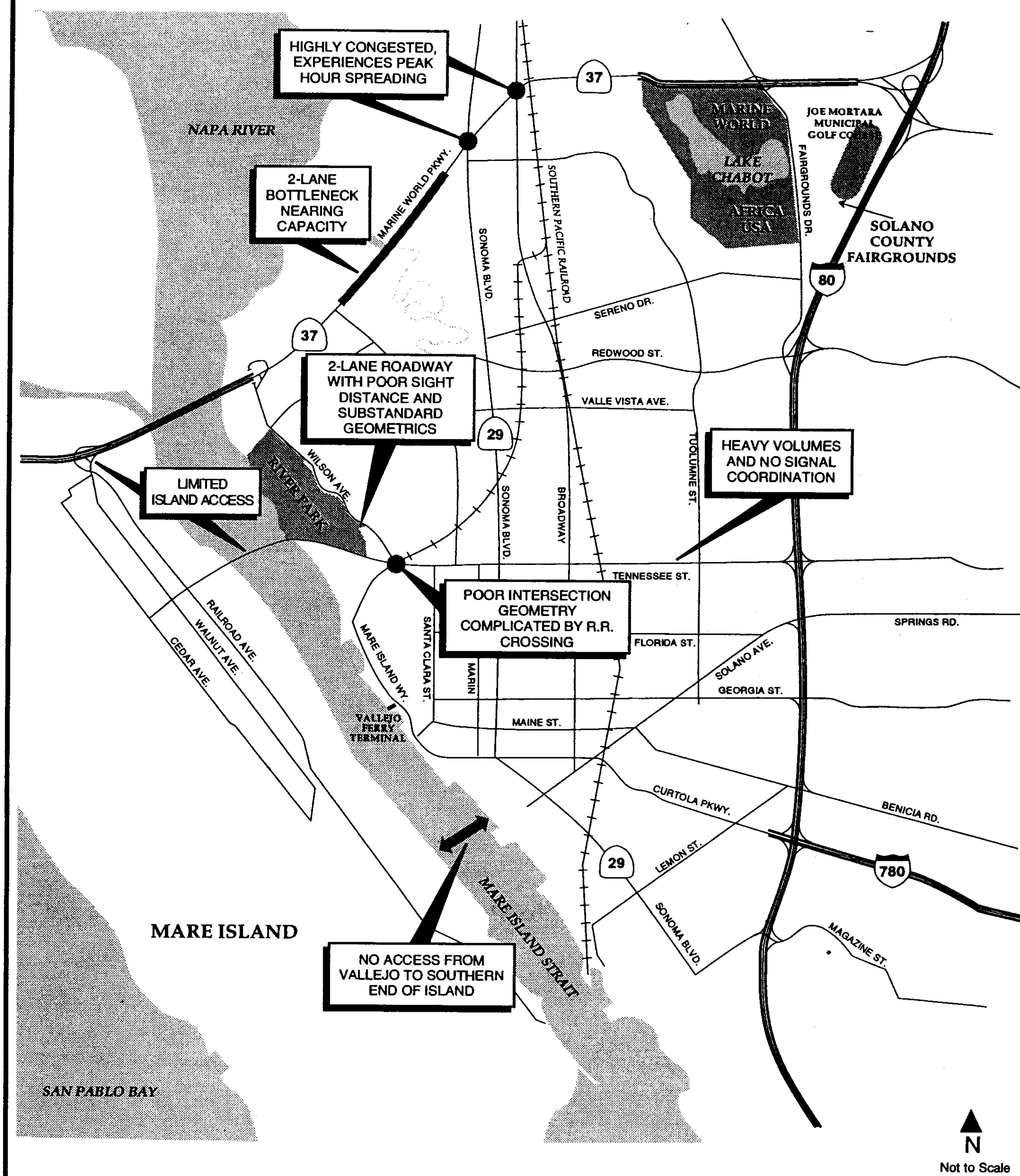

FIGURE 7.14	***EXISTING PRIMARY ACCESS CONSTRAINTS***	**Fehr & Peers Associates, Inc.** Transportation Consultants

Island Accessibility

Mare Island currently has only two access points that would be useable for automobiles and buses. Depending on the level and type of redevelopment on the island, these access roadways could become major points of congestion. Transit alternatives could be a part of the solution to this problem, but their service level could be adversely affected by long delays in gaining access to the island.

Service Levels

In addition to island accessibility constraints, the island's current roadway configuration could adversely affect transit travel times and ridership. Transit route extensions to Mare Island from Vallejo would be partially "looped" if only one route is used to serve the island. According to the *City of Vallejo Short Range Transit Plan Draft Report*, studies indicate that patronage falls dramatically when more than 30 percent of the length of a transit route is "looped." In the worst case, where 100 percent of a route's length is a one-way hourly loop, riders can be forced to ride up to 50 minutes to make what otherwise may be a journey of less than 10 minutes with direct service.

The number of transfers required for transit trips could also affect transit travel times. Currently, Vallejo Transit only serves the main gate to Mare Island with one local route and one regional route. The limited service to and from the island entrance forces most transit users to transfer at least once at the Sereno or Downtown transfer centers before completing their trip.

Ridership

A past attempt to serve Mare Island with transit service from Vallejo was not successful. In 1990, U.S. Navy sponsored local bus service was discontinued due to low ridership and farebox return.[2] Transit service may face similar problems under civilian use of the island especially during the early stages of redevelopment when activity levels are likely to be below those of the U.S. Navy in 1990. This information would tend to support the fact that implementation of transit service to the island would be constrained by the type and the timing of the island's redevelopment.

7.2.3 Bicycle and Pedestrian System Constraints

Distance is the major constraint to significant bicycle and pedestrian travel to Mare Island from the surrounding communities. On island bicycle use during occupation by the Navy, however, was quite high even though bicycle safety was a major complaint of many Mare Island bicycle commuters according to the *Mare Island Commuter Survey*. This survey indicated that 4.4 percent of survey respondents considered bicycles or bicycle facilities as contributing to traffic problems on Mare Island. The perception of bicycle safety and problems is likely due to the lack of bicycle facilities and the fact that sharing traffic lanes with automobiles is undesirable for bicyclists and drivers due to the narrow lane widths. This constraint can be reduced when the future street system is planned by creating a well defined bicycle system that includes adequate on-street facilities as well as off-street facilities.

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2 *City of Vallejo Short Range Transit Plan Draft Report*. July 1993. City of Vallejo.

7.2.4 Aviation System Constraints

There were no constraints identified for the aviation system.

7.2.5 Freight System Constraints

The freight system operates relatively well although trucks must operate on the street system, which has a number of constrained locations and rail access to the study area from the San Francisco Bay Area is quite circuitous. Rail movement using the existing network between Vallejo and Oakland or San Jose involves about 30 miles of circuity compared to highway distances. Rail movement to San Francisco and Peninsula Points involves even more circuity, since the only rail crossing of San Francisco Bay is the Dumbarton Bridge between Newark and Palo Alto. Another constraint is the lack of direct freeway access for trucks coming from I-80 or I-780. Currently, truck routes over city streets and SR 37 are relatively slow and congested.

7.2.6 Parking Constraints

Parking lots are generally in good condition on Mare Island, and do not represent a constraint to the re-use of many existing buildings. The main exception to this is the lack of parking in the densely-built Controlled Industrial Area (CIA). This lack of parking may inhibit some uses which require adequate close-in parking, even if a shuttle system was installed to connect to the existing remote lots.

7.3 TRAFFIC PROJECTIONS FOR REUSE PLAN

The proposed reuse plan contains the following three phases:

- Phase 1 - 1996;
- Phase 2 - 2006; and
- Phase 3 - Buildout.

Traffic projections were prepared for phase 2 and phase 3 using the City of Vallejo MINUTP travel demand model. Trip generation estimates, though, were generated for phase 1 conditions and assigned manually to the Mare Island street system and to the two entrances.

Table 7.8 compares trip generation rates from the City of Vallejo Traffic Model with those contained in *Trip Generation,* Institute of Transportation Engineers (ITE), 5th Edition.

Table 7.8
MARE ISLAND TRIP GENERATION RATES (PM Peak Hour)

Land Use	Units	ITE Rate	City of Vallejo Traffic Model Rates	Notes
Residential	DUs	1.01	0.74	
Recreation				
Golf	acres	0.39	no data	
Parks	acres	1.2	3.5	model adjusted
Open Space	acres	0.39	no data	
Education/Office	KSF	2.24	2.54	
Office	KSF	2.24	2.54	
Retail Commercial	KSF	7.6	4.76	
Light Industry	KSF	0.98	0.91	
Heavy Industry	KSF	0.19	0.91	
Marina	berths	0.19	42	model adjusted
Civic	KSF	2.24	2.54	
Warehouse	KSF	0.74	0.82	
RV Park	spaces	0.56	no data	
Dormitory	Beds	0.34	no data	

DUs = Dwelling Units
KSF = 1,000 square feet

Rates: trips per unit of measure, such as a dwelling or 1,000 square feet at office.

As shown in Table 7.8, the Vallejo model had rates (in some cases) that were too high or that did not relate to specific land uses proposed for Mare Island. For these cases, the Vallejo land use input was adjusted to provide more reasonable trip generation estimates. Adjustments were made by calculating trip generation using the ITE rates and then sizing the land use accordingly. The initial p.m. peak hour trip generation results using the ITE rates are shown in Table 7.9.

	Table 7.9 MARE ISLAND TRIP GENERATION PROJECTIONS								
	1996			2006			Build Out		
Land Use	Quantity	Units	PM Peak Trips	Quantity	Units	PM Peak Trips	Quantity	Units	PM Peak Trips
Residential	483	Dus	488	696	Dus	703	1,536	Dus	1,551
Recreation									
Golf	157	acres	61	157	acres	61	157	acres	61
Parks	103	acres	124	103	acres	124	103	acres	124
Open Space	163	acres	64	163	acres	64	163	acres	64
Education/Office	0	KSF	0	477.5	KSF	1,070	477.5	KSF	1,070
Office	169.6	KSF	380	835.9	KSF	1,872	835.9	KSF	1,872
Retail Comm.	61.1	KSF	464	120.7	KSF	917	200.7	KSF	1,525
Light Industry	178.5	KSF	175	484	KSF	474	2063.2	KSF	2,022
Heavy Industry	291,2	KSF	55	805.4	KSF	153	934.3	KSF	178
Marina	0	Berths	0	0	berths	0	100	berths	19
Civic	154.8	KSF	347	181.7	KSF	407	181.7	KSF	407
Warehouse	234.2	KSF	173	663.1	KSF	491	1,285	KSF	951
RV Park	0	spaces	0	100	spaces	56	100	spaces	56
Dormitory/1	0	Beds	0	0	Beds	0	267	Beds	90
TOTAL			2,331			6,392			9,989

Before imputing the land use into the model, the trip generation estimates were factored to account for the island's job/housing balance and for trip reduction related to mode split and travel demand management (TDM) measures such as flexible working hours and telecommuting. In general, trips were reduced by about 10 percent in phase 1 and 2 while phase 3 trips were reduced by about 20 percent. The reader should note that about 14 percent of the commuter trips to Mare Island used modes other than the automobile according to the*1993 Mare Island Commuter Survey.*

To provide some perspective regarding the trip generation estimates, Table 7.10 compares 1988 p.m. peak hour volumes entering and leaving the island to those projected for the reuse plan phases. The project volumes were generated by the Vallejo traffic model and they include trip reductions for internal travel, travel demand management (TDM) measures, and travel by modes other than automobile.

Table 7.10 MARE ISLAND ENTRANCE P.M. PEAK HOUR VOLUME COMPARISON				
Phase	**Inbound**	**Outbound**	**Total**	**Percent of 1988 Total**
1988	1,050	3,750	4,800	100%
1996	690	1,220	1,910	40%
2006	1,440	3,000	4,440	93%
Buildout w/o Southern Crossing	2,310	4,780	7,090	148%
Buildout w/ Southern Crossing	2,590	5,010	7,600	158%

Under the current reuse plan phasing scheme, phase 2 (2006) would generate about the same number of trips as the MINSY did in 1988. Under the phase 3 (buildout) scenario, traffic levels would increase about 50 percent over 1988 levels.

7.4 FUTURE IMPACTS

As Mare Island converts to civilian uses, new trips will be generated both on and off the island. It is possible that these new trips could adversely affect various components of the transportation system. An impact, for the purposes of this study, is defined as a physical change in the condition or operation of the transportation system. Impacts are considered adverse if they cause a reduction in the City of Vallejo's standards. This section identifies future impacts that are expected as a result of new trips generated by planned land uses on Mare Island.

7.4.1 Street System

New trips generated by the reuse of Mare Island will affect the island's street system as well as the primary access routes onto and off of the island. In addition, on island traffic will create demand for parking. The following discussion summarizes the potential adverse impacts to the street system.

Mare Island Street System

Many of the Mare Island streets are in good condition and can accommodate future traffic levels. New connections and facility upgrades, however, will be required as development occurs. Table 7.11 identifies the Mare Island street system facilities that are expected to be impacted under each phase of the reuse plan.

Table 7.11 MARE ISLAND STREET SYSTEM IMPACT SUMMARY		
Phase	**Facility**	**Location**
1996	- Railroad Ave.	Coast Guard Station to Fishing Pier
	- Railroad Ave	Intersection with 14th Street
	- Tenth Street	Railroad Avenue to Walnut Avenue
2006	- Mare Island Causeway	Wilson Avenue to G Street
	- Walnut Avenue	North Gate to G Street
	- Railroad Avenue	North Gate to G Street
	- J Street	Intersection with Railroad Avenue
	- J Street	Intersection with Walnut Avenue
	- G Street	Cedar Avenue to Mare Island Causeway
	- Railroad Avenue	Intersection with A Street
	- Cear Avenue	Intersection with A Street
	- Club Drive	Cedar Avenue to Sargo
	- Zone 1,3,4,7 and 9 Streets	Various
Buildout	- Mare Island Causeway	Wilson Avenue to G Street
	- Cedar Avenue	J Street to Club Drive
	- Cedar Avenue	Intersection with J Street
	- Cedar Avenue	Intersection with 14th Street
	- Walnut Avenue	J Street to Cedar Avenue
	- Railroad Avenue	G Street to Coast Guard Station
	- Railroad Avenue	Intersection with 4th Street
	- Railroad Avenue	Intersection with 10th Street
	- Railroad Avenue	Intersection with Marina Entrance
	- Zone 1,3,4,5,7 and 10 Streets	Various

Should the timing of development differ from the anticipated phasing of the reuse plan (within the respective land use zones), then the timing of impacts identified in Table 7.11 would also change. This relationship is important to understand, especially as it relates to the need for additional access to the island. Table 7.12 compares p.m. peak hour traffic forecasts at the island entrances for each phase to existing capacity levels.

Table 7.12 MARE ISLAND ENTRANCE P.M. PEAK HOUR VOLUME AND CAPACITY COMPARISON						
	Volume		Capacity[1]		Reserve Capacity	
Phase	In	Out	In	Out	In	Out
1988	1,050	3,750	1,600	3,200	550	-550
1996	690	1,220	1,600	3,200	910	1,980
2006	1,440	3,000	1,600	3,200	160	200
Buildout	2,310	4,780	1,600	3,200	-710	-1,580
Notes: 1 Assumes one inbound lane at each entrance and two outbound lanes at each entrance.						

Under the current reuse plan phasing scheme, available capacity would accommodate projected traffic levels through 2006. Under buildout conditions, demand far exceeds available capacity.

Mare Island Parking Facilities

Implementation of the Mare Island Reuse Plan will result in various impacts to existing parking facilities. Table 7.13 summarizes the parking supply and demand estimates by phase for the planned land uses.

Table 7.13 PARKING IMPACT SUMMARY		
Phase	Parking Demand (No. of Spaces)	Parking Supply (No. of Spaces)
1996	1,582	8,494
2006	4,760	8,494
Buildout	8,955	6,497[1]
Notes: 1 Parking spaces are lost to planned development.		

Table 7.13 shows that a shortfall of about 2,460 spaces would occur under the buildout scenario. In 1996 and 2006 a shortfall is not expected, however, most of the existing surface parking lots on the island need new striping and signing to bring the lots up to City standards.

Primary Access Routes

The primary access routes to Mare Island also happen to be significant local and regional routes for other trip origins and destinations. For example, SR 37 is one of the only major connections between Marin and Sonoma Counties and Interstate 80. Given the importance of these routes the City of Vallejo, the Metropolitan Transportation Commission and Caltrans are all working together to improve traffic flow conditions on these facilities. Table 7.14 summarizes the planned improvements for three of the primary access routes.

Table 7.14
PLANNED PRIMARY ACCESS ROUTE IMPROVEMENTS

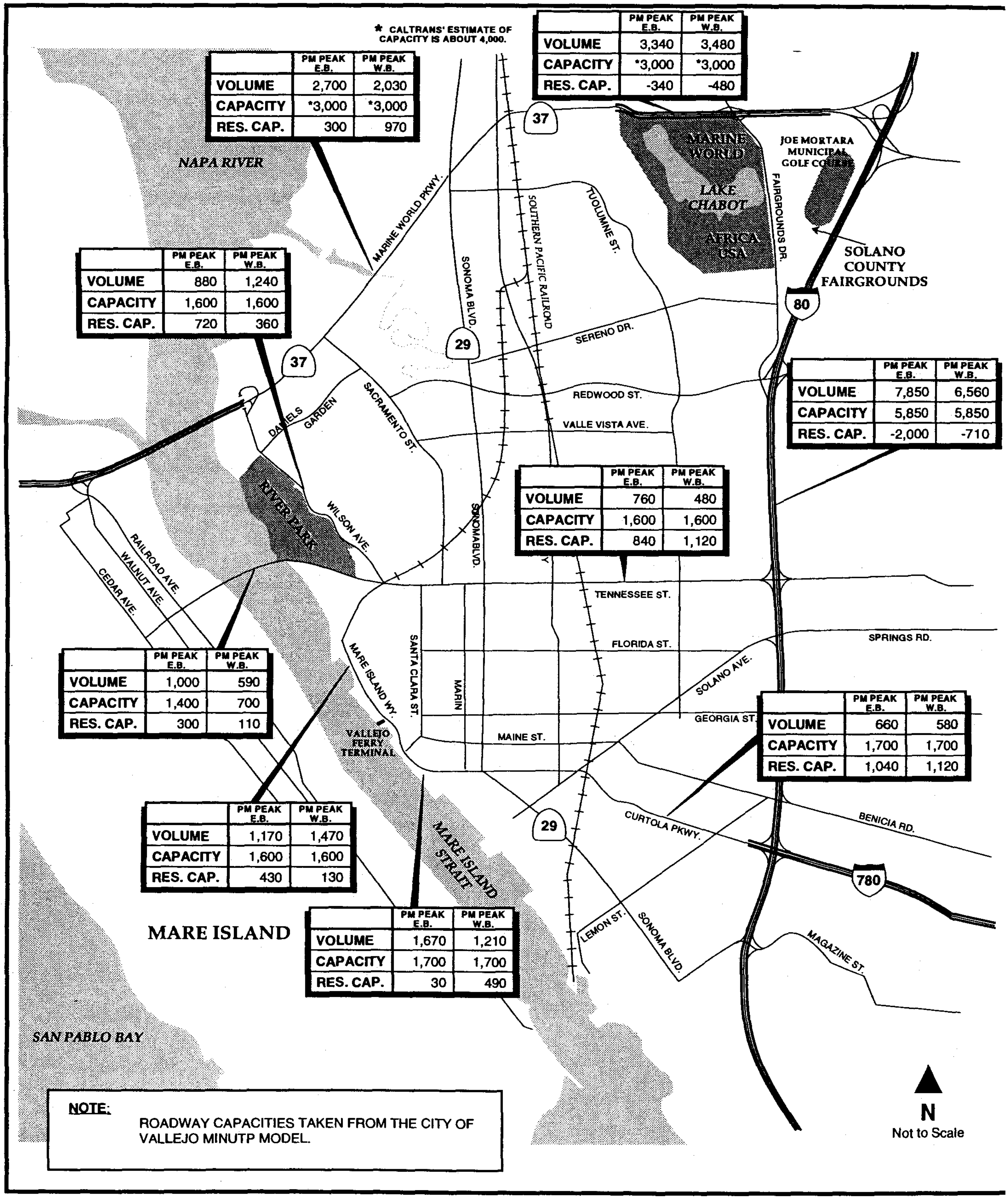
Facility	Improvement	Status	Est. Completion
Tennessee Street	Signal Coordination	Planned	1996
Wilson Avenue	Widening to four lanes/Signalization	Planned	1998/[1]
Wilson Ave/Causeway	Re-Configuration	Planned	1996
S.R. 37	Upgrade To Four-Lane Freeway	Planned	2005/[1]

[1] Widening is warranted now according to recent traffic counts.

Since the planned improvements are expected to be completed prior to 2006, the additional capacity they will provide was included in estimates of reserve capacity for 2006 and buildout conditions for the primary access routes that are shown in Figures 7.15 and 7.16.

The figures show that even with the planned improvements assumed to be in place, a number of locations along the primary access routes are expected to operate near capacity by 2006 and over capacity by buildout. Of the problem routes, traffic volumes exceed capacity to the greatest degree on SR 37 east of Mare Island.

There is only one on-ramp lane access to SR 37 at this point, which has a capacity of about 1,500 vehicles per hour. To accommodate projected levels of traffic demand this ramp would have to have at least two lanes and SR 37 would require six lanes between Mare Island and I-80. However, Assembly Bill 719 limits expansion of SR 37 to four lanes total between Mare Island and SR 29, due in part to environmental concerns.



	PM PEAK E.B.	PM PEAK W.B.
VOLUME	3,340	3,480
CAPACITY	*3,000	*3,000
RES. CAP.	-340	-480

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	2,700	2,030
CAPACITY	*3,000	*3,000
RES. CAP.	300	970

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	880	1,240
CAPACITY	1,600	1,600
RES. CAP.	720	360

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	7,850	6,560
CAPACITY	5,850	5,850
RES. CAP.	-2,000	-710

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	760	480
CAPACITY	1,600	1,600
RES. CAP.	840	1,120

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	1,000	590
CAPACITY	1,400	700
RES. CAP.	300	110

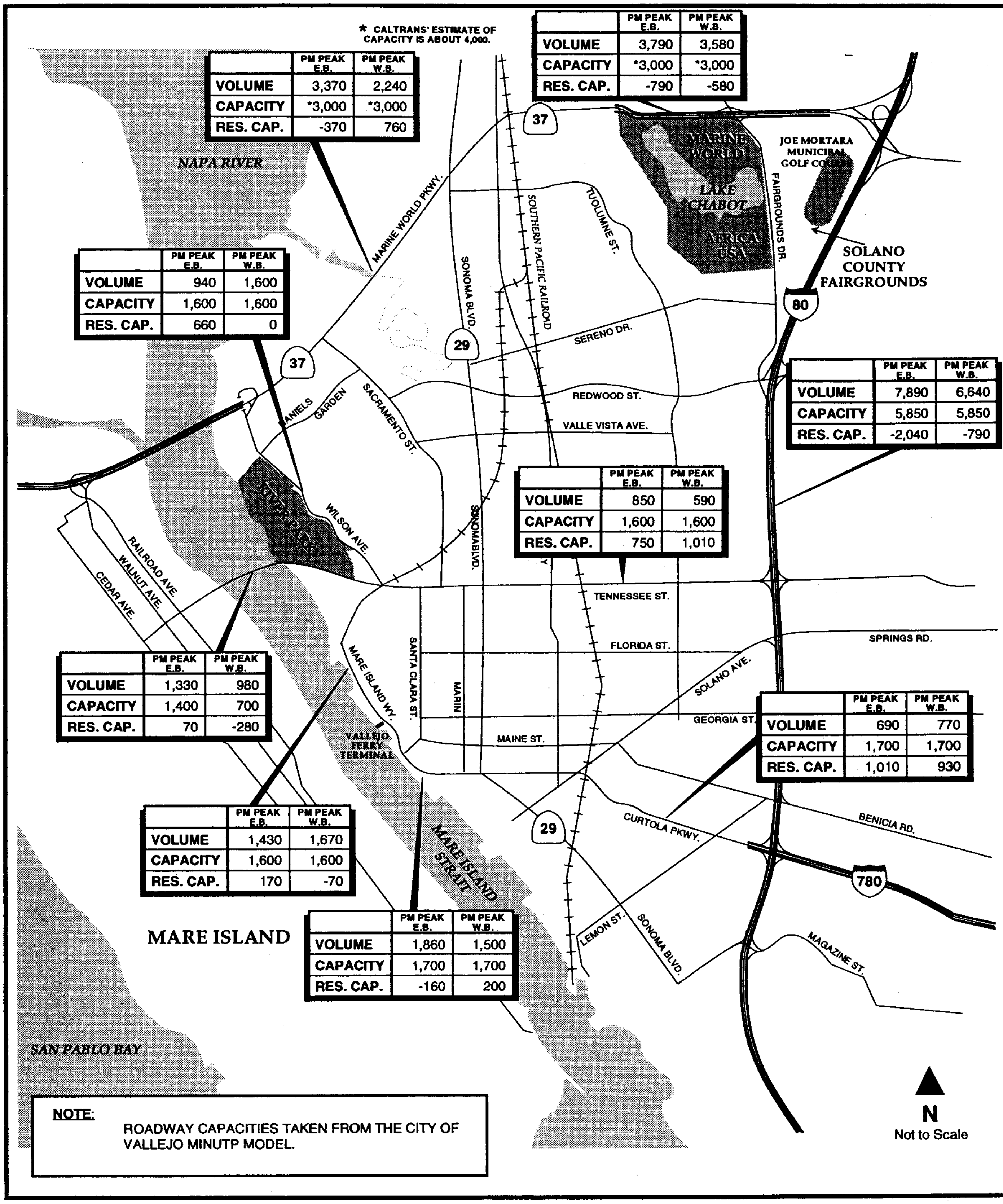
	PM PEAK E.B.	PM PEAK W.B.
VOLUME	660	580
CAPACITY	1,700	1,700
RES. CAP.	1,040	1,120

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	1,170	1,470
CAPACITY	1,600	1,600
RES. CAP.	430	130

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	1,670	1,210
CAPACITY	1,700	1,700
RES. CAP.	30	490

FIGURE 7.15 *2006 PM PEAK HOUR RESERVE CAPACITY FOR PRIMARY ACCESS ROUTES*

Fehr & Peers Associates, Inc.
Transportation Consultants



* CALTRANS' ESTIMATE OF CAPACITY IS ABOUT 4,000.

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	3,370	2,240
CAPACITY	*3,000	*3,000
RES. CAP.	-370	760

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	3,790	3,580
CAPACITY	*3,000	*3,000
RES. CAP.	-790	-580

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	940	1,600
CAPACITY	1,600	1,600
RES. CAP.	660	0

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	7,890	6,640
CAPACITY	5,850	5,850
RES. CAP.	-2,040	-790

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	850	590
CAPACITY	1,600	1,600
RES. CAP.	750	1,010

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	1,330	980
CAPACITY	1,400	700
RES. CAP.	70	-280

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	690	770
CAPACITY	1,700	1,700
RES. CAP.	1,010	930

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	1,430	1,670
CAPACITY	1,600	1,600
RES. CAP.	170	-70

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	1,860	1,500
CAPACITY	1,700	1,700
RES. CAP.	-160	200

NOTE: ROADWAY CAPACITIES TAKEN FROM THE CITY OF VALLEJO MINUTP MODEL.

FIGURE 7.16 ***BUILD OUT PEAK HOUR RESERVE CAPACITY FOR PRIMARY ACCESS ROUTES***

Fehr & Peers Associates, Inc.
Transportation Consultants

7.4.2 Transit System

As Mare Island develops, demand for transit service is expected to increase. The level of demand, however, depends on the type and intensity of new land uses on Mare Island. Under the proposed phasing of the reuse plan new transit service would likely be required on the island as well as to Vallejo. The new services would impact Vallejo Transit by requiring the creation of new routes and schedules. It is assumed that the new routes would also require new vehicles in order to maintain service levels.

7.4.3 Bicycle and Pedestrian System

With future growth and increased traffic, bicyclists and pedestrians will need adequate facilities to circulate on Mare Island. The proposed efforts to minimize auto use for internal and external trips will be compromised without adequate sidewalks, bike lanes, paths, and routes. Moreover, with many existing streets on Mare Island having no sidewalks or bike lanes, basic safety and convenience standards would not be met in the future.

7.4.4 Aviation System

At this time, it is difficult to determine if the reuse plan would adversely affect the island's heliport facilities. The reuse plan identifies the heliport facilities and does not recommend land uses that would be inconsistent with its operation. Therefore, no impacts are expected to occur.

7.4.5 Freight System

The reuse plan contains a large amount of land designated for industrial type uses. It is likely that industrial users in these areas would create demand for freight shipments by truck or rail. Also, commercial development would likely receive and send shipments via truck. Since both truck and rail freight service are integrated with the street system, increased demand for freight service could adversely affect street system operations for the following reasons:

- Trucks are larger than passenger cars and, therefore, occupy more roadway space than passenger cars;

- Trucks have poor operating capabilities when compared to passenger cars, particularly with respect to acceleration, deceleration, and the ability to maintain speed on upgrades; and

- Train traffic accessing Mare Island would have to use the Mare Island Causeway, which would close off all causeway traffic when a train crosses Mare Island Strait.

As traffic levels increase these potential impacts would become more important factors in the operation of the street system. Truck turning and loading bay requirements for the proposed warehouse, light industrial, and heavy industrial uses are generally available with the existing buildings. As some buildings are removed and others expanded or constructed, site specific review should be performed.

Currently, some trucks within the Controlled Industrial Area maneuver in former roadways such as Railroad Avenue. In the future trucks will be prohibited from doing so. While most buildings have ample loading capacity at many locations, some loading bays may need to be moved in the future.

7.5 REQUIRED TRANSPORTATION IMPROVEMENTS

Transportation improvements are required to eliminate or reduce existing constraints and to mitigate identified impacts. This section identifies improvements for each transportation system component.

7.5.1 Street System

In order to accommodate future traffic levels at acceptable standards, a number of improvements are required to the Mare Island street system and parking facilities as well as to primary access routes.

Mare Island Street System

As development occurs, the street system on Mare Island would be upgraded and expanded. Figures 7.17 through 7.20 show the recommended improvements for Mare Island streets and parking facilities under each phase of the reuse plan. Descriptions of each improvement are contained in Table 7.15.

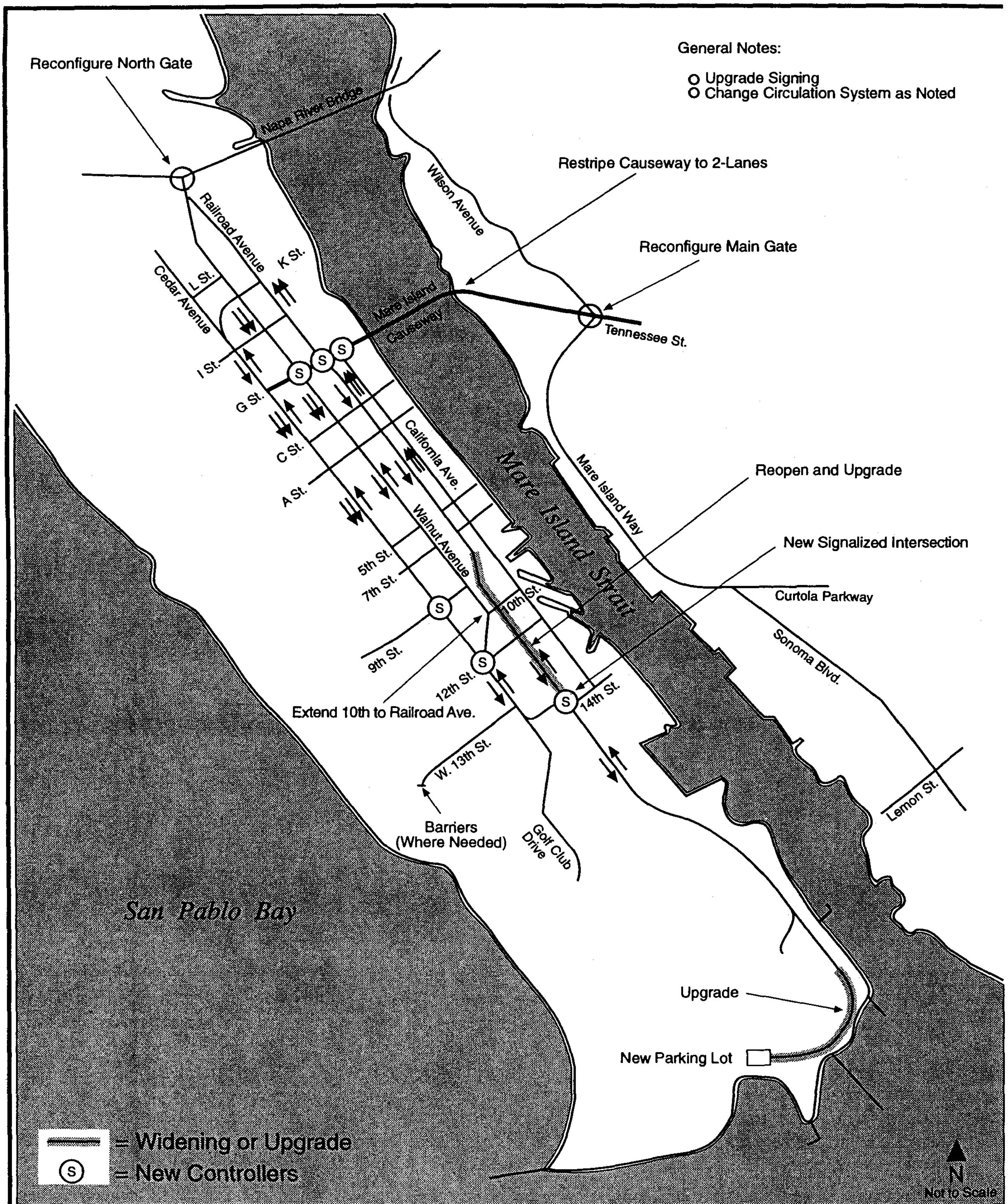


FIGURE 7.17	*1996 STREET SYSTEM IMPROVEMENTS*	Fehr & Peers Associates, Inc. Transportation Consultants

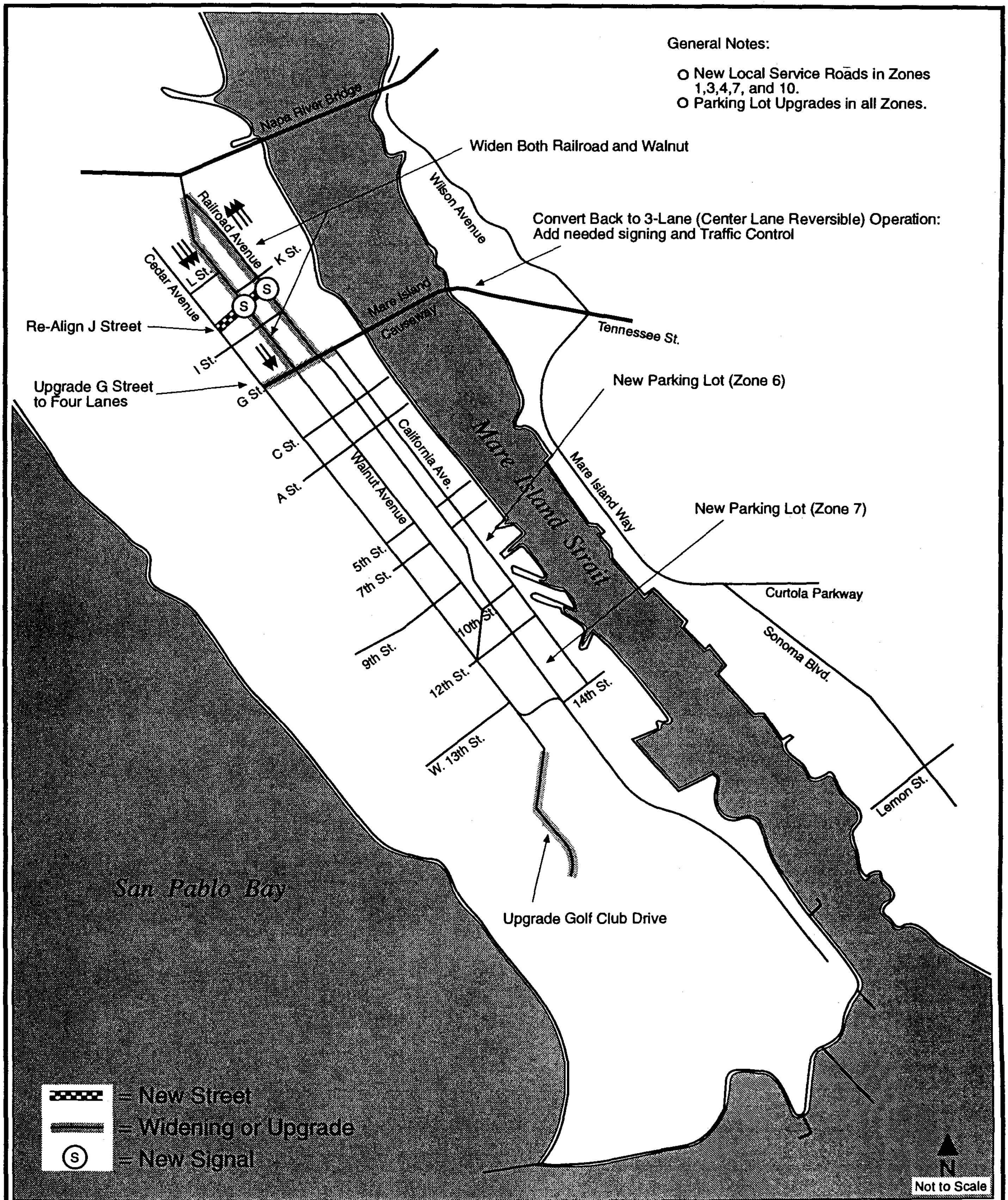


FIGURE 7.18

2006 STREET SYSTEM IMPROVEMENTS

Fehr & Peers Associates, Inc.
Transportation Consultants

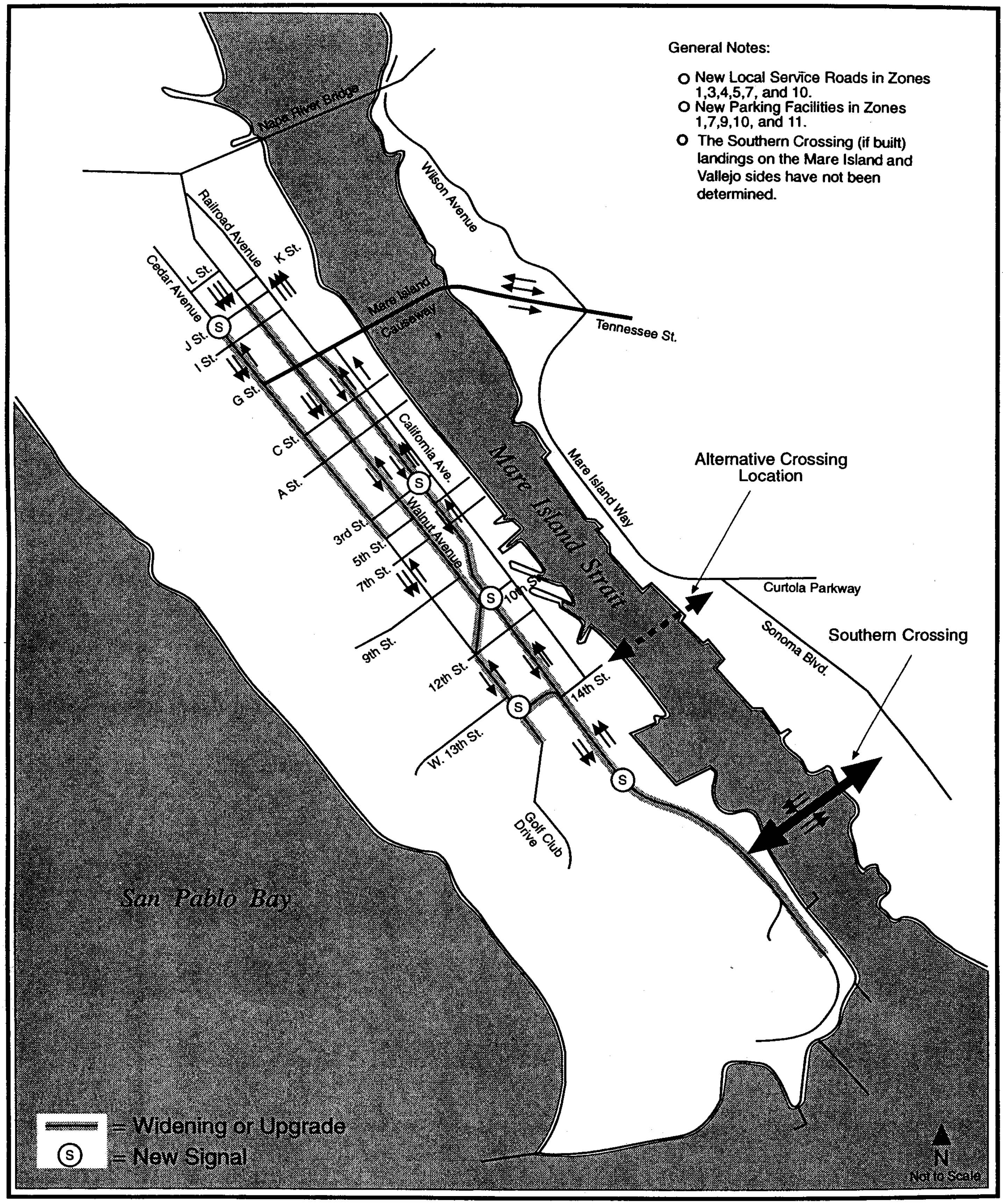


FIGURE 7.19

BUILD OUT (WITH SOUTHERN CROSSING) STREET SYSTEM IMPROVEMENTS

Fehr & Peers Associates, Inc.
Transportation Consultants

Table 7.15 MARE ISLAND STREET SYSTEM RECOMMENDED IMPROVEMENTS	
Facility	**Improvement Description**
PHASE 1 - 1996	
Mare Island Arterials and Collectors	Provide new traffic control and informational signs
North Gate	Reconfigure north entrance to include two inbound and two outbound lanes (see Figure 7.20)
Mare Island Causeway/G Street	Convert Mare Island Causeway to two lanes by adding new striping and traffic control devices from Wilson Avenue to G Street (see Figure 7.21) plus reconfigure G Street from Railroad Avenue to Cedar Avenue (see Figure 7.22)
New Signal Controllers (4)	Replace existing signal controllers
Railroad Avenue	Extend Railroad Avenue from 8th Street to 14th Street as a primary arterial
Railroad Avenue at 14th Street	Construct new traffic signal when warrants are met
Railroad Avenue	Upgrade Railroad Avenue from Coast Guard Station to proposed public fishing pier
Tenth Street	Extend Tenth Street from Walnut Avenue to Railroad Avenue to provide access to planned industrial area
Minor Streets	Close substandard streets that are not planned for future use
Public Fishing Pier	Construct public parking lot near fishing pier
Existing Parking Lots (Zones 1-10)	Upgrade signing and striping at existing parking lots
PHASE 2 - 2006	
Walnut Avenue	Widen to three lanes plus bike lanes, parking and curb and gutter from the north gate to G Street
Railroad Avenue	Widen to three lanes plus bike lanes, parking and curb and gutter from the north gate to G Street
Mare Island Causeway/G Street	Convert to three lane reversible operation (see Figures 7.23)
Railroad Avenue at J Street	Construct new traffic signal when warrants are met
Walnut Avenue at J Street	Construct new traffic signal when warrants are met
J Street	Realign and construct two lanes between Walnut Avenue and Cedar Avenue
G Street	Upgrade G Street to include four 12' lanes between Mare Island Causeway and Cedar Avenue (see Figure 7.24)

Table 7.15 MARE ISLAND STREET SYSTEM RECOMMENDED IMPROVEMENTS	
Facility	**Improvement Description**
Club Drive	Upgrade Club Drive to include two 12' lanes from Cedar Avenue to Sargo
Local Service Roads (Zones 1,3,4,7 and 9)	Assumes the need to construct about 2 miles of new collectors
Existing Parking Lots (Zones 1-10)	Upgrade signing and striping at existing parking lots
New Parking Lots (Zone 6)	Construct 180 new surface parking spaces
New Parking Lots (Zone 7)	Construct 170 new surface parking spaces
PHASE 3 - BUILDOUT WITH SOUTHERN CROSSING	
Cedar Avenue	Widen to three lanes plus bicycle lanes and curb and gutter from J Street to Club Drive
Walnut Avenue	Widen to three lanes plus bicycle lanes and curb and gutter from J Street to G Street
Walnut Avenue	Widen existing two lanes to add bicycle lanes and curb and gutter from G Street to Cedar Avenue
Railroad Avenue	Widen to three lanes plus bicycle lanes and curb and gutter from G Street to 14th Street
Railroad Avenue Approach to Southern Crossing	Widen Railroad Avenue up to six lanes with bicycle lanes, curb and gutter, and sidewalk from 14th Street to the Southern Crossing
Railroad Avenue	Widen to two lanes with turn bays, bicycle lanes, and curb and gutter from Southern Crossing to the Coast Guard station
Cedar Avenue at J Street	Construct new traffic signal when warrants are met
4th Street at Railroad Avenue	Construct new traffic signal when warrants are met
Cedar Avenue at 14th Street	Construct new traffic signal when warrants are met
10th Street at Railroad Avenue	Construct new traffic signal when warrants are met
Railroad Avenue at Marina Entrance	Construct new traffic signal when warrants are met
Local Service Roads (Zones 1,3,4,5,7 and 10)	Assumes the need to construct about 4.2 miles of new collectors
Existing Parking Lots (Zones 1-10)	Upgrade signing and striping at existing parking lots
New Parking Lots (Zone 1)	Construct 1,750 surface parking spaces
New Parking Lots (Zone 7)	Construct 660 surface parking spaces
New Parking Lots (Zone 9)	Construct one 1,000 space parking garage
New Parking Lots (Zone 10)	Construct 110 surface parking spaces

Table 7.15 MARE ISLAND STREET SYSTEM RECOMMENDED IMPROVEMENTS	
Facility	**Improvement Description**
New Parking Lots (Zone 11)	Construct 30 surface parking spaces
Southern Crossing	Construct a four to six lane bridge between Vallejo and Mare Island

The improvements listed in Table 7.15 follow the land use plan's phased approach. Improvements are recommended to accommodate the development expected to occur in each phase within the respective land use zones while also maintaining consistency with the ultimate transportation system plan shown in Figure 7.25.

Other Improvements

The main gate intersection at Wilson Avenue/Tennessee Avenue/Mare Island Causeway will be reconfigured in the future to increase capacity and efficiency. This reconfiguration may include removal of existing Navy buildings and lots in the area.

The Roosevelt Terrace street system is adequate for existing and proposed residential uses. Access to the site may be affected by the SR 37 freeway upgrade depending on the configuration of interchanges in the area.

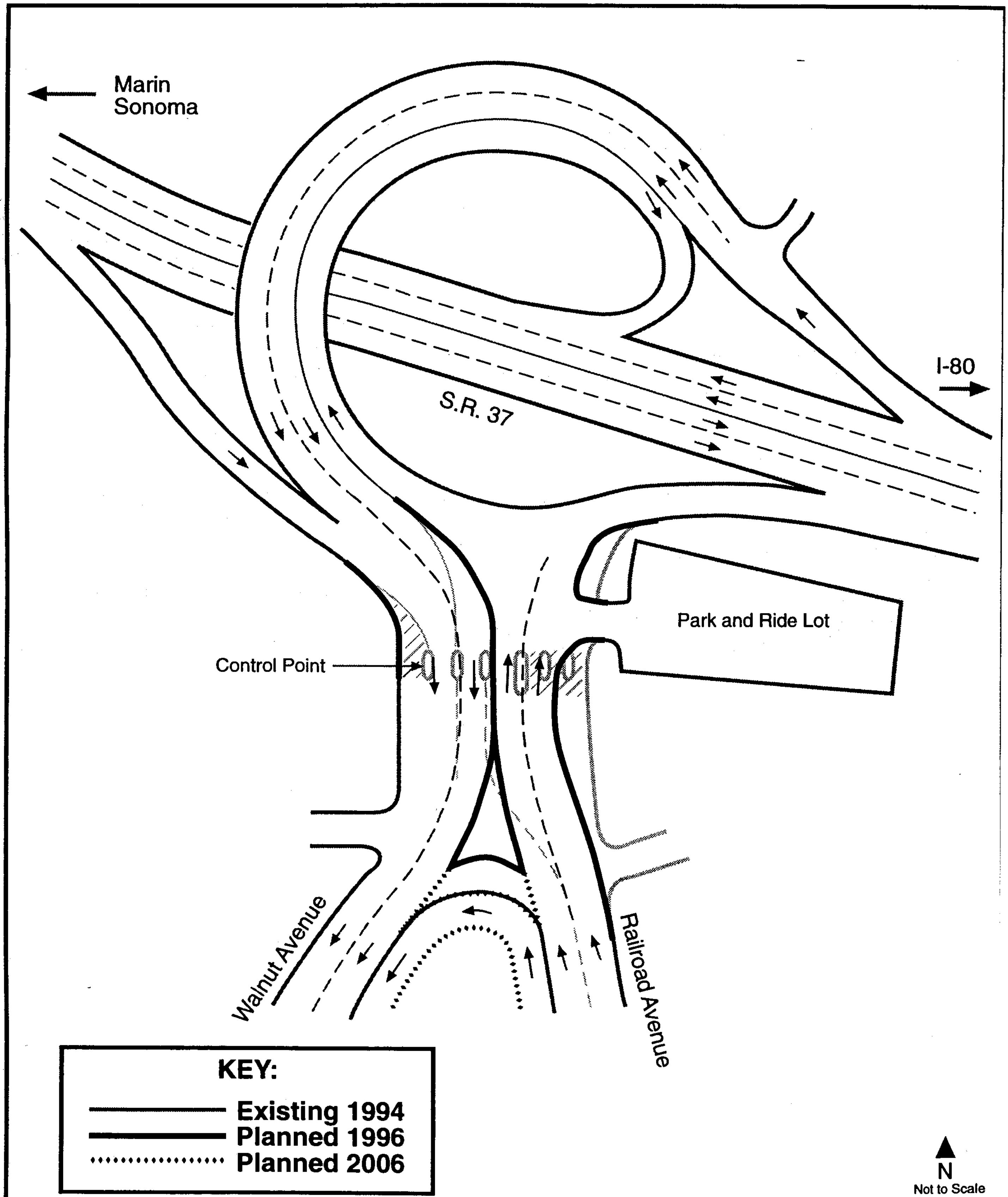


FIGURE 7.20	*NORTH GATE IMPROVEMENTS*	Fehr & Peers Associates, Inc. Transportation Consultants

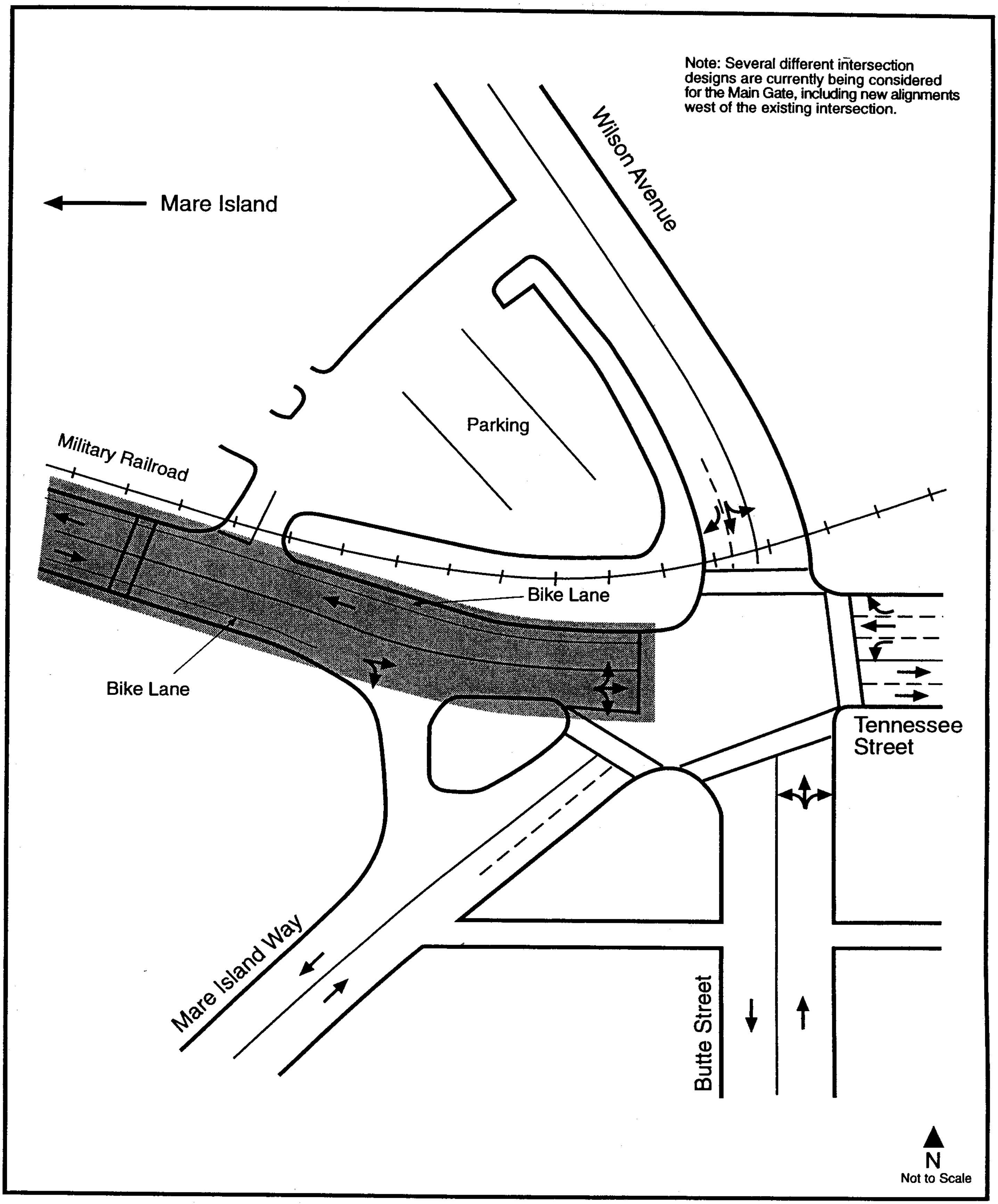


FIGURE 7.21

1996 MARE ISLAND CAUSEWAY IMPROVEMENTS

Fehr & Peers Associates, Inc.
Transportation Consultants

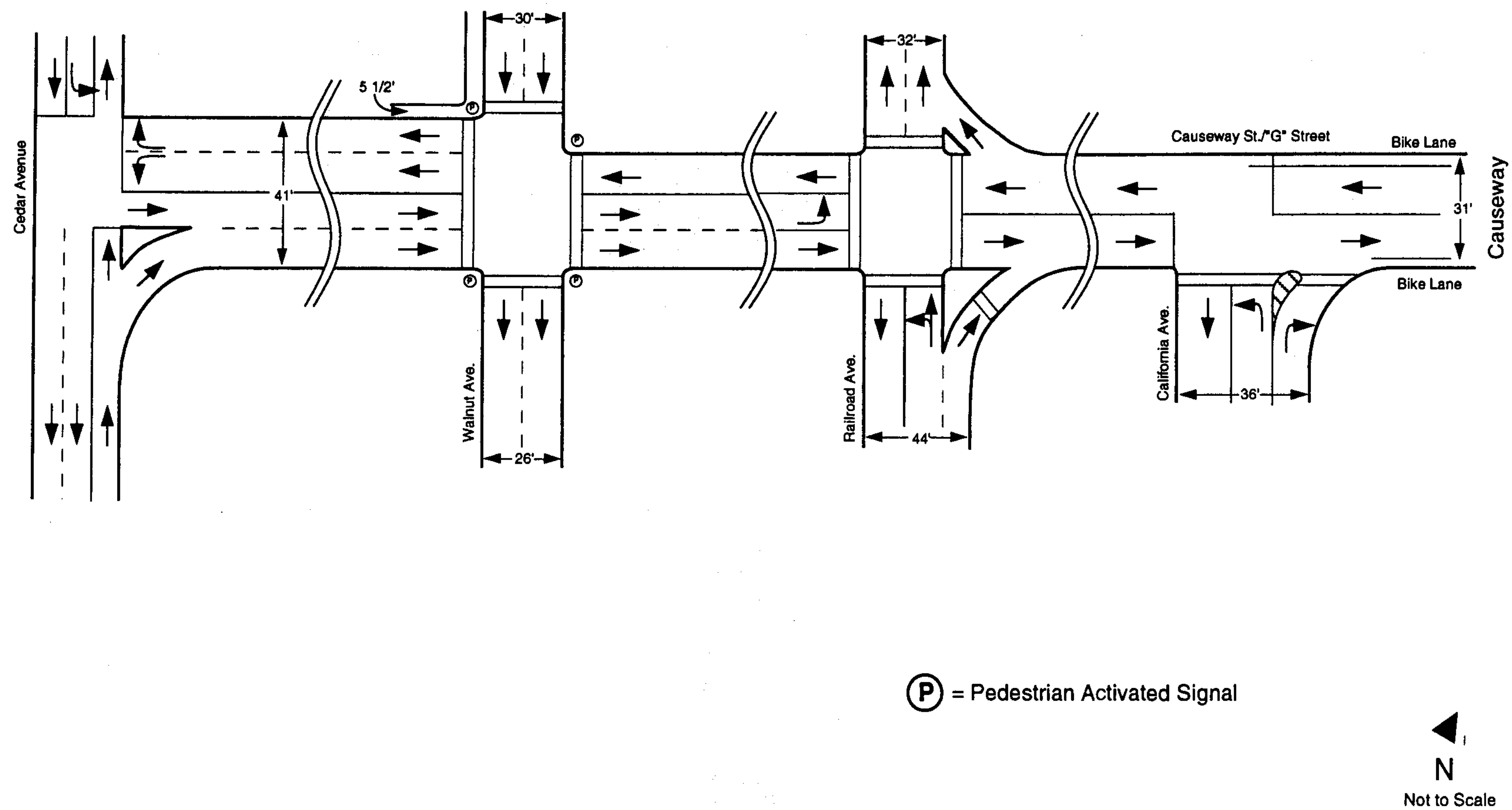


FIGURE 7.22

1996 G STREET IMPROVEMENTS

Fehr & Peers Associates, Inc.
Transportation Consultants

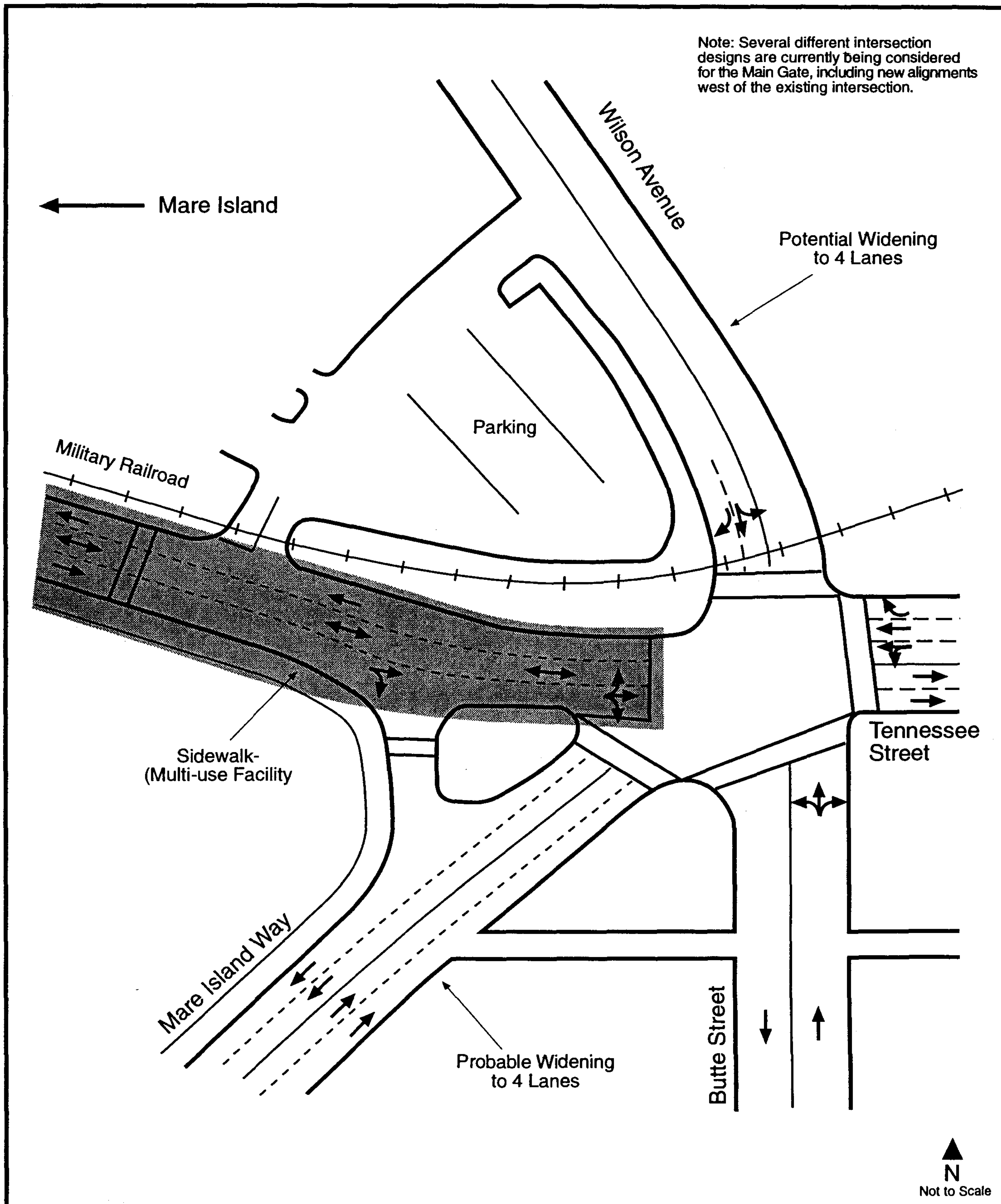


FIGURE 7.23	*2006 MARE ISLAND CAUSEWAY IMPROVEMENTS*	Fehr & Peers Associates, Inc. Transportation Consultants

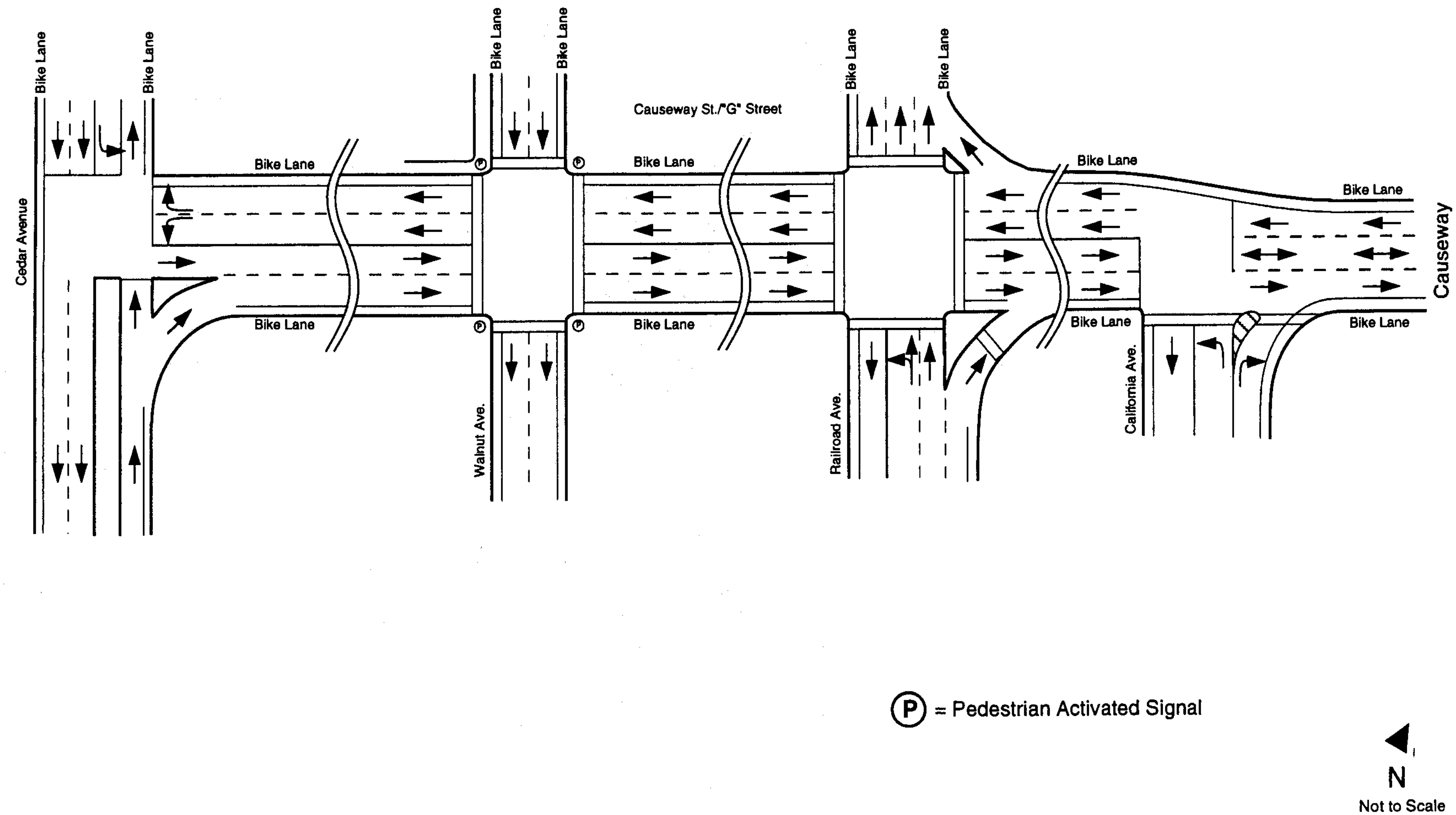


FIGURE 7.24

2006 / BUILDOUT G STREET IMPROVEMENTS

Fehr & Peers Associates, Inc.
Transportation Consultants

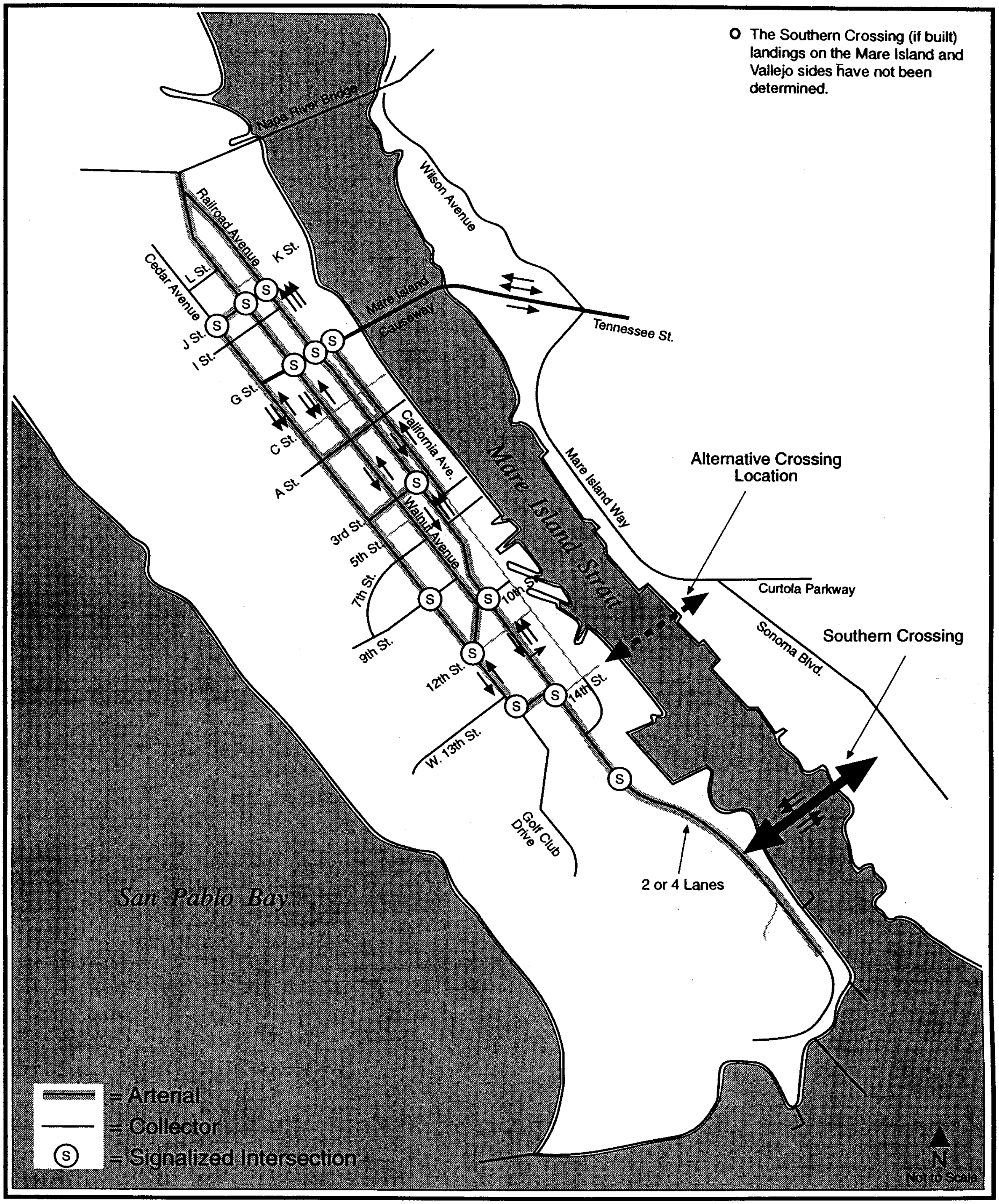


FIGURE 7.25

ULTIMATE STREET SYSTEM

Fehr & Peers Associates, Inc.
Transportation Consultants

Primary Access Routes

As discussed earlier, improvements are already planned for SR 37, Wilson Avenue and Tennessee Street. For the most part these improvements represent ultimate configurations given constraints such as existing land uses and right-of-way costs. Nevertheless, implementation of the Mare Island Reuse Plan would adversely affect the following primary access routes:

- SR 37;
- I-80;
- Wilson Avenue; and
- Mare Island Way.

Given the significant constraints facing further improvement of these facilities, options are limited for accommodating future travel demand accessing Mare Island. The first option and least costly would be to reduce the number of trips generated by Mare Island land uses. Since trip reductions due to mode split and TDM efforts were already assumed, it is likely that reductions in land use would be the next most significant factor affecting the island's trip generation.

Another option, assuming funding is available, would be to widen existing primary access routes such as SR 37 or to construct a new southern crossing to the island that would connect directly to Interstate 80 and 780. The southern crossing has been considered in the past because there is no access from Vallejo to the southern end of Mare Island. A general location for this crossing is shown in Figure 7.26 followed by a typical profile and cross section in Figure 7.27.

The southern crossing would improve circulation on and off the island by providing more capacity and by providing a direct connection to Interstates 80 and 780. This connection would best accommodate peak period trips coming from and going south and east of Vallejo. Figure 7.28 displays the buildout p.m. peak hour reserve capacity for the primary access routes assuming the southern crossing is in place.

In summary, a southern crossing is considered essential between 2006 and buildout, given current land use assumptions. Without a southern crossing, it is unlikely that the island would achieve buildout due to the severity of congestion. The threshold of acceptable congestion would most likely come between 65 and 80 percent of buildout.

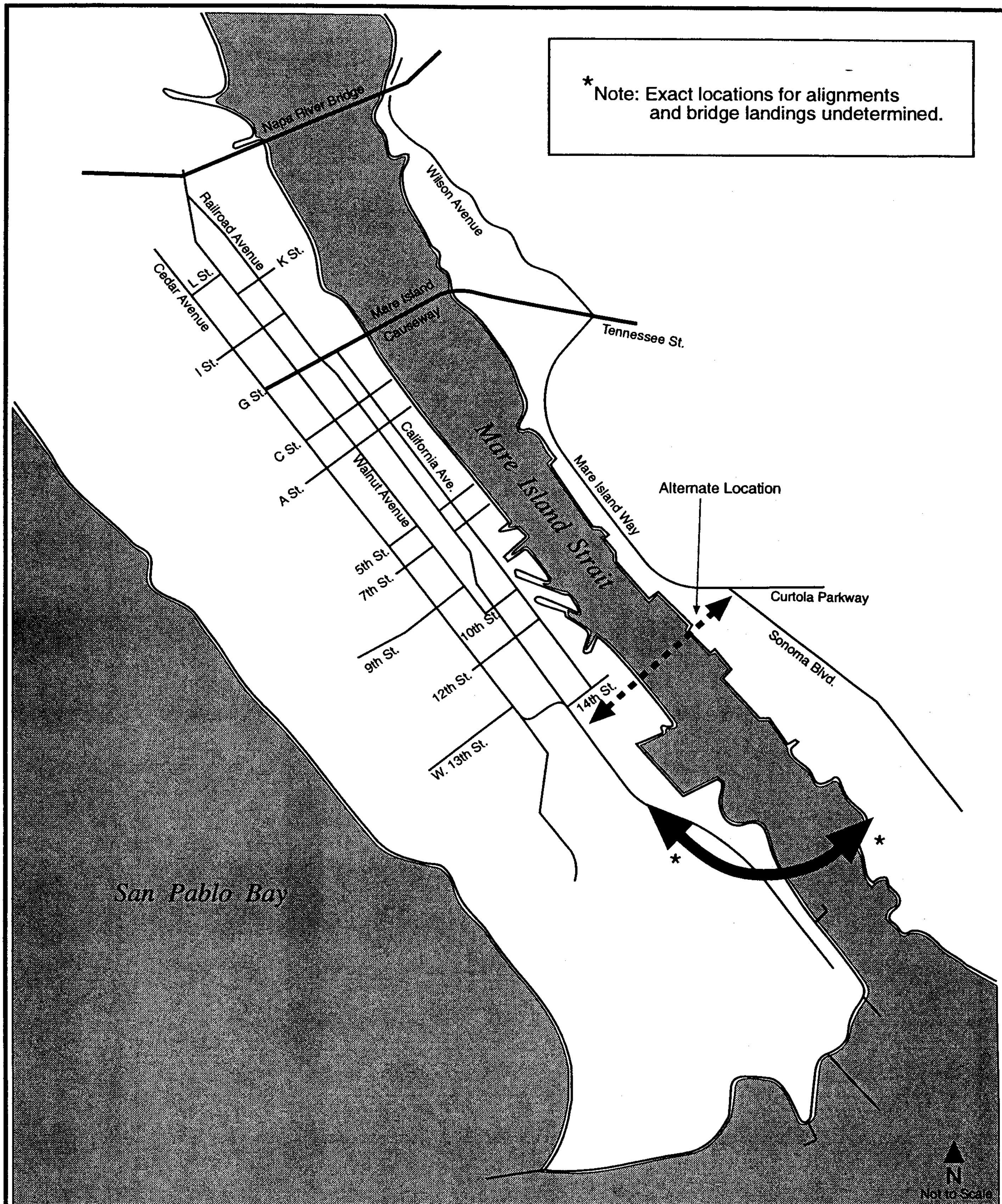


FIGURE 7.26

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SOUTHERN CROSSING ALIGNMENT

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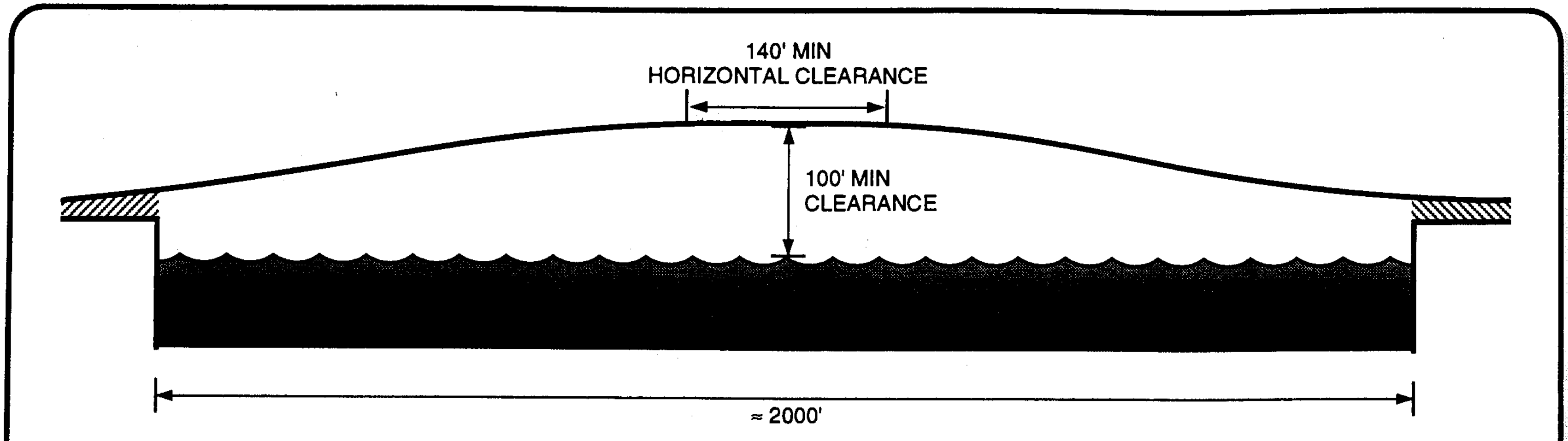
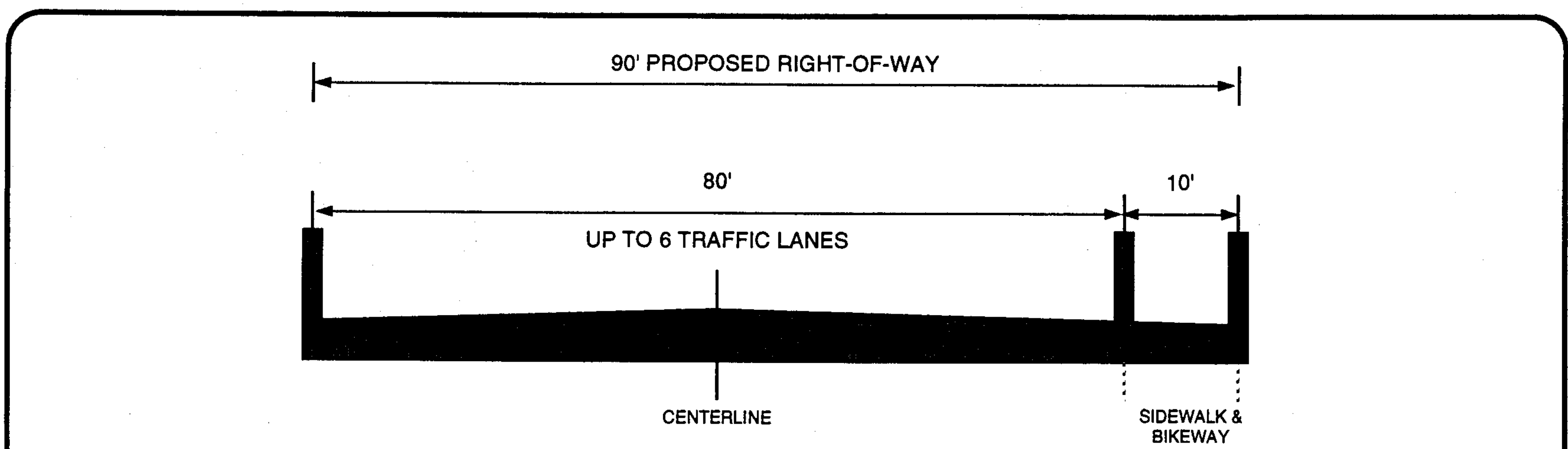


TYPICAL PROFILE



TYPICAL CROSS-SECTION

FIGURE 7.27

SOUTHERN CROSSING
TYPICAL PROFILE AND CROSS SECTION

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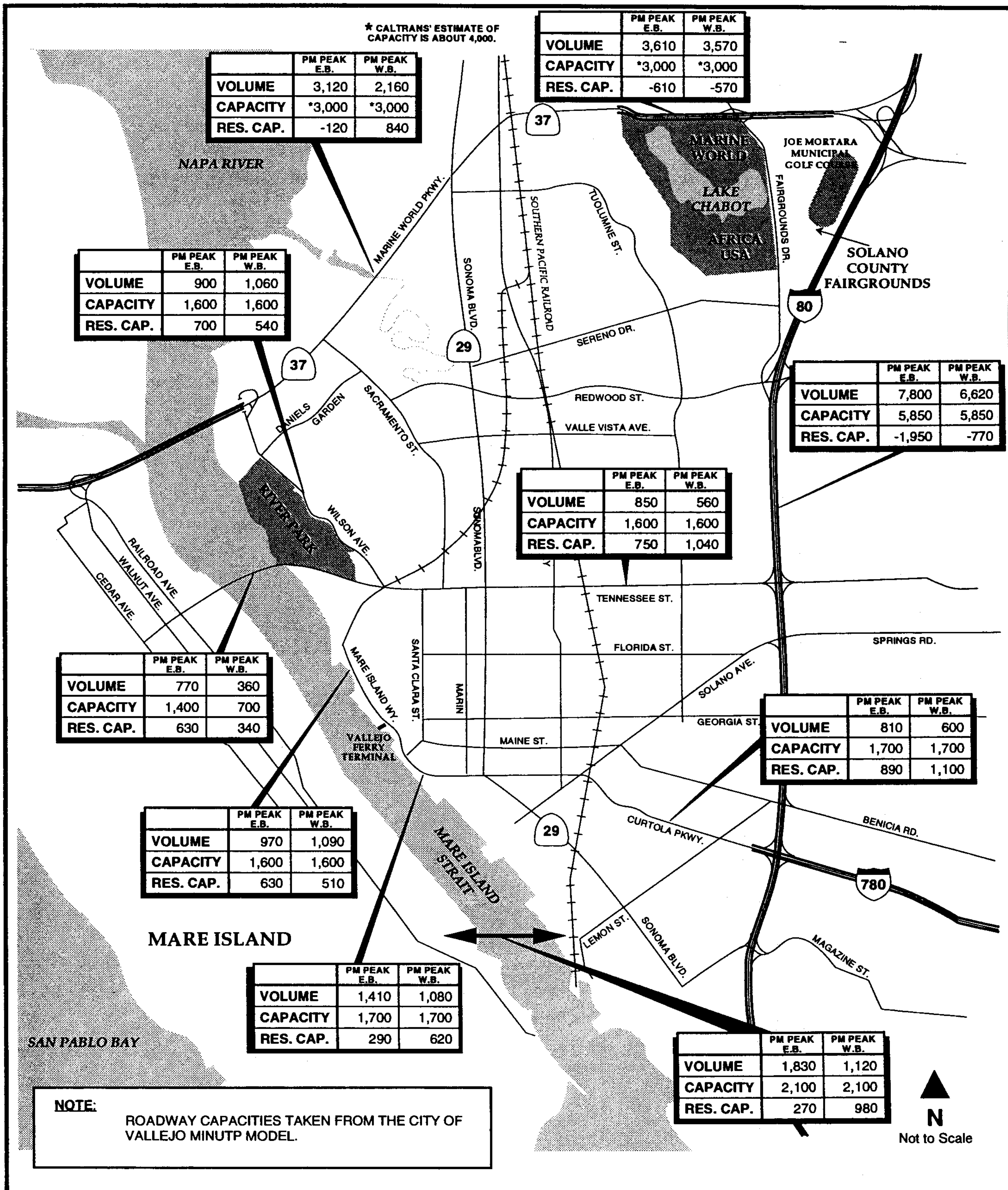

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	3,610	3,570
CAPACITY	*3,000	*3,000
RES. CAP.	-610	-570

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	3,120	2,160
CAPACITY	*3,000	*3,000
RES. CAP.	-120	840

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	900	1,060
CAPACITY	1,600	1,600
RES. CAP.	700	540

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	7,800	6,620
CAPACITY	5,850	5,850
RES. CAP.	-1,950	-770

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	850	560
CAPACITY	1,600	1,600
RES. CAP.	750	1,040

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	770	360
CAPACITY	1,400	700
RES. CAP.	630	340

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	810	600
CAPACITY	1,700	1,700
RES. CAP.	890	1,100

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	970	1,090
CAPACITY	1,600	1,600
RES. CAP.	630	510

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	1,410	1,080
CAPACITY	1,700	1,700
RES. CAP.	290	620

	PM PEAK E.B.	PM PEAK W.B.
VOLUME	1,830	1,120
CAPACITY	2,100	2,100
RES. CAP.	270	980

NOTE: ROADWAY CAPACITIES TAKEN FROM THE CITY OF VALLEJO MINUTP MODEL.

FIGURE 7.28

BUILD OUT (WITH SOUTHERN CROSSING) PEAK HOUR RESERVE CAPACITY FOR PRIMARY ACCESS ROUTES

Fehr & Peers Associates, Inc.
Transportation Consultants

7.5.2 Transit System

The future transit system serving Mare Island could include buses, ferries and trains. Demand for service will determine when and if each mode should be implemented. Table 7.16 shows the proposed phasing plan for the Mare Island transit system and Figure 7.29 shows the proposed routes.

Table 7.16
TRANSIT SYSTEM IMPROVEMENTS

Development Phase	Improvement Description	Capital Requirements
1996	- Construct multi-modal transit center	- Two acre site plus materials
	- Establish new local route between the island transit center and the York & Marin and Sereno transit centers	- Two 20' transit coaches
	- Establish new island shuttle route	- Two 20' transit coaches
2006	- Reconstruct Mare Island ferry landing	- Landside and dock improvements
	- Establish ferry service between Vallejo and Mare Island	- One 150-passenger ferry
Buildout	- Reduce on-island shuttle headway to 15 minutes	- Add one new 20' transit coach and replace the two original transit coaches
	- Provide additional capacity for off-island local routes	- Replace the two 20' local route coaches with 40' buses

Table 7.16 shows that bus service would play the greatest role in serving Mare Island with transit. Connecting bus service to Mare Island should be provided from the downtown York & Marin transit center and the Sereno transit center. These routes would stop at a transit center located on the island near the intersection of Railroad Avenue and Walnut Avenue, where a dedicated island shuttle would then carry passengers throughout the island. The new routes would operate on schedules similar to existing Vallejo Transit service. Operating hour would extend from 6:00 a.m. to 10:00 p.m. with headways ranging from 30 to 60 minutes depending on demand.

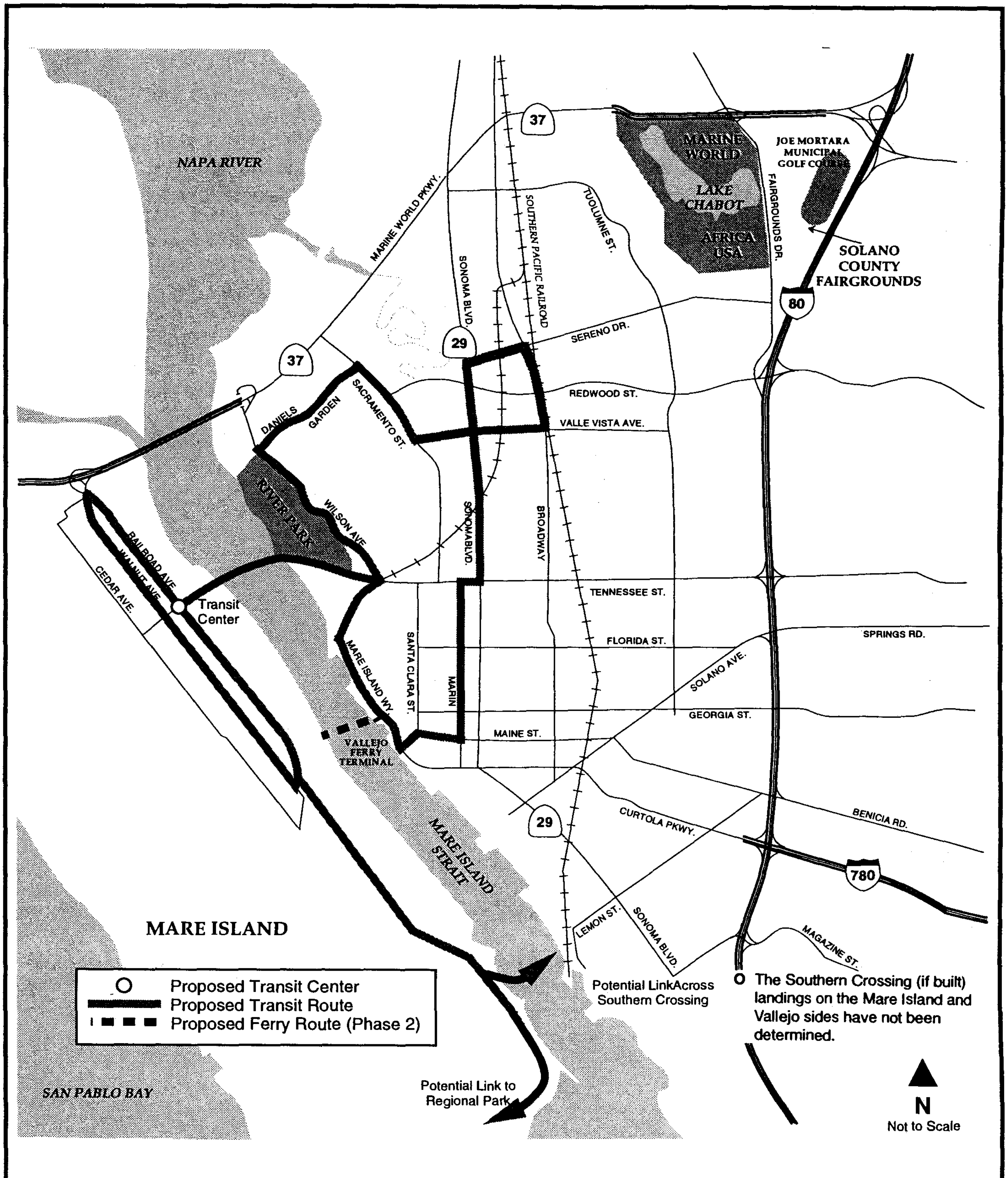

FIGURE 7.29	***PROPOSED BUS AND FERRY ROUTES***	Fehr & Peers Associates, Inc. Transportation Consultants

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The proposed transit center would serve as a multi-modal station and would include bus shelters, bicycle lockers and a park-and-ride lot. The station would require about two acres of land with 100 parking spaces taking up about half the space. Because passenger rail service is an option for the future, the station should be oriented so that the center could serve a passenger train.

Ferry service would likely be added by 2006, but would depend on demand levels for this service. Implementation of the service is expected to help relieve congestion on Mare Island Causeway. The service would also make travel to the island by pedestrians and bicyclists much more convenient. The service would probably use a smaller boat (up to 150 passengers) than the one currently in use for the trip to San Francisco. Headways would likely be 30 minutes during peak periods and 30 to 60 minutes during off-peak periods with operating hours extending from 6:00 a.m. to 7:00 p.m.

Although the improvements described in Table 7.16 do not include passenger rail service, this is an option that may become more feasible as the island develops. Through phase 2, the shuttle service would use buses but as demand increased consideration should be given to some form of passenger rail service. Potential rail technologies could include a rail shuttle similar to an historic trolley or more modern light rail vehicles. Light rail operations, though, would require reconfiguration of freight rail operations. The following discussion identifies some of the key improvements that would be associated with implementation of light rail service on Mare Island.

Light Rail Transit

Substantial residential reuse and additional residential development on the Island may make the possibility of light rail transit operation attractive. It should be noted, however, that the existing rail network is not a feasible alternative for the development of transit services between Mare Island and the central and southern portions of the Bay Area, due to extreme circuity.

Generally, it is not desirable from a safety point of view or practical from an operational and maintenance point of view to mix carload freight switching operations and light rail transit operations on the same trackage. Should the redevelopment plan include both industrial freight service and light rail transit, it may be prudent to consider reserving the Waterfront Ave./California Ave. line for freight operations and the Railroad Ave. line for light rail transit operations. Should both light rail transit and freight operations be desired over the Drawbridge line, it is suggested that freight rail operations over the bridge be restricted to night hours after transit service is stopped.

At present, the Railroad Avenue line between 9th Street and 14 Street passes through the middle of the industrial area; if industrial operations in this area are to continue, consideration should be given to building a new relocated line via Walnut and Cedar Avenues between these points, so that light rail operations would skirt the industrial area.

If substantial carload freight usage is envisioned in reuse of the industrial area, both the Railroad Avenue and the Waterfront Ave./California Ave. lines could continue to be reserved for freight operations, and an entirely new light rail line could be built paralleling the two freight lines, located further west along streets more central to the residential area.

As with freight operations, installation of safety devices at public crossings-at-grade would be an important prerequisite for any MINSY railroad lines converted to light rail use.

7.5.3 Bicycle and Pedestrian System

Bicycling and walking are expected to be important travel modes for Mare Island residents, employees and visitors. Ideally, residents of the island would be able to walk or ride a bike to work and for shopping purposes. Some employees may commute to the island from Vallejo and it is likely that visitors may want to use bicycles as their primary travel mode for touring the island especially the regional park area. With these concepts in mind, the bicycle and pedestrian system shown in Figure 7.30 was developed. Specific improvements required to implement this system are listed in Table 7.17.

A very ambitious TDM program has been outlined for Mare Island in order to minimize auto traffic and required roadway capacity. Two key components of the TDM program are bicycle and pedestrian facilities, capitalizing on the unique conditions imposed by the island itself and the history of bicycle riding within the Shipyard.

All new and upgraded collectors and arterials will be constructed with bike lanes. All new or upgraded streets will have curb, gutter, and sidewalks. Crosswalks will be provided at all intersections and mid-block where needed. All signalized intersections will have pedestrian and bicycle-activated signals.

A Pedestrian-Bicycle Corridor is proposed for Walnut Ave. between G Street and Cedar Ave.. This street will have lower traffic volumes with slow (25 mph) speed limits and frequent STOP signs. Emphasis will be given to pedestrian and bicycle movement by constructing wider sidewalks with landscaping and street furniture, and bike lanes.

Pedestrian and bicycle access along the waterfront may be provided by a 12-foot wide multi-use "boardwalk," subject to compatibility with future industrial users in the vicinity. This facility would extend from the Marina area in the south to the fishing pier and wetlands next to SR 37 in the north.

Table 7.17 BICYCLE AND PEDESTRIAN IMPROVEMENTS	
Phase/Area	**Improvement Description**
PHASE 1 - 1996	
Regional Park	Construct trailheads, trails and safety improvements at the fishing pier
Waterfront	Conduct a feasibility study of a waterfront promenade
Mare Island Causeway	Upgrade bicycle and pedestrian access
Island-wide	Upgrade existing bicycle lanes and sidewalks
PHASE 2 - 2006	
Walnut Avenue Corridor	Create bicycle/pedestrian corridor along Walnut Avenue
Waterfront	Implement recommendations of waterfront feasibility study
Regional Park	Continue construction of trail and path system
Island-wide	Complete upgrade of existing bicycle lanes and sidewalks
PHASE 3 - BUILDOUT	
Island-wide	Construct new sidewalks/paths for pedestrian use as development occurs

7.5.4 Aviation System

Public use of the two heliport facilities is not anticipated at this time. If a private user should be interested in using this facility they would be responsible for any necessary improvements.

7.5.5 Freight System

Future improvements to the freight system serving Mare Island would depend on the specific users. The reuse plan at this time is relatively general although it does include extensive industrial uses. The anticipated freight system improvements to support the reuse plan are summarized for both trucks and rail below.

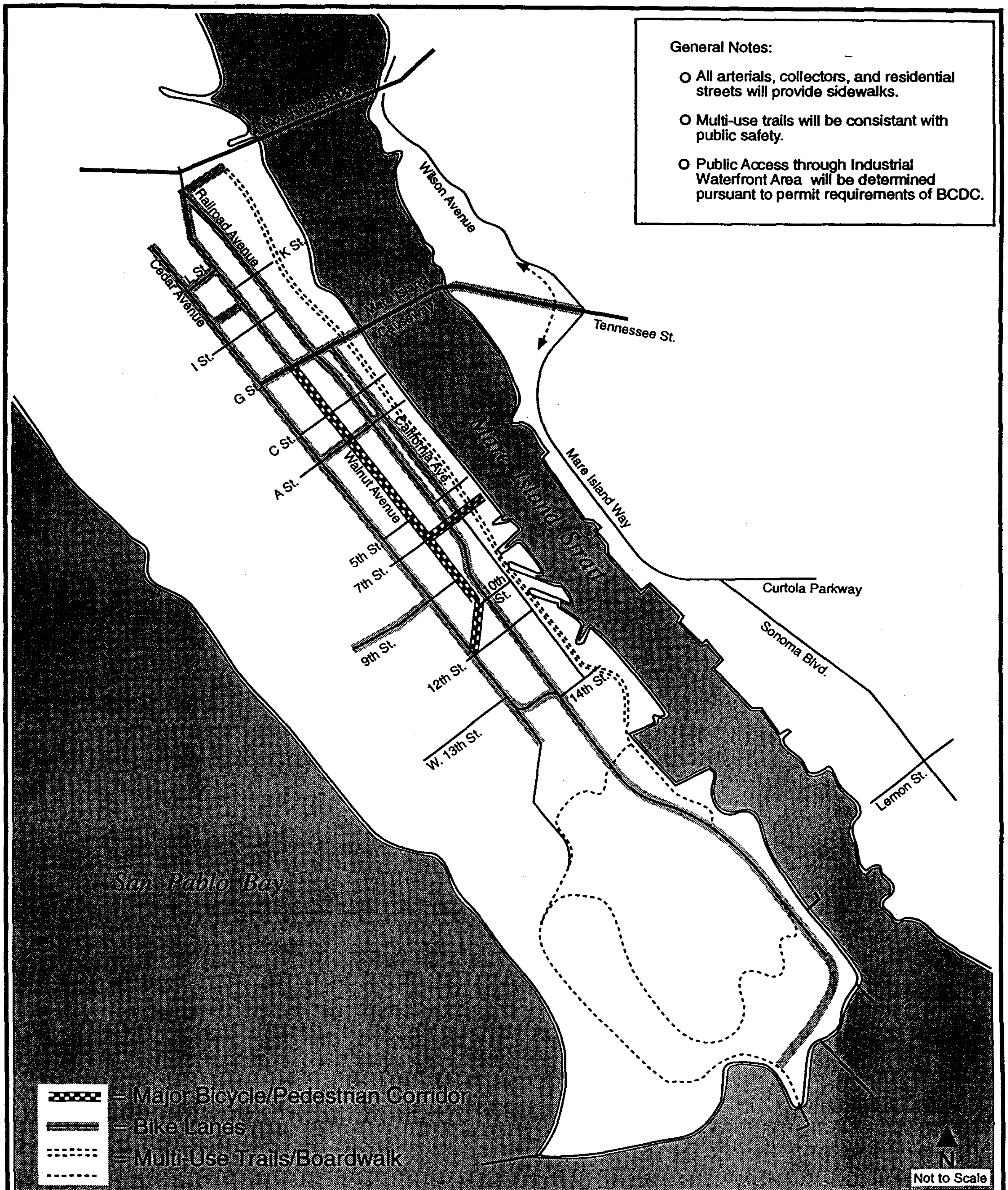

FIGURE 7.30 03	*FUTURE BICYCLE AND PEDESTRIAN SYSTEM*	Fehr & Peers Associates, Inc. Transportation Consultants

Trucks

Existing truck routes to Mare Island follow the primary access routes. To some degree this can be a problem because trucks can adversely impact traffic in two critical ways, including:

- Trucks are larger than passenger cars and , therefore, occupy more roadway space than passenger cars, and

- Trucks have poor operating capabilities when compared to passenger cars, particularly with respect to acceleration, deceleration, and the ability to maintain speed on upgrades.

Because of these operating characteristics and the fact that trucks have to access the island through one of the two entrances, it is recommended that operating time restrictions be considered for truck traffic serving the island. For example, trucks would be restricted from accessing the island during a.m. and p.m. peak periods. This restriction would not be necessary until traffic levels at the entrances neared capacity levels.

Rail

The MINSY railroad trackage is in generally excellent condition and can be considered for continued usage. The main shortcoming is the complete absence of warning and safety devices at the numerous street crossings.

The nature of reuse of the MINSY railroad of course depends on the reuse plan for the Island. If industrial activity is retained in the current industrial area, the railroad can be used to continue service to industrial operations desiring carload freight service. The key issues would be (1) securing an interested operator for the railroad, and (2) installing adequate safety/warning devices at crossings over streets that would be opened to public travel.

A review of rail and street crossings resulted in the identification of up to 35 locations that require some form of crossing protection. In many cases crossing signs and flashing signals were considered adequate improvements; however, there were five crossings that would require flashing signals and gates. These include primary arterial crossings of the drawbridge line, Railroad Avenue line, Waterfront and California Avenue line and A Street line. Other improvements to the rail freight system would depend heavily on the needs of future users.

The reader should note, however, that the existing A Street classification and storage yard mainly serves intra-yard rail activity. Should the industrial reuse of the Island not require intra-Island rail service or substantial freight car storage, this yard would become surplus. In such a case, a direct connection between the Railroad Avenue line and the Drawbridge line at E Street should be installed in lieu of the current switchback connection. As a safety precaution, a direct connection to the Drawbridge line should be protected by derails preventing runaway equipment from accessing the draw.

7.6 COST ESTIMATES

Conceptual capital and maintenance costs estimates were prepared for the improvements identified in Section 7.5. Table 7.18 summarizes the total capital and maintenance costs for each transportation system component.

Table 7.18
Transportation System Capital and Maintenance Conceptual Cost Estimates
(Millions of 1994 Dollars)

	Phase 1 1996		Phase 2 2006		Phase 3[1] Buildout (SC)	
System Component	Cap	Maint/[2]	Cap	Maint/[2]	Cap	Maint/[2]
Street System	$1.60	$0.36	$6.00	$0.54	$115.85	$0.62
Transit System	$2.10	$0.33	$2.50	$0.98	$3.05	$1.06
Bicycle/Pedestrian System	$0.70	$0.02	$1.18	$0.05	$0.20	$0.05
Aviation System	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Freight System	$1.09	$0.00	$0.72	$0.00	$1.43	$0.00
Subtotal	**$5.49**	**$0.71**	**$10.40**	**$1.57**	**$120.53**	**$1.73**
25 Percent Contingency	$1.37	$0.18	$2.60	$0.39	$30.13	$0.43
TOTAL	$6.86	$0.89	$13.00	$1.96	$150.66	$2.16

Notes: 1 Buildout (SC) = Buildout with a Southern Crossing.
2 Annual Maintenance Costs.

Table 7.18 shows that Phase 3 requires a substantially larger investment in transportation facilities than Phases 1 or 2. A significant portion of this cost results from the need to construct a new southern crossing with an estimated capital cost of about $106 million.

Funding for the proposed transportation improvements will most likely come from a combination of future island property owners, the City of Vallejo, Regional, State, and Federal government agencies. The burden of on-island land owners paying for all of the improvements might result in some of the proposed land uses being infeasible. As such, identifying a wide range of funding sources will be important if the proposed land use scenarios are to be maintained.

Some of the proposed transportation improvements are needed to bring the U.S. Navy facilities up to acceptable standards for civilian use. This includes, for example, unprotected railroad crossings. Some of these improvements may be funded by the U.S. Navy or Dept. of Defense as part of the base transfer process.

All proposed improvements will have to be incorporated into the City of Vallejo's Capital Improvement Plan (CIP), with those projects of to be funded wholly or partially by outside sources being submitted to the Metropolitan Transportation Commission (MTC) for prioritization in the Regional Transportation Improvement Plan (RTIP). Roadway projects to be funded by outside sources generally must be of regional significance. For example, local service roads would probably be funded by the developer, City, or both, while a southern crossing may qualify as a regional route if it carries diverted traffic from S.R. 37 in the future.

Other projects do not need to be of regional significance, but simply fit under one of the Intermodal Surface Transportation Efficiency Act (ISTEA) programs such as the construction of multi-modal terminals, bikeway systems, and coordinated signals. The likelihood of obtaining some funding for this type of improvement is good if (a) the facilities are adequately planned and documented according to ISTEA and MTC guidelines, (b) the improvements are adopted into the CIP and RTIP, and (c) there is some local matching funding available.

7.7 RECOMMENDATIONS AND IMPLEMENTATION ACTIONS

7.7.1 Roadways and Parking

7.7.1(a) *Mare Island Traffic Analysis and Signal Coordination Study (City):* In order to implement short term traffic and signal improvements, this study must be undertaken by the City. The study should provide detailed traffic information for the design of a coordinated signal system on Mare Island, along with needed re-striping, signing and other minor improvements to bring the roadway system up to acceptable standards. Civil engineering and signal designs documents will be produced out of this process and used as bid documents for construction.

7.7.1(b) *Mare Island Causeway Reconfiguration Study (City/Navy):* In its current configuration, the Causeway cannot be used by civilian traffic. This study will evaluate the best configuration for civilian use, and the preferred alignments into the intersections at each end of the Causeway. A re-striping and signing plan suitable for bids along with an operations plan for the drawbridge and rail interface will be the ultimate product.

7.7.1(c) *Street, Intersection, and Gateway Planning and Design (City):* Civil engineering and landscaping documents for street and gateway improvements may be undertaken on a piecemeal basis, by phase, or all at the same time. The trigger point for street and gateway upgrading may be (a new adjacent tenant and/or traffic volumes exceeding a set threshold. The designs will cover street and streetscape upgrading including new paving, striping, sidewalks, crosswalks, bike lanes, landscaping, lighting, and signing. The gateway designs may include an entrance feature. All designs should meet City and Caltrans standards and be suitable for bid.

7.7.1(d) *Southern Crossing Planning Study (City/Caltrans):* The long term need for a Southern Crossing has been established. This study will focus on planning and design of the bridge, approaches, and connections to I-780 and the Mare Island street system, and contain an alternatives analysis, conceptual cross sections and geometrics, preliminary investigation into subsurface conditions, property acquisition requirements, and other information needed to (a) establish feasibility , (b) cost, (c) phasing and timing, and (d) a preferred alignment. Should the alignment be dedicated as a state or federal highway extension, Caltrans will develop this planning study as a Project Study Report (PSR) and submit the report as part of the STIP process to be funded.

7.7.1(e) *Southern Crossing Preliminary Engineering and EIR (City/Caltrans):* An EIR will be performed to meet CEQA guidelines, based on the preferred alternative and other alternatives such as a "no build" scenario. Preliminary engineering will be required as part of recommended mitigations and/or alternatives in the report .

7.7.1(f) *Southern Crossing Engineering and Design (City/Caltrans):* Design and engineering documents for the project will be produced meeting Caltrans and City design standards. A phasing and temporary traffic plan will also be prepared along with documents suitable for bid.

7.7.1(g) *Parking Facility Planning and Design (City/Private):* Parking facility needs studies may need to be undertaken as Mare Island develops in the future, including a possible shuttle system linking remote lots. Financial analysis will also be required if revenue-producing parking facilities to be financed by bonds were recommended. As existing surface lots are improved and new lots constructed, conceptual parking plans and civil engineering drawings will need to be produced which meet City standards and are suitable for bid documents. The City may choose to do this by lot, phase, or all at once. The same holds true for a parking structure: the City may choose to design and construct a lot to make a parcel more attractive for a large tenant or tenants, and finance the structure through lease payments and/or parking fees. Or, a parking structure may be designed and constructed by a private entity.

7.7.2 Pedestrian/Bicycle

7.7.2(a) *Waterfront Pedestrian Walkway Feasibility Study (City):* A public walkway along part or all of the waterfront may be feasible if it is compatible with short and long term adjacent uses. This study will evaluate (a) compatibility issues with a variety of proposed and potential uses, (b) design and planning alternatives to address safety and compatibility issues, (c) a phasing and implementation plan, and (d) a funding and operations plan. The study will provide cross sections, alignments, design details, usage estimates, costs, and other details. An urban design/landscape architect and civil engineering set of design documents will follow suitable for bid.

7.7.2(b) *Mare Island Bikeway and Pedestrian Study (City):* In order to ensure that pedestrian and bicycling activity is maximized on the Island, this study will focus on overall circulation and transportation needs, support facilities (racks, lockers), design standards, costs, surface treatments, signing, striping, and lighting, and a detailed implementation plan.

7.7.3 Transit

7.7.3(a) *Multi-modal Terminal Feasibility Study and Design (CIty):* This study will focus on the location and configuration of a new multi-modal terminal which will connect off-island transit routes with an island shuttle system. Transit planning, equipment needs, scheduling, access, and other issues will be resolved, along with layout of the terminal. The study will lead into a design and engineering project for eventual construction of the facility.

7.7.4 Ferry

7.7.4(a) *Mare Island Ferry Plan, Designs, and Program (City):* A ferry study will evaluate the proposed service and required equipment, including terminal locations and configurations, scheduling, capital and operations costs, capacity needs, potential vessels, parking requirements, among other issues. This will be used to justify the required outside funding. If approved, design of both the vessels and landing facilities will be required, along with a ferry operations program.

7.7.5 Rail/LRT

7.7.5(a) *Mare Island LRT Shuttle Study (CIty):* If a light rail transit or trolley mode is selected for Mare Island, a study of suitable equipment, alignments, service requirements, operations, cost, impacts on roadways, and other information will be developed to justify outside funding. The study will compare the relative advantages and disadvantages of LRT versus bus modes for an island shuttle service.

7.7.5(b) *Mare Island Freight Service Feasibility Study (City):* If future tenants require freight service, this study will identify required upgrading of existing trackage and required new infrastructure (including crossing guards), interface with traffic on the Causeway, capital and operations costs, and other information required for the City to either lease the operation to a private entity or operate the service itself.

8.0 PARCELIZATION PLAN

8.1 PARCELIZATION PLAN

The land use plan presented in Chapter 5 divides Mare Island into 13 specific subareas according to expected reuse themes and land use characteristics. That plan will be the management blueprint to guide overall implementation of the Mare Island reuse program.

However, within each of the main land use sub-areas shown on the plan, additional definition may be required of individual parcels or blocks to meet one or more of the following needs: (1) facilitate reuse leasing or property sales, (2) reflect the environmental clean-up effort and express priorities for clean-up of specific parcels, (3) define necessary transportation or utility service corridors between parcels, and/or (4) express variations in expected/allowable land use within an overall subarea as planning and zoning studies proceed.

The City is currently defining a Parcelization Plan to meet these needs. The process of parcelization planning will continue over time as more becomes known regarding demand for facilities, environmental contamination conditions, and other factors.. Ultimately, the Parcelization Plan will portray necessary/useful sub-divisions within the main Land Use Plan sub-areas. This parcelization process will be tied to the IDC/City's database, allowing detailed assessment of individual parcels for lease/sale potential, existing/potential facilities, environmental cleanup status, utility services and other factors. As such, the Parcelization Plan and associated database will be an important management tool for implementing the Reuse Plan.

9.0 HUMAN SERVICES

9.1 ASSESSMENT OF THE IMPACT OF MARE ISLAND CLOSURE ON HEALTH AND WELFARE

For the past fifty years, the Shipyard has been the largest employer in Solano and Napa Counties, accounting for up to 25,000 direct and indirect jobs. To prepare for the social and human consequences of the Shipyard closing, the Mare Island Futures Group commissioned an assessment of the community impact of the closing. Under the direction of the Human Resources Work Group, Harder+Kibbe Research, a San Francisco-based consulting firm, conducted a study intended to answer two questions: 1) What will be the impact of the closing of the Shipyard on Mare Island employees and their families? and 2) What is the capacity of the health and human service system in Solano and Napa Counties to respond to the needs created by the closing of the Shipyard?

The methods used in the study included a re-analysis of existing demographic, service use and economic data; a review of the literature on plan and base closings; a total of twenty-seven focus groups held with four types of groups (Shipyard workers and their families, local businesses, health and human service providers and community leaders); and a mail survey of workers laid off from the Shipyard in 1990-91 and a series of key informant interviews.

The loss of a region's largest employer could be a significant trauma for the entire community. The region (Solano and Napa Counties) will be especially hard hit. In August 1993, a survey conducted by Solano Economic Development Corporation found only 38 job categories would be open to employ Mare Island workers. This total employment would represent 574 jobs. A large portion of the total jobs (191) are likely to be offered on a seasonal basis. In this same report, Solano Economic Development Corporation indicated wages will be especially difficult to match. They compared the hourly pay of 17 positions at Mare Island with those in the private sector and found that the shipyard workers will encounter a 36 to 48 percent cut in wages.

A similar survey was conducted by the Napa Valley Economic Development Corporation. They found that approximately eleven percent of the 1,100 Mare Island workers living in Napa County can expect to find jobs in the County. Additionally, it was found that significant numbers of skilled and technical Mare Island workers would find it difficult to find work in their field. It is therefore anticipated that current Mare Island workers will have to take lesser skilled work at lower pay to remain in the area.

California's on-going recession has created rising unemployment and increased demand for emergency services. Aid to Families with Dependant Children (AFDC) participation in Solano County increased by 31% from 1989 to 1993 while Food Stamp use grew 58%. The impact of the past reductions in force is not easily discernable in the region's economic statistics. The unemployment rates in Solano and Napa Counties have not varied significantly from those for the Northern California region and have been slightly better than the state's overall statistics. The majority of Shipyard workers who lost their jobs in previous rounds of layoffs have found employment outside the area. The more significant impact of the Mare

Island reduction in force can be found in the permanent loss of civilian jobs in the community.

Population growth in the region will continue at a rapid rate until 2000 and then at a slower rate for the next forty years. Jobs will grow at a much slower rate than population. The California Department of Economic Development projects a 1% growth in Solano County jobs between 1993 and 1997, with most of the new employment in the service and retail sectors, which together will account for 74% of the new jobs created. The projected portrait of the County's labor force has little to offer the skilled work force coming from the Mare Island Naval Shipyard.

Harder+Kibbe surveyed a non-representative sample of 378 former workers who did not transfer to employment on other Department of Defense (DOD) facilities following their lay off. Of those who responded, 37% have been unemployed since their lay off. Over half (58%) are currently working. Two-thirds reported suffering significant financial hardship as a result of the reduction in force. Forty-four percent reported that their quality of life has declined significantly since their termination. The former employees identified low use of traditional health and human services. Only 15% sought counseling but 35% used employment assistance programs. The primary reliance has been on employment-related income assistance programs (67% received unemployment compensation). Of those surveyed, just over half (54%) said they considered moving out of the area but cited personal and financial reasons for staying.

The service needs of Shipyard workers and their families will be minimal if there are jobs available at comparable income levels. The greater the difficulty in securing employment at a level that allows for maintaining the existing standard of living, the more intense the need for human services. If the re-training and re-use strategies of the Mare Island Futures Group are successful, the primary service needs of the workers and their families will be short-term and transitional. Without suitable employment locally, and lacking the capacity to pursue opportunities elsewhere, the potential for chronic dependency on social services for some laid off workers is high. Assuming that there are employment opportunities for most of the former Shipyard employees, a relatively small group (approximately 15%) will have service needs. These needs will be in the following areas:

- financial planning and counseling
- short-term financial assistance to continue health insurance coverage and housing
- assistance in re-negotiating mortgages and rent payments
- information and referral to specialized services
- prevention and early intervention related to substance abuse
- prevention and early intervention related to domestic violence
- support groups and counseling

- day care while enrolled in re-training or other employment-related programs

If the employment transition process takes more than two years and is only partially successful, the need for services will increase. A greater number of workers (up to 30%) will require the services listed above while up to 10% will have more intensive needs. Among these more intensive service needs will be:

- emergency housing
- emergency food and other subsistence items
- treatment for substance abuse, especially alcohol
- mental health treatment
- family violence treatment and shelters
- access to free or very low cost health care

If redevelopment takes more than five years, and no comparable jobs are available, approximately half the laid off workers remaining in the region are likely to require some combination of these intensive services.

The service use patterns of laid off workers and their families will be determined by their expectations of the service system and the efforts made to use social services provided. Workers hold contradictory beliefs about the human service system. Many believe that a wide variety of services will be available to them when they are in need, ranging from income assistance to mental health counseling. Related to this belief is the perception that they deserve special forms of assistance due to their special status. They do not see themselves as typical human service users.

Many workers view social service programs with disdain. These beliefs suggest that they may seek services only if they are given the treatment they feel they deserve. Being unfamiliar with the service system, they would like special sources of information about special resources. They are unlikely to use traditional services, even if they experience significant needs. If these workers are to be targeted by the existing providers, new methods of access and service delivery must be developed.

According to the information obtained for this analysis, there is little capacity to meet the needs of either Shipyard workers and their families or displaced community members among the region's service providers. Four years of recession have taken a significant toll on the non-profit providers in Solano and Napa Counties. The demand for services has been rising as the resources to meet the needs have declined. Most service providers indicate they do not have the resources to adequately meet the often overwhelming needs of their current clients. The resources to provide a comprehensive, long-term response do not currently exist in the region.

This lack of resources also applies to the need for both affordable and emergency housing services in the local region. These needs have been addressed by the Housing Task Force Report as well as in various sections of the Final Reuse Plan which deal with land use, disposition of property, and the McKinney Act Screening Process.

The Harder-Kibbe Report also found that the primary means to satisfy the anticipated increase in human service needs as a result of the closure of Mare Island is through prevention. In other words, expediting the employment retraining process will accomplish more through prevention than increasing the capacity of the human service delivery system possibly could.

This reflects the importance of the interrelationship among the various elements of the Reuse Plan.

A copy of the entire Human Services Resource Group's report is included in Volume III, Attachment 6.3.1.

10.0 RETRAINING

10.1 ASSESSMENT OF RETRAINING NEEDS OF AFFECTED LABOR FORCE

10.1.1 Nature and Extent of Defense Spending Reduction

The closure of the Shipyard in April 1996 will have a devastating short-term impact on the region's economy. During the second World War, Mare Island became one of the largest ship construction and repair facilities in the world, with more than 40,000 employees. More recently, the role of Mare Island has been to modernize, refuel and overhaul the Navy's fast attack nuclear submarines. Repair and overhaul work at the shipyard has declined steadily since the late 1980's as the Navy trimmed its fleet in response to budget cuts. Advanced ship designs needing less maintenance, as well as a shift in the national defense strategy away from nuclear weapons capable of massive destruction toward tactical warfare capability and specialized weapons capable of inflicting limited damage, have reduced the shipyard's military significance and led to elimination of its mission.

According to a 1992 study[1] conducted by the University of California Davis Graduate School of Management, Solano County is home to over 74% of all civilian employees at the Shipyard. These employees represent an annual payroll of over $184 million. The shipyard has an annual economic impact of over $157 million in Solano County. Over 200 vendors in Solano County supply the shipyard through competitively bid Department of Defense (DoD) contracts; the loss of these contracts will multiply the effects of the closure until substitute markets are found. The development of new jobs and new businesses to replace the positions and revenue lost through the closure is critical to the region's economy. Residents can expect their standard of living to decline well into the next century.

The recently awarded $8 million Department of Labor Defense Diversification Program (DDP) grant does not include subcontractor vendors and regional business employees who may lose their jobs as a result of base closure. It is expected that State Rapid Response funds as well as other funding to be identified and accessed will be used to separately survey these workers in the summer of 1994. Services for these employees will be addressed through a later Defense Diversification Program (DDP) application or other Title III funding sources. Given the lead time before shipyard closure, those involved in the project planning have chosen to concentrate Defense Diversification Program (DDP) resources on affected Department of Defense (DoD) civilian personnel. It is assessed that sufficient time is available to provide services to other subcontractor employees in the community.

10.1.2 Layoff and Closing Schedule

The Mare Island Naval Shipyard will close officially in April 1996 with all civilian DoD positions to be eliminated. In December 1993, all shipyard employees received official

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[1]"The Economic Impact of Mare Island Shipyard", 9/19/92, compiled by UC Davis Graduate School of Management and commissioned by the Solano Economic Development Corporation (SEDCORP).

Certification of Expected Separation from the Navy that their jobs would be terminated on or before April 1, 1996, with layoffs scheduled to occur in four phases. The first involuntary separations scheduled by shipyard management for March 1994 were postponed after a substantial number of Mare Island Naval Shipyard employees accepted financial incentives to leave voluntarily in lieu of layoff. The most current layoff schedule is as follows:

During 1994	1,700 workers will voluntarily transition
During 1995	1,300 workers will voluntarily transition
During 1996	1,500 workers will voluntarily transition
April 1996	900 will receive layoff notices at closure

Although retraining services are proposed under this project for a 24 month period from April 1, 1994, through March 31, 1996 (in keeping with the Defense Diversification Program grant regulations for a maximum project duration of 24 months), a longer project period was planned and determined necessary in order to ensure the full provision of all necessary employment/training services for a period deemed reasonable to effect the successful retraining and placement of Mare Island workers. While a 24-month project is reflected under this proposal, a minimum 36-month project has been determined to provide for the continued reemployment/retraining needs of Mare Island workers. Consequently, an extension of project services for a minimum period of an additional 12 months beyond the regulatory established maximum of 24 months is being requested to be considered and approved under this project.

10.2 ACTION PLAN TO MITIGATE IDENTIFIED NEEDS

10.2.1 Goal/Mission Statement

Consistent with the mission statements of the Retraining Resource Group and the Private Industry Councils (PICs) of Solano and Napa Counties:

"The mission of the Mare Island Reemployment Center is to provide a full range of programs and services to support Mare Island workers in obtaining reemployment. This will include the development of partnerships with numerous agencies and service providers to provide quality support services, training and resources to help workers find and retain fulfilling jobs. To this end, Solano and Napa County PICs have agreed to establish a jointly staffed Reemployment Center at the Shipyard to exclusively serve Mare Island workers. The primary goal of this new Unit is to provide professional services and financial assistance for retraining (if necessary) to all eligible workers and to assist them in finding suitable reemployment based on their individual circumstance and need."

10.2.2 Objectives and Priorities

The initial phase of the implementation effort will be managed on the basis of the following specific objectives. These objectives define the overall direction and priorities for the implementation effort. As the project moves into the next phase of development, following the receipt of Defense Diversification Program (DDP) funds and in consultation with appropriate AFL-CIO councils, it is expected that many additional objectives will be added. The major anticipated objectives for the initial phase of the retraining effort at this time are:

- To establish the new Mare Island Reemployment Center (MIRC) as the central coordinating agency for delivery of reemployment and retraining services at Mare Island.

- To complete recruitment, hiring and training (Solano and Napa) of professional administrative and program staff for the Center.

- To arrange for and equip office space in Building 755, and to establish offices, install phone/communication systems, obtain equipment and supplies, etc.,and house the Unit and its assessment, counseling and training activities.

- To design and develop an integrated process for the flow of services that is efficient, convenient, and expedites customer access to programs, and that builds upon existing base transition resources and avoids unnecessary duplication of services.

- To develop clear policies and procedures to address issues with respect to each step of the client services flow process (in the form of a Standard Operating Procedure Manual), including a grievance procedure for both customers and vendors, and to educate various MI interest groups on the policies and procedures.

- To develop an effective and centralized means for systematically sharing information between PICs, workers and various interest groups, including both written and oral communications, and with the surrounding local communities and media, both print and electronic.

- To establish clear, objective, and competitive policies and processes for screening and procuring training vendor services, including both classroom training and On-the-Job-Training (OJT).

- To identify and promote "fast track" high priority and labor market demand occupations for retraining within a reasonable commuting distance in the Bay Area.

- To implement the full continuum of PIC programs and services at the Shipyard on a pilot, limited initial enrollment basis.

- To identify, recruit, select, and enroll an estimated 150-225 participants, on a "first come, first served" basis, into priority retraining and job search activities for the initial piloting of the programs.

- To develop administrative and fiscal systems to support the program, including detailed policies and procedures for contracting and monitoring vendor services and to establish objective standards and process for ongoing program evaluation and improvement.

- To clarify and define roles and responsibilities of the key partners and to establish a formal oversight and advisory committee process that meets the needs of the PICs to address ongoing policy and programming issues, eliminates conflicts of interest, fosters balanced representation and collaborative relations among vendors, labor and management, and other interest groups, and builds as much as possible upon the existing participatory decision making process at the Shipyard.

The achievement of these objectives is critical not only to the employees of Mare island themselves, but to the community at large. The skilled human resources at Mare Island are one of the primary competitive advantages outlined in our marketing program. Furthermore, as mentioned in the previous section regarding Human Services, the effectiveness of the retraining effort is critical to the ability of the overburdened system to continue to deliver needed human services to the community at large.

A copy of the Retraining Resource Group report is included in Volume III, Attachment 6.5.

11.0 PLAN IMPLEMENTATION AND RECOMMENDATIONS

11.1 ENVIRONMENTAL REVIEW

Upon acceptance of the Final Reuse Plan by the City Council, the Navy begins the preparation of the environmental document for the closure and reuse of Mare Island. The Navy is required to complete the environmental review process within one year of receipt of the Final Reuse Plan from the City. The document will be a joint Environmental Impact Statement / Environmental Impact Report (EIS / EIR), and will satisfy the requirements of both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The EIS / EIR is scheduled to be considered by the City Council by August 1995, and, if certified, this document will be used by the City for subsequent capital improvement and land use decisions.

11.2 LAND USE

11.2.1 General Plan

Every city in California is required to have a general plan to guide the physical development of the community by expressing the goals and policies for the distribution and intensity of future land use. Mandatory elements of a general plan include land use, circulation, housing, conservation, open space, noise, and safety. The scope of the plan is to include the area within the city's boundaries, and all development should be consistent with the plan before it can be approved by the city.

While Mare Island is within Vallejo's city limits, it has only briefly been acknowledged in the General Plan because of its status as a federal facility which is exempt from local land use control. It is currently designated as "Employment" on the Land Use Map. Therefore, the City will amend its General Plan to include Mare Island in more detail following the certification of the EIS / EIR and before any land use actions are taken. The amendment will be based on the goals and policies of the Final Reuse Plan while maintaining consistency with the intent of the current goals, policies, and land use designations contained within the City's General Plan.

Possible land use designations for the Island include: Residential (Low, Medium, High), Commercial (Retail, Waterfront), Employment, and Open Space (Community Parks, Wetlands).

Sections of the Plan that could be amended include the following: Vallejo's Role in the Bay Area; Urban Design; Waterfront Development; Business and Industry; Transportation; Schools and Parks; Public Facilities and Services; Seismic Hazards; Soil Instability; Soil Related Problems; Floodplain Hazards; Noise Hazards; Air Quality; Fish and Wildlife Habitats; and Housing.

11.2.2 Specific Plan

A specific plan is a tool to implement a general plan. Its contents include at a minimum the following elements: the distribution, location, and extent of land uses; distribution, location, extent, and intensity of the infrastructure required to support the land uses; development and conservation standards; and an implementation program to carry out the plan. It also describes the relationship with the general plan.

The City will use the elements of the Final Reuse Plan to develop a specific plan which meets these requirements.

11.2.3 Zoning

The City's Zoning Ordinance includes a type of land use process and zoning district known as "Planned Development". Section 16.112.010 of the Ordinance states:

"The intent of this district is to implement the policies of the Vallejo General Plan which call for the establishment of specific areas where flexibility of design and development of diverse land use is appropriate for the benefit of the city as a whole. These areas will be conducive to creative and experimental methods of land development, including the application of new technologies or the innovative application of existing technologies relating to resource conservation. These areas will also facilitate the development or redevelopment of land which is not being utilized to its best advantage due to special circumstances which prevent its development or redevelopment through the conventional application of the zoning ordinance."

The City will use the Planned Development approach for at least the developed areas and future development areas of Mare Island and create zoning standards and regulations unique to the Island and based upon the elements of the Final Reuse Plan. The Island will be designated with Planned Development zones and the Specific Plan will serve as the Master Plan. Projects will then be developed using the development and conservation standards included in the Specific Plan / Master Plan.

The City may use a traditional zoning district for the conservation areas, such as the wetlands and the regional park. The classification is "RC, Resource Conservation", and it is intended to preserve these areas for open space uses.

11.3 Institutional and Financial Framework

The reuse of Mare Island will not be feasible without satisfactory completion of a variety of negotiations, preparation of a feasible financing strategy, and creation of the institutions and institutional arrangements necessary to implement the Plan. The components of such an institutional and financial framework are discussed in Volume II, Chapter 4 of the Mare Island Final Reuse Plan.

The most critical of the negotiations are those with the Navy related to responsibility for toxics remediation, infrastructure improvements and support for a portion of recurring services costs during the transition years. Achieving a successful financing strategy depends upon managing and prioritizing infrastructure costs to be proportional to available funding, whether from federal sources, or Island-based real estate activity. The institutional framework that must be developed includes the necessary intergovernmental agreements (e.g., between the City/IDC and special districts) and the establishment of an operating entity for managing and developing Mare Island's real estate assets (i.e., the Island Development Corporation).

12.0 RECOMMENDATIONS AND IMPLEMENTATION ACTIONS

12.1 RECOMMENDATIONS AND IMPLEMENTATION ACTION

In addition to the broad implementation requirements defined in Chapter 11, the City is preparing a detailed implementation strategy to guide its efforts both during and beyond the time remaining until the Navy's departure from Mare Island. The reuse planning process has identified numerous actions which must be taken to solidify agreements with the Navy and other agencies, better understand the conditions of facilities on the Island, and prepare the Island for civilian reuse. These actions are presented in matrix format on Table 12.1. Together they represent a comprehensive approach to ensuring efficient, responsible and complete transfer of jurisdiction over Mare Island from the Navy to the City of Vallejo.

Table 12-1 (Page 1 of 8)
Recommendations and Implementation Actions*

Actions and Programs **	City/IDC	Development Applicants/ Tenants	Navy	Other (Specify)*	1994	1995	1996	1997	Beyond 1997	
	Responsibility for Implementation				Timeframe for Implementation					
3.0 Reuse Considerations										
3.1 Geology										
(a) Building Code Compliance—Existing Structures	■					■	(ongoing)			
—New Development		■							■	(as development occurs)
(b) Design and Upgrading of Utilities	■						■	■	■	
(c)(e)(h) Geotechnical Investigations		■						■	■	(as development occurs)
(d) Public Awareness and Preparedness		■				■	(ongoing)			
(f) Structural Survey	■				■					
(g) Design of Foundations		■				■	(ongoing)			
(i) Storm Water Discharge Permit	■					■	(ongoing)			
(j) Erosion and Sedimentation Control	■					■	(ongoing)			
(k) Revegetation After Grading	■					■	(ongoing)			
(l) Stabilization Measures	■					■	(ongoing)			
(m) Levee System Investigation			■			■				
3.2 Floodplain Hazards										
(a) Conformance with Flood Damage Protection Ordinance	■					■	(ongoing)			
(b) Preparation of Flood Insurance Study				(FEMA)		■				
(c) Evaluation of Levee Systems			■			■				
3.3 Vegetation and Wildlife										
(a) Memorandum of Understanding between the Navy and USFWS	■			(USFWS)			■			
(b) Cooperative Agreement for the Conservation and Management of Fish and Wildlife Resources	■		■	(CDFG)			■			
(c) Expansion of National Wildlife Refuge				(USFWS)			■			
(d) Mitigation of Impacts of Ground Power Line	■		■	(USFWS)			■			
(e) Long-Term Solutions to Mosquito Problems	■						■			
3.4 Environmental Contamination										
(a) Completion of EBS and BCP			■		■					
(b) Development of Prioritization Process	■		■		■	(ongoing)				
(c) Resolution of Hazardous Materials Impacts	■		■		■	(ongoing)				
(d) Leasing Options Strategy	■				■	■				
(e) Lead-Based Paint and Asbestos-Containing Materials Surveys			■			■				

* Footnotes and a key to acronyms are contained on the final page of this table.
** Recommendations and implementation actions are cited and numbered according to the Chapter and/or Section of the Final Reuse Plan (Volume II) within which they are discussed.

Table 12-1 (Page 2 of 8)
Recommendations and Implementation Actions*

Actions and Programs **	Responsibility for Implementation: City/IDC	Development Applicants/ Tenants	Navy	Other (Specify)*	Timeframe for Implementation: 1994	1995	1996	1997	Beyond 1997
(f) Potential Ordnance and Explosives Residue Disposal Areas Surveys			■			■			
(g) Evaluation of Storm Drain Network			■			■			
(h) Develop BMP Program	■							■	
(i) Decommissioning of PCB-Containing Equipment			■			■	■		
3.5 Dredging									
(a) Negotiations with Corps for Channel Dredging	■			(Corps)		■			
(b) Change in Channel Dredging Procedures	■			(Corps)		■			
(c) Retention of Berthfront Dredging Equipment	■		■				■		
(d) Explore Leasing of Dredge Equipment	■					■			
(e) Investigate Dredge Pond Capacity Expansion	■							■	
3.6 Historic Resources									
(a) Adoption of Programmatic Agreement	■		■	(ACHP,SHPO)			■		
(b) Storage of Historic Artifacts	■		■			■	(ongoing)		
(c) Inspection and Preservation of Vacant Buildings	■		■				■	(ongoing)	
(d) Code Compliance	■					■	(ongoing)		
(e) Preparation of Maintenance Plans	■	■					■		
3.7 Archaeological Resources									
(a) Draft Archaeological Resources Inventory			■	(SHPO)		■			
(b) Resources of Traditional Cultural Significance			■	(SHPO)		■			
(c) Preconstruction Archaeological Surveying		■					■	(as new development occurs)	
(d) Archaeological Monitoring during Excavation		■					■	(as new development occurs)	
(e) Report Distribution	■						■	(ongoing)	
(f) Security Program	■		■				■	(ongoing)	
(g) Nomination of Discovered Archaeological Sites	■							■	(as sites are discovered)
3.8 Building Conditions									
(a) Building Condition Survey - Structural, Electrical/Mechanical, ADA Compliance	■				■				
3.9 Equipment Conditions (None)									

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Table 12-1 (Page 3 of 8)
Recommendations and Implementation Actions*

Actions and Programs **	Responsibility for Implementation: City/IDC	Development Applicants/ Tenants	Navy	Other (Specify)*	Timeframe for Implementation: 1994	1995	1996	1997	Beyond 1997
3.10 Federal Reuse Screening and McKinney Act									
(a) Excess Property Process Integration	■				■				
3.11 Air Quality									
(a) Continuation of Air Quality Compliance and Maintenance	■		■		■	(on-going)			
(b) Implementation of Transportation Recommendations	■						■	(on-going)	
3.12 Jurisdictional									
(a) Resolve State Lands Commission Jurisdiction	■			(SLC)	■				
4.0 Economic Feasibility									
4.1 - 4.3 (None)									
4.4 Organizational Framework									
(a) Form the Island Development Corporation (IDC)	■				■				
(b) Appoint IDC Board of Directors	■				■				
(c) Seek tax-exempt status for the IDC	■				■				
4.5 Mare Island Transition Process									
(a) Designate IDC as Vallejo "development authority"	■				■				
(b) Negotiate lease agreements with federal agencies	■				■	■			
(c) Work with the Navy to create master lease and discounted interim leases	■				■	■			
(d) Transfer personal property to IDC	■		■			■			
4.6 Fiscal Impact Analysis									
(a) Secure Navy Funding	■		■		■				
(b) Federal Tenants Services Fee	■					■			
(c) Encourage Revenue Generating Uses	■				■	(on-going)			
(d) Reduce Fire Staff Needs	■						■		
(e) Secure Net Services Costs from IDC	■					■	(on-going)		
4.7 Infrastructure Costs and Financing									
(a) Refine Financing Analysis	■					■			

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Table 12-1 (Page 4 of 8)
Recommendations and Implementation Actions*

Actions and Programs **	Responsibility for Implementation: City/IDC	Development Applicants/ Tenants	Navy	Other (Specify)*	Timeframe for Implementation: 1994	1995	1996	1997	Beyond 1997
(b) Establish Contractual Commitments Among Agencies	■					■			
(c) Seek Outside Funding	■				■	(ongoing)			
(d) Implement Comprehensive Financing Plan	■						■		
4.8 Operations Analysis									
(a) Refine Building Rehabilitation Assumptions	■					■			
(b) Refine Leasing and Phasing Estimates	■						■	(on-going)	
(c) Coordinate Infrastructure Phasing	■						■	(on-going)	
4.9 Marketing and Disposition Strategies									
(a) Marketing/Interim Subleasing for North Light Industry Area	■				■	(ongoing)			
(b) Bulk Sale of North Light Industry Subarea	■								■
(c) Building-Specific Assessments in Heavy Industry Area	■					■			
(d) Marketing for Interim Subleasing of Heavy Industry Area	■				■	(ongoing)			
(e) Create Historic Ship Repair Facility in Historic District	■		■			■			
(f) Bulk Sale/Lease of Captain's Row/Alden Park	■						■		
(g) Marketing/Interim Subleasing of Golf Course	■						■		
(h) Interim Sublease of Farragut Village/Coral Sea Village	■				■				
(i) Public Benefit Conveyance of Education/ Office Area Required by Education Consortium	■		■	(Consortium)		■			
(j) Lease Balance of Education/Office Area	■							■	
(k) Public Benefit Conveyance of Developed Recreation Area	■		■				■		
(l) Public Benefit Conveyance of Regional Park Area	■		■				■		
(m) Disposition of Roosevelt Terrace	■		■				■		
(n) Parcel Sales in Mixed Use Office/Light Industry Area	■							■	■
(o) Lease/Sale of Recreational Facilities in Neighborhood Center Area	■								■
(p) Bulk Sale of Non-Recreational Portions of Neighborhood Center Area	■								■
(q) Bulk Sale of Marina Residential Area	■								■

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Table 12-1 (Page 5 of 8)
Recommendations and Implementation Actions*

Actions and Programs **	Responsibility for Implementation: City/IDC	Development Applicants/ Tenants	Navy	Other (Specify)*	Timeframe for Implementation: 1994	1995	1996	1997	Beyond 1997
5.0 Land Use									
5.1-5.3 (None)									
5.4 Recommendations and Implementation Actions									
(a) North Light Industry Area Plan	■							■	
(b) Historic District Plan	■								■
(c) Recreation, Open Space and Natural Resources Plan	■								■
(d) Waterfront Plan	■							■	
(e) Neighborhood Center Plan	■								■
(f) Industrial Areas Plan	■							■	
6.0 Infrastructure									
6.1-6.5 (None)									
6.6 Recommendations and Implementation Actions (8)									
6.6.1 Potable Water									
(a) Leak Detection & Pipe Condition Study (9)	■					■			
(b) Review Cross Conn. Control Program (9)	■					■			
(c) Valve & Hydrant Condition Study (9)	■					■			
(d) Storage Tank Evaluations (9)	■					■			
6.6.2 Sanitary Wastewater									
(a) Inflow Infiltration Study (9)				(VSFCD)		■			
(b) Negotiate Transfer of Sewage Service Agreement	■		■				■		
6.6.3 Storm Water									
(a) Negotiate Transfer of NPDES Storm Water Permit	■		■	(RWQCB)			■		
(b) Incorporate M.I. into VSFCD Territory				(VSFCD)			■		
6.6.4 Electrical									
(a) Utility Study (9)	■			■		■			
(b) Negotiate Transfer to New Owner	■		■	■			■		
6.6.5 Gas									
(a) Utility Study (9)	■			■		■			
(b) Negotiate Transfer to New Owner	■		■	■			■		
6.6.6 Telephone									
(a) Utility Study (9)	■			■		■			

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Table 12-1 (Page 6 of 8)
Recommendations and Implementation Actions*

Actions and Programs **	Responsibility for Implementation: City/IDC	Development Applicants/ Tenants	Navy	Other (Specify)*	Timeframe for Implementation: 1994	1995	1996	1997	Beyond 1997
(b) Negotiate Transfer to New Owner, incl. AT&T Equipment Agreement	■		■	■			■		
General:									
• System Easement Description and Recordation Noted in Chapter 6 Text Not Included									
• Alternate Utility System Disposition to be Decided Before Implementation Actions can be Defined									
7.0 Transportation									
7.1-7.6 (None)									
7.7 Recommendations & Implementation Actions (8)									
7.7.1 Roadway/Parking									
(a) Mare Island Traffic Analysis & Signal Coordination Study	■					■			
(b) Mare Island Causeway Reconfiguration Study	■		■			■			
(c) Street, Intersection, and Gateway Planning and Design	■					■			
(c) Southern Crossing Planning Study	■			(Caltrans)			■		
(d) Southern Crossing Preliminary Engineering and EIR	■			(Caltrans)				■	
(e) Southern Crossing Engineering and Design	■			(Caltrans)					■
(f) Parking Facility Planning and Design	■			(Private)			■		
7.7.2 Pedestrian/Bicycle									
(a) Waterfront Pedestrian Walkway Feasibility Study	■								■
(b) Mare Island Bikeway and Pedestrian Plan	■								■
7.7.3 Transit									
(a) Multi-Modal Terminal Feasibility Study and Design	■						■		
7.7.4 Ferry									
(a) Mare Island Ferry Plan, Designs and Program	■								■
7.7.5 Rail/LRT									
(a) Mare Island LRT Shuttle Study (if this mode is selected)	■								■
(b) Mare Island Freight Service Feasibility Study	■						■		

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Table 12-1 (Page 7 of 8)
Recommendations and Implementation Actions*

Actions and Programs **	Responsibility for Implementation: City/IDC	Development Applicants/ Tenants	Navy	Other (Specify)*	Timeframe for Implementation: 1994	1995	1996	1997	Beyond 1997
11.0 Plan Implementation									
11.1 Environmental Review									
(a) Preparation of EIS/EIR	■		■		■	■			
11.2 Land Use									
(a) Amendment of General Plan	■					■			
(b) Preparation of Specific Plan	■					■			
(c) Zoning	■					■			

* Footnotes and a key to acronyms are contained on the final page of this table.

** Recommendations and implementation actions are cited and numbered according to the Chapter and/or Section of the Final Reuse Plan (Volume II) within which they are discussed.

Recommendations and Implementation Actions*

Key to Table 12.1 Acronyms

ACHP	Advisory Council on Historic Preservation
ADA	American With Disabilities Act
BCP	Base Clean-Up Plan
BMP	Best Management Practices
BRAC	Base Realignment and Closure (Commission)
Caltrans	California Department of Transportation
CDFG	California Department of Fish and Game
Corps	U.S. Army Corps of Engineers
EBS	Environmental Baseline Survey
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FEMA	Federal Emergency Management Agency
IDC	Island Development Corporation
LRT	Light Rail Transit
SHPO	State Historic Preservation Office
SLC	State Land Commission
USFWS	U.S. Fish and Wildlife Service
VSFCD	Vallejo Sanitation and Flood Control District

Table 12.1 Footnotes

(1) Amounts are preliminary, for planning purposes only.
(2) Costs are associated with building/Site specific studies in preparation for reuse/occupancy; costs will vary by building/site and will be a normal part of reuse/development plan implementation.
(3) Navy funded action; conducted by the Navy.
(4) City role to be included in City/IDC staff costs.
(5) Does not include engineering costs.
(6) Estimate assumes outside consultants; actual cost depends on capability/ availability of City/IDC staff.
(7) Sales Commission -- Variable.
(8) Actions listed in Table 12.1 are supplemental to the Capital Improvement and O&M costs/requirements noted in chapters 6 and 7 of the Final Reuse Plan (unless otherwise noted).
(9) Actions included in CIP described in Chapters 6 and 7 of the Final Reuse Plan.