Appendix D

1997 JRP Historical Consulting Services Report: Peyton Marsh Drainage System

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Inventory and Evaluation:

Peyton Marsh Drainage System, Contra Costa County, California

Prepared by:

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Prepared for:

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Constra Costa Mosquito and
Vector Control District
155 Mason Circle
Concord, CA 94520

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1. INVENTORY AND EVALUATION OF PEYTON MARSH DRAINAGE SYSTEM

Purpose and Findings of Report

Contra Costa Mosquito and Vector Control District (CCMVCD) has asked JRP Historical Consulting Services to inventory and evaluate the Peyton Marsh drainage system located in the Peyton Marsh (Shell Marsh) east of Martinez, California. CCMVCD has requested this evaluation in compliance with requirements of the California Environmental Quality Act (CEQA) that mandate the review of properties fifty years old or older for historical importance and the wetland permitting process of the US Army Corps of Engineers that requires compliance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations. Together, these acts require evaluation of potential historic resources for eligibility for the California Register of Historic Places and the National Register of Historic Places (NRHP). Eligibility for the National Register is determined by applying NRHP's established criteria of significance to the resource (see Section 3).

The California Register of Historic Places was established in 1992 (Code 5024.1) and is the authoritative guide to identifying the state's historic resources. The criteria for evaluation of historic properties for the California Register of Historic Places, however, are in the final phase of review by the Office of Administrative Law. In the absence of any formal criteria, it is the standard professional practice to make use of the National Register Criteria in the interim. The California Register criteria in their draft stage are almost identical with those used by the National Register with the exception that the program emphasizes properties significant in California history. Any California property deemed eligible for listing in the National Register is automatically eligible for the California Register. For the purposes of this evaluation, application of the National Register criteria of significance is appropriate.[1]

This report concludes that the Peyton Marsh drainage system does not appear to be eligible for the National Register of Historic Places. The Peyton Marsh drainage system consists of three basic elements: 1) the East Levee; 2) a network of drainage channels; and 3) a tide gate structure. These structural elements do not appear to meet the criteria for significance, and therefore, the system does not appear to be eligible for the National Register under the historical significance criteria alone. Furthermore, the three main elements of the drainage system have lost integrity and do not appear to retain enough of their original form and function to support a finding of eligibility.[2]

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[1] Governor's Office of Planning and Research, *CEQA and Historic Resources: CEQA Technical Advice Series* (April 1994).

[2] The results of this inventory and evaluation are presented both in report format and on a DPR 523 form that appears as Attachment A at the end of the report. The DPR 523 actually consists of two forms, a Primary Record and a Building, Structure, and Object Record. JRP has not prepared a Linear Feature Record. While the drainage channel elements of the Peyton Marsh system are linear in nature, JRP has inventoried and evaluated the drainage system as a whole because this small system is contained within a single, discrete hydrologic unit. Furthermore, JRP was able to inspect all major elements of the system in the field, eliminating the need to use of comparison point recordations, which would have been necessary for a more extensive linear resource.

Description of Resource

Peyton Marsh (or Shell Marsh), drained by Peyton Slough, is one hydrologic unit of a band of salt marshes located on the southern shore of Suisun Bay extending from Martinez on the west, to Antioch, at the edge of the Sacramento-San Joaquin Delta, on the east.[3] The marshes on this side of the bay are less expansive than those to the north as they are confined by the steep northern foothills of Mount Diablo. Peyton Marsh fills the low land between two areas of high ground formed by these foothills, Bull's Head Point and Peyton Hill, and extends inland toward the marsh's southern boundary at Vine Hill. The marsh is bisected by the east-west aligned Union Pacific Railroad tracks (and the parallel Waterfront Road) and diagonally by Interstate 680. At one time the 230 acre marsh split into three reaches south of the railroad line, but changes in inflows, drainage, nearby industrial development and construction of Interstate 680 have altered the shape of this part of the marsh and reduced the total marsh area to approximately 200 acres (**Figures 1-2**).[4]

The marsh drainage system includes three main elements: 1) the East Levee; 2) a network of drainage channels; and 3) a tide gate structure (**Figures 2-3**). The East Levee, an earthen levee running between Bull's Head Point and Peyton Hill, crosses the marsh and bisects the area that lies north of the railroad line (**Photograph 1**). The drainage channels consist of a main canal running between the East Levee and to just south of the railroad tracks, and three branch canals that run into the three reaches of the marsh described above (**Photographs 2-3**). As natural runoff and discharged effluent flow into these branch canals in the southernmost marsh areas, the three canals combine to form the single drainage channel just south of the railroad and the flows are carried under the tracks in a culvert. The main drain then heads northwest towards Bull's Head Point where the Rhône-Poulenc Basic Chemicals, Inc. plant dominates the landscape with its tanks and processing equipment. At the East Levee, about one half mile inland, the main drainage channel reaches tide gate structure, the third element of the system (**Photograph 4**), where the water empties into Peyton Slough (**Photograph 5**) during low tide and flows into Suisun Bay.[5]

The tide gates themselves are simple cast iron, top-hinged, one-way flap valves that are attached to the north side of a culvert structure set into the western end of the approximately 1100' long East Levee (**Figure 4** and **Photographs 6-7**). The gates operate automatically in response to the receding tide. When the tide recedes and no longer applies pressure to the outside (north side) of the gate flaps, the gates can open to allow water from the marsh to flow out to the bay. The structure framing the gates consists of a timber and concrete box culvert approximately 21' long,

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[3] Peyton Marsh is also known as Shell Marsh because of Shell Oil Company's long-time presence on the southwestern border of the marsh. The company began building a refinery here in 1914 and leased existing refining facilities from American-Oriental Company near the Mococo railroad station during the construction period. At the same time Shell installed a crude oil pipeline running from Coalinga to its new refinery site, a distance of approximately 175 miles. [*Oil Age* (November 1914), 20; (May 1915), 9, 13; (June 1915), 1; (August 1915), 9; (April 1916), 2.]

[4] Please note that figures and photographs appear in the DPR 523 form in Attachment A.

[5] Karl Malamud-Roam interview, June 9, 1997.

12' wide and 7' deep. Concrete and timber headwalls (about 12' wide) form the openings on either end of the box culvert and support the flap gates on the north end and a grizzly rack on the south end (**Photograph 4**). A pumphouse sits on the south slope of the levee just to the east of the gate structure (**Photographs 2 and 8**). It houses pumping equipment that sends additional drainage water by way of a pipe that runs through the levee to empty on the north side at a discharge box on Peyton Slough (**Photograph 9**).

Rhône-Poulenc Basic Chemicals, Inc. uses the paved the top of the gate structure as an access road for its waste water treatment area. The company also maintains a utility bridge running parallel with the north side of the levee. This bridge (**Photograph 10**), which is supported by bracing attached in part to the gate structure, carries several pipelines between the plant and its waste water treatment facility east of the slough. The waste water plant consists of two small metal-clad buildings, treatment equipment and a waste water containment pond (**Photographs 11-13**). An approximately 200 foot long portion of the levee, running east from the gate structure, forms the southern side of this pond. The surface of the levee along the pond is dirt, but is maintained as an extension of the asphalt section across the gate structure. Beyond the pond to the east, the levee is overgrown and appears to have deteriorated and subsided causing generally uneven dimensions (**Photograph 1**).[6]

Project Description

Contra Costa Mosquito & Vector Control District (CCMVCD), as the lead agency, has proposed a restoration project for the Peyton (Shell) Marsh. The project is intended to restore and enhance wetland habitat values to the marsh, and to provide ancillary benefits for flood reduction and mosquito control through improved water control and expanded flow capacity in channels and through control structures. Existing culverts, gates, levees and channels will be repaired and improved to allow restoration of controlled tidal action into the 200-acre diked, historically-tidal marsh. A small quantity of new channels will also be dredged to improve circulation. In addition, a cooperative Natural Resources Management and Monitoring Plan will be adopted to govern operation of the water control structures and data collection on site.

The project includes plans to demolish and replace the existing tide gate structure. The replacement structure will consist of five two-way flap gates measuring 4.5' x 6' with mechanical controls for opening and closing the gates. This new gate structure will allow tides to flow into and out of the marsh area. The existing levee road over the tide gate structure will be replaced by a concrete bridge to allow access by the landowners to facilities east of the new structure. As noted above, other elements of the project include repairing and improving the East Levee and marsh channels, as well as the installation of new channels.[7]

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[6] George Chin, Engineer, Rhône-Poulenc Basic Chemicals, Inc., interview June 10, 1997.

[7] CCMVCD, "Draft Mitigated Negative Declaration and Initial Study, Shell Marsh Restoration Project," (June 1997), 2-3.

2. HISTORY OF PEYTON MARSH DRAINAGE SYSTEM

The Development of Mosquito Abatement

According to historian David McCullough, malaria was historically "the world's greatest killer" and a disease that had long been present in the US, but it became a special concern during the construction of the Panama Canal. Although the disease was found all over the world, its name is derived from *mal'aria*, Italian for "bad air," illustrating the long-held belief that the disease was airborne, caused by poisonous fumes from swamps or marshes. This theory appeared to explain why the disease was most prevalent in hot, humid, tropical locations. Several scientists and physicians in these places began to piece together the actual source of the disease during the last decades of the nineteenth century. Among the many individuals who contributed to this effort was Dr. Ronald Ross, an Englishman working in India, who discovered in 1897 that the *Anopheles* mosquito carried the disease, and Dr. William Gorgas, an American army doctor assigned to the Panama Canal Zone during construction of the canal. Gorgas did pioneering work in Panama, studying the life history of the disease-bearing insects and organizing efforts in the construction, living, and hospital areas to control mosquito breeding by drastically reducing their access to standing water.[8]

Malaria did not have as long a history in California as it did in the tropical areas where the research took place. The indigenous Indian tribes of the west coast did not suffer from the disease and malaria did not appear in the state during the time of Spanish and Mexican control, but it did appear after several groups of hunters and explorers passed through the region in the late 1820s and early 1830s. An especially destructive outbreak of malaria in California in 1833 decimated the Indian tribes of the Central Valley. Hudson's Bay trapping parties are specifically believed to have introduced malaria to the region, but as more and more groups of explorers, cattle drovers, traders, and settlers arrived so did new sources of the malarial parasite, ensuring the establishment of the disease in California well before the Gold Rush. Fortune-hunters and immigrants poured into the state during the rush and in the following decades; many new arrivals succumbed to epidemics of the disease that occurred every few years through about 1880. During this period, malaria was so common that it became a largely accepted part of life in California.[9]

Attitudes about the disease began to slowly shift after 1900 with the news of Dr. Ross's discovery and accounts of the construction crews' battles with malaria in the Panama Canal Zone. Historical overviews of malaria in the state note that in the 1800s California communities freely discussed the presence of the disease, but after the turn of the century "there developed a 'chamber of commerce' attitude that malaria was a deterrent to economic development and should not be discussed publicly." What many of these communities did not recognize was that their own development efforts supported the spread of malaria in their own towns. Although the

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[8] David McCullough, *The Path Between the Seas* (New York: Simon and Schuster, 1977), 137-147, 405-426.

[9] Harold F. Gray and Russell E. Fontaine, "A History of Malaria in California," reprinted from the *Proceedings and Papers of the 25th Annual Conference, California Mosquito Control Association* (June 30, 1957), 4-10, 15.

disease appears to have been on the decline beginning about 1880, farmers throughout the Central Valley began to install fairly extensive irrigation systems at this time that brought back localized, and sometimes severe, malaria outbreaks.[10]

Meanwhile, the discoveries of Dr. Ross and Dr. Gorgas between 1897 and 1914 enabled the scientific community to identify methods for controlling mosquitoes and California health officials learned from their efforts. William B. Herms, Assistant Professor of Entomology, University of California College of Agriculture, began to crusade against malaria in California in 1909. At the same time the secretary of the State Board of Health, Dr. William F. Snow, reported on the financial costs of malaria in California and officially supported the idea of community-level mosquito eradication efforts. The state board also began to conduct a field survey to determine the endemic index of malaria in California. Three communities also began privately-funded campaigns against malarial mosquitoes in 1910: Penryn, Oroville, and Bakersfield. Although funding for the projects only lasted a few years, the projects were successful in reducing the number of mosquitoes in those communities. Professor Herms and the scientific community, with the authorship of California State Assemblyman J. H. Guill (Chico), were able to sponsor a bill to create anti-malarial mosquito districts in 1911, but it did not pass.[11]

Local governments hesitated to fund on-going mosquito control projects, so the support for creation of governmental mosquito control eventually came from "real estate developers who were being badly hurt in their pocketbooks by excessive prevalence of salt marsh mosquitoes in areas [like Contra Costa] which had never had malaria." Private efforts to eradicate these pest mosquitoes, which do not carry malaria, in wealthy resort communities in the Bay Area had been established as early as 1903 in San Rafael (Marin County) and in San Mateo and Burlingame (San Mateo County) by 1906. Private donors and land developers, however, could not sustain the level of effort necessary to control the pests. In 1915 the real estate lobby supported legislation similar to Guill's 1911 bill, but this time the act focused on general mosquito eradication. The lobby was successful and the governor approved the Mosquito Abatement District Act on May 29, 1915.[12]

Noble M. Stover was one of the sponsors of the 1915 legislation and contributed to the drafting of the act that enabled local governments to collect taxes to be used for the control of both malarial and pest mosquitoes. Stover, a native of Logan, Utah, graduated from the engineering department of the University of California in 1910 and in 1913 he moved to Burlingame. That same year he helped found the "San Mateo, Burlingame, Hillsborough Mosquito Control Committee" demonstrating the local support for pest mosquito control even at a time before the state passed a mosquito district enabling law. Stover served as the district's first

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[10] Gray and Fontaine, "A History of Malaria in California," 8-9, 15; California State Board of Health, *24th Biennial Report 1914-1916* (California State Printing Office, 1916), 68.

[11] California State Board of Health, *24th Biennial Report 1914-1916*, 13, 67-68, 86-90; Gray and Fontaine, "A History of Malaria in California," 9, 16-18; "Aims to Wipe Out Mosquito Swamps," San Francisco Chronicle (January 24, 1911), 3:3.

[12] Stanley B. Freeborn, "Mosquito Abatement Districts in California," *Bulletin of California State Board of Health* (April 1918), 455-459; Gray and Fontaine, "A History of Malaria in California," 17-18.

engineer/superintendent. When the real estate lobby was ready to support mosquito district legislation in 1915, Stover was an enthusiastic supporter. As he admitted later, in 1926, he found it "gratifying to know that without amendment the act has worked successfully for the past eleven years." Stover became the superintendent of the first district organized under the new law, Marin County Mosquito Abatement District No. 1 (1915), and continued in his position for the San Mateo district when it began operations in early 1916.[13]

Northern California and Central Valley communities were the first to respond to the 1915 act. By the time Contra Costa formed its district in 1926, there were already several mosquito control agencies in the northern coastal, Sacramento Valley and San Joaquin Valley areas. Of the vector control districts that are still in existence today, seven were created before Contra Costa:

Agency & County Name (Same unless noted)	Year Formed
Marin/Sonoma	1915
San Mateo	1916
Kern	1917
Tehama	1917
Shasta	1919
Delta (Tulare County)	1922
Napa	1925

Eight more districts were formed during the late 1920s and 1930s, three in southern California, bringing the total to sixteen in 1940.[14]

Contra Costa County residents living along the southern side of Suisun Bay were the third Bay Area community to initiate a mosquito control agency under the new legislation. Clouds of mosquitoes breeding in the extensive salt marshes between Martinez and Antioch were a substantial nuisance, often forcing the closure of schools, recreational areas and waterfront industries. Although the salt marsh mosquitoes were not malarial, the pests were enough of a problem that real estate sales and general economic development of the region were hampered. Furthermore, mosquito control agencies throughout the state had had general success since the first districts began organizing in 1915 and the two older Bay Area districts provided local examples. By 1926 residents voted to create the Contra Costa County Mosquito Abatement District along with an oversight committee.[15]

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[13] Gale Jirik, "CCMVCD: 70 Years in the Making," *Mosquito and Vector News and Notes* (Fall-Winter 1996), 1; Stover, "Report to Committee on Organization, Contra Costa County Mosquito Abatement District No. 1," (final submitted March 31, 1927), 2-3; "Noble Stover Taken by Death," *San Mateo Recorder* (September 19, 1935), 1; *San Mateo Recorder* (September 20, 1935), 12.

[14] Mosquito and Vector Control Association of California, "Agency Statistics and Fiscal Data, 1995-1996," *Year Book, 1995-1996* (MVCAC); Freeborn, "Mosquito Abatement Districts in California," 455-459; California State Board of Health, *25th Biennial Report 1916-1918*, 14-15.

[15] Jirik, "CCMVCD: 70 Years in the Making," 1; Karl Malamud-Roam interview, June 9, 1997.

The newly formed committee in Contra Costa County asked Noble Stover to propose an abatement strategy. With at least thirteen years of practical experience in the Bay Area, Stover was able to quickly design an overall control program consisting of a series of thirteen drainage projects located between Martinez and Antioch. As he pointed out in his report to the committee, mosquito abatement had "progressed past the experimental stage [to] become a problem of economic entomology combined with the science of drainage practice" because of the efforts, experiences and results obtained by these early districts. Stover also emphasized the importance of pursuing rapid drainage of the marsh areas even though the initial cost might be high.[16]

Stover's proposal for the district consisted of thirteen hydrologically separate drainage systems that would function independently of each other to drain each section of marsh. He lettered the projects beginning with Project A, on Peyton Marsh, and continuing through Project L, east of Antioch. Each project involved cutting dredged drainage channels through the swamped areas to allow water to run freely to the bay instead of forming stagnant pools where mosquitoes could breed. The drains were the most extensive features of the projects, but Stover also included other water control devices, such as culverts, pumps and tide gates in his designs. Some of the projects were solely drainage canals designed to feed into existing natural channels (such as the drains in Project B that fed into Pacheco Creek), while other drains that emptied into the bay required control structures to keep the tide from rising up the newly created drains. Stover specifically called for the use of California Corrugated Culvert Company's (Calco) tide gates and culverts at these locations. He planned to install Calco gates on the following projects within his proposed system: Project A (Peyton Marsh); Project E (Bay Point area); Projects I, J, and K (between McAvoy and Pittsburg); and Project L (near Antioch).[17]

Stover had successfully used Calco products in designing the drainage works of the two other abatement districts where he worked and he recommended the equipment which was in use all over California in various irrigation, reclamation and drainage projects. In fact, Calco was the major fabricator of water control structures in the state during the early decades of the twentieth century and their products can still be found on hundreds of water conveyance systems throughout California. Just before Stover designed the mosquito abatement program for Contra Costa County, he wrote to Calco praising their products; the company printed his January 21, 1926 testimonial in a catalog distributed that year:

> Having installed your gates over a period of ten years from 1916 to 1926 in our work of mosquito abatement, I can say that they rank supreme among all other methods of control used by us in the eradication of breeding areas for this pest. When properly installed they work without further attention and I can recommend them as an efficient working device."
>
> --Marin County Mosquito Abatement District, by N. M. Stover, Supt.[18]

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[16] Stover, "Report to Committee," 1, 6; California Corrugated Culvert Company [Calco], *Solutions for Drainage and Flood Control Problems*, (S.l.: Calco, 1926), 20; CCMVCD, "Minutes of Mosquito Abatement District Committee," April 5, 1927, [hereafter shown as CM, date].

[17] Stover, "Report to Committee," passim and accompanying map.

[18] Calco, *Solutions for Drainage and Flood Control Problems*, 20; Stover, "Report to Committee," 10.

Other testimonials and example projects that appear in this catalog attest to the widespread use of Calco products in the state. Dozens of California water agencies and private entities in the Central Valley and the Bay Area are noted in the 1926 catalog as customers of Calco who had purchased drainage gates and culverts.[19]

The Peyton Marsh and Stover's Proposed Drainage System

Stover focused his proposed abatement program for the committee on the control of a mosquito called *Aedes dorsalis*, which breeds in salt marshes that have little tidal action. He specifically noted that "old reclaimed marsh lands [like Peyton Marsh], where the levees have been abandoned, or insufficient drainage provided, form the worst problem." Culverts installed under roads and railroad spurs also presented a widespread problem in the district because, according to Stover, "one culvert in ten is installed low enough to act properly for the purpose of mosquito abatement." The district committee largely accepted Stover's plan and approved these projects under separate contracts with local dredging companies during the next several years.[20]

Project A, Stover's drainage plan for Peyton Marsh, made use of existing structures as well as providing new drainage works for the area. Some early reclamation work on the marsh predated the abatement district's project, but it is not known who installed the first levee between Peyton Hill and Bull's Head Point. The San Pablo (also San Francisco) and Tulare Railroad laid its tracks through the area in the mid-1880s and sold out to Southern Pacific in 1889. US coastal maps do not indicate that there was a levee or any high ground between Peyton Hill and Bull's Head Point during this time, but by 1896 the US Geological Survey did record a narrow strip of high ground at the approximate location of the modern tide gate levee (**Figure 5**). This suggests two possible scenarios for the ca. 1890s construction of this early levee: 1) the railroad may have experienced flooding at high tide and put in the levee as a flood protection device; or 2) the Mountain Copper Company (Mococo), which began operating a refining and manufacturing plant on Bull's Head Point in the late 1890s, put in the low dam to protect its factory site.[21]

Stover described Peyton Marsh, the area between Bull's Head Point and Peyton Hill, in 1926 as "probably the most extensive breeding ground" of mosquitoes in the proposed district. Drainage of the marsh was established as the district's first priority, in part because it posed the greatest problem, but also because its was closest to the growing town and industrial center of Martinez, the largest of the towns on the south side of Suisun Bay. The area was poorly drained and had

[19] Calco, *Solutions for Drainage and Flood Control Problems*, passim.

[20] Stover, "Report to Committee," 3-4, 8; CM, May 19, 1927; CM, November 10, 1927; CM, February 15, 1928; CM, September 17, 1928; CM, February 20, 1929; CM, October 29, 1929.

[21] US Geological Survey, *Carquinez*, Topographic Quadrangle, 15' series, surveyed in 1896 (Washington, D.C.: GPO, 1901); US Coast and Geodetic Survey, *Suisun Bay, California*, triangulation 1864 and 1866, topography 1856 and 1866, hydrography 1866 and 1867, corrected to 1889 (Washington, D.C.: GPO, 1889); Southern Pacific Railroad Company, Station Plats, "Amorco, Mococo, and Peyton," California State Archives; Mountain Copper Company collection, Bancroft Library, UC Berkeley.

substantial amounts of standing water where the insects bred. Some small culverts under the highway and railroad tracks provided localized drainage, however, much of the area had no outlet to the bay. The eastern reach of the marsh was completely closed off by the railroad embankment. Stover also reported that the old, deteriorating levee running from Peyton Hill to Bull's Head let high tides into the marsh, but obstructed drainage from the marsh into the bay. He described this feature as follows:

> Extending from Peyton Hill west runs the remains of an old levee, which apparently connected with Bull Head. This levee has been abandoned and only a low embankment remains. No flood gates are to be found and the result is that the levee acts as an artificial barrier to the rapid runoff at low tide of all of the marsh land to the south.[22]

Stover's recommendation for drainage of Peyton Marsh included three key elements: the rebuilding of the old levee; installation of a network of drainage channels; and installation of a tide gate structure at the western end of the rebuilt levee (**Figure 6**). The new higher levee would be about 1,500 feet long and follow the alignment of the older dike. Stover's designs called for dredging an 18 foot-wide, 4.5 foot deep, 1,000 yard long channel from the gates southeastward to the culvert under the railroad. South of the railroad, the channel would be dredged to branch into the three reaches of the marsh. Finally, one-way flap-type tide gates installed at in the new levee would allow water in the marsh to flow through the drains and out to the bay at low tide and close at high tide to prevent re-flooding of the area. Stover specified that the tide gates in the levee across Peyton Slough would consist of two Model 100 California Corrugated Culvert Company (Calco) 60-inch diameter automatic drainage gates. The gates came attached to 35 feet of corrugated metal culvert. A concrete and timber box structure set into the levee framed the gate-culvert elements, which Stover estimated could carry 500 cfs of drainage water at low tide.[23]

Contra Costa Mosquito Abatement District No. 1 accepted Stover's marsh drainage plan at its first meeting on March 31, 1927 and its committee members offered him the job of district supervisor. Stover had worked with a man named Ernest Campbell on other projects and recommended that the district hire Campbell as well. Stover served as superintendent of the district from 1927 through his death in September 1935, while Campbell was the district's first employee. Campbell succeeded Stover as supervisor in 1935.[24]

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[22] Stover, "Report to Committee," 9; see also CCMVCD, Fiscal Report, 1942/1943, p. 9, unnumbered textual report [hereafter CCMVCD Fiscal Reports will appear as FR, date.]

[23] Stover, "Report to Committee," 9-10; FR 11/1/1927-2/15/1928, p. 3.

[24] CM, March 31, 1927, April 5, 1927; May 19, 1927; FR 6/11/1934-6/19/1935; FR 1936/1937; FR 1948/1949; "Noble Stover Taken by Death," *San Mateo Recorder* (September 19, 1935), 1.

Construction, Maintenance and Operation History of Peyton Marsh Drainage System

The district committee approved an appropriation of $5,000 for the Peyton Marsh drainage project (Project A) at its first meeting in March 1927, in addition to funding Project B (west of Avon) and Project K (west of Pittsburg). They accepted the Dutton Dredging Company's bid on Project A, for $4,480, on May 19, 1927.[25]

As of November 1, 1927, the district had spent the allotted amount on Project A. The expenditure included re-building the levee, excavating a 27 foot wide, six foot deep canal from the new levee southeast to the Southern Pacific railroad trestle, as well as dredging 18 foot wide branching channels south of the railroad alignment.[26] District Superintendent Stover reported that the Peyton gates "worked perfectly all summer long" the first season after installation, but added that he had arranged for the Dutton Dredge Company to reinforce the levee at the Peyton gates because the structure had settled. The company deepened the main channel somewhat and re-dredged areas that had caved in, except around the new railroad culvert which was too wet to work until summer. Because the tide gates worked so well in keeping the frontage road from flooding during the winter, the district received "some very favorable acknowledgment of the drainage work done on this particular portion of marsh land." Before the district's work on Peyton Marsh the frontage road connecting the town of Martinez to other south shore Suisun Bay communities to the east was regularly flooded in winter.[27]

District records, including Stover's proposal for the drainage projects and fiscal reports to the committee, do not contain detailed as-built information on the Peyton Slough tide gate structure. However, the gates were comparable to gates installed for Project K, in the West Pittsburg area. In late 1927 Stover described the Pittsburg gates as "similar in design to the Peyton gate, the only change being that the concrete wing walls were extended farther into the levee and the retaining wall above the gate being considerable higher." The West Pittsburg gate flood box was 13 feet wide and 30 feet long, containing two 60" Calco automatic tide gates that were set in a 4 foot wide concrete block. The block extended two feet below the box to join with two rows of redwood crab fencing. Examples of Calco gates from their 1926 catalog appear in **Figure 7.**[28]

Fiscal reports of the abatement district contain multiple references to recurring maintenance on Project A in the Peyton Marsh. On at least five occasions between 1929 and 1956, the district performed extensive cleaning, dredging and enlarging of the drainage channels south of the tide

[25] CM, March 31, 1927; April 5, 1927; May 19, 1927.

[26] FR 8/1-11/1/1927, p. 2, 7-8. Southern Pacific soon replaced the trestle referred to in this fiscal report. The present concrete box culvert has the date 1928 stamped in the head wall.

[27] FR 11/1/1927-2/15/1928, p. 3, 12-13; FR 1944/1945, p. 16; FR 1945/1946, p. 15.

[28] FR 8/1-11/1/1927, p. 3. Although Stover's design for the Peyton gate structure called for Calco flap gates attached to a length of corrugated metal culvert, this is the only reference to the culvert portion of the equipment. All other references to the Peyton gates and the similar structure near West Pittsburg describe concrete and timber box culverts being inserted into the levee and used in conjunction with flap gates without metal culverts. The box culvert was weighted down by back filling and by attaching it to concrete headers and wing walls at each end. See also FR 1939/1940, p. 11-12.

gates.[29] The abatement district was especially diligent in cleaning and dredging Peyton Slough from the gates to the bay. In his 1929/1930 fiscal report, Stover explained that "there is a continual depositing of silt in this channel through the summer months, and it is necessary to remove this in order to allow the gate to flow down to the bottom." Ten years later Superintendent Campbell noted that Peyton Slough, "from the tide gate to deep water has had to be de-silted with floating dredge every two years." As early as 1935 Stover suggested moving the Peyton gates closer to the bay to eliminate the need for dredging the slough every spring, however, the district never followed up on this proposal. Stover's successor, Ernest Campbell, noted that dredging Peyton Slough continued to be the regular practice for this area during the 1940s, even though he also supported the idea of moving the gates closer to the bay to eliminate the need for this work.[30]

Disking and plowing of Peyton Marsh was another routine district task. Low spots that held standing water for long periods and dry cracked earth that held water in each fissure created ideal breeding areas for mosquitoes, so the district often hired local farmers to plow large portions of the marsh in the summer. Through 1950 the district superintendent reported work of this kind about every two years. Local ranchers grazed cattle in other parts of the marsh where seasonal pastures developed. Until the early 1950s cattle grazing kept marsh plant growth in check in the area south of the railroad line, but Campbell reported that the district had to increase disking and plowing in the area for fire protection after the cattle were removed.[31]

In addition to the annual or biennial maintenance and operation work on the project, the district initiated more substantial changes to the Peyton Marsh drainage system during the 1940s as industry expanded east of Martinez encroaching on the marsh. Natural disasters, flooding in 1938 and a fire in 1939, along with increased marsh inflows and drainage outflows made changes to the major elements of the system necessary. Higher than normal tides flooded the levee in 1938 and certainly eroded the levee to some degree. The high water in the marsh exceeded the capacity of the Peyton gates, and the backed-up water washed over the frontage road for the first time in ten years. The following year a substantial portion of the levee burned in a peat fire. The flood and fire damage had damaged the gate structure enough that the box culvert had to be replaced. Because the superintendent did not submit an expense report for new gates, the district may have salvaged the original gates.[32]

[29] FR 9/17/1928-2/20/1929, p. 8; FR 1939/1940, p. 5; FR 1942/1943, p. 9; FR 1947/1948, p. 11; FR 1955/1956, p. 7.

[30] FR 10/29/1929-4/3/1930, p. 5-6; FR 6/19/1933-6/11/1934, p. 10; 6/11/1934-6/19/1935, p. 11-12; FR 1936/1937; FR 1938/1939, p. 10-11; FR 1940/1941, p. 19-20; 1941/1942, 18; FR 1942/1943, p. 9, unnumbered textual report.; FR 1945/1946, p. 14-15.

[31] FR 5/28/1931-2/23/1932, p. 4-5; 6/11/1934-6/19/1935, p. 18; FR 1938-1939, 15; FR 1939/1940, p. 10; FR 1941/1942, p. 10-12, 22; FR 1942/1943, p. 8-9, 13; FR 1946/1947, p. 16; FR 1947/1948, p. 9; FR 1949/1950, p. 23, 27-28; FR 1950/1951, p. 20-22; FR 1951/1952, p. 18; FR 1952, p. 18; FR 1954/1955, p. 1.

[32] FR, Special meeting March 1, 1938, passim and photographs. There is some physical evidence, however, that suggests the gates may have been replaced. Photographs of the Calco Model No. 100 flap gate appear in the company's 1926 catalog mentioned earlier (**Figure 7**). The photographs of this gate, and others in the catalog, indicate that it was standard practice for Calco to cast their products with raised letters, "CALCO." The examples in the catalog all show this mark and often the model number on the face of the gates. Neither of the modern flap

In the 1939/1940 fiscal year the district repaired the flood and fire damage by rebuilding the Peyton Marsh levee and replacing the timber balance box on the Peyton gates. The superintendent described the contract work done on the levee with a dragline dredger as follows:

> In 1939 the levee was burned including some peat of which it is partly composed. Levels on the levee in the fall of 1939 showed about half of the approximately 1,200 lineal feet to be below the high water of 1938. With the lowest portion reduced to ashes this was a bad condition. The levee was entirely rebuilt and now is in excellent condition.[33]

The superintendent's reports of the early 1940s also noted increasing industrial effluents and a reduction in the quality of water discharged into Peyton Marsh by local industry. The district placed primary blame on Pacific Gas & Electric Company's plant at the Shell Oil Company site on the southwest of the marsh. PG&E started operations at this steam generator in about 1941, discharging 200 gpm of waste water into Peyton Marsh year round into the channel near the Mountain View Sanitary District's (MVSD) sewer discharge line. The increased effluent from PG&E and MVSD caused the water level of the whole southern part of the marsh to rise. Whereas the marsh had previously dried up each summer, now the constant flows of industrial waste water through the Peyton system created different problems. The constant supply of water caused rapid growth of tules and other water plants that clogged and slowed the drainage system and allowed more rapid settling of solids. This accumulation of vegetation and silt would require significant dredging efforts. Furthermore, the PG&E waste water deteriorated water quality enough to kill the mosquito fish planted by the district.[34]

Because the tules in the Peyton drains threatened to completely clog the system by the beginning of summer in 1942, Superintendent Campbell thoroughly dredged and cleaned it, even removing tule tubers by hand labor. This type of work had not been necessary (even during wet years) during the preceding decade because the Peyton drainage channels had gone dry each summer. The district was not immediately able to convince PG&E that it should bear the cost of this work. By the time that the district cleaned and dredged the Peyton Marsh channels in 1947-1948, PG&E had agreed to pay half the cost. The company recognized that silt accumulation in these channels was caused by their discharges, but still would not admit that the increased volume of water in the drainage canals could be attributed to their plant alone.[35]

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gates bear this identifying stamp. One of the gates, installed in 1995, carries the "HYDRO" in raised letters. The other gate does not bear any raised letters on its face. If the original installation used Calco gates as per Stover's design, this evidence suggests that the gates may have both replaced between 1927 and 1995, perhaps when the structure was rebuilt in 1940.

[33] FR 1939/1940, p. 11-12; see also FR 1942/1943, p. 9, unnumbered textual report.

[34] FR 1942/1943, unnumbered textual report; FR 1941/1942, p. 10-12, 22. Changes in the water levels in the marsh beginning in the 1940s were also due in part to the success of the district's drainage system itself. By allowing standing water to drain off and the marsh land to dry out, parts of the marsh, especially south of the railroad tracks began to subside. This part of the marsh may have lowered about four to five feet, causing discharged water and natural runoff to tend to collect in the area (Personal communication with Karl Malamud-Roam, June 23, 1997).

[35] FR 1942/1943, unnumbered textual report; FR 1947/1948, p. 11.

The Mountain View Sanitary District had been discharging into the marsh from its plant south of the railroad along the central reach well before PG&E. Its outflows also increased during the 1940s. In 1923 MVSD was established to serve the unincorporated area east of Martinez. The initial sewer system was a large septic tank. As population increased up to and through World War II, the plant began discharging effluent into "an old broad slough [in the Peyton Marsh] that meandered east and emptied into the main drain canal near the highway." Continuing post-war growth increased the amount of effluent discharged from the sanitation plant. By 1951 the sanitary district installed primary sewage treatment units which discharged continuously into Peyton Slough. Superintendent Campbell noted that if the sanitary district expanded operations, the increases in effluent would require installation of a pump at the Peyton Slough gates to increase discharge capacity at this choke point.[36]

In response to the increased flows into the marsh, the district worked to adapt the Peyton Marsh drainage system to handle the additional water. The district enlarged the main drainage channel south of the tide gates from 27 feet to 30 feet wide in 1942/1943, but the capacity of the tide gates themselves was not increased. During the 1949/1950 fiscal year Campbell supervised the installation of five redwood box culverts (measuring 12" x 20" inside and 20' long) in the marsh to better manage water flows. At this time the district also deepened the 18 foot wide Peyton Marsh drainage canals south of the railroad line, as well as performing routine dredging and cleaning in the channels. Campbell noted that the deepening was necessary to carrying the increased volume of water and to discourage the growth of tules. Again, the gates were not enlarged. Beginning in 1951/1952 the district decided to drain the far southern reaches of the Peyton Marsh with a redwood diversion box with flap gates in lieu of building and tearing down a low earthen dam at this location each season as had been the practice since the start of increased discharges into the marsh a decade before. Campbell emphasized that the district had made all possible improvements to the Peyton Marsh drainage system and that with any higher inflow "a pumping plant will be necessary to pump said water over the levee."[37]

General changes to the project continued. In 1952 the district raised the entire levee between the Mountain Copper Company and Peyton Hill, altering the feature for the third time (the first two changes were the district installation of a new levee over the old dike in 1927 and the district's reconstruction work done after the 1939 fire). District contractors also installed a ditch in the marsh to handle the effluent from the new Mountain View Sanitary District treatment plant in 1953. This new ditch carried waste water to the main Peyton Marsh drain canal. Its alignment required the installation of a new culvert feeding into the main canal for draining an area isolated by the new ditch construction. Even though Campbell had recommended adding a pumping station at the tide gates when MVSD expanded, the abatement district did not immediately do so. Other work during that year included improving the access road along the main canal, repairs to the marsh diversion box and addition of a new timber culvert in a small Peyton Marsh drain. By

[36] FR 1952/1953, p. 8; Roam, Peyton Marsh History, typescript, 1997; FR 1941/1942, p. 10-12, 22; FR 1951/1952, p. 11, 14-15.

[37] FR 8/1-11/1/1927, p. 2, 7-8; FR 1942/1943, 9; FR 1944/1945, p. 16; FR 1949/1950, p. 20, 23; FR 1950/1951, p. 21-22; FR 1951/1952, p. 11, 14-15.

the 1954/1955 fiscal year the Mountain Copper-Peyton Hill levee required raising a fourth time and a washout caused by muskrat digging near the tide gate required backfilling in 1956.[38]

Ongoing district operations and the Interstate 680 construction project continued to alter the Peyton Marsh drainage system during the 1960s. In 1958 B. F. Floyd made soundings to produce a profile of Peyton Slough between the gates and the bay, possibly in preparation for installing a pump at the gates or studying the feasibility of moving the tide gates closer to the bay. Although suggested at least twice over the years, the district never proceeded with plans to move the gates. The district did, however, install a 3,000 gpm capacity pump to expel excess discharges from the marsh that could not be handled through the tide gates alone by the 1960s. The pumping equipment was housed in a corrugated metal shelter on the south side of the levee and a 12" diameter metal discharge pipe was inserted through the levee to discharge on the north side just east of the tide gates.[39]

Between 1960 and 1962, the Department of Transportation built Interstate 680 through the area, including the stretch of highway transecting the southwestern edge of Peyton Marsh. Highway construction involved significant filling of the marsh. The central Peyton drain canal was also re-routed for this project, creating a perpendicular undercrossing through a large concrete culvert beneath the interstate.[40]

Recent work on the Peyton Marsh drainage system includes dredging the slough from the gates to the bay in 1988 and installation of a new timber grizzly, or trash grate at the south side of the gate structure. The pump discharge pipe rusted through, so the district has also recently placed a 10" diameter plastic pipe inside the old metal pipe to stop water losses between the pump and the discharge point. Furthermore, the easternmost tide gate failed in 1995 and the district replaced it with a similar 60" flap gate bearing the "HYDRO" manufacturers mark.[41]

3. SIGNIFICANCE AND EVALUATION OF PEYTON MARSH DRAINAGE SYSTEM

The National Register of Historic Places requires that a historic resource be determined eligible by meeting at least one of the following four criteria:

Criterion A: Properties associated with events that have made a significant contribution to the broad patterns of our history.

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[38] FR 1951/1952, p. 18; FR 1952/1953, p. 5, 8-9; FR 1954/1955; FR 1956/1957, p. 8.

[39] FR 1957/1958, p. 4; Aerial photographs, July 18, 1960, Mountain Copper Company collection, Bancroft Library, UC Berkeley.

[40] Roam. Peyton Marsh History, 1997; Raymond Forsyth and Joseph Hagwood, *One Hundred Years of Progress: A Photographic Essay on the Development of the California Transportation System* (Sacramento: California Transportation Foundation, 1996), 107, 110; Aerial photographs, July 18, 1960, Mountain Copper Company collection, Bancroft Library, UC Berkeley.

[41] Karl Malamud-Roam, interviews June 9 and 10, 1997.

Criterion B: Properties that are associated with the lives of persons significant in our past.

Criterion C: Properties that embody the distinctive characteristics of a type, period, or method of construction.

Criterion D: Properties that have yielded, or may be likely to yield, information important in prehistory or history. *[This category is largely applied to archeological sites and, therefore, will not be used in the evaluation of this resource.]*[42]

The Peyton Marsh drainage system, as stated previously, consists of three basic elements: 1) the East Levee; 2) a network of drainage channels; and 3) a tide gate structure. These elements do not appear to meet the four criteria for significance, and therefore, the system does not appear to be eligible for the National Register under the historical significance criteria alone. Furthermore, the drainage system has lost integrity and does not appear to retain enough of its original form and function to support historical significance. The specific significance and integrity issues for this resource are discussed below.

Significance of Peyton Marsh Drainage System

The scientific understanding of malaria and its transmission, along with the development of malarial and pest mosquito control districts are important trends in the history of California's public health policies. The abatements program also testifies to the influence of land development interests in the state who saw mosquito control as a nuisance abatement program that converted waste land into development opportunities and increased property values. The Peyton Marsh drainage system is not an unusual or outstanding example of pest mosquito control or marsh drainage engineering. While the drainage of marsh lands along the bay opened the immediate area to additional industrial development and improved seasonal road access through the region, the works do not appear to have important association with significant events or persons in the history of Contra Costa County or the state. The drainage system does not represent a distinctive example of engineering techniques, nor does this system make a significant or unique contribution to engineering or marsh drainage technology. This is especially true in the California context where some of the greatest reclamation work in the world was carried out in the Sacramento Valley and the Sacramento-San Joaquin Delta.

Nor is the reclamation work at Peyton Marsh an example of the work of a distinguished engineer or leader in the field of mosquito abatement science. Noble Stover, the system's designer, managed three mosquito abatement districts over his 20 year career in the field, but he did not contribute significantly to the field of pest abatement engineering. He designed the Peyton Marsh drainage system by applying well-known and tested engineering and drainage methods within the context of mosquito abatement and used widely available and widely used water

[42] USDI, NPS, "How to Complete the National Register Registration Form," *National Register Bulletin 16A* (Washington, D.C.: 1992), 37.

control structures, specifically Calco one-way flap gates, in his design. As such, the Peyton Marsh drainage system is ordinary and utilitarian in nature; it is not an outstanding, nor rare example of its type.

Integrity of the Peyton Marsh Drainage System

The second element of National Register eligibility is the evaluation of the integrity of the resource. The Peyton Marsh drainage system does not appear to retain various aspects of historic integrity to the system's potential period of significance. The potential period of significance for a resource is defined as the "time when the property made the contributions or achieved the character on which significance is based," however, "continued use or activity does not necessarily justify continuing the period of significance." The potential period of significance for this property is 1927-1939, beginning with construction and including the span of time that the property retained its original form and function as a tidal marsh drainage facility installed specifically for mosquito abatement. As noted above, flooding, fire and increased water levels in the marsh in the late 1930s and early 1940s combined to damage the East Levee and gate structure, as well as tax the carrying capacity of the drainage channels and tide gates. The replacement, repairs and alterations necessary to correct the damage resulted in a loss of integrity throughout the drainage system.[43]

Integrity relates to the historical authenticity of a property, measuring the degree to which it retains its original appearance, or its appearance during the potential period of significance. Integrity is measured using seven criteria: location, design, setting, materials, workmanship, feeling and association. In applying these criteria to the Peyton Marsh drainage system, it appears that the system retains the greatest degree of integrity in the realm of location. It does not appear to retain good integrity of setting, feeling, association, materials, design, or workmanship. Each of these integrity considerations will be discussed in turn.[44]

The nature of the setting and feeling of the marsh in general does not create strong ties to the potential period of significance. The various elements of the system are located more or less on their original alignments and the immediate surroundings are somewhat similar to the setting during the period of significance. However, the continual growth of high profile industrial complexes, especially the addition of waste water treatment facilities and large storage tanks on Peyton Hill and at the plants to the south and west have altered the appearance of the surrounding landscape. Interstate 680 has also made an indelible mark on the area with its physical presence and the traffic it carries as it crosses the southern reaches of the marsh. Although the site may be recognizable to someone who knew it in the 1920s and 1930s, these changes indicate a loss of the feeling of the place, or a loss of the historic sense of that time. The loss of this sense of time and place is compounded by alterations at tide gate structure, which is arguably the most character-defining feature of the drainage system. The addition of a pumphouse, utility bridge,

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[43] USDI, NPS, *National Register Bulletin 16A*, 42.

[44] USDI, NPS, "How to Apply the National Register Criteria for Evaluation," *National Register Bulletin 15* (Washington, D.C.: 1991), 44-49.

and waste water containment pond at the location of the gates have adversely affected the setting and feeling of the property.

Integrity of design requires that a property retain the form, plan, space, structure, and style of its original design. To a degree, the major elements of the drainage system retain some integrity of design because the system's components carry out the same general function and functional relationship to each other, i.e., preventing tides from entering the marsh and allow drainage to take place at low tide. For similar reasons, the system retains a moderate degree of integrity of association with its historic function. Two other elements of integrity, materials and workmanship, are closely related to design because the design prescribes the materials, or the physical components of the structure, and workmanship is revealed in the physical evidence of the skill with which those materials were used in the completion of the design. The Peyton Marsh drainage system appears to retain only a moderate degree of integrity of design, materials, or workmanship. Most of the structural elements of the system have been rebuilt since 1939.

The original design intended to allow seasonal runoff to drain to the bay at low tide, but was altered in order to allow the drainage system and gates to carry year-round outflows. The district rebuilt the levee at the location of the old dike at least four times, including the first district levee installation in 1927, and enlarged the drainage channels carrying water through the marsh. Furthermore, when Rhône-Poulenc Basic Chemicals Inc. took over the old Mountain Copper Company property in 1968, the company made changes and additions to both the East Levee and the gate structure over the next few years. Rhône-Poulenc added a pipe cage structure north of the gates to support several pipelines running between the plant and the company's waste water pond east of the gates. This pond was another new addition that altered the original design of the marsh drainage system because a ca. 200 foot-long portion of the levee was used as a containment wall for the waste treatment pond.[45]

The materials, or physical elements used in the drainage system have been altered as well. The box culvert, and possibly the flap gates, were completely rebuilt and replaced in 1940. The district also added a pumphouse and pumping equipment, including a discharge pipe that runs through the levee, to handle the increased discharges into the marsh. This addition changed the design of the outlet and altered the function of the gates, as well as introducing new materials to the gate superstructure. Later, the pump discharge was further altered by the installation of a plastic pipe inside the existing metal pipe. It is possible that neither of the flap gates is of original design. Certainly, the easternmost tide gate, which failed in 1995, has been replaced with another flap gate of the same dimensions, but of different manufacture. Without integrity of materials, the workmanship, or physical evidence of the skill involved in constructing this resource has also been compromised.

[45] George Chin, Engineer, Rhône-Poulenc Basic Chemicals, Inc., and Karl Malamud-Roam, CCMVCD, interviews June 10, 1997.

Findings

In conclusion, the physical attributes of the Peyton Marsh drainage system do not appear to retain a high degree of integrity to their potential period of significance, 1927-1939, when the system was constructed for pest mosquito abatement. The alterations and additions to the property since 1939 increasingly made it an integral part of the industrial plants surrounding it, a system to channel and expel industrial effluents to the bay, and compromised the association of the system with it original purpose. The marsh drainage system, or its component parts individually, do not appear to meet the National Register of Historic Places standards for significance under Criterion A, for significant events, Criterion B, for important persons, or Criterion C, for engineering merits.

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Appendix A:

DPR 523 Form
Peyton Marsh Drainage System

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # ____
HRI # ____
Trinomial ____
NRHP Status Code ____
Other Listings ____
Review Code ____ Reviewer ____ Date ____

 Resource Name or #: (Assigned by recorder) Peyton Marsh Drainage System

P1. **Other Identifier:** Mosquito abatement drainage system, Peyton Marsh (also Shell Marsh)

*P2. Location: ☐ Not for Publication ☒ Unrestricted *a. County Contra Costa
and P2c, P2e, and P2b or P2d. (Attach Location Map as necessary.)
*b. USGS 7.5' Quad Vinehill Date 1980 T 2N ; R 2W ; Secs 8, 16, 17 ; MDBM B.M.
c. Address About 2 miles east of downtown Martinez City Martinez, CA Zip 94553
d. UTM: (Give more than one for large and/or linear resources) Zone: ____ ; ____ mE/ ____ mN
*e. Other Locational Data: (E.g., parcel #, directions to resource, elevation, etc., as appropriate.)

Peyton (Shell) Marsh contains approximately 200 acres and is located east of Interstate 680 just south of the Benicia-Martinez bridge on Interstate 680. The marsh is bounded by Bull's Head Point, Peyton Hill, and Vine Hill.

*P3a. **Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries.)

Please see continutation sheets.

*P3b. Resource Attributes: (See attributes and codes) HP11 (drainage system); HP20 (drainage channels); HP21 (levee)

*P4. Resources Present: ☒ Building ☒ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)

For photos of the various elements of the drainage system, see attachment sheets.

P5b. Description of Photo: (View, date, accession #) Photos taken June 10, 1997, see continuation sheets

***P6. Date Constructed / Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1927

***P7. Owner and Address:**
Rhone-Poulenc Basic Chemicals, Inc.; Wickland Oil Martinez; and others. See P7. on continuation sheets

***P8. Recorded by:** (Name, affiliation, and address)
Meta Bunse Linn, JRP Historical Consulting
1477 Drew Ave, Ste 105
Davis, CA 95616

***P9. Date Recorded:** 6/3/1997

***P10. Survey Type:** (Describe) Intensive Survey

***P11. Report Citation:** (Cite Survey report and other sources, or enter "none.") "Inventory and Evaluation of Peyton Marsh Drainage System," prepared for Contra Costa Mosquito Control District by JRP Historical Consulting Services (June 1997).

*Attachments: ☐ None ☐ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record ☐ Linear Resource Record ☐ Archaeological Record ☐ District Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (List) ____

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

BUILDING, STRUCTURE, AND OBJECT RECORD

Primary # ______
HRI# ______

*NRPH Status Code 6Z

*Resource Name or # (Assigned by recorder) Peyton Marsh Drainage System

B1. Historic Name: Peyton Marsh Drainage System

B2. Common Name: Mosquito abatement drainage system. Peyton Marsh (also Shell Marsh)

B3. Original Use: Drainage for mosquito abatement B4. Present Use: Drainage for mosquito abatement, industrial waste water management and flood control

*B5. Architectural Style: N/A, utilitarian engineering feature

*B6. Construction History: (Construction date, alterations, and date of alternations.)

Please see continuation sheets.

*B7. Moved? ☒No ☐Yes ☐Unknown Date: ______ Original Location: ______

*B8. Related Features:

This resource is a drainage system, and as such consists of three basic elements: 1) a levee; 2) drainage channels; 3) tide gate structure. The elements are physically described on the Primary Record and the history of the system is described in B6, above.

B9a. Architect: Noble M. Stover B9b. Builder: CCMVCD

*B10. Significance: Theme ______ Area ______

Period of Significance ______ Property Type ______ Applicable Criteria ______

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

This resource has been inventoried and evaluated as part of an intensive survey prepared for Contra Costa Mosquito and Vector Control District in June 1997. The survey found that the system appears to be ineligible for the National Register of Historic Places. Please refer to continuation sheets.

B11. Additional Resource Attributes: (List attributes and codes):

*B12. References:

See continuation sheets for footnotes and references.

B13. Remarks:

*B14. Evaluator: Meta Bunse Linn

*Date of Evaluation: June 30, 1997

(This space reserved for official comments.)

(Sketch Map with north arrow required.)

See continuation pages

*Required Information

P3a. Description:

Description of Resource[1]

Peyton Marsh (or Shell Marsh), drained by Peyton Slough, is one hydrologic unit of a band of salt marshes located on the southern shore of Suisun Bay extending from Martinez on the west, to Antioch, at the edge of the Sacramento-San Joaquin Delta, on the east.[2] The marshes on this side of the bay are less expansive than those to the north as they are confined by the steep northern foothills of Mount Diablo. Peyton Marsh fills the low land between two areas of high ground formed by these foothills, Bull's Head Point and Peyton Hill, and extends inland toward the marsh's southern boundary at Vine Hill. The marsh is bisected by the east-west aligned Union Pacific Railroad tracks (and the parallel Waterfront Road) and diagonally by Interstate 680. At one time the 230 acre marsh split into three reaches south of the railroad line, but changes in inflows, drainage, nearby industrial development and construction of Interstate 680 have altered the shape of this part of the marsh and reduced the total marsh area to approximately 200 acres (**Figures 1-2**).[3]

The marsh drainage system includes three main elements: 1) the East Levee; 2) a network of drainage channels; and 3) a tide gate structure (**Figures 2-3**). The East Levee, an earthen levee running between Bull's Head Point and Peyton Hill, crosses the marsh and bisects the area that lies north of the railroad line (**Photograph 1**). The drainage channels consist of a main canal running between the East Levee and to just south of the railroad tracks, and three branch canals that run into the three reaches of the marsh described above (**Photographs 2-3**). As natural runoff and discharged effluent flow into these branch canals in the southernmost marsh areas, the three canals combine to form the single drainage channel just south of the railroad and the flows are carried under the tracks in a culvert. The main drain then heads northwest towards Bull's Head Point where the Rhône-Poulenc Basic Chemicals, Inc. plant dominates the landscape with its tanks and processing equipment. At the East Levee, about one half mile inland, the main drainage channel reaches tide gate structure, the third element of the system (**Photograph 4**), where the water empties into Peyton Slough (**Photograph 5**) during low tide and flows into Suisun Bay.[4]

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[1] The results of this inventory and evaluation are presented on a DPR 523 form that consists of two forms, a Primary Record and a Building, Structure, and Object Record. JRP has not prepared a Linear Feature Record. While the drainage channel elements of the Peyton Marsh system are linear in nature, JRP has inventoried and evaluated the drainage system as a whole because this small system is contained within a single, discrete hydrologic unit. Furthermore, JRP was able to inspect all major elements of the system in the field, eliminating the need to use of comparison point recordations, which would have been necessary for a more extensive linear resource.

[2] Peyton Marsh is also known as Shell Marsh because of Shell Oil Company's long-time presence on the southwestern border of the marsh. The company began building a refinery here in 1914 and leased existing refining facilities from American-Oriental Company near the Mococo railroad station during the construction period. At the same time Shell installed a crude oil pipeline running from Coalinga to its new refinery site, a distance of approximately 175 miles. [*Oil Age* (November 1914), 20; (May 1915), 9, 13; (June 1915), 1; (August 1915), 9; (April 1916), 2.]

[3] Please note that figures and photographs appear at the end of this DPR 523 form, following the references.

[4] Karl Malamud-Roam interview, June 9, 1997.

The tide gates themselves are simple cast iron, top-hinged, one-way flap valves that are attached to the north side of a culvert structure set into the western end of the approximately 1100' long East Levee (**Figure 4** and **Photographs 6-7**). The gates operate automatically in response to the receding tide. When the tide recedes and no longer applies pressure to the outside (north side) of the gate flaps, the gates can open to allow water from the marsh to flow out to the bay. The structure framing the gates consists of a timber and concrete box culvert approximately 21' long, 12' wide and 7' deep. Concrete and timber headwalls (about 12' wide) form the openings on either end of the box culvert and support the flap gates on the north end and a grizzly rack on the south end (**Photograph 4**). A pumphouse sits on the south slope of the levee just to the east of the gate structure (**Photographs 2 and 8**). It houses pumping equipment that sends additional drainage water by way of a pipe that runs through the levee to empty on the north side at a discharge box on Peyton Slough (**Photograph 9**).

Rhône-Poulenc Basic Chemicals, Inc. uses the paved the top of the gate structure as an access road for its waste water treatment area. The company also maintains a utility bridge running parallel with the north side of the levee. This bridge (**Photograph 10**), which is supported by bracing attached in part to the gate structure, carries several pipelines between the plant and its waste water treatment facility east of the slough. The waste water plant consists of two small metal-clad buildings, treatment equipment and a waste water containment pond (**Photographs 11-13**). An approximately 200 foot long portion of the levee, running east from the gate structure, forms the southern side of this pond. The surface of the levee along the pond is dirt, but is maintained as an extension of the asphalt section across the gate structure. Beyond the pond to the east, the levee is overgrown and appears to have deteriorated and subsided causing generally uneven dimensions (**Photograph 1**).[5]

P7. Owner and Address:

Various portions of the Peyton Marsh drainage system are owned by different companies and agencies as follows:

1. A levee section and the culvert/tide gate structure are owned by Rhône-Poulenc Basic Chemicals, Inc., 100 Mococo Road, Martinez, CA 94553.

2. A levee section, channel, and marshlands are owned by Wickland Oil Martinez, 2801 Waterfront Road, Martinez, CA 94553.

3. A culvert is owned by Union Pacific Railroad, north of Waterfront Road, east of Interstate 680, no address.

4. Channels and marshlands owned by Mt. View Sanitary District, East Bay Regional Park District, and the California State Lands Commission, no address.

[5] George Chin, Engineer, Rhône-Poulenc Basic Chemicals, Inc., interview June 10, 1997.

B6. Construction History:

HISTORY OF PEYTON MARSH DRAINAGE SYSTEM

The Development of Mosquito Abatement

According to historian David McCullough, malaria was historically "the world's greatest killer" and a disease that had long been present in the US, but it became a special concern during the construction of the Panama Canal. Although the disease was found all over the world, its name is derived from *mal'aria*, Italian for "bad air," illustrating the long-held belief that the disease was airborne, caused by poisonous fumes from swamps or marshes. This theory appeared to explain why the disease was most prevalent in hot, humid, tropical locations. Several scientists and physicians in these places began to piece together the actual source of the disease during the last decades of the nineteenth century. Among the many individuals who contributed to this effort was Dr. Ronald Ross, an Englishman working in India, who discovered in 1897 that the *Anopheles* mosquito carried the disease, and Dr. William Gorgas, an American army doctor assigned to the Panama Canal Zone during construction of the canal. Gorgas did pioneering work in Panama, studying the life history of the disease-bearing insects and organizing efforts in the construction, living, and hospital areas to control mosquito breeding by drastically reducing their access to standing water.[6]

Malaria did not have as long a history in California as it did in the tropical areas where the research took place. The indigenous Indian tribes of the west coast did not suffer from the disease and malaria did not appear in the state during the time of Spanish and Mexican control, but it did appear after several groups of hunters and explorers passed through the region in the late 1820s and early 1830s. An especially destructive outbreak of malaria in California in 1833 decimated the Indian tribes of the Central Valley. Hudson's Bay trapping parties are specifically believed to have introduced malaria to the region, but as more and more groups of explorers, cattle drovers, traders, and settlers arrived so did new sources of the malarial parasite, ensuring the establishment of the disease in California well before the Gold Rush. Fortune-hunters and immigrants poured into the state during the rush and in the following decades; many new arrivals succumbed to epidemics of the disease that occurred every few years through about 1880. During this period, malaria was so common that it became a largely accepted part of life in California.[7]

Attitudes about the disease began to slowly shift after 1900 with the news of Dr. Ross's discovery and accounts of the construction crews' battles with malaria in the Panama Canal Zone. Historical overviews of malaria in the state note that in the 1800s California communities freely discussed the presence of the disease, but after the turn of the century "there developed a 'chamber of commerce' attitude that malaria was a deterrent to economic development

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[6] David McCullough, *The Path Between the Seas* (New York: Simon and Schuster, 1977), 137-147, 405-426.

[7] Harold F. Gray and Russell E. Fontaine, "A History of Malaria in California," reprinted from the *Proceedings and Papers of the 25th Annual Conference, California Mosquito Control Association* (June 30, 1957), 4-10, 15.

and should not be discussed publicly." What many of these communities did not recognize was that their own development efforts supported the spread of malaria in their own towns. Although the disease appears to have been on the decline beginning about 1880, farmers throughout the Central Valley began to install fairly extensive irrigation systems at this time that brought back localized, and sometimes severe, malaria outbreaks.[8]

Meanwhile, the discoveries of Dr. Ross and Dr. Gorgas between 1897 and 1914 enabled the scientific community to identify methods for controlling mosquitoes and California health officials learned from their efforts. William B. Herms, Assistant Professor of Entomology, University of California College of Agriculture, began to crusade against malaria in California in 1909. At the same time the secretary of the State Board of Health, Dr. William F. Snow, reported on the financial costs of malaria in California and officially supported the idea of community-level mosquito eradication efforts. The state board also began to conduct a field survey to determine the endemic index of malaria in California. Three communities also began privately-funded campaigns against malarial mosquitoes in 1910: Penryn, Oroville, and Bakersfield. Although funding for the projects only lasted a few years, the projects were successful in reducing the number of mosquitoes in those communities. Professor Herms and the scientific community, with the authorship of California State Assemblyman J. H. Guill (Chico), were able to sponsor a bill to create anti-malarial mosquito districts in 1911, but it did not pass.[9]

Local governments hesitated to fund on-going mosquito control projects, so the support for creation of governmental mosquito control eventually came from "real estate developers who were being badly hurt in their pocketbooks by excessive prevalence of salt marsh mosquitoes in areas [like Contra Costa] which had never had malaria." Private efforts to eradicate these pest mosquitoes, which do not carry malaria, in wealthy resort communities in the Bay Area had been established as early as 1903 in San Rafael (Marin County) and in San Mateo and Burlingame (San Mateo County) by 1906. Private donors and land developers, however, could not sustain the level of effort necessary to control the pests. In 1915 the real estate lobby supported legislation similar to Guill's 1911 bill, but this time the act focused on general mosquito eradication. The lobby was successful and the governor approved the Mosquito Abatement District Act on May 29, 1915.[10]

Noble M. Stover was one of the sponsors of the 1915 legislation and contributed to the drafting of the act that enabled local governments to collect taxes to be used for the control of both malarial and pest mosquitoes. Stover, a native of Logan, Utah, graduated from the engineering department of the University of California in 1910 and in 1913 he moved to Burlingame. That same year he helped found the "San Mateo, Burlingame, Hillsborough

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[8] Gray and Fontaine, "A History of Malaria in California," 8-9, 15; California State Board of Health, *24th Biennial Report 1914-1916* (California State Printing Office, 1916), 68.

[9] California State Board of Health, *24th Biennial Report 1914-1916*, 13, 67-68, 86-90; Gray and Fontaine, "A History of Malaria in California," 9, 16-18; "Aims to Wipe Out Mosquito Swamps," San Francisco Chronicle (January 24, 1911), 3:3.

[10] Stanley B. Freeborn, "Mosquito Abatement Districts in California," *Bulletin of California State Board of Health* (April 1918), 455-459; Gray and Fontaine, "A History of Malaria in California," 17-18.

Mosquito Control Committee" demonstrating the local support for pest mosquito control even at a time before the state passed a mosquito district enabling law. Stover served as the district's first engineer/superintendent. When the real estate lobby was ready to support mosquito district legislation in 1915, Stover was an enthusiastic supporter. As he admitted later, in 1926, he found it "gratifying to know that without amendment the act has worked successfully for the past eleven years." Stover became the superintendent of the first district organized under the new law, Marin County Mosquito Abatement District No. 1 (1915), and continued in his position for the San Mateo district when it began operations in early 1916.[11]

Northern California and Central Valley communities were the first to respond to the 1915 act. By the time Contra Costa formed its district in 1926, there were already several mosquito control agencies in the northern coastal, Sacramento Valley and San Joaquin Valley areas. Of the vector control districts that are still in existence today, seven were created before Contra Costa:

Agency & County Name (Same unless noted)	Year Formed
Marin/Sonoma	1915
San Mateo	1916
Kern	1917
Tehama	1917
Shasta	1919
Delta (Tulare County)	1922
Napa	1925

Eight more districts were formed during the late 1920s and 1930s, three in southern California, bringing the total to sixteen in 1940.[12]

Contra Costa County residents living along the southern side of Suisun Bay were the third Bay Area community to initiate a mosquito control agency under the new legislation. Clouds of mosquitoes breeding in the extensive salt marshes between Martinez and Antioch were a substantial nuisance, often forcing the closure of schools, recreational areas and waterfront industries. Although the salt marsh mosquitoes were not malarial, the pests were enough of a problem that real estate sales and general economic development of the region were hampered.

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[11] Gale Jirik, "CCMVCD: 70 Years in the Making," *Mosquito and Vector News and Notes* (Fall-Winter 1996), 1; Stover, "Report to Committee on Organization, Contra Costa County Mosquito Abatement District No. 1," (final submitted March 31, 1927), 2-3; "Noble Stover Taken by Death," *San Mateo Recorder* (September 19, 1935), 1; *San Mateo Recorder* (September 20, 1935), 12.

[12] Mosquito and Vector Control Association of California, "Agency Statistics and Fiscal Data, 1995-1996," *Year Book, 1995-1996* (MVCAC); Freeborn, "Mosquito Abatement Districts in California," 455-459; California State Board of Health, *25th Biennial Report 1916-1918*, 14-15.

Furthermore, mosquito control agencies throughout the state had had general success since the first districts began organizing in 1915 and the two older Bay Area districts provided local examples. By 1926 residents voted to create the Contra Costa County Mosquito Abatement District along with an oversight committee.[13]

The newly formed committee in Contra Costa County asked Noble Stover to propose an abatement strategy. With at least thirteen years of practical experience in the Bay Area, Stover was able to quickly design an overall control program consisting of a series of thirteen drainage projects located between Martinez and Antioch. As he pointed out in his report to the committee, mosquito abatement had "progressed past the experimental stage [to] become a problem of economic entomology combined with the science of drainage practice" because of the efforts, experiences and results obtained by these early districts. Stover also emphasized the importance of pursuing rapid drainage of the marsh areas even though the initial cost might be high.[14]

Stover's proposal for the district consisted of thirteen hydrologically separate drainage systems that would function independently of each other to drain each section of marsh. He lettered the projects beginning with Project A, on Peyton Marsh, and continuing through Project L, east of Antioch. Each project involved cutting dredged drainage channels through the swamped areas to allow water to run freely to the bay instead of forming stagnant pools where mosquitoes could breed. The drains were the most extensive features of the projects, but Stover also included other water control devices, such as culverts, pumps and tide gates in his designs. Some of the projects were solely drainage canals designed to feed into existing natural channels (such as the drains in Project B that fed into Pacheco Creek), while other drains that emptied into the bay required control structures to keep the tide from rising up the newly created drains. Stover specifically called for the use of California Corrugated Culvert Company's (Calco) tide gates and culverts at these locations. He planned to install Calco gates on the following projects within his proposed system: Project A (Peyton Marsh); Project E (Bay Point area); Projects I, J, and K (between McAvoy and Pittsburg); and Project L (near Antioch).[15]

Stover had successfully used Calco products in designing the drainage works of the two other abatement districts where he worked and he recommended the equipment which was in use all over California in various irrigation, reclamation and drainage projects. In fact, Calco was the major fabricator of water control structures in the state during the early decades of the twentieth century and their products can still be found on hundreds of water conveyance systems throughout California. Just before Stover designed the mosquito abatement program for Contra Costa County, he wrote to Calco praising their products; the company printed his January 21, 1926 testimonial in a catalog distributed that year:

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[13] Jirik, "CCMVCD: 70 Years in the Making," 1; Karl Malamud-Roam interview, June 9, 1997.

[14] Stover, "Report to Committee," 1, 6; California Corrugated Culvert Company [Calco], *Solutions for Drainage and Flood Control Problems,* (S.l.: Calco, 1926), 20; CCMVCD, "Minutes of Mosquito Abatement District Committee," April 5, 1927, [hereafter shown as CM, date].

[15] Stover, "Report to Committee," passim and accompanying map.

> Having installed your gates over a period of ten years from 1916 to 1926 in our work of mosquito abatement, I can say that they rank supreme among all other methods of control used by us in the eradication of breeding areas for this pest. When properly installed they work without further attention and I can recommend them as an efficient working device."
> --Marin County Mosquito Abatement District, by N. M. Stover, Supt.[16]

Other testimonials and example projects that appear in this catalog attest to the widespread use of Calco products in the state. Dozens of California water agencies and private entities in the Central Valley and the Bay Area are noted in the 1926 catalog as customers of Calco who had purchased drainage gates and culverts.[17]

The Peyton Marsh and Stover's Proposed Drainage System

Stover focused his proposed abatement program for the committee on the control of a mosquito called *Aedes dorsalis*, which breeds in salt marshes that have little tidal action. He specifically noted that "old reclaimed marsh lands [like Peyton Marsh], where the levees have been abandoned, or insufficient drainage provided, form the worst problem." Culverts installed under roads and railroad spurs also presented a widespread problem in the district because, according to Stover, "one culvert in ten is installed low enough to act properly for the purpose of mosquito abatement." The district committee largely accepted Stover's plan and approved these projects under separate contracts with local dredging companies during the next several years.[18]

Project A, Stover's drainage plan for Peyton Marsh, made use of existing structures as well as providing new drainage works for the area. Some early reclamation work on the marsh predated the abatement district's project, but it is not known who installed the first levee between Peyton Hill and Bull's Head Point. The San Pablo (also San Francisco) and Tulare Railroad laid its tracks through the area in the mid-1880s and sold out to Southern Pacific in 1889. US coastal maps do not indicate that there was a levee or any high ground between Peyton Hill and Bull's Head Point during this time, but by 1896 the US Geological Survey did record a narrow strip of high ground at the approximate location of the modern tide gate levee (**Figure 5**). This suggests two possible scenarios for the ca. 1890s construction of this early levee: 1) the railroad may have experienced flooding at high tide and put in the levee as a flood protection device; or 2) the Mountain Copper Company (Mococo), which began operating a refining and manufacturing plant on Bull's Head Point in the late 1890s, put in the low dam to protect its factory site.[19]

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[16] Calco, *Solutions for Drainage and Flood Control Problems*, 20; Stover, "Report to Committee," 10.

[17] Calco, *Solutions for Drainage and Flood Control Problems*, passim.

[18] Stover, "Report to Committee," 3-4, 8; CM, May 19, 1927; CM, November 10, 1927; CM, February 15, 1928; CM, September 17, 1928; CM, February 20, 1929; CM, October 29, 1929.

[19] US Geological Survey, *Carquinez*, Topographic Quadrangle, 15' series, surveyed in 1896 (Washington, D.C.: GPO. 1901); US Coast and Geodetic Survey, *Suisun Bay, California*, triangulation 1864 and 1866, topography 1856 and 1866,

Stover described Peyton Marsh, the area between Bull's Head Point and Peyton Hill, in 1926 as "probably the most extensive breeding ground" of mosquitoes in the proposed district. Drainage of the marsh was established as the district's first priority, in part because it posed the greatest problem, but also because its was closest to the growing town and industrial center of Martinez, the largest of the towns on the south side of Suisun Bay. The area was poorly drained and had substantial amounts of standing water where the insects bred. Some small culverts under the highway and railroad tracks provided localized drainage, however, much of the area had no outlet to the bay. The eastern reach of the marsh was completely closed off by the railroad embankment. Stover also reported that the old, deteriorating levee running from Peyton Hill to Bull's Head let high tides into the marsh, but obstructed drainage from the marsh into the bay. He described this feature as follows:

> Extending from Peyton Hill west runs the remains of an old levee, which apparently connected with Bull Head. This levee has been abandoned and only a low embankment remains. No flood gates are to be found and the result is that the levee acts as an artificial barrier to the rapid runoff at low tide of all of the marsh land to the south.[20]

Stover's recommendation for drainage of Peyton Marsh included three key elements: the re-building of the old levee; installation of a network of drainage channels; and installation of a tide gate structure at the western end of the rebuilt levee (**Figure 6**). The new higher levee would be about 1,500 feet long and follow the alignment of the older dike. Stover's designs called for dredging an 18 foot-wide, 4.5 foot deep, 1,000 yard long channel from the gates southeastward to the culvert under the railroad. South of the railroad, the channel would be dredged to branch into the three reaches of the marsh. Finally, one-way flap-type tide gates installed at in the new levee would allow water in the marsh to flow through the drains and out to the bay at low tide and close at high tide to prevent re-flooding of the area. Stover specified that the tide gates in the levee across Peyton Slough would consist of two Model 100 California Corrugated Culvert Company (Calco) 60-inch diameter automatic drainage gates. The gates came attached to 35 feet of corrugated metal culvert. A concrete and timber box structure set into the levee framed the gate-culvert elements, which Stover estimated could carry 500 cfs of drainage water at low tide.[21]

Contra Costa Mosquito Abatement District No. 1 accepted Stover's marsh drainage plan at its first meeting on March 31, 1927 and its committee members offered him the job of district supervisor. Stover had worked with a man named Ernest Campbell on other projects and recommended that the district hire Campbell as well. Stover

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hydrography 1866 and 1867, corrected to 1889 (Washington, D.C.: GPO, 1889); Southern Pacific Railroad Company, Station Plats, "Amorco, Mococo, and Peyton," California State Archives; Mountain Copper Company collection, Bancroft Library, UC Berkeley.

[20] Stover, "Report to Committee," 9; see also CCMVCD, Fiscal Report, 1942/1943, p. 9, unnumbered textual report [hereafter CCMVCD Fiscal Reports will appear as FR, date.]

[21] Stover, "Report to Committee," 9-10; FR 11/1/1927-2/15/1928, p. 3.

served as superintendent of the district from 1927 through his death in September 1935, while Campbell was the district's first employee. Campbell succeeded Stover as supervisor in 1935.[22]

Construction, Maintenance and Operation History of Peyton Marsh Drainage System

The district committee approved an appropriation of $5,000 for the Peyton Marsh drainage project (Project A) at its first meeting in March 1927, in addition to funding Project B (west of Avon) and Project K (west of Pittsburg). They accepted the Dutton Dredging Company's bid on Project A, for $4,480, on May 19, 1927.[23]

As of November 1, 1927, the district had spent the allotted amount on Project A. The expenditure included re-building the levee, excavating a 27 foot wide, six foot deep canal from the new levee southeast to the Southern Pacific railroad trestle, as well as dredging 18 foot wide branching channels south of the railroad alignment.[24] District Superintendent Stover reported that the Peyton gates "worked perfectly all summer long" the first season after installation, but added that he had arranged for the Dutton Dredge Company to reinforce the levee at the Peyton gates because the structure had settled. The company deepened the main channel somewhat and re-dredged areas that had caved in, except around the new railroad culvert which was too wet to work until summer. Because the tide gates worked so well in keeping the frontage road from flooding during the winter, the district received "some very favorable acknowledgment of the drainage work done on this particular portion of marsh land." Before the district's work on Peyton Marsh the frontage road connecting the town of Martinez to other south shore Suisun Bay communities to the east was regularly flooded in winter.[25]

District records, including Stover's proposal for the drainage projects and fiscal reports to the committee, do not contain detailed as-built information on the Peyton Slough tide gate structure. However, the gates were comparable to gates installed for Project K, in the West Pittsburg area. In late 1927 Stover described the Pittsburg gates as "similar in design to the Peyton gate, the only change being that the concrete wing walls were extended farther into the levee and the retaining wall above the gate being considerable higher." The West Pittsburg gate flood box was 13 feet wide and 30 feet long, containing two 60" Calco automatic tide gates that were set in a 4 foot wide concrete block. The block extended two feet below the box to join with two rows of redwood crab fencing. Examples of Calco gates from their 1926 catalog appear in **Figure 7**.[26]

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[22] CM, March 31, 1927, April 5, 1927; May 19, 1927; FR 6/11/1934-6/19/1935; FR 1936/1937; FR 1948/1949; "Noble Stover Taken by Death," *San Mateo Recorder* (September 19, 1935), 1.

[23] CM, March 31, 1927; April 5, 1927; May 19, 1927.

[24] FR 8/1-11/1/1927, p. 2, 7-8. Southern Pacific soon replaced the trestle referred to in this fiscal report. The present concrete box culvert has the date 1928 stamped in the head wall.

[25] FR 11/1/1927-2/15/1928, p. 3, 12-13; FR 1944/1945, p. 16; FR 1945/1946, p. 15.

[26] FR 8/1-11/1/1927, p. 3. Although Stover's design for the Peyton gate structure called for Calco flap gates attached to a length of corrugated metal culvert, this is the only reference to the culvert portion of the equipment. All other

Fiscal reports of the abatement district contain multiple references to recurring maintenance on Project A in the Peyton Marsh. On at least five occasions between 1929 and 1956, the district performed extensive cleaning, dredging and enlarging of the drainage channels south of the tide gates.[27] The abatement district was especially diligent in cleaning and dredging Peyton Slough from the gates to the bay. In his 1929/1930 fiscal report, Stover explained that "there is a continual depositing of silt in this channel through the summer months, and it is necessary to remove this in order to allow the gate to flow down to the bottom." Ten years later Superintendent Campbell noted that Peyton Slough, "from the tide gate to deep water has had to be de-silted with floating dredge every two years." As early as 1935 Stover suggested moving the Peyton gates closer to the bay to eliminate the need for dredging the slough every spring, however, the district never followed up on this proposal. Stover's successor, Ernest Campbell, noted that dredging Peyton Slough continued to be the regular practice for this area during the 1940s, even though he also supported the idea of moving the gates closer to the bay to eliminate the need for this work.[28]

Disking and plowing of Peyton Marsh was another routine district task. Low spots that held standing water for long periods and dry cracked earth that held water in each fissure created ideal breeding areas for mosquitoes, so the district often hired local farmers to plow large portions of the marsh in the summer. Through 1950 the district superintendent reported work of this kind about every two years. Local ranchers grazed cattle in other parts of the marsh where seasonal pastures developed. Until the early 1950s cattle grazing kept marsh plant growth in check in the area south of the railroad line, but Campbell reported that the district had to increase disking and plowing in the area for fire protection after the cattle were removed.[29]

In addition to the annual or biennial maintenance and operation work on the project, the district initiated more substantial changes to the Peyton Marsh drainage system during the 1940s as industry expanded east of Martinez encroaching on the marsh. Natural disasters, flooding in 1938 and a fire in 1939, along with increased marsh inflows and drainage outflows made changes to the major elements of the system necessary. Higher than normal tides flooded the levee in 1938 and certainly eroded the levee to some degree. The high water in the marsh exceeded the capacity of the Peyton gates, and the backed-up water washed over the frontage road for the first time in ten

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references to the Peyton gates and the similar structure near West Pittsburg describe concrete and timber box culverts being inserted into the levee and used in conjunction with flap gates without metal culverts. The box culvert was weighted down by back filling and by attaching it to concrete headers and wing walls at each end. See also FR 1939/1940, p. 11-12.

[27] FR 9/17/1928-2/20/1929, p. 8; FR 1939/1940, p. 5; FR 1942/1943, p. 9; FR 1947/1948, p. 11; FR 1955/1956, p. 7.

[28] FR 10/29/1929-4/3/1930, p. 5-6; FR 6/19/1933-6/11/1934, p. 10; 6/11/1934-6/19/1935, p. 11-12; FR 1936/1937; FR 1938/1939, p. 10-11; FR 1940/1941, p. 19-20; 1941/1942, 18; FR 1942/1943, p. 9, unnumbered textual report.; FR 1945/1946, p. 14-15.

[29] FR 5/28/1931-2/23/1932, p. 4-5; 6/11/1934-6/19/1935, p. 18; FR 1938-1939, 15; FR 1939/1940, p. 10; FR 1941/1942, p. 10-12, 22; FR 1942/1943, p. 8-9, 13; FR 1946/1947, p. 16; FR 1947/1948, p. 9; FR 1949/1950, p. 23, 27-28; FR 1950/1951, p. 20-22; FR 1951/1952, p. 18; FR 1952, p. 18; FR 1954/1955, p. 1.

years. The following year a substantial portion of the levee burned in a peat fire. The flood and fire damage had damaged the gate structure enough that the box culvert had to be replaced. Because the superintendent did not submit an expense report for new gates, the district may have salvaged the original gates.[30]

In the 1939/1940 fiscal year the district repaired the flood and fire damage by rebuilding the Peyton Marsh levee and replacing the timber balance box on the Peyton gates. The superintendent described the contract work done on the levee with a dragline dredger as follows:

> In 1939 the levee was burned including some peat of which it is partly composed. Levels on the levee in the fall of 1939 showed about half of the approximately 1,200 lineal feet to be below the high water of 1938. With the lowest portion reduced to ashes this was a bad condition. The levee was entirely rebuilt and now is in excellent condition.[31]

The superintendent's reports of the early 1940s also noted increasing industrial effluents and a reduction in the quality of water discharged into Peyton Marsh by local industry. The district placed primary blame on Pacific Gas & Electric Company's plant at the Shell Oil Company site on the southwest of the marsh. PG&E started operations at this steam generator in about 1941, discharging 200 gpm of waste water into Peyton Marsh year round into the channel near the Mountain View Sanitary District's (MVSD) sewer discharge line. The increased effluent from PG&E and MVSD caused the water level of the whole southern part of the marsh to rise. Whereas the marsh had previously dried up each summer, now the constant flows of industrial waste water through the Peyton system created different problems. The constant supply of water caused rapid growth of tules and other water plants that clogged and slowed the drainage system and allowed more rapid settling of solids. This accumulation of vegetation and silt would require significant dredging efforts. Furthermore, the PG&E waste water deteriorated water quality enough to kill the mosquito fish planted by the district.[32]

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[30] FR, Special meeting March 1, 1938, passim and photographs. There is some physical evidence, however, that suggests the gates may have been replaced. Photographs of the Calco Model No. 100 flap gate appear in the company's 1926 catalog mentioned earlier (**Figure 7**). The photographs of this gate, and others in the catalog, indicate that it was standard practice for Calco to cast their products with raised letters, "CALCO." The examples in the catalog all show this mark and often the model number on the face of the gates. Neither of the modern flap gates bear this identifying stamp. One of the gates, installed in 1995, carries the "HYDRO" in raised letters. The other gate does not bear any raised letters on its face. If the original installation used Calco gates as per Stover's design, this evidence suggests that the gates may have both replaced between 1927 and 1995, perhaps when the structure was rebuilt in 1940.

[31] FR 1939/1940, p. 11-12; see also FR 1942/1943, p. 9. unnumbered textual report.

[32] FR 1942/1943, unnumbered textual report; FR 1941/1942, p. 10-12, 22. Changes in the water levels in the marsh beginning in the 1940s were also due in part to the success of the district's drainage system itself. By allowing standing water to drain off and the marsh land to dry out, parts of the marsh, especially south of the railroad tracks began to subside. This part of the marsh may have lowered about four to five feet, causing discharged water and natural runoff to tend to collect in the area (Personal communication with Karl Malamud-Roam, June 23, 1997).

Because the tules in the Peyton drains threatened to completely clog the system by the beginning of summer in 1942, Superintendent Campbell thoroughly dredged and cleaned it, even removing tule tubers by hand labor. This type of work had not been necessary (even during wet years) during the preceding decade because the Peyton drainage channels had gone dry each summer. The district was not immediately able to convince PG&E that it should bear the cost of this work. By the time that the district cleaned and dredged the Peyton Marsh channels in 1947-1948, PG&E had agreed to pay half the cost. The company recognized that silt accumulation in these channels was caused by their discharges, but still would not admit that the increased volume of water in the drainage canals could be attributed to their plant alone.[33]

The Mountain View Sanitary District had been discharging into the marsh from its plant south of the railroad along the central reach well before PG&E. Its outflows also increased during the 1940s. In 1923 MVSD was established to serve the unincorporated area east of Martinez. The initial sewer system was a large septic tank. As population increased up to and through World War II, the plant began discharging effluent into "an old broad slough [in the Peyton Marsh] that meandered east and emptied into the main drain canal near the highway." Continuing post-war growth increased the amount of effluent discharged from the sanitation plant. By 1951 the sanitary district installed primary sewage treatment units which discharged continuously into Peyton Slough. Superintendent Campbell noted that if the sanitary district expanded operations, the increases in effluent would require installation of a pump at the Peyton Slough gates to increase discharge capacity at this choke point.[34]

In response to the increased flows into the marsh, the district worked to adapt the Peyton Marsh drainage system to handle the additional water. The district enlarged the main drainage channel south of the tide gates from 27 feet to 30 feet wide in 1942/1943, but the capacity of the tide gates themselves was not increased. During the 1949/1950 fiscal year Campbell supervised the installation of five redwood box culverts (measuring 12" x 20" inside and 20' long) in the marsh to better manage water flows. At this time the district also deepened the 18 foot wide Peyton Marsh drainage canals south of the railroad line, as well as performing routine dredging and cleaning in the channels. Campbell noted that the deepening was necessary to carrying the increased volume of water and to discourage the growth of tules. Again, the gates were not enlarged. Beginning in 1951/1952 the district decided to drain the far southern reaches of the Peyton Marsh with a redwood diversion box with flap gates in lieu of building and tearing down a low earthen dam at this location each season as had been the practice since the start of increased discharges into the marsh a decade before. Campbell emphasized that the district had made all possible improvements to the Peyton Marsh drainage system and that with any higher inflow "a pumping plant will be necessary to pump said water over the levee."[35]

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[33] FR 1942/1943, unnumbered textual report; FR 1947/1948, p. 11.

[34] FR 1952/1953, p. 8; Roam, Peyton Marsh History, typescript, 1997; FR 1941/1942, p. 10-12, 22; FR 1951/1952, p. 11, 14-15.

[35] FR 8/1-11/1/1927, p. 2, 7-8; FR 1942/1943, 9; FR 1944/1945, p. 16; FR 1949/1950, p. 20, 23; FR 1950/1951, p. 21-22; FR 1951/1952, p. 11, 14-15.

General changes to the project continued. In 1952 the district raised the entire levee between the Mountain Copper Company and Peyton Hill, altering the feature for the third time (the first two changes were the district installation of a new levee over the old dike in 1927 and the district's reconstruction work done after the 1939 fire). District contractors also installed a ditch in the marsh to handle the effluent from the new Mountain View Sanitary District treatment plant in 1953. This new ditch carried waste water to the main Peyton Marsh drain canal. Its alignment required the installation of a new culvert feeding into the main canal for draining an area isolated by the new ditch construction. Even though Campbell had recommended adding a pumping station at the tide gates when MVSD expanded, the abatement district did not immediately do so. Other work during that year included improving the access road along the main canal, repairs to the marsh diversion box and addition of a new timber culvert in a small Peyton Marsh drain. By the 1954/1955 fiscal year the Mountain Copper-Peyton Hill levee required raising a fourth time and a washout caused by muskrat digging near the tide gate required backfilling in 1956.[36]

Ongoing district operations and the Interstate 680 construction project continued to alter the Peyton Marsh drainage system during the 1960s. In 1958 B. F. Floyd made soundings to produce a profile of Peyton Slough between the gates and the bay, possibly in preparation for installing a pump at the gates or studying the feasibility of moving the tide gates closer to the bay. Although suggested at least twice over the years, the district never proceeded with plans to move the gates. The district did, however, install a 3,000 gpm capacity pump to expel excess discharges from the marsh that could not be handled through the tide gates alone by the 1960s. The pumping equipment was housed in a corrugated metal shelter on the south side of the levee and a 12" diameter metal discharge pipe was inserted through the levee to discharge on the north side just east of the tide gates.[37]

Between 1960 and 1962, the Department of Transportation built Interstate 680 through the area, including the stretch of highway transecting the southwestern edge of Peyton Marsh. Highway construction involved significant filling of the marsh. The central Peyton drain canal was also re-routed for this project, creating a perpendicular undercrossing through a large concrete culvert beneath the interstate.[38]

Recent work on the Peyton Marsh drainage system includes dredging the slough from the gates to the bay in 1988 and installation of a new timber grizzly, or trash grate at the south side of the gate structure. The pump discharge pipe rusted through, so the district has also recently placed a 10" diameter plastic pipe inside the old metal pipe to

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[36] FR 1951/1952, p. 18; FR 1952/1953, p. 5, 8-9; FR 1954/1955; FR 1956/1957, p. 8.

[37] FR 1957/1958, p. 4; Aerial photographs, July 18, 1960, Mountain Copper Company collection, Bancroft Library, UC Berkeley.

[38] Roam, Peyton Marsh History, 1997; Raymond Forsyth and Joseph Hagwood, *One Hundred Years of Progress: A Photographic Essay on the Development of the California Transportation System* (Sacramento: California Transportation Foundation, 1996), 107, 110; Aerial photographs, July 18, 1960, Mountain Copper Company collection, Bancroft Library, UC Berkeley.

stop water losses between the pump and the discharge point. Furthermore, the easternmost tide gate failed in 1995 and the district replaced it with a similar 60" flap gate bearing the "HYDRO" manufacturers mark.[39]

B10. Significance:

SIGNIFICANCE AND EVALUATION OF PEYTON MARSH DRAINAGE SYSTEM

The National Register of Historic Places requires that a historic resource be determined eligible by meeting at least one of the following four criteria:

Criterion A: Properties associated with events that have made a significant contribution to the broad patterns of our history.

Criterion B: Properties that are associated with the lives of persons significant in our past.

Criterion C: Properties that embody the distinctive characteristics of a type, period, or method of construction.

Criterion D: Properties that have yielded, or may be likely to yield, information important in prehistory or history. *[This category is largely applied to archeological sites and, therefore, will not be used in the evaluation of this resource.]*[40]

The Peyton Marsh drainage system, as stated previously, consists of three basic elements: 1) the East Levee; 2) a network of drainage channels; and 3) a tide gate structure. These elements do not appear to meet the four criteria for significance, and therefore, the system does not appear to be eligible for the National Register under the historical significance criteria alone. Furthermore, the drainage system has lost integrity and does not appear to retain enough of its original form and function to support historical significance. The specific significance and integrity issues for this resource are discussed below.

Significance of Peyton Marsh Drainage System

The scientific understanding of malaria and its transmission, along with the development of malarial and pest mosquito control districts are important trends in the history of California's public health policies. The abatements program also testifies to the influence of land development interests in the state who saw mosquito control as a

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[39] Karl Malamud-Roam, interviews June 9 and 10, 1997.

[40] USDI, NPS, "How to Complete the National Register Registration Form," *National Register Bulletin 16A* (Washington, D.C.: 1992), 37.

nuisance abatement program that converted waste land into development opportunities and increased property values. The Peyton Marsh drainage system is not an unusual or outstanding example of pest mosquito control or marsh drainage engineering. While the drainage of marsh lands along the bay opened the immediate area to additional industrial development and improved seasonal road access through the region, the works do not appear to have important association with significant events or persons in the history of Contra Costa County or the state. The drainage system does not represent a distinctive example of engineering techniques, nor does this system make a significant or unique contribution to engineering or marsh drainage technology. This is especially true in the California context where some of the greatest reclamation work in the world was carried out in the Sacramento Valley and the Sacramento-San Joaquin Delta.

Nor is the reclamation work at Peyton Marsh an example of the work of a distinguished engineer or leader in the field of mosquito abatement science. Noble Stover, the system's designer, managed three mosquito abatement districts over his 20 year career in the field, but he did not contribute significantly to the field of pest abatement engineering. He designed the Peyton Marsh drainage system by applying well-known and tested engineering and drainage methods within the context of mosquito abatement and used widely available and widely used water control structures, specifically Calco one-way flap gates, in his design. As such, the Peyton Marsh drainage system is ordinary and utilitarian in nature; it is not an outstanding, nor rare example of its type.

Integrity of the Peyton Marsh Drainage System

The second element of National Register eligibility is the evaluation of the integrity of the resource. The Peyton Marsh drainage system does not appear to retain various aspects of historic integrity to the system's potential period of significance. The potential period of significance for a resource is defined as the "time when the property made the contributions or achieved the character on which significance is based," however, "continued use or activity does not necessarily justify continuing the period of significance." The potential period of significance for this property is 1927-1939, beginning with construction and including the span of time that the property retained its original form and function as a tidal marsh drainage facility installed specifically for mosquito abatement. As noted above, flooding, fire and increased water levels in the marsh in the late 1930s and early 1940s combined to damage the East Levee and gate structure, as well as tax the carrying capacity of the drainage channels and tide gates. The replacement, repairs and alterations necessary to correct the damage resulted in a loss of integrity throughout the drainage system.[41]

Integrity relates to the historical authenticity of a property, measuring the degree to which it retains its original appearance, or its appearance during the potential period of significance. Integrity is measured using seven criteria: location, design, setting, materials, workmanship, feeling and association. In applying these criteria to the Peyton Marsh drainage system, it appears that the system retains the greatest degree of integrity in the realm of location.

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[41] USDI, NPS, *National Register Bulletin 16A*, 42.

It does not appear to retain good integrity of setting, feeling, association, materials, design, or workmanship. Each of these integrity considerations will be discussed in turn.[42]

The nature of the setting and feeling of the marsh in general does not create strong ties to the potential period of significance. The various elements of the system are located more or less on their original alignments and the immediate surroundings are somewhat similar to the setting during the period of significance. However, the continual growth of high profile industrial complexes, especially the addition of waste water treatment facilities and large storage tanks on Peyton Hill and at the plants to the south and west have altered the appearance of the surrounding landscape. Interstate 680 has also made an indelible mark on the area with its physical presence and the traffic it carries as it crosses the southern reaches of the marsh. Although the site may be recognizable to someone who knew it in the 1920s and 1930s, these changes indicate a loss of the feeling of the place, or a loss of the historic sense of that time. The loss of this sense of time and place is compounded by alterations at tide gate structure, which is arguably the most character-defining feature of the drainage system. The addition of a pumphouse, utility bridge, and waste water containment pond at the location of the gates have adversely affected the setting and feeling of the property.

Integrity of design requires that a property retain the form, plan, space, structure, and style of its original design. To a degree, the major elements of the drainage system retain some integrity of design because the system's components carry out the same general function and functional relationship to each other, i.e., preventing tides from entering the marsh and allow drainage to take place at low tide. For similar reasons, the system retains a moderate degree of integrity of association with its historic function. Two other elements of integrity, materials and workmanship, are closely related to design because the design prescribes the materials, or the physical components of the structure, and workmanship is revealed in the physical evidence of the skill with which those materials were used in the completion of the design. The Peyton Marsh drainage system appears to retain only a moderate degree of integrity of design, materials, or workmanship. Most of the structural elements of the system have been rebuilt since 1939.

The original design intended to allow seasonal runoff to drain to the bay at low tide, but was altered in order to allow the drainage system and gates to carry year-round outflows. The district rebuilt the levee at the location of the old dike at least four times, including the first district levee installation in 1927, and enlarged the drainage channels carrying water through the marsh. Furthermore, when Rhône-Poulenc Basic Chemicals Inc. took over the old Mountain Copper Company property in 1968, the company made changes and additions to both the East Levee and the gate structure over the next few years. Rhône-Poulenc added a pipe cage structure north of the gates to support several pipelines running between the plant and the company's waste water pond east of the gates. This pond was

[42] USDI, NPS, "How to Apply the National Register Criteria for Evaluation," *National Register Bulletin 15* (Washington, D.C.: 1991), 44-49.

another new addition that altered the original design of the marsh drainage system because a ca. 200 foot-long portion of the levee was used as a containment wall for the waste treatment pond.[43]

The materials, or physical elements used in the drainage system have been altered as well. The box culvert, and possibly the flap gates, were completely rebuilt and replaced in 1940. The district also added a pumphouse and pumping equipment, including a discharge pipe that runs through the levee, to handle the increased discharges into the marsh. This addition changed the design of the outlet and altered the function of the gates, as well as introducing new materials to the gate superstructure. Later, the pump discharge was further altered by the installation of a plastic pipe inside the existing metal pipe. It is possible that neither of the flap gates is of original design. Certainly, the easternmost tide gate, which failed in 1995, has been replaced with another flap gate of the same dimensions, but of different manufacture. Without integrity of materials, the workmanship, or physical evidence of the skill involved in constructing this resource has also been compromised.

Findings

In conclusion, the physical attributes of the Peyton Marsh drainage system do not appear to retain a high degree of integrity to their potential period of significance, 1927-1939, when the system was constructed for pest mosquito abatement. The alterations and additions to the property since 1939 increasingly made it an integral part of the industrial plants surrounding it, a system to channel and expel industrial effluents to the bay, and compromised the association of the system with it original purpose. The marsh drainage system, or its component parts individually, do not appear to meet the National Register of Historic Places standards for significance under Criterion A, for significant events, Criterion B, for important persons, or Criterion C, for engineering merits.

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CONTINUATION SHEET

Primary #
HRI#
Trinomial

 *Resource Name of # (Assigned by recorder) Peyton Marsh Drainage System

*Recorded by Meta Bunse Linn *Date 06/30/1997 ☒ Continuation ☐ Update

Figure 1: General Location, Martinez, California

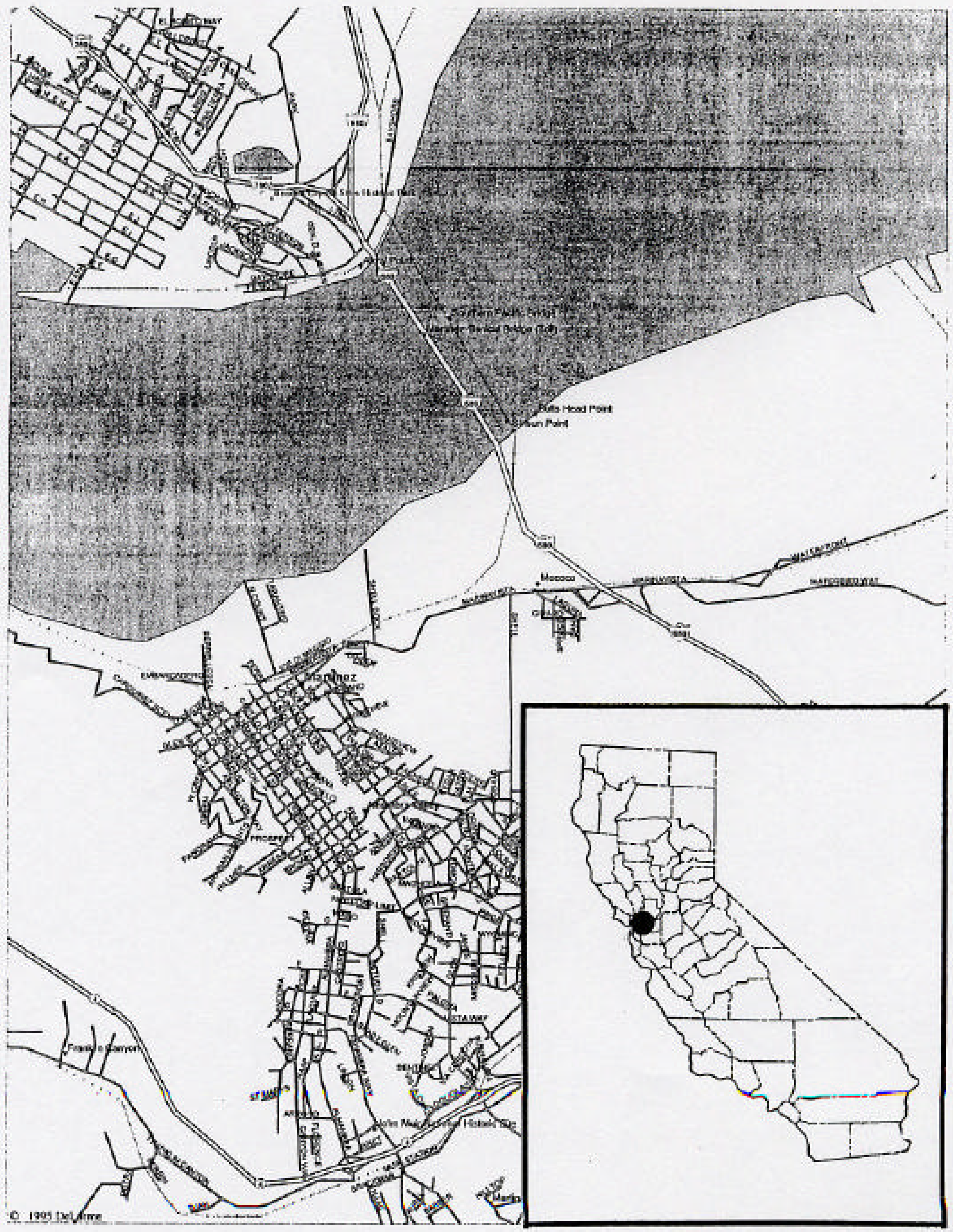

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Figure 2: Peyton Marsh Drainage System Vicinity Map

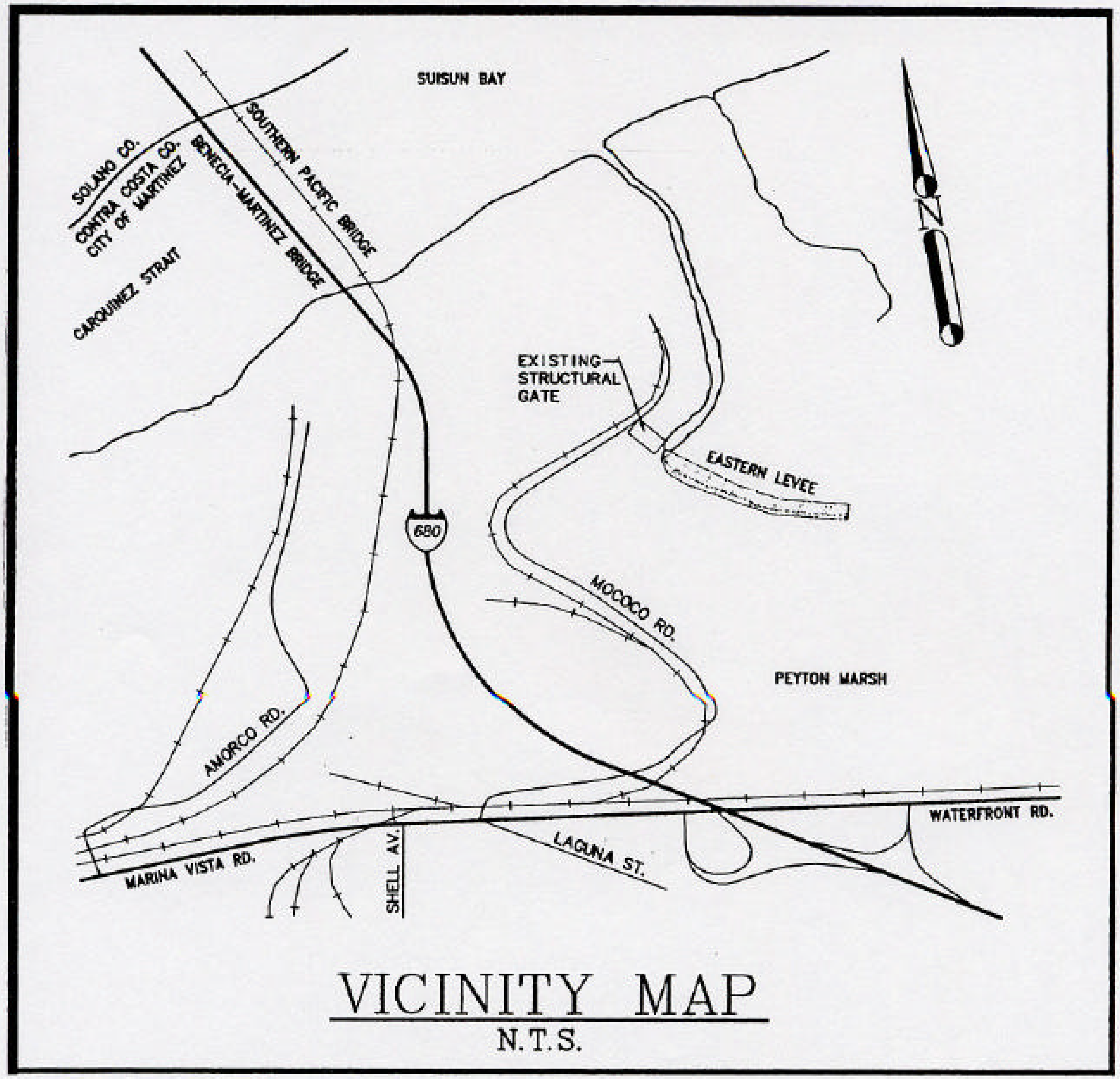

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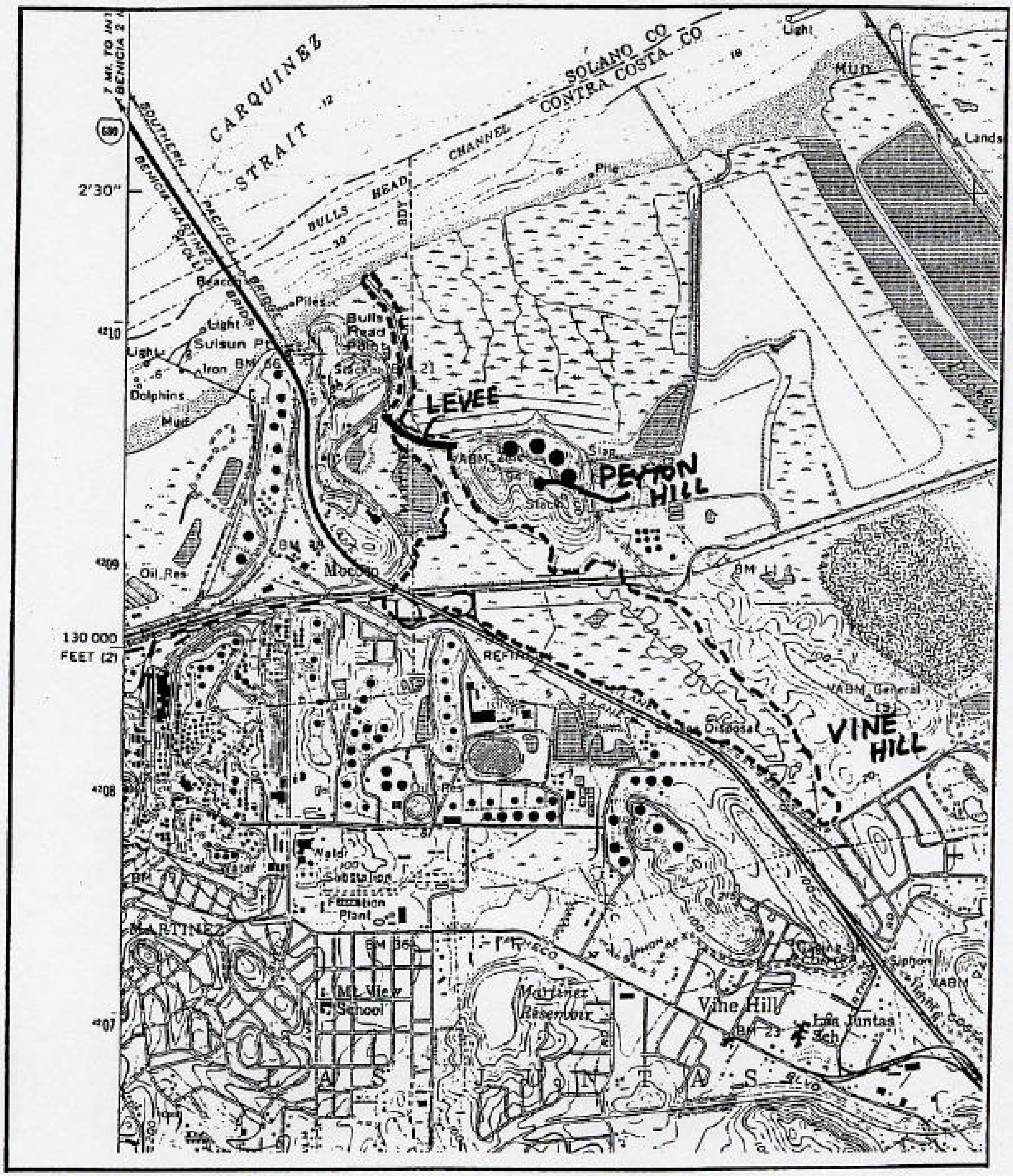
Figure 3: Approximate Boundary of Peyton Marsh



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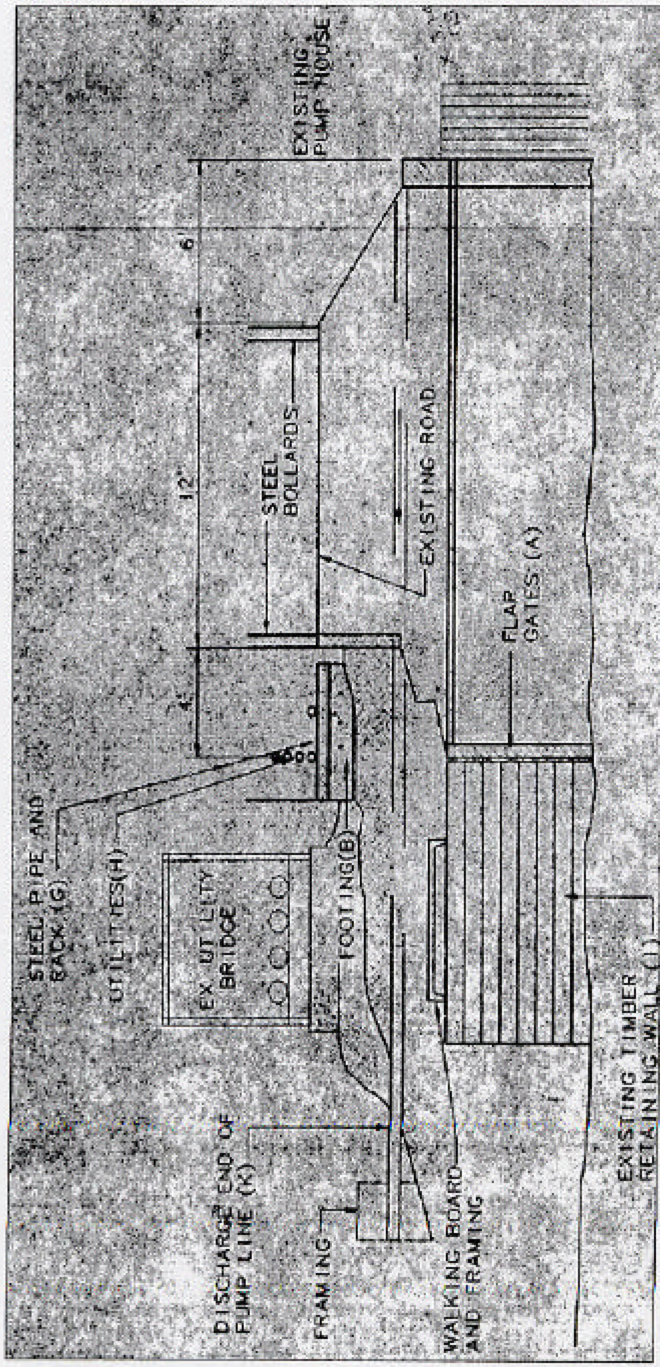

Figure 4: Peyton Marsh Tide Gate Structure

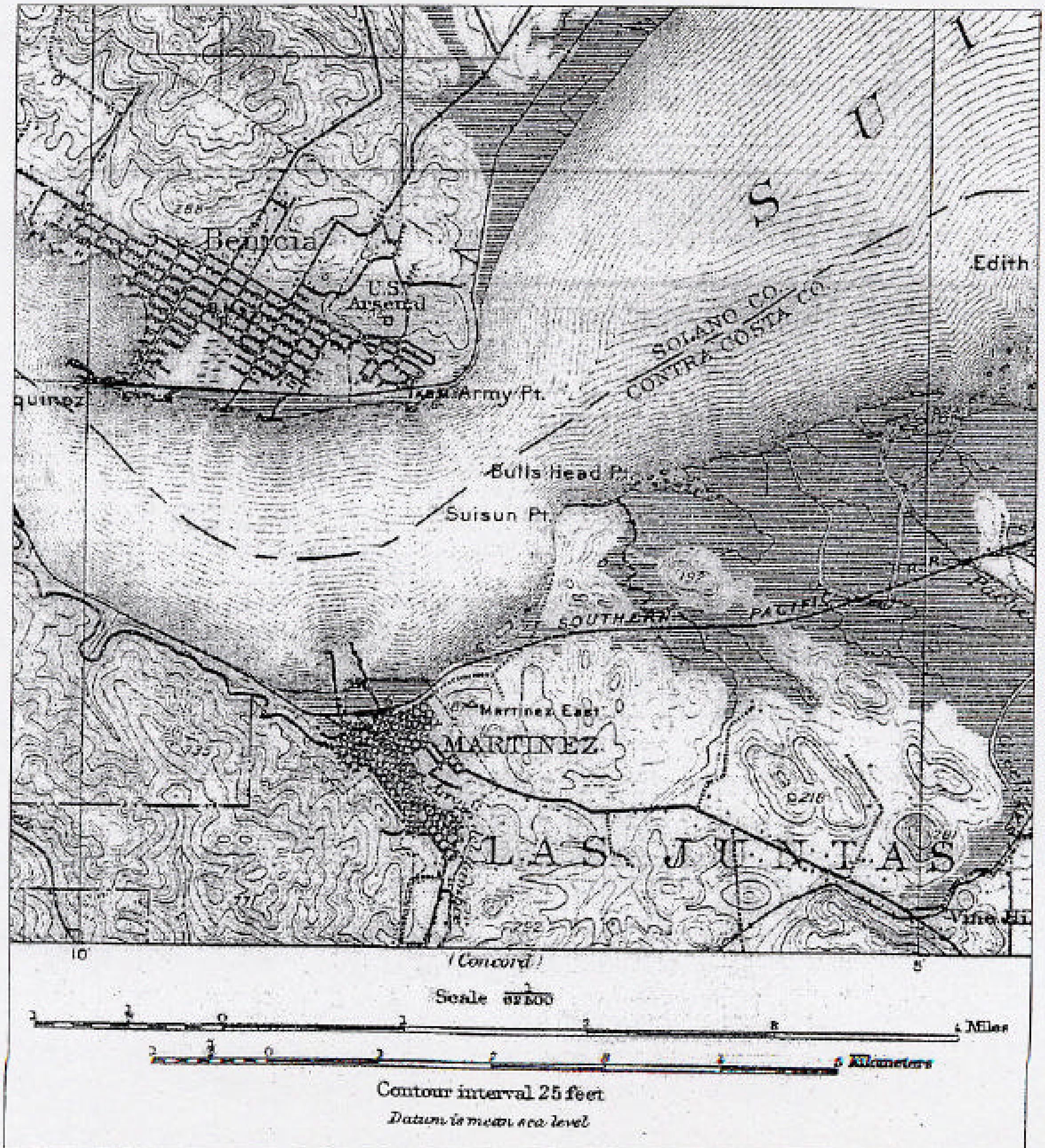

Figure 5: USGS, *Carquinez Quadrangle*, surveyed 1896, edition of July 1901.

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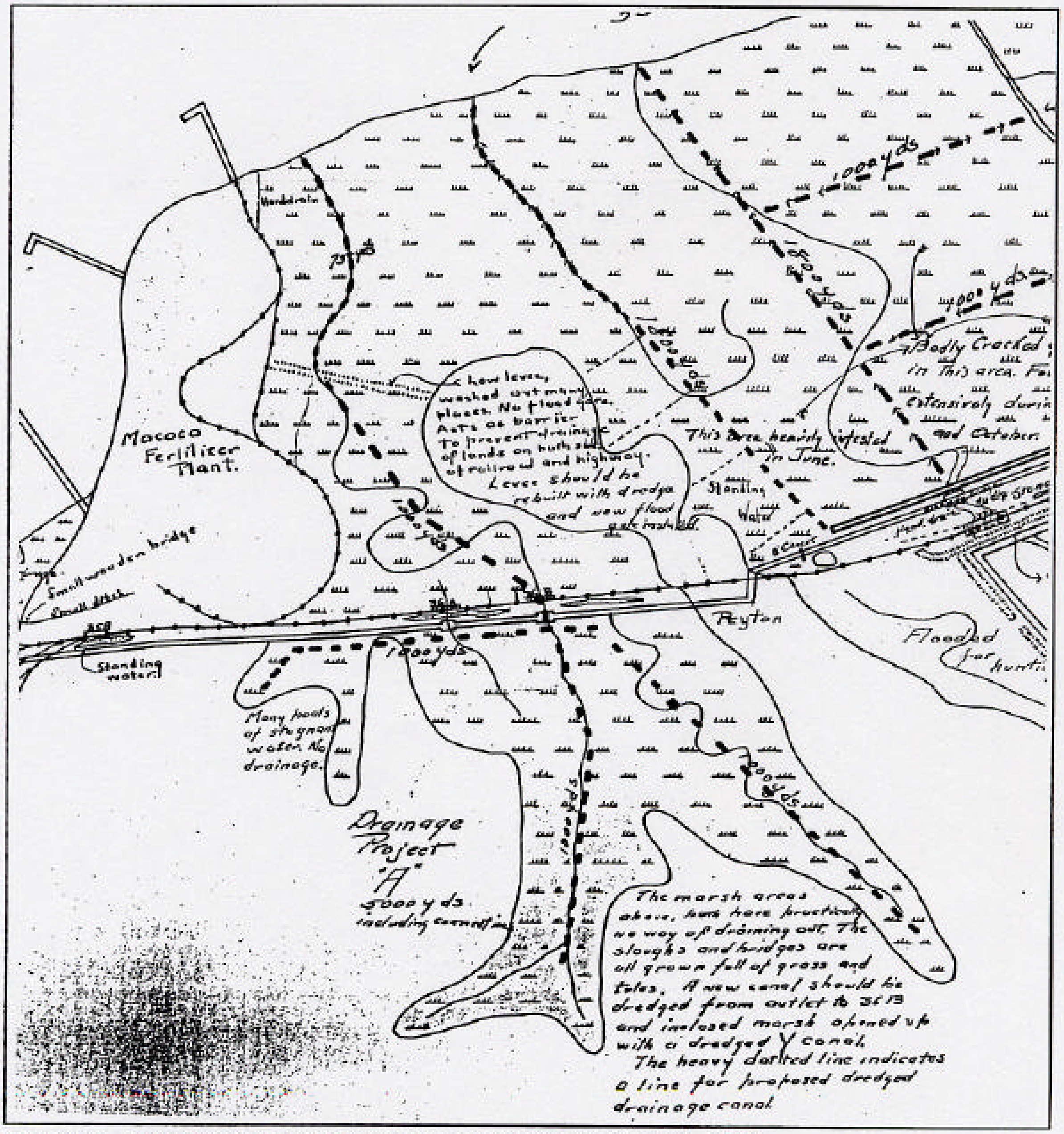
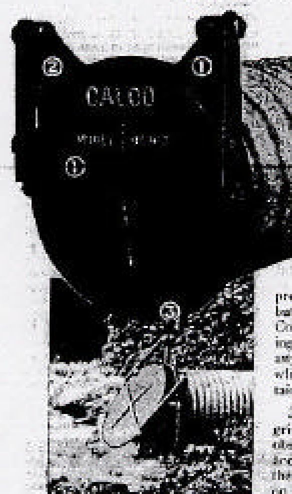


Figure 6: Detail of Stover's drainage plan for Peyton Marsh, 1927.

Figure 7a: Calco Model No. 100 flap gate, 1926.

Constructional Advantages of the CALCO GATE



The Calco Automatic Drainage Gate is not an ordinary valve; it is fully automatic.

The construction of the Calco Automatic Drainage Gate is simple, yet remarkably efficient. There are three principal features that are responsible for its effective operation.

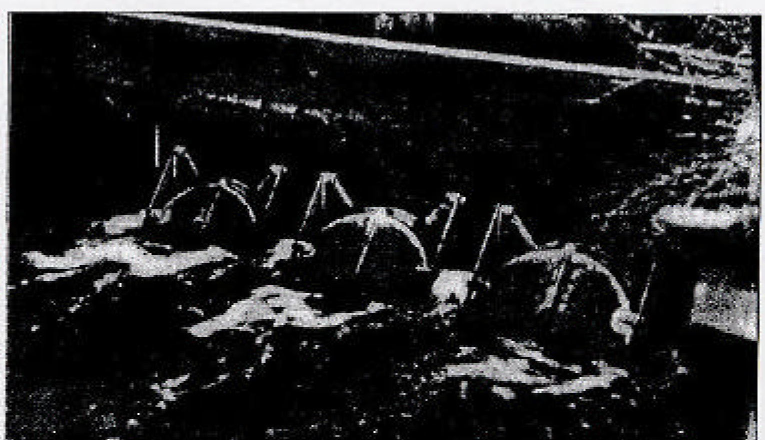
1. **The Double Hinge**—The shutter or flap is hinged not only at the tops of the standards but also at the points where the arms are attached to the shutter.

2. **Flexible Bearings**—These, together with the double hinge, allow the shutter to be moved forward by water pressure, not only at the bottom, but to some extent at the top also. Consequently when the pipe is flowing full the gate constitutes hardly any obstruction, and practically the whole capacity of the pipe is obtained.

3. **Water Tight Seat** providing grinding surfaces that grind out obstructions when in operation. The accurate machine fit, together with the very desirable play of the cover on the seat, that results from the flexibility of the construction, gives a slight grinding motion which grinds away any rust, dirt or foreign matter adhering to these surfaces, and thus keeps them in good working condition.

Calco Gates are made in sizes from eight (8) to eighty-four (84) inches, equipped with any desired length of pipe. Thousands of them are in satisfactory use.

Our Engineers are at your service to show how Calco Gates can help solve your drainage and irrigation problems.



Three 30-inch Calco Automatic Gates Installed for Marsh Reclamation and Mosquito Control.

Figure 7b: Calco catalog, p. 41 (1926).

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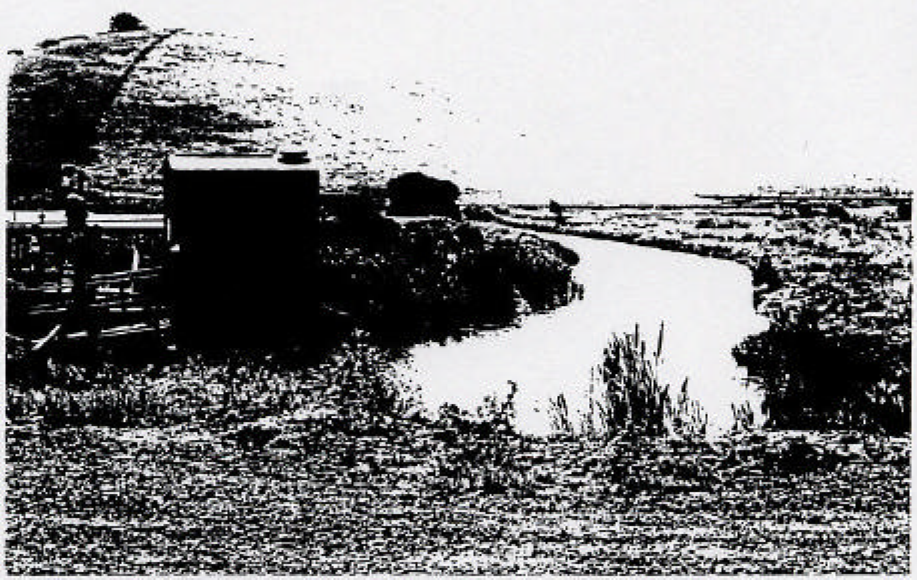
Photographs:

Photograph 1. Deteriorated East Levee, location indicated by white stakes. Rhône-Poulenc Basic Chemicals, Inc. facility in background, camera facing west.



Photograph 2. Main Peyton Marsh drainage channel, camera facing east. Pumphouse near tide gate intake appears to left and Peyton Hill in background.

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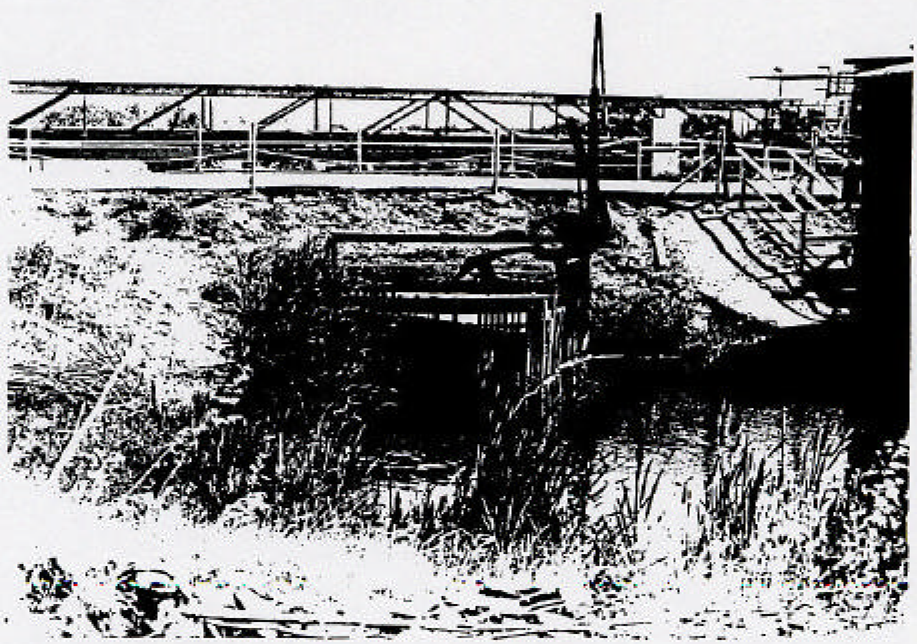
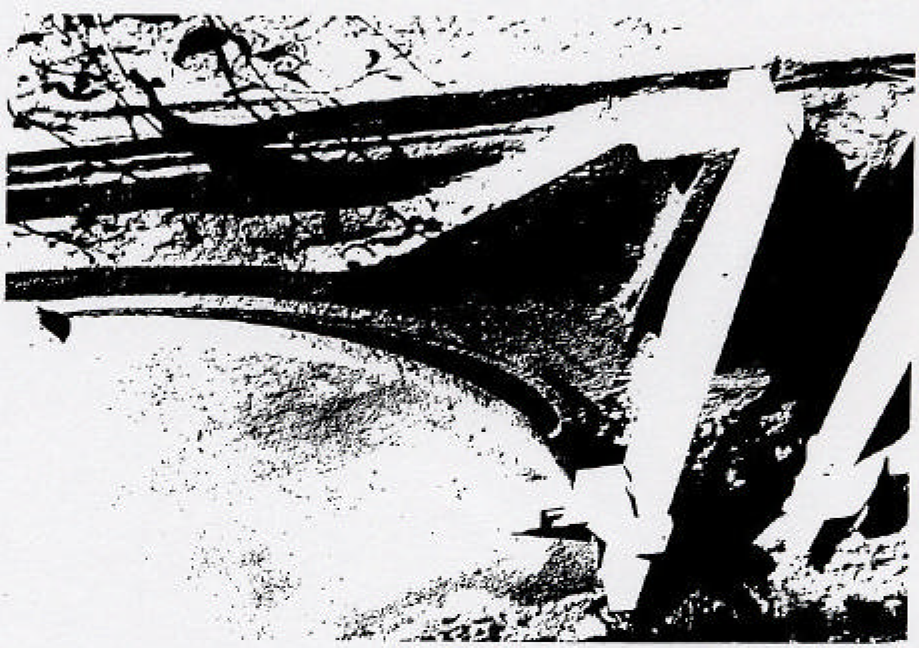
Photograph 3. Drainage channels in Peyton Marsh near meeting point of the three reaches. Camera facing southeast.



Photograph 4. Intake (south side) of tide gate structure showing trash rack, or grizzly, at water level and utility bridge on the north side. Camera facing north.

Photograph 5. Peyton Slough. Taken from tide gate structure, camera facing north.



Photograph 6. East flap gate, north side of tide gate structure. Camera facing south.

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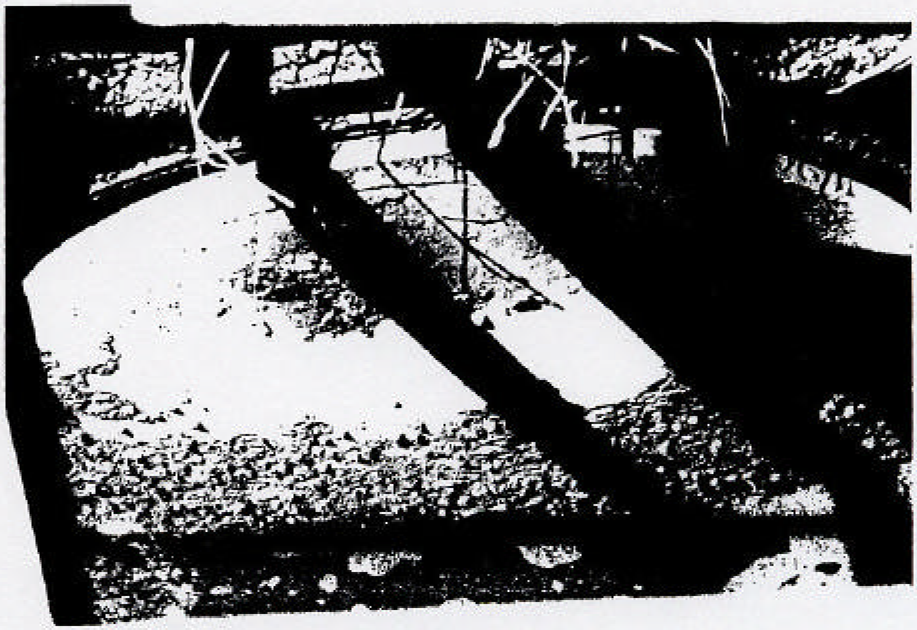
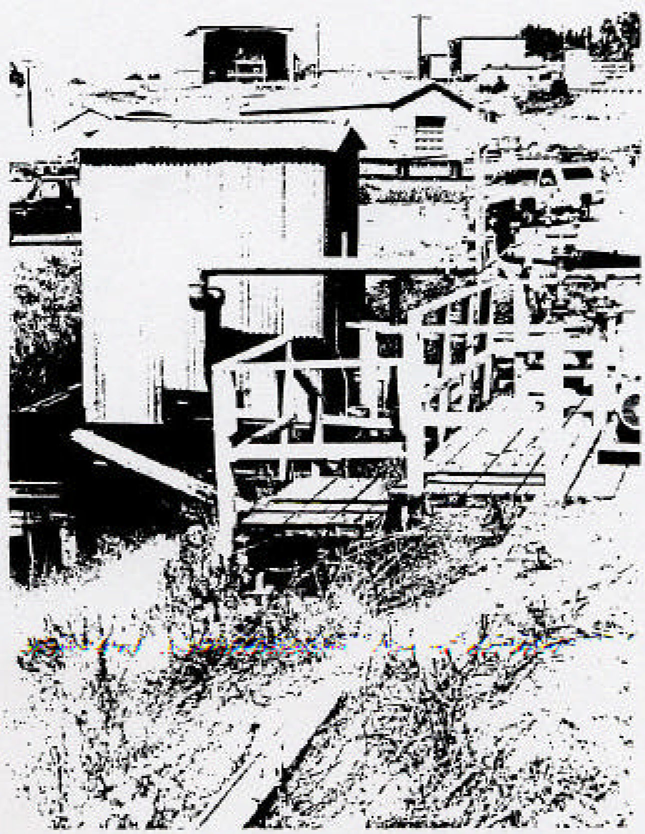
HRI#
Trinomial

 *Resource Name of # (Assigned by recorder) Peyton Marsh Drainage System

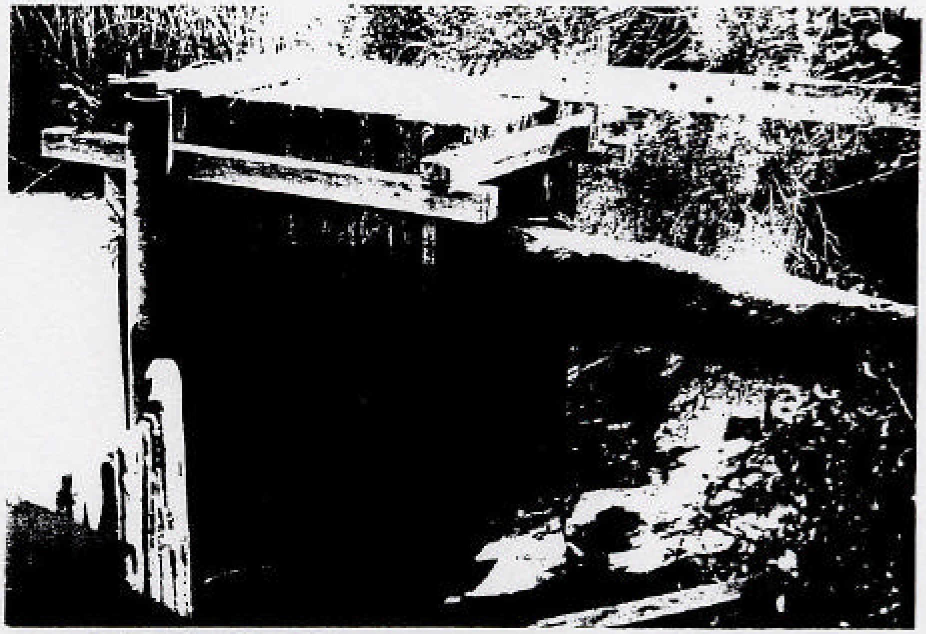
*Recorded by Meta Bunse Linn *Date 06/30/1997 ☒ Continuation ☐ Update



Photograph 7. West flap gate, north side of tide gate structure. Camera facing south.



Photograph 8. Pumphouse, south side of tide gate structure. Camera facing west.



Photograph 9. Discharge pipe and box in Peyton Slough, north side of tide gate structure. Camera facing northeast.

Photograph 10. Detail of utility bridge and pipelines on north side of tide gate structure. Camera facing east.

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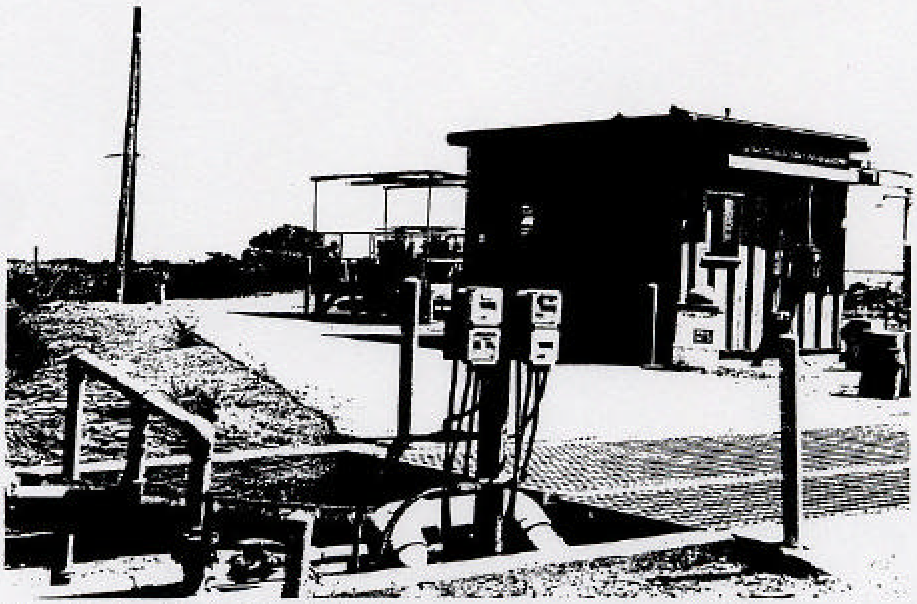
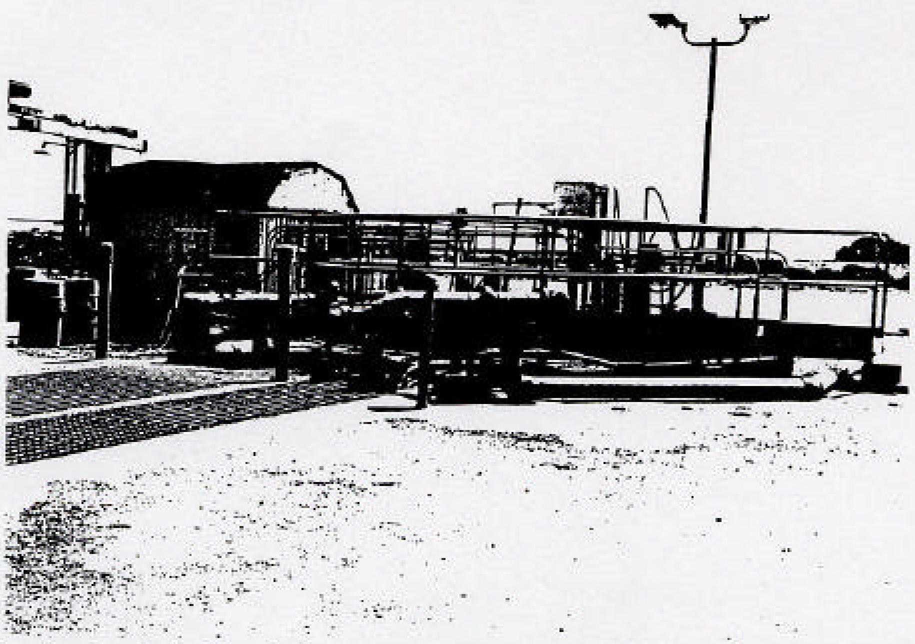


Photograph 11. Rhône-Poulenc Basic Chemicals, Inc. waste water treatment facility, east side of tide gate structure. Camera facing north.



Photograph 12. Rhône-Poulenc Basic Chemicals, Inc. waste water treatment facility, east side of tide gate structure. Camera facing northeast.

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Photograph 13. Rhône-Poulenc Basic Chemicals, Inc. waste water treatment containment pond. Taken from center of roadway over tide gate structure, camera facing east.