

Waiawa Phase 2 Solar + Storage

Waiawa, 'Ewa, Island of O'ahu

Tax Map Key: (1) 9-6-004:024 (por.) 025 & 026
(1) 9-4-006: 034, 035 (por.), 036 (por.), 037 (por.)

Preliminary Civil Engineering Considerations

Prepared for:

Waiawa Phase 2 Solar, LLC
282 Century Place, Suite 2000
Louisville, CO 80027

Prepared by:



111 South King Street, Suite 170
Honolulu, Hawai'i 96813

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1 Project Description

The location of the proposed Waiawa Phase 2 Solar + Storage Project is on a portion of Kamehameha Schools (KS) property in Waiawa, 'Ewa, O'ahu identified as Tax Map Keys No. (1) 9-6-004: 024 (por.), 025, 026 and (1) 9-4-006:034, 035 (por.), 036 (por.), 037 (por.). The solar farm project will be developed by Waiawa Phase 2 Solar, LLC, and is planned to generate approximately 30 megawatts (MW) alternating current (AC) / approx. 60 MW direct current (DC) of power (the "Project"). The Project will be constructed within an approximate 387-acre easement area (the "Project Site") as shown on [Figure 1 – Conceptual Site Plan]. The Project Site is within the 1,395-acre area reclassified by the State of Hawai'i Land Use Commission from the Agricultural District to the Urban District by action taken in 1988 (the entire 1,395-acre area being referred to as the KS Property). The actual solar farm footprint will vary in size, depending on the existing topography, system design, and layout. Still, the final configuration will fall within the easement area within the State Land Use Urban District.

The Project involves construction and operation of a 30-megawatt (MW) alternating current/60 MW direct current (approx.) ground-mounted solar photovoltaic system coupled with a 240 MW-hour battery energy storage system, a substation, and related interconnection and ancillary facilities. A series of solar photovoltaic panels will be mounted on a racking system arranged in evenly-spaced rows throughout the Project area. The energy storage system will consist of containerized lithium-ion battery units distributed throughout the solar arrays. This equipment will connect via underground and overhead electrical wiring with a Project substation. The substation will be located near the existing Hawaiian Electric Company, Inc. (Hawaiian Electric) Waiau-Mililani and Wahiawa-Waimano 46-kilovolt (kV) sub-transmission lines and will include equipment to allow interconnection with the electrical grid; (2) 46 kV overhead lines will deliver power from the Project substation to the existing Waiau-Mililani and Wahiawa-Waimano 46 kV sub-transmission lines. The Project will be accessed via an existing gated entry off Waiawa Prison Road and will utilize a network of existing on-site access roads. Within the Project area, a series of new gravel access roads will be installed to accommodate construction vehicles and to allow ongoing access for operations and maintenance. Temporary construction staging and laydown occurs within the Project area. The power generated by the Project will be sold to Hawaiian Electric under a new power purchase agreement. At the end of the Project's useful life, the Project equipment will be decommissioned, and the land will be returned to substantially the same condition as existed prior to Project development.

Infrastructure improvements required for the solar farm include a substation with control and equipment structures, transformers, distributed pad-mounted power stations with inverters and battery storage systems, PV panels, electrical equipment, overhead collector lines, access roads, perimeter fencing, security systems, and drainage and vegetation improvements.

2 Access

The proposed access point for construction traffic, including trucks and employees' personal vehicles, is at Ka Uka Boulevard-Mililani Cemetery Road, mauka of the H-2 Freeway, which connects to Waiawa Prison Road. Figure 1 shows the access roads to the Project Site. The Project Site is within 1,395 acres of Urban District lands owned by Kamehameha Schools. The access into the KS Property is over existing roads and through an existing driveway. The primary entrance and gate will be on the Project Site's northern end, approximately 1.30 miles from the Ka Uka Boulevard interchange. Site access is also available from the south through the existing agricultural roads that connect to Waihona Street, which is a two-way, two-lane, City and County owned and maintained public roadway, and Kamehameha Highway, which is a two-way, four-lane State of Hawaii owned and City and County maintained public roadway.

3 Grading and Drainage

In general, the location of the solar farm is on the ridgelines where the former tilled sugar cane fields lay. Based on available topographic information, the Project Site generally slopes mauka to makai. Elevations range from 650 feet to 370 feet above mean sea level (MSL). Optimal placement of the PV panels will be on the flatter, more gradually sloped areas and away from the steep ravines that drop into the adjacent gulches.

The Project Site will require clearing, grubbing, and grading to place the solar panels, equipment, facilities, access roads, and fence. In general, the Project will avoid steep areas and focus solar racking systems, roads, BESS, and substation in areas with gradual slopes. The initial rough estimates of potential earthwork volumes for the Project contemplate roughly 100,000-200,000 cubic yards of balanced cut/fill. The design anticipates minimizing earthwork volumes and related construction costs by optimal placement of the PV racks following the existing grades and elevations. Where possible, the current agricultural roads will continue to serve the Project. All grubbed material not reused on the site will be hauled off the KS Property, and no foreign or organic material will be used as fill material. Furthermore, any stockpiling of dirt will be temporary.

Grading at the Project Site will be in accordance with the Revised Ordinances of Honolulu (ROH) Chapter 14, Articles 13-16. Pursuant to the grading ordinance, a geotechnical engineer will provide cut and fill recommendations prior to design and testing/observation during construction.

Permits and approvals will be required from the State of Hawai'i and the City and County of Honolulu (C&C) to allow grading and grubbing of the site including:

- State of Hawai'i Department of Health (DOH) - NPDES General Permit for Construction Activities, Notice of Intent (NOI-C)
- City and County of Honolulu - Grading, Grubbing, and Stockpiling Permit

The applications for both State and C&C grading and erosion control permits identified above require agency review and an approval of Grading Plans, Erosion and Sediment Control Plans, with temporary Best Management Practices (BMPs), a Storm Water Pollution Prevention Plan, and Drainage Reports that discuss permanent BMPs.

4 Stormwater Quantity Management

The Project Site is generally not subject to runoff from offsite areas mauka of the site. Existing runoff currently flows overland toward adjacent downstream areas or directly into the adjacent gulches. The project design intends to maintain the current drainage patterns. The earthwork will be limited to leveling for access roads, equipment pads, substation/battery storage, and smoothing contours as necessary for installing the PV racks. The road improvements will occur for roads within the solar boundary. There will be no planned improvements for haul roads outside the solar array fence line.

The addition of impervious areas from concrete equipment pads, equipment buildings, and micro-pile/pier foundations will be minimal. Due to the even distribution of the impervious regions throughout the Project Site, slight leveling of access road areas, and the use of gravel roads, there is no anticipated increase in runoff rates. As a result, there will not be a significant pre-development to post-development increase in stormwater flows due to the Project's construction. The implementation of detention methods will mitigate any rise in stormwater generated within the Project Site. Any increase in stormwater generated from the Project site will be detained within the Project site. If required, diversion channels will be constructed with

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check dams, drop structures, or different velocity reducing controls before discharge back into the natural drainage features. Any crossing of a drainage way within the solar array will be designed to C&C standards without adverse impact to downstream areas.

The Project Site may require grading near equipment pads and any other structures to direct stormwater away from the equipment pads and structures. The construction of drainage channels with velocity reduction controls will control the flow of water into a stormwater basin(s) or other volume control facilities. The volume control facilities will be situated at the proper downstream locations and discharge back into the natural drainage features with non-erosive velocities.

5 Stormwater Quality Management

The Clean Water Act established and enforced by the United States Environmental Protection Agency (EPA) requires implementing Best Management Practices (BMPs) through the grading and erosion control regulations and permits required by the State and C&C agencies. BMPs include temporary controls during construction activities and the establishment of permanent BMPs. Interim erosion control measures work to minimize soil loss and erosion hazards. Erosion control BMPs are necessary on-site and may include the following (pending final design):

- Preservation of natural vegetation
- Minimizing areas of clearing and grubbing
- Utilization of vegetated buffers
- Temporary soil stabilization with grass, mulch, or both
- Silt fences/fiber filtration tubes
- Gravel bag berms/check dams
- Stabilized construction entrances
- Sediment traps and basins
- Temporary diversion swales and ditches
- Dust control – water application, dust screens, or both

Due to the size of the Project, grading increments implement a phased temporary BMP strategy approved by the regulatory agencies. The Grading Plans and Erosion and Sediment Control Plans indicate grading increments and associated BMPs.

The plans will also incorporate permanent erosion control BMPs and require review and acceptance by the regulatory agency before the closeout of grading and erosion control permits. Typically, permanent BMPs include final stabilization of exposed soils through landscaping or installing pervious surfaces like gravel or impervious surfaces, including pavement and buildings. Additional BMPs are also typically required to provide treatment of stormwater runoff to remove pollutants. The total additional impervious surface for solar farm projects is minimal, and the PV panels and project components are considered non-pollution-generating surfaces. However, C&C regulations include minimum thresholds for installation of BMPs for stormwater quality based on total disturbed area regardless of the added impervious area or pollutant generation from a project.

The C&C Civil Engineering Branch (CEB) is responsible for interpreting and approving BMPs and drainage system designs. CEB has been defining the project's disturbed area for solar farms as all the areas within the project fence line, regardless of actual ground disturbance. This determination results in the solar farm project being classified as a Priority A project that triggers the low impact development (LID) requirements defined in the Department of Planning and Permitting Administrative Rules Title 20, Chapter 3. The City, however, treats solar farms on a case-by-case basis and will not impose LID requirements if adequately demonstrated that the proposed condition does not adversely impact on-site stormwater quality. CEB has

required BMPs for the proposed gravel roads on solar farm projects and it is anticipated that this interpretation and requirement will apply to this project. The Project is not expected to adversely impact stormwater quality because the Project Site will continue to be mostly grass following construction.

6 PV Panel Maintenance

During operations, the Project Site will be largely unoccupied. Panel cleaning may occur a couple of times per year, depending on rainfall. If additional cleaning is necessary, water will be delivered by truck to the Project Site unless a closer water source is later made available. Cleaning solutions and other chemicals are not part of the cleaning process.

A variety of easily controlled grasses are anticipated to be used as a vegetated ground cover. The vegetated ground cover will be maintained through mechanical means by utilizing zero-turn mowers and weed trimmers.

7 Noise Impacts

Noise impacts are regulated based on HAR Title 11, Chapter 46, which sets decibel limits to noise emanating beyond the property line. Allowable limits are based on time of day and zoning district of the Project Site.

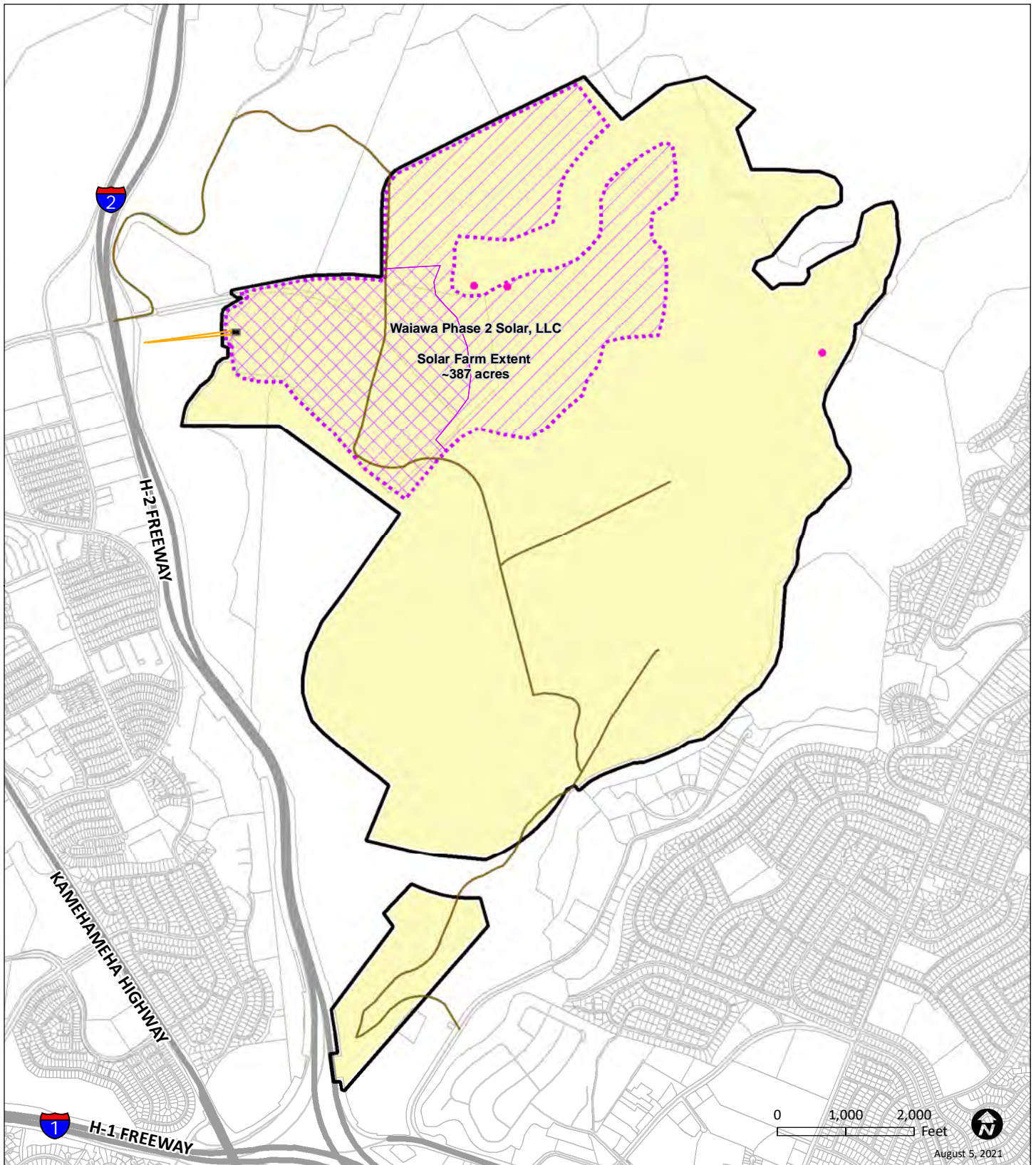
The solar farm is a relatively passive operation. Although the racking systems are a tracking-type system, motors are small and will not generate noise that exceeds acceptable noise levels as limited in HAR Chapter 11-46. The electrical equipment does not include any mechanical or motorized equipment that will generate noise. There will be some minimal corona noise coming from the electrical equipment and battery storage equipment. Operation and maintenance activities may result in minimal vehicular noise from maintenance staff. It is not anticipated that operations at the site would generate noise that exceeds acceptable noise levels.

During construction, noise levels are likely to increase due to earth-moving equipment, installation of solar panels, construction vehicles, and other construction activities. Noise generated from construction activities will comply with the regulations for community noise control in HAR Chapter 11-46. Due to the remote location of the Project and distance from communities, it is anticipated that any impacts would be minimal. If necessary, noise permits will be obtained through DOH.

8 Air Quality

There are no direct air emissions from operating the solar farm. Operation and maintenance activities may result in fugitive dust or tailpipe emissions from vehicular traffic and landscape maintenance. However, it is not anticipated that the operations at the Project Site would adversely affect air quality.

During construction, there will be short-term impacts in the form of exhaust from increased traffic and fugitive dust generated by the construction activity. Temporary BMPs will be used to mitigate impact from fugitive dust during construction. These BMPs may include dust fences, windbreaks, watering of disturbed areas and other soil management measures. BMPs will be identified and included on the erosion and sediment control plans that are required for both C&C and State grading and erosion control permit approvals. Construction activities at the Project Site will comply with the regulations for fugitive dust control in HAR, Section 11-60.1.



Legend

- Waiawa Phase 2 Solar, LLC Solar Farm Extent ~387 acres
- Parcel A
- Parcel B
- KS Waiawa Property (SLUD- Urban, D)

- Utility Improvements Area
- Archaeological Preservation Area
- Waiawa Phase 2 Solar, LLC "Gen-Tie Alignment"
- Access Route

FIGURE 1 CONCEPTUAL SITE PLAN

Disclaimer: This Graphic has been prepared for general planning purposes only and should not be used for boundary interpretations or other spatial analysis.

