WESTERN SALT COMPANY SALT WORKS
(South Bay Salt Company)
South end of San Diego Bay
Imperial Beach
San Diego County
California

HALS CA-67
*HALS CA-67*

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN LANDSCAPES SURVEY
PACIFIC WEST REGIONAL OFFICE
National Park Service
U.S. Department of the Interior
1111 Jackson Street, Suite 700
Oakland, CA 94607

**HISTORIC AMERICAN LANDSCAPES SURVEY**

# WESTERN SALT COMPANY SALT WORKS
## (South Bay Salt Company)

**Location:** The Western Salt Company Salt Works is at the south end of San Diego Bay, San Diego County, California. The 1300-acre salt works is bounded on the east by an industrial park and tracks of the San Diego & Arizona Eastern railway, on the south by the Otay River and city of Imperial Beach, on the west by Silver Strand Boulevard (Hwy 75), and the open bay to the north. The Salt Works processing plant is on the east side of the ponds adjacent to the railroad line. The Salt Works is in Township 18 South; Range 2 West; in Sections 17, 20, 21, and a partially non-sectioned tract. The property is within the South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge-Complex (NWR), USDI Fish and Wildlife Service (USFWS). The western edge of the salt works (ponds 10, 10A, and 11) is concurrently managed by the U.S. Naval Radio Station "R" (NRRF).

Imperial Beach 7.5' USGS Quadrangle,
UTM Zone 11: SW corner (A): 488655mE/3605532mN; NW corner (D): 488393mE/3607144mN; NE corner (J): 490717 mE/3608355mN; SE corner (P): 491147mE/3606481 mN.

**Date of Construction:** 1916-1949.

**Architect/Engineer/ Builder:** Western Salt Company.

**Original owner/ Occupant and use:** La Punta Salt Works (1871-1901); Western Salt Company (1902-1999); South Bay Salt Company (2000-currently).

**Present Owner:** USDI Fish and Wildlife Service, Region 8
2800 Cottage Way
Sacramento, CA 95825

**Present Use:** Salt evaporation ponds (leased by South Bay Salt Company) and salt marsh habitat as part of the South San Diego Bay Unit of the San Diego NWR-Complex.

**Significance:** The Western Salt Company Salt Works has been in continuous operation since 1916 and retains integrity of design, function, and setting. The Western Salt Company is eligible to the National Register of Historic Places because it has

played an important role in the solar salt industry in California. The plant produced up to 10% of California's salt by the 1930s. The property is also significant because the Salt Works embodies the distinctive characteristics of a solar salt processing facility. Distinctive landscape qualities represented by the Western Salt Company Salt Works have changed little from the 1916 operation.

The solar salt industry is predicated on natural processes of evaporation to concentrate the salinity of sea water to create salt crystals. Design features include extensive evaporation ponds, smaller condensing ponds, and very small crystallizing ponds. Ponds are created with earthen dike divisions. Seawater enters the first series of large ponds where the water begins to evaporate and the salinity increases. When salinity reaches a brine-stage the water is moved to smaller condensing ponds, and finally to the crystallization pond, where salt crystals form and are harvested. Processing facilities are located outside of the network of ponds.

**Description:** The full range of evaporation, condensation, and crystallization ponds are represented on the site. The site includes all of the necessary buildings, structures, and land necessary for operating the Salt Works (Table 1). Primary structures associated with the processing plant are located on the east side of the property. The South Bay Salt Works currently lease the ponds and own and operate the processing plant. The processing plant, while determined eligible, is not included in this HALS report.

**History:** See narrative below.

**Sources:** See References below.

**Historian(s):** Angie Gustafson, Architectural Historian and Carrie Gregory, Staff Archaeologist; under the supervision of Dr. Karen J. Weitze, Senior Architectural Historian, EDAW.

**Report Date:** 2001

**Project Information:** Documentation is required by a Memorandum of Agreement for an adverse effect caused by the US Fish and Wildlife Service changing the function and appearance of evaporation ponds 10, 10A, and 11. Restoration of salt ponds to salt marsh habitat on the South San Diego Bay Unit of the San Diego National Wildlife Refuge-Complex includes breeching the exterior levees to allow tidal waters to flow through the ponds. Additionally, dredging and filling to create an undulating landscape that is conducive to salt marsh vegetation will be accomplished. This HALS report was prepared by Lou Ann Speulda-Drews, Historian/Historical Archaeologist, USFWS, Region 8. Another aspect of the mitigation for this project

is to interpret the solar salt industry. An interpretive panel has been created and will be installed in February 2013 along the bike path that borders the southern and western margin of the salt works.

Table 1. Contributing Elements of the Western Salt Company Salt Works (Gustafson and Gregory (2001).

| Feature | Description/Size | Alterations/ Integrity |
|---|---|---|
| Main Processing Plant, Ca. 1916-1920, with additions in 1949. | A long rectangular wood-frame building, elevated on 2'-6" concrete foundation. Wooden weatherboard covers the exterior walls. Timber trusses support a gable roof clad with corrugated sheet metal. Small single-light windows on the west façade. Office is attached to the west end. | A tower was added in the 1940s to house an elevator. Weatherboard covers the wood-framed walls and asphalt shingles clad the multiple shed roofs. The tower contains rectangular single-light windows on all sides. The main conveyor enters the top of the tower and metal conveyors and pulleys run through this portion of the building. |
| Pump house, ca. 1916 | The pump house sits between ponds 20, 21, 44, 47, and 48. The elevation changes 8 ft between ponds 21 and 44, and the pump transfers water to the higher pond (21). The building, sits in the water on wooden cylindrical piers. The rectangular building is wood framed and covered with board-and-batten siding, with corrugated sheet metal covering the front-gable roof. One vent is centered under the gable at each end and a wooden deck wraps around the front and north side with wooden railings and supports. A set of double swinging doors, hung with large metal hinges, open on the east façade. On each of the remaining sides, a single-light, wood-frame window has an interior screen and iron bars. | An addition extends the building on the deck at the southeast corner, to the left of the entry. The addition resembles the rest of the structure, with the exception of rolled asphalt roof covering. A steep ramp that leads from the bank of the levy to the east side of the wooden deck accesses the structure. The original pump was installed in 1917, a 50-horsepower Westinghouse. The motor has been rebuilt twice. The motor sits in the center of the pump house and consumes most of the space. Water flows in through a large pipe from the lower pond, through the pump, and out into the higher pond through a pipe. |
| Electrical Building, ca. 1916-1920 | A small wood-frame shed sits to the northwest of the main processing plant. The building sits on a concrete slab and the exterior is covered with weatherboard. Asphalt shingles clad the hipped roof. Two concrete steps access a single door on the south façade. The wood-frame windows have a single-light without screens. The building contains the electrical junction box for the washer complex. | Some windows have been boarded up. |
| Generator | The rectangular, wood-framed building is | The generator building is one of three |

| Feature | Description/Size | Alterations/ Integrity |
|---|---|---|
| Building, ca. 1916-1920 | covered in corrugated sheet metal. The building sits on a dirt floor, with an undetermined foundation. The front-gable roof is clad with corrugated sheet metal. Windows are wood-frame, single-light style. The entry is a double swinging door on the south façade. It originally housed the generator that provided electricity to the site. | buildings across from the main processing plant. The building was later used as a paint shop and currently is a storehouse. The windows have been boarded up. |
| Maintenance Building, ca. 1916-1920 | The maintenance building is an end-gable form across from the main processing plant. The rectangular post-and-beam building rests on a concrete slab. Corrugated sheet metal covers the wood-frame walls. | Asphalt shingles have replaced the metal covering on the roof. Two additions extend the building to the east. Board-and-batten siding clads the first addition, corrugated sheet metal covers the enclosed shed roof, and two sets of double swinging doors access the south façade. It originally housed the narrow gauge railcars. The second extension, built in 1972, opens to the interior of the main building. Corrugated sheet metal covers the shed roof extension. A large rolling door opens at the northeast corner. Double swinging doors access the west façade along with two pairs of wood-frame, single light openings. The south façade contains five windows. |
| Compressor Building, ca. 1916-1920 | The compressor building sits across the street from the main processing plant. The building originally housed the air compressor, and currently stores machinery for the maintenance building. The rectangular wood-frame structure sits on a dirt floor without a visible foundation. Corrugated sheet metal covers the exterior walls and front-gable roof. Access is through double swinging doors. The wood-frame, single-light windows have no screens. | Corrugated sheet metal clads a shed-roof extension to the rear of the building. |
| Floating Dredge, 1924 | The Western Salt Company purchased the dredge in 1924 from the Stockton Ironworks. Referred to as “one cubic yard dredge, no. 194), it moves around the salt ponds to repair the levees. | The outer levees require constant maintenance to prevent erosion from wave attack. |
| Narrow-Gauge Railway, ca. 1915 | The Salt Works installed the narrow-gauge railroad tracks to transport the salt during harvesting. The Western Salt Company dismantled the track during the 1970s. | A small section remains where the narrow-gauge rail crosses the standard-gauge rail line of the San Diego & Arizona Eastern Railroad at a ninety-degree |

| Feature | Description/Size | Alterations/ Integrity |
|---|---|---|
| | | angle. This situation is very rare, and has been preserved as one of the only sections in the country where this occurs. |
| Salt Pile, Seasonal | After harvesting, salt if stored outdoors in a large pile located north of the main processing plant. The outer layer forms a crust that protects the salt from rain. The piles are largest during the winter months, after harvest, and diminish during the rest of the year. Although they are not a permanent structure of the Salt Works, it is an important landscape feature. | |
| Storage Shed, ca. 1980 | The Western Salt Company built a shed under the main conveyor to support a kiln dryer processing machine. The small wood-frame structure sites on a concrete slab foundation. Horizontal weatherboard covers the exterior walls, and corrugated sheet metal covers the gable roof. | The Storage Shed does not contribute to the significance of the property. |
| Cylindrical Salt Grinder, ca. 1980 | Installed in the 1980s, the grinder processes salt for the laundry detergent industry. The grinder was only used for a short time. It is a large metal cylindrical machine elevated on a metal structure. | The salt grinder does not contribute to the significance of the property. |
| Conveyor and Machinery, ca. 1980 | The machinery associated with the main processing plant has been replaced over the life of the Salt Works. | The machinery was installed in the 1980s and does not contribute to the significance of the property. |
| Scale Office Temporary Building, 1992 | The scale office is a mobile trailer located near the other ancillary buildings across from the main processing plant. | The pre-fabricated temporary building does not contribute to the significance of the property. |
| Salt Ponds and Levees, ca. 1916 | See Individual Report for Salt Ponds. | |

**Historical Summary** (see individual report for historical context):
The California salt industry began in the 1850s, but it did not become a commercial industry in the state until the 1860s (Ver Planck 1958:9, 107). San Diego Bay was blessed with the three principal requirements to manufacture salt by solar evaporation of seawater on a commercial scale: a large tract of coastal land; a reasonably dry climate; and the existence of a market (Ver Planck 1958:42). Salt has long been a commodity in San Diego Bay, as remembered in the autobiography of Kumeyaay elder, Delfina Cuero, who references salt collection by local Native Americans for use as a cure for fish and as a trade good with other tribes (Phillips 1960:8; Shipek 1991:28,33). The first foreign exploration of San Diego

Bay was in 1542 when Juan Rodriguez Cabrillo sailed into the harbor. Reports of the Spanish expeditions refer to the salt found in the marshes of San Diego (Pourade 1960:19, 30, 33). The first Euro-American settlement along the southeastern portion of San Diego Bay began in July of 1868 when the Kimball brothers, Frank, Warren, and Levi, bought the old Spanish land grant of *El Rancho de la Nacion*, that included six miles of bay waterfront( Pourade 1960:19, 30,33).

The California Southern Railroad was built in National City in the late-1880s along the bayside which prompted land speculation in the South Bay area and gave rise to many industries (Pourade 1960:160). The area quickly became home to a power plant, reduction plant, iron works, planning mill, brick kiln, and creosote plant. The industrial growth also stimulated residential development of the bayside area, creating the communities of Chula Vista, Oneonta, and Otay. By 1886, Kimball financed the National City and Otay Railway Company, which ran a line from National City to the southern end of the bay (Pourade 1964:170).

The San Diego Division of Natural Resources provides one of the earliest records of commercial salt production in San Diego Bay, reporting 300 tons produced in 1870 (Ver Planck 1958:113). The earliest written reference of a commercial salt plant in San Diego Bay is of La Punta Salt Works, founded by Shaffer & Stone. La Punta Salt Works began operation in February 1871 in the southern portion of the bay at the future site of the Western Salt Company Salt Works. Stone sold his interest in 1882 to E.E. and J.E. Shaffer, who continued operations under the name of Shaffer Bros. By 1883, they were the only operating salt plant in the county and annual production was large enough to supply all of Southern California (Elliot 1883:187). Hoping to cash-in on rising salt prices, the Klauber-Wagenheim Company purchased and took over operations of the La Punta Salt Works in 1901 (Levy 1982).

Graham Babcock founded and incorporated the Western Salt Company in 1902 at a location approximately a quarter of a mile northeast of the extant La Punta Salt Works plant (Riehle 1952:68; USC&GS map 1887; 1895). Graham died a few years later leaving the company to his wife, who sold her interest in the company in January 1911 to Graham's father, Elisha S. Babcock. Babcock expanded the operations and made property improvements, reincorporating the Western Salt Company in July 1914 (Riehle 1952:68). By 1915, the Salt Works installed a narrow gauge rail line at the plant, with permanent track placed on the levees and portable track extending into the ponds at harvest time (Historic photographs; Ver Planck 1958:63). The Western Salt Company began shipping salt to the Pacific Northwest in direct competition with salt producers in San Francisco in the 1910s. Babcock and his partner, Hampton L. Story, were also involved in financing the Coronado Railroad Company that operated the Coronado Belt Line around the Bay up to Coronado Island (Pourade 1964:170).

In January 1916, months of rain finally took its toll on the South Bay communities, causing the collapse of the Lower Otay Dam. The high water of January 1916 severely damaged the Western Salt Company salt works, flooding the plant and many of the ponds. The damage caused a financial crisis for Mr. Babcock who had refinanced the company shortly before the flood and still owed the bank about $50,000. In order to recoup their monies, the bank supported the reconstruction of the site, which lasted through 1918 (Riehle 1952:68). Employees of the Western Salt Company rebuilt the Salt Works using plans from an unidentified designer.

Even though operations were of a limited scale, the Western Salt Company produced more than five percent of California's salt in 1918 (Historic photographs; San Diego Union 1952; Ver Planck 1958:156). Salt produced in San Diego Bay was sold for use in water softeners, textile dying, pickling, road de-icing, hide processing, the fishing industry, and other chemical applications (Gene Mullenix, personal communication 2001).

Under the management of L.M. Drown, the Western Salt Company began to recover financially after the flood. A couple years later, Frank Riehle took over management and the company began showing profits. Rather than pay off the bank note on the Salt Works, Babcock used these profits to finance other business ventures. In April 1922, the bank called in his loan and put the company's stock up for sale. Hearing of Babcock's financial dilemma, Henry G. Fenton came to the Babcock family with an offer to purchase the salt plant. Henry Fenton assisted Elisha Babcock during the early years of the Coronado development, and was a friend of Babcock's son Arnie. In 1922, Fenton bought the Salt Works, paid off other notes of the Babcock's, and arranged for their financial support until the death of Mrs. Babcock in 1934. Fenton was a successful businessman who already possessed adjacent property, where he planned to create an industry of delivering rock and sand by barge to the City of San Diego, when he seized the opportunity to purchase the salt works (Riehle 1952:68).

Fenton retained the Western Salt Company's management staff of Superintendent Neil B. Dittenhaver and Plant Manager Frank Riehle, who continued working under Mr. Fenton for another twenty-nine years. The experience and knowledge of these two men contributed to the increases in production and sales at the Western Salt Company. By the end of 1922, the Western Salt Company produced more than six percent of California's salt, a figure that rose to eight percent in 1926 and ten percent in 1932. Although Fenton was new to the salt industry, he quickly gained the respect of California competitors by showing increased production totals and even higher sales totals during the Depression (Riehle 1952:68-71).

A 1937 United States Bureau of Mines study found that commercial-scale solar evaporation plants were only found at the Great Salt Lake in Utah and on the California coast because there were only a few areas within the United States where using this method is economically feasible (Coons and Harris 1938:1270-75). Other competing solar salt works in California were the Leslie Salt Works in Newark, the Oliver Brothers Salt Works and Arden Salt Company near San Francisco, and the Monterey Bay Salt Works near Moss landing.

The Pacific Coast Salt Producers Association was organized in 1926 by Henry Fenton along with Aldwyn Hewitt, a manager from the Arden Salt Company of San Francisco. This organization helped to stabilize the industry through the end of World War II, when salt consumption increased dramatically (Riehle 1952:71). The zenith of pond development occurred in 1949 when the greatest amount of acreage had been acquired by Fenton. Unfortunately, Fenton died suddenly in 1951, leaving behind his legacy in the California salt industry and the successful operation of the Western Salt Company.

California salt production continued to increase and in 1958, the State of California Division of Mines found, with only minor exceptions, that California produced all of the salt consumed in California, Oregon, Washington, northern Idaho, western Nevada, and Arizona. The various salt plants in San

Francisco Bay, the Western Salt Company in San Diego Bay and Newport Bay, and the Monterey Bay Salt Works at Moss Landing supported practically all of the salt production in California. The Western Salt Company in San Diego Bay was second only to the plants in San Francisco in solar salt production from seawater (Ver Planck 1958:9, 42, 59). Production levels at the Western Salt Company's plant in South San Diego Bay remained fairly constant from the 1950s to the 1990s.

Changes in the industry caused the Western Salt Company to sell approximately 800 acres to the State Lands Commission and the Port of San Diego in 1999. The land was then transferred to the U.S. Fish and Wildlife Service for inclusion in the South San Diego Bay Unit of the San Diego National Wildlife Refuge-Complex of more than 3,000 acres of salt ponds and adjacent shore line for the protection of several species of threatened or endangered birds that live or feed in the salt ponds. The Fenton family also sold the Western Salt Company to a new enterprise comprised of former employees. The new company, called South Bay Salt Company, leases the Salt Works land from the Port of San Diego and the U.S. Fish and Wildlife Service (Gene Mullenix, personal communication 2001). Under this agreement, the salt works continues to operate although on a reduced scale. The crystallizing ponds, salt processing plant, all buildings, except the pump house, and salt pile are still maintained as privately held South Bay Salt Company property (Gustafson and Gregory 2001:1-5).

**Salt Pond Landscape Summary Statement** (see Individual Report for full description):
The Western Salt Company Salt Works were initially developed in the 1870s as part of the La Punta Salt Works, but a devastating flood in 1916 destroyed the ponds. Rebuilding after the flood took into consideration modern tools and equipment and influenced the size, shape, and number of ponds created between 1916 and 1920. Ponds were added over the years, especially on the exterior of the pond unit, further out into the Bay. The zenith of production and pond size was attained by about 1950. Between 1902 and 1999, the salt works in South San Diego Bay was operated by a single company. The Western Salt Company salt works retains a high degree of integrity and clearly reflects the association, setting, function, design, and appearance of a solar salt evaporation operation that has operated continuously for more than 100 years.

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| 1952 | San Diego Union Newspaper |
| 1874-1903 | San Diego City Directories |
| 1911-1940 | Various historic photographs |

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| Article Files on: | Mining – Salt |
| | Industries—General |
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| | South Bay |
| | Tides—Tidal Pools |
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| 1887-1950 | Sanborn Fire Insurance Maps of San Diego. Sanborn Map Company, Pelham, New York. |
| 1887-1950 | Sanborn Fire Insurance Maps of National City. Sanborn Map Company, Pelham, New York. |
| 1918-1950 | Sanborn Fire Insurance Maps of Chula Vista. Sanborn Map Company, Pelham, New York. |

Western Salt Works

| | |
|---|---|
| 1912 | Salt Works plan map. |
| 1916 | Salt Works plan map. |
| 1921 | Historic photograph showing production total and product uses |
| 1926 | Historic photograph showing production total |
| 1920-1970 | Various historic photographs |

**HISTORIC AMERICAN LANDSCAPES SURVEY**

**WESTERN SALT COMPANY SALT WORKS**

**Location:** The Western Salt Company Salt Works is at the south end of San Diego Bay, San Diego County, California. The 1300-acre salt works is bounded on the east by an industrial park and tracks of the San Diego & Arizona Eastern railway, on the south by the Otay River and city of Imperial Beach, on the west by Silver Strand Boulevard (Hwy 75), and the open bay to the north. The Salt Works processing plant is on the east side of the ponds adjacent to the railroad line. The Salt Works is in Township 18 South; Range 2 West; in Sections 17, 20, 21, and a partially non-sectioned tract. The property is within the South San Diego Bay Unit of the San Diego Bay National Wildlife Refuge-Complex (NWR), USDI Fish and Wildlife Service (USFWS). The western edge of the salt works (ponds 10, 10A, and 11) is concurrently managed by the U.S. Naval Radio Station "R" (NRRF).

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**Historian(s):** Angie Gustafson, Architectural Historian and Carrie Gregory, Staff Archaeologist; under the supervision of Dr. Karen J. Weitze, Senior Architectural Historian, EDAW.

**Report Reference:** *Historic Resource Evaluation Report for Western salt Company Salt Works, San Diego County, Chula Vista, California.* Prepared for Tierra Environmental Services and California Department of Transportation. Prepared by Gustafson and Gregory, EDAW, San Diego, CA, 2001.

## PART I. HISTORICAL INFORMATION

### A. Physical History

**Date of Construction:** 1916-1949.

**Landscape Architect, Designer, etc:** Western Salt Company.

**Builder, contractor, Laborers, suppliers:** Western Salt Company.

**Original and Subsequent owners, occupants:** La Punta Salt Works (1871-1901; Western Salt Company (1902-1999); South Bay Salt Company (2000-currently).

**Periods of development:**
a. Original plans and construction: 1871-1916 initial construction.
b. Changes and additions: 1916-1920 reconstruction of ponds, 1930-1950 addition of evaporation ponds, revision of power supply, maintenance of levees.

### B. Historical Context:

The California salt industry began in the 1850s, but it did not become a commercial industry in the state until the 1860s (Ver Planck 1958:9, 107). San Diego Bay was blessed with the three principal requirements to manufacture salt by solar evaporation of seawater on a commercial scale: a large tract of coastal land; a reasonably dry climate; and the existence of a market (Ver Planck 1958:42). Salt has long been a commodity in San Diego Bay, as remembered in the autobiography of Kumeyaay elder, Delfina

Cuero, who references salt collection by local Native Americans for use as a cure for fish and as a trade good with other tribes (Phillips 1960:8; Shipek 1991:28,33). The first foreign exploration of San Diego Bay was in 1542 when Juan Rodriguez Cabrillo sailed into the harbor. Although not the first Spanish explorer to arrive in California, Cabrillo was a distinguished man and the one credited with its discovery. Reports of the Spanish expeditions refer to the salt found in the marshes of San Diego (Pourade 1960:19, 30, 33).

The first Euro-American settlement along the southeastern portion of San Diego Bay began in July of 1868 when the Kimball brothers, Frank, Warren, and Levi, bought the old Spanish land grant of El Rancho de la Nacion, that included six miles of bay waterfront( Pourade 1960:19, 30,33). Hoping that San Diego would become a terminus for one of the transcontinental railroads, Frank Kimball prepared the area for the expected influx of people and founded National City. He made a Town Plat, built a wharf and a hotel, granted land for the railroad, and secured land and bonds from the city of San Diego (Phillips 1956:7-9; 1960:4). Kimball's dream was fulfilled when the California Southern Railroad was built in National City in the late-1880s (Pourade 1960:160).

The bayside railroad and the wharf prompted land speculation in the South Bay area and gave rise to many industries. The area quickly became home to a power plant, reduction plant, iron works, planning mill, brick kiln, and creosote plant. The industrial growth also stimulated residential development of the bayside area, creating the communities of Chula Vista, Oneonta, and Otay. By 1886, Kimball financed the National City and Otay Railway Company, which ran a line from National City to the southern end of the bay (Pourade 1964:170).

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The 1874 San Diego City Directory references the extensive manufacturing of salt in the bay, and a Los Angeles Star newspaper correspondent reported that two plants were operating in the bay that same year (Truman 1874:105). The Chollas Valley Works, owned by J.P. Duncan and Sons, produced salt sometime before 1880. The Division of Mines began keeping records in 1901 and show that the Chollas Valley Works manufactured salt from 1912 to 1920. State records also indicate that the California Salt Company produced small amounts of salt at their Carlsbad and La Costa plants in 1901 and 1902 (Elliot 1883:188).

Graham Babcock founded and incorporated the Western Salt Company in 1902 at a location approximately a quarter of a mile northeast of the extant La Punta Salt Works plant (Riehle 1952:68; USC&GS map 1887; 1895). Graham died a few years later leaving the company to his wife, who sold her

interest in the company in January 1911 to Graham's father, Elisha S. Babcock. Elisha dissolved the corporation, bought land at the southern end of the bay, and built levees to expand the salt works operation. Babcock continued expanding the operations and making property improvements, reincorporating the Western Salt Company in July 1914 (Riehle 1952:68). By 1915, the Salt Works installed a narrow gauge rail line at the plant, with permanent track placed on the levees and portable track extending into the ponds at harvest time (Historic photographs; Ver Planck 1958:63). The Western Salt Company began shipping salt to the Pacific Northwest in direct competition with salt producers in San Francisco.

Elisha Babcock, an Indiana railroad financier, and Hampton L. Story, a piano manufacturer, both arrived in San Diego in 1884 to improve their health. Babcock, at the age of 34, and his wife Isabel decided to permanently settle in San Diego. Babcock and Story shared a fondness for the San Diego peninsula (Coronado) and formed a syndicate to purchase the property. Planning to build a fine hotel (Hotel del Coronado), they bought more than 4,180 acres of land, which included Coronado and North Island. The newly formed Coronado Beach Company cleared land and sold residential lots for the community. Around the same time, Babcock and Story financed the Coronado Railroad Company that operated the Coronado Belt Line around the Bay up to Coronado Island (Pourade 1964:170).

In January 1916, months of rain finally took its toll on the South Bay communities, causing the collapse of the Lower Otay Dam. The high water of January 1916 severely damaged the Western Salt Company, flooding the plant and many of the ponds. The damage caused a financial crisis for Mr. Babcock who had refinanced the company shortly before the flood and still owed the bank about $50,000. In order to recoup their monies, the bank supported the reconstruction of the site, which lasted through 1918 (Riehle 1952:68). Employees of the Western Salt Company rebuilt the Salt Works using plans from an unidentified designer.

Even though operations were of a limited scale, the Western Salt Company produced more than five percent of California's salt in 1918 (Historic photographs; San Diego Union 1952; Ver Planck 1958:156). Salt produced in San Diego Bay was sold for use in water softeners, textile dying, pickling, road de-icing, hide processing, the fishing industry, and other chemical applications (Gene Mullenix, personal communication 2001).

Under the management of L.M. Drown, the Western Salt Company began to recover financially after the flood. A couple years later, Frank Riehle took over management and the company began showing profits. Rather than pay off the bank note on the Salt Works, Babcock used these profits to finance other business ventures. In April 1922, the bank called in his loan and put the company's stock up for sale. Hearing of Babcock's financial dilemma, Henry G. Fenton came to the Babcock family with an offer to purchase the salt plant. Henry Fenton assisted Elisha Babcock during the early years of the Coronado development, and was a friend of Babcock's son Arnie. In 1922, Fenton bought the Salt Works, paid off other notes of the Babcock's, and arranged for their financial support until the death of Mrs. Babcock in 1934. Fenton was a successful businessman who already possessed adjacent property, where he planned to create an industry of delivering rock and sand by barge to the City of San Diego, when he seized the opportunity to purchase the salt works (Riehle 1952:68).

Fenton retained the Western Salt Company's management staff of Superintendent Neil B. Dittenhaver and Plant Manager Frank Riehle, who continued working under Mr. Fenton for another twenty-nine years. The experience and knowledge of these two men contributed to the increases in production and sales at the Western Salt Company. By the end of 1922, the Western Salt Company produced more than six percent of California's salt, a figure that rose to eight percent in 1926 and ten percent in 1932. Although Fenton was new to the salt industry, he quickly gained the respect of California competitors by showing increased production totals and even higher sales totals during the Depression (Riehle 1952:68-71).

A 1937 United States Bureau of Mines study found that commercial-scale solar evaporation plants were only found at the Great Salt Lake in Utah and on the California coast because there were only a few areas within the United States where using this method is economically feasible (Coon and Harris 1938:1270-75). Other competing solar salt works in California were the Leslie Salt Works in Newark, the Arden Salt Company and Oliver Brothers Salt Works near San Francisco, and the Monterey Bay Salt Works near Moss landing.

The Pacific Coast Salt Producers Association was organized in 1926 by Henry Fenton along with Aldwyn Hewitt, a manager from the Arden Salt Company of San Francisco. This organization helped to stabilize the industry through the end of World War II, when salt consumption increased dramatically (Riehle 1952:71). In 1940, Fenton secured submerged land that supported evaporation pools by submitting a bid to lease the land from the newly appointed steward, the California State Lands Commission. The Western Salt Company offered a bid on 110 acres, which was the only bid for submerged lands that the Commission received (San Diego Union, 1940). Between 1926 and 1949, Fenton purchased or leased at least five other California salt plants with various partners (Riehle 1952:71). The zenith of pond development occurred in 1949 when the greatest amount of acreage had been acquired by Fenton. Unfortunately, Fenton died suddenly in 1951, leaving behind his legacy in the California salt industry and the successful operation of the Western Salt Company.

California salt production continued to increase and in 1958, the State of California Division of Mines found, with only minor exceptions, that California produced all of the salt consumed in California, Oregon, Washington, northern Idaho, western Nevada, and Arizona. The various salt plants in San Francisco Bay, the Western Salt Company in San Diego Bay and Newport Bay, and the Monterey Bay Salt Works at Moss Landing supported practically all of the salt production in California. The Western Salt Company in San Diego Bay was second only to the plants in San Francisco in solar salt production from seawater (Ver Planck 1958:9, 42, 59). Salt production levels in South San Diego Bay remained fairly constant from the 1950s to the 1990s.

Changes in the industry caused the Western Salt Company to sell approximately 800 acres to the State Lands Commission and the Port of San Diego in 1999. The land was then transferred to the U.S. Fish and Wildlife Service for inclusion in the South San Diego Bay Unit of the San Diego National Wildlife Refuge-Complex of more than 3,000 acres of salt ponds and adjacent shore line for the protection of several species of threatened or endangered birds that live or feed in the salt ponds. The Fenton family also sold the Western Salt Company to a new enterprise comprised of former employees. The new company, called South Bay Salt Company, leases the Salt Works land from the Port of San Diego and the U.S. Fish

and Wildlife Service (Gene Mullenix, personal communication 2001). Under this agreement, the salt works continues to operate although on a reduced scale. The crystallizing ponds, salt processing plant, all buildings, except the pump house, and salt pile are still maintained as privately held South Bay Salt Company property (Gustafson and Gregory 2001:1-5).

## PART II. PHYSICAL INFORMATION – Salt Works

### A. Landscape Character and Description Summary:

Operating a large-scale solar salt business requires thousands of acres for the range of evaporation, condensation, and crystallization ponds necessary for the slow process of changing seawater to salt. Ponds are divided by earthen dikes and arranged in a sequence with seawater entering the first tier of ponds where it is held until the salinity level increases, then the brine is transferred to condensing ponds and finally to the crystallizing ponds where the salt precipitates and is harvested. There is only one building in the Salt Works, a pump house, located on the levee between two ponds. Small scale elements such as siphons, tide gates, and water control structures control water flow between ponds. Buildings and structures associated with the processing, packaging, and shipping of salt are located outside of the salt pond landscape.

### B. Character Defining Features:

The Western Salt Company salt ponds were initially developed in the 1870s as part of the La Punta Salt Works, but a devastating flood in 1916 destroyed the ponds. Rebuilding after the flood took into consideration modern tools and equipment and is reflected in the size, shape, and number of ponds created between 1916 and 1920. Ponds were added over the years, especially on the exterior tier of the unit, further out into the Bay. The zenith of production and pond size was attained by about 1950. Unlike other salt producing regions such as San Francisco Bay, the period of small family-owned salt works was never the pattern in South San Diego Bay, rather it was the site of only a few salt works in the 1870s which had combined by 1902, and were destroyed in 1916. The salt works in South San Diego Bay was operated by a single company between 1902 and 1999. Since 2000 the salt works has been operated by the South Bay Salt Company. The Western Salt Company Salt Works retains a high degree of integrity and clearly reflects the association, setting, function, design, and appearance of a solar salt evaporation operation that has operated continuously for more than 100 years.

Major natural features of the solar salt industry include environmental conditions, available salt water, large parcels of flat tidal lands, and impervious mud.

1. Natural features:

    a. *Topography*: Salt marshes and mud flats in South San Diego Bay were considered nearly worthless until salt production began altering the natural landscape. The solar salt industry is dependent on the perfect assemblage of natural environmental features for the production of sea salt. While sea salt may be produced nearly anywhere that salt water is present, the areas where the production can reach an industry-level are few. For instance, only San Francisco Bay, Monterey Bay, and San Diego Bay represent the necessary natural conditions for producing salt from seawater in California.

In order for the solar salt industry to flourish several natural features need to occur: a protected bay; large expanses of flat, shallow water shoreline; abundant salt water; months of dry, sunny weather; and periods of rain. "The land ideally should be absolutely level and at or close to sea level. Above all, it should be impervious to prevent leakage of brine. Salt marshes most nearly fulfill these conditions" (Ver Planck 1958:14-15, 42). All of the necessary qualities are present in the South San Diego Bay.

Initially the salt industry simply augmented the naturally occurring conditions, but to achieve greater capacity and purer salt the natural tidal marsh and mud flats were improved by building levees to create a network of evaporation ponds. In the twentieth century industrial expansion of the salt industry required larger evaporation ponds and additional pickle ponds to meet the growing demand for salt.

The ponds vary in size and shape, in part, by the existing land forms, such as slough or creek channels and the edge of the mud flat. In most instances the ponds have sinuous edges. The crystallizing ponds are usually smaller than the evaporation ponds and are more likely to be rectangular in shape. Once established the ponds are usually maintained because the cost of building the levees and requirement to create an impervious seal for the bottom of the ponds takes about five years to develop.

b. *Vegetation*: There is no vegetation related to the solar salt industry landscape.

c. *Water*: Water is the primary element of the solar sea salt landscape. Sea water is transported through tide gates into a series of ponds, where it is controlled and allowed to evaporate to create brine. The concentrated brine solution is moved to smaller ponds where it evaporates further. The landscape is defined by the water-filled ponds and changing color of the water as the salinity level increases. The final crystallizing ponds turn white with the precipitating salt crystals. Water control structures, gates, siphons, and flumes are used to manipulate the filling and discharge of salt water between ponds.

2. Spatial Organization

a. *Land patterns*: The solar salt industry is distinguished by its spatial organization as defined by levees that divide the concentrating ponds. The solar salt industry is based on a series of various sized ponds divided by levees. The size and placement of ponds relates to levels of salinity and controlling water and brine.

The initial concentrating ponds are arranged in a series of about 10 ponds along the exterior of the salt works, separated from the Bay by a berm. Salt water flows in from the bay and is monitored during the spring, summer, and fall. When the brine reaches a certain salinity level it is called "pickle" and is moved to the pickling ponds where the salinity continues to intensify. The crystallizing pond is the final step in the evaporation process. The crystallizing pond is managed to a specific gravity by withdrawing bittern and replacing it with fresh pickle until the correct depth of salt deposits is reached (Ver Planck 1958:41).

Crystallizing ponds are fairly small, rectangular in shape, and have flat bottoms. The ratio of concentrating ponds to crystallizing ponds is usually 15 to 1.

Evaporation ponds can be up to 200 acres in size, pickle ponds about 100 acres and crystallizing ponds range in size from 10 acres or less to 50 or 60 acres. Evaporation takes place only during the spring, summer, and fall. During the winter the concentrating ponds remain full, and at some plants the crystallizing ponds are left full also" (Ver Planck 1958:41).

Currently, the salt works encompasses six large evaporation ponds, 18 condensing ponds, and four crystallization ponds separated by earthen berms or levees. The Western Salt Company purchased and developed the four large ponds (11, 12, 14, 15) closest to the bay in 1933. The "outside levees are 40 feet wide at the base, 12 feet wide at the top and 3½ feet high. To prevent leakage between the base of the levee and the old surface, the levee is keyed to solid material by coring. In coring a trench is dug through the grass and peat along the center line of the levee and filled with clean mud. Cross levees, or levees that separate one pond from another, may be slightly lower and usually are not cored" (Ver Planck 1958:46). Other features of the large exterior levee are the borrow pit alongside the exterior of the levee where clean mud is gathered for topping the levee and in some areas sheet metal pilings may be used to keep the levees from eroding (Ver Planck 1958:47). For the smaller ponds, wooden planking forms the walls of the ponds.

b. *Circulation:* The system of water circulation is critical to the solar salt industry. Salt works require the flow of water: from intake, through the ponds, to the washer. Ponds are interconnected, moving bay water and brine through the ponds as the salinity is gradually increased. Water control structures, gates, pumps, and pipes or siphons were all used to move water between the ponds. Controlling water flow was also important so that brine was not contaminated by "fresh" bay water.

"Bay water is taken in through automatic gates that open at high tide and close when the tide drops below the pond level. Where possible the gates are placed in north or northwesterly facing levees to take advantage of the prevailing wind. The intake at some points is by means of pumps" (Ver Planck 1958:47). Concentrating bay water requires passing the brine slowly through a series of ponds, the flow is regulated by gates, pipes, and pumps, and the salinity level is checked often. The stages of salt production include: "1) bay water reduced to a salinity level of 12.9 *Be* and reduced the volume to nearly half of that taken in, suspended matter settles, carbonates precipitate begins; 2) evaporation continues until at 25.6 *Be*, the brine is saturated with respect to salt; 3) by 25.0 *Be* the brine is transferred to the pickle pond where it is reduced to about ten percent of the volume of bay water taken in" (Ver Planck 1958:47).

Crystallizing ponds are provided with an elaborate system of ditches and pumps for rapid filling and emptying…Pickle flows from the supply ditch to the concentrating ponds, and from thence bittern ditches carry bittern away. Close control is required to prevent, as far as

possible, the precipitation of either gypsum or bittern salts in the crystallizing ponds (Ver Planck 1958:51). Brine ditches may be constructed with wood and have the appearance of a flume, except that it looks essentially level. Another conveyance structure is a brine bridge which carries brine across a canal (Ver Planck 1958:63).

"Pickle enters the crystallizing pond at 25.6 *Be*, and bittern is withdrawn at 29 *Be*. An effort is made to keep the specific gravity within these limits by continuously drawing off a small amount of bittern. Two to five times during the season, however, it is necessary to empty the ponds and refill them with fresh pickle. As evaporation occurs, tiny seed crystals of salt form on the surface and are supported by surface tension. As their weight increases, they sink deeper…During the season 4 to 6 inches of salt forms, and about 70 percent of the salt in the pickle is extracted…Bittern is withdrawn from the crystallizing ponds to bittern ponds where the specific gravity increases and it is sold to chemical companies" (Ver Planck 1958:51).

Principal features of the circulation system include the intake gates, pump stations, siphons, and pipes. Roads are located on top of the levees to access the water control structures. The Salt Works had its own narrow-gauge railway that also crossed the levees and transported salt during harvesting.

Sea water enters the ponds at high tide through gates located at the northwest corner of the property. The mineral content of the sea water is approximately three and a half percent by weight. Gravity and siphons transport the water through a series of condensation ponds. In these ponds, the seawater evaporates and becomes weak brine. The water travels from the condensation ponds to the crystallization ponds, and salt crystals form on the surface of the seawater when the mineral content reaches twenty-six percent. The crystals sink to the bottom of the ponds, creating a layer of pure salt. Employees removed the brine (or bittern) that remains at the top of the pond and sell it to be used in magnesium chloride recovery. Harvesting takes place during the late summer and fall. Gypsum and the remaining bittern are removed by washing, and the large outdoor piles are used for storage of the salt. Due to the nature of the salt process, very little has changed in the layout of the ponds or levees since they were first constructed.

In 2010, Pond 30 was converted from a "pickling pond," which currently has a salt floor of both calcium sulfate and sodium chloride, to a "crystallizer pond," a pond where sodium chloride can be harvested. The conversion of Pond 30 required modifying the surrounding earthen berm to protect the crystallizing salt from berm failure that would contaminate the commercial-grade salt. Levee boards were installed around the perimeter of Pond 30 using the natural contour of the levees to support the boards. Fill was placed on the outside of the levee boards to stabilize them. The levee boards consist of sawn lumber 1x12 in. and 1x6 inch. The vertical boards are supported by tieback boards, and backfilled to an elevation of 2 ft above the pond floor. This perimeter area and the taper of the existing levees was backfilled with dirt.

c. *Views and vistas*: The spatial structure of the salt works is difficult to comprehend at ground level, because they are by definition flat and at sea level. There are no vistas points available for viewing the salt pond landscape. But the salt ponds are visually striking from the air with the ponds clearly divided, and the color of the water reflecting the increasing salinity from ponds of pink to magenta to white.

d. *Water*: Only naturally occurring seawater is used in the salt pond landscape (see above discussion).

e. *Buildings and structures*: Seven buildings, related to the Western Salt Company's 1916-1949 operation have been determined eligible and are located on a small lot on the east side of the ponds (see Overview Report). The salt processing equipment, washer, grinder, and storage pile were located close to the railway and road system. The Western Salt Company operation is compact with all of the salt production funneled to the east shoreline where crystallizing, processing, and shipping activities occur.

f. *Small scale elements*: Tide gates, siphons, pipes, pumps, and water control structures are all considered small scale elements within the solar salt pond landscape. Each of these elements has been altered over the years, for instance, the tide gates shifted to the outer ponds when new ponds were constructed. Controlling pond water is dynamic and changes with each expansion or contraction.

g. *Archaeological sites*: All of the salt ponds created by Western Salt Company occurred during the twentieth century industrialization. No sites such as boat landings, salt processing plants, or residences were ever part of the salt pond development in South San Diego Bay.

   Native American sites unrelated to salt collection have been identified along the Otay River and bay-front shore line.

h. *Other*: Elements of the landscape that are unusual or unique include the seasonally very large pile of salt adjacent to the processing plant.

   After each salt harvest season, a large outdoor storage pile is located to the north of the main processing plant. The outer layer of the pile forms a crust that protects the salt from rain. The piles are largest during the winter months, after harvest, and diminish during the rest of the year. Although the pile is not a permanent feature of the Salt Works, it is an important element of the solar salt landscape.

## PART III. SOURCES OF INFORMATION

A. Drawings, plans:
   1912 Salt Works plan map.
   1916 Salt Works plan map.

B. Historic view, photographs:
1957 view

C. Interviews: Gene Mullenix, 2001.

D. Bibliography:

*1. Primary and unpublished*:

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National City

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Western Salt Works
1916 Map showing Boundary Lines and Location of Evaporation Ponds of the Western Salt Company, August 19, 1916.
1921 Historic photograph showing production total and product uses
1926 Historic photograph showing production total
1920-1970 Various historic photographs

*2. Secondary and published*:

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1887 Map of Port of San Diego Bay, California.

1892 Survey map, No. 5106.

1895 Map of San Diego Bay, California.

1933 Air Photo Compilation, No. T-5371, December 22, 1933.

1954 Hydrographic Survey No. 8135, March-April 1954.

United States Geological Survey (USGS)
1967 Imperial Beach, California Quadrangle Topographic Map.

Ver Planck, William E.
1958 *Salt in California. Division of Mines, Bulletin 175*. San Francisco: Department of Natural Resources.

## PART IV. PROJECT INFORMATION

Documentation is required by a Memorandum of Agreement (MOA) for an adverse effect caused by the US Fish and Wildlife Service's plans to alter the function and appearance of three evaporation ponds (10, 10A, and 11). Restoring salt ponds back to salt marsh habitat includes breeching the exterior levees to allow tidal waters to flow through the ponds. Additionally, dredging and filling to create an undulating landscape that is conducive to salt marsh vegetation will be accomplished. The ponds are located on the South San Diego Bay Unit of the San Diego National Wildlife Refuge-Complex. Interpretation of the salt works is also stipulated in the MOA and an interpretive panel has been created and will be installed along the trail bordering ponds 10A, 10, and 11 in February 2013.

## MAPS AND PHOTO-DOCUMENTATION

*Location Map;
*Aerial view;
*1912 and 1916 Plan Maps of the Western Salt Company salt works;
*Color photographs;
*Large format 4x5, B&W photographs – HALS photographs.

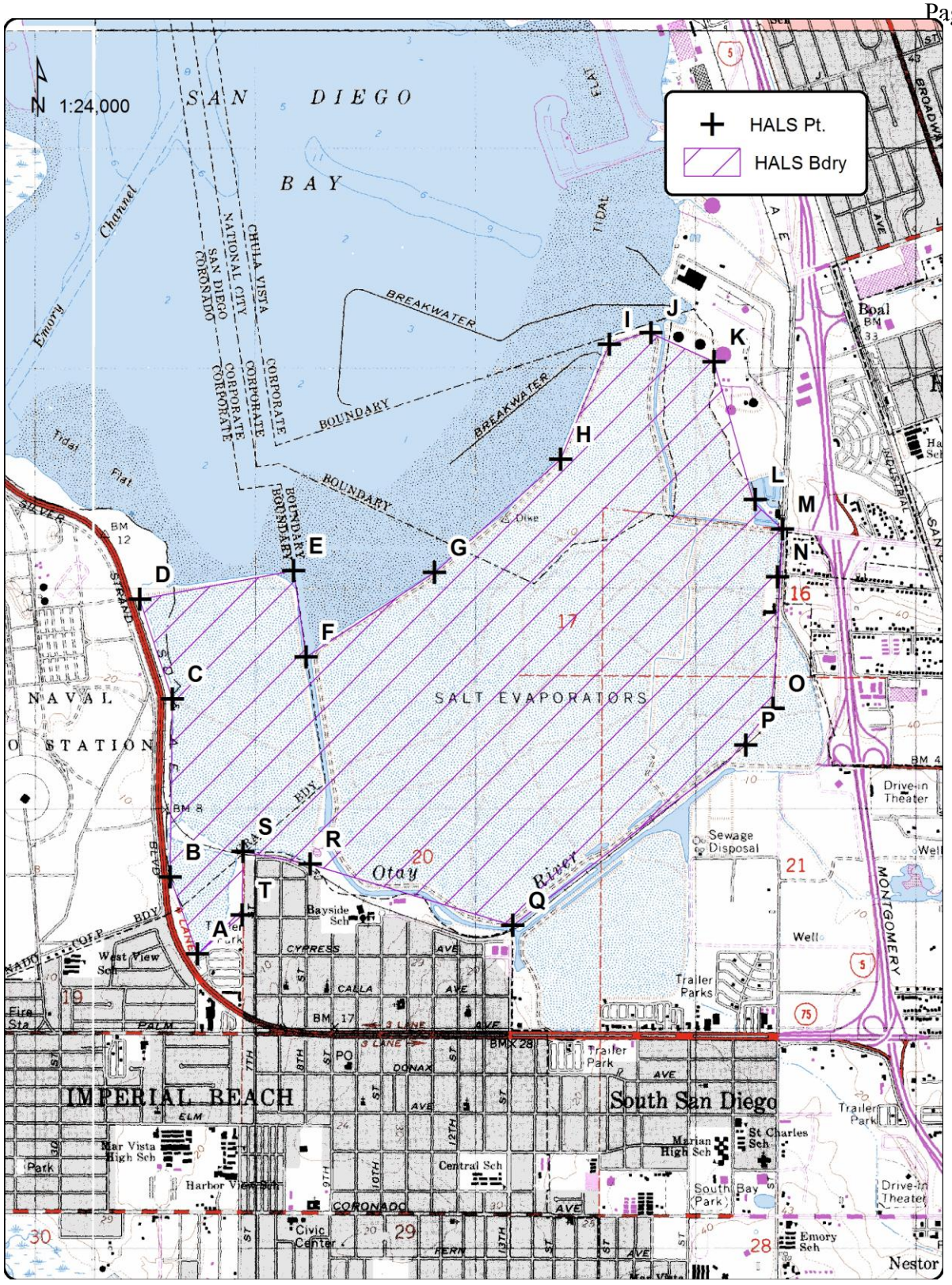


Figure 1. Location of Western Salt Company Salt Works, Imperial Beach USGS 7.5' quadrangle.


Figure 2. Aerial view of South San Diego Bay.

Figure 3. Location of Western Salt Company Salt Works, Imperial Beach USGS 7.5' quadrangle.

Table 2. Western Salt Company Salt Works boundary points by UTM and Latitude and Longitude.

| | DATUM | NAD83 | | LATITUDE | | | LONGITUDE | | |
|---|---|---|---|---|---|---|---|---|---|
| HALS PT | ZONE | EASTING | NORTHING | DEGREE | MIN. | SECONDS | DEGREE | MIN. | SECONDS |
| A | 11 N | 488655 | 3605532 | 32 | 35 | 13.92 | -117 | 7 | 15.20 |
| B | 11 N | 488531 | 3605882 | 32 | 35 | 25.29 | -117 | 7 | 19.95 |
| C | 11 N | 488542 | 3606691 | 32 | 35 | 51.57 | -117 | 7 | 19.60 |
| D | 11 N | 488393 | 3607144 | 32 | 36 | 6.27 | -117 | 7 | 25.31 |
| E | 11 N | 489093 | 3607274 | 32 | 36 | 10.52 | -117 | 6 | 58.48 |
| F | 11 N | 489149 | 3606883 | 32 | 35 | 57.81 | -117 | 6 | 56.29 |
| G | 11 N | 489733 | 3607267 | 32 | 36 | 10.31 | -117 | 6 | 33.89 |
| H | 11 N | 490305 | 3607780 | 32 | 36 | 27.00 | -117 | 6 | 11.96 |
| I | 11 N | 490527 | 3608303 | 32 | 36 | 43.98 | -117 | 6 | 3.49 |
| J | 11 N | 490717 | 3608355 | 32 | 36 | 45.69 | -117 | 5 | 56.21 |
| K | 11 N | 491003 | 3608223 | 32 | 36 | 41.41 | -117 | 5 | 45.20 |
| L | 11 N | 491191 | 3607596 | 32 | 36 | 21.05 | -117 | 5 | 38.00 |
| M | 11 N | 491313 | 3607464 | 32 | 36 | 16.75 | -117 | 5 | 33.30 |
| N | 11 N | 491292 | 3607245 | 32 | 36 | 9.64 | -117 | 5 | 34.11 |
| O | 11 N | 491270 | 3606647 | 32 | 35 | 50.23 | -117 | 5 | 34.91 |
| P | 11 N | 491147 | 3606481 | 32 | 35 | 44.84 | -117 | 5 | 39.63 |
| Q | 11 N | 490089 | 3605663 | 32 | 35 | 18.24 | -117 | 6 | 20.18 |
| R | 11 N | 489167 | 3605941 | 32 | 35 | 27.24 | -117 | 6 | 55.56 |
| S | 11 N | 488863 | 3605998 | 32 | 35 | 29.08 | -117 | 7 | 7.23 |
| T | 11 N | 488860 | 3605710 | 32 | 35 | 19.73 | -117 | 7 | 7.35 |

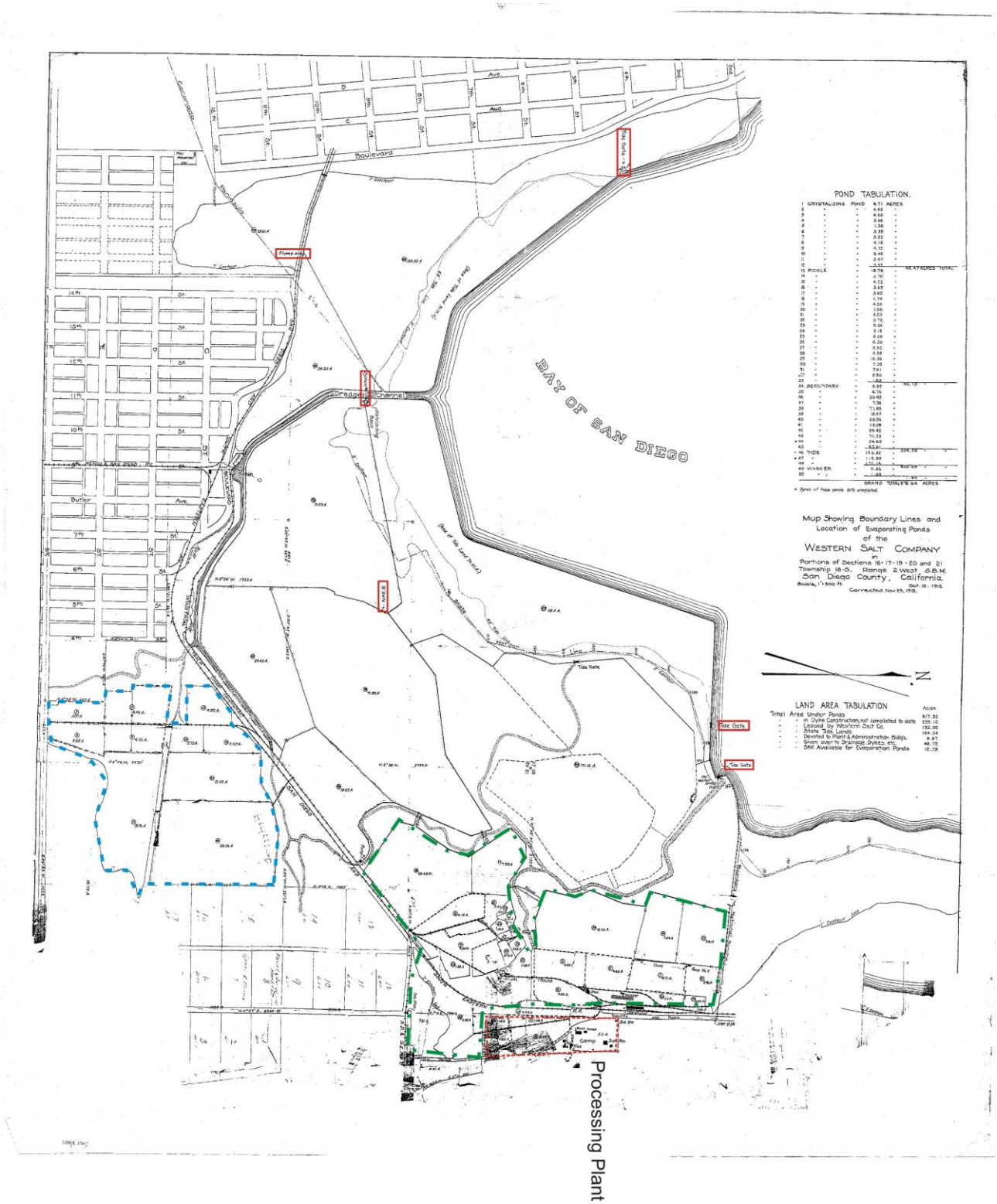


Figure 4. 1912 Plan map of Western Salt Works.

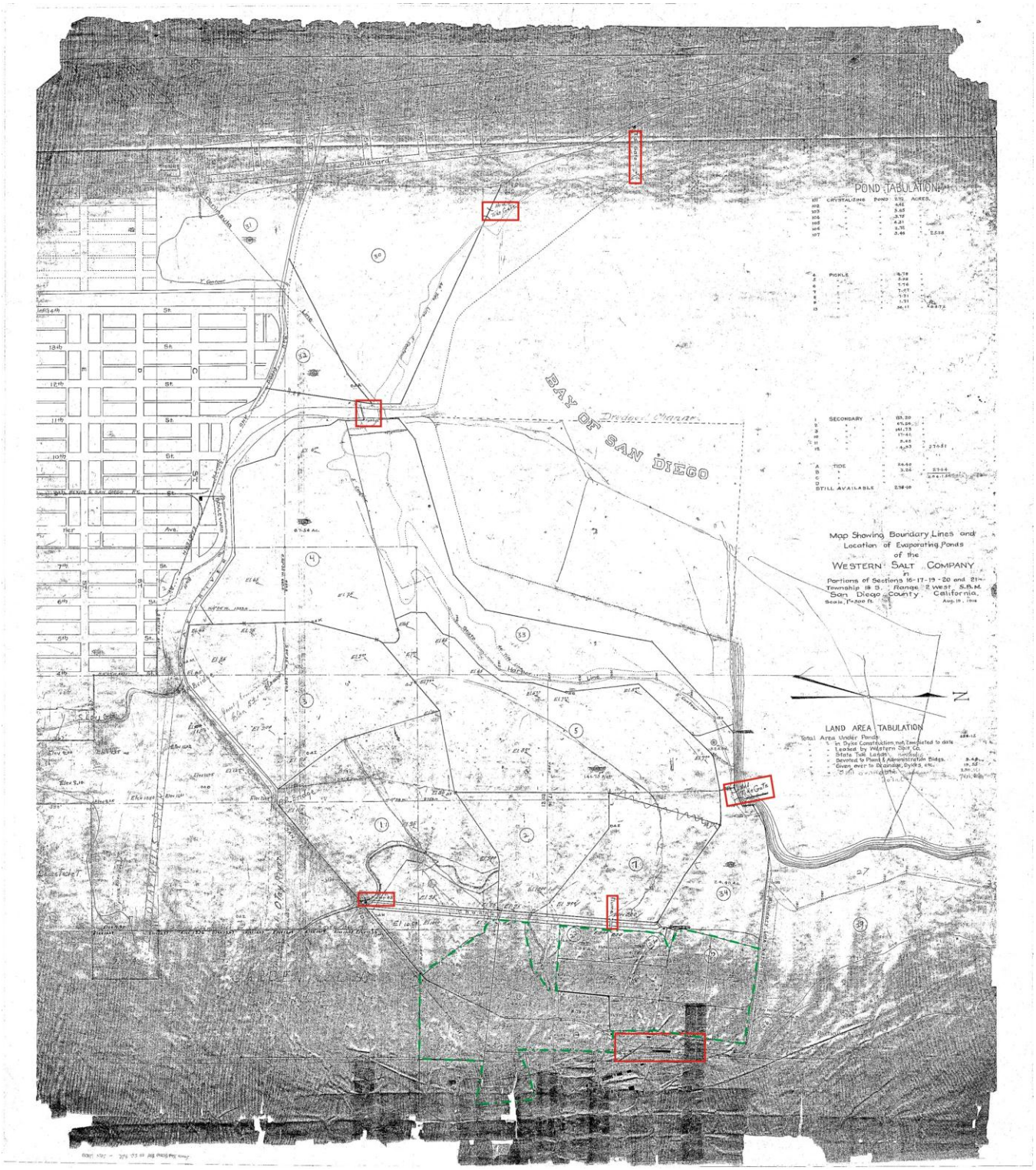


Figure 5. 1916 Plan map of Western Salt Works.

Figure 6. Overview of Salt Pond 10, view to E, salt pile in background (2010-01-02:111).

Figure 7. Road on levee, pond-edge lined with planks, and processing plant in background (2010-01-02:79).

Figure 8. Brine pond adjacent to salt pile, pond-edge lined with wood planks (2010-01-02:88).

Figure 9. Road on levee, pond-edge lined with planks, and processing plant in background (2010-01-02:79).

Figure 10. Overview of salt pond 10, view to E (2010-02-02:05b).


Figure 11. Interpretive Panel 90% Design, to be installed in February 2013.