APPENDIX

Avian and Terrestrial Mammalian Surveys Conducted for the Hawaiian Memorial Park Cemetery Expansion Project – November 2017 Prepared by: Reginald E. David Avian and Terrestrial Mammalian Surveys Conducted for the Hawaiian Memorial Park Cemetery Expansion Project, Ko'olau Poko District, Island of O'ahu



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November 2, 2017

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Introduction

Hawaiian Memorial Life Plan, Ltd. (Petitioner) owns and manages the Hawaiian Memorial Park (HMP) that offers a variety of interment options. HMP is a full-service cemetery located in Kāne'ohe, O'ahu, Hawai'i, and has been at its present location since 1958 (Figure 1.1 and 1.2). The Petitioner is proposing to expand HMP due to the growing aging population on O'ahu and demand for ground interment and inurnment spaces. Currently, only about 6% of all the individual plots at HMP remain available for families.

The petitioner is proposing to develop approximately 28.2 acres of a larger 53.45 acre parcel identified as: Tax Map Key: (1) 4-5-033: por. 001 (Private Property). Proposed improvements (Proposed Action) within the approximately 53.45-acre Petition Area would consist of two main components: 1) expansion of the HMP cemetery; and 2) creation of a 14.5-acre Cultural Preserve immediately to the northeast of the cemetery expansion area. Remaining undeveloped areas of HMP's property (Parcel 1) outside of the Petition Area would continue to remain undeveloped. The 156.5 acres of the 164.4-acre parcel (less 7.9-acre Ocean View Garden) would also be placed in a conservation easement with the Hawaiian Islands Land Trust to protect it from future development of undeveloped areas. Figure 2.2 includes a Conceptual Site Plan for this project, and a summary of the proposed land use is provided.

Summary of Proposed Land Use

	Total	53.45 acres
4.	Other Open Space Area Total	7.75 acres
3.	Cultural Preserve	14.50 acres
2.	Internal Roadways (Approximate)	3.00 acres
1.	Cemetery Expansion Area	28.20 acres

This report describes the methods used and the results of the avian and terrestrial mammalian surveys conducted on the subject property as part of the environmental disclosure process associated with the proposed project.

The primary purpose of the surveys was to determine if there are any avian or mammalian species currently listed, or proposed for listing under either federal or State of Hawai'i endangered species statutes within or adjacent to the study area. The federal and State of Hawai'i listed species status follows species identified in the following referenced documents, (Department of Land and Natural Resources (DLNR) 1998; U. S. Fish & Wildlife Service (USFWS) 2016). Fieldwork was conducted on September 11, 2017.

Hawaiian and scientific names are italicized in the text. A glossary of technical terms and acronyms used in the document, which may be unfamiliar to the reader, are included at the end of the narrative text.

General Site Description

The Petition Area is situated *makai* of the existing HMP and Hawai'i State Veterans Cemeteries (Figure 1.1). The 53.45-acre site is undeveloped. The HMP's existing Ocean View Garden cemetery site is located adjacent to the Petition Area on the northwest end of the larger 164-acre property. Figure 1.2 includes a vicinity map showing the Petition Area and surrounding uses in the vicinity.

Vegetation within the area surveyed have been highly altered over time, introduced nonnative plants dominate the entire survey area (LeGrande, 2017).

Methods

The avian phylogenetic order and nomenclature used in this report follows the *AOU Check-List of North American Birds* (American Ornithologists' Union, 1998), and the 42nd through the 58th supplements to the Check-List (American Ornithologists' Union, 2000; Banks et al., 2002, 2003, 2004, 2005, 2006, 2007, 2008; Chesser *et al.*, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017). Mammal scientific names follow (Wilson and Reeder, 2005)). Place names follow (Pukui et al., 1976).

Avian Survey Methods

Eight count stations were sited roughly equidistant from each other within the project site. A single eight-minute avian point count was made at each count station. Field observations were made with the aid of Leica 8 X 42 binoculars and by listening for vocalizations. The point counts were conducted between 7:30 am and 11:00 am, the period when birds are most active and vocal. Time not spent counting the point count stations was used to search the rest of the site for species and habitats not detected during the point counts.

Mammalian Survey Methods

With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or $'\bar{o}pe'ape'a$ as it is known locally, all terrestrial mammals currently found on the Island of O'ahu are alien species, and most are ubiquitous. The survey of mammals was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign. A running tally was kept of all terrestrial vertebrate mammalian species detected within the project area during the time spent on the site.



Project Location Map

Hawaiian Memorial Park Cemetery Expansion Project Kāne'ohe, O'ahu, Hawai'i

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Results

Avian Survey

A total of 277 individual birds of 19 species, representing 15 separate families, were recorded during point counts. All of the avian species detected during point counts are alien to the Hawaiian Islands. An additional three species, Cattle Egret (*Bulbucus ibis*), Pacific Golden-Plover (*Pluvialis fulva*), and Rock Pigeon (*Columba livia*) were detected as incidental observations within the existing developed Hawaiian Memorial Park facilities while transiting them on route to the upper end of the proposed expansion area. One of these, Pacific Golden-Plover is a native indigenous migratory shorebird species (Table 1).

Avian diversity and densities were in keeping with the location and predominately alien vegetation present on the site. Three introduced species, Red-vented Bulbul (*Pycnonotus cafer*), Zebra Dove (*Geopilia striata*), and Red-whiskered Bulbul (*Pycnonotus jocosus*) accounted for 51-percent of the total number of birds recorded. Red-vented Bulbul was the most commonly tallied species, which accounted for 19 percent of the birds recorded during point counts.

Table 1 – Avian Species Detected During Point Counts Hawaiian Memorial Park Expansion Area						
Common Name	Scientific Name	ST	RA			
	PHASIANIDAE - Pheasants & Partridges					
	Phasianinae - Pheasants & Allies					
Domestic Chicken	Gallus sp.	А	1.63			
	COLUMBIFORMES					
	COLUMBIDAE - Pigeons & Doves					
Rock Pigeon	Columba livia	А	I-10			
Spotted Dove	Streptopelia chinensis	Α	1.63			
Zebra Dove	Geopelia striata	А	5.50			
	CHARADRIIFORMES					
	CHARADRIIDAE - Lapwings & Plovers					
	Charadriinae - Plovers					
Pacific Golden-Plover	Pluvialis fulva	IM	I-4			
	PELECANIFORMES					
	ARDEIDAE - Herons, Bitterns & Allies					
Cattle Egret	Bubulcus ibis	А	I-31			
	PASSERIFORMES					
	PYCNONOTIDAE - Bulbuls					
Red-vented Bulbul	Pycnonotus cafer	А	6.75			

Table 1. Continued

Common Nama	Scientific Name	ст	D۸
		31	NA
Red-whiskered Bulbul	Pychonotus jocosus	А	5.38
	CETTIDAE - Cettia Wardiers & Allies		
Japanese Bush-Warbler	Horomis diphone	A	0.13
	ZOSTEROPIDAE - White-eyes		
Japanese White-eye	Zosterops japonicus	А	4.88
	TIMALIIDAE - Babblers		
Chinese Hwamei	Garrulax canorus	Α	0.13
Red-billed Leiothrix	Leiothrix lutea	А	2.13
	TURDIDAE - Thrushes		
White-rumped Shama	Copsychus malabaricus	А	2.50
·	STURNIDAE - Starlings		
Common Myna	Acridotheres tristis	А	1.38
,	FRINGILLIDAE - Fringilline and Carduline Finches & Allies		
	Carduelinae - Carduline Finches and Hawaiian		
	Honevcreepers		
House Finch	Haemorhous mexicanus	Δ	0.88
	PASSERIDAE - Old World Sparrows		0.00
House Sparrow	Passar domesticus	۸	0.25
House Sparrow	CARDINALIDAE Cordinals & Allias	A	0.25
Nouthous Coudinal	CARDINALIDAE - Cardinalis & Allies	•	0.25
Northern Cardinal		А	0.25
	THRAUPIDAE - Tanagers		
	Thraupinae - Core Tanagers		
Red-crested Cardinal	Paroaria coronata	A	0.75
	ESTRILDIDAE - Estrildid Finches		
Chestnut Munia	Lonchura atricapilla	Α	0.50

Key to table 1

ST Status

- A Alien Introduced to the Hawaiian Islands by humans
- IM Indigenous Migrant Native but not restricted to the Hawaiian Islands, migratory, non-breeder in Hawaii
- RA Relative Abundance Number of birds detected divided by the number of point counts (~8)

Mammalian Survey

Three terrestrial mammalian species were detected on the site during the course of this survey. Numerous dogs (*Canis familiaris*) were heard barking from areas outside of the study site. One small Indian mongoose (*Herpestes auropunctatus*) was seen close to the dead end of Lipalu Street and the study site. A small amount of pig (*Sus scrofa*) rooting was found within the lower section of the proposed expansion area.

No mammalian species currently proposed for listing or listed under either the federal or State of Hawai'i endangered species statutes was recorded on this site (DLNR 1998; USFWS, 2016).

Discussion

Avian Resources

The findings of the avian survey are consistent with the current habitat present within the survey area, and with another faunal survey conducted on the property in September 2006 (Bruner, 2006). During the 2006 survey Bruner recorded 14 avian species, during the course of the current survey we documented the same 14 species, plus an additional five other species (Bruner, 2006; Table 1). All but one of the species recorded on this survey, Pacific Golden-Plover (*Pluvialis fulva*) are alien to the Hawaiian Islands (Table 1).

Pacific Golden-Plover, are a native, indigenous migratory shorebird species which nest in the high Arctic during the late spring and summer months, returning to Hawai'i and the Tropical Pacific to spend the fall and winter months each year. They usually leave Hawai'i for their trip back to the Arctic in late April or the very early part of May. They are widely distributed in the Hawaiian Islands during the winter month. The clearing of the dense secondary forest within the proposed expansion area, and the replacement of the vegetation with grass lawns will provide additional loafing and wintering habitat for Pacific Golden-Plover on the property.

Although no seabirds were detected during the course of this survey, several seabird species potentially overfly the site on occasion. The primary cause of mortality in resident seabirds is thought to be predation by alien mammalian species at the nesting colonies (USFWS 1983; Simons and Hodges 1998; Ainley et al., 2001). Collision with man-made structures is considered to be the second most significant cause of mortality in locally nesting seabird species in Hawai'i. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds often collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Hadley 1961; Telfer 1979; Sincock 1981; Reed et al., 1985; Telfer et al., 1987; Cooper and Day, 1998; Podolsky et al. 1998; Ainley et al., 2001; Hue et al., 2001; Day et al 2003).

The O'ahu population of White-Tern (*Gygis alba*) is listed as an endangered species by the State of Hawaii; it is not listed under federal statute. This ephemeral species was not recorded during this survey, nor was it expected. The current resident population of White Terns on O'ahu is found on the leeward side of the Island concentrated in the Waikiki area.

No owl species were recorded during this survey, there are two resident owl species on O'ahu the introduced Barn Owl (*Tyto alba*) and the indigenous endemic sub-species of the Short-eared Owl, or *Pue'o* as it is locally know (*Asio flammeus sandwichesis*). This species has become increasingly scarce on the Island; the O'ahu population is listed as an endangered species by the State of Hawai'i it is not listed under federal statute. It is probable that this resident indigenous species occasionally uses resources in the general project area on a seasonal basis. This species is not habitat restricted on O'ahu, though there certainly is less suitable nesting habitat than there once was, this species faces daunting

odds on an Island as heavily populated as Oʻahu – they are a ground nesting diurnal species, the shear number and densities of mammalian predator on the Island make it very difficult for this species to successful nest except within protected areas that have a strong mammalian predator control program in place. There is no suitable habitat for this species to forage in or nest in, on the study site.

Mammalian Resources

The findings of the mammalian survey are consistent with the current habitat present on the site and the current land usage of the area surveyed. All of the mammalian species detected are alien species. All of the mammalian species recorded are deleterious to native ecosystems and the organisms on which they depend.

Although, no rodents were recorded during the course of this survey, it is likely that one or more of the other four established alien Muridae found on O'ahu - European house mouse (*Mus musculus domesticus*), roof rat (*Rattus rattus*), brown rat (*Rattus norvegicus*), and black rat (*Rattus exulans hawaiiensis*) - use various resources found within the general project area on a seasonal basis. These human commensal species are drawn to areas of human habitation and activity. All of these introduced rodents are deleterious to native ecosystems and the native faunal species dependent on them.

No Hawaiian hoary bats were detected during the course of this survey. It is only in recent years that this species is being recorded on a regular basis on the Island of O'ahu. It is within the realm of possibility that this species may use resources within the project area on a seasonal basis.

Potential Impacts to Protected Species

Seabirds

The principal potential impact that the construction of the project poses to protected seabirds is the increased threat that birds will be downed after becoming disoriented by lights associated with the proposed action during the nesting season. The two main areas that outdoor lighting could pose a threat to these nocturnally flying seabirds is if; a) during construction, if it is deemed expedient, or necessary to conduct night-time construction activities – currently no nighttime construction is anticipated; b) following build-out, the potential use of streetlights or other exterior lighting during the seabird fledging season which runs from September 15 through December 15th. AS no outdoor lighting will be installed either in the cemetery or in thee cultural preserve, and no night-time construction is being proposed, it is not expected that the proposed action will result in deleterious impacts to protected seabirds.

Hawaiian hoary bat

The principal potential impact that construction poses to bats is during the clearing and grubbing phase of the construction. The trimming or removal of foliage and/or trees within the construction areas may temporarily displace individual bats, which may use the vegetation as a roosting location. As bats use multiple roosts within their home territories, the potential disturbance resulting from the removal of the vegetation is likely to be minimal. During the pupping season, female carrying their pups may be less able to rapidly vacate a roost site while vegetation is cleared. Additionally, adult female bats sometimes leave their pups in the roost tree while they themselves forage, and very small pups may be unable to flee a tree that is being felled. Potential adverse effects from such disturbance can be avoided or minimized by not clearing woody vegetation taller than 4.6 meters (15-feet), between June 1 and September 15, the pupping season.

Critical Habitat

There is no federally delineated Critical Habitat for any species on, or close to the proposed project site. Thus, modifications of habitat on the site will not result in impacts to federally designated Critical Habitat. There is no equivalent statute under state law.

Recommendations

- Schedule clearing and grubbing clearing of woody vegetation taller than 4.6 meters (15-feet), activities outside of the bat pupping season between June 1 and September 15.
- If streetlights or exterior facility lighting is installed in conjunction with the project, it is recommended that the lights be shielded to reduce the potential for interactions of nocturnally flying seabirds with external lights and man-made structures (Reed et al., 1985; Telfer et al., 1987).

Glossary

Alien – Introduced to Hawai'i by humans Commensal – Animals that share humans' food and lodgings, such as rats and mice. Diurnal – Daytime, an animal that hunts and feeds during daylight hours, the opposite of nocturnal Endangered – Listed and protected under the Endangered Species Act of 1973, as amended (ESA) as an endangered species Endemic – Native to the Hawaiian Islands and unique to Hawai'i Indigenous - Native to the Hawaiian Islands, but also found elsewhere naturally Nocturnal – Night-time, after dark '*Ōpe'ape'a* – Endemic endangered Hawaiian hoary bat (Lasiurus cinereus semotus) Pelagic – An animal that spends its life at sea – in this case seabirds that only return to land to nest and rear their young *Makai* – Towards the ocean Phylogenetic – The evolutionary order that organisms are arranged by *Pue'o* - Short-eared Owl (*Asio flammeus sandwichensis*) Ruderal – Disturbed, rocky, rubbishy areas, such as old agricultural fields and rock piles Sign – Biological term referring tracks, scat, rubbing, odor, marks, nests, and other signs created by animals by which their presence may be detected

Threatened – Listed and protected under the ESA as a threatened species

DLNR – Hawai'i State Department of Land & Natural Resources

ESA – Endangered Species Act of 1973, as amended

HMP - Hawaiian Memorial Park

USFWS – United State Fish & Wildlife Service

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