STATE OF HAWAII

DEPARTMENT OF HAWAIIAN HOME LANDS

December 19-20, 2022

To: Chairman and Members, Hawaiian Homes Commission

From: Peter "Kahana" Albinio, Jr., Acting Administrator
Land Management Division KA

Subject: FOR INFORMATION ONLY – Sale of and/or Land Exchange, Waimanalo, Oahu Island, TMK No. (1) 4-1-014:007

RECOMMENDED MOTION/ACTION:

None; For Information Only

BACKGROUND

The purpose of this subject agenda item is to initiate dialogue amongst the Hawaiian Homes Commission on the sale of and/or Land Exchange opportunity for a vacant Hawaiian home lands parcel consisting of 96.4 acres identified more specifically by TMK No. (1) 4-1-014:007 (See Exhibit "A") located in Waimanalo, Oahu Island.

A good majority of the subject parcel is comprised of a steep Koolau mountain face that poses immediate health and safety concerns with rock fall. In April 2015, engineering consultant firm AECOM produced a Rockfall Mitigation Study. The study overview is attached hereto for reference as Exhibit "B."

Additionally, land records for this specific parcel requires further review to determine whether it is part and parcel of the original 1921 Hawaiian home lands trust or part of the Act 14 Settlement where lands were conveyed to DHHL from DLNR. Once that determination is made then sale and/or land exchange options can be further explored for consideration.

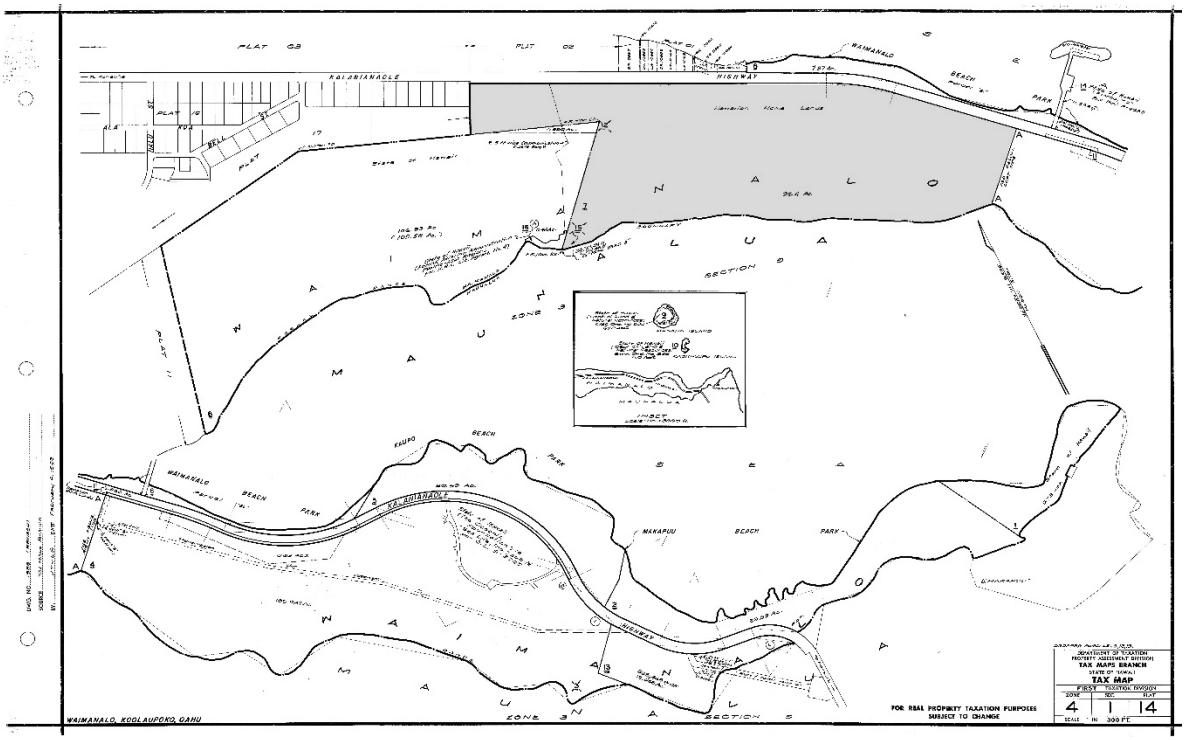

Exhibit "A"
Item No. F-7

OVERVIEW

AECOM has prepared this rockfall mitigation study for the properties of Hawaiian Home Lands at 41-450 Kalanianaole Hwy, Waimanalo, Oahu, Hawaii. The purpose of this mitigation study is to recommend rockfall mitigation method(s) best suited for this site in accordance with Federal Highway Administration (FHWA) publications and construction industry standards.

This rockfall mitigation study was performed in two consecutive phases: a) geological survey of the site and rockfall hazard zone delineation, and b) engineering planning study and development of preliminary rockfall protection design alternatives and cost estimates.

During the geological survey phase, a visual assessment of the geological formation was performed for accessible (without use of rappelling equipment) and representative areas of the project site. The Waimanalo site is located on a talus slope that was formed by previous rockfalls from the high cliffs above. Seven slope profiles were measured using a tape, two clinometers, and one laser range finder capable of measuring both direct and horizontal distances. Computer rockfall simulation was performed for each of the seven slope profiles chosen for this site. Maximum rockfall bouncing heights and maximum kinetic energies at advantageous locations were obtained from the simulations for engineering planning design purposes. Most simulated rockfalls dropped from the top of the high cliffs could impact most parts of the project site.

Rockfall risks were estimated using the simulation results and assumed usage data. Rockfall risks to traffic on Kalanianaole Highway (Route 72) are generally low or non-existent except for the east end of the project site near Profile P1. Rockfall risks to traffic on Bell Street are very low to non-existent. Rockfall risks to existing occupied houses (excluding the abandoned houses at the project site) are generally low with the highest near Profile P6 (Figure 2-2). Rockfall risks to future development houses (including the existing abandoned houses) at the project site are all higher than the recommended tolerable level of 10^{-5} for general public, and are significantly higher than the recommended tolerable risk level of 10^{-6} for new development. Rockfall mitigation is recommended if new houses are to be installed at the Waimanalo project site.

The engineering planning phase identified engineering solutions in terms of alternative designs for reducing potentials for rockfall hazard. All work was based on the research data and the recommended procedures by FHWA, United States Department of Transportation, and the engineering and construction standards accepted by the industry. Most commonly used rockfall mitigation methods were found not to be suitable for the Waimanalo site due to the high cliffs and the very large area to be mitigated.

Six design alternatives are provided, with costs ranging from zero (no action) to $316,887,000 (anchored wire mesh). Design Alternative No. 1 provides for the installation of a wire mesh or ringnet drape system over the entire slope that could potentially send falling rocks to structures to be protected, with a construction cost of $167,871,000 and a construction time of 24 months. Design Alternative No. 2 provides for the installation of an anchored wire mesh over the entire slope that could potentially send falling rocks onto affected structures, with a construction cost of $316,887,000 and a construction time of 48 months. Design Alternative No. 3 provides for the installation of a rockfall impact fence along strategic locations to intercept falling rocks from upslope, at an approximate cost of $2,000 per linear foot. Design Alternative No. 4 provides for the construction of a catchment ditch to intercept rolling rocks from upslope, with a construction cost of $30,000,000 and a construction time of 24 months. Design Alternative No. 5 provides for the scaling of rock outcrops that present high rockfall potential, with a construction cost of $9,777,000 and a construction time of 18 months. This design alternative is only a temporary means of rockfall risk reduction as new rockfall features may develop after scaling due to continuous weathering and erosion. Design Alternative No. 6 provides for the option of taking no action to mitigate rockfall hazard risks at the project site. Because calculated rockfall risks with respect to the existing occupied residential properties and the traffic on Kalanianaole Highway and Bell Street are generally low, except for the two profile areas P1 (impact on Kalanianaole Highway) and P6 (impact on the existing occupied residential properties), this no action alternative would be acceptable for most areas within the

project site under the existing conditions. Areas near profile P1 and P6 exhibit higher rockfall hazard risks than the tolerable levels. We recommend rockfall mitigation in these areas under the no-action alternative. However, all calculated rockfall hazard risks based on future development are higher than the recommended tolerable level. Consequently, rockfall risk mitigation for future development is recommended.

Design Alternative No. 3 (rockfall impact fence) is recommended as the most suitable and highly cost-effective mitigation method for the Waimanalo site. This design alternative would provide an umbrella protection for the areas below the mountain where there are plans for development. Figure 3-4 shows one potential alignment of the rockfall impact fence with significant gentle slopes below: the fence is 4800 ft long and the usable area below the impact fence is approximately 42 acres. Shorter segments of the rockfall impact fence, if needed, can be constructed in different phases. Refinement of the rockfall impact fence alignment may need to be made to best suit development needs.

The rockfall impact fence is designed to be about 16.0 ft tall with impact energy of 1106 ft-ton (3000 kilojoules) for a falling rock of about 5-foot diameter or less. To increase the life span of the impact fence, all steel cables and their hardware, including steel cable anchors, must be of the stainless steel type 316 construction. Since the thin strands of regular steel cables with standard galvanization only last a few years in the corrosive coastal environment of Waimanalo project site. Other components like posts and ring nets should have a hot-dipped galvanized Galfan coating. The construction cost for a 4800-foot long rockfall impact fence is about is $9,685,000, with a construction time of 10 months. The construction cost for a 2000-foot long rockfall impact fence at the most suitable development area is about $4,063,000, with a construction time of 6 months. Shorter segments of the rockfall impact fence, if needed, can be constructed in different phases.