

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
Honolulu, Hawai'i

180-Day Exp. Date: October 12, 2019

September 27, 2019

**Board of Land and
Natural Resources
State of Hawai'i
Honolulu, Hawai'i**

REGARDING: Conservation District Use Application (CDUA) OA-3840
for the Mauna Lahilahi Beach Park Rock Revetment Project

**APPLICANT/
LANDOWNER:** City & County of Honolulu, Department of Design &
Construction (Applicant)

AGENT: Dayan Vihanage, Oceanit Laboratories, Inc.

LOCATION: Mauna Lahilahi Beach Park, Waianae, Oahu
TMKs: (1) 8-5-017:005

AREA OF PARCEL: Approximately (\approx) 1.692-acres

USE: \approx 0.64-acres

SUBZONE: Resource

DESCRIPTION OF AREA AND CURRENT USE

The proposed project is to replace a currently existing sandbag revetment with a permanent, 330-foot long rock revetment for the purpose of erosion control. The subject property exists in a small cove just southeast of Mauna Lahilahi Beach Park in Waianae on the leeward side of Oahu (**Exhibit A**). The subject parcel is approximately 1.692 acres and lies within the Resource subzone of the Conservation District.

The property is located directly makai of the Makaha Surfside Apartments, with Waianae High School directly to the southeast. There are no existing buildings on the project parcel itself. Existing utilities near the project area include the electrical, communication, water, and wastewater utilities at the Makaha Surfside Apartments, as well as the irrigation system in the Mauna Lahilahi Beach Park area to the northwest of the project site.

A small pocket beach sits within the southeast end of the subject cove that fronts the Makaha Surfside Apartments. The project area is currently occupied by a temporary sandbag structure roughly 200 feet in length along the northwestern (mauka) side of the cove. An existing rock breakwater lies approximately 150 feet offshore from the project site across the mouth of the cove, with an opening on one end to allow for water circulation.

Historical information indicates that the subject cove has been subject to chronic beach and shoreline erosion over time. The former beach that previously existed fronting the project site completely eroded away by about the mid-1990s. Several trees were lost to erosion as well as an access easement that formerly ran along the mauka edge of the park property. In 1997, the Makaha Surfside Association of Apartment Owners (AOAO) received a permit to rebuild the beach by adding sand. After analysis of cost, sand availability, and technical difficulties, it was recommended that the installation of a system to cut wave energy prior to placing nourishment sand was necessary.

The City Council budgeted roughly \$1.1 million in funding for a two-phased approach. The first phase consisted of a temporary sandbag revetment along the eroded embankment on the inside of the cove, which was completed in 1999. In July of 2000, undermining and damage to the sandbag revetment required repairs just one year after construction. The second phase in this project was to construct a permanent shore protection structure to reduce wave energy entering the cove. This was done by constructing the rock breakwater across the mouth of the cove that currently exists on site. The rock breakwater was constructed in 2003 along with nourishment of the beach within the cove with roughly 5,000 cubic yards of stockpiled beach sand provided by Hawaiian Cement. By 2005, the nourished sand had migrated to the southeast end of the cove, re-exposing the mixed sand and limestone rock backshore in the north end of the cove to erosion. A temporary emergency sand bag revetment was then constructed along the exposed northern face and has needed repairs several times (**Exhibit B**). The proposed project would replace the sandbags with a permanent rock revetment.

Natural Resources

The subject property is located in a small cove within an elevated fossil reef limestone bench that is overlain by deposits of beach sand and coral rubble of varying thickness. The subject cove has been severely impacted by erosion. A former pocket beach within the cove receded roughly 200 feet from 1949 to 1996, eventually leading to erosion of the backshore substrate. This was followed by installation of the breakwater and nourishment of the pocket beach in 2003 as well as the installation and constant repair of the temporary sandbag structure that currently exists on the site. Because of strong wave action coming into the cove through the gap in the breakwater, the sand from the nourished beach had almost fully migrated to the southern end of the cove by 2005.

The site is impacted by incoming wave energy through the gap in the breakwater. The most frequent wave height is approximately 3 feet with 12-14 second periods, with wave directions changing with summer and winter predominant swell directions. Maximum annually recurring offshore wave heights in the area have the potential to reach as high as 20 feet. The currents closer to the shoreline (outside the cove) generally flow to the northwest during both flood and ebb tides. Storm runoff from upland areas is directed towards two drainage channels: 'Eku Stream, located to the north and outside of the site, and a channel that exists south of Waianae Boat Harbor.

Regarding existing natural hazards, the site is located within flood zones VE and AE, which are characterized as subject to tsunamis and other hazards from wave action. The project area is also subject to the hurricanes that occasionally impact Hawaii. Hurricane Iwa

brought high waves that caused inundation as far as 500 feet inland, and Hurricane Iniki also brought extensive flooding. The bottom floor of the Makaha Surfside Apartments was severely damaged by both hurricanes, and over two million dollars were spent to repair damages.

Flora/Fauna

An updated marine biological survey for the project was completed by AECOS, Inc in January 2019. They identified the marine environment in the project area as mostly flat limestone substrate with scattered sand and rubble, inhabited by largely, but not exclusively, indigenous marine fauna. The hard bottom is largely covered with algae, containing pockets of sand patches. Corals were rare during the observation, but common marine fauna were found in the area such as urchins, 'opihi, and barnacles. Tide pools occur on both the eastern and western sides of the cove, providing habitat for common marine species such as juvenile sturgeon fish. Most of the surface of the intertidal zone in the project area is colonized by algae and other invertebrates, including a few species of crabs, sea urchins and sponges.

The open shoreline and park area do not offer much habitat area for land animals, and no terrestrial animals nor sand dwelling birds were observed during the field survey.

Three state and federally listed (endangered or threatened) marine species may occur in the general vicinity of this project – the green sea turtle, hawksbill sea turtle, and Hawaiian monk seal. The green sea turtle is more likely to be found in the project vicinity than the hawksbill sea turtle, but both remain a possibility to enter the project vicinity. The endangered Hawaiian monk seal has been sighted at Mauna Lahilahi Beach Park 87 times between 2009 and 2017.

Historic/Cultural

The applicant describes the area surrounding nearby Mauna Lahilahi, for which the beach park is named, as a place of important cultural significance as well as a historical population center on the Waianae Coast. The area is mentioned as one of the two fishing grounds associated with 'Ai'ai, the Hawaiian fishing god, and his son Punia. The cultural significance being centered around the sea is coupled with the historical use of the area, as the Waianae area was known for its abundant marine resources.

The Mauna Lahilahi area is a historically significant site comprising numerous archaeological and cultural features, including petroglyphs, rock shelters, burials, habitations, and shrines. Radiocarbon dating yielded results indicating that pre-Contact use in the area possibly began around 1300-1400 AD. The application describes the historical land use in the surrounding areas as being used primarily for its marine resources and activities, such as fishing. Nearby sugarcane fields were eventually cultivated, leading to the creation of a coastal railway in the late 19th century.

Part of the CDUA process requires that the applicant submit an HRS, 6E form developed by the State Historic Preservation Division (SHPD). Pursuant to HRS, §6E-42, prior to any agency or officer of the State [in this case, the Board] approving any project involving a permit, license, certificate, land use change, subdivision, or other entitlement for use, which may affect historic property, artifacts, or a burial site, the agency or office [OCCL] shall

advise SHPD prior to any approval and allow SHPD an opportunity to review and comment on the effect of the proposed project on historic properties.

Previously, SHPD provided comments on this project in March 2014 noting that the area is known to contain historic properties, including subsurface intact cultural layers, human burials containing multiple individuals in several areas, the Badayos family reinternment crypt, and a rectangular alignment known collectively as Site 4064. These historical deposits have been monitored by SHPD since 1999, and cultural deposits have also been documented on the adjacent lots to the north and south. Several instances of human burials eroding from the sand fronting the Makaha Surfside Apartments have been documented in archaeological reports, along with intact subsurface cultural deposits that date back to the pre-Contact period.

On October 29, 2018, SHPD received the required HRS, 6E form and supplemental information for review. SHPD concurred with OCCL's project effect determination of "effect, with proposed mitigation commitments" and the proposed mitigation in the form of archaeological monitoring.

Due to the time passed since the previous correspondence on this matter, SHPD and other related agencies did a site visit on May 7, 2019. The purpose of the site visit was to assess ingress and egress routes for machinery entering the project area, assess protection measures for subsurface cultural deposits including human burials, and to assess an acceptable distance from the shoreline to ensure that machinery does not cause slumping of the already eroded shoreline along with weight distribution of the machinery in the shoreline area.

The accepted SHPD Archaeological Monitoring Plan from 2014 will be implemented, and the permit issuance process may proceed pursuant to SHPD's May 8, 2019 letter (**Exhibit C**). SHPD requested as a condition that the City and County of Honolulu, Department of Design and Construction (DDC) notify all recognized lineal and cultural descendants of the upcoming project prior to the project's initiation.

Site Access

Currently, there is no formal street access to the subject cove. The May 7, 2019 site visit by SHPD and other agencies (including DDC staff) came to an agreement regarding ingress and egress routes for the machinery, and protection measures for both subsurface cultural deposits and the shoreline itself due to weight of machinery. The following conditions were agreed upon by the present parties:

- Access will involve the Makaha corridor (there is an access gate to the shoreline area on Farrington Highway just northwest of the Makaha Surfside Apartments);
- Access using the Waianae High School corridor will be restricted to emergency purposes only;
- Steel plates will be placed to cover the Makaha corridor to ensure protection to subsurface historic properties;
- If the Waianae High School corridor needs to be used, steel plates will be installed prior to usage of this corridor;

- Coconut trees within the project area subject to removal would be removed through cutting and leaving the stumps in situ; and
- Sand mining needed to fill the replacement sand bags will be subject to full-time archaeological monitoring

PROPOSED USE

The proposed use is to construct a 330-foot long permanent rock revetment to replace the dilapidated sandbag revetment that currently sits on site for the purpose of erosion control. The project site is within a small cove at the southeastern end of Mauna Lahilahi Beach Park. The Makaha Surfside Apartments are directly mauka of the project site, and Waianae High School occupies the adjacent lots to the southeast. A rock breakwater was installed across all but a northern portion of the mouth of the small cove in 2003 and remains today, accompanied by a 5,000 cubic yard beach nourishment project. By 2005, the sand from the nourishment project had all migrated to the southeastern end of the cove and erosion along the northern face of the cove continued to occur. A temporary sandbag revetment was constructed in order to mitigate the erosion issue, where it remains today.

According to the information provided, the proposed area of total use would be 0.64 acres, while the construction area itself would be approximately 1,800 square feet in area fronting the Makaha Surfside Apartments to accommodate the 330-foot long and 40-45-foot wide permanent rock revetment. Temporary construction access roads will be constructed perpendicular to the main roadway. Approximately 0.28 acres of the park area on the top of the bank will be used for staging and temporary access roads. Other than the entryways for heavy machinery and the existing sandbag revetment, the surrounding areas (including Waianae High School and the Makaha Surfside Apartments) would be left undisturbed.

Rock Revetment Design and Construction (EXHIBIT D)

The design water elevation for the revetment was determined to be roughly 6.2 feet, calculated by adding the high tide, potential wave setup, and estimated sea level rise over the intended 50-year design life of the structure. A category four hurricane was the assumed worst-case condition during the design process, and the revetment was designed with the intention to withstand these parameters – including expected rates of sea level rise – during the intended life of the structure. The revetment will be wider at the north end where waves entering the breakwater gap have overtopped and damaged the sandbag revetment currently existing on the site. In order to mitigate this, the revetment will be moved slightly seaward of the current sandbag revetment and a rock and gravel drainage and splash area behind the revetment will be placed in order to drain overtopping waves.

The perimeter controls, temporary fencing, and stabilized construction entrances will be completed first, in addition to installation of mitigative measures for Best Management Practices (BMPs). An in-water sandbag barrier to accompany the sliding work zone will then be constructed. Clearing and grading of the site will take place in stages within the sliding work zone. The current sandbag revetment would be deconstructed and removed in accordance with proper BMPs. Excavation within the sandy beach portion in the south of the project area is expected to extend 4 feet below sea level and approximately 20 feet in width. Following the removal of the existing sandbags and grading of the area, crushed

rock backfill will be placed where the sandbags are currently located in order to create a 1.5 : 1 slope.

A geotextile fabric will then be placed on the backfill and covered by a minimum two-foot-deep layer of underlayer stones before the larger armor stones are placed. Equipment including an excavator and a front loader will place a crushed rock filter, geotextile fabric, bedding stones, and armor stones in the project area. The project area will begin at the most northwestern point of the cove's embankment and work towards the southeast in stages. Rock will be moved to a construction stockpile site by truck and then moved to the excavator with a front loader. The temporary erosion control structures and BMPs will be removed after completion of revetment construction activities, and the staging and approach areas will be restored to their original conditions. The current sandbags at the site will be disposed of off-site.

A total of 985 cubic yards of existing soil will be excavated from the backshore and filled with 125 cubic yards of sand and 810 cubic yards of crushed rock backfill, then covered with geotextile fabric to create the drainage and splash area behind the revetment. A total of 550 cubic yards of underlayer stones and 2,035 cubic yards of basalt armor stones will be used to construct the revetment. The top of the revetment will be 10-12 feet above mean sea level, and the rock toe of the revetment will be excavated into firm substrate of 4 feet below mean sea level. A pre-cast concrete curb will extend 270 linear feet along the mauka side of the revetment. The revetment construction will be completed in four phases moving from west to east, and construction activity is estimated to take roughly three months.

Expected Mitigative Actions and Practices

Site Specific Best Management Practices Plan (BMP)

The proposed revetment has been designed to be compatible with standard construction and NOAA BMPs as well as site specific BMPs, such as:

- The contractor shall retain a certified erosion and sediment control plan (ESCP) coordinator to establish and maintain the necessary BMPs to meet federal and local laws and regulations regarding water quality and water pollution control. The contractor shall provide written notice to the Department of Planning and Permitting establishing the ESCP coordinator at least two weeks prior to starting work;
- Sandbags will enclose the immediate work site for water quality control and turbidity monitoring during construction;
- Use of filter socks (at least 9 inches in diameter and held down by sandbags) around both construction stockpile areas as well as the downslope side of the temporary access road to prevent water runoff from entering the ocean;
- Use of temporary silt fence and fiber roll barrier as indicated on plan;
- Rocks intended for use in the revetment will be washed at an appropriate offsite location to prevent runoff of soil;
- Use of a freshwater hose from existing connections to wash the rocks for the revetment as well as to minimize dust in the work area;
- Tree protection zones will be marked with orange plastic mesh fencing;
- Use of the specific Archaeological Monitoring Plan approved by SHPD

The proposed revetment will be porous and will not hold water or divert runoff that might cause erosion. Rainwater and water overtopping will be able to easily drain through gravel, rock, and the fabric filter. Rainfall during construction may wash sediment into the ocean. The contractor will be required to use BMPs and monitor water quality throughout construction. The contractor will enclose the immediate work site with sandbags for water quality control and to monitor turbidity during construction. No long-term impact on water quality or existing drainage is expected from the proposed action.

Construction shall be in compliance with Federal, State and County laws. Standard Best Management Practices will be observed. Water quality monitoring before, during, and after construction is required for compliance with the State of Hawaii Department of Health 401 Water Quality Certification.

Mitigative actions for endangered species and other flora and fauna:

- While it is not expected to encounter any endangered species in the project area based on the above referenced marine biology survey, NOAA's mitigation measures to reduce impacts to protected species will be followed;
- A visual survey of the project area must be performed just prior to commencement or resumption of construction activity to ensure that no protected species are in the project area. If protected species are detected, construction activities must be postponed until the animal(s) voluntarily leave the area;
- All on-site project personnel must be apprised of the status of any listed species potentially present in the project area and the protections afforded to those species under federal laws;
- Any incidental take of marine mammals must be reported immediately to NOAA Fisheries' 24-hour hotline;¹

Mitigative actions for Cultural and Historic Resources:

Cultural impacts will be mitigated by having an archaeologist present at the site to conduct monitoring during all activities requiring machinery activities and earthwork. The archaeological monitor will compile daily monitoring logs noting daily activities, sites, or features that were recorded, personnel on site, and problems encountered, and the corrective action(s) taken. The use of orange plastic fencing to demarcate known burial sites or areas with cultural resources, and machinery and construction vehicles will remain a minimum of 20 feet away from sand embankments to avoid slumping that may expose these resources and artifacts. The ground surface below both the stockpiling areas and the access areas for machinery and vehicles will be protected with metal sheeting to best preserve subsurface resources.

There have been multiple studies and reports on the cultural and archaeological artifacts within the site since 2001. Information was gained through reviews of archaeological studies done in the area, community meetings, and ethnographic interviews. One interviewee for the environmental assessment for the construction of the existing breakwater in the project vicinity was Mr. Lucio Badayos, a kupuna who is a member of the family who formerly lived at the project site and as such was recognized as the most

¹ Staff notes that no other wildlife BMPs were specifically laid out within either the CDUA or the FEA

appropriate person to contact for these issues. Oceanit also met with other members of Mr. Badayos' family, as well as representatives of the Burial Council. Mr. Badayos did not object to the plans for the existing breakwater, noting that erosion controls could minimize the probability of future shoreline burials being exposed.

It is anticipated that removal of the existing sandbag revetment will expose a two to three-foot-high eroded escarpment (bank) that was present prior to the construction of the existing sandbag revetment. After the sandbags are removed, the archaeological monitor will examine the stratigraphic sequence exposed on the shoreline bank and document the stratigraphic sequence of layers present through profile drawings and photographs. If layers containing archaeological materials and subsurface features are present, these layers will be identified, documented, and sampled.

If any human burials or artifacts are found, work shall cease immediately in the vicinity of the find, and the find shall be protected from further damage. The area will be cordoned off, and the Honolulu Police Department and SHPD will be notified to assess the significance of the find and recommend the appropriate mitigation measures, if necessary. The contractor will be made aware of existing burial treatment and preservation plans approved by the Oahu Island Burial Commission for the proposed project area in the event that ancient human remains are encountered during construction.

The accepted SHPD Archaeological Monitoring Plan from 2014 will be implemented, and the permit issuance process may proceed pursuant to SHPD's May 8, 2019 letter (Exhibit D). Pursuant to these documents, the following mitigation practices will be followed:

- On-site archaeological monitoring will occur for all machinery-related ground disturbances;
- The archaeological monitor will examine, record, and photograph the stratigraphic sequence exposed following the removal of the existing sandbag revetment;
- If layers containing archaeological materials and/or subsurface features are present, they will be identified, documented, and sampled;
- If datable materials are visible in subsurface features, they will be collected, identified, and submitted for radiocarbon dating;
- Access measures include the archaeologist monitoring the movement of machinery and construction vehicles to ensure that no burials or non-burial cultural deposits or features are disturbed during access and staging activities;
- Machinery and other vehicles will remain a minimum of 20 feet from the sand embankment to avoid slumping that may expose burials;
- Access will occur along one of the two corridors with a maximum width of 15 feet:
- Northern corridor (Makaha) is the access corridor;
- Access using the Waianae High School corridor would be restricted to emergency purposes only;
- Steel plates will be placed to cover the corridors (if used, in the case of the Waianae High School corridor) to ensure protection to the subsurface historic properties;
- The ground surface beneath the stockpile areas will be protected with metal sheeting or a cushion of coral gravel before stockpiling begins;
- The sand mining needed to fill the replacement sand bags will be subject to full-time archaeological monitoring;

- Avoidance measures include the contractor installing a buffer defined by orange plastic fencing around the known locations of human burials in or near the proposed access corridors, stockpile areas, and revetment area;
- These buffers will be established in consultation with the archaeological monitor and SHPD and will include all burial locations, potential burial locations, and past burial locations depicted on Figure 10 within the AMP;
- A 20-foot wide buffer marked with plastic fencing will also be installed along the sand embankment that runs parallel to the southern access corridor; and
- The archaeological monitor will ensure that construction work, equipment, and personnel do not encroach on these demarcated areas; and
- Coconut trees within the project area subject to removal would be removed through cutting and leaving the stumps in situ;

If any historical or cultural resources are encountered, work will immediately be halted and the following actions will be taken:

- Selected charcoal samples will be collected for the possibility of radiocarbon analysis;
- Bulk samples of midden (flora/fauna material) will be collected, if present;
- All prehistoric artifacts will be collected;
- All historic artifacts will be collected, unless large trash/refuse pits are encountered, in which case a representative sample of diagnostic artifacts will be collected, such as bottle and ceramic bases containing maker's marks;
- Standard documentation will be carried out, including scale maps, profiles, photographs, detailed soil and provenience descriptions, and interpretation;
- Photographs of excavations will be included in the monitoring report even if no historically significant sites are documented during the monitoring field work;

SHPD also requested as a condition that that the City and County of Honolulu, Department of Design and Construction (DDC) notify all recognized lineal and cultural descendants of the upcoming project prior to the project's initiation.

Alternatives

The applicant explored four alternative erosion control methods prior to submitting their application. These alternatives consisted of: (1) constructing an inner breakwater inside of the cove; (2) constructing a vertical seawall on the inner bank of the cove; (3) enclosing and filling the cove with either rock or sand; and (4) no action – the sandbag structure would be left in place. After considering these alternative options, the applicant decided on the subject rock revetment as the best possible solution.

SUMMARY OF COMMENTS

The application was referred to the following agencies for their review and comment: the **State**: Department of Health; Office of Hawaiian Affairs; Office of Environmental Quality Control; Department of Transportation; Department of Land and Natural Resources Divisions of: Aquatic Resources, Forestry and Wildlife, Oahu District Land Office, Historic Preservation, Conservation and Resource Enforcement, and State Parks; the **City**

& County of Honolulu: Department of Parks and Recreation and Department of Planning; and **Federal Agencies:** National Oceanic Atmospheric Administration, the US Army Corps of Engineers, and the US Fish and Wildlife Service. In addition, this application was also sent to the Waianae Neighborhood Board and the nearest public library, the Waianae Public Library, to make this information readily available to those who may wish to review it.

Not all agencies responded to the request for comments. Responses were received and have been summarized from the following agencies:

STATE OF HAWAII

Office of Planning

The Hawaii Coastal Zone Management (CZM) Program issued a federal consistency conditional concurrence on April 12, 2019 for the proposed project. The CZM conditional concurrence dated April 12, 2019 covers the construction of a 330-foot long, 30-40-foot wide, and 15-foot high revetment along the eroded shoreline in the subject parcel. The CZM conditional concurrence and all the prescribed conditions remain in effect.

Applicant's Response

The applicant acknowledges the six conditions in the April 12, 2019 concurrence letter and acknowledges that all six conditions specified in the letter will be fulfilled during the construction process. The project complies with SHPD requirements pursuant to HRS Chapter 6E – Historic Preservation. A letter from SHPD dated May 8, 2019 determined “construction activities for the present project may proceed with the implementation of the SHPD approved monitoring plan”.

Department of Transportation

The DOT had no comments on the proposed project as they do not foresee significant impact to DOT facilities.

Applicant's Response

The applicant notes that the project will have no significant impact on State DOT facilities and that the DOT has no comments at this time.

DEPARTMENT OF LAND AND NATURAL RESOURCES

State Historic Preservation Division

The State Historic Preservation Division (SHPD) provided comments on the Draft Environmental Assessment in March 2014. These comments indicated that that this area is known to contain historic properties, including subsurface intact cultural layers, human burials containing multiple individuals in several areas, the Badayos family reinternment crypt, and a rectangular alignment. The intact cultural layers are located between the middle of the Makaha Surfside Apartments and the northwest drainage of the park, with the uppermost layer beginning at 25 cm below current ground surface. Burials are associated with these habitation deposits, and SHPD has been monitoring and recording these deposits since 1999. The former Badayos residence and the Badayos re-internment site are located on the Waianae High School end of the shoreline within TMK (1) 8-5-017:005, and cultural deposits have also been documented nearby on TMK (1) 8-5-017:003 and 004.

On December 30, 2014, SHPD accepted the proposed archaeological monitoring plan (AMP) – the provisions are in the “Mitigation” section of this report.

Due to the passage of time since SHPD accepted the AMP, SHPD scheduled and attended a site inspection on May 7, 2019 with staff from various agencies. The purpose of the site visit was to assess ingress and egress routes for machinery entering from the Makaha side of the project area, assess protection measures for subsurface cultural deposits including human burials, and to assess an acceptable distance from the shoreline to ensure that machinery does not cause slumping of the already eroded shoreline and weight distribution of machinery on the Makaha side of the project area. The provisions agreed upon by the parties at this meeting are listed in the “Mitigation” section of this report.

Based on the information provided, SHPD concurs with OCCL’s project effect determination of “Effect, with proposed mitigation commitments” and the proposed mitigation in the form of archaeological monitoring. The SHPD accepted archaeological monitoring plan (Vernon, December 2014) will be implemented.

SHPD requested that the DDC notify all recognized lineal and cultural descendants of the upcoming project prior to the project’s initiation. The permit issuance process may proceed pursuant to SHPD’s May 8, 2019 letter. Following the completion of the archaeological monitoring fieldwork, SHPD will have 60 days to review and accept an archaeological monitoring report meeting the requirements of HAR §13-279-5.

Applicant’s Response

Based on the comments received from SHPD during the Chapter 6E-8 review, provisions specified in the December 2014 Archaeological Monitoring Plan (Log No. 201404215, Doc. No. 1412SL28) and stipulated in the letter dated May 8, 2019 (Log No. 2018.02547, Doc. No. 1905GC02) will be adhered to during the construction process. The contractor is aware of these conditions and has selected an archaeological monitor for the project (i.e., Keala Pono).

State Parks

State Parks had no comments on the project.

Applicant’s Response

The applicant notes that the Division of State Parks had no comments on the project.

Land Division

Any improvements outside (makai) of the executive order boundary requires amending the existing executive order (EO 3452).

Applicant’s Response

The applicant notes that the proposed revetment will be entirely on conservation land seaward of the certified shoreline. It is within the boundary of the existing Executive Order (EO) No. 3452. Therefore, no amendment of the existing EO is necessary.

Division of Aquatic Resources

DAR's concerns are addressed in the Final Environmental Assessment (FEA). These concerns included implementing BMP's during the project and an updated marine biological survey of the project area. The FEA includes BMPs for minimizing sedimentation and for minimizing interactions with protected species. The FEA also includes a 2018 marine biological survey done by AECOS that updates the biological information for the project area from a survey conducted in 2001.

Applicant's Response

The applicant notes that DAR's concerns were addressed in the Final Environmental Assessment as well as the updated 2018 marine biological survey performed by AECOS, Inc.

CITY & COUNTY OF HONOLULU

Department of Planning and Permitting

The DPP determined on February 26, 2019 that neither a Special Management Area Use Permit nor a Shoreline Setback Variance would be required for the subject project as all the work would be seaward of the certified shoreline, and had no additional comments.

Applicant's Responses

The applicant notes that the DPP determined on February 26, 2019 that neither a Special Management Area Use Permit nor a Shoreline Setback Variance would be required for the subject project and had no additional comments on the project at this time.

Department of Parks and Recreation

The DPR had no comments on the proposed project.

Applicant's Response

The applicant notes that DPR had no comments on the proposed project at this time.

FEDERAL GOVERNMENT

US Department of the Interior, Fish and Wildlife Service

The Fish and Wildlife Service was unable to specifically address the matter due to significant workload constraints. They provided a table of the protected species most likely to be encountered by the project area.

Applicant's Response

The applicant notes that certain species may occur in the project area. All precautions will be taken to avoid impacts to these and other protected species. However, the nature of the project site and timing of construction activities make encounters with protected species unlikely.

ANALYSIS

After reviewing the application, by correspondence dated April 16, 2019, the Department has found that:

1. The proposed use is an identified land use in the Resource subzone of the Conservation District, pursuant to §13-5-22, Hawaii Administrative Rules (HAR), P-15 SHORELINE EROSION CONTROL: "Seawall, revetment, groin, or other coastal erosion control structure or device, including sand placement, to control erosion of land or inland area by coastal waters, provided that the applicant shows that (1) the applicant would be deprived of all reasonable use of the land or building without the permit; (2) the use would not adversely affect beach processes or lateral public access along the shoreline, without adequately compensating the State for its loss; or (3) public facilities (e.g., public roads) critical to public health, safety, and welfare would be severely damaged or destroyed without a shoreline erosion control structure, and there are no reasonable alternatives (e.g., relocation). Requires a shoreline certification." Please be advised, however, that this finding does not constitute approval of the proposal;
2. Pursuant to §13-5-40 of the HAR, a Public Hearing will not be required;
3. In conformance with Chapter 343, Hawaii Revised Statutes (HRS), as amended, and Chapter 11-200, HAR, the Final Environmental Notice (FEA) was published in the OEQC's May 23, 2014 Environmental Notice, and the City and County of Honolulu, Department of Design and Construction was the approving agency of the Final Environmental Assessment and Finding of No Significant Impact for the proposed project; and
4. In a comment letter regarding the Draft Environmental Assessment for this project on July 11, 2013, the City and County of Honolulu, Department of Planning and Permitting informed consultant Oceanit Laboratories, Inc. that a Shoreline Setback Variance (SSV) and Special Management Area (SMA) Use Permit would likely both be required for this project. However, in their response dated October 29, 2013, consultant Oceanit Laboratories, Inc. stated neither a Special Management Area Use Permit nor a Shoreline Setback Variance are required, as all work for the proposed project is seaward of the certified shoreline.

CONSERVATION CRITERIA

The following discussion evaluates the merits of the proposed land use by applying the criteria established in Section 13-5-30, HAR.

1. *The proposed land use is consistent with the purpose of the Conservation District.*

The objective of the Conservation District is to conserve, protect and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare. The applicant states that the proposed use is an identified land use in the Resource subzone of the Conservation District as it will protect the shoreline from further erosion. Without the revetment, the backshore of the cove would continue to erode, and beach resources may be further lost.
2. *The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur.*

The objective of the Resource subzone is to ensure, with proper management, the sustainable use of the natural resources of those areas. A permanent shoreline revetment is an identified land use pursuant to the HAR, §13-5-22, P-15 SHORELINE EROSION CONTROL, Seawall, revetment, groin, or other coastal erosion control structure or device, including sand placement, to control erosion of land or inland area by coastal waters, provided that the applicant shows that (1) the applicant would be deprived of all reasonable use of the land or building without the permit;(2) the use would not adversely affect beach processes or lateral public access along the shoreline, without adequately compensating the State for its loss; or (3) public facilities (e.g., public roads) critical to public health, safety, and welfare would be severely damaged or destroyed without a shoreline erosion control structure, and there are no reasonable alternatives (e.g., relocation). Requires a shoreline certification.

The County would not lose all reasonable use of the park property if erosion continued unabated, and a park would not normally be considered to constitute “critical public infrastructure.” Potential flooding of the Makaha Surfside Apartments, while significantly problematic, would not deprive owners of all reasonable use of their property².

However, the use would not adversely affect beach processes or lateral public access along the shoreline (in fact it should improve lateral public shoreline access) so the action is potentially permissible.

3. *The proposed land use complies with provisions and guidelines contained in Chapter 205, HRS, entitled "Coastal Zone Management," where applicable.*

Regarding the Coastal Management Criteria: Recreational resources: The structure would improve lateral shoreline access;

Historic Resources: The structure would protect burials and cultural deposits.

Scenic and Open Space Resource: The structure would not detract from scenic and open space values.

Marine and Coastal Ecosystems: BMPs will be deployed to prevent potential pollutant discharges in storm water runoff and will be in place and functional before project activities begin and maintained throughout the construction period;

Coastal Hazards and Beach Protection: It is a Coastal Zone Management policy to “Minimize the construction of public erosion-protection structures seaward of the shoreline.” Staff believes that the proposed shoreline structure will not damage beaches by leading to flanking effects and should not significantly alter the existing artificial beach which is stabilized by an existing rubble mound breakwater/groin.

² The City mentions the Makaha Surfside Apartments in their CDUA. Page 11, under Coastal Hazards, “The proposed land use will protect the backshore infrastructure (i.e., Makaha Surfside Apartments) from flooding and wave damage, and also improve the safety of beach users and pedestrians that utilize the area”

In addition, the structure would be built within a small cove backed by a substrate composed of calcareous (limestone) reef rock and marine sediments. Thus, the structure does not remove or prohibit beach sand from entering the beach system if there is no beach sand landward of the structure.

The cove and existing beach system in the area are essentially engineered shoreline and water features that were created with the construction of the breakwater in the early 2000s. Sand nourishment was attempted and would likely fail again without major changes to the shoreline configuration. A revetment at the site would replace a damaged temporary sand bag structure without threatening adjacent sandy beaches. The small artificial sand beach in the south corner of the project site should not be significantly impacted by this action.

4. *The proposed land use will not cause substantial adverse impacts to existing natural resources within the surrounding area, community, or region.*

Staff does not believe that the effects of structure would rise to the level of "adverse." The area is already suffering from the adversities of a chronic erosion and lack of sand. The chronic sand deficit likely results from some combination of natural sediment processes on the nearshore reef driven by waves and currents, lack of upland carbonate sand resources, and rising sea level (eight inches over the past century).

5. *The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding area, appropriate to the physical conditions and capabilities of the specific parcel or parcels.*

While the Department is generally not in favor of shoreline armoring, staff believes the proposed project is not incompatible with the locality and surrounding area.

6. *The existing physical and environmental aspect of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable.*

The proposed revetment would replace a dilapidated sandbag structure currently existing on site, improving the situation. The revetment would be the same material and design as the rock breakwater just offshore and other coastal engineering structures in the area.

7. *Subdivision of the land will not be utilized to increase the intensity of land uses in the Conservation District.*

No subdivision of land is proposed for this project.

8. *The proposed land use will not be materially detrimental to the public health, safety and welfare.*

Staff believes the proposed land use will not be materially detrimental to the public health, safety and welfare. The existing sandbag revetment is damaged, and public lateral shoreline access will be preserved with the construction of a permanent rock revetment. With proper BMPs identified and followed correctly, the proposed land use will not negatively affect public health or safety in the area.

CULTURAL IMPACT ANALYSIS

The backshore area of the proposed revetment contains known and documented human burials and other cultural/historical resources and was an important site for customary native Hawaiian rights. A cultural layer identified by the State of Hawaii Preservation Division (SHPD) as Site 4064 contains burials going back several hundred years. Wave action and erosion has exposed many of these burials in the past, and if erosion is continued in the absence of a permanent revetment, more cultural and historical resources are expected to be exposed and damaged or destroyed.

A Cultural Impact Assessment was completed for Mauna Lahilahi Beach Park in 2004. This investigation found that the highest concentration of intact cultural deposits occurs between the middle of the Makaha Surfside Apartments and the northwest drainage of the park. Thus, it is highly probable that intact cultural deposits and human burials are present in the intact sand deposits in the current project area.

During the processing of this application, no comments were received from native practitioners or the Office of Hawaiian Affairs. The proposed action does not appear to affect traditional Hawaiian rights. It is believed that the project will not impair, diminish, or preclude customary or traditional native Hawaiian rights and no action is necessary to protect these rights.

The State Historic Preservation Division has commented extensively on this proposed project, as mentioned in previous sections. The SHPD Archaeological Monitoring Plan from 2014 will be implemented with both commonplace and site-specific BMPs and mitigation practices, and the conditions stated in SHPD's corresponding letter in May 2019 will also be followed to minimize any effects on historical and cultural resources in the area. Once completed, the revetment will provide protection for burials and artifacts from ongoing land erosion. In addition, the applicant states that the proposed revetment can be used for fishing or other related cultural practices.

DISCUSSION

Sea level rise is exacerbating coastal erosion on a global scale. Hawaii is particularly vulnerable to coastal erosion because it is surrounded by water and is subject to storm waves on a regular basis. The Hawaii Sea Level Rise Vulnerability and Adaptation Report published in December 2017 demonstrates the State's exposure to sea level rise over the remainder of this century³. **Exhibit (E)** is a screen shot from the Hawaii Sea Level Rise

³ If is difficult to estimate exact timing on sea level rise effects due to some remaining scientific uncertainty and societal behavior over the next few decades in regards to greenhouse gas emissions reductions and response of glaciers and polar ice sheets to warming. However, there is growing certainty that society has

Viewer indicating mostly erosion and wave inundation effects under a scenario of 3.2 feet of additional sea level (current estimates of when we will reach 3.2 feet of additional sea level consider 2100 as a very high probability. However, unless significant reductions in carbon emissions are achieved immediately, 3.2 feet of additional sea level could occur prior to 2100).

The Hawaii Sea Level Rise Vulnerability and Adaptation Report enumerates numerous recommendations for sea level rise adaptation a few which are mentioned below.

Adaptation

Adaptation involves moving out of the way or taking no action to protect human developments/infrastructure along an eroding shoreline. When the cost of shoreline protection exceeds the value of the facilities that are threatened, or if the environmental consequences are too high, the logical outcome is adaptation. Government may prefer this over shore protection when valuable natural resources, such as public beaches, or access ways, would be damaged because of shoreline armoring.

Beach Restoration/Erosion Control

Beach restoration involves the placement of sand on an eroding shoreline to re-supply deficiencies in natural sand volume due to waves and currents and/or human activities. Beach restoration has been used to protect coastal communities and public infrastructure from coastal hazards. At the request of the DLNR, the City and County of Honolulu, conducted a beach nourishment project in 2003 with the construction of a breakwater/groin and sand placement. While the effort created a small beach at the southeast end of the project site, it failed to curtail erosion of the park land along the mauka edge of the cove.

Construction and Shoreline Hardening

In some cases, shoreline hardening may be considered as "an option of last resort," where adaptation and softer erosion control methods have failed, and where the existing beach is of limited quality or non-existent. The construction of the breakwater and pocket beach in the early 2000s essentially created an engineered shoreline within the cove and beach.

CONCLUSION:

The proposed land use entails the construction of a 330-foot permanent rock revetment along with a gravel backsplash and drainage area for erosion control along the inner shoreline of a small pocket beach cove to replace the dilapidated sandbag structure currently existing on site.

Total area of use for the construction is approximately 1,800 square feet within the Resource subzone of the Conservation District. No structures are present on the parcel other than the existing sandbag revetment, and the only utilities in the area are those for the Makaha Surfside Apartments as well as an irrigation system north of the project site

locked in at least three (3) feet of sea level by the end of the century due to greenhouse gas emission that have already been released and which will be released over the next decade.

within Mauna Lahilahi Beach Park. A rock breakwater lies across the mouth of the cove parallel to the proposed revetment as an erosion control structure, but erosion has continued to persist within the cove since its construction.

Staff notes that during construction standard best management practices would be observed. Within the application and the final environmental assessment, the applicant has identified a number of mitigative measures, conditions and practices to ensure that the proposal will have minimal effects on the natural and other resources nearby. These are listed in the "Mitigation" section of this report.

Staff believes that the project will have negligible adverse environmental, ecological, or social effects provided that best management practices and mitigation measures as described in the application and environmental assessment, and as required by rule or laws, are fully implemented.

While the parameters of this proposal do not completely comport to the requirements of the Administrative Rules, Chapter 13-5-22, P-15 Shoreline Erosion Control (specifically parts 1 and 3 of that section), the construction of the proposed revetment does provide for some positive benefits without jeopardizing beach resources in that it preserves lateral shoreline access through the area and would further protect cultural resources.

The construction of the proposed revetment is intended to mitigate ongoing erosion issues at the mauka end of the cove to protect park resources and lateral public shoreline access. The subject cove is an engineered shoreline due to the manmade breakwater and nourished beach as well as the currently existing sandbag structure. It appears from the application materials that an additional, possibly secondary purpose of the project is to protect the Makaha Surfside Apartments from flooding⁴.

RECOMMENDATION

Based on the preceding analysis, staff recommends that the Board of Land and Natural Resources APPROVE Conservation District Use Application OA-3840 for the Mauna Lahilahi Beach Park Rock Revetment Project in Waianae, island of Oahu, TMK: (1) 8-5-017:005, due to the following reasons:

1. The permittee shall comply with all applicable statutes, ordinances, rules, and regulations of the federal, state, and county governments, and applicable parts of this chapter;
2. The permittee, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim, or demand for property damage, personal injury, and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit;

⁴ Staff would like to note that although it is admirable that the City and County would expend public funds to provide shore protection for private property owners, its proposed actions establish a very dangerous precedent that could raise expectations from other private property owners suffering from erosion.

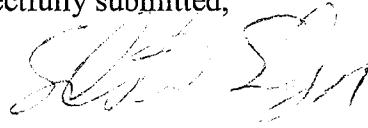
3. Before proceeding with any work authorized by the department or the board, the permittee shall submit four copies of the construction plans and specifications to the chairperson or an authorized representative for approval for consistency with the conditions of the permit and the declarations set forth in the permit application. Three of the copies will be returned to the permittee. Plan approval by the chairperson does not constitute approval required from other agencies;
4. Unless otherwise authorized, any work or construction to be done on the land shall be initiated within one year of the approval of such use, in accordance with construction plans that have been signed by the chairperson, and shall be completed within three years of the approval of such use;
5. The permittee shall notify the Office of Conservation and Coastal Lands (OCCL) in writing at least 24 hours prior to the initiation and upon completion of the project;
6. All representations relative to mitigation set forth in the accepted application and environmental assessment or impact statement for the proposed use are incorporated as conditions of the permit;
7. The permittee shall comply with all of the mitigation representations stated in this document;
8. The permittee shall comply with all applicable Department of Health administrative rules;
9. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the permittee shall be required to take measures to minimize or eliminate the interference, nuisance, harm, or hazard;
10. The applicant shall plan to minimize the amount of dust generating materials and activities. Material transfer points and on-site vehicular traffic routes shall be centralized. Dusty equipment shall be located in areas of least impact. Dust control measures shall be provided during weekends, after hours and prior to daily start-up of project activities. Dust from debris being hauled away from the project site shall be controlled. Landscaping and dust control of cleared areas will be initiated promptly;
11. **Should historic remains such as artifacts, burials or concentration of charcoal be encountered during construction activities, work shall cease immediately in the vicinity of the find, and the find shall be protected from further damage. The contractor and/or on-site archaeological monitor shall immediately contact SHPD (692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary;**

12. That, per SHPD's request, the City and County of Honolulu, Department of Design and Construction (DDC) notify all recognized lineal and cultural descendants of the upcoming project prior to the project's initiation.
13. The applicant shall implement both site-specific and standard Best Management Practices (BMPs), including the ability to contain and minimize silt in nearshore waters and clean up fuel, fluid or oil spills immediately for projects authorized by this letter. Equipment must not be refueled in the shoreline area. If visible petroleum, persistent turbidity or other unusual substances are observed in the water as a result of the proposed operation, all work must cease immediately to ascertain the source of the substance;
14. During construction, appropriate mitigation measures shall be implemented to minimize impacts to the aquatic environment, off-site roadways, utilities, and public facilities;
15. When provided or required, potable water supply and sanitation facilities shall have the approval of the Department of Health and the City & County Board of Water Supply;
16. Obstruction of public roads, trails, lateral shoreline access, and pathways shall be avoided or minimized. If obstruction is unavoidable, the permittee shall provide alternative roads, trails, lateral beach access, or pathways acceptable to the department;
17. During construction, appropriate mitigation measures shall be implemented to minimize impacts to off-site roadways, utilities, and public facilities;
18. Artificial light from exterior lighting fixtures, including but not limited to floodlights, uplights, or spotlights used for decorative or aesthetic purposes, shall be prohibited if the light directly illuminates or is direct to project across property boundaries toward the shoreline and ocean waters, except as may be permitted pursuant to HRS §205A-71. All exterior lighting shall be shielded to protect the night sky;
19. The activity shall not adversely affect a federally listed threatened or endangered species or a species proposed for such designation, or destroy or adversely modify its designated critical habitat;
20. The activity shall not substantially disrupt the movement of those species of aquatic life indigenous to the area, including those species which normally migrate through the area;
21. No contamination of the marine or coastal environment (trash or debris) shall result from project-related activities authorized under this letter;

22. Any landscaping will shall be appropriate to the site location and shall give preference to plant materials that are endemic or indigenous to Hawai'i. The introduction of invasive plant species is prohibited;
23. Authorization of the sand use and placement is contingent upon review and approval of the sand by the Department. The sand shall meet the following State quality standards:
 - A. The proposed fill sand shall not contain more than six (6) percent fines, defined as the #200 sieve (0.074 mm);
 - B. The proposed backplash area sand shall not contain more than ten (10) percent coarse sediment, defined as the #4 sieve (4.76 mm) and shall be screened to remove any non-beach compatible material and rubble;
 - C. No more than fifty (50) percent of the fill sand shall have a diameter less than 0.125 mm as measured by #120 Standard Sieve Mesh; and
 - D. Sand used shall be dominantly composed of naturally occurring carbonate beach or dune sand. Crushed limestone or other manmade or non-carbonate sands are unacceptable;
24. All placed material shall be free of contaminants of any kind including: excessive silt, sludge, anoxic or decaying organic matter, turbidity, temperature or abnormal water chemistry, clay, dirt, organic material, oil, floating debris, grease or foam or any other pollutant that would produce an undesirable condition to the beach or water quality;
25. The permittee acknowledges that the approved work shall not hamper, impede, or otherwise limit the exercise of traditional, customary, or religious practices of native Hawaiians in the immediate area, to the extent the practices are provided for by the Constitution of the State of Hawaii, and by Hawaii statutory and case law;
26. The permittee understands and agrees that the permit does not convey any vested right(s) or exclusive privilege;
27. The permittee shall comply with all applicable statutes, ordinances, rules, and regulations of the federal, state, and county governments, and applicable parts of this chapter;
28. In issuing the permit, the department and board have relied on the information and data that the permittee has provided in connection with the permit application. If, subsequent to the issuance of the permit such information and data prove to be false, incomplete, or inaccurate, this permit may be modified, suspended, or revoked, in whole or in part, and the department may, in addition, institute appropriate legal proceedings;

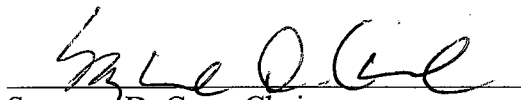
29. Other terms and conditions as prescribed by the chairperson;
30. Failure to comply with any of these conditions shall render this Conservation District Use Permit void under Chapter 13-5, as determined by the chairperson or board.

Respectfully submitted,



Salvatore Saluga, Coastal Lands Program Specialist
Office of Conservation and Coastal Lands

Approved for submittal:



Suzanne D. Case, Chairperson
Board of Land and Natural Resources

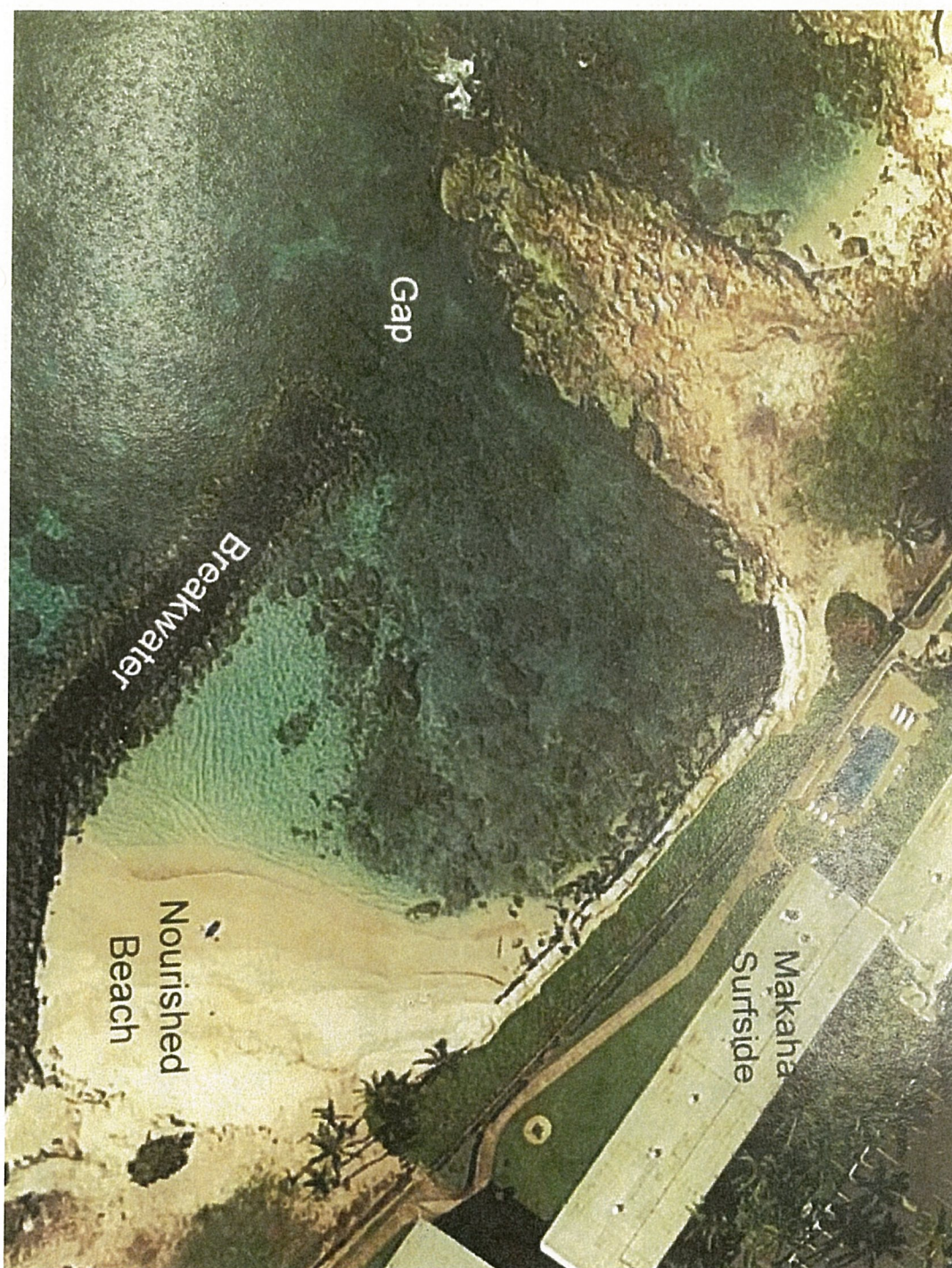


Exhibit A

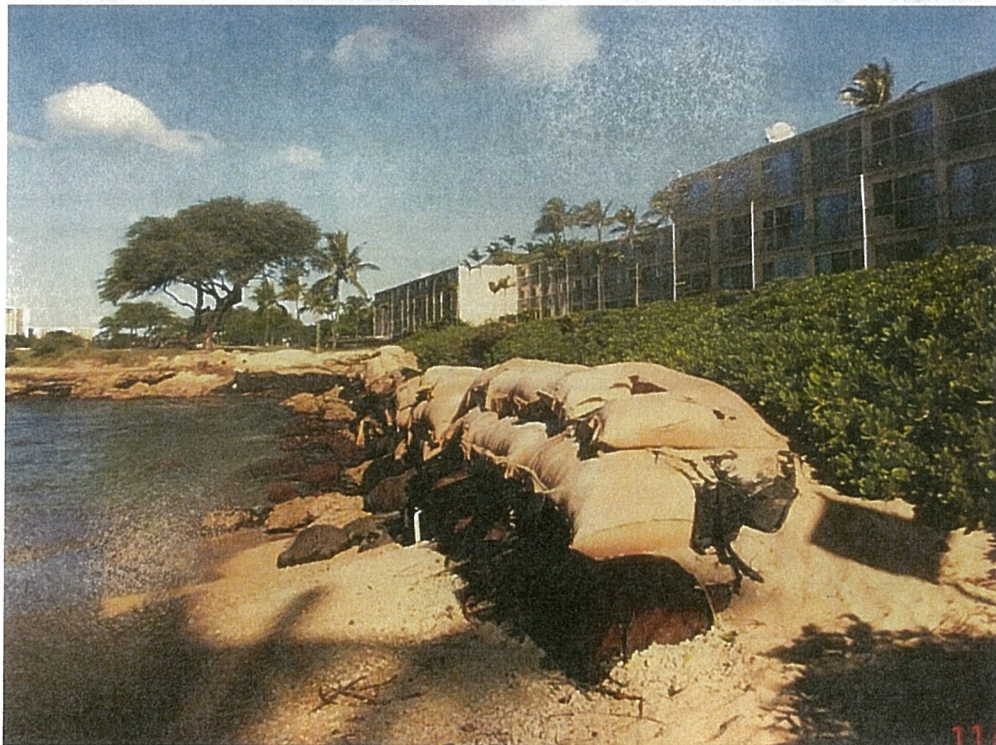


Exhibit B



DAVID Y. IGE
GOVERNOR OF
HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

May 8, 2018

Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands (OCCL)
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809
c/o Kimberly.T.Mills@hawaii.gov

IN REPLY REFER TO:
Log No. 2018.02547
Doc No. 1905GC02
Archaeology

Clifford Lau, Chief, Facilities Division
Department of Design and Construction (DDC)
City and County of Honolulu
650 King Street, 11th Floor
Honolulu, HI 96813
Email: claul@honolulu.gov

Dear Mr. Lemmo and Mr. Lau:

SUBJECT: **Chapter 6E-8 Historic Preservation Review –
Mauna Lahilahi Beach Park Rock Revetment Project
OCCL - Conservation District Use Permit (CDUA) OA-3840
Department of Design and Construction (DDC) Job No. 05-P-20
Mākaha Ahupua‘a, Wai‘anae District, Island of O‘ahu
TMK: (1) 8-5-017:005**

This letter provides the State Historic Preservation Division's (SHPD's) comments on OCCL's CDUA permit for the DDC's Mauna Lahilahi Beach Rock Revetment Project, Job No. 05-P-20 (SHPD Log No. 2018.02547). The SHPD received this submittal on October 29, 2018. The submittal included a SHPD HRS 6E Submittal Form, a TMK Plat map, photographs, permit set, and a supporting document titled, *Archaeological Monitoring Plan (AMP) in Support Construction of a Rock Revetment at Mauna Lahilahi Beach Park, Wai'anae Ahupua'a, Wai'anae District, Island of O'ahu, State of Hawaii, TMK: (1) 8-5-017:001-007* (Vernon, December 2014). The AMP was prepared for the rock revetment work for the full extent of the park. However, the current project involves only the portion within Parcel 005.

SHPD received via email additional information on March 29, 2019 (Taylor Chock [Oceanit] to Garnet Clark [SHPD]), regarding the U.S. Army Corps of Engineers' (USACOE) response dated December 4, 2013 (File Number POH-2010-00248) concerning the NHPA Section 106 consultation. The USACOE indicated that because the scope of work has not changed since 2014 and because no new cultural information has become available since that time, the USACOE will not be reopening the NHPA Section 106 process. On April 16, 2019, SHPD received from OCCL a request for comments on the subject permit application, CDUA OA-3840 (SHPD Log No. 2019.00860), and on April 30, 2019, SHPD received a letter dated April 26, 2019 from the Office of Planning, State of Hawaii (DTS201904160729NA) titled, *Hawaii Coastal Zone Management Program Federal Consistency Review for Mauna Lahilahi Beach Park Rock Revetment, Waianae, Oahu, TMK: (1) 8-5-017:005; Department of the Army Permit File No. POH-2010-00248* (SHPD Log No. 2019.00910). This Office of Planning letter provides information clarifying that the current project is for a 330-ft.-long rock revetment.

Exhibit C

Mr. Lemmo and Mr. Lau
May 8, 2019
Page 3

The current project involves the removal and replacement of the existing damaged temporary sand bag revetment and with a permanent rock revetment to protect the eroding shoreline within a 0.64-acre portion of the 2.10-acre State-owned property. The temporary sand bag revetment was added to the eroding shoreline within the project area in 2003. The first 275 ft. of the revetment is on existing coral grade thus no excavation will be conducted within this area. Excavation within the sandy beach portion is anticipated to extend 4 ft. below sea level (5 ft. below beach level) and approximately 20 ft. in width. Per the submitted permit set, ingress and egress will involve the previously-defined northern corridor only.

A review of SHPD records indicates that SHPD provided comments (March 7, 2014; Log Nos. 2013.3225, 2013.3278, Doc No. 1403NN03) on the *Draft Environmental Assessment for Mauna Lahilahi Beach Park Rock Revetment*. The SHPD indicated that this area is known to contain historic properties, including subsurface intact cultural layers (Sites 50-80-07-6634 and 50-80-07-6592), human burials containing multiple individuals in several areas (Site 50-80-07-4064), the Badayos family reinternment crypt (Site R1992-1-001-001), and a rectangular alignment (Site 50-80-07-6635). The intact cultural layers are located between the middle of the Makaha Surfside Apartments (*makai*) and the northwest drainage of the park, with the uppermost layer beginning at 25 cm below current ground surface. Burials are associated with these habitation deposits, and SHPD has been monitoring and recording these deposits since 1999. The former Badayos residence and the Badayos re-internment site are located on the Waianae High School end of the shoreline within TMK: (1) 8-5-017:005. Additionally, cultural deposits have been documented nearby on TMK: (1) 8-5-017:003 and 004.

On December 30, 2014, SHPD accepted aforementioned Vernon (December 2014) AMP which includes the current project area and proposed revetment work (Log No. 201404215, Doc. No. 1412SL28). The AMP includes the following provisions:

1. On-site archaeological monitoring will occur for all machinery-related ground disturbances;
2. The archaeological monitor will examine, record, and photograph the stratigraphic sequence exposed following the removal of the existing sandbag revetment;
3. If layers containing archaeological materials and/or subsurface features are present, they will be identified, documented, and sampled;
4. If datable materials are visible in subsurface features, they will be collected, identified (e.g., wood charcoal) and submitted for radiocarbon dating;
5. Access measures include the archaeologist monitoring the movement of machinery and construction vehicles to ensure that no burials or non-burial cultural deposits or features are disturbed during access and staging activities;
6. Machinery and other vehicles will remain a minimum of 20 ft. from the sand embankment to avoid slumping that may expose burials;
7. Access will occur along one of two corridors with a maximum width of 15 feet:
 - a. Southern Corridor (Waianae) is the preferred route. If used, orange plastic fencing will be installed 20 feet from the beach edge along this access corridor. This route will extend from an existing dirt access road on the south end of the project area and terminate at the selected stockpile area on the east side of the rock revetment location; and
 - b. Northern Corridor (Makaha) is the alternate route and will extend from the existing parking lot on the north end of the project area and terminate at a proposed stockpile area on the west side of the rock revetment area;
8. The ground surface beneath the stockpile areas will be protected with metal sheeting or a cushion of coral gravel before stockpiling begins;
9. Avoidance measures include the contractor installing a buffer defined by orange plastic fencing around the known locations of human burials in or near the proposed access corridors, stockpile areas, and revetment area;
10. These buffers will be established in consultation with the archaeological monitor and SHPD and will include all burial locations, potential burial locations, and past burial locations depicted on Figure 10 within the AMP;
11. A 20-ft. wide buffer marked with plastic fencing will also be installed along the sand embankment that runs parallel to the southern access corridor; and

Mr. Lemmo and Mr. Lau
May 8, 2019
Page 3

12. The archaeological monitor will ensure that construction work, equipment, and personnel do not encroach on these demarcated areas.

Due to the passage of time since SHPD accepted the AMP (Vernon 2014), SHPD scheduled and attended a site inspection on May 7, 2019, with staff from the following agencies: OHA, Oceanit, DDC, OCCL, and the Leeward Representative of the O'ahu Island Burial Council. The purpose of the site visit was to assess ingress and egress routes for machinery entering from the Makaha side of the project area, assess protection measures for subsurface cultural deposits including human burials, and to assess an acceptable distance from the shoreline to ensure that machinery does not cause slumping of the already eroded shoreline and weight distribution of machinery on the Makaha side of the project area. All parties agreed to the following:

- Access will involve the Makaha corridor;
- Access using the Waianae High School corridor would be restricted to emergency purposes only;
- Steel plates will be placed to cover the Makaha corridor to ensure protection to subsurface historic properties;
- If the Waianae High School corridor needs to be used, steel plates will be installed prior to usage of this corridor;
- Coconut trees within the project area subject to removal would be removed through cutting and leaving the stumps in situ; and
- The sand mining needed to fill the replacement sand bags will be subject to full-time archaeological monitoring.

Based on the information provided, SHPD **concurs** with OCCL's project effect determination of "Effect, with proposed mitigation commitments" and the proposed mitigation in the form of archaeological monitoring. The SHPD accepted archaeological monitoring plan (Vernon, December 2014) will be implemented.

SHPD request that the DDC notify all recognized lineal and cultural descendants of the upcoming project prior to project initiation. Please contact Ms. Regina Hilo, Oahu Island Burial Specialist at Regina.Hilo@hawaii.gov or at (808) 692- 8026, for names and contacts for these descendants.

SHPD hereby notifies the OCCL and the DDC, construction activities for the present project may proceed with the implementation of the SHPD approved monitoring plan (Vernon, December 2014). The permit issuance process may proceed.

SHPD requests the selected archaeological firm consult with our office regarding the AMP, to ensure appropriate implementation, and that this firm provide SHPD written and photographic documentation of the implementation of the interim protection measures (orange fencing, metal sheeting or gravel cushion) prior to project initiation.

Following completion of the of archaeological monitoring fieldwork, SHPD looks forward to receiving within 60 days for review and acceptance an archaeological monitoring report meeting the requirements of HAR §13-279-5.

Please contact Dr. Susan Lebo, Archaeology Branch Chief, at Susan.A.Lebo@hawaii.gov or at (808) 692-8019 for any questions regarding archaeological resources or this letter.

Aloha,

Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: Susan Gayagas, USACOE-HI, susan.a.meyer@usace.army.mil
Taylor Chock, OCEANIT tchock@oceanit.com
Dayan Vithanage dvithanage@oceanit.com
Curtis Kushimaejo, DDC ckushimaejo@honolulu.gov
John Nakagawa, State Office of Planning, John.D.Nakagawa@hawaii.gov

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU

JOB NO. 05-P-20

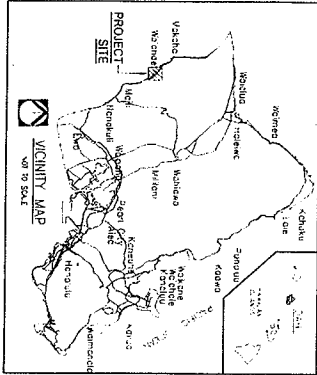
MAUNA LAHILAH BEACH PARK ROCK REVETMENT

WAI'ANAE, O'AHU, HAWAII 196792

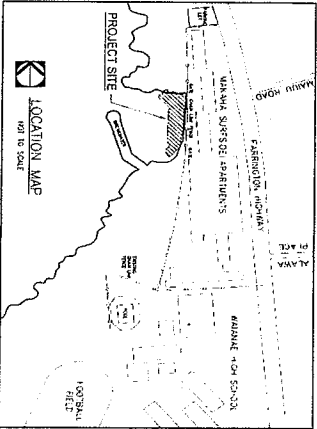
TMK: (1) 8-5-017:005

PREPARED BY:
OCEANIT LABORATORIES, INC.

APPROVED:



VICINITY MAP
NOT TO SCALE



LOCATION MAP
NOT TO SCALE

SHEET NO.	DWG. NO.	DESCRIPTION	DATE
1-1	1	GENERAL NOTES	
1-2	2	ROCK RETENTION WALLS	
1-3	3	ROCK RETENTION WALLS	
1-4	4	ROCK RETENTION WALLS	
1-5	5	ROCK RETENTION WALLS	
1-6	6	ROCK RETENTION WALLS	
1-7	7	ROCK RETENTION WALLS	
1-8	8	ROCK RETENTION WALLS	
1-9	9	ROCK RETENTION WALLS	
1-10	10	ROCK RETENTION WALLS	
1-11	11	ROCK RETENTION WALLS	
1-12	12	ROCK RETENTION WALLS	
1-13	13	ROCK RETENTION WALLS	
1-14	14	ROCK RETENTION WALLS	
1-15	15	ROCK RETENTION WALLS	
1-16	16	ROCK RETENTION WALLS	
1-17	17	ROCK RETENTION WALLS	
1-18	18	ROCK RETENTION WALLS	
1-19	19	ROCK RETENTION WALLS	
1-20	20	ROCK RETENTION WALLS	

GRAPHIC SCALE: NONE

DEPARTMENT OF DESIGN AND CONSTRUCTION
CITY AND COUNTY OF HONOLULU


MAUNA LAHILAH BEACH PARK
ROCK REVETMENT

DATE: 05-P-20

BY: T-1

SCALE: 1" = 100'

APPROVED:

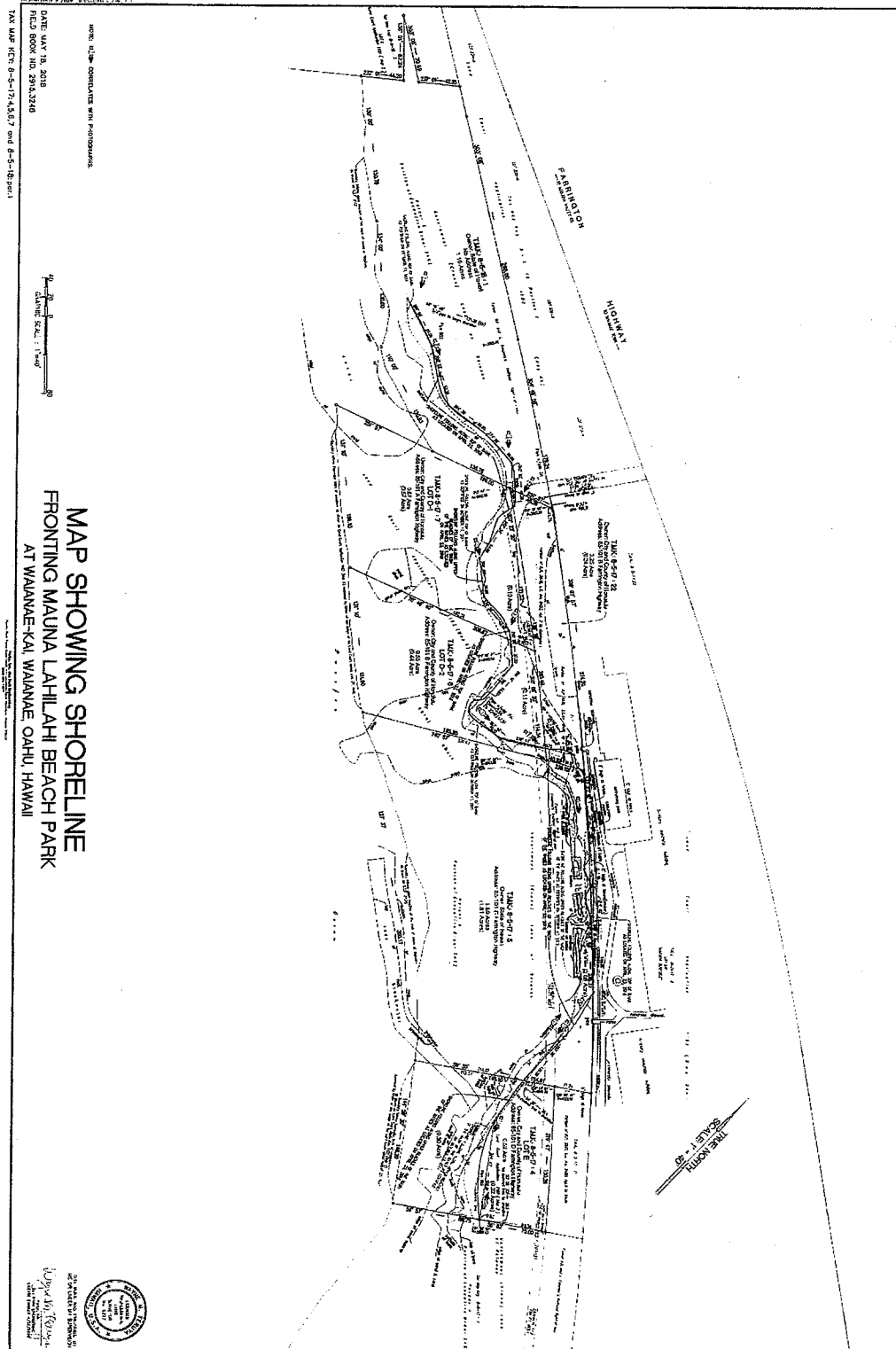


DATE: 05-P-20

BY: T-1

SCALE: 1" = 100'

Exhibit D



संज्ञा:

EROSION PREVENTION/SEDIMENT CONTROL NOTES (CONTD.)

- ALL POLLUTANTS AND MATERIALS THAT ARE DROPPED, WASHED, TRACED OR OTHERWISE RELEASED FROM A TANK ARE TO BE

5 The Corporation shall continue to maintain temporary staff that are not permanent employees of the Corporation. The Corporation shall continue to maintain temporary staff that are not permanent employees of the Corporation. The Corporation shall continue to maintain temporary staff that are not permanent employees of the Corporation.

1. RESISTANCE TO CHANGING AND IMPROVING is that the organization from the top management down, resists change and does not want to be subjected to a standard based on scientific management.
2. RESISTANCE TO CHANGING AND IMPROVING is that the organization from the top management down, resists change and does not want to be subjected to a standard based on scientific management.
3. RESISTANCE TO CHANGING AND IMPROVING is that the organization from the top management down, resists change and does not want to be subjected to a standard based on scientific management.

[illegible]

1. ECOSYSTEM AND SECTOR CONTROL PLAN SCHEDULE AND PLAN RESPONSE PLAN
2. WATER RESOURCES
3. WATER QUALITY
4. WATER QUANTITY
5. WATER USE
6. WATER POLLUTION
7. WATER CONSERVATION
8. WATER TREATMENT
9. WATER DISTRIBUTION
10. WATER STORAGE
11. WATER INFRASTRUCTURE
12. WATER MANAGEMENT
13. WATER POLICY
14. WATER LEGISLATION
15. WATER ECONOMICS
16. WATER SOCIALS
17. WATER CULTURE
18. WATER ETHICS
19. WATER HISTORY
20. WATER FUTURE
21. WATER RESEARCH
22. WATER EDUCATION
23. WATER AWARENESS
24. WATER PARTICIPATION
25. WATER ACCOUNTABILITY
26. WATER TRANSPARENCY
27. WATER INTEGRITY
28. WATER RESILIENCE
29. WATER ADAPTABILITY
30. WATER FLEXIBILITY
31. WATER INNOVATION
32. WATER LEADERSHIP
33. WATER PARTNERSHIP
34. WATER COOPERATION
35. WATER COLLABORATION
36. WATER CONSORTIUM
37. WATER ALLIANCE
38. WATER NETWORK
39. WATER CLUSTER
40. WATER HUB
41. WATER NODE
42. WATER LINK
43. WATER BRIDGE
44. WATER GATEWAY
45. WATER CORRIDOR
46. WATER ROUTE
47. WATER PATH
48. WATER WAY
49. WATER HIGHWAY
50. WATER EXPRESSWAY
51. WATER FREEWAY
52. WATER BOULEVARD
53. WATER PARKWAY
54. WATER DRIVE
55. WATER AVENUE
56. WATER BLVD
57. WATER ST
58. WATER RD
59. WATER HWY
60. WATER EXPR
61. WATER FWY
62. WATER BLVD
63. WATER PKY
64. WATER DR
65. WATER AV
66. WATER ST
67. WATER RD
68. WATER HWY
69. WATER EXPR
70. WATER FWY
71. WATER BLVD
72. WATER PKY
73. WATER DR
74. WATER AV
75. WATER ST
76. WATER RD
77. WATER HWY
78. WATER EXPR
79. WATER FWY
80. WATER BLVD
81. WATER PKY
82. WATER DR
83. WATER AV
84. WATER ST
85. WATER RD
86. WATER HWY
87. WATER EXPR
88. WATER FWY
89. WATER BLVD
90. WATER PKY
91. WATER DR
92. WATER AV
93. WATER ST
94. WATER RD
95. WATER HWY
96. WATER EXPR
97. WATER FWY
98. WATER BLVD
99. WATER PKY
100. WATER DR
101. WATER AV
102. WATER ST
103. WATER RD
104. WATER HWY
105. WATER EXPR
106. WATER FWY
107. WATER BLVD
108. WATER PKY
109. WATER DR
110. WATER AV
111. WATER ST
112. WATER RD
113. WATER HWY
114. WATER EXPR
115. WATER FWY
116. WATER BLVD
117. WATER PKY
118. WATER DR
119. WATER AV
120. WATER ST
121. WATER RD
122. WATER HWY
123. WATER EXPR
124. WATER FWY
125. WATER BLVD
126. WATER PKY
127. WATER DR
128. WATER AV
129. WATER ST
130. WATER RD
131. WATER HWY
132. WATER EXPR
133. WATER FWY
134. WATER BLVD
135. WATER PKY
136. WATER DR
137. WATER AV
138. WATER ST
139. WATER RD
140. WATER HWY
141. WATER EXPR
142. WATER FWY
143. WATER BLVD
144. WATER PKY
145. WATER DR
146. WATER AV
147. WATER ST
148. WATER RD
149. WATER HWY
150. WATER EXPR
151. WATER FWY
152. WATER BLVD
153. WATER PKY
154. WATER DR
155. WATER AV
156. WATER ST
157. WATER RD
158. WATER HWY
159. WATER EXPR
160. WATER FWY
161. WATER BLVD
162. WATER PKY
163. WATER DR
164. WATER AV
165. WATER ST
166. WATER RD
167. WATER HWY
168. WATER EXPR
169. WATER FWY
170. WATER BLVD
171. WATER PKY
172. WATER DR
173. WATER AV
174. WATER ST
175. WATER RD
176. WATER HWY
177. WATER EXPR
178. WATER FWY
179. WATER BLVD
180. WATER PKY
181. WATER DR
182. WATER AV
183. WATER ST
184. WATER RD
185. WATER HWY
186. WATER EXPR
187. WATER FWY
188. WATER BLVD
189. WATER PKY
190. WATER DR
191. WATER AV
192. WATER ST
193. WATER RD
194. WATER HWY
195. WATER EXPR
196. WATER FWY
197. WATER BLVD
198. WATER PKY
199. WATER DR
200. WATER AV
201. WATER ST
202. WATER RD
203. WATER HWY
204. WATER EXPR
205. WATER FWY
206. WATER BLVD
207. WATER PKY
208. WATER DR
209. WATER AV
210. WATER ST
211. WATER RD
212. WATER HWY
213. WATER EXPR
214. WATER FWY
215. WATER BLVD
216. WATER PKY
217. WATER DR
218. WATER AV
219. WATER ST
220. WATER RD
221. WATER HWY
222. WATER EXPR
223. WATER FWY
224. WATER BLVD
225. WATER PKY
226. WATER DR
227. WATER AV
228. WATER ST
229. WATER RD
230. WATER HWY
231. WATER EXPR
232. WATER FWY
233. WATER BLVD
234. WATER PKY
235. WATER DR
236. WATER AV</

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS UNDER THE CITY OF LOS ANGELES HEALTH DEPARTMENT'S ORDINANCES AND THE CITY OF LOS ANGELES PUBLIC HEALTH DEPARTMENT'S ORDINANCES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND FOR THE COST OF THE PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS.

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS.

14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS.

15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF THE PERMITS.

[illegible]

12

- POINTS FROM THE SET SHALL GO TO THE SET PROTECTION DEVICE UNLESS THEY ARE DIRECTED TO A STATIONARY BARRIER.
- STATIONARY BARRIERS HAVE AN EFFECT ON THE HEIGHT OF A STATIONARY BARRIER. THE EFFECT OF THE STATIONARY BARRIER ON THE SET PROTECTION DEVICE (THE BARRIER OF THE STATIONARY BARRIER) IS COMPROMISED.
- STATIONARY BARRIERS AND SET PROTECTION DEVICES MUST BE INCLUDED AND CLIMBED WHEN PERSONNEL IS COMBINED.
- WORK DEVICES MUST BE REMOVED OR REPLACED IMMEDIATELY.

URGENT CONTRA:

- HUMAN CONTACT: TACKLING, GOING TO SET, SETTING, DRIFT, PARTS, AND BEGINNING FROM ABOVE. THE CONSTRUCTION SITE IS RECONSTRUCTED, CONTACTING TO REPAIR, RECONSTRUCT, PARTS, AND PARTS.
- CONTACTING TO REPAIR, RECONSTRUCT, PARTS, AND PARTS.
- CONTACTING TO REPAIR, RECONSTRUCT, PARTS, AND PARTS.

REPAIRING THE PROBLEM AND INDICATORS ON PROTECT SETS MUST BE OVERSEEN TO PAID SAFETY FOR RECONSTRUCTED PARTS, PARTS AND SETS. PARTS WHICH SHOULD BE PLACED WITH PARTS OF BARRIER PROTECT.

1

DEPT. PARKS AND RECREATION NOTES (CONT'D)

- [illegible]

GRAPHIC SCALE: NONE

DEPARTMENT OF DESIGN AND CONSTRUCTION

MAUNA LAHILAH BEACH PARK
ROCK RETENMENT

CONSTRUCTION NOTES

05-P-20
T-2
15/04



32

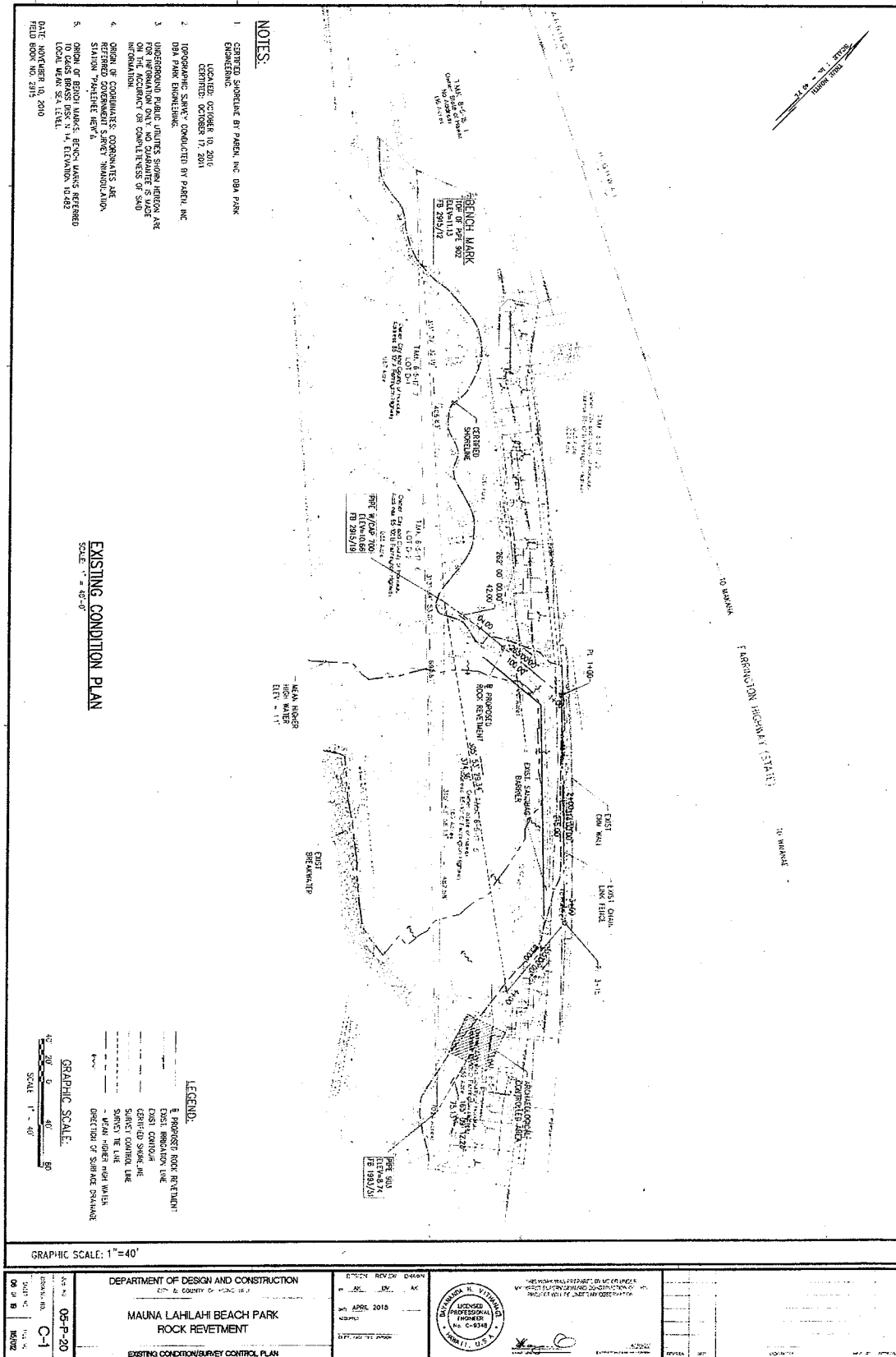
TREE PROTECTION NOTES:

1. CONTRACTOR SHALL BE CAREFUL WHEN DOING WORK NEAR EXISTING TREES OF THE PROJECT AND SHALL BE RESPONSIBLE FOR PROTECTING THEM. ANY REMOVAL OF TREES SHALL BE APPROVED BY THE HAWAIIAN SOCIETY OF ARCHITECTS, INC.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL TREES OF A DETERMINED AGE AND SIZE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL TREES OF A DETERMINED AGE AND SIZE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL TREES OF A DETERMINED AGE AND SIZE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL TREES OF A DETERMINED AGE AND SIZE.
3. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL CONDUCT A VISUAL INSPECTION OF THE PROJECT AREA TO IDENTIFY ALL TREES OF A DETERMINED AGE AND SIZE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL TREES OF A DETERMINED AGE AND SIZE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL TREES OF A DETERMINED AGE AND SIZE.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE.
5. TO MAINTAIN THE EXISTING DRAINAGE OF THE PROJECT AREA, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE.
7. FOR TREES THAT ARE IN EXISTING PLANTING STRIPS, THE EXISTING PLANTING STRIP SHALL BE MAINTAINED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE.
8. FOR TREES THAT ARE IN EXISTING PLANTING STRIPS, THE EXISTING PLANTING STRIP SHALL BE MAINTAINED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE.
9. IF THE CONTRACTOR'S WORK IS NEAR THE TRUNK OF A TREE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL TREES OF A DETERMINED AGE AND SIZE.

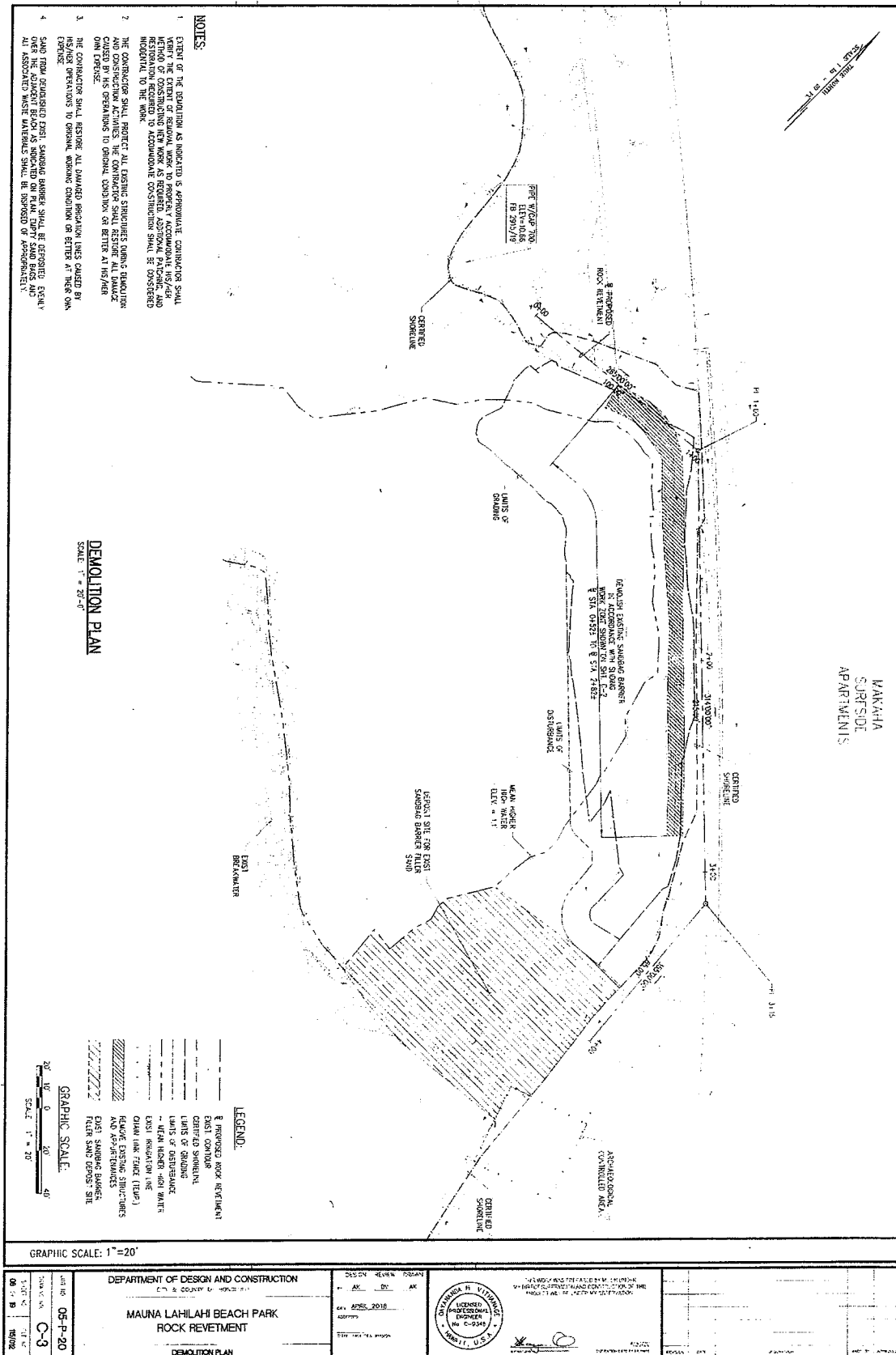
GRAPHIC SCALE: NONE

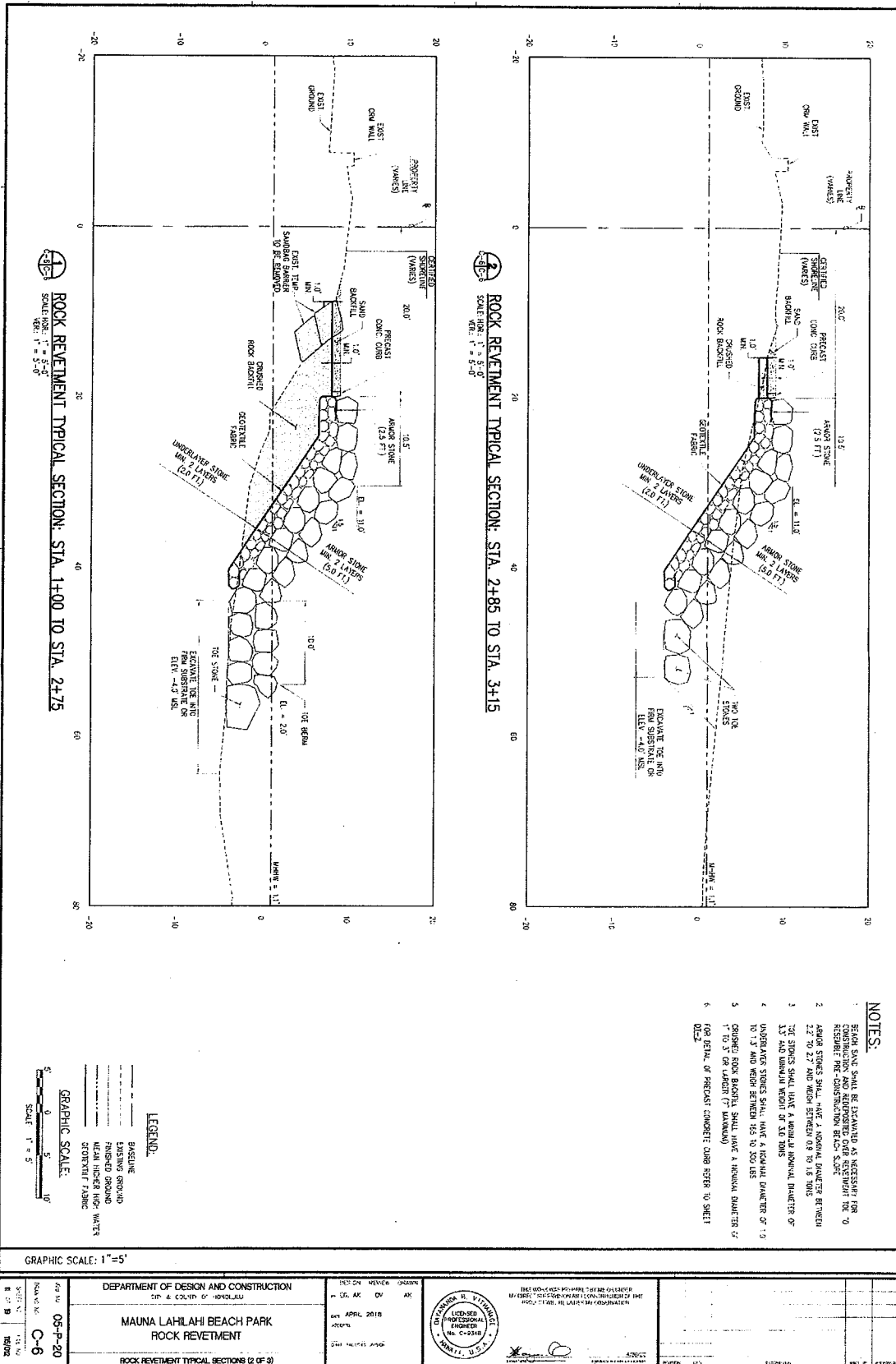
DEPARTMENT OF DESIGN AND CONSTRUCTION MAUNA LAHILAH BEACH PARK ROCK REVETMENT TREE PROTECTION NOTES		DESIGNED BY: [Signature] DATE: 05-08-2018 CHECKED BY: [Signature] DATE: 05-08-2018	LICENSED PROFESSIONAL ENGINEER NO. 10-00000000 HAWAII, U.S.A.	THIS DOCUMENT IS THE PROPERTY OF THE HAWAIIAN SOCIETY OF ARCHITECTS, INC. AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM.
--	--	---	---	--





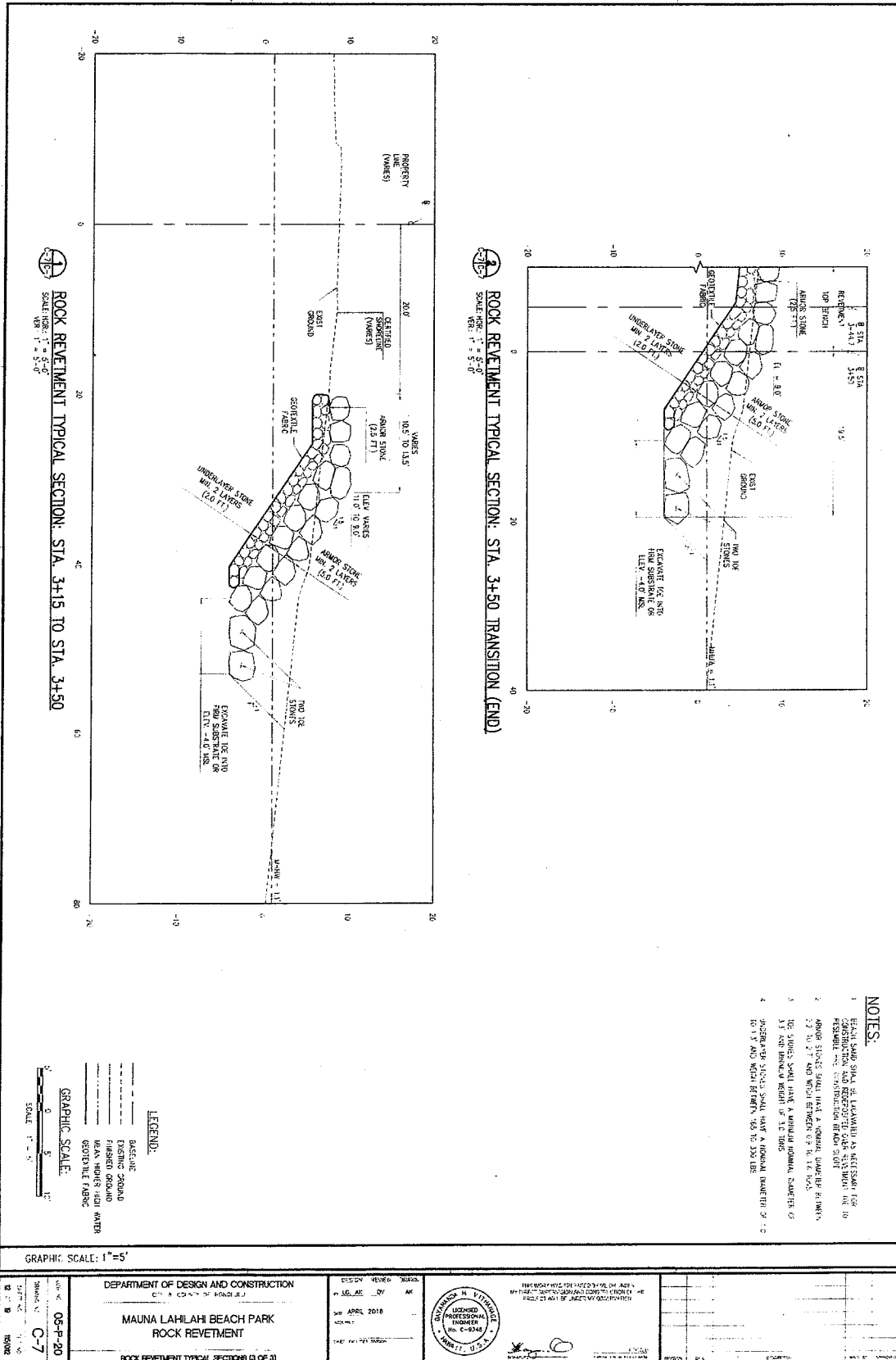








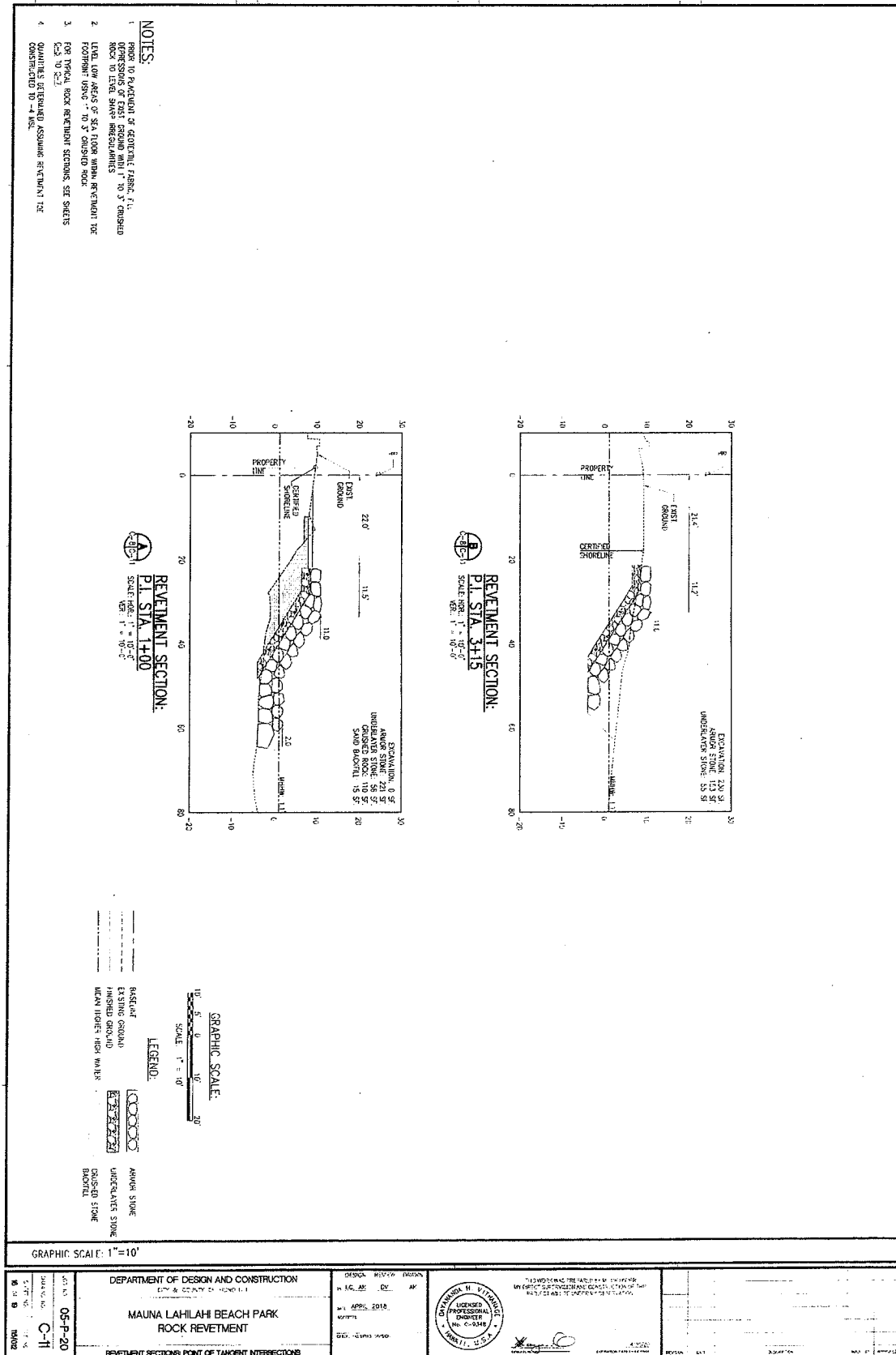




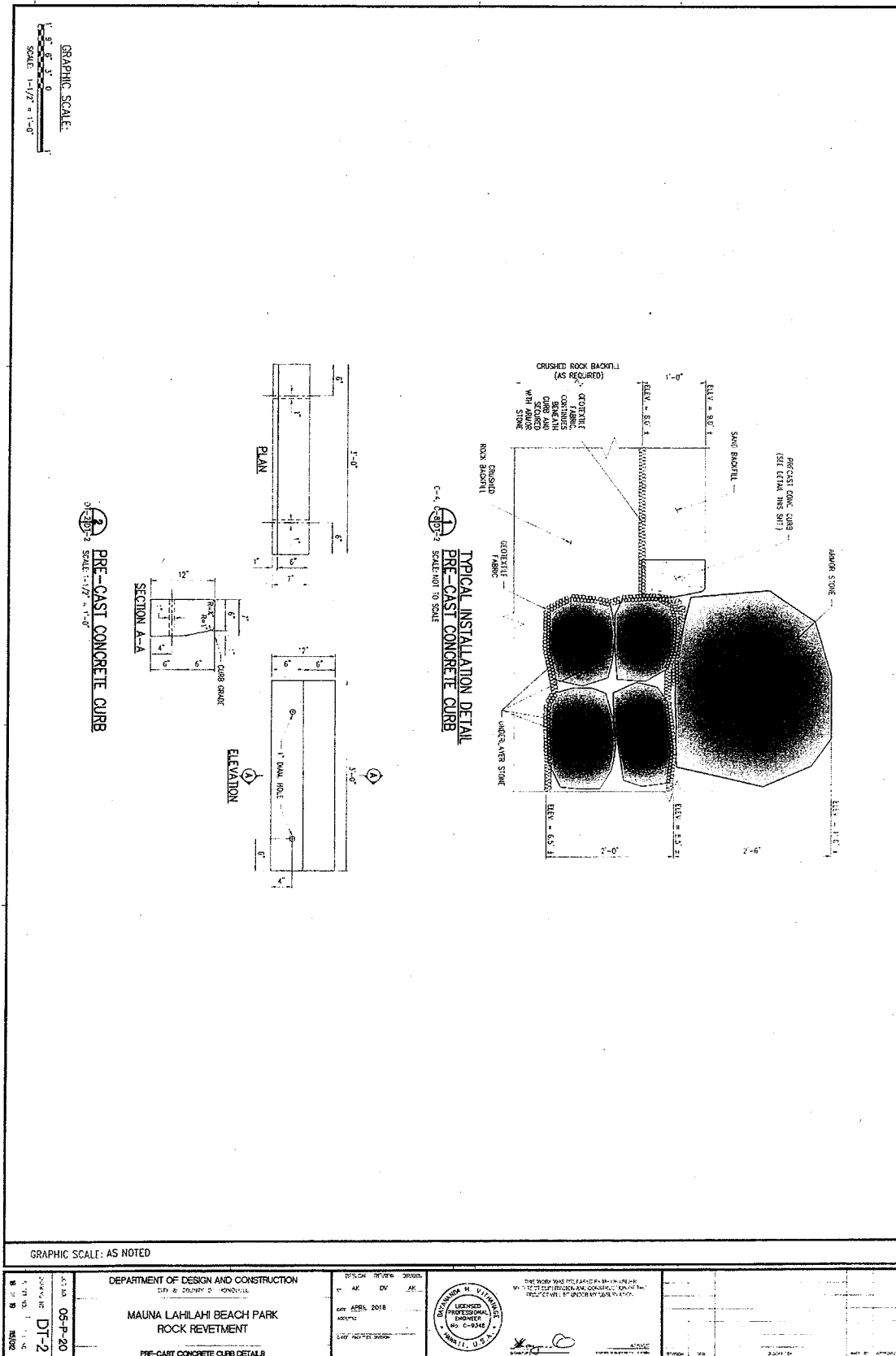












Sea Level Rise : Hawai'i Sea Level Rise Viewer

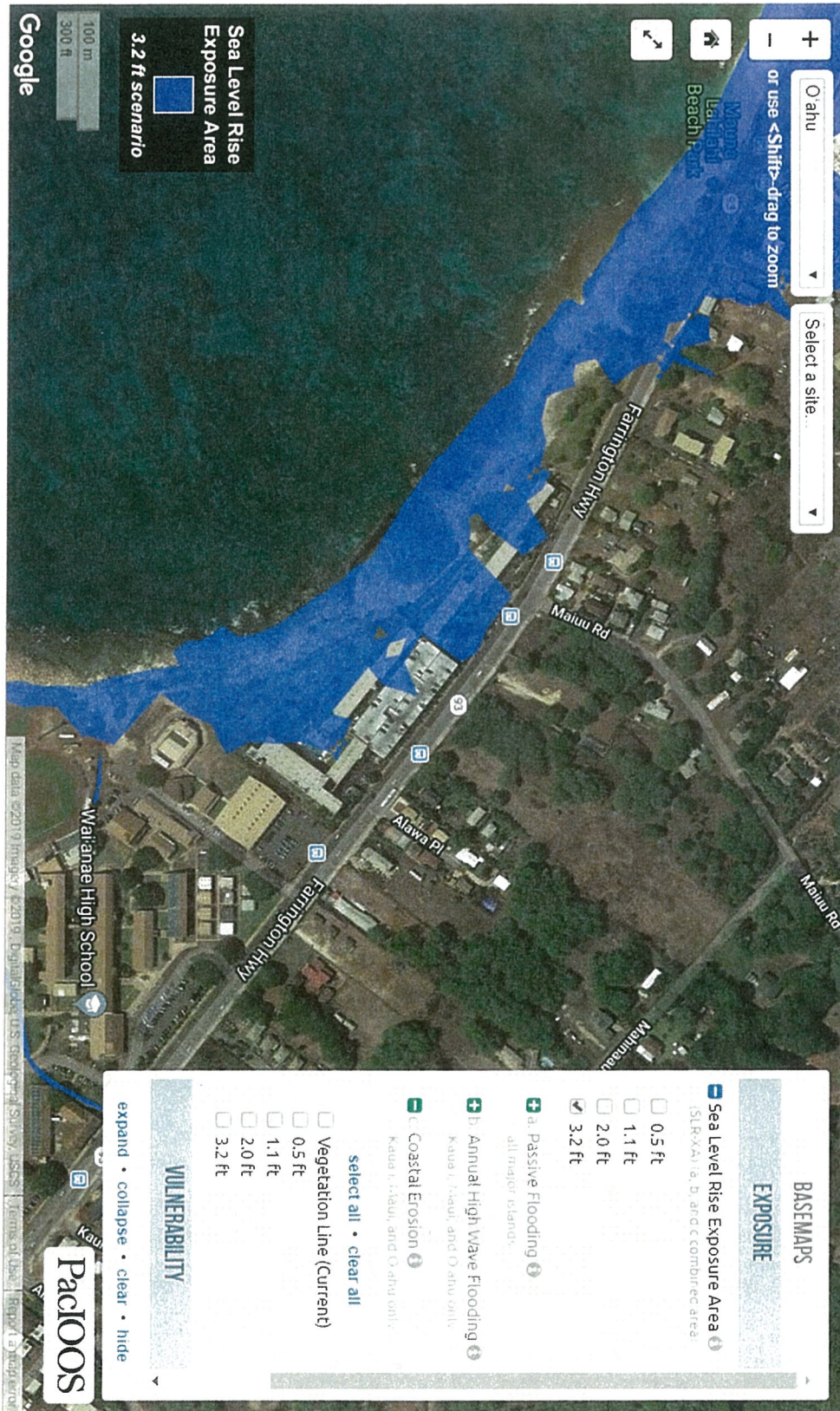


Exhibit E