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W11a

MEMORANDUM

Date: May 7, 2024

To: Commissioners and Interested Persons

From: Shana Gray, Deputy Director
Melissa B. Kraemer (District Manager) and Tom Luster (Senior Environmental Scientist)

Subject: Addendum for Commission Meeting for Wednesday, May 8, 2024
Item W11a, CDP Application No. 1-21-0653 (Humboldt Bay Harbor District)

The purpose of this addendum is to update the staff recommended findings and conditions in response to comments received since publication of the April 25, 2024 staff report and to respond to comments received. Since publication of the staff report, staff received several comment letters and emails, including from the applicant, California Department of Fish and Wildlife (CDFW), Humboldt Waterkeeper, and several others. The letter from the applicant identifies certain minor errors, suggests clarifications related to eelgrass protection and mitigation requirements, and requests consideration of an alternative approach to calculating impacts to marine resources. An email received from CDFW identifies certain minor corrections related to CDFW's estimated entrainment of longfin smelt and its consideration of the applicant's proposed revised screen mesh size. The comment letter from Humboldt Waterkeeper discusses the potential for the project to mobilize legacy contaminants during the proposed trenching activities associated with pipeline installation and suggests certain actions and conditions avoid these impacts. Additional letters from other organizations and members of the public raise concerns regarding project impacts on salmonids and marine resources generally. The Commission also received several letters of support for the project from various parties. All correspondence received after publication of the staff report through May 3, 2024 is included in the correspondence packet posted to the Commission's website.[1]

[1] See https://documents.coastal.ca.gov/reports/2024/5/w11a/W11a-5-2024-correp.pdf.

In response to comments received, staff recommends various changes to Special Condition 3 and 6 to (1) correct minor errors and make minor clarifications, and (2) revise requirements for eelgrass protection and water quality protection. Staff also recommends adding a new exhibit, the Interim Measures Work Plan for the Former Evergreen Pulp Mill (SHN January 2021), as Exhibit 11 (attached to this addendum). This plan was developed in support of the Nordic Aquafarms project and identifies methods and procedures for characterization and management of debris, soil, and groundwater generated in connection with construction activities within a portion of the project area (activities on APN 401-112-021 where the Nordic Aquafarms project is permitted to be sited). The recommendations in this plan are identified in the County's FEIR for the Nordic Aquafarms project as required to address historic soil and groundwater contaminants remaining at the project site from historic use (though the plan itself was not included as an appendix to the FEIR). Added discussion regarding the relevance of this plan to the project as a whole is included in the below recommended updates to the water quality findings.

Responses to comments will be added to the adopted findings report as new Finding IV-O: "Response to Comments" In addition to the recommended changes described in this addendum, staff continues to recommend that the Commission, upon completion of the public hearing, approve the coastal development permit with the special conditions and findings included in the staff recommendation of April 25, 2024, as modified by the changes recommended herein.

I. Changes to Special Conditions

Revise and correct Special Condition 3 on pages 6-8 and Special Condition 6 on pages 15-18 and add new Special Condition 13 as follows (text to be deleted is shown in **~~bold strikethrough~~** format, and text to be added is shown in **bold underline** format):

- **Correct Special Condition 3.A.1, pages 6-7 as follows:**

  1. Water Intake System, Screens, and Maintenance Plans. The final plans for the bay water intake systems at each dock, screens, pumps, and related infrastructure shall substantially conform with the preliminary plans included in the proposed Project Description (Exhibits 2-4 and as modified by the April 5, 2024 Technical Memorandum prepared by GHD, attached as Exhibit 8) and consistent with the special conditions of this CDP. Screens to be installed on the intake systems shall have a mesh size of no more than 1.0-millimeter and a through-screen water velocity of no more than **~~0.12~~** **0.2** feet per second. The submitted final plan shall describe all cleaning and maintenance activities the Permittee will conduct on the screens and intake systems and the expected timing of those activities. The maintenance activities identified are to ensure that through-screen water velocities remain at or below **~~0.12~~** **0.2** feet per second at all times.
     …

- **Revise Special Condition 3.A.7, page 8 as follows:**

7. Eelgrass Protection. The Final Plans shall include a plan showing that all authorized **in-water** activities **~~and associated structures or infrastructure~~** around Red Tank Dock shall remain a minimum of **10 meters (m)** **~~30 feet~~** away from the outside edge of any eelgrass bed within or adjacent to the intake site. **Associated structures and infrastructure, including that above sea surface, shall also be depicted.** The **~~Final~~** **submitted** Eelgrass Protection Plan **provided to the District by SHN (dated April 15, 2022)** shall **be finalized to incorporate work around the Red Tank Dock area, and shall** include a map of all eelgrass in the immediate area and a 50-foot perimeter outside. The map shall be based on the results of an updated eelgrass survey carried out consistent with the timing and methodology guidelines of the National Marine Fisheries Service's California Eelgrass Management Policy and Implementing Guidelines (**[CEMP]** 2014). Areas with depths greater than twice the minimum expected eelgrass growing depth in Humboldt Bay may be excluded from this survey requirement. **The final Eelgrass Protection Plan shall also incorporate the following:**

   a. If in-water work is determined to be unavoidable within the 10-meter buffer, the use of silt curtains or similar devices shall be considered to minimize potential turbidity impacts. Entry to areas where eelgrass is present and buffer areas shall be limited to the minimum amount necessary to complete the work and shall occur via the least damaging means. Direct contact with eelgrass shall be avoided to the maximum extent feasible and where possible, buffers of no less than 5 m shall be used to insulate eelgrass from indirect impacts. Any activity occurring directly within eelgrass, or its 5-m buffer, shall be clearly documented, including with the date, activity, and proximity to eelgrass on a map. A qualified biologist shall prepare a post-work survey within 30 days of completed work, or within the first 30 days of the next active growth period following completion of the work that occurs outside of the active growth period, and as consistent with the CEMP guidelines referenced above, the survey shall be provided to the Executive Director for review and written approval.

   b. If the post-work survey demonstrates that adverse effects to eelgrass have occurred, the District shall be required to prepare a plan to compensate for the impacted eelgrass at a minimum final 1.2:1 (mitigation:impact) ratio on-site, or at another location, in accordance with CEMP. Implementation of mitigation to ensure success in achieving the minimum final mitigation ratio shall require an amendment to this permit or a new coastal development permit unless the Executive Director determines otherwise.

- **Revise Special Condition 6, pages 15-17 as follows:**

A. **AT LEAST ONE MONTH PRIOR TO COMMENCEMENT OF WATER SYSTEM INFRASTRUCTURE IMPROVEMENTS AUTHORIZED BY THIS PERMIT**, the permittee shall submit, for the review and written approval of the Executive Director, final water quality protection measures for construction and site operations that identify a suite of appropriate Best Management Practices (BMPs) and other measures and plans to prevent the entry of stormwater runoff into Humboldt Bay from the construction area(s) during construction; to prevent the entrainment of excavated contaminated materials leaving the site; **to prevent the mobilization of legacy contaminants during excavation;** and to prevent the entry of polluted stormwater runoff into coastal waters during the transportation and storage of excavated materials.

1. BMPs for Water Quality Protection. The following BMPs and measures, at a minimum, shall be utilized:…

…

(n) Grading and excavation shall be prohibited during the wet season period of November 1st - April 15th.

2. Dewatering Plan. A dewatering plan shall be included that specifies measures for handling, storage, testing, treatment, monitoring, and discharge of groundwater in the event that groundwater is encountered during construction. Sampling and testing of groundwater shall conform to the final approved SAP**, and, for project work on APN 401-112-021, with the** ~~**and**~~ requirements of Mitigation Measure HAZ-1 requiring implementation of recommendations of the Interim Measures Work Plan (SHN 2020). **Sampling and testing of groundwater should include constituents related to the site history, including, at a minimum, sampling for pentachlorophenol, dioxins, and furans for groundwater encountered during construction in portions of the project north of APN 401-112-021 consistent with Special Condition 13.** The dewatering plan shall specify that any necessary dewatering shall provide for the pumping and storage of groundwater into Baker tanks or similar appropriate storage for testing and characterization consistent with the final approved Sampling and Analysis Plan prior to disposal. The dewatering plan shall further specify that water sourced from dewatering shall not be discharged to on-site wetlands or to Humboldt Bay.

3. Sampling and Analysis Plan (SAP). ~~**A**~~ **One or more** SAP**s** shall be prepared and submitted for the Executive Director's review and approval to address characterization of excavated soils, **groundwater,** assessment of final in-place conditions, and testing of materials for reuse or offsite disposal **for (a) portions of the project on APN 401-112-021 and (b) portions of the project north of APN 401-112-021**. The SAP shall be the primary guide used to determine suitability of material for reuse **and shall comply with the requirements of the Interim Measures Work Plan for project activities on**

APN 401-112-021 and with the final Site Characterization and Sampling and Analysis Plan required by Special Condition 13 for project activities north of APN 401-112-021. The use of Incremental Sampling Methodology (ISM) for characterization of soils is the preferred approach **both for pre-excavation characterization of the portions of the project north of APN 401-112-021 as required by Special Condition 13 and** to assess suitability of reuse. The SAP shall contain the ISM program to evaluate the chemical quality of the material. The SAP shall comply with the requirements of Mitigation Measure HAZ-1 **for portions of the project on APN 401-112-021** with respect to Health and Safety procedures, handling of excavation of soils, field screening of debris and excavated soils, and other applicable requirements outlined in MM HAZ-1.

B. The permittee shall undertake development in accordance with the approved final plans. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the approved final plan shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is required.

- **Add new Special Condition 13 as follows:**

13. Final Site Characterization and Sampling and Analysis Plan for Pipeline Work Areas North of APN 401-112-021

A. PRIOR TO ISSUANCE OF COASTAL DEVELOPMENT PERMIT 1-21-0653, the Permittee shall provide, for the review and written approval of the Executive Director, a final Site Characterization and Sampling and Analysis Plan for portions of the water pipeline project work north of APN 401-112-021 to identify areas of potentially impacted soil and/or groundwater along the pipeline route that may require special handling and disposal during construction or which could pose a health exposure risk to construction workers during construction. The final plan shall include provisions for all of the following:

1. Initial site assessment that identifies past use(s) of the project area based on site records, historic photos and maps, SWRCB GeoTracker information, etc. and field reconnaissance within the project alignment to determine if potential sites of concern are present.

2. Pre-excavation soil borings along the length of the pipeline route to characterize soil and groundwater in anticipation of commencement of trenching activities. A site characterization work plan should be provided that identifies potential constituents of concern (COC) for laboratory analysis, the number and location of borings necessary for pre-characterization consistent with the water board's Incremental Sampling Methodology (ISM) approach, and depth for sample collection. Based on initial site history information available, COCs to be evaluated should include, at a minimum, dioxins, furans, pentachlorophenol,

PCBs, metals, petroleum and polycyclic aromatic hydrocarbons, and other toxic compounds associated with past activities on the site.

3. **Delineation of the full horizontal and vertical extent of COCs.**
4. **Evaluation of concentrations of contaminants using environmental screening levels (ESLs) of significance that could be harmful to Humboldt Bay aquatic life using the San Francisco Regional Water Quality Control Board ESLs for aquatic life (SFRWQCB 2019).**
5. **Use the results of the laboratory analysis of samples to determine whether health and safety concerns are present for construction workers and to determine potential soil and/or groundwater handling and disposal options. If sampling results reveal ESLs of significance that could pose a health exposure risk to construction workers during construction, a site-specific health and safety plan should be prepared for workers that may come into contact with contaminated materials. The plan shall outline procedures, training requirements, and contain applicable monitoring programs to limit worker exposure. A hazard analysis must be performed in accordance with industry standards to determine the appropriate level of personnel protection required for completing the work.**
6. **Providing sampling results to the Executive Director for review and written approval no less than 90 days prior to commencement of construction of portions of the water pipeline project north of APN 401-112-021.**

B. If sampling results reveal that dioxins and furans (measured as TEQs) or other constituents of concern are encountered at environmental screening levels of significance that could be harmful to Humboldt Bay aquatic life, a Soil and Groundwater Management Plan should be prepared and submitted with recommendations to mitigate the potential for mobilization of constituents of concern during pipeline trenching/installation work that includes provisions for the following: (1) a description of the specific locations, methods, and procedures for staging, stockpiling, managing, characterizing, testing, and disposing of soil, groundwater, and waste material expected to be encountered during construction; (2) ensuring that all staging, stockpiling, management, and disposal of waste is consistent with Special Condition 6; (3) confirmation sampling of excavated materials and post-excavation walls and floor of excavated areas for constituents related to site history, including, at a minimum, pentachlorophenol, dioxins, and furans consistent with the screening level requirements outlined above; and (4) proper waste disposal at authorized facilities capable of receiving the waste materials. The Soil and Groundwater Management Plan shall be processed as an amendment to this CDP, unless the Executive Director determines that no amendment is legally required.

C. The permittee shall undertake development in accordance with the approved final plans. Any proposed changes to the approved final plans

shall be reported to the Executive Director. No changes to the approved final plans shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is required.

II. Changes to the Findings

Revise the following findings (text to be deleted is shown in **~~bold strikethrough~~** format, and text to be added is shown in **bold underline** format):

- **Correct Finding IV-B (Project Location) on pages 22-23:**

The water intake and water system improvement project site is located along the western shore of Humboldt Bay, on the eastern shore of the Samoa Peninsula, east of New Navy Base Road, at 364 Vance Avenue near Samoa (Exhibit 1). The site is due west, across Humboldt Bay, from the City of Eureka and less than a mile south of the unincorporated town of Samoa. The subject **~~~76-acre property (~~project area includes portions of** APNs 401-112-021, -011 & -024**~~,~~ ~~and~~** APN 401-031-040**, and an area with no parcel number directly east of and adjacent to APN 401-112-013.~~)~~, These parcels, generally** referred to as Redwood Marine Terminal II (hereafter RMT-II), **~~is~~ are** currently owned/managed by the Harbor District. The District is permitted (under several CDPs issued by the Commission and the County) to operate various coastal-dependent and other non-coastal-dependent interim uses on the property.[3]

- **Correct Finding IV-E (Other Agency Approvals & Consultations) on page 25:**

California Department of Fish and Wildlife (CDFW): The project requires an Incidental Take Permit from CDFW pursuant to the California Endangered Species Act for projected incidental take of state listed threatened Longfin Smelt (*Spirinchus thaleichthys*) **~~and Coho Salmon (*Oncorhynchus kisutch*)~~**. Commission staff has coordinated closely with CDFW staff on the proposed mitigation and final mitigation plan requirements as discussed in these findings. A permit for the project has not yet been approved by CDFW…

- **Revise and correct Finding IV-F (Marine Resources and Water Quality), in the section regarding "Analysis of Remaining Impacts from Seawater Extraction" on pages 33-35:**

The District **~~additionally developed an APF for~~ estimated entrainment of** longfin smelt, pursuant to guidance by CDFW and to allow for any mitigation needed specifically for this listed species could be provided **(the District did not calculate APF for longfin smelt due to limited data)**. CDFW used a modified calculation method to determine expected entrainment and needed mitigation for the longfin smelt. It **continues to evaluate the District's mitigation requirements but has currently** concluded that mitigating the intake system's estimated annual entrainment of 15,881 longfin smelt larvae would require 5.89 acres of highly productive mitigation habitat.[22]

As noted below, all or most of this habitat designed specifically for longfin smelt might also serve as appropriate mitigation for the seven species listed above…

…

- Intake Screen Mesh Size. Regarding the intake's mesh size, the State Water Board has determined that adding a 1.0-mm or smaller mesh screen on an open water intake such as that proposed by the District provides just a slight reduction in entrainment. The State Water Board's analyses conducted as part of its adoption of the Ocean Plan amendment for seawater desalination established that seawater intakes using a screen with a mesh no larger than 1.0 mm would be credited with a one percent reduction in their APF.[24] This modest reduction is largely due to the vast majority of planktonic organisms subject to entrainment are much smaller than that mesh size, with most measured in microns, which are 1/1000th of a millimeter. Although this Ocean Plan provision applies to desalination facilities, the studies reviewed by the State Water Board that served as the basis for this determination covered a wider range of intakes, including the type being proposed by the District.**[25]** Applying this one percent reduction to the District's 28.8-acre APF results in an APF of 28.5 acres.

  The District contends that installing a 0.5-mm screen mesh on its intake would result in an additional and substantial reduction in entrainment. This was based on the District's evaluation of how it might reduce entrainment of longfin smelt, pursuant to concerns raised by CDFW about the intake's adverse effects of that specific listed species. The District evaluated the characteristics of longfin smelt, primarily the length and head capsule size of the longfin smelt larvae and young fish that might be subject to entrainment. The District proposed**~~, and CDFW concurred,~~** that using a 0.5-mm mesh instead of a 1.0-mm mesh would result in a **~~41%~~** reduction in longfin smelt entrainment. **CDFW is still reviewing the District's revised screen design and proposed reduction in entrainment and mitigation. At this point, CDFW expects the use of a 1.0-mm mesh screen would reduce longfin smelt entrainment by about 43%, and it is still evaluating potential reductions from a 0.5-mm mesh screen.**

  The District then proposed that the same approach be used to calculate a similar reduction in its overall entrainment rate. It measured lengths and head capsule sizes of the seven species used to calculate the intakes' overall APF and concluded that using a 0.5-mm screen would provide a 74.8% reduction in the APF, which would reduce it from the original 28.8 acres to about 7.8 acres. 25 However, in reviewing the District's evaluation and again relying in part on prior studies and reviews by the State Water Board, there is a lack of support for this proposed overall reduction. While the **~~41%~~** **43%** reduction may be appropriate to

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[25] Additionally, these Ocean Plan provisions are based on Water Code Section 13142.5(b), which states: "For each new or expanded coastal powerplant or other industrial installation using seawater for cooling, heating, or industrial processing, the best available site, design, technology, and mitigation measures feasible shall be used to minimize the intake and mortality of all forms of marine life."

apply at the District's intakes for longfin smelt, the State Water Board's analysis of relevant studies, which included some cited by the District, cautioned against applying results from one species to other species, due to the often-substantial differences in the species' morphology and behavior that could affect the degree to which individual species at different life stages are subject to entrainment. **The Water Board noted that entrainment rates could vary among species due to body length, width, head capsule size, life stage, swimming ability, and the age at which avoidance can occur.** The Board also observed that the various studies had sometimes inconsistent or contradictory results. Most, too, were conducted in laboratory settings or at locations with species other than those present in Humboldt Bay.[26] Without site- and species-specific data from the District's intakes, the Commission finds that the proposed reduction is not adequately supported for species other than the longfin smelt.

More recently, the District followed its March 2024 memo with a May 2, 2024 memo (see correspondence) that reiterates its proposed reductions but also acknowledges the difficulties of applying the ETM approach to the full variety of planktonic organisms for which the selected seven species serve as surrogates. To better capture the expected entrainment effects on a wider range of species, the District is proposing another method that would combine the ETM approach with a volumetric approach. This volumetric approach would be based largely on the concentrations of plankton in the source water body and the "turnover" time – i.e., the number of tidal cycles it would take to fully replace the Bay's water volume – to determine how long various organisms would be subject to entrainment. The District believes that this approach would result in a lower APF than has been currently calculated.

The District concludes its May memo by requesting that the Commission consider using this approach once more information becomes available. The Commission acknowledges that this or another similar approach may be useful for future reviews, though this review of a proposed modified approach is likely to require the involvement of the several agencies that use ETM. That said, the District may propose amending this permit in the future to reflect potential entrainment modifications if and when the additional information is available and the involved agencies can conduct the necessary review.

- **Correct Finding IV-F (Marine Resources and Water Quality), in the section regarding "Tidal Restoration and Enhancement Activities" on pages 41-43:**

…For the portion of work that would be limited to treatment of *Spartina*, which is presently estimated as approximately 2.5 acres of moderate cover and 1.2 acres of the high cover classes (26-60% and 60-100%, respectively), the corresponding ratios of 1:1.7 and ~~**1:1.32**~~ **1:3.2** would apply and would total less than the 15% *Spartina* only treatment threshold of 4.275 acres. Using this framework, and depending on the final plan, the Commission estimates that 7-11 acres of credit towards the total 28.5-acre

mitigation requirement could be available at Bay Street. This acreage and credit could also include the mitigation being developed by the District to address CDFW requirements for longfin smelt, since it would benefit a variety of species included in the APF calculation as well as the smelt. However, the conceptual nature of the current proposal does not provide sufficient detail for the Commission to make a final determination of mitigation credit. That would be determined as part of the review under Special Condition 4 that requires the District to obtain an amendment to this permit and/or separate CDP authorization to implement this proposed mitigation element.
…

- **Correct Finding IV-F (Marine Resources and Water Quality), in the section regarding "Other Proposed Mitigation Activities" on page 43:**

The District has proposed several additional potential mitigation actions, as identified in Exhibit 7. Additional mitigation activities, like the Bay Street activities **and *Spartina* removal activities**, would require an amendment to this permit and/or separate CDP authorization from the Commission and/or the applicable local government pursuant to a certified LCP once mitigation details and impact analyses are completed. The only proposed mitigation activities for which environmental review (pursuant to CEQA) has been completed to date is the piling removal in Fields Landing proposed under this CDP ~~**and Spartina removal work at various sites in the Humboldt Bay region (permitted under CDP 1-14-0249)**~~. …
…

- **Clarify Finding IV-F (Marine Resources and Water Quality), in the section regarding "Additional Mitigation Needed to Compensate for Marine Life Impacts" on pages 45-47 as follows:**

Mitigation ratios are usually written with the first figure representing the mitigation acreage required and the second the acreage impacted – e.g., a 4:1 ratio for wetlands means four acres of habitat restoration are required for each acre impacted. This is the same for ratios developed for entrainment and APF purposes; however, **in these situations,** the ratio generally recognizes that the acreage of mitigation provided is as productive or more productive than the area of source waters represented by the APF. For example, a 1:4 ratio means that every acre of mitigation is expected to be four times more productive than an acre of source water, with less area needed overall to provide an equivalent amount of production to the system. Past Commission decisions have used a range of ratios in determining how much mitigation different projects needed to provide, based largely on the amount of productivity and ecological benefits expected from different types of mitigation – for example, to address the entrainment impacts of the Poseidon Carlsbad desalination facility (CDP #9-14-0731), the Commission used ratios of 1:1 and 1:4 for several different types of mitigation, based largely on their expected levels of productivity. This approach is similar to the state's Ocean Plan, which recognizes that different types of mitigation provide different levels of productivity and allows for mitigation ratios of between 1:1 and 1:10 when addressing entrainment impacts. Recent application of the Ocean Plan requirements by the Santa Ana Regional Water Quality Control Board resulted in ratios of 1:4.5 for wetland restoration and 1:5.8

for artificial reef creation, reflecting their relatively high productivity rates compared to that of the open coastal waters where entrainment would occur.[33]

As noted previously, the District has proposed ratios at the maximum 1:10 for estuarine source waters, which is substantially more than has been calculated or approved in past authorizations. Nonetheless, the Commission acknowledges that there would be some increase in productivity where mitigation is implemented in certain habitats around Humboldt Bay. As quantifying productivity can be a complex exercise and challenging to extrapolate from one habitat or location to another, determining the relative lift between systems with precision is effectively infeasible for this analysis. However, published meta-analyses from the scientific literature suggest the presence of productivity hierarchies in coastal waters where biogenically-structured habitats such as **coral reefs, mangroves, submerged aquatic vegetation like** seagrass beds, and salt marshes significantly exceed the productivity of unstructured habitats such as **rock rubble or shell,** mudflats, or sandy bottoms.[34] The value of biogenic structure and its role in supporting increased productivity extends beyond the physical complexity that it introduces to create microhabitats for organisms and **importantly** includes primary production (i.e. photosynthesis), which in turn supports higher trophic levels within a food web.

Provided the assortment of above precedent, regulatory standards, and technical literature, the Commission finds it appropriate to recognize a mitigation crediting framework that characterizes the habitats in which mitigation might occur as biogenically structured **(e.g., eelgrass beds, saltmarsh)** or unstructured **(e.g., mudflats, sandy bottoms)** and establishes maximum crediting ratios reflecting differences in their productivity as 1:4 and 1:3, respectively. By setting a maximum, the Commission is assured that no less than 7.125 acres of **total** compensatory mitigation will be provided for the Project's 28.5-acre APF while providing some flexibility to address nuances that may arise within specific mitigation proposals. With allowances for enhancement activities such as derelict piling removal **(estimated to provide for 0.79 ac APF based on the current proposal)** and *Spartina* eradication **(allowing for up to 15% of the 28.5-acre APF, equaling 4.275 ac APF)**, the minimum area of mitigation to be provided as habitat creation or substantial restoration would be approximately 5.8**6** acres **while the remainder would be provided via other mitigation strategies (i.e. 28.5 ac APF requirement – 0.79 ac APF via pile removal – 4.275 ac APF via *Spartina* eradication = 23.436 ac APF outstanding / 4 [assumes maximum 1:4 credit strategy] = 5.86 ac APF habitat creation or substantial restoration in biogenically-structured habitat), and thus, the total package would provide approximately 10.865 ac**. **If a lower credit were to be applied (e.g., for provision of unstructured habitats at 1:3), the total acreage provided would be more.** Special Condition 4 formalizes this framework. It also specifies that the duration of any mitigation other than *Spartina* eradication, which is expected to be permanently managed, is required for as many years as the project is in operation (i.e. 30 years under the terms of this CDP), as well as clarifies guidance on what would be considered appropriate mitigation actions, what would necessitate additional CDP authorizations, and details the required contents of the Marine Life Mitigation Plan to be submitted for review and approval.

- **Revise Finding IV-F (Marine Resources and Water Quality), in the section regarding "Potential Water Quality Impacts Associated with Construction" on page 53:**

From EIR section 3.8.6 (impact HAZ-b):

> *The Humboldt Bay Water Intakes component would modernize the operation of the two intake structures, as well as install sea water and industrial freshwater distribution pipelines. During construction, this component would require the use of heavy machinery to perform construction-related tasks including grading, excavation, trenching, compaction, and transportation of materials. There is always the possibility when equipment is operating that an accident could occur and petroleum products could be accidentally released onto the soil. Equipment on-site during construction would be required to have emergency spill cleanup kits immediately accessible in the case of any petroleum product spills. Equipment would not be refueled near any one-parameter wetlands nor Humboldt Bay. If equipment must be washed, it would be washed off-site at an appropriate facility. This component would also partially overlap with the AOIs listed in the Interim Work Plan document, therefore there is potential for the construction phase to encounter hazardous substances. Adherence to Mitigation Measure AIR-2, GEO-2, HWQ-1…, and HAZ-1, which include Construction BMPs, implementation of a SWPPP, and implementation of recommendations from the Interim Measures Work Plan, would further negate the potential for accidental releases of hazardous materials during construction.*

The mitigation measures referenced above as appropriate to minimize or avoid potential water quality impacts related to pipeline installation work include measures requiring various construction BMPs for erosion, runoff, and sediment control and various measures to address historic soil and groundwater contaminants remaining at the Project Site from historic use. The full suite of BMPs and mitigation measure requirements are included in Appendix B.

Although many of the measures included are appropriate to address the potential for the construction phase to encounter hazardous substances, additional measures are needed to ensure that ground disturbance associated with pipeline trenching does not inadvertently mobilize or discharge constituents of concern to the Humboldt Bay environment. For example, the County's FEIR for the Nordic Aquafarms project includes mitigation measures (HAZ-1 – see Appendix B) requiring the water intake component of the project to implement recommendations from the SHN (2021) Interim Measures Work Plan. This plan was developed in support of the Nordic Aquafarms project and relied on earlier site assessments that had been completed, which identified constituents of concern (COC) based on the past use of the site as a pulp mill. The SHN plan outlines methods and procedures for characterization and management of debris, soil, and groundwater generated in connection with demolition and construction activities on APN 401-112-021. Although a portion of the District's water pipeline project is also located on APN 401-112-021, the scope of the SHN plan did not

extend across the full project area for the District's water pipeline installation project (specifically, the SHN report did not extent to areas north of the northern boundary of APN 401-112-021). Thus, there are no methods or procedures in place for the characterization and management of debris, soil, and groundwater generated in connection with construction activities in the northern portion of the water pipeline installation site. This is problematic, because as shown on the State Water Resources Control Board's GeoTracker website,[3] this northern area that is not addressed in the SHN plan includes the site of a former cogeneration plant and log yard known to have used the wood preservative pentachlorophenol ("penta") in its operations. Penta was a commonly used wood preservative from the 1950s through the 1980s on various lumber mills around Humboldt Bay. During its use, it was not uncommon for penta to be inadvertently dispersed into the environment through spraying and dip tank operations used for treating lumber and in conical burners used to burn treated wood waste. Elevated levels of penta have been documented in groundwater in this area in the past. However, because penta rapidly degrades in the environment, whereas dioxins and furans are much more persistent, it's important that sampling and analysis plans include testing for dioxins and furans in addition to chlorinated phenols. It's also important that site-specific characterization be completed prior to excavation of the pipeline trench north of APN 401-112-021, since areas to the north have a different site history than the pulp mill site (per above, the area to the north supported a cogeneration plant and log yard with chemical spraying of penta as opposed to pulp mill operations). Because previous characterization of the soils and groundwater in the area planned for pipeline trenches north of APN 401-112-021 is unknown or incomplete, additional measures are needed to prevent the mobilization of legacy contaminants during excavation. If excavation of pipeline trenches were to commence without understanding whether COCs are present in the soil and/or groundwater, contaminants could be released to the Humboldt Bay environment, impacting marine resources, nearby aquaculture operations, and human health,

Thus, to ensure the maintenance of the water quality of Humboldt Bay appropriate to maintain optimum populations of marine organisms and for the protection of human health consistent with section 30231 of the Coastal Act, the Commission attaches Special Condition 13 requiring the District to provide, prior to permit issuance, a final Site Characterization and Sampling and Analysis Plan for portions of the water pipeline project north of APN 401-112-021 to identify areas of potentially impacted soil and/or groundwater along the pipeline route that may require special handling and disposal during construction or which could pose a health exposure risk to construction workers during construction. The plan shall provide for conducting pre-excavation soil borings along the length of the water pipeline route consistent with the Incremental Sampling

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[3] **E.g., see site figure from SHN 2002: https://documents.geotracker.waterboards.ca.gov/regulators/deliverable_documents/4332485377/Site%20Figure.pdf**.

Methodology (ISM) approach (recommended by the State and Regional Water Boards for site cleanup programs) to characterize soil and groundwater in anticipation of commencement of trenching activities. Based on site history information available, COCs to be evaluated should include, at a minimum, dioxins, furans, pentachlorophenol, PCBs, metals, petroleum and polycyclic aromatic hydrocarbons, and other toxic compounds associated with past activities on the site. The appropriate environmental screening levels (ESLs) to reference for soil samples are the San Francisco Regional Water Quality Control Board ESLs for aquatic life (SFRWQCB 2019)[4] because the North Coast Regional Water Quality Control Board does not currently have its own ESLs for Humboldt Bay aquatic life. In the event dioxins/furans (measured in TEQs)[5] or other COCs are encountered at harmful levels in the pipeline construction area, the permittee shall submit a Soil and Groundwater Management Plan that provides recommendations to mitigate the potential for mobilization of constituents of concern during pipeline trenching/installation work. The Soil and Groundwater Management Plan shall be processed as an amendment to this CDP, unless the Executive Director determines that no amendment is legally required.

To ensure that the above mitigation measures determined to be necessary to protect water quality are implemented during construction of the development authorized under this CDP, the Commission imposes **Special Condition 6**. This condition requires adherence to the suite of water quality protection standards, measures, and plans during construction in compliance with final mitigation measures summarized above required by Humboldt County in its approval of the FEIR for the larger project. The condition requires submittal of final water quality protection requirements prior to commencement of construction that identify BMPs and other measures and plans to be used to prevent the entry of stormwater runoff into Humboldt Bay during construction; to prevent the entrainment of excavated contaminated materials leaving the site; and to prevent the entry of polluted stormwater runoff into coastal waters during the transportation and storage of excavated materials.

- **Revise Finding IV-F (Marine Resources and Water Quality), in the section regarding "Potential Impacts to Adjacent Eelgrass Beds During Construction" on page 54:**

The water depths at the proposed intake sites are -4.5 m MLLW at the RMT-2 dock and -1.8 m MLLW at the Red Tank dock. The depth of the RMT-2 intake prohibits growth of

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[4] The current ESL are dated July 25, 2019. See https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html.

[5] Scientists have developed Toxicity Equivalency Factors ("TEFs") to compare the potential toxicity of the many different dioxins and furans to the relative toxicity of TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin), which is the most well-known and most toxic of these compounds. Given these TEF factors, the toxicity of a mixture of dioxins/furans can be expressed in terms of its Toxicity Equivalents ("TEQs"), which is the amount of TCDD it would take to equal the combined toxic effect of all the dioxins found in that mixture.

eelgrass, but the depth at Red Tank dock is only slightly greater than the maximum growing depth that eelgrass is known to grow (-1.3 m MLLW according to Gilkerson 2008). The intake at Red Tank is within the area evaluated under the CDP 9-16-0204 approved by the Commission in November of 2016 for the subtidal mariculture pre-permitting project.[38] An associated EIR (SCH #2013062068) was certified by the District, which included eelgrass surveys and impact analysis. An active mariculture lease with a site-specific eelgrass protection plan includes the area where the Red Tank intake is proposed to be located. Condition 8 of CDP 9-16-0204 requires:

> *Prior to the initiation of installation activities for aquaculture gear or mooring piles, the Harbor District shall submit for Executive Director review and approval a plan showing that all such activities and associated structures or infrastructure (including pilings, moorings, anchors, longlines, surface rafts, FLUPSYs) shall remain a minimum of 30-feet away from the outside edge of any eelgrass bed within or adjacent to the three subtidal aquaculture sites. This report shall include a map of all eelgrass within each subtidal site and a 50-foot perimeter outside. The map shall be based on the results of an eelgrass survey carried out consistent with the timing and methodology guidelines of the National Marine Fisheries Service's California Eelgrass Management Program. Areas with depths greater than twice the minimum expected eelgrass growing depth in Humboldt Bay are exempt from this survey requirement.*

To protect eelgrass beds growing near Red Tank dock from potential impacts that could occur during construction, Special Condition 3-A(7) imposes these same requirements **with some minor revisions to clarify applicability pertaining to in-water work, to require the incorporation of protection measures pursuant to the final Eelgrass Protection Plan, and to allow for limited incursion into the eelgrass buffer when determined necessary with additional measures for monitoring, reporting, and if necessary, compensatory mitigation for any adverse impacts observed**.

III. Add "Response to Comments" to Adopted Findings report

Add the following "Response to Comments" section as Finding IV-O of the adopted findings report.

O. Response to Comments

In addition to corrections, clarifications, and revision made to the April 25, 2024 report in response to written comments received after publication of the report, following are additional responses included as part of the Commission's Adopted Findings.

Comments regarding issues raised by project elements not within the scope of this CDP

Several comment letters raise issues related to the Nordic Aquafarms project and the discharge of treated wastewater effluent from that project through the existing marine outfall line. Comments also generally express concern with the "piecemeal approach" to permitting various components of "one project" under multiple CDPs. One comment

letter (from Scott Frazer) also mentions the recent emergency CDP issued by the Commission's Executive Director for the emergency stabilization of the marine outfall line that will be used by the Nordic Aquafarms project to discharge treated wastewater to the open ocean and suggests that because of the age and disrepair of that line, this project should not be approved.

As noted in Finding IV-D, the Nordic Aquafarms Project was approved under a CDP issued by Humboldt County in 2022. That CDP was appealed to the Commission (Appeal No. A-1-HUM-22-0063), and in December of 2023 the Commission found that the appeal did not present a substantial issue with respect to the grounds on which the appeal was filed under section 30603 of the Coastal Act. The Commission separately granted a CDP to Nordic Aquafarms in November of 2023 for the discharge up to 10.3 million gallons per day of treated wastewater effluent from the Nordic facility via the existing marine outfall pipe that terminates 1.5 miles offshore of Samoa (CDP 9-20-0488). In addition, as noted by one commenter, in March of 2024, the Commission's Executive Director issued Emergency Permit G-1-24-0035 to the District to stabilize an approximately 175-foot-long portion of the outfall line along the beach west of the subject project site that had become exposed to waves and tides of the surf zone.[6]

The Commission has not acted on the CDPs in a piecemealing manner. First, the County's certified final EIR evaluated and disclosed the adverse impacts from the outfall and intake pipes and from the aquaculture facility, rendering any piecemealing claims baseless. Furthermore, there are no published court cases that identify a responsible agency, like the Commission in this circumstance, as violating CEQA under a piecemealing theory because the lead agency bears the primary burden to ensure that it reviews and discloses the full scope of a proposed project's impact on the environment.

Second, even if a responsible agency could be found to have violated CEQA on piecemealing grounds, the Commission could not have been subject to such claims because it lacked primary permitting jurisdiction over the aquacultural facility and, even if it did have full jurisdiction over all permitting, it could not force two different applicants to propose one project. Although Coastal Act section 30601.3 allows the Commission to process and act upon a consolidated coastal development permit application where a proposed project requires a CDP from both a local government with a certified local coastal program and from the Commission (and where the applicant, the local government, and the Commission all consent to permit consolidation), section 30601.3 does not require permit consolidation. In this case, the two CDP applications from Nordic were not consolidated and, as a result, the Commission and the County processed their own CDPs within their primary permitting jurisdictions. Additionally, the Harbor District is the applicant for the currently proposed development, not Nordic. While section 13053.4 of the Commission's regulations requires that "functionally related developments to be performed by the same applicant…be the subject of a single

[6] This permit was reported to the Commission on April 10th as part of the North Coast Deputy Director's Report: https://documents.coastal.ca.gov/reports/2024/4/w9/W9-4-2024-report.pdf.

permit application" to the maximum extent feasible, the Commission cannot force a separate applicant to join an application from another applicant. Each CDP evaluated the project within its application scope and conditioned the project to be consistent with the policies of the Coastal Act or the certified LCP as applicable. As discussed in the adopted findings for each of the CDPs, mitigation measures to minimize or avoid all significant adverse environmental impacts have been required for each component of the project, and as conditioned there are no other feasible alternatives or feasible mitigation measures available that would substantially lessen any significant adverse impacts that the project activities may have on the environment.

Regarding the emergency CDP authorized by the Commission's Executive Director for the emergency stabilization of the marine outfall line, as required by Condition 12 of the emergency permit, within 90 days of completion of the authorized emergency work, the applicant is required to either remove the emergency stabilization materials around the marine outfall line or submit a complete CDP application to retain or the materials. If the latter, the CDP application would be subject to the Commission's review and approval at a noticed public hearing, which would afford the public the opportunity to review and comment on any proposed long-term stabilization plans for the marine outfall line.

Comments regarding Standard Condition 2

A comment received from the applicant states "*As written, the permit must be vested within two years. The Harbor District requests this be updated to three years to provide greater flexibility in the event of construction delays, to avoid the need to revisit or renew the permit in the future*."

As written, Standard Condition 2 requires that the permit will expire two years from the date on which the Commission votes on the application if development has not commenced by that date. The condition does not require that development be completed within two years. As specified in the condition, application for extension of the permit may be made prior to the expiration date if development has not commenced by that date.

Comments regarding Special Conditions and review of final plans

A comment letter from Shannon C. Wilhite, Esq. suggests that Special Condition 2 (Federal Agency Authorizations) should be modified to require submittal of both the National Marine Fisheries Service (NMFS) and Army Corps authorizations prior to issuance of the CDP. A similar comment from Alison Willy suggests that consideration of the CDP should be delayed until formal ESHA consultation with NMFS has concluded. Additional comments in these letters as well as a letter from Scott Frazer suggest that Special Condition 3 (which requires the Executive Director's review and approval of final plans prior to commencement of construction) and Special Condition 4 (which requires submittal of a Marine Life Mitigation Plan prior to CDP issuance) should instead require final plans to be reviewed and commented on by the public at a subsequent Commission hearing.

Typically, federal approvals are not issued or released until after state approvals are in place. Hence, Special Condition 2 requires these authorizations to be submitted prior to commencement of construction of the development authorized by the CDP rather than prior to issuance of the CDP. Commission staff has coordinated closely with staff from the Corps and NMFS through the CDP review process, and NMFS staff have confirmed in communications with the applicant and with Commission staff that although the project is "Likely to Adversely Affect" federally listed salmonids and their associated critical habitat through the entrainment of salmonid prey, the proposed mitigation is anticipated to benefit salmonids and appropriately offset the project's adverse effects. Special Condition 4 requires submittal of a Marine Life Mitigation Plan prior to CDP issuance that has been developed in consultation with NMFS and the Corps (as well as CDFW and the Regional Water Board). As mentioned, Special Condition 2 requires submittal of the final NMFS consultation (Biological Opinion) prior to commencement of construction, and any changes to the project required by NMFS shall not be incorporated into the project until the District obtains an amendment to the CDP.

Additionally, because several of the plans required to be provided by Special Condition 3 (e.g., final plans for debris disposal, construction areas, and water quality protection) are plans typically produced by a contractor hired by an applicant to develop the authorized project rather than by the applicant itself, and because permit issuance normally is a prerequisite to the hiring of a contractor, the condition allows for the submittal of final plans prior to commencement of construction rather than prior to permit issuance.

Furthermore, because the applicant has provided sufficient information as part of its application to enable the Commission to evaluate the project's potential impacts on coastal resources, and because the Commission has conditioned the permit with specific details for plan submittal requirements and mitigation criteria, additional *Commission* review of final plans is not necessary in some cases (e.g., final plans for intake screens, debris disposal, water quality protection, and ESHA protection). In the case of the final Marine Life Mitigation Plan, as noted in the condition (4-A(2)(g)), other than the Fields Landing/Kramer Dock derelict piling removal, all mitigation activities, including any *Spartina* removal and any restoration at Bay Street, shall require separate authorization, either as an amendment to this permit or as a new CDP, which in either case would be considered by the Commission at a noticed public hearing that would provide opportunities for public review and comment.

<u>Comments regarding entrainment, loss of productivity, and required mitigation</u>

Several comments expressed concern about the effects of the project's entrainment on the Bay's biological community and suggested either that the project be denied based on these impacts or that a higher APF be used to ensure the impacts were adequately mitigated. As noted in Finding IV-F, the regulatory preference for seawater intakes is to select methods that entirely avoid entrainment – i.e., subsurface intakes – which have been determined to be infeasible at or near the proposed project site. If avoidance is not possible, the next step is to minimize the entrainment effects of an open water intake by installing screens that will reduce the number of organisms entrained. As expressed in

the Findings, these screens provide some reduction but still allow for entrainment to occur. The final step is to ensure there is adequate mitigation provided to fully address the loss of marine life resulting from entrainment. For this project, the calculated APF serves as the basis for identifying the type and scope of expected entrainment impacts and as the basis for the mitigation needed.

The APF for this project – 28.5 acres – is based on the average of the individual APFs calculated for each of seven species in the Bay that serve as surrogates for the many other species also subject to entrainment. This average APF reflects the overall average productivity values of the different bay habitats used by these species, which include areas with a wide range of greater or lesser productivity, such as vegetated or unvegetated mudflats, intertidal and subtidal areas, hard or soft substrates, including beneath docks or in riprap, and others. Instead of requiring mitigation that recreates the same mix of habitats present in the Bay, mitigation for entrainment generally focuses on providing areas of habitat that are as or more productive than the Bay's average productivity. For example, creating or restoring highly productive intertidal habitat areas or opening up areas of habitat that have been diminished due to invasive plants means that the loss of productivity represented by the individual or average APFs can be provided in mitigation areas that are smaller than those APFs.[7] While this approach largely (but not entirely) results in "out-of-kind" mitigation, it benefits the wider range of species that the selected surrogate species represent.

This project also includes an exception to this approach due to the presence of a special-status species – the longfin smelt – for which CDFW is developing specific mitigation requirements. In this case, all or some of the habitat that will benefit the smelt will also benefit many other species and therefore much of the smelt mitigation required by CDFW is likely to count towards the Commission's overall mitigation requirements for the suite of other species.

Comments requesting further evaluation of alternative intake locations

Commenters suggest the Commission consider alternatives to the District's proposed use of the two existing intakes in Humboldt Bay. As explained in Findings IV-F and G, the project FEIR evaluated a number of possible intake locations and found them to be infeasible or found that they would not result in reduced impacts compared to the current proposal. Additionally, and as noted in the Findings, subsurface intakes are considered infeasible at nearby alternative locations due to the substrates being largely silts and muds, which do not allow for adequate water flow rates.[8] Installing one or more

[7] It may also be impractical in some instances to recreate the same habitats. For example, the arrow goby, which has an APF of about 57 acres, is predominantly a mudflat species. It is likely not practicable to create 57 acres of additional mudflats in Humboldt Bay.

[8] The FEIR specifically evaluated potential sub-suface intakes in the form of slant wells and noted that results from a District test well confirmed that the limited yields would require multiple wells that would require more space than is available at the project site. Also see Finding IV-G.

new open water intakes at other nearby locations in the Bay would likely not reduce the entrainment impacts of the current proposal, as the District's entrainment study evaluated effects on the planktonic community throughout the Bay, and the hydrodynamics that affect the project's entrainment rate would be similar at other locations along the Samoa Channel. Installing new open water intakes in the Bay would additionally increase impacts related to in-water construction, noise, turbidity, and other adverse effects. One commenter proposed constructing an open intake on the ocean side of the Samoa Peninsula; however, this would primarily shift entrainment impacts from Bay species to nearshore oceanic species, many of whom would likely have a much larger source water body than the Bay species, which could result in a larger overall APF than the current 28.5-acre APF. Constructing an ocean intake would also likely result in substantial ESHA impacts due to the need for intake pipelines to cross dune habitat to connect to the proposed project site.

Comments regarding impacts on salmonids

Comment letters from Egger, Wiley, and others raise concerns regarding project impacts on salmonids. The Findings in section IV-F related screen mesh design and intake velocities discuss measures proposed and required as part of the project to protect salmonids. Specifically, the District has proposed to install screens with mesh sizes consistent with the Ocean Plan, which uses a more protective standard than the criterion established by NMFS for reducing salmonid impingement and entrainment. Furthermore, water intake velocities will be no more than 0.2 feet per second, which is a more protective standard than the criteria that NMFS has established for salmonids – i.e., no more than 0.4 feet per second for self-cleaning screens and no more than 0.2 feet per second for screens without self-cleaning capacity. Special Condition 3-A(1) requires submittal of final plans prior to commencement of construction that conform to these protective requirements. Furthermore, the requirements for mitigation under Special Condition 4 will ensure that any lost productivity that salmonids (and other marine resources) depend on for prey species is replaced.

Comments regarding water quality and the project's potential to mobilize contaminants

Comments from Humboldt Waterkeeper raise concerns related to insufficient measures to address legacy contamination along the proposed pipeline route(s). The comments assert that the portion of the water pipeline construction area north of APN 401-112-021 crosses an area with known contamination from past industrial use, including the use of pentachlorophenal ("penta") for lumber treatment. The comments point out that this chemical is invariably contaminated with dioxins and furans, and the trenching work involved with pipeline installation may disturb contaminated soil and groundwater and cause these constituents of concern to mobilize to Humboldt Bay. Although the project will be required to adhere to various BMPs under Special Condition 6 – in particular recommendations of the "Interim Measures Work Plan" developed by SHN in support of the Nordic Aquafarms project (Exhibit 11), which identifies methods and procedures for characterization and management of debris, soil, and groundwater generated in connection with construction activities – the recommended measures are specific only to a portion of the project area (i.e., to activities on APN 401-112-021). No site-specific recommendations have been developed to address the potential for encountering soil

and groundwater contaminants in the portion of the project site north of APN 401-112-021, which includes over 3,000 feet of proposed trenching work (trenches will be up to 19 feet wide and 5 feet deep). To address these comments, clarifications have been added to Special Condition 6, new Special Condition 13 is imposed, and updates have been made to Finding IV-F (Marine Resources and Water Quality) in the section regarding "Potential Water Quality Impacts Associated with Construction."

Comments requesting clarification on "structured and unstructured habitats"

A comment from the applicant requests clarification of the terms "structured habitats" and "unstructured habitats," specifically requesting definitions of these terms to support mitigation design planning. This information was previously provided on page 46 of the staff report (and referenced on pages 42 and 44) and has been further elaborated on through the revisions to Finding IV-F above. In brief, the habitats in Humboldt Bay that would be defined as biogenically-structured include, for example, eelgrass beds and saltmarsh whereas those that would be defined as unstructured would include mudflats, rubble or shell bottoms, and sandy bottoms. As many habitats are represented by some level of heterogeneity and can include a mosaic of features, appropriate features embedded within a predominant habitat type could be evaluated as the latter through a holistic lens; for example, tidal channels created within and to benefit salt marsh areas could be considered part of that ecosystem and credited as biogenically-structured habitat. The degree of spatial integration versus removal from a given habitat when considering a feature's qualification will necessarily be determined on a case-by-case basis since this will be dependent on the specific ecosystem(s).

Comments requesting clarification on *Spartina* removal

A comment from the applicant suggests that the amount of *Spartina* mitigation allowed under Special Condition 4-A(2)(c) includes, in addition to *Spartina* removal to occur at Bay Street, an additional 4.275 acres of *Spartina* removal to support the required APF mitigation. This is incorrect – as articulated in the referenced condition on page 9 (emphasis added), "Up to 15% of the total impact acreage (i.e. up to 4.275 acres) may be mitigated for via *Spartina densiflora* eradication where no other restoration activity is implemented (e.g., active revegetation)..." and the original findings concerning the Bay Street proposal on page 42 state (emphasis added) "For the portion of work that would be limited to treatment of *Spartina*, which is presently estimated as approximately 2.5 acres of moderate cover and 1.2 acres of the high cover classes (26-60% and 60-100%, respectively), the corresponding ratios of 1:1.7 and ~~**1:1.32**~~ **1:3.2** would apply and would total less than the 15% *Spartina* only treatment threshold of 4.275 acres." To further clarify, assuming 3.7 acres of *Spartina* were eradicated as part of the Bay Street project and no further action was taken in those areas, 0.575 acres of potential credit for *Spartina* eradication would remain available from other locations. Notably, the two Bay Street parcels total approximately 4.4 acres and apart from the 3.7 acres of proposed *Spartina* eradication (representing 84% of the subject area), there would be less than 0.5 acres of qualifying substantial restoration, and some upland areas that would seem to go untreated (note: all acreages are approximated); thus, the predominant action would be limited to *Spartina* eradication, though some habitat complexity would be developed in the salt marsh where features such as tidal channels, ponds, and pannes

would be created. However, if additional restoration activity were implemented at Bay Street (or elsewhere) in the areas where *Spartina* was eradicated, particularly through efforts to revegetate with native species in order to accelerate the return of ecological productivity, such an area might reasonably be interpreted as a more robust restoration of biogenically structured habitat and be able to receive credit at the maximum available 1:4 ratio. In such a situation, the corresponding acreage of *Spartina* removal would not be deducted from the 15% total acreage allowance.

Comments requesting clarification on mitigation requirements

A comment from the applicant requests clarification of the mitigation requirements in the Marine Resources Finding regarding “Additional Mitigation Needed to Compensate for Marine Life Impacts.” To address these comments, clarifications and updates have been added to the referenced finding as shown above.

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W11a

1-21-0653

(Humboldt Bay Harbor, Recreation, and Conservation District)

May 8, 2024

EXHIBITS

Interim Measures Work Plan
Former Evergreen Pulp Mill
Revision 1

Samoa, California
Case No. 1NHU892

Prepared for:

Nordic Aquafarms California, LLC

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January 2021

QA/QC: EJN___

Reference: 019146.050

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Abbreviations and Acronyms

Units of Measure

cy	cubic yards
ft/day	feet per day
ft/ft	feet per foot
mg/kg	milligrams per kilogram
pg/g	picograms per gram
pg/L	picograms per liter
ppm	parts per million
ug/L	micrograms per liter
uS/cm	microsiemens per centimeter
<	denotes a value that is “less than” the method reporting limit
>	denotes a value that is “greater than” the method reporting limit

Acronyms

AOI	area of interest
As	arsenic
AST	aboveground storage tank
BGS	below ground surface
CAM	California Administrative Manual
COPC	contaminants of potential concern
CPT	cone penetrometer
Cr	chromium
Cr VI	chromium VI
CSM	conceptual site model
DDP	Dewatering and Discharge Plan
DHS	California Department of Health Services
DP-#	direct push boring-number
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ESL	environmental screening level
ERM	Environmental Resource Management
HASP	health and safety plan
HHRA	Human Health Risk Assessment
HBHRCD	Humboldt Bay Harbor, Recreation, and Conservation District
IMOs	Interim Measure Objectives
IMW	Interim Measures Work Plan
ISM	Incremental Sampling Methodology
LACO	LACO Associates
LP	Louisiana Pacific Corporation
MCL	maximum contaminant level
MFG	McCulley, Frick & Gilman, Inc.
MH-#	Manhole-number
Mn	manganese
MRP	monitoring and reporting program
MSW	municipal solid waste

MW	monitoring well-number
NAFC	Nordic Aquafarms California, LLC
NAVD88	North American vertical datum, 1988
NPDES	National Pollutant Discharge Elimination System
PCB	polychlorinated biphenyls
PID	photoionization detector
OCP	organochlorine pesticides
PES	PES Environmental Inc.
PHG	California public health goal
QC	quality control
RAS	recirculating aquaculture system
RCRA	Resource Conservation and Recovery Act
RMT-II	Redwood Marine Terminal II
RWQCB	North Coast Regional Water Quality Control Board
SAP	sampling and analysis plan
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SB-#	soil boring number
SMARTS	Stormwater Multiple Application and Report Tracking System
STLC	Soluble Threshold Limit Concentrations
SWPPP	stormwater pollution prevention plan
SWRCB	California State Water Resources Control Board
SVOCs	semi-volatile organic compounds
TB-#	TB boring-number
TCDD	tetrachlorobenzeno-p-dioxin
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
TEQ	toxicity equivalence
TPHD	total petroleum hydrocarbons as diesel
TPHMO	total petroleum hydrocarbons as motor oil
TWP-#	temporary well point-number
VOCs	volatile organic compounds
Weston	Weston Solutions
WHO	World Health Organization
WQOs	water quality objectives
XRF	x-ray fluorescence

1.0 Introduction

On behalf of Nordic Aquafarms California, LLC (NAFC), SHN has prepared this Interim Measures Work Plan (IMW) for planned redevelopment at the former Evergreen Pulp Mill (Case No. 1NHU892). NAFC is considering construction of a recirculating aquaculture system (RAS) facility at this location that will require the old pulp-mill buildings and infrastructure to be demolished and removed. This IMW outlines the site history, current conditions, and planned methods to address material handling from demolition and construction activities for site redevelopment.

1.1 Site Description

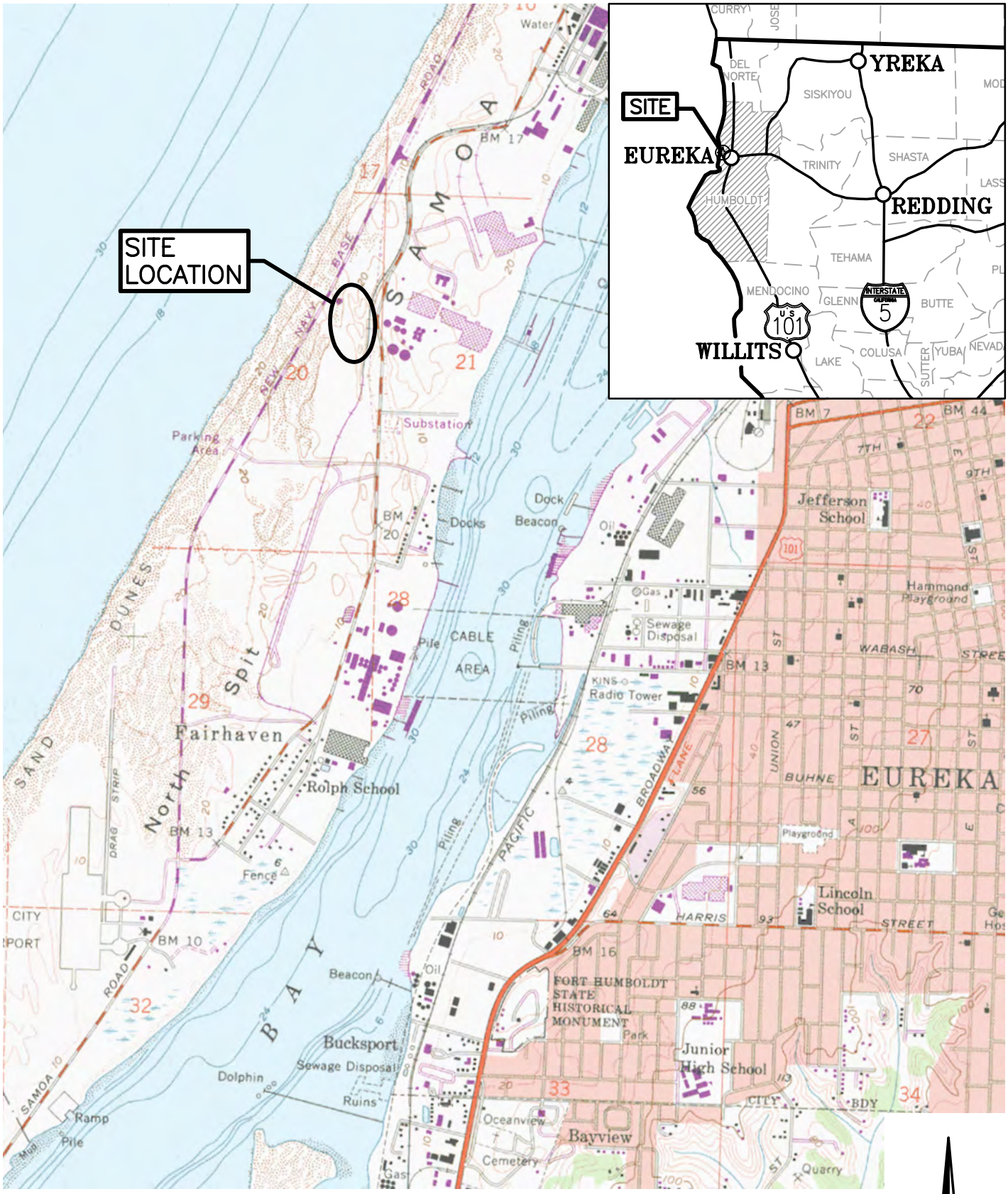
Historically referred to as the Evergreen Pulp Mill, the footprint of the old facility occupies approximately 70 acres of Assessor's parcel number 401-112-021 at One TCF Drive, in Samoa, California (Figure 1). The site is located on the Samoa Peninsula, a narrow divide between the Pacific Ocean to the west and Humboldt Bay to the east. Land use of the site and surrounding properties is industrial/commercial. The Samoa landfill (a closed ash disposal site) is located to the west of the facility. The former mill has not been used for commercial purposes since 2008 and is in a current state of decommissioning as demolition has occurred at various areas of the mill. This inactive pulp mill is owned by the Humboldt Bay Development Association, Inc. and is leased to the Humboldt Bay Harbor, Recreation, and Conservation District (HBHRCD). The facility is currently referred to as Redwood Marine Terminal II (RMT-II).

1.2 Site History and Operations

The site was developed in 1964 as a bleached Kraft pulp mill by Georgia-Pacific manufacturing company. The pulp mill in its original configuration was in operation between 1965 and 1994, when it was converted into a totally chlorine-free operation by Louisiana Pacific Corporation (LP). Process chemical recovery was comprised of removing organic matter accumulated in the pulp bleaching process through combustion in recovery boilers 1, 2, and 3; the recovered chemicals were then available for reuse in the bleaching process. The bleaching process was performed to remove tannins and lignins from wood chips prior to being introduced to the pulping process.

Evergreen Pulp was the last company to operate the mill until it was shut down in October 2008. Freshwater Tissue Company purchased the site in 2009 and planned on reopening the mill; however, they abandoned these plans and began decommissioning equipment, demolishing various buildings, and liquidating assets. In August 2013, Freshwater Tissue Company transferred ownership of the site to HBHRCD. The HBHRCD is currently leasing northeastern portions of the property for use by commercial businesses.

Historical buildings and land uses of the site included offices, pulp warehouses, a machine building, a sand blasting shop, petroleum products distribution and storage, a hazardous waste storage area, diesel aboveground storage tanks (ASTs), a chemical storage tank farm, a water treatment plant, a "black liquor" processing area, a bleach plant, three process chemical recovery boilers, and an electrical generation station. To date, the petroleum products distribution and storage infrastructure, diesel ASTs, the chemical storage tank farm, the black liquor processing area, the bleach plant, and two of three process chemical recovery boilers have been demolished.



SOURCE: EUREKA USGS 7.5 MINUTE QUADRANGLE

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1"=2000'±

SHN	Nordic Aquafarms California, LLC Landfill Gas Monitoring Samoa, California	Site Location Map SHN 019146.050	
	October 2020	019146-050-SITE-LCTN	Figure 1

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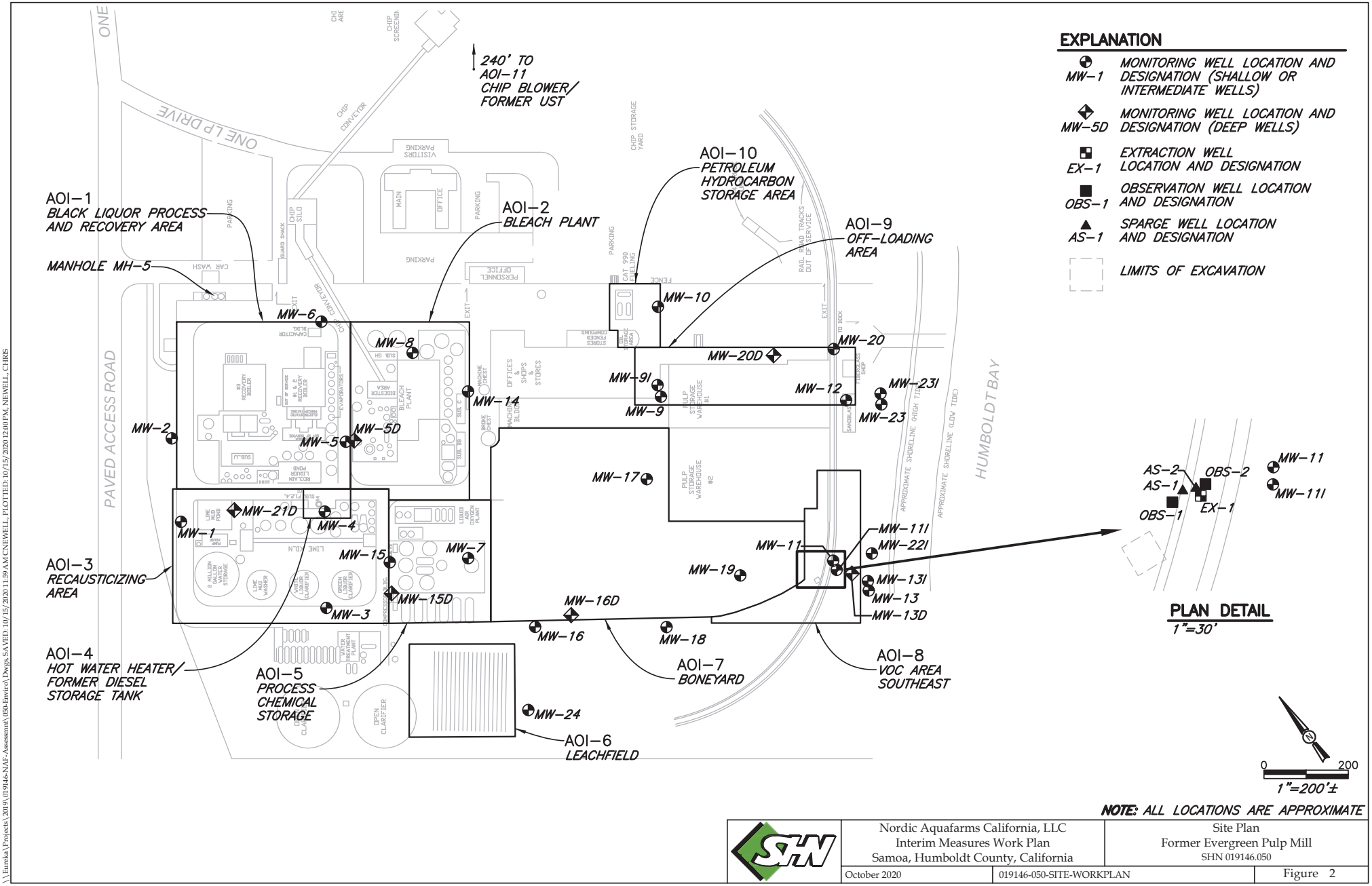

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2.0 Environmental Conditions

Numerous investigations of soil, groundwater, soil gas, and construction materials have been initiated by consultants on behalf of past and current owners and stakeholders starting from the late 1990s. This commercial property is a Brownfields site that has received funding grants from the U.S. Environmental Protection Agency (EPA) for cleanup and assessment activities. The North Coast Regional Water Quality Control Board (RWQCB) is the lead agency for the investigation and cleanup of environmental impacts associated from mill operations and oversees the current groundwater monitoring program in place for the site. Documents related to site work and regulatory correspondence have been publicly available on the California State Water Resource Control Board (SWRCB) Geotracker website at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL0602377769

A total of 11 areas of interest (AOI) have been identified at the site based on historic operations and potential contaminants at each area. The AOIs for the site are shown on Figure 2 and include:

- Black Liquor Process and Recovery Area (AOI-1)
- Bleach Plant (AOI-2)
- Causticizing Area (AOI-3)
- Hot Water Heater and Former Diesel Tank (AOI-4)
- Process Chemical Storage (AOI-5)
- Leachfield (AOI-6)
- Boneyard (AOI-7)
- VOC Area southeast (AOI-8)
- Off Loading Area (AOI-9)
- Petroleum Hydrocarbon Storage Area (AOI-10)
- Chip Blower (AOI-11)

Aspects of significance for AOIs at the former pulp mill site include the following:

AOI-1, identified as the Black Liquor Process and Recovery Area, encompasses the portion of the mill site formerly occupied by the chemical recovery boilers, electrical generating station, multiple aboveground storage tanks (ASTs) for chemical storage and management, and the reclaimed liquor pond. Only recovery boiler #3 and portions of the associated infrastructure, smokestack, portions of the electrical generating infrastructure, the reclaimed liquor pond, concrete floors and foundations, and fluid conveyance structures (such as sanitary sewers, storm sewers, and concrete-lined trenches related to the spill recovery system) remain in AOI-1.

AOI-2, identified as Bleach Plant, encompasses the portion of the site formerly occupied by the wood chip digester, bleach plant, and associated infrastructure. Most of the AOI-2 structures have been demolished; however, five ASTs, portions of two electrical substations, remnants of concrete floors and foundations, and fluid conveyance structures like those noted in AOI-1 remain in AOI-2.

AOI-3, AOI-4 and AOI-5 make up the southern portion of the pulp processing area. These AOIs are where chemicals were stored for making the pulping liquors to breakdown the woodchips. Storage tanks for caustic and acidic chemicals, and diesel were located in this area. AOI-7 (Boneyard) was used as a storage area for miscellaneous mill equipment that was discarded or saved for potential future use. This area additionally contains a pipeline used for chemicals delivered to the dock by barge that were transferred to the chemical storage area.

On September 3, 2003, the Humboldt County Division of Environmental Health issued a remedial action completion certificate for the former UST in AOI-11. The RWQCB provided a notice of no further assessment for AOI-6 in December 2014 (RWQCB, 2014). Active remediation of chlorinated solvent impacts to soil and groundwater is being performed in AOI-8 and AOI-9. The planned area of redevelopment for this RAS project is shown in Figure 3 and does not extend to AOI-9, -10, and -11, and only includes a small westerly portion of AOI-8.

The conceptual site model (CSM) prepared for the site in 2011 is located on Geotracker and provides a comprehensive summary that contained historical plans and data for a 14-year period (SHN, 2011b). To assess contamination associated with historical use at this property, SHN completed a review of the 2011 CSM and subsequent update in 2013 (SHN, 2013), and all data collected since that time prior to submitting this IMW. A site map of all historical sample locations compiled by Ramboll in October 2019 is additionally provided in Appendix 1 (Ramboll, 2019).

2.1 Previous Assessments

A summary of investigation and remediation activities conducted at the site are summarized in the following sections. Investigations were performed to assess known releases and potential impacts from mill operations under the oversight of the RWQCB. Results of the investigations were provided in subsequent reports that are referenced and summarized in sections describing site conditions of this IMW. Historical results provided in Appendix 1 of this IMW include soil samples collected after 2013 and groundwater monitoring from site wells since 1997.

February 1997—LP conducted a preliminary investigation at the site to assess soil and groundwater conditions at various locations throughout the mill (LP, 1997). Seven locations were targeted during this investigation, including: Black Liquor Process and Recovery Area, Causticizing Area, Bleach Plant, Petroleum Product Storage Areas, Hazardous Waste Storage Area, Tank Farm, and various general site locations.

October 1997—SHN supervised the installation of 10 groundwater monitoring wells (MW-1 through MW-10).

December 1997—SHN performed a tidal influence study, and in January and February 1998, SHN conducted an aquifer test using wells MW-4 and MW-10 (SHN, 1998).

2000—Environmental Resource Management (ERM) conducted a subsurface investigation on behalf of a prospective buyer. A total of 42 borings were installed at the site. (SB01 through SB40, GP-1, and GP-2).

April 2003—A subsurface investigation consisting of seven borings (BH-1 through BH-7) was completed in the area of AOI-3, near the western boundary of AOI-5, due to a caustic release (MFG, April 2003).

May 2005— McCulley, Frick & Gilman, Inc. (MFG) submitted a supplemental site characterization report. The report included the results of additional soil borings (DP-1 through DP-8) and the installation of wells MW-12 and MW-13 (MFG, 2005).

2006—MFG submitted an additional site characterization report and an additional site investigation report. The reports included the results of additional borings (DP-9 through DP-21, TB-1, and DP-22 through DP-32) (MFG, April and December 2006).

May 2008—PES Environmental Inc. (PES) submitted the report of findings from a data gaps investigation performed as described in the November 2007 data gap evaluation work plan (PES, 2008).

September 2010—SHN supervised an additional investigation in the vicinity of AOI-8 (SHN, January 2011a). The investigation consisted of membrane interface probe borings, collecting soil samples from 8 soil borings (WP-101, WP-102, WP-103, WP-104, WP-115, B-105, B-106, and B-107), collecting depth discrete groundwater samples from 14 temporary well points (WP-101 WP-102, WP-103, WP-104, WP-108, WP-109, WP-110, WP-111, WP-112, WP-113, WP-114, WP-115, WP-116, and WP-117), and performing a tidal study.

December 2013—LACO Associates (LACO) conducted debris pile characterization as part of Brownfields cleanup alternatives analysis for debris pile removal (LACO, 2014a).

2014, 2015, and 2017—SHN collected groundwater samples from select monitoring wells located in the vicinity of AOI-1 and AOI-2 for the presence of dioxin and furan congeners. Soil samples were collected for dioxin and furan analysis during the February 2015 event near the former black liquor pond, and in the central portion of AOI-2 in the vicinity of the former bleach plant (SHN, 2017).

July 2019—Weston Solutions (Weston) completed a site-wide investigation under grant funding from the EPA for impacts from metals, polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs) and dioxins in site soils. Sixteen soil borings were completed for collection of 55 soil samples at three depth intervals (Weston, 2019).

September 2020—A hazardous materials survey report was completed for structures remaining onsite designated for demolition as part of the project (GHD, 2020). The report identified the presence of lead, asbestos containing material and universal waste in multiple areas of the site that will require special handling and offsite disposal during site demolition activities.

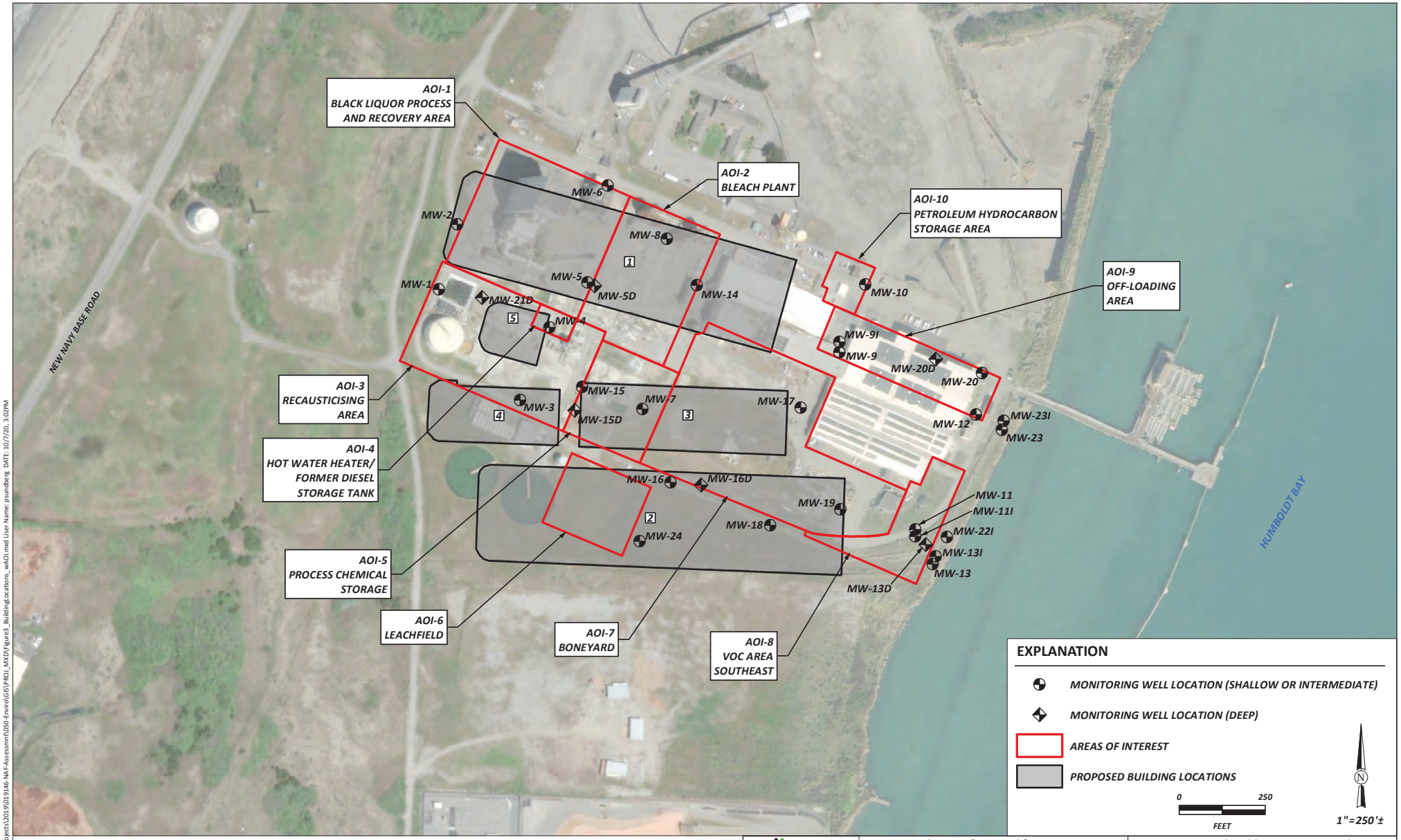
2.2 Remediation Activities

1994—LP prepared and began implementation of a plan to prevent releases of pulping liquors and hazardous materials to the environment. Prior to the plan preparation, LP had already constructed secondary containment for the black liquor storage area. Pursuant to the plan, additional spill controls were installed in the black liquor handling area and new secondary containment for the digester area was constructed. LP became aware of the contamination present in the black liquor storage area during this time (SHN, 1998).

1995—LP demolished the secondary containment for a 50,000-gallon fuel oil/diesel tank in AOI-4, prior to converting the petroleum storage tank to a hot water tank. During the demolition, LP removed a substantial amount of petroleum impacted soil from the perimeter of the tank (LP, 1995).

1997 and 1998—Two geophysical surveys were performed in the southeastern portion of AOI-7, where an LP employee reported that drums were buried. Both surveys identified potential buried metal. LP performed exploratory excavations in the areas where buried metal was identified; only pieces of scrap metal, no buried drums, were discovered (MFG, 2000).

October 2003—MFG supervised a limited excavation in the vicinity of SB-05 (AOI-8). Approximately 37 cubic yards (cy) of material were removed, and five confirmation soil samples were collected from the excavation cavity (MFG, October 2003).



NOTE: ALL LOCATIONS ARE APPROXIMATE
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Nordic Aquafarms California, LLC.
Interim Measures Work Plan
Samoa Peninsula, Humboldt County, California

Proposed Building Locations with Areas of Interest
SHN 019146.050

October 2020 | Figure3_BuildingLocations_wAOI | Figure 3

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2013 to 2017—EPA Superfund Emergency Response Section removed approximately 4,000,000 gallons of caustic and acidic liquids; 10,000 tons of toxic sludges; and various chemicals from the site. Numerous ASTs were demolished and removed as part of the project. As of December 2017, cleanup of the hazardous waste storage area and demolition of most of the aboveground storage tanks, the bleach plant, and two recovery boilers, has been completed (EPA, 2016).

March 2016, April 2018, and May 2020—SHN oversaw three remedial action events performed at AOI-8 and AOI-9 to address volatile organic compounds (VOCs) in soil in groundwater. The three events included injection of liquid sodium permanganate into the subsurface at multiple depth intervals (38 locations for the first two events and 37 locations for the third event) (SHN, August 2020).

April 2019—Debris piles that had resulted from structures demolished in 2011 and 2012 was processed for sorting under an EPA Brownfields grant. The debris was from recovery boilers 1 and 2, and the bleach plant and was comprised of various building materials (reinforced and unreinforced concrete rubble, brick, tile, roofing materials, equipment parts and scrap metal). The material underwent sorting for separation of debris and then ran over a screen to separate material smaller than 1 inch in diameter. The smaller material was temporarily stockpiled onsite for characterization and proper disposition. The larger material was crushed as necessary to attain 4-inch minus size and placed in a stockpile. Both the crushed and screened material was tested according to the project sampling and analysis plan (SAP) and determination was made for suitability of reuse onsite or offsite transport and disposal at a licensed facility (SHN, 2018). At debris pile project completion, approximately 288 cy of material with elevated lead concentrations was transported offsite for disposal and approximately 1,764 cy was deemed suitable for site reuse and remains onsite.

2.3 Historical Constituents of Concern

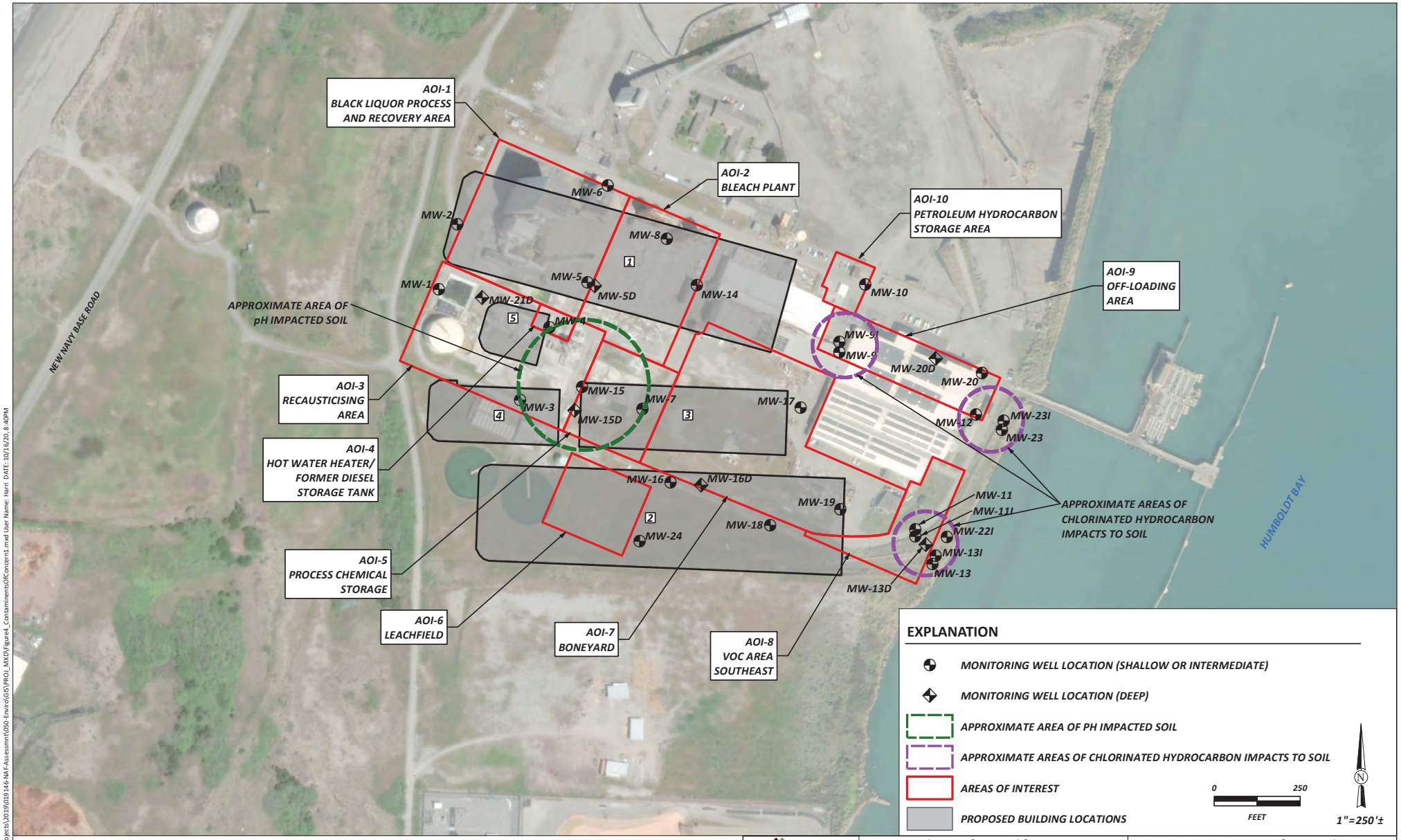
Historical results for soil and groundwater samples collected from the site were reviewed for comparison to the most recent environmental screening levels (ESLs). Several documents are used in application of ESLs in site soil due to some reference documents having a limited number of constituents. The RWQCB has adopted the following reference documents to assess contaminants in site soils for residential and commercial land use:

- California Department of Toxic Substance Control (DTSC) Human Health Risk Assessment (HHRA) Note 3, Screening Levels for Soil (DTSC, 2020)
- DTSC HHRA Note 2, Soil Remedial Goals for Dioxins (DTSC, 2017)
- San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) Tier 1 Environmental Screening Levels (SFRWQCB, 2019)

For groundwater at the site, the water quality objectives for cleanup projects in the North Coast Region (RWQCB, 2016) and the SFBRWQCB ESL spreadsheet referenced above were the primary regulatory guidance documents used for comparison. A description of contaminants of potential concern (COPC) identified at the site is provided in the following sections.

2.3.1 Contaminants of Potential Concern in Soil

The primary COPCs identified in site soils are chlorinated hydrocarbons and pH (Figure 4). Remaining soil impacted by petroleum hydrocarbons does not appear to be impacting groundwater and dioxin



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Nordic Aquafarms California, LLC.
Interim Measures Work Plan
Samoa Peninsula, Humboldt County, California

Contaminants of Potential Concern in Soil
SHN 019146.050

October 2020 | Figure4_ContaminentsOfConcern1 | Figure 4

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concentrations detected in site soils are at levels below residential screening levels. Concentrations of metals, PCBs, and OCPs in soil samples collected from the site do not appear to be elevated based on review of historical data and comparison to background values for the area.

Chlorinated hydrocarbons. These are present in soil and are primarily in AOI-8 and AOI-9. The extent of chlorinated hydrocarbons in soil generally has been defined (except beneath the warehouse in AOI-9).

Low concentrations of certain chlorinated hydrocarbons have been detected in a few isolated borings in this area. The area of planned redevelopment shown on Figure 3 does not extend to areas where soils are impacted by chlorinated hydrocarbons in AOI-8 and AOI-9.

pH. A known release of high pH material (sodium hydroxide) occurred in the vicinity of well MW-15, and it was reported that hardened sodium hydroxide was present in boring BH-1 (MFG, April 2003). Elevated pH (> 8.5 pH units) in soil is present beneath the majority of the former process areas. The extent of elevated pH in soil was reported to have been adequately defined.

Petroleum hydrocarbon. Impacted soils were excavated in AOI-4 during decommissioning of the diesel fuel tank secondary containment. Only low concentrations of total petroleum hydrocarbons as diesel (TPHD) (<5 milligrams per kilogram [mg/kg]) were detected in soil from borings completed in the area.

Dioxins and Furans. Soil impacts by dioxins and furans were recorded for samples collected near the former black liquor pond, and the central portion of AOI-2 in the vicinity of the former bleach plant in 2015 (SHN, 2017). The site-wide investigation in 2019 additionally reported the presence of dioxins and furans in a majority of the 55 samples collected during the event (Ramboll, 2019). All dioxin testing results were reported at concentrations below DTSC residential soil screening levels for 2,3,7,8-tetrachlorobenzeno-p-dioxin (TCDD) at 4.8 picograms per gram (pg/g) and the World Health Order toxicity equivalence (WHO TEQ; WHO 2005) for residential soils of 50 pg/g.

Metals. Arsenic is the only metal at the site that was detected at a concentration above the residential soil ESL of 0.11 mg/kg. However, the concentrations observed for arsenic in site soil is within the probable background range for this area of 5.6 mg/kg (Kearney, 1996). Levels of lead, cadmium and copper in site soil additionally appear to be in the background range for natural soils for this area.

2.3.2 Contaminants of Potential Concern in Groundwater

Site wide, COPCs in groundwater include chlorinated hydrocarbons (chlorinated ethanes and ethenes), dissolved arsenic (As), dissolved chromium (Cr), and dissolved manganese (Mn). Additional parameters of concern include dioxins, pH, color impact from black liquor release, total dissolved solids (TDS), dissolved nickel and dissolved chromium VI (Cr VI). Petroleum hydrocarbons have generally been nondetectable or below the water quality objectives (WQOs) in groundwater samples from site monitoring wells, and are, therefore, not considered COPC of significance at this site. COPCs identified in groundwater at the site include the following:

Chlorinated hydrocarbons have been detected in groundwater samples from site monitoring wells in AOI-7, AOI-8, and AOI-9. Active remediation is occurring in this area and a recent groundwater monitoring event was conducted in June 2020. Based on the post-injection data, it appears the injection of sodium permanganate had some effect on reducing chlorinated solvent concentrations, although

post-injection concentration trendlines show variable results. Some indicate decreasing trendlines through time, while others do not. The general area of impact for chlorinated hydrocarbons at the site is shown in Figure 5.

Dissolved Metals. Elevated concentrations of dissolved arsenic, manganese and chromium are most prevalent within the process areas (AOI-1, AOI-2, AOI-3, AOI-4, and AOI-5). The source of dissolved metals in groundwater beneath the process areas is unknown but may be related to the changes in geochemistry from the known release of high pH material and organic acids from the release of black liquor. An isolated area of elevated dissolved chromium is present in the vicinity of well MW-18, and dissolved arsenic has been detected above the WQO in well MW-13. Dissolved arsenic was detected in samples of Humboldt Bay water (PES, 2008) and may be a contributing source of dissolved arsenic in shallow groundwater near the bay margin.

Parameters of Concern. The extent of high pH (>8.5 pH units) and high EC (> 900 uS/cm) impacted shallow groundwater is in the area surrounding well MW-15 that includes AOI-4 and AOI-5. Color slightly exceeds the WQO in almost all shallow site wells in the former process areas. Color greatly exceeds the WQO in the vicinity of wells MW5/5D, likely related to releases of black liquor in AOI-1. The extent of impacts from parameters of concern is shown on Figure 5.

Dioxins and Furans. Groundwater samples collected in 2014, 2015, and 2017 from monitoring wells and well points located in the vicinity of AOI-1 and AOI-2, and at manhole 5 (MH-5) were analyzed for the presence of dioxin and furan congeners. Laboratory analytical reports showed TEQ results for 2,3,7,8-TCDD in most samples were below the California maximum contaminant level (MCL) in drinking water of 30 picograms per liter (pg/L). Groundwater samples collected from monitoring wells MW-5 and MW-8, and the manhole exceeded the California public health goal (PHG) for drinking water of 0.05 pg/L. The peak concentrations for 2,3,7,8-TCDD and TEQ in groundwater were recorded from the field composited well point sample in AOI-2 at concentrations of 8.24 pg/L and 231.56 pg/L, respectively (LACO, 2014b). The lateral distribution of dioxin impacts to groundwater below the WQO is defined by laboratory analytical results recorded for samples collected from monitoring wells MW-1, MW-2, MW-4, MW-6, MW-7, MW-14, MW-15, and MW-17.

2.4 Ambient (Background) Conditions

PES collected 10 background water samples from areas upgradient of the pulp mill in 2008. All the background water samples collected by PES were collected from screened intervals of 16-20 feet below ground surface (BGS). Field pH measurements varied between 7.02 and 8.25. Of the four dissolved metals identified by PES (As, Cr, Mn, and Nickel), manganese was the only dissolved metal detected at concentrations above the California Department of Health Services (DHS) secondary maximum contaminant level (MCL) of 50 micrograms per liter (ug/L).

EC measurements in groundwater generally increase with depth, as observed in data collected from the variably screened deep monitoring wells. The EC is likely related to saltwater intrusion, based on EC measurements and cation/anion analysis in deep screened wells. The transition from fresh to brackish water occurs between approximately 50 to 80 feet BGS, and from brackish to saline water between 100 feet to 110 feet BGS.

SWRCB Resolution 92-49 indicates that cleanup and abatement is not required to achieve water quality conditions that are better than background conditions (SWRCB, 1992); therefore, the WQO for dissolved manganese for this site should be modified to reflect the calculated background concentrations.

An evaluation of background conditions for concentration of metals in soils on the Samoa peninsula will be completed and included in the project SAP. Metals known to be present locally that are often above established regulatory screening threshold for residential soils include arsenic, cadmium, and chromium. A study showing the range for metals naturally occurring in this area will be completed for determination of soil suitability for site reuse and RWQCB approval.

3.0 Hydrogeologic Conditions

This section summarizes the geologic and hydrologic information available from historic site investigations.

3.1 Geology

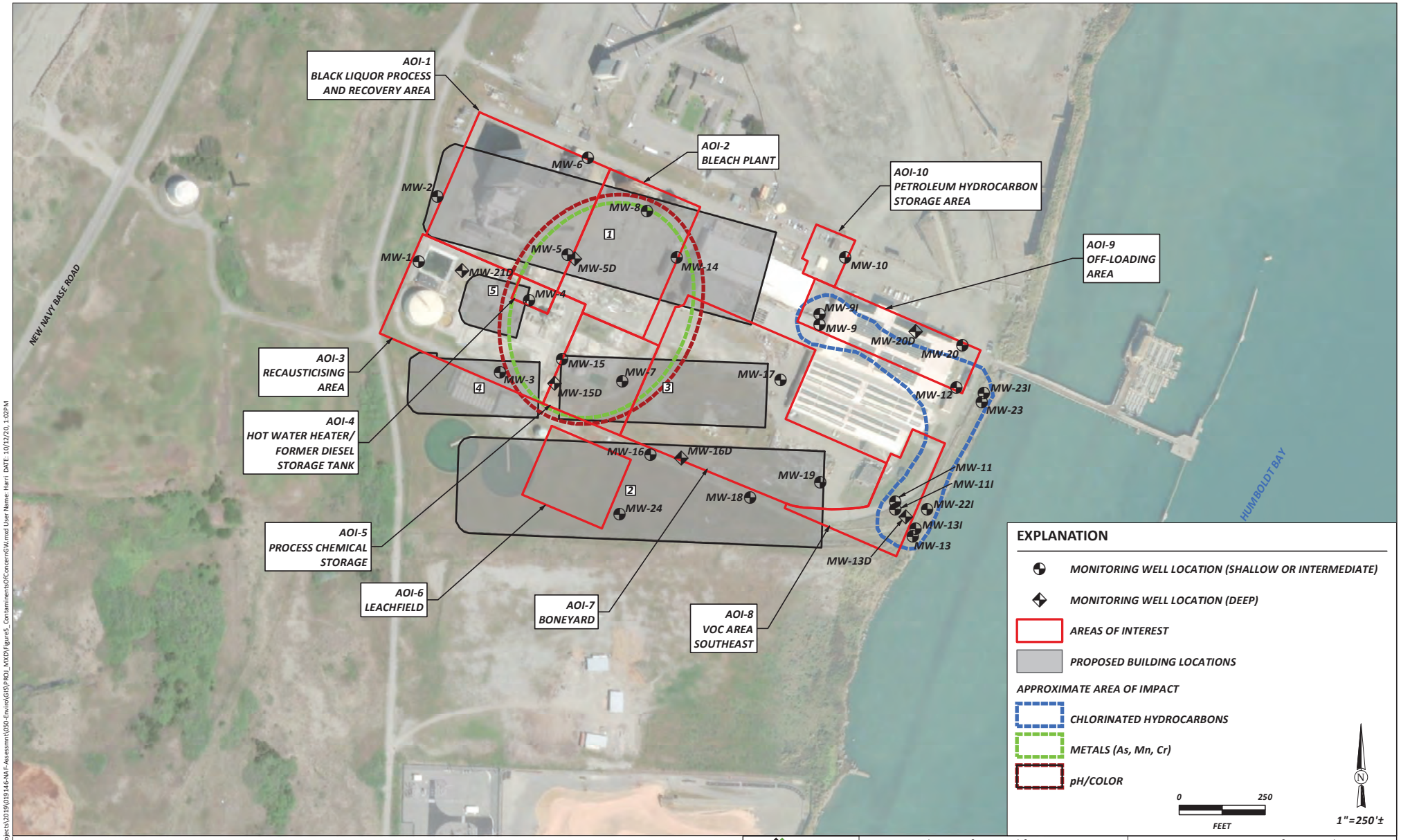
The geology in the vicinity of the site was described as "undeformed marine shoreline and Aeolian deposits (Holocene and late Pleistocene)," which consist of gravel and sand deposited in marine terraces, on benches and on dunes along present shorelines (McLaughlin et al., 2000). The entire Samoa Peninsula is covered with a variable thickness of dune sands. The northern part of the peninsula is covered with a thick sequence of dunes that can be subdivided into four distinct stratigraphic units. These dunes typically are forested and reach as much as 60 to 70 feet above sea level. To the south, in the vicinity of the pulp mill, the peninsula is covered with a relatively young accumulation of dunes that are generally less than 20 feet in elevation above sea level. Surface elevations at the pulp mill range from approximately 18 to 23 feet relative to North American vertical datum, 1988 (NAVD88).

Previous investigations for subsurface conditions include:

- In 1964, 16 geotechnical borings were advanced at the site to depths of 41 to 102 feet BGS in advance of site development (Harding and Associates, 1964).
- In 1988, 11 geotechnical borings were advanced for a modernization project, apparently in the vicinity of AOI-1 or AOI-2 (Walter B. Sweet, 1988). Borings were advanced to depths of 25 to 75 feet BGS. Site soils were described primarily as poorly graded sands, medium dense to very dense, with densities increasing with depth.
- Between October 1997 and September 2010, soil borings were completed for monitoring well installation to a maximum depth explored of 150 feet BGS (well MW-15D).
- Cone penetrometer (CPT) borings installed by PES in 2008 were advanced to depths ranging from 46 to 89 feet BGS.
- January 2020 geotechnical investigation completed by SHN for evaluating subsurface conditions for site development that included 13 geotechnical boring and 6 CPT borings (SHN, June 2020).

Data from the borings and CPT probes indicates the upper 130 feet of the subsurface profile to be consistent across the project site. A thin veneer of loose surficial sandy fill overlies most of the project site. Below the fill, the subsurface profile can be divided into four primary depositional units consisting of:

1) loose to mostly medium dense recent and older dune deposits,
2) dense to very dense beach and shallow marine deposits,
3) medium stiff bay mud, and
4) very dense Hookton Formation sand and sand with silt.



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Nordic Aquafarms California, LLC. Interim Measures Work Plan Samoa Peninsula, Humboldt County, California		Contaminants of Potential Concern in Groundwater SHN 019146.050
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The dune deposits are composed of clean fine sand and are present to a maximum depth of about 50 feet below existing site grades (approximate elevation of -25 feet relative to sea level). The dune deposits are in turn underlain by beach and shallow marine deposits from a depth of 40 or 50 (±) feet and continuing to 90 (±) feet. The beach and shallow marine deposits are composed of medium to coarse grained sand with occasional thin layers of subrounded fine gravel. The transition from the dune to beach deposits is readily identifiable by the sudden occurrence of medium to coarse sand and the presence of fine gravel, shell fragments and woody debris, and marked increase in the sampler penetration resistance. Underlying the beach and shallow marine deposits are much older fine-grained bay deposits and granular deposits of the Hookton Formation (Ogle, 1953).

3.2 Hydrology

Groundwater occurs at the site under unconfined conditions at depths ranging from approximately 12 to 16 feet BGS. Groundwater elevations in shallow site monitoring wells range from approximately 5 to 9 feet NAVD88. No continuous confining layers were observed in the boring logs or CPT logs from historic site investigations; therefore, it is assumed that the saturated zone extends from the water table to at least the depth of the deepest borehole (150 feet BGS at well MW-15D). Shallow monitoring wells exhibit seasonal groundwater fluctuations, and generally follow a similar fluctuation pattern.

Groundwater flow directions calculated from groundwater elevation data show the direction in the shallow and deep zones at the site is to the east-southeast to south-southeast with a very low gradient (0.002 to 0.004 feet per foot [ft/ft]).

In 1997, aquifer tests were conducted on monitoring wells MW-4 and MW-10 in order to determine the hydraulic conductivity of the screened portion of the aquifer (first encountered groundwater), and to gain a better understanding of site aquifer characteristics. Based on the results of aquifer pump tests, the hydraulic conductivity ranged from 570 feet per day (ft/day) to 915 ft/day, or 2.01 $x10^{-4}$ to 3.23 $x10^{-4}$ meters per second. Storage coefficients of 0.20 and 0.11 were additionally calculated. The calculated groundwater velocity ranged from 5.2 feet per day in the area around well MW-10, to 5.5 feet per day in the area around well MW-4 (SHN, 1998).

3.3 Tidal Influence

Results of a tidal influence study conducted at the site in December 1997 indicate that groundwater flow beneath portions of the site is influenced by tidal activity in Humboldt Bay, with no measurable effect from tidal activity on the ocean-side of the Samoa Peninsula. The change in water level appears to be sufficient to temporarily alter the groundwater gradient in areas of the site within approximately 600 feet of Humboldt Bay. During the tidal study, it was observed that water level changes in wells MW-9 and MW-10 were very minor. Therefore, tidal fluctuations in Humboldt Bay would not have any noticeable effect on monitoring wells MW-1 through MW-8 located farther away from Humboldt Bay. This information confirms the finding that tidal influence on groundwater movement beneath the site is restricted to areas at distances similar, or closer to, Humboldt Bay than wells MW-9 and MW-10 (approximately 600 feet) (SHN, 1998).

4.0 Description of Proposed Interim Measures

This IMW describes the procedures and methods for characterization and management of debris, soil and groundwater generated in connection with demolition and construction activities for the project.

Please note that this IMW does not propose soil excavation as a remedial action, but rather provides a plan to address reuse and disposal of materials and soil excavated during demolition and construction work.

4.1 Interim Measure Objectives

Accordingly, Interim Measure Objectives (IMOs) were established to:

- Provide protection of human health and the environment during the generation and management of demolition debris, excavated soils, and dewatering activities.
- Provide consistency with the site cleanup requirements for:
  - assessing final in place conditions,
  - determining suitability of material reuse, and
  - characterization of material for discharge and disposal.

Areas known or suspected to contain COPCs have been identified at the site. Field screening and the collection of samples for laboratory testing of chemicals depending upon material medium and location of collection will be conducted. To achieve the IMOs, chemical concentrations in excavated soils will be compared to published screening levels, the Resource Conservation and Recovery Act (RCRA) and non-RCRA (California) hazardous waste classification thresholds. The collective chemical screening and testing results will be used to determine if the soils are hazardous waste, and to evaluate the appropriate disposal/reuse options. As noted in this section, additional documents will be generated to address specific aspects of this project for material characterization.

4.2 Construction Activities

The general order of operations for site redevelopment will be demolition of structures and infrastructure, site preparation, and construction. Each of these work phases will contain a specific set of requirements from an environmental standpoint that will require the submittal of accompanying documents for approval from the RWQCB and other agencies. This IMW is designed to be used for guidance of plans and documents prepared and submitted at future dates to address environmental components identified on this project that may include:

Monitoring and Reporting Program (MRP): Site redevelopment has the potential to affect 18 existing monitoring wells at the site. Modifications to the MRP will be required to address proper closure and replacement of wells, if necessary. A request for modifications to the MRP will be submitted to the RWQCB that includes a work plan for well destruction and replacement (if necessary) for implementation prior to initiation of site demolition work. Justification for wells to be completely removed from the MRP will be provided in the request with supporting documentation.

Construction Storm Water Pollution Prevention Plan (SWPPP): The SWPPP will be required to be implemented during the demolition and construction phases of the project. The SWPPP will be submitted to the SWRCB Stormwater Multiple Application and Report Tracking System website (SMARTS) and contain the following components: best management practices to address erosion and sediment control, monitoring and testing for site runoff, an inspection program, and site maps. The SWPPP will be updated during the project if needed to reflect changes in conditions.

Sampling and Analysis Plan (SAP): Prior to demolition and ground disturbance, the project SAP will be submitted to the RWQCB for approval. The SAP will describe protocols and procedures that will be implemented for characterization of chemical impacts associated with past operations at the site. The SAP will address characterization of excavated soils, assessment of final in-place conditions, and testing of materials for reuse or offsite disposal. The SAP will be the primary guide used to determine suitability of material for reuse

Dewatering and Discharge Plan (DDP): Development of a plan for water management that includes handling, storage, testing, treatment, monitoring, and discharge will be prepared for the project and submitted to the RWQCB for approval if dewatering is required to complete the project. The plan will use available groundwater testing results to identify appropriate treatment and include a monitoring program to ensure discharge parameters contained in the permit are met.

Soil Gas Monitoring Program: The planned project development will occur within 1,000 feet of the Samoa Solid Waste Disposal Site (SWDS). An evaluation of soil pore gas from the SWDS will be required, per Title 27 California Code of Regulations Section 20925. A work plan to address soil gas conditions will be submitted to the Humboldt County Department of Environmental Health and CalRecycle for approval and implementation. The workplan will contain installation of soil gas probes and a monitoring program to evaluate subsurface conditions and potential impacts to site development. One year of site monitoring for soil gas is anticipated to be completed as part of this assessment program.

Health and Safety Plan (HASP): Preparation of a site-specific health and safety plan will be required for workers that may come in contact with contaminated materials. The HASP will outline procedures, training requirements, and contain applicable monitoring programs to limit worker exposure. A hazard analysis must be performed in accordance with industry standards to determine the appropriate level of personnel protection required for completing the work.

4.2.1 Structure Demolition

Standard demolition and excavation equipment will be used to remove structures and to segregate the material for sorting and processing. A demolition plan will be prepared for the project that describes the approach and processes to be implemented by the selected contractor. The plan will be an overview that evaluates all structures designated for removal and will require augmentation as it relates to specific engineering or onsite activities requiring additional planning.

Special handling and disposal of building materials identified to be impacted during the site-wide hazardous materials survey will be conducted (GHD, 2020). Separate plans provided by specialized contractors to address the removal and disposal of lead, asbestos-containing material, and universal waste will be prepared as part of the demolition permit for National Emission Standards for Hazardous Air Pollutants compliance and submitted to the North Coast Air Quality Management District. Approval of these plans will be required prior to initiation of site wide demolition activities.

As structures are demolished, the material will be segregated and stockpiled. Non-hazardous debris will be transported offsite for disposal as municipal solid waste (MSW) and metals will be recycled. Much of the concrete, brick, and tile is considered usable material and machines will sort and downsize the material for preparation as onsite reuse or recycling. Field screening and laboratory testing methods proposed for debris as part of this IMW are provided in Section 4.3.

4.2.2 Excavation of Soils

Demolition and construction activities will result in the excavation of soil that must be properly managed. The amount of soil to be excavated in the demolition and construction phases of this project is currently undetermined. Soil excavated during demolition work may be limited to near-surface material within proximity of the structure to be removed or if visible impacted by contaminants. The volume of soil to be excavated during the construction phase of the project will be far greater than the demolition phase. Soils excavated during demolition and construction at the site will be screened in the field according to methods described in Section 4.3 and stockpiled appropriately. To evaluate whether excess soil can be reused onsite or disposed of offsite, samples of the soil will be collected and tested, and the results compared to established screening levels.

Excavated soils identified to have impacts from mill operations that require off-site disposal will be moved for temporary stockpiling to a secure area of the site that is away from routine traffic and is high enough that water will not pond on or around the soil. The contaminated soil will be placed on, and covered with, plastic (Visqueen®) in such a way that the soil pile is protected from water runon and runoff. Soils that are not hazardous will be considered for site reuse if analytical results are below the published regulatory thresholds for residential or industrial soils. Table 1 provides industrial screening levels (where available) proposed for the project to ensure protection of human health and the environment.

Table 1. Regulatory Screening Thresholds for Site Reuse
Evergreen Pulp Mill, Samoa, California

Constituent Name	Screening Level	Constituent Name	Screening Level
Metals (mg/kg)[a]		**VOCs[b] (mg/kg)**	
Arsenic	4.2[c]	PCE[d]	390[c]
Cadmium	1,100[e]	TCE[f]	19[e]
Chromium	160[g]	Vinyl Chloride	370[c]
Lead	320[c]	1,1-DCE[h]	350[c]
Nickel	11,000[c]	**Dioxins (pg/g)[i]**	
Zinc	110,000[e]	2,3,7,8-TCDD[j]	18[c]
Petroleum Hydrocarbons (mg/kg)		TEQ[k]	200[l]
Diesel	1,200[e]	**Parameters**	
Motor Oil	54,000[e]	**pH**	**5.5 – 8.5**

[a] mg/kg: milligrams per kilogram
[b] VOCs: volatile organic compounds
[c] California Department of Toxic Substances Control, Human Health Risk Assessment Note 3, Screening Levels for Commercial/Industrial Soil, June 2020
[d] PCE: tetrachloroethylene
[e] San Francisco Bay Regional Water Quality Control Board, Tier 1 Environmental Screening Levels for Commercial/Industrial Shallow Soil, Revision 2, January 2019.
[f] TCE: trichloroethene
[g] [g]San Francisco Bay Regional Water Quality Control Board, Tier 1 Environmental Screening Levels for Terrestrial Habitat Soil, Revision 2, January 2019
[h] DCE: dichloroethene
[i] pg/g: picograms per gram
[j] TCDD: tetrachlorobenzeno-p-dioxin
[k] TEQ: toxic equivalent

4.2.3 Dewatering

Groundwater encountered during demolition and construction that requires removal will be pumped into appropriate containers, such as a Baker tanks for storage and characterization. Based on the results of characterization, the water will be discharged, treated, or transferred to a treatment facility, as appropriate. Water requiring treatment prior to discharge will be analyzed for COPCs following treatment according to the DDP monitoring program to ensure discharge permit thresholds are maintained. The estimated volume of water to be generated for the project is uncertain at this time. Excavation depths for construction are not anticipated to extend to groundwater and the use of dewatering wells for the project is not planned. Should use of the outfall pipe for discharge of treated groundwater during the demolition and construction phase of this project occur, a National Pollutant Discharge Elimination System (NPDES) permit from the RWQCB will be required.

4.3 Testing Program

The volumes of material to be generated during demolition for this project are not completely defined at this point. Initial estimates on the structures identified for demolition and processing look to exceed 50,000 tons and could have over 5,000 tons of metal recycled, and 4,000 tons of non-hazardous debris disposed as MSW. The testing program proposed will involve a combination of initial assessment through field screening as described in Section 4.3.1 followed by sample collection and laboratory testing.

The amount of soil excavated for this project that has potential for reuse could be in the range of several hundred thousand cubic yards. Based on this volume, the use of Incremental Sampling Methodology (ISM) for characterization of soils is the preferred approach to assess suitability of reuse. The SAP will contain the ISM program to evaluate the chemical quality of the material. Replicating ISM methodology should provide reasonably unbiased, reproducible estimates of the mean concentration of analytes in the decision for site reuse. Several thousand cubic yards of material excavated may ultimately require offsite transport and disposal. The testing program for material requiring offsite disposal will include COPCs and have a frequency determined by the facility designated to receive the material.

4.3.1 Field Screening

Field screening of debris and excavated soils will occur through visual observation and hand-held tools that will be outlined in the project SAP. All debris and excavated soils will be assessed for visible discoloration or staining, and if noticeable odors are present. Use of a hand-held Niton XLp 702A x-ray fluorescence (XRF) meter for metals and a portable photoionization detector (PID) for VOCs will be used to assist in field screening activities. The use of a pH meter for extracted water and pH strips on soil mixed with deionized water will additionally be implemented in the field to assess levels present.

Construction materials such as concrete and brick will be tested in the field for metals using the XRF prior to being processed (crushed) for reuse onsite. Exterior surfaces of materials selected for field screening will be analyzed using the device's "standard bulk" mode, which includes analysis for 15 elements. Records of concentrations of cadmium, chromium, lead, nickel, and zinc will be maintained through the field screening program. Frequency of testing with the XRF and for quality control will be developed based on the volume of material and the AOI of generation for RWQCB approval and implementation in the project SAP. Petroleum hydrocarbons and VOCs are not considered a potential contaminant of concern with debris material due to the coarse surface features.

Excavated soils will additionally be screened in the field using the XRF. Soil samples will first be analyzed using the hand-held XRF, and results for select metals will be recorded. A percentage of XRF-analyzed soil samples will be submitted to the laboratory for analysis by EPA 6010B, to which field screening results can be directly compared. Details of sample collection frequency in the field and laboratory testing will be provided in the project SAP.

Coarse material and soils not passing screening as determined by XRF results exceeding the more conservative value of either State of California industrial/commercial screening levels, will be separated for further evaluation. Coarse material recorded with concentrations below screening levels will be stockpiled onsite for processing and future use as needed.

Selected soil samples collected for the purpose of field screening of VOCs with the hand-held PID will be placed in a clean glass jar or plastic resealable bag. After some time has elapsed, the headspace will be quickly screened for the presence of VOC. The PID meter measures total volatile organics in the air in parts per million (ppm) by volume in reference to a selected standard. The meter cannot specifically identify each volatile compound but can be adjusted to be sensitive to selected VOCs.

All meter readings for soil samples screened in the field for metals and VOCs will be recorded on logs or daily field record sheets.

4.3.2 Laboratory Testing

Stockpiles will be divided based upon AOI, COPCs present and the number of samples determined from the volume estimate and composite ratio. Once stockpile volumes have been estimated and the number of samples has been determined, soil samples will be collected from the material for transportation to a state-certified laboratory under standard chain-of-custody protocols. The laboratory will composite and homogenize samples prior to analysis. Soil sample collection, storage, labeling, and chain-of-custody documentation will be performed according to procedures outlined in the project SAP to be developed at a future date.

It is anticipated that soil and groundwater samples collected during the project program will be analyzed for the following constituents:

- Total petroleum hydrocarbons as diesel and motor oil (TPHD/MO) using EPA Method 8015B
- California Administrative Manual (CAM) 17 metals using EPA 6010B
- Volatile organic compounds (VOCs) analyzed in general accordance with EPA Method No. 8260B
- Dioxins and furans by EPA Method 1613B

If necessary, Soluble Threshold Limit Concentrations (STLC) for metals and/or Toxicity Characteristic Leaching Procedure (TCLP) for organic constituents may be performed on the samples to meet the acceptance requirements of the disposal facility.

The analytical results of the soil stockpile samples will be used to determine the proper handling and disposal method for the soil. If the soil requires offsite disposal, a contractor licensed to transport such material will be used. The contractor will arrange transportation for the contaminated soil to a facility that is licensed to accept such soil. All contaminated soil shall be removed from the site within 90 days of generation, or as required.

4.3.3 QA/QC and Reporting

The project SAP will outline quality assurance and control quality (QA/QC) for the field program and laboratory testing. SOPs will be provided for field activities and the designated testing laboratory quality assurance manual will be included. A frequency according to industry standards for the number of samples to be analyzed, duplicate requirements, and testing limits for COPCs will be determined based on the volumes of material generated.

Following the completion of the field and testing program, a summary of findings will be prepared and submitted on behalf of NAFC to the RWQCB. The report will include a description of the work performed, a summary of field screening and laboratory testing results, analytical laboratory reports, maps depicting the analytical results, and recommendations for additional work, if needed.

5.0 References Cited

California Department of Toxic Substance Control. (April 2017). Human Health Risk Assessment, Note 2. Sacramento, CA:DTSC.

---. (June 2020). Human Health Risk Assessment, Note 3. Sacramento, CA:DTSC.

GHD. (September 2020). Hazardous Material Survey Report, Former Samoa Pulp Mill, Version 3. Samoa, California, Eureka, CA:GHD.

Google Earth. (May 26, 2016). "Arcata North, California." 40°54'19.73"N and 124° 4'10.02"W. Accessed November 2019. NR:Google Earth.

Harding Associates. (1964). Soil and Foundation Investigation, Georgia Pacific Corporation Pulp Mill, Samoa, California. NR:Harding Associates.

Kearney. (1996). Background Concentrations of Trace and Major Elements in California Soils. Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California.

LACO Associates. (2014a). Draft Analysis of Brownfields Cleanup Alternatives. Eureka, CA:LACO

Louisiana-Pacific Corporation. (1995). Louisiana-Pacific Corporation Samoa Pulp Mill Proposed Bunker Fuel Clean-Up at 50,000-gallon Fuel Tank. Samoa, CA:LP.

---. (1997). Preliminary Investigation of Potential Groundwater and Soil Contamination. Samoa, CA:LP.

McCulley, Frick & Gilman, Inc. (2000). Groundwater Management Plan, Louisiana-Pacific Samoa. Inc., Samoa Pulp Mill. Arcata, CA:MFG.

---. (April 18, 2003). Results of Subsurface Investigation, Caustic Line Area, Samoa Pacific Cellulose Pulp Mill, Samoa, California. San Francisco, CA:MFG.

---. (October 2003). Limited Excavation at Boring SB-05, Stockton Pacific Enterprises, inc., Pulp Mill, Samoa, California. Arcata, CA:MFG.

---. (2005). Supplemental Site Characterization Report, Pulp Mill, One TCF Drive, Samoa, California. Arcata, CA:MFG.

---. (April 2006). Additional Site Characterization Report, Evergreen Pulp, Inc., Pulp Mill, Samoa, California. Arcata, CA:MFG.

---. (December 2006). Additional Site Investigation Report, Pulp Mill, One TCF Drive, Samoa, California. Arcata, CA:MFG.

McLaughlin, R. J., and others. (2000). "Geology of the Cape Mendocino, Eureka, Garberville, and Southwestern Part of the Hayfork 30 x 60 Minute Quadrangles and Adjacent Offshore Area, Northern California," Scale 1:100,000. U.S. Geological Survey Miscellaneous Field Studies MF2336. 27 p., 6 plates. NR:USGS.

National Geographic Society. (NR). Topographic Map of Arcata, California. Accessed at: http://maps.nationalgeographic.com/maps

North Coast Regional Water Quality Control Board. (September 2016). Groundwater Water Quality Objectives for Cleanup Projects in the North Coast Region. Santa Rosa, CA:RWQCB.

---. (December 2014). Cleanups Regulatory Program-No Further Assessment Required for Area of Interest 6 (AOI-6), Evergreen Pulp Inc., former, One TCF Drive, Samoa, California. Santa Rosa, CA:RWQCB.

Ogle, B. A. (1953). "Geology of the Eel River Valley Area, Humboldt County, California," *California Department of Natural Resources, Division of Mines, Bulletin 164*. Sacramento, CA:CDMG.

PES Environmental Services, Inc. (2008). Data Gap Evaluation Report, Evergreen Pulp Mill, Samoa, California. Novato, CA: PES.

Ramboll. (2019). Review of USEPA July 2019 Soil Investigation Results. One TCF Drive, Samoa, Humboldt County, California. NR:Ramboll.

San Francisco Bay Regional Water Quality Control Board. (January 2019). Tier 1 Environmental Screening Levels. San Francisco, CA:SFBRWQCB.

State Water Resources Control Board. (March 2019). Maximum Contaminant Levels for Regulated Drinking Water Contaminants. Sacramento, CA:SWRCB.

SHN (1998). Groundwater Investigation, Samoa Pulp Mill, Louisiana-Pacific Corporation, Samoa, California. Eureka, CA:SHN.

---. (January 2011a). Additional Subsurface Investigation and Well Installation Report of Findings- AOI-8, Former Louisiana-Pacific Pulp Mill, Samoa, California; Case No. 1NHU892. Eureka, CA:SHN.

---. (January 2011b). Conceptual Site Model, Former Louisiana-Pacific Pulp Mill, Samoa, California; Case No. 1NHU892. Eureka, CA:SHN.

---. (September 2013). First Half 2013 Groundwater Monitoring Report and Updated Conceptual Site Model, Former Louisiana-Pacific Pulp Mill, Samoa, California; Case No. 1NHU892. Eureka, CA:SHN.

---. (September 2017). Work Plan to Investigate Dioxin and Furan Impacts at AOI-1 and AOI-2. Former Louisiana-Pacific Pulp Mill, Samoa, California; Case No. 1NHU892. Eureka, CA:SHN.

---. (February 2018). Sampling and Analysis Plan, Debris Cleanup Project, Redwood Marine Terminal II, Samoa, California, 1NHU892. Eureka, CA:SHN.

---. (August 2020). Post Injection and Second Quarter 2020 Groundwater Monitoring Report, Evergreen Pulp Incorporated, Samoa, California, 1NHU892. Eureka, CA:SHN.

---. (June 2020). Preliminary Geotechnical Investigation, Proposed Nordic Aquafarms California, LLC Development. Redwood Marine Terminal II, Samoa, California. Eureka, CA:SHN.

U.S. Environmental Protection Agency Region IX. (2016). Pollution/Situation Report POLREP #21. Final Polrep Samoa Pulp Mill, Samoa, California. (June 9, 2016). NR:EPA.

Walter B. Sweet. (1988). Soils and Foundation Investigation for Louisiana Pacific Corporation, Pulp Mill Modernization Project No. 87-501, Samoa, California. Arcata, CA:Walter B. Sweet.

Weston. (2019). Phase II Targeted Brownfields Assessment Data Summary Package, 1 TCF Drive, Samoa, California. NR:Weston.

World Health Organization. (2005). Toxicity equivalency factors. NR:WHO.