

**DRAFT INITIAL STUDY AND  
MND FOR PUBLIC COMMENT**

**COMMENT PERIOD ENDS  
6-22-13**

**Draft  
Initial Study**

**Arcata Bay Shellfish Mariculture Facility**

May 2013

Prepared for:

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# CHAPTER 1 INTRODUCTION

## ***Purpose of this Document***

This initial study (IS) is a public document that assesses the environmental effects of the proposed Hog Island Oyster Company (Hog Island) Arcata Bay Shellfish Mariculture Facility (the project), as required by the California Environmental Quality Act (CEQA) and in compliance with the State CEQA Guidelines (14 Cal. Adm. Code 1400 et seq.). It serves as an informational document to be used in the local planning and decision-making process, and does not recommend approval or denial of the project.

The Humboldt Bay Harbor, Recreation, and Conservation District (the District), the state lead agency under CEQA, will use this document to evaluate the environmental effects of the project and to identify any necessary mitigation measures required to reduce the project's effects to less-than-significant levels as part of the District's consideration of whether to approve the project.

## ***Scope of this Document***

This document evaluates the project's impacts on the following resource topics:

- aesthetics,
- agricultural resources,
- air quality,
- biological resources,
- cultural resources,
- geology and soils,
- greenhouse gas emissions,
- hazards and hazardous materials,
- hydrology and water quality,
- land use planning,
- mineral resources,
- noise,
- population and housing,
- public services,
- recreation,
- transportation/traffic
- utilities and service systems, and
- mandatory findings of significance.

## ***Impact Terminology***

The following terminology is used in this document to describe the levels of significance of impacts that would result from the project:

- The project is considered to have no impact if the analysis concludes that the project could not affect a particular resource topic.
- An impact is considered less than significant if the analysis concludes that the project would cause no substantial adverse change to the environment and that impacts would not require mitigation.
- An impact is considered less than significant with mitigation incorporated if the analysis concludes that the proposed project would cause no substantial adverse change to the environment with the inclusion of mitigation measures identified by the lead agency.
- An impact is considered environmentally significant if the analysis concludes that the proposed project would cause substantial adverse change to the environment that could not be reduced to less-than-significant levels by the inclusion of identified mitigation measures.

## ***Organization of this Document***

The content and format of this document, described below, are designed to meet the requirements of CEQA.

- Chapter 1, "Introduction," identifies the purpose, scope, and terminology of the document.
- Chapter 2, "Project Description," identifies the location, background, and planning objectives of the project; describes the project in detail; identifies the permits and approvals required for the project; and identifies public involvement procedures.
- Chapter 3, "Environmental Checklist," presents the checklist responses for each resource topic. This section includes a brief setting description for each resource topic and identifies the project's impacts on those resources topics.
- Chapter 4, "List of Preparers," identifies the individuals who prepared this document.
- Chapter 5, "References Cited," identifies all printed references and personal communications cited in this report.

## CHAPTER 2 PROJECT DESCRIPTION

- 1. Project Title:** Arcata Bay Shellfish Mariculture Facility
- 2. Lead Agency Name and Address:** Humboldt Bay Harbor, Recreation and Conservation District  
601 Startare Drive  
Eureka, CA 95502
- 3. Contact Person and Phone Number:** Dan Berman, Director of Conservation  
(707) 443-0801
- 4. Project Location:** The project would occur at and adjacent to 1606 Fay Avenue, Samoa, CA (tax parcels 40116126, 40116123, 40116122, 40130109, 40130105, and 40130107)
- 5. Project Sponsor's Name and Address:** Hog Island Oyster Company  
PO Box 829  
Marshall, CA 94940
- 6. General Plan Designation:** Humboldt County Humboldt Bay Area Plan: MC- Industrial Coastal Development  
  
Humboldt Bay Management Plan Water-use designation: Harbor
- 7. Zoning:** County of Humboldt Coastal Zoning: MC/A- Industrial
- 8. Background:**

The project site is located north of the Eureka Municipal Airport near the town of Samoa on the west side of the entrance channel of Arcata Bay (Figure 1). The site is an unimproved upland lot and existing pier facility formerly associated with an upland pulp mill, located south of the site. The upland site and pier are owned by Sequoia X, LLC (Sequoia X). The tideland associated with the pier is leased from the District.

The existing pier is perpendicular to the shoreline extending approximately 350 feet (ft) with a typical width of 20 ft (Figure 2). Historically, the dock was used to offload materials and chemicals for the upland paper mill. Currently, the dock is used for access to Taylor Mariculture, LLC (Taylor), shellfish nursery rafts. In the near future, Taylor's operations will be moved to the Berth 2 facility, north of the project site. Water depth around the dock ranges from -10 to -30 ft mean lower low water (MLLW). Industrial piping is currently attached to the pier.

The bulkhead supporting the pier is approximately 75 ft long by 35 ft wide. Riprap extends along the adjacent shoreline to both the north and south (see photos in Appendix).

## 9. Description of Project

Hog Island proposes to establish a shellfish mariculture operation at an existing pier facility and an approximately 3.5-acre adjacent upland site formerly associated with a pulp mill. The proposed mariculture facility would support shellfish (i.e., Manila clam, and Pacific and Kumamoto oysters) seed cultivation operations. There would also be a small-scale larvae and microalgae production component in the facility, to ensure a regular supply of larvae and food. The operation takes free-swimming larvae and grows them to seed, which are 7 to 19 millimeters (mm) in size. After reaching this size, the shellfish seed are either transported to Hog Island's shellfish farms for further grow-out or are sold to other shellfish farms in Humboldt Bay or small shellfish farms elsewhere on the West Coast. Ultimately, the facility may grow up to 40 million seed, and supply 25 to 50 percent of the larvae needed for Hog Island company operations.

The proposed facility would have the capability to accommodate offloading and processing activities in the event that Hog Island later seeks to establish a potential shellfish farm in Arcata Bay. If the shellfish farm is approved, market-size oysters would be brought in to be cleaned, sorted and graded, and held in filtered seawater tanks and cold storage before being shipped to terminal markets.

Detailed descriptions of the major site modifications are discussed below, and illustrated on Figure 2. The existing 7,000 square foot (ft<sup>2</sup>) pier will be used for loading/unloading and approximately 15,000 ft<sup>2</sup> to the north side of the Sequoia X pier will be used to moor floating upwelling systems (FLUPSYs) and nursery rafts. The upland building, covered work area, equipment storage area, parking area, loading facilities, and septic mound system will utilize up to 20,000 ft<sup>2</sup>. The septic will be approximately 500-800 ft<sup>2</sup> (Figure 2). As of the date of this Initial Study, Hog Island is in the process of finalizing and executing a sublease with Sequoia X to lease the upland area and pier for the uses described herein. The sublease requires District approval. Hog Island plans to enter a lease with the District for the tideland adjacent to the pier. The leased area would be limited to the area analyzed in this Initial Study. Specifically, the proposed project includes:

### Marine Facilities

Several ancillary structures will be secured to the existing pier; the pier will not require any improvements to support these structures. The additions involve:

- Securing up to three 30- by 50-ft nursery rafts within the District lease area adjacent to existing pier;
- Securing up to six 80-ft-long, 25-ft-wide, and 5-ft-deep FLUPSYs within the District lease area adjacent to existing pier; and
- Securing access and loading features including:
  - An approximately 40-ft by 5-ft walkway/gangway to the pier for access to the FLUPSYs and nursery rafts, and to support pumps for the upland facility;
  - A 2,000-pound (lb) capacity crane on the existing pier.

### Upland Facilities

The upland site is approximately 3.5 acres, and currently has no improvements. The planned additions are:



- Construction of an approximately 6,400- to 7,200-ft<sup>2</sup> mariculture building. This building would be pre-engineered on a mat slab foundation to house:
  - a shellfish hatchery,
  - a seed setting facility,
  - wet storage tanks, and
  - appropriately configured area of building used for market product sorting area, office, and employee restroom and break room;
- Construction of a 20- by 60-ft greenhouse for microalgae culture;
- Construction of a seed washing system, consisting of a 2,000-gallon water storage tank and a sloped-slab sump system for treating seed prior to shipment off site;
- Construction of a 25- by 60-ft covered work area over concrete slab;
- Piping from the bay via PVC lines, attached to underside of pier deck. Most water will be discharged into an upland gravel infiltration area, with some water discharged directly back to bay;
- Site upgrades including improvements to the existing electrical service and access road and creation of an employee parking area; and
- Equipment storage.

## **Marine Facilities**

### **Nursery Rafts**

Nursery rafts boost seed size before seed is placed in the FLUPSYs for further growth (Figure 3). Seed is placed in the nursery raft when it is approximately 315 to 450 micrometers (0.3 to 0.4 mm) in size and then moved to the FLUPSYs when it reaches 2 to 2.8 mm in size. The project site will include up to three 30- by 50-ft nursery rafts, each with a draft of approximately 2 ft. The nursery rafts will consist of grated decking (e.g., ThruFlow™), upwell tanks used to cultivate small seed, and associated equipment including electric pumps to circulate seawater. The nursery rafts will be secured along the north side of the pier alongside the FLUPSYs (Figure 2). The nursery rafts will be moored by chain and line to the pier and adjacent pilings and anchored to the seafloor using 500-lb Danforth anchors. Access to the nursery rafts will be from the dock by the gangway extending from the pier to the FLUPSYs.

Untreated bay water will be circulated from just below the nursery rafts (at 4 to 5-ft depth) via a 10 horsepower electric pump and passed through the bivalve seed at less than 0.33 ft/second. The intake will be enclosed by a stainless steel screen that has been designed according to NMFS fish screening standards (3/32-inch openings and 0.4-ft-per-second approach velocity) to be protective of fish life. Water will be circulated to a single head tank and moved through upwell tanks in a gravity-fed, single-pass system.

Shellfish are filter-feeding organisms that consume naturally occurring microalgae, bacteria, and organic debris in the circulated water. Therefore, no supplemental feeding of the seed with cultured algae or other additives will be conducted. Water will be drained from the system daily, the seed rinsed with bay water, and system restarted.

## FLUPSYs

FLUPSYs are used to increase seed size before shellfish seed is outplanted on shellfish farms. A row of up to six FLUPSYs will be secured in the Sequoia X lease area (Figure 2). A FLUPSY is an in-water, raft-like structure designed to upwell nutrient-rich water through upwelling bins to provide a consistent source of food to growing shellfish (Figure 3). FLUPSYs circulate water through their open structure. A submerged trough contains a paddle wheel or slow moving propeller. This trough is surrounded by open wells containing the upwelling bins. The paddle wheel or propeller moves the water out of the trough and incoming water passes through the upwelling bins containing seed. The flow rate is less than 0.33 ft/second. The bottoms of the upwelling bins are a 1.2- to 1.8-mm mesh screen, which allows water to come up through the upwelling bin and exit the bin at the top. The water does not leave the Bay.

The FLUPSYs will be moored by chain and line to the pier and adjacent pilings, and anchored to the seafloor using 500-lb Danforth anchors. Access to the FLUPSYs will be from the dock by the gangway extending from the pier. The FLUPSYs will be constructed of aluminum with poly-encapsulated floats for flotation.

Each FLUPSY is approximately 25 ft wide and 80 ft long and will hold 30 upwelling bins (3 ft by 3 ft by 4 ft). Water depth in the lease area is approximately -10 to -33 ft MLLW (Figure 2), and the FLUPSYs have a draft of approximately 5.5 ft of water (i.e., area below water). Thus, the FLUPSYs will not rest on the bottom during low tides.

Seed is typically placed in a FLUPSY when it is approximately 2 to 2.8 mm in size, and removed when it reaches 7 to 19 mm in size. After being grown to a 7- to 19-mm size using the FLUPSYs, the shellfish seed are either transported to Hog Island's shellfish farms for further grow-out or are sold to other shellfish farms in Humboldt Bay or small shellfish farms elsewhere on the West Coast. Activities on the FLUPSY include maintaining the seed by rinsing bins with bay water and grading seed based on size using a vibrating screener. Daily maintenance of the FLUPSY bin screens is performed by pressure washing, which prevents the colonization of those bins by fouling organisms. The bins will also be periodically cycled out into the upland to dry out, thus killing any fouling organisms.<sup>1</sup> The FLUPSYs and nursery rafts do not require regular maintenance to remove fouling organisms, although periodic maintenance on an annual or greater timeframe may be used, depending on site conditions.

### Access and Loading Features

An approximately 40- by 5-ft walkway/gangway to the pier will provide access to the FLUPSYs and nursery rafts. The gangway will be constructed of aluminum.

The FLUPSYs and nursery rafts will be loaded and unloaded using a 2,000-lb-capacity crane that utilizes the existing deck structure of the pier. The crane will be electric powered and will be attached to existing pier infrastructure using bolts and guy wires. No pile driving activities are proposed.

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<sup>1</sup> Potential biofouling organisms may include algae, ascidians, bryozoans, hydroids grazers, tunicates, sponges, amphipods and mysid shrimp. The recruitment of organisms is highly seasonally and annually variable and dependent upon free larvae present in the water column during the specific time of year. The periodic washing and drying of bins is anticipated to prevent accumulation of such biofouling organisms.

Shellfish seed from the FLUPSYs will be moved to the uplands using plastic totes and a small, natural gas powered forklift. Once in the uplands, the seed will be stored in refrigerated units, or treated using the seed washing system and then stored. The refrigeration units will be accessible by trucks for loading and distribution.

## ***Upland Facilities***

### **Mariculture Building**

The mariculture building will be a one story structure approximately 6,400 to 7,200 ft<sup>2</sup> and 30 feet in height and will include the hatchery, seed setting facility, wet storage tanks, and office areas and will be constructed on the unimproved upland site (Figure 2).

#### **Shellfish Hatchery**

The upland shellfish hatchery serves the purpose of spawning, feeding, and growing shellfish seed to a size suitable for transfer to Hog Island's existing and potential future nursery facilities, both on and off the project site. The hatchery includes an algae growing area, a broodstock (from shellfish raised or occurring in Humboldt Bay) conditioning area, and a larvae culture area. The hatchery will require a supply of seawater (see Intake and Discharge description below and Table 1) that is heated and recirculated through the culture tanks. After cycling through the shellfish hatchery, the seawater will be discharged to the gravel infiltration area. The discharged seawater from the shellfish hatchery will contain biologically negligible amounts of surplus algae, feces, and pseudofaeces. Any bleach (sodium hypochlorite) used during periodic sterilization procedures of hatchery tanks will be pH neutralized using sodium thiosulfate per industry standards prior to discharge.

#### **Seed Setting Facility**

The purpose of the seed setting facility is to produce shellfish seed from larvae hatched either on site or elsewhere. Seed is set when free-swimming larvae, spawned in a hatchery, attach themselves to a surface. These surfaces, called "setters" or "spat," are small pieces of shells approximately 0.2 to 0.3 mm in size. The seed is set on the spat using water drawn through an intake from the bay (see Intake and Discharge description below and Table 1). The water (at a flow rate of approximately 100 gallons per minute [gpm])<sup>2</sup> is passed through a sand filtration system to control turbidity, heated using a propane heater to 74 to 76 degrees Fahrenheit, and then passed through bins containing the larvae and spat. The controlled temperature of the water acts as a signal to the larvae to settle on the spat, marking the transition from the free-swimming to sedentary phase of the bivalve lifecycle. Once passed through these bins, the water will be brought back down to ambient bay temperature and discharged into the bay. No other additions are made to the water used in the seed setting facility, and, because bivalve larvae are filter feeders, the water being discharged typically contains lower amounts of organic material and other detritus than the water taken into the facility.

#### **Wet Storage Tanks**

The mariculture building will also house two to four wet storage tanks. Each tank will hold approximately 800 gallons of bay water. These tanks will be used to hold live mature shellfish harvested from the bay to meet market demands. The tanks will be periodically filled with water from the bay (see Intake and Discharge description below

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<sup>2</sup> This flow rate will be maintained constantly during operation of the seed setting facility, mostly occurring during the late spring and summer.

and Table 1) after sand filtration and ultraviolet sterilization. The tanks will be operated as a recirculating system, with the water being replaced at approximately 1-week intervals.

### Office Area

Approximately eight employees will utilize the office area, break room, restrooms, and sorting area, at maximum buildout operations, in the remaining space of the mariculture building.

### Microalgae Greenhouse

The greenhouse for microalgae culture will be approximately 1,200 ft<sup>2</sup> and 30 feet in height, constructed on the upland next to the mariculture building (Figure 2). The microalgae cultivated provide a food source for the hatchery larvae. The microalgae will be sourced from pure stocks and strains located at other West Coast hatcheries. Algae will be grown in a static system. Daily algae needed during peak operations (March through November) will be between 500 and 1,000 gallons/day.

The greenhouse will have tanks containing a total of 10,000 gallons of water. The water would be supplied from the main intake pipe, at a rate of 80 gpm (see Intake and Discharge description below and Table 1). The discharged seawater will be piped out into the infiltration area in the upland. Because shellfish are filter feeders and will digest the algae that are added to the seawater, the discharged seawater will not be significantly different in character from the intake seawater. Hog Island will also culture macroalgae (*Gracillaria* sp., *Fucus* sp.) in the discharge stream for use in its restaurants.

### Seed Wash System

A seed wash system will be constructed to prepare seed for shipment out of state. This system is necessary to comply with a Washington Department of Fish and Wildlife requirement that seed be soaked in a 60 parts per million (ppm) freshwater sodium hypochlorite solution "(chlorine)" prior to shipment to Washington. A 2,000-gallon freshwater storage tank will be placed in the uplands adjacent to the facility (municipal supply; Table 1). This tank will be used to prepare the hypochlorite solution and will be coupled with an approximately 3,000-gallon-capacity sloped-slab sump system to recover spent seed wash water for treatment and appropriate disposal. Totes containing seed will be transported to the concrete pad from the pier using a small forklift, filled with the hypochlorite solution from the mixing and holding tank, and the seed will then be soaked for at least one hour. After soaking, the totes will be drained into the sump system, with the soaking solution recovered back to the storage tank using the sump system. From there, the spent solution will be neutralized and measured for residual chlorine. If the water measures 4 ppm or less of chlorine (4 ppm is the drinking water standard), then the wash water will be infiltrated with no further treatment. Should the wash water have more than 4 ppm of chlorine, then the wash water would be neutralized by adding sodium thiosulfate to the mixing tank until the wash water measures 4 ppm or less of chlorine. The treated water will be disposed of through infiltration in the uplands. During peak seed production season (March through November), this system will be use approximately 2000-3000 gallons of municipal water an average of two times per week.

### Covered Work Area

Adjacent to the mariculture building, a 1,500 ft<sup>2</sup> covered work area will be constructed over concrete slab, with a maximum height of 30 ft (Figure 2). This area will be used for sorting of larger seed and market-sized product and preparation of shipments. Oysters will be sorted using electric-powered sorting machines, and washed down with bay water (see Intake and Discharge description below and Table 1). The concrete slab will have a drain system

that captures any sediments (to be disposed of via an upland waste facility) before water is allowed to flow back to the bay.

### Intake and Discharge

Water would be piped from the bay by two 4- to 6-inch intakes, extending 4 to 5 ft below the walkway float. Two 10 horsepower (hp), variable-speed pumps, capable of pumping up to 300 gpm at any one time, would provide seawater to the systems described above. The intakes will be enclosed by stainless steel screens that have been designed according to NMFS fish screening standards (3/32-inch openings and 0.4-ft-per-second approach velocity) to be protective of fish life. The pumps and intakes would operate alternately, with the non-operating equipment serving as backup. The water would be discharged via a 12-inch pipe into an upland gravel infiltration area prior to filtering back into the bay. Some water (i.e., from seed setting, the hatchery, wash down) would discharge directly back into the bay after any particulate matter has been settled out in concrete flumes or otherwise captured.

The infiltration system will consist of a rock swale. The swale will be sized based on the anticipated soil infiltration rates so that the neutralized wash water and used hatchery water can efficiently be stored by the infiltration structure and infiltrated into the ground within approximately 24 hours. The infiltration area will be situated in the northern portion of the lease boundary so as to maximize the distance to the bay (Figure 2). The water table is located at a minimum of 5.5 to 8 ft below ground surface (LACO 2013).

Table 1, below, summarizes the approximate water use of the upland systems.<sup>3</sup>

**Table 1. Summary of System Water Use**

System	Water Source	Water Use	Discharge Location
Pressure Washer	Municipal	100 gallons/day	Bay
Hatchery	Bay	15,000 gallons/day (includes greenhouse)	Infiltration Area
Seed Setting Facility	Bay	7200 gallons/day (50 gpm)	Bay
Wet Storage Tanks	Bay	4000 gallons/week	Bay (solids settled out)
Greenhouse	Bay	(included in hatchery)	Infiltration area
Seed Wash	Municipal	6000 gallons/week (Mar-Nov)	Infiltration Area
Covered Work Area	Bay	50,000 gallons/day (100 gpm, 4-6 hrs/day)	Bay (solids settled out)

### Access Road and Parking

Site improvements include electrical upgrades and a parking area. The existing electrical service will be upgraded to a 400-amp, three-phase service to both buildings and the pier. An employee parking area will be created for six cars. The parking area will be constructed using gravel and will comply with local stormwater code.

<sup>3</sup> Table 1 does not include estimates of water used in the FLUPSYs and nursery rafts, as that water is merely circulated through the structures and never taken out of the Bay.

## Equipment Storage

Equipment will be stored primarily in the in mariculture building. Some will be stored outside, in the yard, along the north side of the site. No structure will be associated with this storage.

## Construction Sequencing

Construction will most likely be phased over two to three years. In the first year, the seed setting facility, one to two nursery rafts, and one to two FLUPSYs will be constructed and placed. One to two more of each will be constructed and placed the following year. Building construction may occur in phases beginning the first year with the 2,500-ft<sup>2</sup> seed setting facility.

The proposed buildings will be built on new concrete slabs. Approximately 400 cubic yards of soils will need to be excavated to set the slabs. The infiltration area will require excavation backfill of clean crushed gravel and of native material, or other appropriate backfill, to the restored ground surface.

## Best Management Practices

### Construction

Standard motorized diggers and other equipment would be used to excavate the soils. All construction on the site would implement appropriate best management practices (BMPs) to prevent soil and petroleum products from entering the bay. Specific BMPs used will be approved as part of obtaining required grading and building permits. All storage and disposal of hazardous materials will follow all applicable regulations.

### Operations

A potential hazard will be the use of ordinary equipment fuels and fluids during routine operation activities. No diesel fuel is anticipated to be stored at the project site. Propane and gasoline will be used on site. Propane will be stored on site in an appropriate vessel for use in heating the seed setting facility water. Gasoline will be used in minor quantities for fueling the pressure washer. When gasoline is used on site, it will be stored in small quantities in spill-proof (2-5 gallon) containers, and housed in the upland mariculture building rather than at the overwater structures. All refueling will occur in the upland. All hydraulic fluids and lubricants will be food grade. Electric power equipment will be used over water to further minimize the chances of spills. Small amounts (less than 20 pounds) of sodium hypochlorite/bleach will be stored onsite for use in the seed wash system. Should the spent wash water need to be neutralized, corresponding small amounts of sodium thiosulfate will be stored at the site. All hazardous materials will be stored in the upland mariculture building.

Spill containment and response protocols will be developed for the site based on the actual quantities of hazardous materials used at the site, and will be consistent with applicable regulations. Examples of such protocols include appropriate secondary containment in storage areas, employee training, and spill response kits appropriate for the type of materials stored onsite.

## 10. Surrounding Land Uses and Environmental Setting

The surrounding properties include industrial properties to the south and north with several smaller residential buildings along Fay Avenue to the northwest (Figure 4). Plants in the uplands consist mostly of native and non-native species of grasses and shrubs. A small stand of deciduous trees line the property to the west.

Eelgrass is located between the toe of the bank and the inshore edge of the pier, in areas where the elevation is between +1.0 and -1.0 ft MLLW.

The project area is bordered to the east by Humboldt Bay. Humboldt Bay encompasses roughly 62.4 square kilometers (about 15,400 acres) at mean high tide in three geographic segments: South Bay, Entrance Bay, and Arcata Bay. Humboldt Bay is a bar-built coastal lagoon that holds the second largest estuary in California. The bay is home to the largest commercial oyster production operations in the state. Humboldt Bay is also the only deep water bay between San Francisco Bay and Coos Bay, Oregon. Industrial harbor facilities in the Bay include large industrial docks at Samoa and Fields Landing (Barnhart et al 1992).

Humboldt Bay provides habitat for approximately 95 species of fish, 41 of which contribute to sport or commercial fisheries or have contributed to those fisheries in the past. Humboldt Bay is considered an internationally significant area for migratory birds due to the sheer number of birds that depend on Bay habitats in the fall, winter, and spring. Important bird groups that depend on the bay include waterfowl, shorebirds, waterbirds, raptors, and passerines. More than 50 different species of mammals and a wide variety of reptiles and amphibians are known to utilize Humboldt Bay habitats. The various mammalian species use both the Humboldt Bay NWR aquatic and terrestrial habitats. Marine mammals such as harbor seal (*Phoca vitulina*), harbor porpoise (*Phocoena phocoena*) and California sea lion (*Zalophus californianus*) use bay habitats as well as near shore habitats (USFWS and HBNWRC 2009).

## **11. Alternative Sites Considered**

The applicant considered two alternative sites in addition to the proposed project site. The two alternative sites were Berth 2 and 865 North Navy Base Road in Samoa, as shown on Figure 5. The proposed project site is superior to the two alternative sites for the proposed operations. The proposed project site is superior to the Berth 2 site because the proposed project site already has an existing shellfish operation that the Hog Island operation would replace and the Berth 2 upland site is smaller, which would limit Hog Island's proposed operations. The 865 North Navy Base Road site does not have an existing dock and would therefore require additional construction, resulting in greater (although likely still insignificant) environmental impacts. Further, the proposed project site is categorized as a "Priority 1" site under the Humboldt County Code, in that the site has "existing facilities suitable to accommodate the proposed use, or that could accommodate the proposed use with minor alteration or expansion of the existing facilities." Humboldt County Code § 313-45.1.3.3. Coastal-Dependent Industrial uses are encouraged on Priority 1 sites. The project site does not include any wetland areas and has an existing dock that will be used for the proposed operations. Therefore, the site is preferable based on the County's standards for site selection.

**12. Public Agencies whose Approval Is Required:**

Agency	Permit Type
<b>Humboldt County Harbor, Recreation &amp; Conservation District</b>	-Use Permit -Tidal Lease -Upland and Pier Sublease
<b>United States Army Corps of Engineers</b>	Department of Army Permit (Section 10 Rivers and Harbors Act)
<b>California Coastal Commission</b>	Coastal Development Permit and Coastal Zone Management Consistency Determination
<b>North Coast Regional Water Quality Control Board</b>	Waste Discharge Requirements
<b>Humboldt County</b>	Building and Grading Permits



## CHAPTER 3 ENVIRONMENTAL CHECKLIST AND DISCUSSIONS

### *Environmental Factors Potentially Affected*

The proposed project could potentially affect the environmental factor(s) checked below. The following pages present a more detailed checklist and discussion of each environmental factor.

- |  |   |  |
|--|---|--|
| <input checked="" type="checkbox"/> Aesthetics               | <input type="checkbox"/> Agricultural and Forest Resources      | <input checked="" type="checkbox"/> Air Quality                        |
| <input checked="" type="checkbox"/> Biological Resources     | <input type="checkbox"/> Cultural Resources                     | <input checked="" type="checkbox"/> Geology and Soils                  |
| <input checked="" type="checkbox"/> Greenhouse Gas Emissions | <input checked="" type="checkbox"/> Hazards/Hazardous Materials | <input checked="" type="checkbox"/> Hydrology and Water Quality        |
| <input type="checkbox"/> Land Use/Planning                   | <input type="checkbox"/> Mineral/Energy Resources               | <input checked="" type="checkbox"/> Noise                              |
| <input type="checkbox"/> Population and Housing              | <input type="checkbox"/> Public Services                        | <input type="checkbox"/> Recreation                                    |
| <input type="checkbox"/> Transportation and Circulation      | <input type="checkbox"/> Utilities and Service Systems          | <input checked="" type="checkbox"/> Mandatory Findings of Significance |

## ***Evaluation of Environmental Impacts:***

1. A brief explanation is required for all answers except “No Impact” answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A “No Impact” answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A “No Impact” answer should be explained if it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2. All answers must take account of the whole action involved, including offsite as well as onsite, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3. Once the lead agency has determined that a particular physical impact may occur, the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. “Potentially Significant Impact” is appropriate if there is substantial evidence that an effect may be significant. If there are one or more “Potentially Significant Impact” entries when the determination is made, an Environmental Impact Report (EIR) is required.
4. “Negative Declaration: Less than Significant with Mitigation Incorporated” applies when the incorporation of mitigation measures has reduced an effect from a “Potentially Significant Impact” to a “Less-than-Significant Impact”. The lead agency must describe the mitigation measures and briefly explain how they reduce the effect to a less-than-significant level. (Mitigation measures from Section XVII, “Earlier Analyses”, may be cross-referenced.)
5. Earlier analyses may be used if, pursuant to tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration [Section 15063(c)(3)(D)]. In this case, a brief discussion should identify the following:
  - a. Earlier Analysis Used. Identify and state where earlier analyses are available for review.
  - b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards and state whether such effects were addressed by mitigation measures based on the earlier analysis.
  - c. Mitigation Measures. For effects that are “Less than Significant with Mitigation Incorporated,” describe the mitigation measures that were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, when appropriate, include a reference to the page or pages where the statement is substantiated.
7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project’s environmental effects in whatever format is selected.
9. The explanation of each issue should identify:
  - a. the significance criteria or threshold, if any, used to evaluate each question; and
  - b. the mitigation measure identified, if any, to reduce the impact to a less-than-significant level.

## Evaluation of Environmental Effects

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
<b>I. AESTHETICS—Would the project:</b>				
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment which contribute to a scenic public setting?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area or which would substantially impact other people or properties?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### Discussion of Checklist Responses:

I.a-b) The Samoa Peninsula (Peninsula) constitutes a scenic resource for the region on the eastern side of Humboldt Bay (the Bay). Potentially significant effects on scenic resources would occur if the proposed project degraded the existing scenic environment. Proposed activities will occur in areas that have previously been disturbed by historic site use. Historically, the dock was used to offload materials and chemicals for the upland paper mill, adjacent to the project site. Currently, the dock is used for access to Taylor Mariculture's shellfish nursery rafts. The proposed project would moor FLUPSYs and nursery rafts to the existing industrial dock. The FLUPSYs and nursery rafts are low-profile improvements that will not be visible from public viewpoints and roads and will not detract from the scenic views of the Bay and Peninsula. While the proposed upland structures will constitute new development on currently unimproved land, the single-story structures will have a maximum height of 30 feet, thereby avoiding blocking public views of the Peninsula and Bay. Given the proximity of nearby residences to the shoreline, the project, which is located several hundred feet south of the residences, is not likely to significantly impact residents' eastern views.

I.c) Adjacent property uses include a boat/ship drydock facility, a former pulp mill, and smaller residential buildings. The elements of the proposed project are consistent with the industrial zoning of the site. Further, all proposed upland structures are single-story structures with heights between 25 and 30 feet. The low profile of the structures and rafts will eliminate any potential view impacts to nearby residential properties, as the structures will not impede their view corridor. The proposed facility does not degrade the aesthetic or scenic resources at the project site, surrounding area, or of the Bay.

I.d) Additional lighting may be required to maintain safe working conditions.

**Mitigation Measure Aesthetics-1.** If additional exterior lighting is required, new sources of light shall be directed downward on structures and/or the parking lot area and properly shielded to minimize impacts to nighttime views and prevent light spillover onto adjacent residential properties, while maintaining a safe level of exterior lighting during nighttime work.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
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**II. AGRICULTURE AND FOREST RESOURCES:** In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state’s inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

**—Would the project**

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)) or timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in the loss of forest land or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

II.a-e) There is no agricultural land, forestland, or associated zoning near the project site, and the project will have no effect on agriculture or forested areas.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>III. AIR QUALITY:</b> When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations <b>— Would the project:</b>				
a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal, state, or regional ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Otherwise degrade the atmospheric environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Substantially alter air movement, moisture temperature or other aspects of climate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

III.a, b, d) The project area is within the North Coast Air Basin and is under the regulatory jurisdiction of the North Coast Unified Air Quality Management District (NCUAQMD).

Construction Emissions

Temporary sources of emissions include operation of construction equipment used to construct the upland structures. Construction of the upland structures would be similar to that required for a small commercial structure. Commercial structures less than 10,000 ft<sup>2</sup> have been deemed to not have a significant impact on the environment and are categorically exempt from CEQA. (CEQA Guidelines § 15303(c)). Therefore, the emissions during construction will be similar to projects normally exempt from CEQA analysis. Further, the project will likely be constructed in phases, thereby further reducing potential daily construction emissions as not all required construction equipment will be in operation at once. Given the small size of the project, project-related construction would not exceed any of the NCUAQMD daily emission thresholds established in NCUAQMD Rule 110 § 5.1.

## Operational Emissions

Potential sources of operational emissions are vehicle trips to and from the site, skiff operation around the rafts, operation of a natural gas forklift, and intermittent use of 5 hp pumps. All internal combustion engines have a power rating of less than 50 hp. A portable (5hp) pump is used for approximately 1 hour per day to rinse seed and a 5 hp gas-powered power-washer would be used daily to clean the upwelling bins. The settling facility water will be heated using a propane heating system. Based on the small size of the machines used, the small number of machines, and intermittent usage, the project will have a minor net increase in CO<sub>2</sub> emissions. However, the proposed equipment are considered by the NCUAQMD as insignificant sources of pollution and therefore operating permits are not required (i.e., operation of the project would not exceed any of the NCUAQMD daily emission thresholds established in NCUAQMD Rule 110 § 5.1). Further, emissions from the project would be significantly less than most other industrial uses that could be constructed on the project site consistent with the underlying zoning.

III.c) The project will emit minor amounts of exhaust from small internal combustion engines associated with equipment used at the site, including power washers and outboard engines, and these emissions could contribute to an existing non-attainment status for the North Coast Air Basin for particulate matter smaller than 10 micrometers (PM<sub>10</sub>). Reductions in emissions are expected over time as advances in equipment technology continue and equipment is replaced or upgraded.

The District lacks direct jurisdiction over air quality, and thus lacks direct authority to require mitigation for potential air quality impacts. The District is entitled to rely on the air quality management efforts of NCUAQMD with respect to mitigating environmental effects of the applicant's proposed activities. NCUAQMD has adopted several air quality management plan elements, specifically including a "PM<sub>10</sub> Plan".

**Mitigation Measure Air Quality-1.** To prevent a potentially significant contribution to the regional non-attainment for PM<sub>10</sub>, contractor shall comply with the NCUAQMD's "Air Quality Control Rule 104 – Prohibitions."

III.e) The proposed project is not expected to create objectionable odors. Additionally, there are no sensitive receptors or a substantial number of people in the immediate vicinity of the project site.

III.f-g) No atmospheric or climatic effects are expected. Given the low emissions emitted from the portable pumps and other equipment used on site, the proposed project is not expected to emit greenhouse gas air pollutants at a significant level. Any emissions from the proposed project would be significantly less than other industrial uses that could be built on the project site.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>IV. BIOLOGICAL RESOURCES</b>				
<b>—Would the project:</b>				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Otherwise degrade the biotic environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Discussion of Checklist Responses:**

IV.a) Terrestrial animals present in the uplands are those associated with industrial areas along estuarine shoreline: raccoons, rodents, gulls, crows, other small birds and aquatic species would be those typically found in the shallow waters of Humboldt Bay and likely include anchovies, herring, smelt, salmon, trout, perch, and stickleback (Fritzsche and Cavanagh 2007). Based on existing habitat conditions, no sensitive upland or wetland plants are in the vicinity of the project site.

Eelgrass

Based on air photo interpretation and eelgrass mapping data, eelgrass may be present in the project vicinity, and is likely located in areas of +1 to -1.0 ft MLLW (Figure 2) as is typical throughout Humboldt Bay (Barnhart 1992). However, project activities will not occur over or adjacent to any existing eelgrass. The FLUPSYs and nursery rafts are moored in water about -10 to -30 ft MLLW, well beyond the limit of the eelgrass zone. The shade footprint

caused by the proposed project does not encroach into the eelgrass beds. Therefore no direct (e.g., physical disturbance) or indirect (e.g., shading) impacts to eelgrass would occur.

### Fish

Since the proposed project is located in Humboldt Bay, the following sensitive aquatic animal species may be in the vicinity of the project site:

- Green sturgeon (*Acipenser medirostris*)
- Coho salmon (*Oncorhynchus kisutch*)
- Chinook salmon (*Oncorhynchus tshawytscha*)
- Steelhead (*Oncorhynchus mykiss*)
- Pacific eulachon (*Thaleichthys pacificus*)
- Longfin smelt (*Spirinchus thaleichthys*)

North American Green sturgeon (green sturgeon) may be in the vicinity. Green sturgeon adults and sub-adults are temporary residents in Humboldt Bay from June through October, utilizing Arcata Bay as summer-fall holding or feeding habitat, and the deeper waters of the North Bay channel as a migratory corridor between the Pacific Ocean and Arcata Bay (Pinnix 2008). Green sturgeon would likely swim through Samoa Channel, past the project site, en route to Arcata Bay, as they move from the Pacific Ocean into Humboldt Bay. Because the proposed action will occur in deeper water adjacent to the Samoa Channel and is far from the holding area in Arcata Bay, the potential adverse effects of the proposed action on the epibenthic and benthic prey resources in Arcata Bay are likely negligible.

Salmonids, including coho salmon, Chinook salmon, and steelhead, use Humboldt Bay for foraging and migration and likely use the area in and around the pier for migrating, rearing and feeding. A recent study by Pinnix et al (2013), observed that coho smolts often used areas of the bay characterized by deep channels with narrow intertidal margins. Because the study area has similar characteristics as those preferred by salmonid smolts, they will likely be in the project vicinity and have the potential to be impacted by project activities. The placement of nursery rafts and FLUPSYs have the potential to impact salmonid migration. Some studies have described overwater structures and shading as problematic for juvenile salmonids during outmigration (Simenstad and Nightingale 2001). However, the negative effects on juvenile salmon are based on structures attached to and oriented perpendicular to the shoreline. The pier to be used for this project has been present for many years and is part of the existing environmental setting. Further, studies have challenged whether there is a causal link between overwater structures and predation Simenstad and Nightingale (1999) state:

Despite considerable speculation about the effects of over-water structures increasing predation on juvenile salmon, evidence supporting this contention is scientifically uncertain at best. Quantitative assessment of predation around over-water structures is meager. The limited state of knowledge about the relationship between overwater structures and predation is demonstrated by the paucity of existing empirical data . . . In cases that have attempted to verify enhanced predation associated with overwater structures, such as Ratte (1985), predation has actually been shown to be relatively insignificant and limited to one or two species . . . In addition, the significance of predation to the migrating population has, to our knowledge, never been assessed empirically. No studies have examined the mortality specifically due to predation,



much less attribute to predators specifically associated with overwater structures. (Simenstad et. al. 1999)

In 2003, an empirical study was undertaken to evaluate this issue further and included an assessment of potential increased predation on juvenile salmonids by aggregation of fish, avian, and marine mammal predators (Williams et. al. 2003). The study concluded that there was no evidence that avian, marine, mammal, or fish predators consumed more juvenile salmon near overwater structures than along shorelines without overwater structures.

The proposed FLUPSYs and nursery rafts are located in medium depth water and allow juvenile salmon to outmigrate in the deeper water channel areas as they currently do. No new structures will be placed in waters where salmonids are expected to be migrating or foraging; therefore impacts to salmonids from project structures are not expected to occur.

All pump intakes will be designed according to NMFS fish screening standards (i.e., 3/32-inch (in) openings and 0.4-foot-per-second approach velocity) to be protective of fish life. Because the nursery rafts and FLUPSYs will be placed adjacent to existing piers and docks, and there is no evidence that predation is increased in the vicinity of overwater structures, the proposed action is not likely to increase of predation on juvenile salmonids in the action area. Therefore, the potential adverse effects on survival juvenile salmonids would likely be less than significant. Because the flow rate through the nursery rafts and FLUPSYs is low (i.e., less than 0.33 feet (ft) per second), the potential for juvenile salmonids to be unable to swim past the structures and be drawn into the upwelling bins is highly unlikely. The potential adverse effects of withdrawal of Humboldt Bay water on entrainment of juvenile salmonids are negligible.

Adult Pacific eulachon have been occasionally found in Humboldt Bay and its tributaries in the early 1970s, and were likely strays from the Mad River (Jennings 1996). No additional adult Pacific eulachon have been collected in the subsequent 40 years. Therefore, presence of Pacific eulachon in the action area is unlikely, and exposure of individuals to the potential effects of project activities is improbable and discountable.

Longfin smelt are widely but patchily distributed along North America's Pacific coast as a series of disjunct estuarine-anadromous or land-locked populations, and have been observed in Humboldt Bay (CDFG 2009). Throughout their two-year life cycle, longfin smelt seasonally occupy a range of open water habitats in estuaries, from fresh to brackish water areas for spawning to brackish and marine habitats for juvenile and sub-adult rearing. While in estuaries, longfin smelt utilize areas with freshwater inflow for spawning and rearing and open water habitats for feeding and migration. Threats to longfin smelt include: reductions in freshwater inflow to the estuaries they inhabit; loss of larval, juvenile and adult fish at agricultural, urban, industrial, and local water diversions (usually located in freshwater areas of estuaries used by the species for spawning); direct and indirect impacts of non-native species on the longfin smelt food supply and habitat; lethal and sub-lethal effects of toxic chemicals; physical disruption of their spawning substrates and the habitat of their prey species (e.g., by dredging); and warming of estuary waters resulting from global climate change. The project site does not contain areas of freshwater inflow nor will the project contribute to any of the identified threats to longfin smelt. Given the similar class size of longfin smelt and juvenile salmonids, the logic of the studies cited above concerning the lack of an impact from overwater structures on predation would apply equally to smelt. Given the lack of impact mechanism from the project, no impacts to longfin smelt are anticipated.

## Fish Habitat and Phytoplankton

Groundfish, coastal pelagic, and salmonid fish species could have designated essential fish habitat (EFH) in the vicinity of the project. The proposed project entails no alteration in baseline indicators for geomorphology; circulation; salinity; dissolved oxygen; biochemical oxygen demand; temperature regime; water column and sediment contaminants; prey base; the fish, bird and mammal communities; or invasive/exotic species. The principal changes will be to the water column phytoplankton community. Changes to water column phytoplankton, also, could be beneficial or adverse to the phytoplankton community, but in view of the extremely rapid regeneration time for phytoplankton and the large amount of exchange with coastal nearshore waters, the changes do not have the potential to affect habitat use by EFH species potentially present in the area.

The amount of phytoplankton removed as well as the waste products produced is not expected to impact other species dependent on phytoplankton. The tidal currents in the vicinity of the project as well as the tidal exchange for Humboldt Bay are exceedingly large with an average of 44% of the waters of Arcata Bay being replaced each day and 99% achieved in 7 days (Barnhart et al 1992). The nearshore waters adjacent to Humboldt Bay are highly productive due to coastal upwelling of nutrient rich waters. Within the bay, riverine sources of nutrients provide for additional primary productivity within Humboldt Bay. Agricultural and municipal discharges, including two wastewater treatment discharges, contribute to further nutrient sources. All of these factors provide for abundant nutrients fueling high levels of primary production in the form of phytoplankton and marine algae.

The shellfish within FLUPSYs and nursery rafts are very small (up to 19 mm); filter small amounts of water (0.0048 m<sup>3</sup> per day [Nakamura 2004]); and, accordingly consume a limited amount of primary productivity in the form of phytoplankton. A simple calculation is as follows:

$X * Y / Z = \% \text{ of water in Arcata Bay filtered per day}$

$X = \# \text{ of shellfish in proposed operation (20-40 million organisms } 0.3 - 19 \text{ mm is size)}$

$Y = \text{volume of water filtered per shellfish per day (} 0.0048 \text{ m}^3 \text{ per day)}$

$Z = \text{volume of water in Arcata Bay (} 8.43 * 10^7 \text{ MHW [Barnhart et al 1992])}$

$40,000,000 * 0.0048 / 84,318,181 = 0.00227 = 0.227\%$

Based on these calculations, less than 0.25% of the volume of Arcata Bay is filtered by the shellfish in the FLUPSYs and nursery rafts. The tidal prism (volume of water leaving the estuary during one ebb tide) for Arcata Bay is  $3.71 * 10^7 \text{ m}^3$  (Barnhart et al 1992). Thus, while the shellfish do filter a certain volume of water, more than 380 times this amount is exchanged with the coastal nearshore ocean each day. Therefore any changes to water quality associated with the proposed project would be insignificant and discountable. It is also important to note that any water quality changes that do occur are generally positive, as shellfish filter material from the water column.

The shellfish within FLUPSYs and nursery rafts are very small and consume a limited amount of phytoplankton. Given the small size of the organisms, the large tidal exchange with the nearshore ocean, and the abundant sources of additional nutrient inputs from terrestrial and anthropogenic sources, the filtering of primary production by the cultured shellfish in this project will be insignificant and not measurable in the context of the carrying capacity of Humboldt Bay. Therefore the amount of phytoplankton removed as well as the waste

products produced can be reasonably deemed insignificant and would not have a measurable effect on other species or habitats.

### Brown Pelicans

Although brown pelicans have not been observed in the project area, they have a history of roosting on docks, pilings, and shellfish rafts, including times when farmers are present to maintain seed. Hog Island's personnel do not undertake any activity that would be defined as take or harassment of any protected species, including brown pelicans. Generally, the additional surface area provided by the nursery rafts and FLUPSYs may provide additional resting areas for various bird species. The addition of the rafts and FLUPSYs are unlikely to significantly increase or decrease bird activity in the area, as birds already have significant resting areas provided by the existing dock. If consistent use is observed, exclusionary devices could be installed.

### Marine Mammals

Although sea lions, harbor seals, and river otters are residents/visitors of Samoa Channel, no seal haul out or pupping areas exist in the vicinity of the project site. Again, Hog Island's personnel do not undertake any activity that would be defined as take or harassment of any protected species, including marine mammals. If consistent use is observed, exclusionary devices could be installed.

### Fouling Organisms and Nonnative Species

Hog Island is a participant in a disease prevention program, (the "Shellfish High Health Program"), sponsored by the Pacific Coast Shellfish Growers Association (PCSGA). Hog Island conducts disease examination of all species cultured annually by a USDA certified Shellfish Pathologist. All import of bivalve larvae and seed to Humboldt Bay are done under a permit issued by CDFW, and exports are permitted by cooperating state or foreign governments. All species cultured are mono-culture, with their origin at a certified hatchery that cultures only species that are licensed by the state of origin. Therefore, there is very little risk of new nonnative species being introduced through cultivation of the seeds themselves.

Daily washing of trays and wells generally prevents their colonization by fouling organisms. Hog Island will rinse the bins on the raft and FLUPSY surfaces with water from the bay. This method (as opposed to rinsing the bins onshore) results in a more efficient operation, less water being drawn out of the bay for upland activities, and less disturbance of the ecological habitat (as the bins will be out of the water for less time). The rafts do not require regular maintenance to remove fouling organisms, although periodic maintenance on an annual or greater timeframe may be used, depending on site conditions. Washing is conducted on-site, so organisms are returned to the bay.

Boyle et al (2006) evaluated the role of exotic species and larval settlement in Humboldt Bay. The study concluded that the initial phases of settlement of new surfaces were dominated by colonial and solitary ascidians, byozoans and hydroids, almost all of which were introduced to Humboldt Bay. However, rainstorms, which brought fresh water and heavy sediment loads into the bay each winter, lead to the sudden disappearance of many of these invasive species and that over time native species, such as mussels, sponges and tubicolous amphipods gradually increased in abundance, perhaps due to their tolerance to heavy sediment loads.

The project will provide substrate for both native and non-native fouling organisms; however the additional surface area created by this project is minimal relative to the existing substrate in the bay. Further, several species of invasive fouling organisms are well established in the bay, and are caused by a variety of factors, including

international shipping (Barnhart et al 1992, Boyd et al.2002). Therefore, the project is considered to have a less than significant impact concerning fouling organisms and nonnative species.

**Mitigation Measure Biological Resources-1.** While use of the proposed structures by birds and mammals is not anticipated, if any marine mammals or more than 10 pelicans are observed on Hog Island's FLUPSYs or nursery rafts for more than two continuous weeks, Hog Island shall notify the Department of Fish and Wildlife within 10 days and within 30 days of such notification shall submit a plan to install passive deterrent devices (such as exclusionary fencing or netting) to prevent the future use of such structures by marine mammals and seabirds, for the Department's review and approval, and shall install the devices pursuant to the approved plan.

IV.b) The shoreline adjacent to the pier consists of riprap armoring with limited to non-native riparian vegetation present. Aquatic vegetation includes eelgrass between the existing finger pier and the shoreline at depths of approximately +1 to -1.0 MLLW. The FLUPSYs and nursery rafts are moored in water -10 to -30 ft MLLW, well beyond the limit of the eelgrass zone. Floating eelgrass debris that seasonally accumulates in large rafts will strand alongside the FLUPSYs and nursery rafts (as with all vessels and docks in Humboldt Bay). Stranded eelgrass is moved by the crew as necessary and replaced in the bay. Due to depth of mooring site, and naturally occurring high turbidity, the nursery rafts do not contribute to shading of macrophytes. Bladderwort and various other intertidal macrophytes colonize the nursery rafts and adjacent pilings.

IV.c.) No wetlands are within the project area. The project site has not been identified as a wetland area or coastal wetland area by Humboldt County, or the National Wetlands Inventory.

IV.d) The project site is located at an industrial dock adjacent to the Samoa Channel which is periodically dredged to a depth of 38 ft to maintain navigation safety. The project site does not include tidewater goby habitat (i.e., brackish water in shallow lagoons or in lower stream reaches). However, green sturgeon, salmonids and longfin smelt may be in the vicinity. Studies show green sturgeon, salmonids, and longfin smelt utilize habitats (i.e., bottom habitats and deepwater channels) outside of where the FLUPSYs and nursery rafts or pump intakes would be placed. Should fish swim near the pump intakes, the intakes have been designed to meet NMFS's guidelines to prevent the entrainment and entrapment of all life history stages fish. The submersible pumps have a very low suction head (<0.33 ft/second) and are screened with the 3/32 inch mesh screen to prevent impacts to fish.

IV.e-f) The proposed project does not conflict with any local policies or Habitat Conservation Plans. In fact, the proposed project meets the goals and policies identified in the Humboldt Bay Management Plan (HBHRCD 2007).

IV.g) The project will occur in an existing industrial area, where historic uses have degraded the biotic environment. The activities included in the proposed project will allow the continued improvement of the biotic environment in the project vicinity.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>V. CULTURAL RESOURCES</b>				
<b>—Would the project:</b>				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

V.a-c) No cultural or historical resources are known to be present at the project site. Part of the upland property appears to be fill over original wetlands based on the 1870 maps of the area, and this former intertidal area is unlikely to hold any cultural resources. The proposed project will include excavation that will all occur within this filled area, and no native soils will be disturbed. Because of these factors, the project is not expected to impact any cultural or historical resources.

However, it is possible that unknown cultural, historic, or paleontological resources, as well as human remains, could be uncovered in the course of the project. To address this potential, the following mitigation measures shall apply.

**Mitigation Measure Cultural Resources -1.** Should any historical or cultural resources be unearthed during site preparation and construction, work in that area will immediately halt, the District shall be notified, and a qualified professional shall be contacted to determine the significance and make recommendations to the District for appropriate mitigation measures in compliance with the guidelines of the California Environmental Quality Act. In addition, in the event of an inadvertent discovery of artifacts the THPOs for the Blue Lake Rancheria, Wiyot Tribe and Bear River Band of Rohnerville Rancheria, shall be contacted and consulted about significance and treatment of the discover.

d) Construction activities, particularly grading and soil excavation, carry the potential to uncover unknown buried human remains, therefore, the following mitigation measure shall be implemented:

**Mitigation Measure Cultural Resources -2.** If human remains of any kind are found during project activities, all activities must cease immediately and the Humboldt County Coroner, the District, and a qualified archaeologist must be notified. The Coroner will examine the remains and determine the next appropriate action based on his or her findings. If the coroner determines the remains to be of Native American origin, he or she will notify the Native American Heritage Commission and the THPOs for the Blue Lake Rancheria, Wiyot Tribe and Bear River Band of Rohnerville Rancheria I.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>VI. GEOLOGY AND SOILS</b>				
<b>—Would the project:</b>				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Be located on geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Change substantially the topography or any unique geologic or physical features of the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

VI.a-f) The entire area, including the project site, is subject to strong earthquakes and ground shaking associated with both the Cascadia Subduction Zone and the Little Salmon Fault. There are no delineated fault zones at the site<sup>4</sup>; and surface rupture is not expected. Previous field surveys conducted after a magnitude 7.0 earthquake in the vicinity of the project site revealed little to no damage at the site, and no reports of liquefaction in the area (Lajoie and Keefer 1981). The upland facilities proposed for the site are single story structures built to standard engineering design criteria subject to California Building Code building regulations designed to withstand earthquake impacts, and those buildings are not the type of structures that present significant chances of failure in a seismic event that would lead to substantial adverse effects.

<sup>4</sup> See Figure 4a of Division of Mines and Geology Special Publication 42, available at: <ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf> (last visited March 14, 2013).

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>VII. GREENHOUSE GAS EMISSIONS</b>				
<b>—Would the project:</b>				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

VII.a-b) The project will utilize new 3-phase, 400 amp electricity service to be provided by the local utility company, and will use small quantities of gasoline and larger quantities of propane. Potential sources of greenhouse gas (GHG) emissions are operation of the FLUPSYs and nursery rafts, vehicle trips to and from the site, operation of a natural gas forklift and crane, and intermittent use of 5 hp electric pumps. The FLUPSYs and nursery rafts have electric main circulating pumps. A portable (5hp) pump is used for approximately 1 hour per day to rinse seed and a 5 hp gas-powered or electric power-washer would be used daily to clean the upwelling bins. The settling facility water will be heated using a propane heating system.

The project emissions would not conflict with the plans described in the following reports:

- CEQA and Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act, California Air Pollution Control Officers Association (CAPCOA), January 2008
- Climate Change Scoping Plan, California Air Resources Board (CARB), December 2008
- The California Environmental Quality Act – Addressing Global Warming Impacts at the Local Agency Level, Office of the California Attorney General, 2008

As compared to other prior industrial uses for the site and other potential industrial uses that could be constructed on the site, the project would result in substantially less GHG emissions, as emissions from stationary sources and vehicle emissions would be negligible. Therefore, the project would result in a less than significant impact concerning GHG emissions.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>VIII. HAZARDS AND HAZARDOUS MATERIALS</b>				
<b>—Would the project:</b>				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be located within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

VIII.a-b) No diesel fuel is anticipated to be stored at the project site. A recognized hazard will be the use of ordinary equipment fuels and fluids during the construction and routine operation activities. The small chance of a spill is not considered a significant impact. Propane and gasoline will be used on site. Propane will be stored on site in an appropriate vessel for use in heating the seed setting facility water. Gasoline will be used in minor quantities for fueling small internal combustion engines such as outboards or pressure washers, or other similar equipment. All refueling will occur in the upland. All hydraulic fluids and lubricants will be food grade. Electric power equipment will be used over water when possible to further minimize the chances of spills. Where gasoline is used on site, it will be stored in small quantities in spill-proof (2-5 gallon) containers, and housed in the upland mariculture building rather than at the overwater structures. Small amounts (less than 20 pounds) of sodium



hypochlorite/bleach will be stored onsite for use in the seed wash system. Should the spent wash water need to be neutralized, corresponding small amounts of sodium thiosulfate will be stored at the site. All hazardous materials will be stored in the upland mariculture building. Spill containment and response protocols will be developed for the site based on the actual quantities of hazardous materials used at the site, and will be consistent with applicable regulations. Examples of such protocols include appropriate secondary containment in storage areas, employee training, and spill response kits appropriate for the type of materials stored onsite.

**Mitigation Measure – Hazards and Hazardous Materials-1.** The hull of the nursery rafts shall only be painted with an epoxy (SDR 235, Devon Products) that is approved for drinking water holding tanks. Because bivalves are susceptible to heavy metal contaminants such as copper oxide and tributyl tin found in some bottom paints, the company's vessels shall not utilize commercial bottom paints. The nursery rafts shall be moored at the industrial dock such that there will be no impact on navigation safety.

VIII.c-h) The project site is not on a list of hazardous materials sites, nor is it within ¼ mile (mi) of a school or proposed school. The closest airport is the Eureka Municipal Airport, about 1.35 mi southwest of the project site. The project site is not within the land use area for the airport. The project will have no bearing on emergency plans nor does the project create unusual fire risk at the site.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>IX. HYDROLOGY AND WATER QUALITY</b>				
<b>—Would the project:</b>				
a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion of siltation on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f) Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
j) Contribute to inundation by seiche, tsunami, or mudflow?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Discussion of Checklist Responses:**

IX.a) As stated in the project description, water will be discharged both directly into the bay and indirectly through a gravel discharge area. The seed setting facility uses water from the Humboldt Bay to set the seed and would discharge that water back into the bay. Hog Island anticipates that the discharge water will contain lower amounts of organic material and other detritus than the intake water as a result of filtration by shellfish and will

be no more than 1.8 to 2.7 degrees Fahrenheit (1 to 1.5 degrees Celsius) above ambient temperature. The seed wash system uses chlorinated freshwater to soak the seed. After soaking, the water is recycled into the holding tank and neutralized before discharging. This water will be infiltrated in the uplands consistent with appropriate regulatory requirements. Humboldt County has indicated that it will not assert jurisdiction over this type of facility because it is not being used to dispose of human waste. A Waste Discharge Permit application will need to be filed through the North Coast Regional Water Control Board (NCRWB), and, based on that application, the NCRWB will either issue a permit or waive the permit requirements. The infiltration system is being designed to be consistent with the standards required by the NCRWB as set forth in Section 4 of the Water Quality Control Plan for the North Coast Region.

IX.b-e) The project is utilizing an existing, vacant, industrial parcel and pier. The parcel will be redeveloped and the area put to beneficial use. As the project site is undeveloped, the project will result in a greater area of impermeable surfaces on the property, resulting from construction of the upland structures. The proposed parking area would be made of gravel and would not contribute to additional surface runoff. Any changes in runoff due to site development will comply with local stormwater code requirements designed to eliminate runoff to the Bay or other undesignated water sources.

IX.f) The project site is a favorable location for bivalve culture due to salinity, temperature, and bacteriological quality. Turbidity in this channel is naturally high, as in all channels in Humboldt Bay, especially following rain or strong wind; however the bivalve seed is quite tolerant of high turbidity conditions. Some sediment settles in the culture tanks, and is rinsed out during daily maintenance. The only local natural resource being utilized by the project is bay water for cultivation of shellfish seed, but that water is not altered when used, and is discharged cleaner in terms of organic material and other detritus because of the filter feeding nature of shellfish.

IX.g-i) All of Humboldt Bay is designated as the 100 year flood hazard area. No housing or structures will be placed within the 100-year floodplain that would impede or redirect flood flows. The proposed project is protected by virtue of being on an existing pier, and by the existing berm that separates the uplands from Humboldt Bay. In addition, proposed upland structures are simple (i.e., sheet metal and metal framing) and would resist flooding damage. No residential housing is proposed for the site.

IX.j) The project site is subject to inundation by tsunami associated with Cascadia Subduction Zone events. Workers will be informed regarding evacuation routes and procedures in the event of a seismic event and tsunami.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>X. LAND USE AND LAND USE PLANNING</b>				
<b>—Would the project:</b>				
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

X.a-c) The project would not divide an established community. The project site is zoned industrial; coastal dependent, and mariculture operations are a permitted use in this zone (Humboldt County Code Zoning Regulations § 313-3.4). Further, Hog Island’s project will assist in promoting the mariculture industry in Humboldt Bay, consistent with the District’s goals set forth in the Humboldt Bay Management Plan (“HBMP”), and also consistent with the State of California’s goals of encouraging aquaculture as a means of augmenting food supplies and local economies. The project furthers the District’s goals of continuing to support commercial aquaculture (HBMP 3.5.1). The project site is located within the ‘Harbor’ use designation in the HBMP, a designation intended to support adjacent upland land uses that are consistent with coastal-or water-dependent uses. The project also furthers the District’s policy objectives of protecting the shoreline for the development of aquaculture facilities (HFA-3); and identifying other aquaculture opportunities in Humboldt Bay (HFA-5). The conversion of a vacant industrial site to an aquaculture facility is consistent with these goals. The project will also be compatible with other coastal dependent uses. This type of facility can coexist with industrial coastal dependent uses such as marine terminals, mills, and other heavy industrial uses.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>XI. MINERAL AND ENERGY RESOURCES</b>				
<b>—Would the project:</b>				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

XI.a-b) No mineral resources are known in the project site; In addition, the site is already developed with a dock infrastructure; thus, the likelihood of mineral resources being present but unknown is very small. In the event there are mineral resources at the site, the lease with the District for the site reserves mineral rights to the State of California.

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	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>XII. NOISE</b>				
<b>—Would the project:</b>				
a) Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Be located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

XII.a-b) Construction activities will use typical mechanized and hand equipment. Installation of the rafts and construction of the single-story upland structures, and phased design of the project, is expected to result in relatively short and intermittent periods of construction noise. Given the existing surrounding industrial land use and activities, no substantial changes to noise or vibration are expected in the project vicinity.

XII.c-d) During project operations, work will include seed sorting, pressure washing, occasional vehicular traffic, loading and unloading, and work boat operations. The water movement onboard the nursery rafts does not create any noise beyond the immediate vicinity of the vessel. The pressure washer pump will be muffled, and during operation (approximately 1 hour per day) can be heard clearly at 50 ft (68-88 dBA), and at a low level 400 ft (50-70 dBA) from nursery rafts (WSDOT 2013). Given the existing surrounding industrial land use and activities, no substantial changes to noise or vibration are expected in the project vicinity.

XII.e-f) The site is not located within an airport land use plan area or in the vicinity of an airstrip.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>XIII. POPULATION AND HOUSING</b>				
<b>—Would the project:</b>				
a) Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace substantial numbers of existing housing units or create demand for additional housing, necessitating the construction of replacement housing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

XIII.a-c) The proposed project is on existing industrial land and will not induce substantial population growth or displace existing housing.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>XIV. PUBLIC SERVICES</b>				
<b>— Would the project:</b>				
a) Result in substantial adverse physical impacts associated with the provision of, or the need for, new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

XIV.a) The proposed project would not impact fire or police protection services, schools, parks, or other public facilities. The proposed facilities would comply with all local regulations and do not involve the use of hazardous materials or operations that would generate additional demand for fire or police services beyond those needed for small commercial or residential uses.



	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>XV. RECREATION</b>				
<b>—Would the project:</b>				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

XV.a-b) The site is located at an industrial dock with no history of recreational uses.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>XVI. TRANSPORTATION AND CIRCULATION— Would the project:</b>				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

XVI.a-b) The project will generate light volumes of traffic both from employees, as well as deliveries and pickups (about 3-4 times/week). The roads used to access the site are used regularly to access other business and residences nearby; therefore the capacity of the roads greatly exceeds the traffic volume that will be generated by the project.

XVI.c) The project will not result in air traffic patterns, increased air traffic, or a change in location that results in substantial safety risks.

XVI.d) The project does not have hazardous design features (e.g. sharp curves). The project would use the existing roads system.

XVI.e) The access to the project site will be adequate for emergency access. The project will have a wide access road and driveway that can accommodate emergency and fire vehicle access.

XV. f) The project will not conflict with existing or proposed transit, bicycle, or pedestrian facilities.

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>XVII. UTILITIES AND SERVICE SYSTEMS—</b>				
<b>Would the project:</b>				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Have sufficient water supply available to serve the project from existing entitlements and resources, or require new or expanded water supply resources or entitlements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in a determination by the wastewater treatment provider that would serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

XVII.a, b, c, e) The project would include upland facilities used by eight employees that would generate a minimal amount of wastewater. While the project site is not served by a publicly owned wastewater treatment provider, the site will have an approved septic system installed that will have adequate capacity to serve the project's anticipated wastewater demand with no impact on the County's wastewater treatment facilities.

XVII.b,d) The project does not anticipate using a significant amount of municipal water, as the majority of water used will be piped directly from the Bay using intake pipes (Table 1). Further, the project's water demand is negligible as compared to surrounding industrial uses and other industrial uses that previously existed on the project site. The major use of municipal water is the seed wash system, at approximately 5,000 to 7,000 gallons (gals) per week from March through November. Lesser amounts of municipal water will be used for pressure washing and other activities. Although it is difficult to estimate annual use, a rough estimate of the annual water use is on the order of a maximum 300,000 to 400,000 gals per year, with the majority of that water used in seed washing. A municipal water line is already constructed to the site, and minor plumbing may be needed to utilize that existing supply.

XVII.f-g) Construction will generate minimal debris needing disposal. The local waste disposal facility will be able to accommodate this waste. The project does not generate a significant amount of solid waste and will comply with federal, state, and local statutes and regulations related to solid waste.

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	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporated</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
<b>XVIII. MANDATORY FINDINGS OF SIGNIFICANCE</b>				
<b>—Would the project:</b>				
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Have impacts that would be individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Discussion of Checklist Responses:**

XVIII.a) By virtue of the mitigation measures identified above, the project would not significantly degrade the quality of the environment, substantially reduce the habitat of fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant of animal, or eliminate important examples of the major periods of California history or prehistory.

XVIII.b) With the mitigation measures identified above, the proposed project will not have significant impacts that are individually limited but cumulatively considerable. As discussed in this Initial Study, the potential impacts from each environmental factor are negligible or less than significant upon adoption of the proposed mitigation measures. The proposed project is small in scale and will not contribute to cumulative impacts to a very large bay such as Humboldt Bay. Further, any potential project impacts to biological resources are extremely localized, and would be indistinguishable from existing conditions within several hundred feet. There are no other existing or proposed shellfish operations within 3,500 feet of the project site (other than the existing Taylor operation which will be replaced by the proposed project). For further discussion of carrying capacity issues, see Chapter 3, Section IV. Therefore, the project would have a less than significant cumulative impact on any of the environmental factors potentially affected by the project

XVIII.c) The proposed project will not cause significant direct or indirect, substantial effects on humans.

## Determination

On the basis of this Initial Study:

- I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- I find that the proposed project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, no further environmental documentation is required.

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Signature

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Date

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Printed Name

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For

## CHAPTER 4 LIST OF PREPARERS

This analysis was prepared by Confluence Environmental Company employees Chris Czesla, Ruth Park, and Kerrie McArthur and Plauché & Carr employees Billy Plauché and Robert Smith. Contact information is provided below:

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## CHAPTER 5 REFERENCES CITED

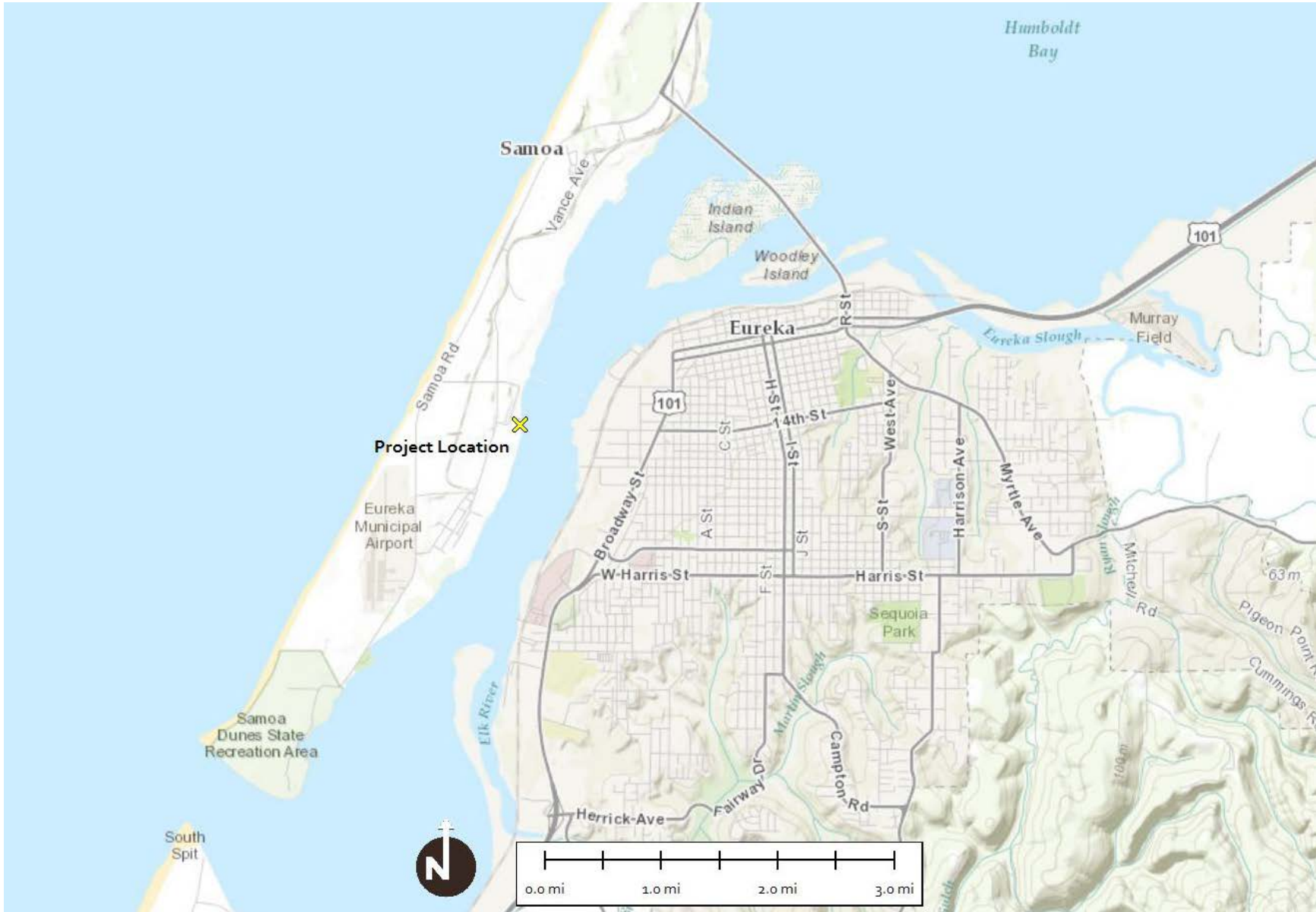
- Barnhart, R.A., M.J. Boyd, and J.E. Pequegnat. 1992. The Ecology of Humboldt Bay, California: An Estuarine Profile. Biological Report 1. U.S. Fish and Wildlife Service. Washington, D.C.
- Boyd MJ, Mulligan TJ, Shaughnessy FJ (2002) Non-indigenous marine species of Humboldt Bay, California. California Dept. Fish Game report, 110 pp.
- Boyle, M., D. Janiak, and S. Craig. 2006. Succession in a Humboldt bay marine fouling community: the role of exotic species, larval settlement, and winter storms. Proceedings of the 2004 Humboldt Bay Symposium. Humboldt Bay Harbor, Recreation and Conservation District, Eureka, CA.
- CDFG (California Department of Fish and Game) 2009. A Status Review of the longfin smelt (*Spirinchus thaleichthys*) in California. Report to the Fish and Game Commission. CDFG, Sacramento.
- Fritzsche, R.A. and J.W. Cavanagh. 2007. A Guide to the Fishes of Humboldt Bay. Humboldt State University, Department of Fisheries, Arcata CA.
- HBHRCD (Humboldt Bay Harbor, Recreation and Conservation District). 2007. Humboldt Bay Management Plan. Humboldt Bay Harbor, Recreation and Conservation District, Eureka, CA.
- Jennings, M.R. 1996. Past Occurrence of Eulachon, *Thaleichthys pacificus*, in streams tributary to Humboldt Bay, California. California Fish and Game 82(3):147-48.
- LACO Associates. 2013. Hog Island Geotechnical Report. Prepared for: Sequoia Investments X, LLC. Prepared by LACO Associates, Eureka CA.
- Lajoie, K. and D. Keefer. 1981. Investigations of the 8 November 1980 Earthquake in Humboldt County, California. U.S. Geological Survey, Menlo Park. Open File Report 81-397.
- Nakamura, Y. 2004. Suspension feeding and growth of the juvenile Manila clam *Ruditapes philippinarum* reared in the laboratory. Fisheries Science Vol.70 Issues 2 pages 215-222.
- Pinnix, W. 2008. Letter to J. Weeder with subject "Green sturgeon acoustic telemetry detections in Humboldt Bay, California." Dated February 20, 2008. 2 Pages.
- Pinnix, W.D., P.A. Nelson, G. Stutzer, and K.A. Wright. 2013. Residence Time and Habitat Use of Coho Salmon in Humboldt Bay, California: An Acoustic Telemetry Study. Environ Biol Fish (2013) 96:315-323.
- Simenstad, C. A. and Nightingale, B. 2001. Overwater Structures: Marine Issues. White Paper. Washington State Transportation Center. Agreement T1803, Task 35.
- USFWS (U.S. Fish and Wildlife Service) and HBNWRC (Humboldt Bay National Wildlife Refuge Complex). 2009. Humboldt Bay National Wildlife Refuge Complex, Draft Comprehensive Conservation Plan and Environmental Assessment. USFWS, California Nevada Region, Refuge Planning, Sacramento CA.
- WSDOT (Washington Department of Transportation). 2013. Biological Assessment Preparation for Transportation Projects – Advanced Training Manual. WSDOT, Olympia.

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# Figures

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**FIGURE 1**  
Project Location

**ARCATA BAY SHELLFISH MARICULTURE FACILITY**  
Samoa, CA  
for Hog Island Oyster Company

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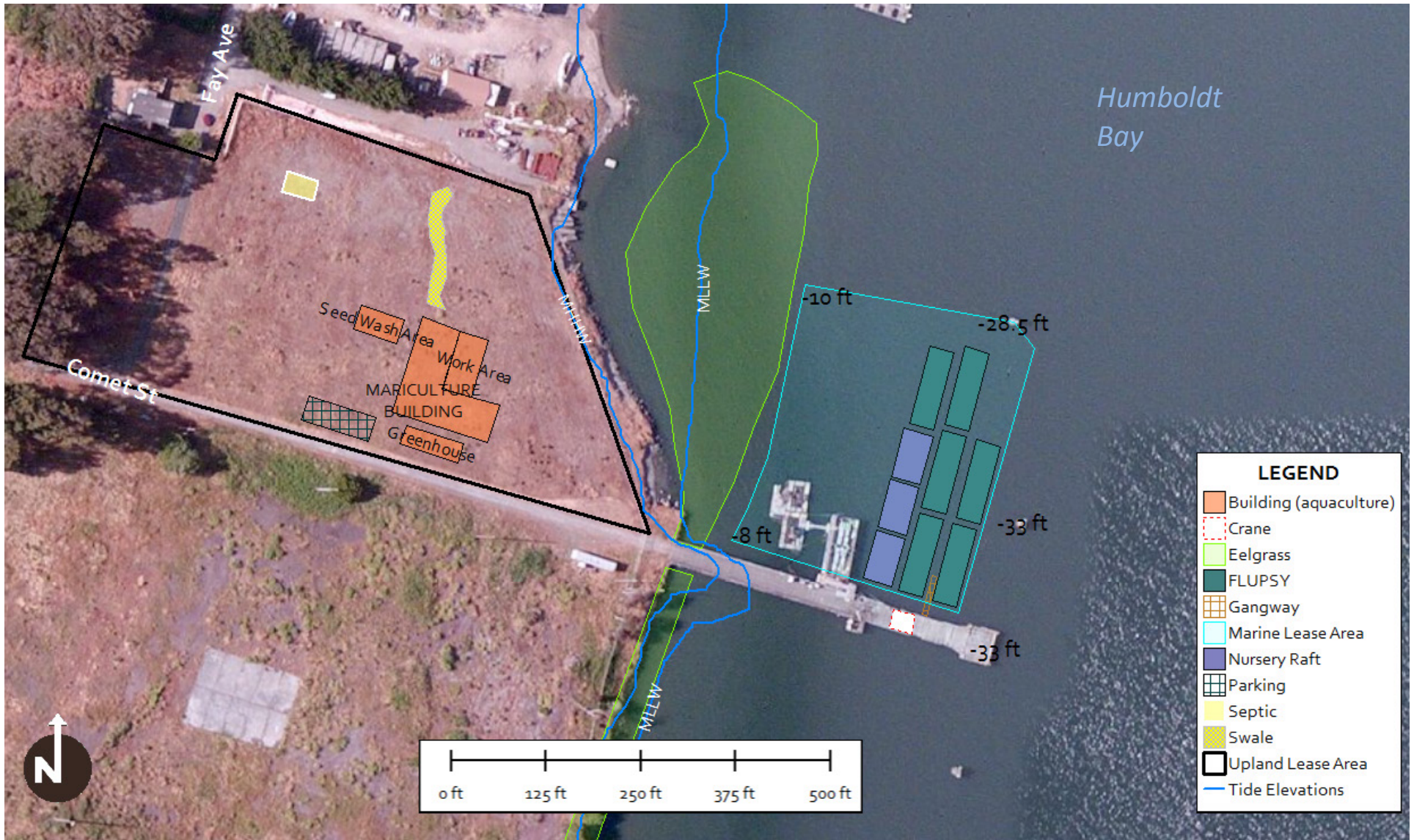


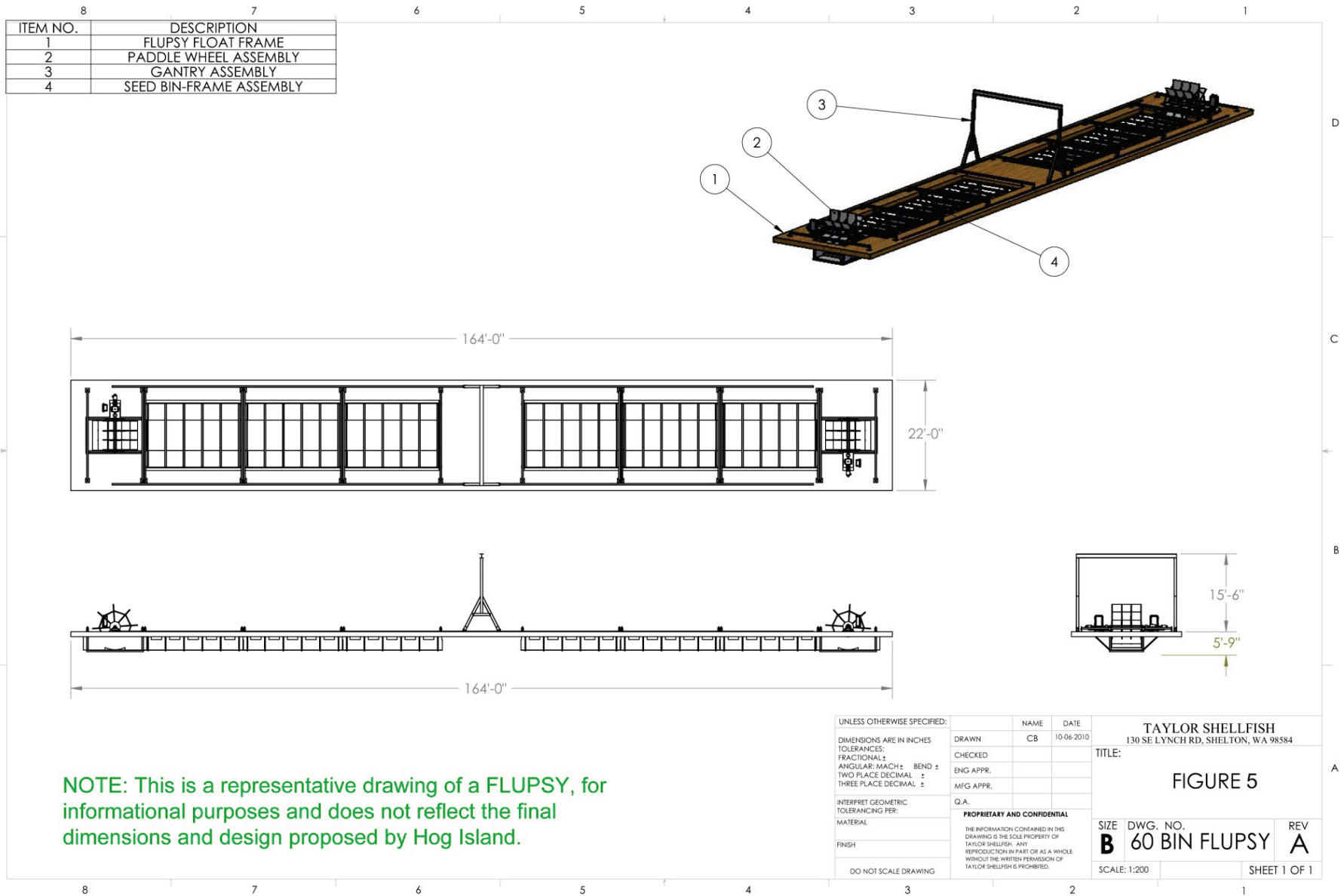
FIGURE 2  
Site Layout

**ARCATA BAY SHELLFISH MARICULTURE FACILITY**

Samoa, CA  
for Hog Island Oyster Company

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**FIGURE 3**  
**FLUPSY Diagram**

**ARCATA BAY SHELLFISH MARICULTURE FACILITY**  
Samoa, CA  
for Hog Island Oyster Company

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FIGURE 4  
Surrounding Properties

**ARCATA BAY SHELLFISH MARICULTURE FACILITY**  
Samoa, CA  
for Hog Island Oyster Company

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FIGURE 5  
Site Alternatives

**ARCATA BAY SHELLFISH MARICULTURE FACILITY**  
 Samoa, CA  
 for Hog Island Oyster Company

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# Appendix

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## PHOTO APPENDIX



Photo 1— View to the northwest, from southeast property corner.



Photo 2— View to west from east side of property.



Photo 3— View east, toward pier, from southeast property corner.



Photo 4— View of the pier.



Photo 5— View south along western edge of site.



Photo 6 — View of riprap shoreline, from pier.



Photo 7 — Pier, from north.



Photo 8— Pier, from south.