

DESIGNING A FUTURE URBAN CEMETERY IN HONOLULU; INTEGRATION OF  
ECOLOGICAL END OF LIFE CHOICES.

A DARCH PROJECT SUBMITTED TO THE GRADUATE DIVISION OF THE  
UNIVERSITY OF HAWAI'I AT MĀNOA PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF ARCHITECTURE

MAY 2018

By

Joern Ryan Vallesteros

D.Arch Committee:

Simon Bussiere  
William Chapman  
Dr. Ramdas Lamb

Keywords: Cemetery, Ecological, Urban, Landscape, Burial, Inurnment, Repository

**© 2018**  
Joern Ryan Vallesteros  
ALL RIGHTS RESERVED

I dedicate this dissertation to my dogs Haku and Kula and to the humanitarians across the globe striving to make the universe a better place.

## Acknowledgments

I would like to first thank those on my dissertation committee for your support and guidance. Professors Simon Bussiere, Ramdas Lamb and William Chapman I am grateful and honored to have worked with you on a topic I am passionate about. Thank you for bestowing your expertise knowledge in the research and design of my D.Arch dissertation. Your support channels through me with hopes to create resilient communities in Hawai'i

To my professors of the Global Track program in China, thank you to Professors Clark Llewellyn and Hongtao Zhou for the beautiful experience I have had in Beijing, Shang Hai and Singapore. I have learned so much and became more globally conscious of cultural, social and political climates worldwide. It has allowed me to become more human and take on the role of an architect with deeper calling. I believe I must reinvent the role of the architect who does not only design space but takes part in aiding humanity.

I would also like to thank the Lyceum Fellowship for the once in a lifetime travel scholarship in fulfilling my dreams of traveling the world. During my odyssey I have seen, smelled, heard, felt, tasted so much and have become a new person. A person who is more globally conscious of the misfortunes of the world. The things I have experienced were a blessing and a turning point in my life. On behalf of the University of Hawai'i at Mānoa school of architecture, I thank the Lyceum Fellowship for recognizing the amazing faculty and students of our school.

Thank you to my family for your unconditional love and support throughout my academic career as an aspiring architect. Your support continues to motivate my passion for architecture and helps navigate me towards my future endeavors.

## **Abstract**

Urban cemeteries in Honolulu face increasing pressures of development. The rapid growth of population and densification of buildings has caused some cemeteries to reach full capacity and inadvertently overflow. Within the cemetery landscape, traditional methods of treating the dead in Hawai'i has continued until today. Although these methods may be culturally and religiously traditional, they are criticized for being unsustainable practices. An excessive amount of dirt excavation, use of embalming fluid and the process of cremation are considered harmful to the environment. To properly maintain the sanctity, capacity and landscape ecology in Honolulu's cemeteries, a thorough, inclusive, and sensible set of design criteria is necessary.

This study aims to examine how key stakeholders in death care influence the treatment of the dead. Policy makers, funerary businesses, and religious groups are amongst the essential stakeholders who significantly influence the potential integration of ecological end of life choices within sustainable urban cemeteries. Toward this end, the research questions ask: How can ecological end of life choices sustainably integrate with the landscape and future growth of urban cemeteries in Honolulu? How do religious groups, funerary businesses, and policymakers influence shifting trends towards a more ecological means of practice in death care?

By using a qualitative approach, the research questions are answered through field research in case of studies, distribution of survey questionnaires and conduction of interviews. The case studies examined real-world cemeteries in the city of Honolulu and were selected based on site criteria. Respondents of the survey questionnaire were randomly selected and kept anonymous while the interview respondent is known as a significant religious group leader. The findings from the research indicated the potential design solutions for an urban ecological cemetery in Honolulu and have shown the level of impact from each of the key stakeholders.

For this reason, it is ideal that every position in the urban community of Honolulu collaborates on an inclusive design agenda for the future of today's cemeteries. Further research could be considered to measure long-term factors in the shifting of sociocultural and religious attitudes towards ecological end of life choices.

## List of Tables

Table 4.2 Average Cost of Funeral Breakdown of Services .....	41
Table 4.3 The FTC Funeral Rule.....	47
Table 6.1 Elemental Composition of a Human Body.....	74
Table 6.2 Annual Potential Releases from a Single Human Body.....	75
Table 6.3 List of Religions insight on Cremation .....	79
Table 7.1 Research framework of critical sustainable features for design .....	84
Table 7.2 Maui Valley Isle Memorial Park Pricing .....	88
Table 9.1 Cemeteries within Nu'uaniu watershed area .....	123
Table 8.2 Population Data of Counties in Hawaii .....	93
Table 9.1 List of Cemeteries in Nu'uaniu Watershed .....	95
Table 9.2 Programming of Spaces in Cemetery .....	107

## List of Figures

Figure 1.1 Honolulu 1905 and 2007: .....	14
Figure 1.2 Conceptual Framework .....	16
Figure 3.1 Data Trifold .....	27
Figure 4.1 Types of Funerals .....	42
Figure 5.1 Typology Context, Urban and Rural Cemeteries .....	50
Figure 5.2 Memorial Necropole Ecumenica III in Santos Brazil .....	51
Figure 5.3 Typology of Cemeteries .....	52
Figure 5.4 Layers of Egyptian Tomb Containers .....	57
Figure 5.5 Section Cut of a typical woof coffin buried in soil. ....	58
Figure 5.6 Nomenclature of Casket.....	59
Figure 5.7 Isometric Drawing of a Casket, Coffin and Wicker Container .....	60
Figure 5.8 Section Cut of the casket with burial vault in the soil .....	61
Figure 5.9 Stress impact from 6-ton bulldozer over the burial ground .....	62
Figure 5.10 Concrete Box vs Lined, Sealed Burial Vault .....	63
Figure 5.11 Relic Urns from China and Rome .....	65
Figure 6.1 Urban Ecology Concept .....	70
Figure 6.2 Natural Burial Compared to standard burial .....	73
Figure 6.3 What happens to your body after you die .....	76
Figure 6.4 Religious beliefs and non-beliefs in cremation .....	79
Figure 7.1 Island of Maui Map, Location of VIMP .....	85
Figure 7.2 Photo of VIMP Cemetery .....	89
Figure 7.3 Density Map within 1 square mile of the roman catholic cemetery .....	90
Figure 7.4 Map of Mō'ili'ili Japanese Cemetery.....	93
Figure 7.5 Photo of the case study cemeteries .....	94
Figure 7.6 Topography of case study cemeteries .....	98
Figure 7.7 Vegetation of case study cemeteries .....	101
Figure 7.8 Surrounding Context of the case study cemeteries .....	104
Figure 7.9 ArcGIS Map of Honolulu density and population rail transit.....	105
Figure 7.10 Facilities in the case study cemeteries.....	106
Figure 7.11 Perimeter conditions of the three case study cemeteries .....	109
Figure 8.1 Flow Diagram of Variable factors affecting each other .....	110
Figure 8.2 Number of interred in the case study cemeteries .....	111
Figure 8.3 Honolulu Population Increasing .....	112
Figure 8.4 Age groups .....	113
Figure 8.5 Hawaii ranking 72% in cremation .....	114
Figure 8.6 Participants affiliated with a religion .....	115
Figure 8.7 Ethnicity of Survey Participants .....	115
Figure 8.8 Preference of Burial methods responses from survey participants .....	118
Figure 8.9 Relationship between Culture, Religion and Environment.....	119
Figure 9.1 O'ahu Cemetery Columbarium .....	124
Figure 9.2 Diagrams are showing spatial relationship between various points .....	125
Figure 9.3 Ulumaihala Cemetery lower grounds .....	126
Figure 9.4 Ulumaihala Cemetery lower grounds bridge .....	127
Figure 9.5 FBG Community Gardens .....	128
Figure 9.6 Mission of Hawaii Temple .....	129
Figure 9.7 'A'ala park circa 1904 .....	131
Figure 9.8 Tax map key of two parcels for one park .....	132
Figure 9.10 South Perimeter of 'A'ala Park riverfront walkway .....	133
Figure 9.11 Climate data for Honolulu .....	134
Figure 9.12 Diagrams of Spatial studies .....	136
Figure 9.13 Five Key Design Principles for the design proposal .....	138
Figure 9.14 Program Distribution Chart 2d and 3d.....	139
Figure 9.15 Program Adjacency of Administrative spaces .....	140
Figure 9.16 Program Adjacency of Back of House spaces .....	141
Figure 9.17 Program Adjacency of Public Information center spaces .....	141
Figure 9.18 Program Adjacency of Maintenance Spaces .....	142
Figure 9.14 Program Distribution Chart 2d and 3d.....	139
Figure 9.17 Program Adjacency of Public Information center spaces .....	141
Figure 9.18 Program Adjacency of Maintenance Spaces .....	142
Figure 9.20 3d Rendering of Vertical Cemetery .....	144
Figure 9.21 Site Plan Rendering of phases over time .....	145

## List of Acronyms

CTAHR	College of Tropical Agriculture and Human Resources
DLNR	Department of Land and Natural Resources
DOH	Department of Health
EIS	Environmental Impact Statement
FBG	Foster Botanical Gardens
FCA	Funeral Consumers Alliance
FEO	Funeral Ethics Organization
FTC	Federal Trade Commission
GBC	Green Burial Council
HMP	Hawaii Memorial Park
ICCFA	International Cemetery, Cremation and Funeral Association
JMC	Japanese Mō'ili'ili Cemetery
KSRCC	King Street Roman Catholic Cemetery
NCA	National Cemetery Association
NFDA	National Funeral Directors Association
NFD&MA	National Funeral Director's & Mortician's Association
OGR	Order of The Golden Rule
OIBC	O'ahu Island Burial Council
SHPD	State Historic Preservation Division
USGBC	United States Green Building Council
VIMP	Valley Isle Memorial Park



# TABLE OF CONTENTS

Acknowledgements .....	iv
Abstract .....	v
List of Tables .....	vi
List of Figures .....	vii
List of Acronyms .....	viii
<b>CHAPTER 1: INTRODUCTION</b>	
1.1 Overview .....	13
1.2 Significance of Problem .....	14
1.3 Conceptual Framework .....	15
1.4 Literature Synthesis .....	16
1.5. Problem Statement .....	16
1.6. Research Questions .....	17
1.7 Methodology .....	19
1.8. Limitations and Delimitations .....	20
<b>CHAPTER 2: LITERATURE REVIEW</b>	
2.1 Sociology, Urban Design, Religion, Ecology .....	22
2.1.2 Urban Ecology .....	22
2.1.3 Multi-Culturalism in Hawaii .....	23
<b>CHAPTER 3: METHODOLOGY</b>	
3.1 Overview .....	26
3.2 Qualitative Approach .....	26
3.3 Trifold Research Data .....	27
3.4 Documentation Gathering .....	27
3.5 Case Studies (Mixed Methods) .....	28
3.6 Correlational Research (Interviews and Survey's) .....	28
3.7 Design Application .....	29
3.8 Research Limitations and Delimitations .....	30
3.9 Data Sources .....	31
3.10 Data Collection Analysis .....	31
<b>CHAPTER 4: HISTORY; ECONOMICS, POLICY, AND SOCIOLOGY</b>	
4.1 Introduction .....	34
4.1.2 History of the Cemetery .....	35
4.2 Honolulu; The City and Growth .....	37
4.3 Culture and Religion in Hawaii (Adaptation and reinterpretation) .....	38
4.4 Funerary Business, Consumerism Trends .....	40
4.5 Policies/Regulations .....	44

## **CHAPTER 5: CEMETERY DESIGN PARAMETERS**

5.1 Cemetery Design .....	48
5.1.2 Typology of Landscape. Rural and Urban Context .....	48
5.2 Typology of Cemeteries, Mournful Spaces .....	49
5.3 Cemetery Typology Studies .....	50
5.5 Design Guidelines .....	52
5.6 Casket Designs, Vaults (Burial Containers) .....	56
5.7 Urn Designs, Traditional and Contemporary .....	64

## **CHAPTER 6: ECOLOGY**

6.1 Introduction; Cemetery Ecology .....	66
6.2 Concept of Ecology .....	66
6.3 Hawaiian Ecology, Contemporary and Multicultural Influences .....	67
6.4 Urban Ecologies .....	69
6.5 Ecology in Traditional and Contemporary Cemeteries .....	70
6.6 Ecological End of Life Choices .....	71
6.7 Natural Burials “Green Burials” .....	72
6.8 Body Decomposition .....	74
6.9 Cremation .....	78
6.10 Ecology and Religion .....	80

## **CHAPTER 7: CASE STUDIES**

7.1 Honolulu, Oahu and Maui Cemeteries .....	83
7.2 Maui Valley Isle Memorial Park Cemetery .....	84
7.3 Honolulu Urban Cemeteries .....	89
7.4 Density/Compactness .....	89
7.4.1 Area .....	89
7.4.2 Grave Arrangement .....	91
7.4.3 Grave Practices .....	92
7.5 Conservation .....	98
7.5.1 Topography .....	98
7.5.2 Drainage .....	98
7.5.3 Vegetation .....	99
7.5.4 Softscape Graves .....	103
7.6 Integration .....	103
7.6.1 Spatial Relationship .....	103
7.6.2 People and Activities .....	105
7.6.3 Facilities Provided .....	106
7.7 Provision of Open Space .....	107
7.7.1 Perimeter Boundary .....	108
7.7.2 Degree of Openness .....	108
7.7.3 Vehicle Accessibility .....	109

**CHAPTER 8: CORRELATIONAL STUDIES**

8.1 Surveys and Interview ..... 110  
8.2 Interview with Bishop Larry Silva ..... 116

**CHAPTER 9: CONCEPT DESIGN APPLICATION**

9.1 Design Approach ..... 121  
9.2 Nu'uauu Watershed Field Research ..... 122  
    9.2.1 Cemeteries in Nu'uauu Watershed ..... 125  
    9.2.2 Foster Botanical Garden FBG ..... 127  
9.3 Izumo Tashakyo of Hawaii and Lum Sai Ho Tang Temples ..... 129  
9.4 Homeless and Drug Activity ..... 130  
9.5 Site Analysis ..... 130  
    9.5.1 History of Site ..... 130  
    9.5.2 Zoning ..... 131  
    9.5.2 Circulation ..... 133  
    9.5.3 Natural Elements ..... 134  
    9.5.4 Spatial Studies ..... 135  
    9.5.5 SWOTS ..... 136  
    9.5.6 Design Principles ..... 137  
    9.5.7 Programming ..... 138  
    9.5.8 Program Adjacency ..... 139  
    9.5.9 Form Studies ..... 140  
9.6 Design Rational ..... 143

**CHAPTER 10: CONCLUSION**

10.1 Summary ..... 152

**BIBLIOGRAPHY**

List of Sources ..... 154

**APPENDIX**

A. The Green Burial Council Standards GBC ..... 160  
B. Survey for Data Collection ..... 162  
C. List of Cemeteries on O'ahu ..... 163  
D. Urn Types ..... 164  
E. Program of Cemetery ..... 165  
F. Program of Cemetery ..... 166

# CHAPTER 1:

## Introduction

### 1.1 Overview

Ashes to ashes, dust to dust and urban cities to even more larger urban cities. As urban Honolulu continues to grow in population along with the densification of high rise buildings, urban cemeteries face the byproduct pressures of rapid development. Burial grounds are reaching full capacity and overflowing due to poor management in accommodation of future growth. These once pristine cultural and religious landscapes have become disconnected with the urban fabric. In May of 2008, the Hawaiian Memorial Park Cemetery located in an urban area of Kaneohe Hawai'i, the cemetery released an environmental impact statement for the expansion of burial grounds stating;

*“HMP anticipates it will exhaust its available supply of burial plots in the near-term and is approaching its future expansion plans in a master planning effort that it hopes will eliminate the need to re-apply for separate entitlements to expand the cemetery in the future.”<sup>1</sup>*

Cemeteries are associated with numerous stigmas and stark along with different perspectives from different religious groups and cultures. Thus high sensitivity revolves around cemeteries that perhaps contribute to separating the dead from the living. The concern for more suitable burial grounds also headlines several underlying problems within cemeteries themselves such as studies identifying the unsustainability of

---

<sup>1</sup> Helber Hastert and Fee, Planners. “Hawaiian Memorial Park Cemetery Expansion; Draft Environmental Impact Statement” May 2008.

traditional ground burials and typical processes of cremation. The amount of material needed to create funerary products such as caskets and burial vaults can alternatively be used for more sustainable purposes. Embalming is a highly practiced method used for funerary purposes and poses a potential threat by exposure to the living with long-term effects in the future. Today, there are ecological end of life choices such as natural green burial and other sustainable practices of death-care with the opportunity to internalize and externalize sustainability in the ecology of the urban city. Urban cemeteries in Honolulu today can become ecological landscapes adapting to changes and integrating firmly in the urban environment.

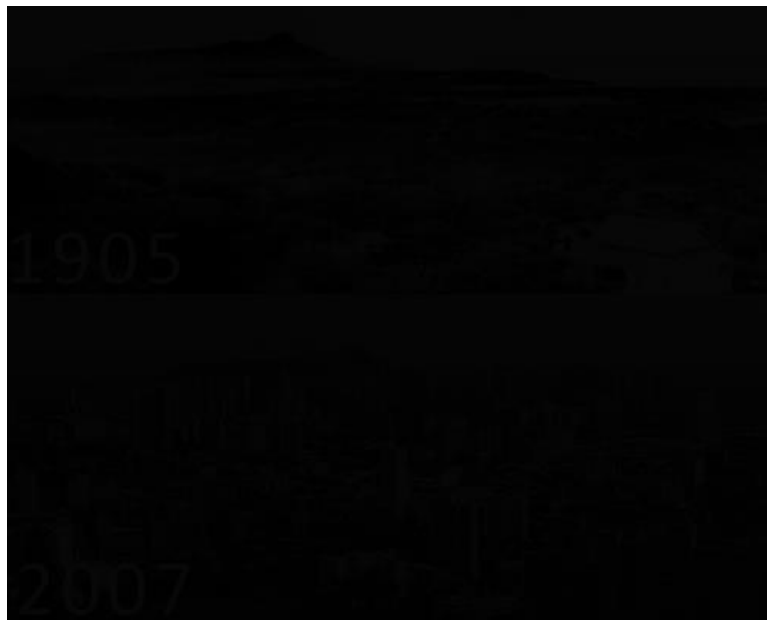


Figure 1.1 Honolulu in 1905 and 2007, rapid urban growth.

## **1.2 The Significance of the Problem**

The demand for cemetery space in Hawaii is high due to numerous factors in the urban context. These factors include but are not limited to, aging population, annual average number of deaths in Hawaii, trends and preferences for processes of death,

inefficient city planning, and sociocultural hierarchy. Despite the allowance or restriction of expanding cemetery spaces, these factors will continue to affect the demand for cemetery space. “The need for new interment space will not disappear if HMP cannot expand its facilities” noted in the draft EIS of the HMP cemetery expansion implies that even if the current grounds are non-expandable, the occupation of more land for cemetery space will take place elsewhere but will still consume landscape.

<sup>2</sup>Architecturally speaking, expansion of cemetery space shares one of the common characteristics of urban growth which is growing outwards, but urban motifs have also to manage the expansion of space by going vertical which practically most cemeteries are not typically designed to be that way. Urban ecologies

### **1.3 Conceptualizing a Framework for the Study**

The theoretical basis approach for the study of this dissertation is Qualitative and navigates between the objective and subjective variables identified based on foreshadowed problems, conjectures, and exploratory questions. Based on the preview of problematic factors concerning the demand for cemetery spaces in Honolulu and lack of sustainable integration of Honolulu urban cemeteries, specific variables from the main issue are identified drawing either a cause and effect relationship or speculation of correlation. The framework graphically generated in figure 1.2 originates from a systematic inquiry that considers the perplexities and conjectures of most urban cemeteries lacking connection to the city around them. Some of which are measurable data for cemetery capacity issues such as population numbers.

---

<sup>2</sup> Helber Hastert and Fee, Planners. “Hawaiian Memorial Park Cemetery Expansion; Draft Environmental Impact Statement” May 2008.

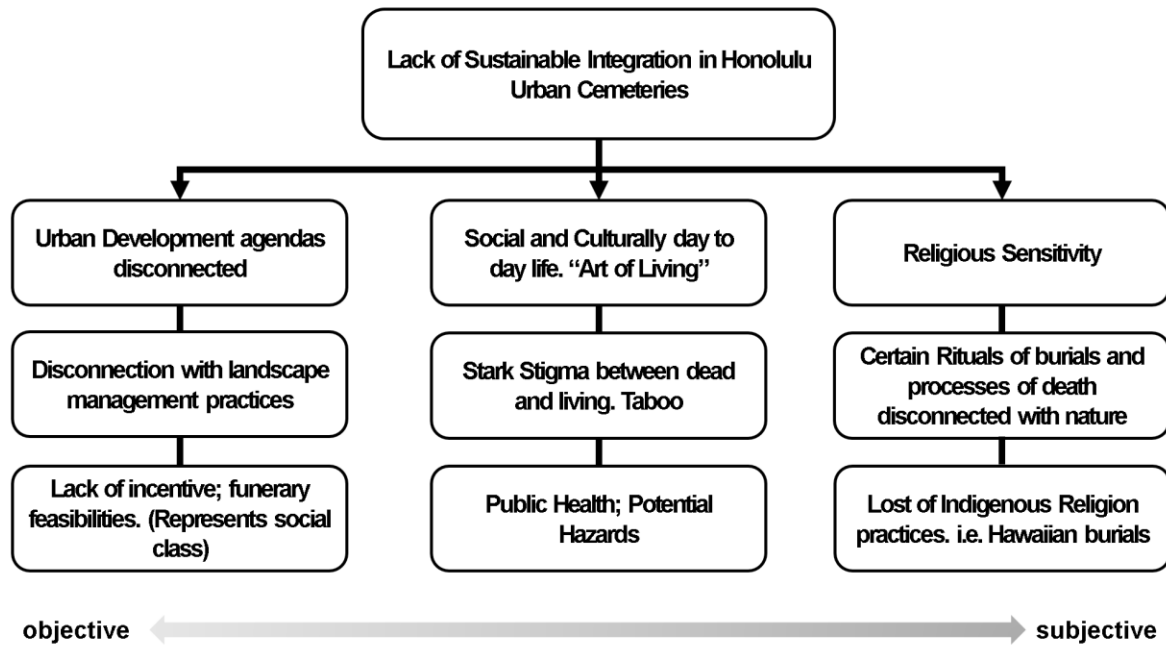


Figure 1.2 Conceptual Framework of Variables on the basis of the study

## 1.4 Literature Synthesis

In chapter two of this dissertation, the literature review stems from the variables itemized in figure 1.2 with three central themes of disciplines. Ecology, Religion, and Sociocultural themes make up the framework for the dissertation research, where ecology discusses different scales of ecological relationships between the urban environment, the landscape of the cemetery and the interments.

## 1.5 Problem Statement

The need for more urban cemetery spaces in Honolulu is increasing, despite the type of burial, there is an overall disconnect with the urban ebb and flow around these cemeteries. Indeed, cemetery spaces along with churches and temples in Hawaii share

a secure connection with mysticism and sacredness, emitting identity in the sense of place. Urban cemeteries in Honolulu today lack the ecological and sustainable integration with existing and or future municipal green infrastructure for the holistic welfare of the people and city.

## **1.6 Research Questions**

The key stakeholder's involved in death care are government officials such as the Federal Trade Commission and the Department of Health Hawai'i, city planners, designers such as landscape architects, funerary businesses, cemetery operators, religious organizations, sociocultural groups and the general public. Each of these stakeholders are interconnected to the issues and variables noted in the conceptual framework, and have influential power to design efficient solutions. One of the research questions is:

“How can city planner officials and designers in Honolulu better manage the future growth of urban cemeteries, keeping up with pressures of development?”

Based on the initial research of several cemeteries in Honolulu facing adversity from urban development, city planners should be responsible in working with the Honolulu community in creating management plans that focus on the sustainable integration of ecological end of life choices with landscape management practices in an urban context.

Consumerism is a crucial factor influencing everyone in the public and measures different social classes based on income. Funerary businesses, although monitored by moral compass associations, have a massive effect on certain trends when it comes to death care. Trends such as burial methods, goods and services can be categorized



between sustainable and non-sustainable practices, which ultimately affects the choices of the consumers. Another research question in this dissertation asks;

“How are funerary businesses in urban Honolulu addressing issues on non-sustainable methods of burials such as traditional ground burials and the process of cremation?”

Although pre-planning and funeral rights make it easier for the community to make consumer choices in a time of grief, those affiliated with a religion are influenced in deciding what elements they desire for a funeral.

Religious groups in Honolulu have a firm stance in the community influencing behavior and attitudes stemming from a belief system. Religion is ultimately traditional but also adapts and reinterprets certain beliefs in its system due to changes in social, political and economic climates. Therefore, this research questions asks:

How do religious groups in urban Honolulu identify with reinterpreting burial rituals and practices more sustainably for the environment?

Most religions will have theology and connection to nature expressed in their belief system. These ideologies of nature and religion catalyze a spiritual connection with ecological end of life choices and religious beliefs.

The movement of going green is essentially a twentieth-century initiative where the actions of people today affect the future for generations to come. Specifically, young millennials who are the potential target demographic for the research of this dissertation likely have the power to shift public attitudes and trends in burial methods, sustainable funerals and urban development. The final research question asks:

How will young environmentally conscious millennials of the Honolulu community influence today's burial methods in designing a future ecological cemetery and maintaining growth onwards?

The preliminary research performed for this dissertation identified certain trends in death care such as burial methods, funerary goods and services slowly shifting in the direction of specific green initiatives and agendas. These research questions target these stakeholders involved and connect them with the variables identified, ultimately configuring the methodology for the research performed.

## **1.7 Methodology**

The methodology utilizes a qualitative approach and consists of research methods best suited for the findings of this dissertation. Historical studies, case studies, correlational data findings and application of conceptual design aims to identify the relationships between the variables. Firstly, given data is collected for control points such as official documents from the Hawaii Department of Health, National Cemetery Administration, Hawaii population census and the Green Burial Council to provide leverage in the conduction of the research methods. The case studies are a specific selection of urban cemeteries in Honolulu along with a green burial certified hybrid cemetery on the island of Maui examined based on a set of design principles categorizing sustainable components and subcategorizing those components into more specific detail design elements noted. The research of this dissertation also includes conducted interviews and surveys with both familiar and significant stakeholders relevant to the topic of this dissertation such as residents of Honolulu and religious group leaders from different religious backgrounds. Furthermore, an application of

conceptual design or proof of concept is generated to provide theoretical discussions. Rigorous workflow of pre-design, concept design to schematic design in chapter nine of this dissertation demonstrates a logical selection of site and analysis of context for both master planning and site-specific design efforts. Spatial studies, ecological studies, and typology studies were performed to supplement the conceptual design of a vertical ecological urban cemetery at the site of 'A'ala Park. Finally, the conclusive findings of the research methods combined exhibit the data collected through the conceptual design as a rational response to the problem statement of this dissertation.

## **1.8 Limitations and Delimitations**

Throughout the course of the research, there were both limitations and delimitations set for the directionality and guidance of this dissertation. The limitations of the research involved were the travel constraints to perform architectural field research at the green burial hybrid VIMP cemetery on the island of Maui. Thus, the constraints resorted to the remote research of the VIMP cemetery, collecting data through web electronic sources. Restriction of access is also another limitation to the research as some of the cemeteries for potential field research are private property despite your credentials. This restriction of access prohibits but also exemplifies the sacredness and either the connection or disconnection of the space. The delimitations set for the conduction of research in this dissertation involves sensitivity towards theology and thanatology. The relationship between ecology and religion is highlighted in this thesis but does not delve in depth of religious belief systems. However, the responses from the surveys and interview in the research involve supplemental religious perspectives from those affiliated with their respected religion. A sense of place, human behavior,

and user activity are essential to architecture design processes and influences the designer in creative problem solving, the extent of the research in this dissertation does not fully observe thanatology and the mourners memorializing either in grief or remembrance in the duration of the case study cemetery field research. The measuring of emotions is intangible and are sensitive subjective matters, although these types of behaviors are the most vulnerable occurrences in cemeteries they may also be the reason why cemeteries are associated with taboo in cultures of Hawaii.

## **CHAPTER 2: Literature Review**

### **2.1 Sociology, Religion, Urban Design, and Ecology**

Previous research on both the design development and success of ecological urban cemeteries has contributed to numerous urban societies. However, Honolulu, Hawaii is one of the most diverse cities in culture, natural resources and climate. Multiculturalism in Hawaii greatly reflects different practices and beliefs both religious and non-religious. [source] The scope of the literature review for this research proposal focuses and may be limited to analysis' in multiculturalism in Hawaii, Hawaii religions, progression or funerary practices in the past to today, urban ecological studies, landscape management, city planning of Honolulu, and cultural evolution theories. However, this review excludes and does not explore the fragile process of personal bereavement, grief or concept of death due to the high level of sensitivity and cultural taboo. Majority of the sources are very delicate resources being a single copy of the information and securely preserved in archives. In reviewing the literature, most sources conclude a high level of sanctity, mysticism and ephemeral atmospheres in cemetery design that supplements the urban focus of this research.

#### **2.1.2 Urban Ecology**

Urban ecology plays a vital role in the research proposal in creating design guidelines for future urban cemeteries in Honolulu. The referencing of ecological principles that identify biodiversity and interactions between living systems in the urban fabric of Honolulu becomes supplementary to city planning agendas of sustainability. Understating different "process models" in urban ecological design is interdisciplinary and

assessed for either applicability or reinterpretation to urban Honolulu.<sup>3</sup> “*Findings from the document: Urban Ecological Design: A Process for Regenerative Places.*”

The principles of ecology transcend past landscape stewardship and should preserve traditional cultural landscape practices especially in the context of Hawaii.

### **2.1.3 Multiculturalism**

Multiculturalism is a distinguishable characteristic in the islands of Hawaii, and the urbanization of Honolulu has brought more diversity to the population. The ethnic makeup of Hawaii consists of eight significant ethnicities; Chinese, Filipino, Japanese, Koreans, Native Hawaiians, Okinawans, Portuguese and Puerto Ricans all which layers as the fabric of Hawaii’s society with the urban fabric of Honolulu. Both culture and religion are reflected in cemeteries. Therefore the need for a multicultural urban cemetery serves as a body of information inscribing social complex in Hawaii’s society that ultimately continues the success of multiculturalism. Author Michael Haus mentioned that Hawaii could manage ethnic tensions with more success than elsewhere around the world.<sup>4</sup> The management of ethnic tension in Hawaii can be used to assume a successful outcome in design guidelines for a multicultural cemetery but also as a method of resolving cultural and or religious conflict in rituals of death.

With Honolulu Hawaii being so culturally diverse, there is also diversity in religion. Since most cemeteries are a repository reflection of religion, it is significant to understand the relationship between nature and religion. Almost every religion will either directly or

---

<sup>3</sup> Palazzo, Danilo and Frederick R. Steiner. *Urban Ecological Design: A Process for Regenerative Places, Volume 12*. Island Press, 22th, June 2012

<sup>4</sup> Haas, Michael. *Multicultural Hawaii: The Fabric of Multiethnic Society*. Taylor and Frances published 1998.

indirectly reference spirituality in nature, with rituals or beliefs in sustainability. Typically, indigenous religions such as the Hawaiian's believing in gods and demigods that represent nature displays their integration and secure connection to the land. A journal article titled "Ecological Concerns Over Cemeteries" by landscape architect Aysel Uslu expressed that attitudes of different religions worldwide are vital instruments to solving environmental problems and, in a sense, help shape cemeteries, forms and ceremonies of burial.<sup>5</sup> Investigating connections between religion and the environment in urban Honolulu envisages the goal for an urban ecological cemetery with a sense of place. Although investigating the relationship between religion and environment may paralyze the intended research, dismissing religion would seem nihilistic to the research itself. Over time the relationship between environment and religion reciprocates shifts and changes that influence one or the other.

Culture and religion share a long line of wealthy history in which a timeline identifies a progression or co-evolution significantly influence by changing environments such as rapid urban development. Evolution is key to survival thus cultures and religions strive to preserve traditions but also adapt and grow during times of change. Therefore, reinterpretation and or adaptation translates into innovation increasing cultural and religious capacities. Although most of the cemeteries today in urban Honolulu reflect more traditional practices, Hawaii's concern for a clean environment will help shift attitudes and social complexity towards sustainable urgencies. "Cultural evolution allows the human population to solve problems that are much too hard for individuals to solve on their own"<sup>6</sup>

---

<sup>5</sup> Uslu, Aysel; Emin Baris and Elmas Erdogan. *Ecological Concerns Over Cemeteries*. Ankara University of Agricultural Faculty Department of Landscape Architecture, Diskapi Ankara, Turkey. Pg 1508

<sup>6</sup> Richerson, Peter J. Morten H. Christiansen. *Cultural Evolution: Society, Technology, Language and Religion*. MIT Press 1<sup>st</sup> November 2013 pg 106

In the case of Honolulu Hawaii, evolution in culture and religion involves the fusion of these entities that contribute to Hawaii's unique methods of managing conflict and tension. This notion of fusion and evolution helps constitute the potential benefits and outcome of designing urban ecological cemeteries in Honolulu enhancing more significant meaning to traditional landscape stewardship and ecological end of life choices.



## **CHAPTER 3: Methodology**

### **3.1 Overview**

The literature review in chapter two on cemeteries, design, religious beliefs and rituals, and urban sustainability identified significant overlapping themes between culture, ecology, and religion creating the principles and framework for the research methodology in this thesis. These three fields indicated both the connection and disconnection between one another indicating the qualitative approach for the research design. The goal of this chapter is to describe the methods of the data collection and denote the reasoning of the architectural research methods selected, research procedures, gathering data, issues, delimitations, analysis of data collection and development of theoretical framing for the dissertation.

### **3.2 Qualitative Approach**

The approach to the research of this dissertation is a qualitative approach aiming to respond to research questions and research problems. Ethnography, phenomenology and field research strategically rationalized the research methods chosen for this dissertation; Case studies, correlational findings, and application of conceptual design responds to the nature of the research regarding understanding cemetery typology and design, the religious connection between religious rituals of death and the environment. Naturally, the strategies for the research generated hypothesis with sub-findings that where quantitative, such as data from the surveys designed for the research in this dissertation.

### 3.3 Trifold Data Research Design

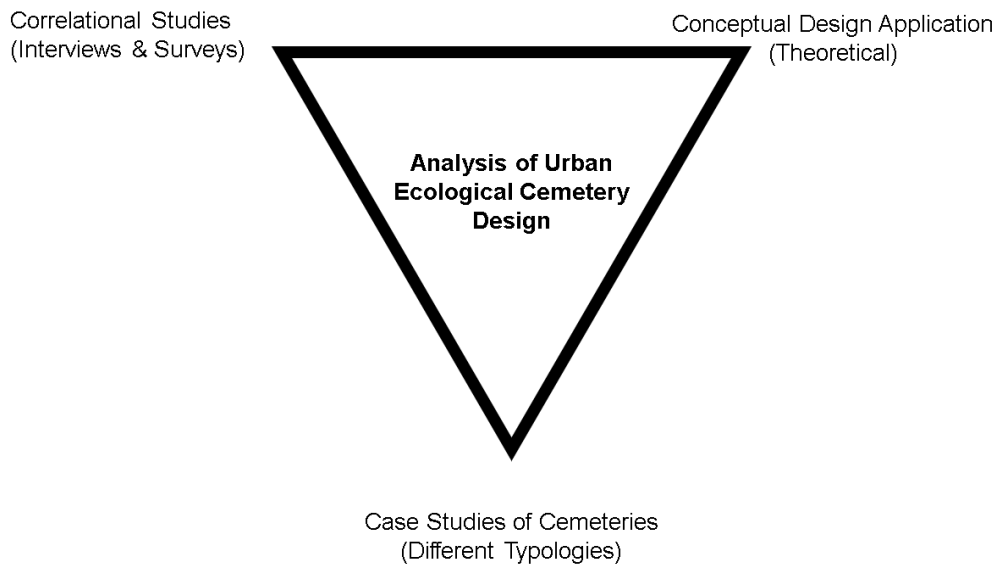


Figure 3.1 Data Trifold Generated by Joern Ryan Vallesteros

The three research methods for this dissertation are Case studies, correlational studies and design application, each method triangulates the set of variables of the theoretical, conceptual framework.

### 3.4 Documentation Gathering

In collecting data and information, the research topic involved specific official data sets for quantitative processes. Design standards and criteria, government regulation and code information, are referenced in this thesis as supplemental to the research. The official documents for the research analysis include the following;

1. The Green Burial Council Cemetery Certification Standards (2015)
2. Hawaii Department of Health Administrative Rules Title 11 Chapter 22
3. National Cemetery Administration (NCA) Facilities Design Guide

The official documents listed above are publicly available for stakeholders involved in the field of cemetery design.

### **3.5 Case Studies**

The case studies in the research examined design elements in different cemeteries throughout Hawaii both urban and rural and were selected based on individual site criteria. Specific elements mainly present in cemeteries, particularly urban cemeteries, are identified and investigated with the relation between culture, religion, and environment. A descriptive, and exploratory approach in the form of a field survey or site analysis outlined each set of findings for the chosen case study cemeteries, each drawing comparison between one another. No human subjects shall be involved in this research method as this approach is identifying design elements, processes, and characteristics of the case study cemeteries. However, specific issues associated with this approach include sensitivity and ethical consideration to the sacredness of the cemetery site, and privacy and protection of the interred.

### **3.6 Interview's and Survey's**

A series of both interviews and surveys were conducted with participants both identified and anonymous. The surveys conducted remain anonymous in name and unidentifiable by the responses recorded via an electronic survey. "So-Go Survey" is the host website for the creation of the survey's in this thesis and was used via shared web link to distribute a survey for dissemination. Seven questions in the survey range from rating selections to single choice selection. The distribution period occurred in two-three months at the end of 2017 and beginning of 2018. The responses gathered helped to draw a correlation between religion and ecology; more specifically the connection

between different age groups who are affiliated with a religion and the type of burial preference chosen. The validity of the data may be threatened by both internal and external factors such as redundancy in the survey process and or user error. The distribution was random and distributed in the town of Honolulu, and via social media apps such as Facebook, thus other external factors may affect the locality of responses. A copy of the original survey can be referenced in Appendix C for further research analysis.

The interviews conducted were of consent with the participants fully aware of the dissertation topic and research goals. Participants responses were recorded by handwritten document and then transcript on to text format verbatim. The issues involved with conducting survey dealt with discussing a timely meeting with the participant's convenience. Before the interviews, a set of guiding questionnaires allowed for open-ended responses whereas the surveys were more narrow and specific via multiple choice responses and number rankings.

### **3.7 Design Application**

The design application is a conceptual design based on the performed research and investigates through architectural design strategies and studies to rationalize the data. Using the site analysis, field research, spatial studies and official documents the design of an urban ecological vertical cemetery manifests into phase designs, trajected for future growth along with other design principles developed from the research. The Site analysis targeted the Nu'uaniu watershed from the Pali on the Ko'olau mountain

rage to estuary waters for Honolulu harbor and was performed over eight weeks on separate occasions.

### **3.8 Research Limitations/Delimitations**

Due to traveling constraints such as time and funding, the case study cemeteries not located in Oahu were not personally observed, instead information was collected through the web such as google maps and official website of the cemetery. Site analysis and field research was performed on the case study cemeteries located on the island of Oahu on four separate occasions during the winter months. There were minor accessibility issues with the roman catholic cemetery on king street due to the site being private and secured with high fences. However, I was able to manage and access entrance for the field research performed.

Another limitation was the research access in obtaining landscape management plans for cemeteries, along with logistic manuals for cemeteries due to privacy of record. These types of data would prove beneficial to studying certain operational aspects of the case study cemeteries both from a historical and current point of view. The only available detail information related to logistics of cemeteries in Hawaii was the EIS draft of the Hawaii Memorial Park Cemetery, although the data recorded was nearly a decade ago in 2008, the trajectory and changes within the past ten years serving as significant information in the comparative analysis of the variables.

The delimitations in this paper involve thanatology, theology and in-depth of religious belief systems. Due to the sensitivity of death, the research primarily focuses on basic knowledge of religion but does not delve into the process death through grief

and memorialization as this would tap into the realm of neurology effects of architecture. Indeed, space influences the behavior of the mind despite the state it is in, in a more morbid setting the mind in grief tends to be emotional and somewhat unstable therefore it shall be respect that there shall be no recording or those in cemeteries experiencing grief and will not be direct participants to the research study.

### **3.10 Data Sources**

In this dissertation, both secondary and primary sources was collected for data. In the field research or site analysis, the collection of data included primary data through observational studies and secondary sources from news publications, government documents and recorded information by organizations such as the community websites of the cemeteries. Secondary data allowed for the synthesis, comparative referencing checking between official sources of data, for example, the census information of Hawaii provided for the past fifty years cross-referenced with the EIS data of the HMP. Subsequently, the secondary sources contributed to forming the surveys and interviews conducted for the research of this dissertation.

### **3.11 Data Collection Analysis**

In performing the research for this dissertation, the primary data methods utilized were structured survey, questionnaires, field observation by site analyzation, personal interviews and application of conceptual design. Participants were both selected based on their role of a stakeholder and or connection as a resident in Honolulu. Distribution and dissemination of the survey was analyzed for drawing a correlation between variables of the conceptual framework. When conducting site analysis, the observations

occur or a period to better understand changes and different times of day, week and or year compared with historical and trajectory data.

Survey participants were anonymous and asked to respond to the survey given the options per questions. Several questions on the survey included options to respond with “not applicable” and “do not know” while still being valuable to the analysis of the data. For example, the question regarding preference of burial, if responded with “N/A” or “do not know” is interpreted in contrast and comparison with their corresponding responses to the other questions in the questionnaire. A consensus could be made from the data of the participant's responses but more detailed are the interviews by immediate stakeholders in the dissertation topic.

The interviews conducted were observed by the consent of the interviewee and permission to record and disseminate their responses. The goal of quotes for verbatim is essential to preserving the authenticity of the participant's responses. Bishop Larry Silva's responses were transcribed in a word document format and were carefully analyzed for cross comparison with relative data. The data collected from the survey's and case studies were crucial to understanding the point of view of the interviewee along with agreements and contradictions of critical concepts and variables.

The three case study cemeteries in chapter seven, observations based on a pre-organized set of design criteria were thoroughly examined throughout different site visits. In doing so, the data collected from the case study cemeteries identified similarities and differences from the type of case study approaches utilized. There was constant cross-referencing between continuous data used as control points for comparison and mapped out essential issues common to urban cemeteries in Honolulu.

The case studies were examined based on five sustainable components and broken down into more detail subcategories of a design element checklist. Ultimately, the data from the case studies became fuel for generating a design criteria narrative as conceptualized in the data application portion of this research.

On this basis, the methods used were ideal to the findings of the research. The case studies are organized based on key sustainable principles that thoroughly itemizes the design components of the cemetery. The correlational studies, surveys, and interview are illustrated both consistencies and inconsistencies with literature review relevant for the support of the thesis and research goals.



## **CHAPTER 4: Past, Present and Future**

### **4.1 Introduction**

The City Honolulu today is rich in cultural and, religious and environmental diversity and has been changing since the early 1900's. From the early days of plantation fields and settlements to the now increasing development of high rise condominiums, the pressures of space are growing. Urban cemeteries, once rural when established, reflect these changes in the city serving as informative time capsules of culture, religion, politics, economics, and environment. Honolulu's cemeteries identify old existing ties to the natural elements of the Ahupua'a reflecting land stewardship and management. Cultural diversity has managed to integrate different landscape tenures from different cultures such as the Japanese, Chinese and Filipino's plantation workers. While religious diversity has also contributed to the diversity of people and showcases, Hawaii's multi-ethnic and lack of cultural conflict, part of this comes from adaptation and reinterpretation. It is the fusion of cultures through practices, food and in the biological makeup of some people themselves that lessen cultural conflict as can also be represented in the cemeteries of the city. However, the economy of Hawaii has a reputation of being weak, contributing to segregation of social classes and this is also reflected in the cemeteries of Honolulu and the corruption of local funerary businesses. Different government departments in the City and County of Honolulu lack of connection to designing sustainable cemeteries and fail to see the opportunity in the ecological benefits of urban cemeteries for the future of Honolulu. Cemeteries are both artifacts and relics of the place they are established in and tells a story timeline rich in history,

despite some cemeteries in Honolulu being forgotten there is still opportunity to maintain their sacredness and preserve their history.

#### **4.1.2 History of the Cemetery**

The word cemetery is from the Greek for “sleeping place” (Walter, 1993), a place for burying those who northern Oujda, Morrocco dating back nearly fifteen thousand years. Similarly, ancient Hawaiians used caves as a part of their cultural ritual in burying the dead but at the time was not called a cemetery the way Taforalt is categorized.<sup>7</sup> It raises a poetic architectural question on what defines a cemetery, a discussion that will be later brought up in chapter five of this thesis. Despite not being a typical cemetery, we know today, these cave burials are not directly affected by the products of urbanity due to the region-specific location outside of the cities.

Before 1831, cemeteries did not exist in America until the establishment of Mount Auburn Cemetery located in Cambridge, Massachusetts.<sup>8</sup> The construction of the Mount Auburn Cemetery initiated a trend in building cemeteries across America, as the trend grew over time the cemeteries became a landmark in time describing the cultural, religious, economic and political climate of that time. However, the trend in cemetery issues today also originated from its church burial grounds predecessor; “they were inadequate, dangerous, crowded, expensive to maintain and possibly carriers of disease.”<sup>9</sup> These were internal issues described by Keith Eggener, an associate professor of art and architecture at the University of Missouri. However, these internal

---

<sup>7</sup> Jodee Redomnd [https://dying.lovetoknow.com/Hawaii\\_Burial\\_Methods](https://dying.lovetoknow.com/Hawaii_Burial_Methods)

<sup>8</sup> Greenfield, Rebecca. Our First Public Parks: The Forgotten History of Cemeteries. The Atlantic, March 16, 2011.

<sup>9</sup> Greenfield, Rebecca. Our First Public Parks: The Forgotten History of Cemeteries. The Atlantic, March 16, 2011.

issues exist still today even with modern cemeteries both urban and rural. Eggener also describes in detail and design that cemeteries were shaped by pop culture with starker imagery of cemeteries and how the living places a strong emphasis on taboo with the dead, for example, Zombie movies depicting chaos in cities and neighborhoods.<sup>10</sup> America has also standardized the practice of embalming and reflects the specific religious burial rituals that influenced these practices.

Christian burials were typically ground burials with the process of cremation due to the belief that it was a conflict with resurrecting the body. Thus, the practice of embalming began to help keep a preserved look for the deceased where patrons can view during numerous ritual types such as the wake, ceremony by the graveside. Conveyance of the body to the church, ablution, and ceremony in the church. During early Christianity near the seventh century, the Church was powered by the European burial and graves were only allowed on consecrated church grounds. Although embalming practices are still performed, many religions who objected cremation now accept it, such as Protestants and Catholics. However, traditional ground burials, regardless of religion, are still practiced in high volume in the U.S. with additional concerns other than chemicals such as materials like wood, steel and upholstery appeared unsustainable compared to modern green burials. For example, the materials

---

<sup>10</sup> Greenfield, Rebecca. Our First Public Parks: The Forgotten History of Cemeteries. The Atlantic, March 16, 2011.

used each year in the United States for burying more than 2.5 million persons in 22,500 cemeteries are given below.<sup>11</sup>

- i. 30 million board feet (70,000 m<sup>3</sup>) of hardwood caskets.
- ii. 90,272-ton vaults (for caskets).
- iii. 14,000-ton vaults (for graves).
- iv. 2,700 ton copper and bronze (for caskets).
- v. 1,636,000 concrete (for graves).
- vi. 872,060 gallon (1 gallon = 3.78 lt.) of embalming fluid, which most commonly includes formaldehyde is using.

These alarming numbers have triggered a new trend in green burials aiming to offset and diminish the unsustainable aspects of traditional ground burials. Green burials are fundamentally not a new practice but rather an old one if you will. Natural burials, biodegradable urns, and other ecologically friendly funerary products stem from the broader movement for sustainability. However, there are some conflicting agendas between religion, culture, and society where sustainability may not be an overlapping goal, therefore ideating different concepts of being connected and or disconnected with nature.

Ultimately cemeteries developed a stigma and were desired to be removed from the city if it were not already in the city.<sup>12</sup> It is ironic that even though you locate a cemetery outside the city, it may inevitably be swallowed up by outward urban expansion.

## **4.2 Honolulu the City and Growth.**

---

<sup>11</sup> Uslu, Aysel; Emin Baris and Elmas Erdogan. *Ecological Concerns Over Cemeteries*. Ankara University of Agricultural Faculty Department of Landscape Architecture, Diskapi Ankara, Turkey.

<sup>12</sup> Greenfield, Rebecca. Our First Public Parks: The Forgotten History of Cemeteries. *The Atlantic*, March 16, 2011.

Urban cemeteries today were once rural cemeteries having been selected a site where local objects do not disturb the sacredness of the space and do not block surrounding views of nature.

### **4.3 Culture and Religion in Hawaii (adaptation and reinterpretation)**

“Space is organized not physically but culturally; cultural understandings provide a frame for encountering space as meaningful and coherent. Because technology causes people to re-encounter space, it is important to understand and to respond to users’ needs for a sense of place.”<sup>13</sup>

Cemetery landscapes mirror the past life and historical eras through which the community has passed. Attention must also be paid to transition rights, which reveal how death influences the relations between privilege, power, and prestige among the minister, the doctor and the undertaker. As family members withdraw their customary attention to the dying and dead. (Doris Francis)

The isolation of the cemetery, restructured families, as well the rise of cremation and continuing alienation from death (both furthered by rising prices and strict management policies that discouraged the involvement of mourners) dictated that the grave have less cultural importance than a century ago (Doris)

---

<sup>13</sup> Dow, Steven; Susan Wyche. *Designing for Place in Urban Cemeteries*. Published by Georgia Institute of Technology 2008

Both Sloane and Warner revealed that funerary landscapes do not merely reflect and express the cultural continuities and transformation of their communities, they also help to write that history.<sup>14</sup>

Hawaii is recognized for its diversity in people, a fusion of culture, ethnicity, and religion creates a multifaceted community. Therefore, cultural and religious customs begin to blend in harmony rather than contradiction. Since most third-generation people of Honolulu are mixed ethnicity the fusion of culture is more prevalent than in the past. Cultures and religions all practice rituals and beliefs that may have similar purposes but performed differently.

Although cultural fusion is more prevalent than the mixture of religions, there are instances observed where different religious our indigenous religious practices occur in a single ceremony in Hawaii. A case where oriental practices with Hawaiian practices is said to be natural and not challenged by people in Hawaii. During an opening ceremony of a new building, a Chinese Christian Merchant will follow Chinese tradition practice by sounding gongs and setting off firecrackers, but the Chinese merchant will also have a Hawaiian ritual with salt water, and maile leaves to celebrate. (Wise, John H.)

Almost analogous, these rituals performed symbolizes the beginning of an entity as if it is celebrating the birth of something, but in the case of the ending of a living entity, the combinations of rituals seem also fitting. The idea of mixing religions or religious practices may seem taboo as religions are puritanically practiced. However, in Hawaii due to the mixing of ethnicities and culture, the mixing of similar ritual types has become a

---

<sup>14</sup> Doris, Francis. *Cemeteries as Cultural Landscapes*. Museum of International Folk Art, Santa Fe, New Mexico, USA. Mortality, Vol. 8, No.2, 2003

norm in Hawaii. Again, this fusion of ethnicities and cultures serves as a framework for designing a multi-cultural cemetery

#### **4.4 Funerary Businesses, Consumerism Trends**

When breaking down the costs of arranging a funeral there are different services reflecting necessity based on regulation, and preference influenced by religious and cultural rituals. Numerous entities make up the funeral business providing services specific to their business type. For example, there are agents such as Hawaii Plots like real estate agencies, who buy and sell plot spaces in cemeteries of Hawaii, whereas Affordable Caskets company offer to sell just caskets. However, there are also services sold in packages from Mortuaries across the state of Hawaii that will take care of multiple services that include the plot space, casket, death certificates, obituaries, notices and other funeral items. The cost data obtained for the research of this dissertation is examined and compared to show substantial current figures although the historical data on costs could not be acquired, inflation is speculated. The economic aspects of funerals illustrate different economic, social classes, and in Hawaii, the cost of dying is based on different types of burials.

In a 2017 blog from a funeral home comparison website called “Parting,” the average cost for a traditional funeral is stated to range from \$7,000 to \$10,000. (source) In the blog a breakdown sheet of services itemized are costs that are compared and averaged between numerous funeral service providers, table 4.2 lists the cost of these services.

<u>Average costs of services for traditional funerals</u>	
Service	Cost
<b><i>Fee for the funeral director's services</i></b>	\$1,500
<b><i>Cost for a Casket</i></b>	\$2,300
<b><i>Embalming and body preparation</i></b>	\$600
<b><i>Funeral ceremony and viewing</i></b>	\$1,000
<b><i>Grave Space</i></b>	\$1,000
<b><i>Cost to dig the grave (open/closing fee)</i></b>	\$1,000
<b><i>Grave Marker or Headstone</i></b>	\$1,000 to \$2,000
	<b>Total \$9,400</b>

Table 4.2 Average Cost of Funeral Breakdown of services (source, Parting website)

The funeral home comparison website had classified three critical components of their analysis of the average cost of a funeral; The funeral home, Cemetery and Grave marker. Although these prices represent average figures, the practice of pre-planning is somewhat not accounted for or emphasized from a business standpoint to that of life insurance.

More region-specific, an article published in October of 2016 titled "The Cost of Dying" by Hawaii Business Author Marina Riker discusses the economics, finance, and lifestyle of funerals and death care in Hawaii. Riker specifies on both the low and high ends of the cost spectrum of average figures of funeral services provided in Honolulu, Hawaii that ironically reflect the nature of the expensive cost of living in Hawaii compared to elsewhere in America. The comparative costs of cremation are also significantly noted as Hawaii's is also ranked highest in America with the number of cremations performed. These figures and numbers are what the funeral industries are



burying their priorities in and trying to profit off tangible goods and services. Author Riker itemizes different funerary goods and services in Hawai`i that illustrates a spectrum of low and high costs from different cemeteries and funeral sites. Also, these numbers help to draw a comparison with the averages costs to that of the U.S. mainland. Cremation starts off at 745 dollars with a non-profit organization and costs up to 3,000 dollars with recognized facilities such as the Borthwick Mortuary in downtown Honolulu.<sup>15</sup> Additional good and services offered in Hawaii include the transportation of body starting at 745 dollars, the hearse of limousine costing around 700 dollars, memorial books for 225 dollars, stationaries for 195 dollars and caskets ranging from 1,900 dollars to 6,000 dollars, these prices reflect current costs and is influenced on a location to location basis in Hawai`i.

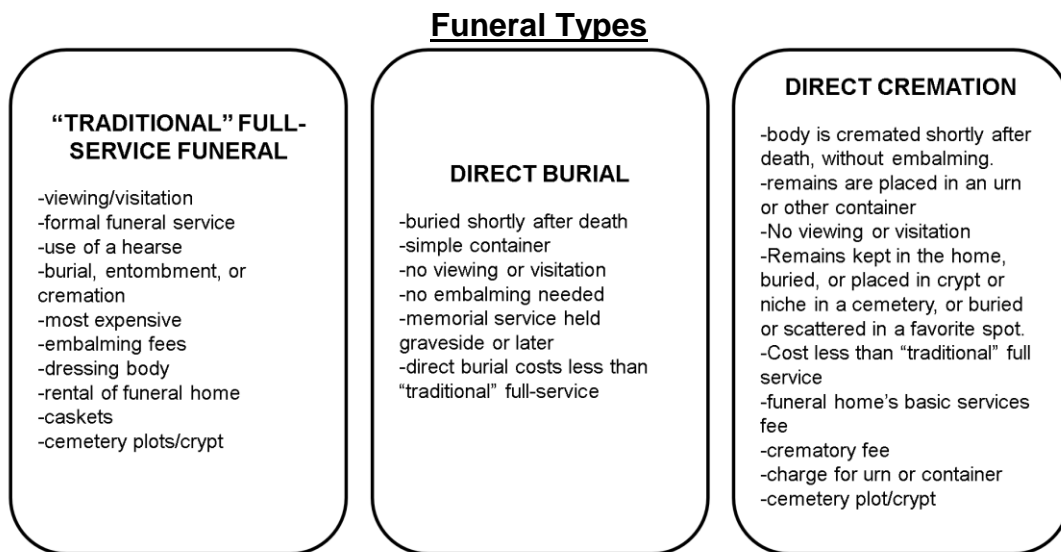


Figure 4.1 Types of Funerals Diagram generated from FTC "Types of Funerals."<sup>16</sup>

There are so few of funerary goods and services providers in Hawai`i who are environmentally conscious and have expressed efforts of going green by selling

<sup>15</sup> Riker, Marina. *The Cost of Dying*. Hawaii Business, October 31,2016

<sup>16</sup> Federal Trade Commission "Types of Funerals" '<https://www.consumer.ftc.gov/articles/0302-types-funerals>' Electronic Source Accessed via web March 31<sup>st</sup> 2018

biodegradable caskets and urns for a more natural burial. Bodhi Be, one of the associates from the Maui Death Store, recognizes his goal towards establishing an environmentally friendly burial park which he says includes gardens, trails, and picnic areas joined with the cemetery. The biophilia aspect of it all is expressed by Be's ideation of how healing nature can be from the involvement of the family during funeral events, for example, families themselves digging graves and performing the lowering of the body and coverage. Be's aspirations of this green cemetery is expressed from his acknowledgment of general trends in environmental health.<sup>17</sup> From this author, Riker acknowledges and writes about the "Death Store" on the island of Maui changing the "business of dying' from a transactional service to a "Sacred service."<sup>18</sup>

Although there is only one certified hybrid green burial cemetery located on the island of Maui, the funerary businesses who are selling biodegradable caskets and urns on Oahu provide their customers with significant information regarding regulations on both a local and national level regarding rights, standards and background information on funerary goods and services. Such information illustrates the promotion of awareness of the relationships between funerary businesses, policymakers in government and non-profit organizations so that there is universal knowledge readily available to the public.

---

<sup>17</sup> Riker, Marina. *The Cost of Dying*. Hawaii Business, October 31,2016

<sup>18</sup> Riker, Marina. *The Cost of Dying*. Hawaii Business, October 31,2016

## 4.5 Policies/Regulations

Numerous stakeholders are involved in death care help in regulating rights to funerary goods and services, maintain public health hazard concerns regarding burial operations and outline initiatives for more environmental methods. Both the federal and local levels of governing organizations dealing with death care branches control from a top-down system. The Federal Trade Commission (FTC), specifies a list of entitled rights about funerary goods and services. For example, family survivors of the deceased are entitled to purchase a casket elsewhere from the funeral provider. Another right under the funeral rule stated in table 4.3 states that funeral arrangements can be made without embalming and that no state law requires the regular practice of embalming for every death.<sup>19</sup> Several of the rights under the FTC funeral rule indicate specific procedures that are not mandated by state or local law but specifies which party will have control over such procedures. Although the terms “No state law requires” are stated in the FTC funeral rule there are cases of inconsistencies that provide loopholes for other stakeholders in the industry of death care.

The International Cemetery, Cremation and Funeral Association (ICCFA) and the Order of the Golden Rule (OGR) are both international associations working to provide education, networking and legislative guidance in death care and awareness of ethical business and service standards. The ICCFA and OGR help to build bridge gaps between funerary professionals and their client communities dealing with death care. The Funeral Ethics Organization (FEO) is a non-profit corporation like the OGR, serving

---

<sup>19</sup> Federal Trade Commission “Types of Funerals” <https://www.consumer.ftc.gov/articles/0302-types-funerals>’ Electronic Source Accessed via web March 31<sup>st</sup> 2018

the public by promoting ethical dealings in death care as a significant resource. (source)

On a national level, The National Funeral Directors Association (NFDA), The National Funeral Directors and Morticians Association, (NFD&MA) and Funeral Consumers Alliance (FCA) also strive to maintain an ethical code of conduct in the funeral industry by collecting data, monitoring and observing trends taking place. Each of these entities shares a common goal in proliferating ethical practices for stakeholders in the funerary industry. However, there are always traces of unethical activity occurring in the dark within the industry.

One of the local stakeholders in Hawai`i is the Department of Health (DOH) and created the Title 11 Chapter 22 administrative rules to regulate burials and protection of public health. In compliance with the FTC, the DOH does not specify the funerary products such as burial vaults or liners needed. Also, embalming fluid is said to be required in Title 11 chapter 22. However the FTC says that no state is required by law to practice embalming mandatorily, it is an optional service.

Another stakeholder on the local level is the O`ahu Island Burial Council; this group is a section from the State Historic Preservation Division SHPD in Honolulu. The purpose of the OIBC is to manage the inadvertent uncovering of human remains such as bones. This is in the event of elder unmark burials of Hawaiian ancestors, however, in the even of the uncovering of remains, there are two remedy options. One is to let the bones be or move to another place free from future obstruction. In the event that the remains are moved, there are options to either rebury either in a cemetery or an unmarked grave. Unmark graves are traditional Hawaiian burial's, but the problem is a

burial treatment plan must be thoroughly developed and processed so that the remains do not unearth again.

Public health is one of the responsibilities of architects and is crucial to designing. The Hawaii Department of Health enforces the priority of public health by explicitly noting the penalty and fines for any violation. Ultimately, jurisdiction and control over logistics of burials appear to be inconsistent.

**The Federal Trade Commission Funeral Rule:  
Your Rights Under The Funeral Rule:**

<u>Rule</u>	<u>Description</u>
Buy only the funeral arrangements you want	You have the right to buy separate goods (such as caskets) and services (such as embalming or memorial service). You do not have to accept a package that may include items you do not want.
Get price information on the telephone.	Funeral directors must give you price information on the telephone if you ask for it. You don't have to give them your name, address, or telephone number first. Although they are not required to do so, many funeral homes mail their price lists, and some post them online.
Get a written, itemized price list when you visit a funeral home.	The funeral home must give you a General Price List (GPL) that is yours to keep. It lists all the items and services the home offers and the cost of each one.
See a written casket price list before you see the actual caskets.	Sometimes, detailed casket price information is included on the funeral home's GPL. More often, though, it's provided on a separate casket price list. Get the price information before you see the caskets so that you can ask about lower-priced products that may not be on display.
Receive a written statement after you decide what you want and before you pay.	It should show exactly what you are buying and the cost of each item. The funeral home must give you a statement listing every good and service you have selected, the price of each, and the total cost immediately after you make the arrangements.
Get an explanation in the written statement from the funeral home that describes any legal cemetery or crematory requirement	-that requires you to buy any funeral goods or services.
Use an "alternative container" instead of a casket for cremation.	No state or local law requires the use of a casket for cremation. A funeral home that offers cremations must tell you that alternative containers are available and must make them available. They might be made of unfinished wood, pressed wood, fiberboard, or cardboard.
Provide the funeral home with a casket or urn you buy elsewhere.	The funeral provider cannot refuse to handle a casket or urn you bought online, at a local casket store, or somewhere else — or charge you a fee to do it. The funeral home cannot require you to be there when the casket or urn is delivered to them.
Make funeral arrangements without embalming.	No state law requires routine embalming for every death. Some states require embalming or refrigeration if the body is not buried or cremated within a particular time; some states do not require it at all. In most cases, refrigeration is an acceptable alternative. Also, you may choose services like direct cremation and immediate burial, which don't require any form of preservation. Many funeral homes have a policy requiring embalming if the body is to be publicly viewed, but this is not required by law in most states. Ask if the funeral home offers private family viewing without embalming. If some form of preservation is a practical necessity, ask the funeral home if refrigeration is available.

**Table 4.3** The FTC Funeral Rule generated from a list of rights under the Funeral Rule

# **CHAPTER 5: Cemetery Design and Typology**

## **5.1 Cemetery Design**

Cemetery design has evolved due to shifts in political, social and economic pressures, while still revering the sacredness of the place. Such designs reflect various agendas and guidelines created by landscape designers, public health sectors, funerary companies and religious groups. Within these agenda's and guidelines are descriptions of design criteria defining typologies of repositories for the dead, programmatic distribution of types of spaces, logistics of burials, and more contemporary initiatives for future sustainable and ecological goals. However, the hierarchy of the design recommendations, guidelines and agendas are individually paramount but could integrate specific vital points for improving the quality of cemetery design.

### **5.1 Landscape Typologies/Context (rural and urban)**

The term landscape is often depicted with lush green vegetation, open space and sunlit views of vast surrounding natural elements creating a sense of tranquility. Cemeteries are typically located in these types of environments to capture such tranquil atmosphere as the final resting place for the dead. Urban cemeteries, unlike rural cemeteries, faced surrounding pressures by urban sprawl such as the growth of infrastructure, population and shifting birth to death ratios. Even though both the typical urban and rural cemetery are established on a single surface plane, it is the urban cemetery that is directly prone to issues of land shortage because of limited land capacity.

## 5.2 Typology of Cemeteries, mournful spaces

Cemeteries are often categorized as mournful spaces amongst other similar type spaces such as Burial grounds, graveyards, and memorial parks, and columbarium's; each with distinctive similar and differing characteristics. Majority of these types are considered open spaces except for the columbarium which is typically an enclosed area located above ground. Burial grounds are characterized as archaic and primitive, while cemeteries are consecrated with stone monuments, and memorial parks are lush green spaces with flat tomb markers.<sup>20</sup> In the case of ancient Hawaiian's, burial grounds take place in different settings such as caves, and below ground, however most burial grounds are not marked leading to issues of inadvertent unearthing during building construction. While these spaces fall under the typology of mournful spaces, cemeteries also come in different types as they reflect different cultural and religious backgrounds.

---

<sup>20</sup> Higgins, Jessica Faith. "Deathscapes: Designing Contemporary Landscapes to Solve Modern Issues in Cemeteries. Published by Texas Tech University, 2010. Page 5



## TYPOLOGY STUDY OF CEMETERIES

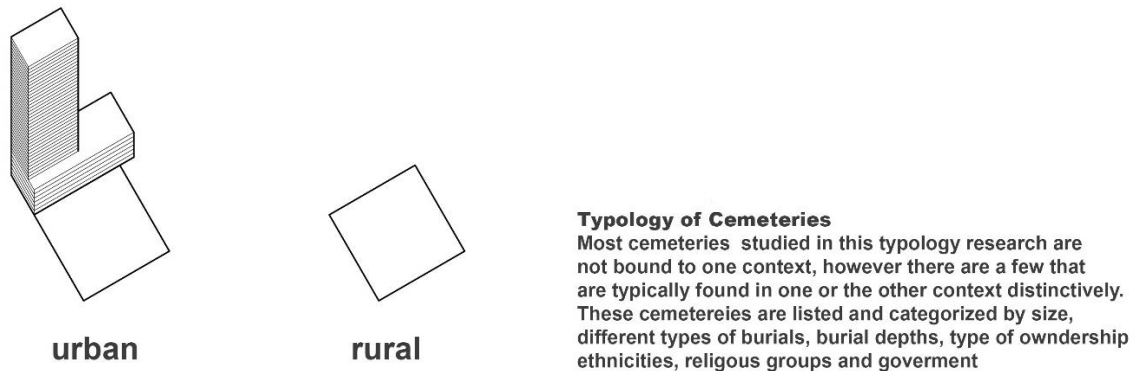


Figure 5.1 Typology Context, Urban and Rural cemeteries. Image generated by Joern Ryan Vallesteros

### 5.3 Cemetery Typology

Cemeteries range from different types as they are repositories that reflect different social, cultural and religious traits. Based on the typology context of cemeteries mentioned in the earlier paragraph, certain types of cemeteries can be both occupied in rural and urban environments but not necessarily thrive or function similarly than one another. For example, the Roman Catholic Cemetery on King Street in Honolulu is a private cemetery that has had instances of being an eyesore for not having been maintained and overcrowded due to the pressures of development. The overcrowding is a design flaw that did not encompass the prediction of future growth in Honolulu. Even though the typology of cemeteries is classified distinctly on internal characteristics, the context in which these cemeteries are significantly established influence how these cemeteries prosper or become forgotten relics.

The approximated thirty cemeteries on the island of Oahu range from at least nine cemetery typologies as shown in figure 5.3. There are monumental, lawn park,

columbarium's, churchyard, public, private, veteran's, pet and memorial park cemeteries throughout the island of O`ahu. Majority of them are public cemeteries specific to the communities they are in. Also, the majority of them are in mid to high-density areas. These cemeteries also range in different sizes depending on the location and parcel size allocation by the city tax map keys, influencing the capacity of interred or inurned. However, one typology not noted because of few examples are vertical cemeteries which are ultimately the design response in this dissertation to cemetery capacity. A few vertical cemeteries already exist such as the Memorial Necrópole Ecumenica III in Santos, Brazil (see figure 5.2) which is the tallest sky cemetery in the world.<sup>21</sup> Multi-storey Pagoda's are also seen throughout Asia like the high-rise cemetery columbarium in Tainan, Taiwan. Unlike the urban cemeteries noted in the research, these vertical cemeteries in Brazil and Taiwan differ in that they are in a more rural context.



Figure 5.2 Memorial Necrópole Ecumenica III in Santos, Brazil<sup>22</sup>

---

<sup>21</sup> Speed, Barbara. "High-Rise Cemeteries Are Now a Thing" <https://www.citymetric.com/skylines/high-rise-cemeteries-are-now-thing-371> Published my City Metric October 9<sup>th</sup>, 2014. Electronic source accessed March 03<sup>rd</sup> 2018.

<sup>22</sup> Speed, Barbara. "High-Rise Cemeteries Are Now a Thing" <https://www.citymetric.com/skylines/high-rise-cemeteries-are-now-thing-371> Published my City Metric October 9<sup>th</sup>, 2014. Electronic source accessed March 03<sup>rd</sup> 2018.

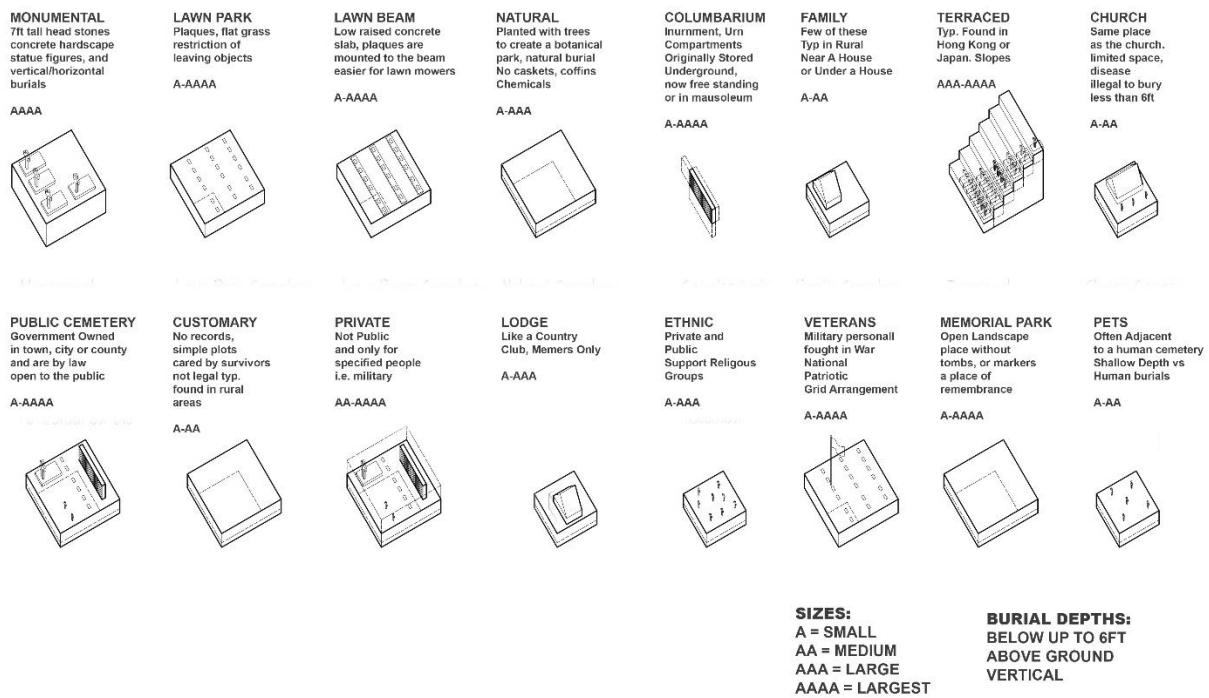


Figure 5.3 Typology of Cemeteries. Image generated from “15 Types of Cemeteries.”<sup>23</sup>

## 5.5. Design Guidelines

Cemetery designs are also influenced by different legislative and non-legislative bodies of people such as the Green Burial Council, the United States Green Building Council’s Sustainable SITES initiative, and both local and federal government. In Hawaii, Codes, and regulations from the local Land Use Ordinance Sector, Department of Health, Department of Land and Natural resources specify boundaries of land space, constraints of land use, and logistics criteria for the protection of the public’s health. Also, these legislative bodies delegate specific control to cemetery operations such as soil depth of burial and funerary logistics. On the other hand, the GBC and USGBC outline standards based on sustainable strategies in a rating system for designers to

<sup>23</sup> M-Gillies. “The 15 Types of Cemeteries” Mysendoff. <https://mysendoff.com/2012/05/the-15-types-of-cemeteries/> May 2012. Electronic Source accessed March 3<sup>rd</sup>, 2018.

achieve in landscape ecology. GBC and USGBC mainly provide these strategies for building and landscapes that can be applied to at most any building or landscape type. So forth, these regulations and design standards can be integrated to help achieve long-term outcomes to environmental initiatives in cemeteries both locally and globally.

In chapter twenty-two of the title eleven administrative rules from the Department of Health in Hawaii, a cemetery is defined as – “a place dedicated to and used or intended to be used for the permanent interment of human remains. It may be either a burial park, for earth interment; a mausoleum; for vault or crypt interment; a structure or place used or intended to be used for the interment of cremated remains; or any combination of one or more thereof.”<sup>24</sup> It is explicitly noted that permanency is a consistent characteristic in cemeteries, which is a factor in the capacity of land space and can become a design flaw if not taken into consideration properly. The Hawai`i Department of health regulates cemetery authorities’ responsibilities, for example specifying their depth of the grave, which provides an opportunity to marry GBC and USGBC with the Hawaii Green Growth 2030 statewide initiatives.

The commonality of creating a sustainable environment for Hawaii is found between the green burial council, USGBC and the Hawaii Green Growth organization having overlapping strategies for designing urban ecological cemeteries. The green burial council emphasizes in detail the criteria for green cemeteries that reflect some of the interconnected sustainability goals of the HGG organization. These standards adopted by the GBC are categorized under burial practices, site planning, operations

---

<sup>24</sup> “Chapter 22 Mortuaries, Cemeteries, Embalmers, Undertakers, and Mortuary Authorities” Title 11 Administrative Rules Department of Health Hawaii. Dec 7<sup>th</sup> 1981

and management along with preservation and stewardship. Standard number fourteen on the GBC certification standards states, “Implement an invasive plant and pest control plan to employ best management practices for the control of invasive species and to discourage the use of pesticide, except as a last resort.”<sup>25</sup> Invasive species are a huge concern for Hawaii’s protection of native species as highlighted in HGG’s Natural Resource Management goal in controlling invasive species and restoring native species.<sup>26</sup> Ideally, these standards and goals mirror an ecological design approach and aim to both maintain public health in good standing alongside environmental initiatives in urban Honolulu.

SITES is another set of design guidelines and strategies, particularly for landscapes. As noted cemeteries are cultural and religious landscapes and landscapes nonetheless. Developed by USGBC, SITES also have some overlapping criteria with GBC because they are both derivatives from USGBC.

Another set of standards available for architects is from the National Cemetery Association for the design of National Cemeteries. -

In smaller detail, the caskets buried in cemeteries are also an array of diverse types, representing social, economic and political classes.

---

<sup>25</sup> Green Burial Council. “Green Burial Council Cemetery Certification Standards” Published by Green Burial Council <https://greenburialcouncil.org/> March 6<sup>th</sup>, 2015. Electronic Source accessed December 07<sup>th</sup> 2017

<sup>26</sup> “Aloha + Challenge” <http://www.hawaiiengrowth.org/aloha-challenge> Published by Hawai`i Green Growth 2016. Electronic Source accessed December 7<sup>th</sup>, 2017.

## 5.6 Casket Designs, Vaults (Burial Containers)

The boxes or chests for the containment of the non-cremated deceased remains come in different shapes, sizes, and detail in aesthetics. Coffins and caskets are examples of these boxes and chests that are commonly known today and used for traditional ground burials. Historically both the coffin and casket date back from older forms such as mummy cases and the sarcophagi. The earliest proof of coffins made from wood is dated at 5,000 B.C. years old from China while caskets also made from wood, cloth, and paper trace their roots to Egypt and Mesopotamia. Mostly, the primary function of these death containers remained consistent until today but has subtly evolved through sociocultural and religious ritual beliefs influencing form, ornamentation, artwork, and materiality.

The sarcophagi are identified as a coffin and were typically rectangular box-shaped during the time of the old kingdom. It was during the middle kingdom where the sarcophagus was carved and more form fitting to the body of the mummy, these sarcophagus types are called anthropoid coffins.<sup>27</sup> Carving the sarcophagus to fit the outline of the mummy's body came from the design of the mummy cases. These cases fit between the mummy's body and the coffin itself; Cartonnage material was used to make these mummy cases molded to the form of the mummy's body.<sup>28</sup> It is easy to identify these Egyptian coffins through their form but also directly through their art decor. Hieroglyphics covered the sarcophagus and mummy cases indicating names,

---

<sup>27</sup> "Egyptian Mummification" <http://www.spurlock.illinois.edu/exhibits/online/mummification/artifacts6.html> published by Illinois Spurlock Museum of World Cultures 2016. Electronic source accessed January 7<sup>th</sup>, 2018

<sup>28</sup> "Egyptian Mummification" <http://www.spurlock.illinois.edu/exhibits/online/mummification/artifacts6.html> published by Illinois Spurlock Museum of World Cultures 2016. Electronic source accessed January 7<sup>th</sup>, 2018

titles, and food offering. However, due to the intricacy and aesthetics of these magnificent caskets, they were either kept in secured tombs unlike most coffins and caskets buried in the ground. Similarly, the sarcophagus design is associated with numerous layers of material like today's coffins and caskets.

The primary goal of most coffins and caskets are to preserve the body inside, in the case of Egyptians they preserved the body through mummification. Helping further preserve the mummy are the essential layers to the Egyptian sarcophagi which are similar and reinterpreted into modern day caskets. In figure 5.4 the image shows an outer coffin in two pieces which is the thickest of all the layers like a burial vault or container also having homogenous materiality and texture. The next layer inwards is the inner coffin which is similarly associated with the casket or coffin which is more form fitting to the mummy inside. The innermost layer of the container is the mummy case, even more, form-fitting and decorated with gold and art showcasing the significance and identity of the mummy.<sup>29</sup> Unlike casket's, the Egyptian coffins were more sculpted to an anthropoid shape, whereas precedent coffins were designed with six sides rather than four on your typical casket.

Unlike casket's, coffins are typically designed with six sides, a hexagonal shape tapering towards the head and feet of the body also considered to be an anthropoid coffin like the sarcophagus. However, caskets and a four-sided coffin variation had either split lids are also known as a perfection cut where the deceased is viewed from

---

<sup>29</sup> "Egyptian Mummification" <http://www.spurlock.illinois.edu/exhibits/online/mummification/artifacts6.html> published by Illinois Spurlock Museum of World Cultures 2016. Electronic source accessed January 7<sup>th</sup>, 2018

the waist up or the entire body with a full couch lid.<sup>30</sup> Based on the geometry of the six-sided coffin, lids that were hinged did not seem ergonomic when opening or

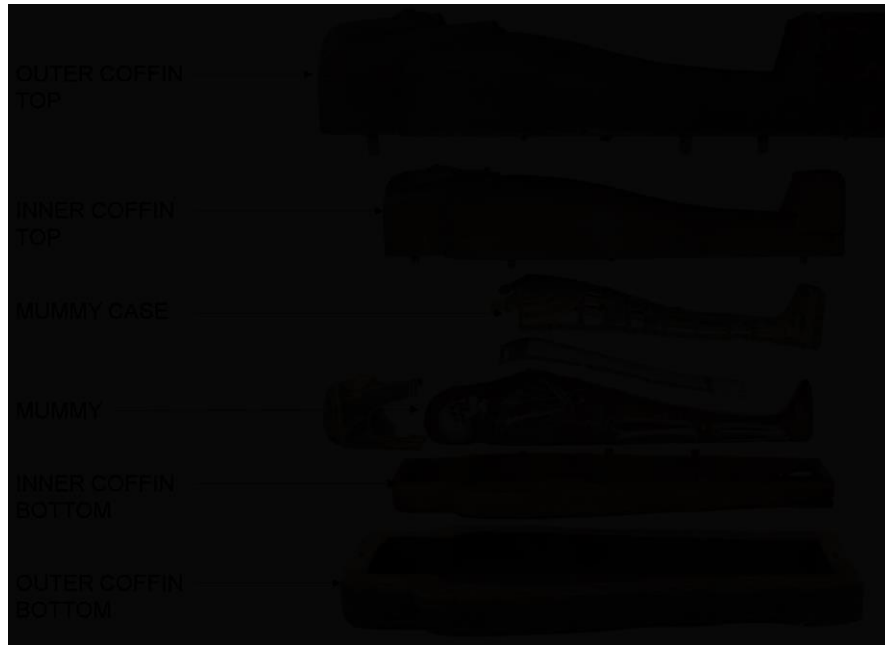


Figure 5.4 Layers of Egyptian Tomb Containers<sup>31</sup>

closing and looked aesthetically displeasing. Instead, the lid is typically a separate piece from the coffin itself and requires proper sealing before time of burial. Like the sarcophagus, the thickness of the coffin based on the number of timber frames represents a particular honor as described by the Chinese proverb books. Both the coffin and casket are ideally built from wood. However, caskets became a nineteenth-

---

<sup>30</sup> *How it's Made*. Discovery Channel. 2015. [https://www.youtube.com/watch?v=85GYWH\\_rerQ](https://www.youtube.com/watch?v=85GYWH_rerQ) Film Accessed March 2<sup>nd</sup>, 2018.

<sup>31</sup> "Egyptian Mummification" <http://www.spurlock.illinois.edu/exhibits/online/mummification/artifacts6.html> published by Illinois Spurlock Museum of World Cultures 2016. Electronic source accessed January 7<sup>th</sup>, 2018



century trend and started to be commonly used for ground burials instead of coffins and have evolved in its materiality.

Caskets were built out of flat stone in Europe during the year 700 but were also typically known as chests for jewelry rather than for the deceased.<sup>32</sup> Through evolution, the casket soon was commonly made from wood and ultimately advanced being manufactured in plastic and steel. Caskets became more diverse and gave a

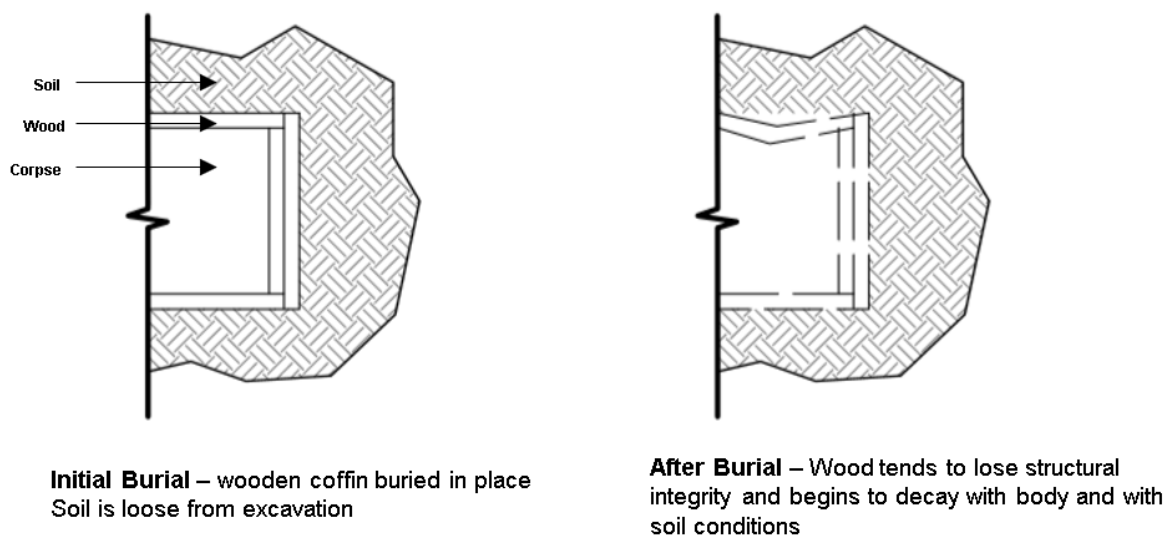


Figure 5.5 Section cut of a typical wood coffin buried in soil. Image generated by Joern Ryan Vallesteros

Similar array of selection to that of cars causing a broad spectrum in the price range.

Therefore, intricacy levels in caskets became extreme for individualization and extension of the deceased. In figure 5.6, the amount of material and design features indicate how customizable caskets can be in their upholstery, exterior material, finishes and fixtures such as handles for lifting. However, the extensive list of materials within a

---

<sup>32</sup> Weber, Austin “*The History of Caskets*” *Assembly Magazine*. Published October 2<sup>nd</sup> 2009. Electronic source Accessed Feb 26 2018

casket extends to the outer part of the casket where a burial vault or liner like the Egyptian tombs are also recommended but also not required.



Figure 5.6 Nomenclature of Casket

Upon final burial, caskets will then fit into a burial vault or a burial liner which is then sealed and lowered into the earth six feet deep. It was during the twentieth century when burial vaults started trending and becoming a standard funerary item increasing the cost of funerals. Burial vaults, burial liners or grave liners are made typically of concrete, plastic or metal and functions both as a protective enclosure to the casket and the deceased inside. They provide structure to the soil pressure above as depicted in figure 5.9, preventing ground sinking and collapsing of the coffin or casket.<sup>33</sup>

---

<sup>33</sup> Myers, Patricia (2011). *Embracing the Teardrops: A Simple, Step-By-Step Guide to Planning a Funeral That Is Dignified, Memorable, and Affordable*. Bloomington, Ind.: XLibris. Pg 74-75

The settling can occur from the weight pressure of bulldozers adjacent to a plot in the process of opening and closing and result in inadvertent accidents above and below the ground surface. Compared to traditional ground burials, natural burials do not use a casket. Therefore minimal soil settling occurs for the cemetery operators to fill in.<sup>34</sup> Soil settlement is just one of the issues concerned in-ground burials; another issue regards theft and obstruction.

Security is also a leading concern as some funerary practices involved burying sentimental objects with the deceased such as jewelry and clothing that often were stolen after burial.<sup>35</sup> While the burial vault serves multi-functional purposes such as structural support for soil pressure and safely securing the deceased, there are claims by burial vault manufactures stating that their vaults are not harmful to the environment and designed for the optimal enclosure.

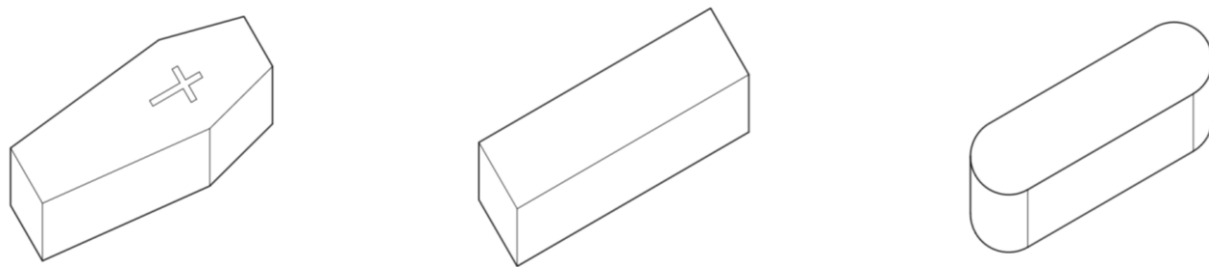


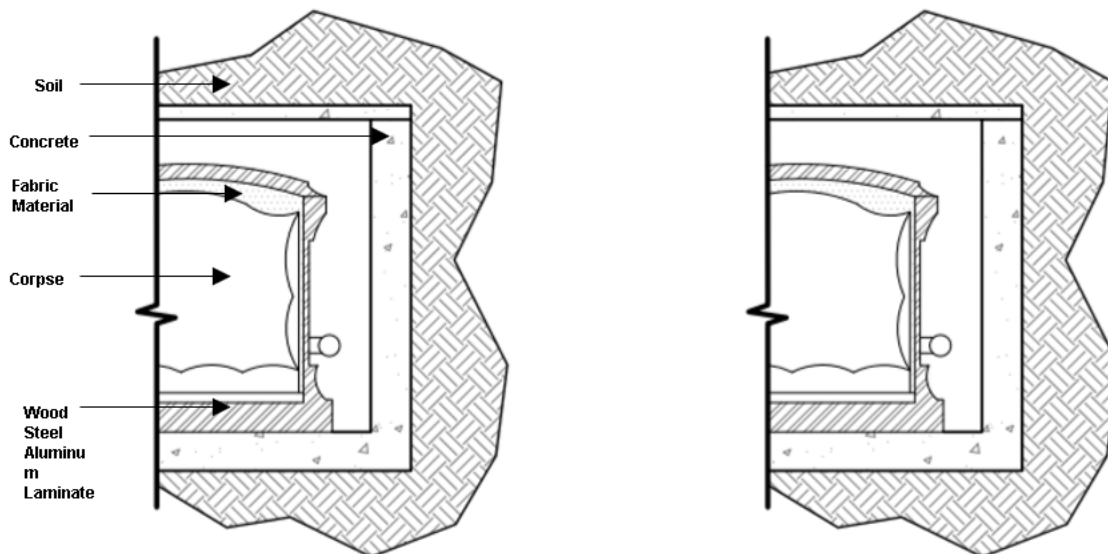
Figure 5.7 From left to right, a coffin, casket and alternative container (wicker basket) image generated by Joern Ryan Vallesteros

---

<sup>34</sup> Pitz, Marylynne (January 30, 2008). "Eternally green: Woodland burials are a natural alternative to an embalmed afterlife". Pittsburgh Post-Gazette. Retrieved September 6, 2014.

<sup>35</sup> Mariaca-Sullivan, Katherine (2011). *When a Loved One Dies*. Amherst, N.H.: Kaleidoscope Books. Pg 94

Typically, all four sides of a casket are enclosed, including both the top and bottom by the burial vault leaving no direct contact with the surrounding earth.<sup>36</sup> Other variations include burial vaults having reversed forms where the base is sealed with the lid made up of the four sides. Comparatively the burial vault is more structurally sound than the burial liner due to different forms. Burial liners do not have bases leaving the bottom of the coffin in direct contact with the earth; like burial vaults, the burial liners are also made of concrete, metal, and plastic.<sup>37</sup> Both the burial vault and burial liner act as a second protective layer for the deceased and requires careful and proper installation.



**Initial Burial** – Sealed by concrete vault, the coffin is remained preserved while the embalmed body independently decomposes over time

**After Burial** – Conditions remain the same, preserved, no interaction between corpse and nature of soil/life.

<sup>36</sup> Stevens, Hal. *How To Plan A Funeral. CemeterySpot Inc. 2008*  
 Stummer, Peter O. and Christopher Balme. *Fusion of Cultures? Rodopi 1996. Pg 50*

<sup>37</sup> Stevens, Hal. *How To Plan A Funeral. CemeterySpot Inc. 2008*  
 Stummer, Peter O. and Christopher Balme. *Fusion of Cultures? Rodopi 1996. Pg 51*

Figure 5.8 Section Cut of the casket with burial vault in the soil. Image generated by Joern Ryan Vallesteros

Vaults, if incorrectly fastened and water tight sealed, will rupture due to pressure build up from gases generated within the decomposing corpse causing the toxins from both embalming fluid and the decomposing body to leach in the adjacent soils possibly infiltrating municipal infrastructure such as water pipelines for human consumption.<sup>38</sup> Even though burial vaults have stringent protocol guidelines for correct installation and are not in fact watertight sealed, it would mean that the toxins mentioned would still leach where gas pressure is inadvertently ventilated through the gaps near the vault lid. Thus, burial vaults should not be deemed as “environmentally friendly “because they serve no ecological benefit interacting with the immediate soils. Despite the different designs of the burial vault and liner, they are not required in Hawaii as specified by the Department of Health Title Eleven administrative rules in chapter twenty-two. As mentioned in chapter four, burial vaults are also not required by state law as described in the FTC Funeral Rule.



Figure 5.9 Stress impact from 6-ton bulldozer over the burial ground.<sup>39</sup>

---

<sup>38</sup> Slocum, Josh; Carlson, Lisa (2011). *Final Rights: Reclaiming the American Way of Death*. Hinesburg, Vt.: Upper

<sup>39</sup> “Why a Burial Vault” <https://www.trigard.com/burial-vaults/why-a-burial-vault/> Published by Triguard 2018. Electronic Source Accessed January 7<sup>th</sup>, 2018.



Figure 5.10 Concrete Box vs. Lined, Sealed Burial Vault.<sup>40</sup>

The Hawaii Department of Health does not directly regulate casket and burial vault designs, instead the concern for public health and safety is emphasized on proper procedures of funerary services and logistics. In Chapter twenty-two of the Title eleven administrative rules, the Hawai'i Department of health states "If death resulted from a disease specified in section 11-22-4(a)(3) and the body is not embalmed, it shall be placed in a hermetically sealed coffin or casket and encased in an outer box."<sup>41</sup> The "outer box" stated by DOH (Department of Health, Hawaii) is not specified as either a burial vault or burial liner. Although the burial vault or burial liner is not specified as a requirement for deaths not resulted from the diseases listed in section 11-22-4(a)(3) it inadvertently is implied. "A dead human body shall be interred at a depth sufficient to prevent the creation of any public nuisance or public health hazard and to make it impossible for hogs and other animals, or surface drainage or wash, to uncover it."<sup>42</sup>

---

<sup>40</sup> "Why a Burial Vault" <https://www.trigard.com/burial-vaults/why-a-burial-vault/> Published by Triguard 2018. Electronic Source Accessed January 7<sup>th</sup>, 2018.

<sup>41</sup> *Chapter 22 Mortuaries, Cemeteries, Embalmers, Undertakers, and Mortuary Authorities*" Title 11 Administrative Rules Department of Health Hawaii. Dec 7<sup>th</sup> 1981

<sup>42</sup> *Chapter 22 Mortuaries, Cemeteries, Embalmers, Undertakers, and Mortuary Authorities*" Title 11 Administrative Rules Department of Health Hawaii. Dec 7<sup>th</sup> 1981

Despite claims by burial vault or liner manufactures stating that their products are environmentally friendly, the evidence such that they are not are publicly criticized. Both burial vaults and liners are fixed within the ground and are not biodegradable. It is said that 14,000 short tons of steel and more than 1,636,000 short tons of reinforced concrete has been consumed by burial liners and vaults.<sup>43</sup> In that inordinate amount of steel and concrete, there are burial vaults also designed for the ashes from cremation, although in a much smaller compact design.

### **5.7 Urn Designs, Traditional and Contemporary**

Unlike coffins and caskets, Urns are designed to contain the cremated ashes of the deceased with many different repository settings to be safely kept. Urns come in different architectural forms and material influenced by different cultures for example old Egyptian urns are decorated in artwork and hieroglyphs. Traditionally, most urns are made of metal and consists of the vase and lid for protection. However the concept or idea of urns have been reinterpreted with different materiality other than metal. Like green burials, there are biodegradable urns along with other types of sustainable urns to transition cremated ashes back into nature. These contemporary urns are currently trending and have parallel sustainability community efforts worldwide.

Urn date back to 7,000 B.C., first used by the Chinese and represents the memory of a gone loved one. There are implications of Urns being ecological compared to traditional burials because of the difference in plot sizes, however, traditional urns are like traditional ground burials in the sense that the artifact is kept idle no matter where it

---

<sup>43</sup> Pitz, Marylynne (January 30, 2008). "Eternally green: Woodland burials are a natural alternative to an embalmed afterlife". Pittsburgh Post-Gazette. Retrieved September 6, 2014.

is kept; urn grave, columbarium niches, or in homes. These urns become an extension of the deceased and become a token of memory for the survivors. These urns become very decorative artifacts with personal meaning with the purpose of securing the ashes for many generations in the family of the deceased.

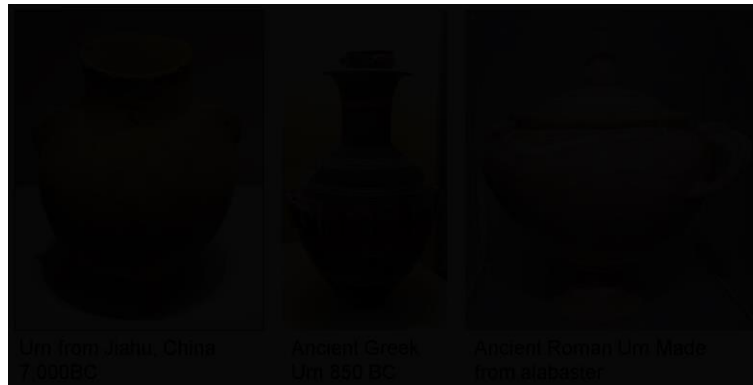


Figure 5.11 Relic Urns from China and Rome<sup>44</sup>

Numerous civilizations have used and designed their funerary urns significant to their cultures. China is where several of the earliest funerary urns have been discovered as early as 7,000 BC; in Jiahu, Laoguantai Shaanxi and Yangshao, these Urns came in different shapes and sizes from the Chinese culture, but most knowingly, the urns were mainly used to keep cremated ashes remains of children. <sup>45</sup>

It appears that urns are more diverse than caskets and burial vaults put together and has more architectural variety in its form. This characteristic of urns displays the essence of evolution over time, both the cultural and religious adaptation or reinterpretation is exhibited in these relic urns. Like tombstone these urns encode time.

---

<sup>44</sup> "Urn" <https://en.wikipedia.org/wiki/Urn> Electronic Source Accessed Dec 07 2017

<sup>45</sup> Wang, Xiao. "On the Early Funeral Coffin in Central China," in *Cultural Relics of Central China*, 1997, No. 3:93–100. ISSN 1003-1731. pp. 93-96.



# CHAPTER 6: Ecological Properties

## 6.1 Intro; Cemetery Ecology

Urban cemeteries in the county of Honolulu were initially thriving; a pristine green landscape is commemorating those who have passed on before us. However, due to pressures of development such as population increase, the growth of infrastructure and densification of high-rise building led these cemeteries to struggle in maintaining alongside such pressures. The ecology systems in Hawaii are known for its unique characteristics in landscape management deeply integrated with Hawaiian culture in the Ahupua'a; the division of land from mountain to sea. Although some of these ecological systems fall prey to urbanity, there are still opportunities for restoration, conservation, and preservation. Today, most of the urban cemeteries in Honolulu lack the full potential of its past ecosystems but they are utilized as models for designing future ecological cemeteries. Designing multi-cultural ecological urban cemeteries in Honolulu aims to capture the essence of local landscape stewardship. The integration of ecological end of life choices analyzes the process of burial trends, the precise composition of the body and influential climate factors.

## 6.2 Concept of Ecology

Ecology is interconnected with religion, architecture, and culture throughout this dissertation and emphasizes the relationships between these subjects. Essentially, ecology is the study of intricate relationships between biotic communities and their

abiotic environments.<sup>46</sup> Examples of these intricate relationships exemplifies different settings such as ecology in an urban environment, ecology in cemeteries, and ecology in cultures; each take on a different scale both macro and micro in an ecosystem. Urban ecologies consist of the landscape of the built environment and its users where a typical mutual relationship exists. The typical relationship between man and the urban environment expresses the ecological systems neglecting nature, generating social, economic and environmental issues. In author Richard T.T. Forman's publishing titled "Urban Ecology: Science of Cities," Forman describes a recognized ecological perspective of negativity associated with urbanization or the human component having a destructive effect on natural ecological entities.<sup>47</sup> Evidently, the repercussions of anthropogenic urbanization are realized today in the form of pollution, disease, and global warming. Urbanity reflects the rapaciousness of humans and thus questions ethics and capabilities, but it also showcases the advancing of culture and religion using deviation.

### **6.3 Hawaiian Ecology, Contemporary Multicultural influences**

Before Hawaii's diverse cultural and religious communities, Hawaiian's succeeded in optimizing their land use, ultimately generating active ecological processes. It was the latter prehistoric times of the Hawaiians when the idea of resource-use came to fruition and identifies as a model of a land division called the "Ahupua'a." The Ahupua'a is characterized by its high point from the mountain ridgeline

---

<sup>46</sup> Hennigan, Tom; Jean Lightner. "The Ecology Book" Published by New Leaf Publishing Group, April 15<sup>th</sup> 2013.

<sup>47</sup> Forman, Richard T. T. "Urban Ecology: Science of Cities. Cambridge University Press, Feb 2014 pg 3

to the coastline; the Hawaiian words “Mauka” meaning towards the mountains and “Makai” meaning towards the ocean are common uses in Hawai‘i to orient a sense of location and direction. Within the land division, different social classes designated the type of work in the different land use areas. For example, those who grow crops, find and gather materials, and fish and hunt are considered the “Maka‘āinana” or commoners of that ahupua‘a.<sup>48</sup> Aquaculture is incorporated at a later period and fishponds were developed in the coastal areas of the ahupua‘a adding more ecological benefit to the Hawaiian’s. <sup>49</sup>Ultimately, Hawaiian ecology characterized the stable integration between ecosystems that occur on land, and in water, however much of these ecological processes are competing between ecosystems in the urban environment rather than working together in mutualism.

In urban Honolulu, Community associations such as the Hawaii Community Development Association (HCDA), academic institutes and to an extent the government are taking part in responding to pressures of urban development by integrating traditional Hawaii landscape practices and urban design. Integrating these traditional landscape practices can be seen in particular areas like Kaka‘ako where they are reinterpreted to fit the more modern and urban Honolulu.

---

<sup>48</sup> Ziegler, Alan C. “*Hawaiian Natural History, Ecology, and Evolution*” University of Hawaii Press, 2002.

<sup>49</sup> Ziegler, Alan C. “*Hawaiian Natural History, Ecology, and Evolution*” University of Hawaii Press, 2002.

## 6.4. Urban Ecologies (cemeteries, burials, living and dead)

In the urban or built environment, ecology occurs differently than in the natural environment. Typically, the relationship between the built and natural environment often associate with one being more dominant than the other resulting in a nonproductive equilibrium. There are numerous abiotic components in an urban ecosystem such as spatial patterns, flows, movements, change, urban soil, urban air, urban water bodies and systems, urban habitat and vegetation, urban wildlife, and green spaces. These parts of the ecosystem are the logistics of urbanization in which 'natural' systems degrade.<sup>50</sup> Where do 'urban' cemeteries fit in the urban ecosystem?

"A Cemetery is a burial ground as well as an arboretum, statuary collection and wildlife sanctuary"<sup>51</sup> Essentially the cemetery is described as multi-purpose landscape and as a habitat for an array of biological entities. Ironically the dichotomy of death and life; biotic and abiotic organisms are portrayed in the urban cemetery. However, the cemetery is also sometimes noted as an amenity space for the neighborhood or as a recreational area. "Urban ecology for planners typically emphasizes providing environmental amenities for people, while, ideally decreasing environmental impacts."<sup>52</sup> Such amenities are a representation of nature but significant to the holistic urban ecosystem. Contradictory to initial assumptions and hypothesis in this dissertation, Forman mentions that grave digging, soil disturbance, and variations in herbicide and fertilizer application contribute to habitat diversity. Aeration or infusion of oxygen into the

---

<sup>50</sup> Forman, Richard T. T. "Urban Ecology: Science of Cities. Cambridge University Press, Feb 2014 pg 2

<sup>51</sup> Marzluff, John M. "Urban Ecology" Published by Springer 2008 pg 357

<sup>52</sup> Forman, Richard T. T. "Urban Ecology: Science of Cities. Cambridge University Press, Feb 2014 pg 4

soil is probably what facilitates such diversity. Like farmlands or agricultural landscape, plowing soil is essential to fruition of the planting of crops.



Figure 6.1 Urban ecology concept. Interactions of organisms, built structures, and the physical environment, where people are aggregated.<sup>53</sup>

## 6.5 Ecology in Traditional and Contemporary Cemeteries

Traditional cemeteries come in different settings as most of them are depicted in lush daylight greenery landscapes, with stone markers and a sense of profoundly respected sanctification and taboo. From the rural to urban environments, the careful planting of trees with spiritual attributes and maintenance of these traditional cemetery landscapes may exhibit cases of ecological activity but disregards the inclusion of how the interred interacts with the landscape itself.

---

<sup>53</sup> Forman, Richard T. T. "Urban Ecology: Science of Cities. Cambridge University Press, Feb 2014 pg 3

Regardless of being a traditional or contemporary cemetery, to maintain the life and activeness of urban cemeteries, there must be a well thought out regiment that considers future growth. In the eyes of a landscape architect, these elements are carefully considered and understood through trajectory and time. In the urban context, infrastructure that is foreign to cemetery landscapes such as transit-oriented development, and sprawl lack a mutual relationship with no benefit to one another. Flora and fauna become secondary to the urban landscape almost as if they were afterthoughts in the planning process.

## **6.6 Ecological End of Life Choices**

Today, ecological end of life choices such as natural green burials, tree burials, integration of cremated ashes into bio urns for plant nutrients are slowly trending but challenged by traditional methods used today. Again, these traditional methods associated with religious beliefs and rituals that prohibit different methods of burial, for example, Catholicism recommends the retainment of traditional burial, although cremation is not forbidden it may appear analogous to condemnation. More recently, in 2016 the Vatican announced that Catholics could be cremated.<sup>54</sup> Cremation is ecological under the pretext of “conservation of space” as mentioned in the previous chapters that urn graves take up less space than traditional ground burials. However, the process of cremation is criticized as not being so environmentally friendly. Numerous ecological end of life choices are trending at the moment, but the most popular one is natural burials or “green burials.”

---

<sup>54</sup> Gallagher, Delia. Daniel Burke and James Masters. “*Vatican Issues Guidelines on Cremation, Says No to Scattering Ashes*” CNN World News October 25, 2016.

## 6.7 Natural Burials “Green Burials”

The modern concept of natural burial began in the UK at the Carlisle cemetery in 1993 and had since spread across the globe. A natural burial is a conservation tool to create, restore and protect urban green spaces. The first eco-cemetery in the United States is established in 1998 with Ramsey Creek Cemetery.<sup>55</sup> The concept of green burial has been around for two decades now but originates from precedents of natural burials in the past.

In the process of a natural burial, the grave is smaller than the typical traditional ground burial at three and a half feet deep by three feet wide and six feet in length as shown in figure 6.2. Of course, embalming is restricted from being used during the body preparation. The bodies are placed in containers made of natural elements able to biodegrade within the soil. Natural burials take on a more natural setting as if the landscape was untouched. Thus a headstone is not used to mark the grave. Instead, a rock or a piece of rough-cut limestone is placed for identification.<sup>56</sup> Natural burials are also closely related to other similar methods such as tree burials and integration of cremated ashes with bio-urns that are far more inexpensive as well.

Natural burials also share a secure connection with religion. Attributes of natural burials reflect on the belief systems of individual religions, for example, Islamic faith. “According to Islamic vision, a dead body must be buried directly to the ground without a

---

<sup>55</sup> Uslu, Aysel; Emin Baris and Elmas Erdogan. *Ecological Concerns Over Cemeteries*. Ankara University of Agricultural Faculty Department of Landscape Architecture, Diskapi Ankara, Turkey. P

<sup>56</sup> Green Burial Council. “The Science Behind Green and Conventional Burial; In Lay Terms.” Published by Green Burial Council 2016. Electronic Source Accessed Dec 17<sup>th</sup>, 2017

casket. This is the main reason a dead body must be decomposed into the soil as soon as earlier.” established in 1998 with Ramsey Creek Cemetery.<sup>57</sup> Ideally, the Islamic visions describe the urgency of burials because the process of decomposition is vital to the biotic surroundings.



Figure 6.2 Natural Burial compared to Standard burial<sup>58</sup>

## 6.8 Body Decomposition

After death, the body begins to decompose within thirty hours or so. The decomposition of a corpse becomes a public health hazard and is regulated by the state

---

<sup>57</sup> Uslu, Aysel; Emin Baris and Elmas Erdogan. *Ecological Concerns Over Cemeteries*. Ankara University of Agricultural Faculty Department of Landscape Architecture, Diskapi Ankara, Turkey. P

<sup>58</sup> Green Burial Council. "The Science Behind Green and Conventional Burial; In Lay Terms." Published by Green Burial Council 2016. Electronic Source Accessed Dec 17<sup>th</sup>, 2017



of Hawaii to be kept out of contact with the living. The human body, while alive, is composed of many different elements as shown in table 6.1 but once dead, the corpse begins to break down causing odor from gasses produced within the body and produces microbes for breaking down soft tissues.<sup>59</sup> Rates of decomposition will vary on the setting of the corpse; in an article written by faculty of Ankara University Agriculture Faculty Department of Landscape Architecture in Turkey, numerous external and internal are listed regarding burial sites and practices describing the effect on decomposition.

Element	Mass (g)
Oxygen	43000
Carbon	16000
Hydrogen	7000
Nitrogen	1800
Calcium	1100
Phosphorus	500
Sulfur	140
Potassium	140
Sodium	100
Chlorine	95
Magnesium	19
Iron	4.2
Copper	0.07
Lead	0.12
Cadmium	0.05
Nickel	0.01
Uranium	0.00009
Total body mass	70000

Table 6.1 Elemental composition of a human body based on a standard or reference man of 70 kg Body<sup>60</sup>

A corpse is susceptible to numerous conditions both internal and external affecting the rate of decomposition. Abiotic factors, which are more external factors, for example, soil conditions, such as humidity and texture will influence the process of body

<sup>59</sup> Fogli, D. *Techniques of Decomposition of Bodies Adopted in Cemeteries and Their Relations with the Environment*. May 2009, Electronic Source Accessed Jan 28th 2018

<sup>60</sup> Fogli, D. *Techniques of Decomposition of Bodies Adopted in Cemeteries and Their Relations with the Environment*. May 2009, Electronic Source Accessed Jan 28th 2018

decomposition. In the case of traditional ground burials, there are external factors involving the materiality of the coffin or casket in which the corpse is sealed inside. Varnishes, Zinc, Synthetic material such as mortuary lining fabric in the air or watertight coffin and or casket works against preserving the corpse. “A sealed coffin may speed up rather than slow down the process of decomposition”<sup>61</sup> In the previous chapter, burial or vault ruptures occurring from tightly sealed coffins or caskets speeds up the process of decomposition, which may reflect the abrupt pressure build up in mass content in the decomposing body to explode from inside. Tightly sealing the coffin or casket appears to be redundant if they will only rupture and then become exposed to the soil, leaching harmful chemicals. The materiality of the coffin and casket are external factors that work in tandem with the internal factors of body decomposition creating different couplets of processes.

Year	Potential mass releases (g)					
	C	NH4	P	SO4	Cd	Ni
1	6000.0	870.0	250.0	210.0	0.01875	0.00375
2	3000.0	435.0	125.0	105.0	0.009	0.002
3	1500.0	217.5	62.5	52.5	0.005	0.001
4	750.0	108.0	31.3	26.3	0.002	0.000
5	375.0	54.4	15.6	13.1	0.001	0.000
6	187.5	27.2	7.8	6.6	0.000	0.000
7	93.8	13.6	3.9	3.3	0.000	0.000
8	46.9	6.8	2.0	1.6	0.000	0.000
9	23.4	3.4	0.98	0.82	0.000	0.000
10	11.7	1.7	0.49	0.41	0.000	0.000

Table 6.2 Example annual potential releases from a single human burial<sup>62</sup>

Embalming is continuously mentioned as unfavorable for the environment and is one of the internal factors that influence the decomposition of a corpse. Naturally, the body will produce certain bacteria and enzymes that help to break down soft tissue.

<sup>61</sup> “Coffins” Wikipedia. <https://en.wikipedia.org/wiki/Coffin> Electronic Source Accessed January 7<sup>th</sup>, 2018.

<sup>62</sup> Fogli, D. *Techniques of Decomposition of Bodies Adopted in Cemeteries and Their Relations with the Environment*. May 2009, Electronic Source Accessed Jan 28<sup>th</sup> 2018

Injection of formaldehyde-based compounds from embalming inhibits bacterial activity and thus is desired to maintain temporary preservation of the body during funeral visitations before burial.<sup>63</sup> Ironically, formaldehyde from embalming became a trend for the deceased and highly accepted but seemingly unwanted by the living if it were to leach into groundwater sources. Contrary to religious, traditional beliefs and social norms, there are definite and ecological benefits from the decomposition of the human body if appropriately managed.

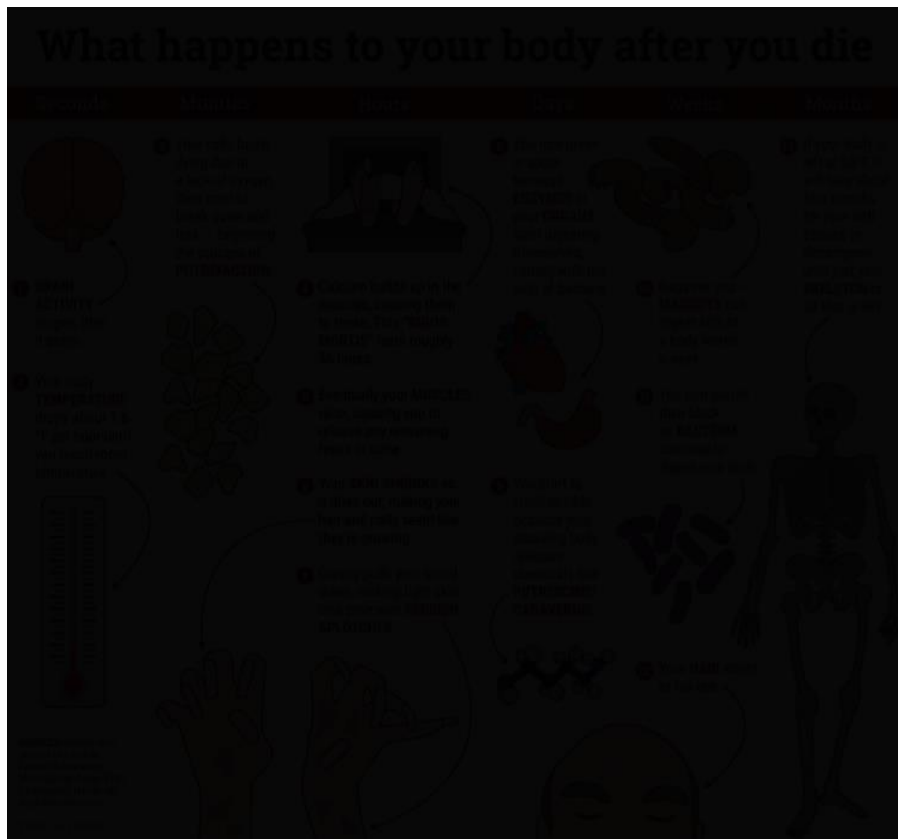


Figure 6.3 Sequence of events after death<sup>64</sup>

---

<sup>63</sup> Uslu, Aysel; Emin Baris and Elmas Erdogan. *Ecological Concerns Over Cemeteries*. Ankara University of Agricultural Faculty Department of Landscape Architecture, Diskapi Ankara, Turkey. P

<sup>64</sup> Green Burial Council. "The Science Behind Green and Conventional Burial; In Lay Terms." Published by Green Burial Council 2016. Electronic Source Accessed Dec 17<sup>th</sup>, 2017

Green burials eliminate some of these external factors mentioned, allowing for the body to decompose in a more natural state. In the previous chapter, the design standards for green burials from GBC was recognized as significant to the research of this dissertation. The Green Burial Council has also provided scientific information explaining the science behind both green and conventional burials. To speed up decomposition, exposure to oxygen is one of the goals of GBC were natural or green burials are specified to be three to four feet deep. GBC states that three to four feet of burial depth are optimal to produce fertile soil for plants where aerobic decomposition facilitates. Ecologically, the then fertile soil can be potentially used as nutrients for future plants, unlike fertile soil from green burials, ashes from cremation do not make good fertilizer.

### **6.7.1 Cremation**

The cremation process is criticized for not being so environmentally friendly because of the harmful byproducts released into the atmosphere. Certain chemicals during the process are harmful to the environment, and while the ashes conserve more burial space than traditional ground burials, the ashes itself can be harmful to the environment. Cremation is a growing trend especially in Asian communities is expected to be in high demand like ground burials. Instead, there are alternative methods and modifications of processing the ashes that are ecological for the environment.

Typically, cremation takes about two to two and half hours in a chamber heated to a temperature range from 1,400 degrees to 1,800 degrees Fahrenheit.<sup>65</sup>

---

### **Religious Perspectives on Cremation**

---

<b><u>Religion</u></b>	<b><u>Perspective Description</u></b>
Anglican/Episcopalian	Cremation is acceptable for Episcopalians and will not interfere with holding a traditional Episcopal funeral.
Baptist	There is no ban on cremation for members of the Baptist faith, and cremation may take place either before or after the funeral service.
Buddhist	Cremation is acceptable in Buddhism. If the body is to be cremated, monks may be present at the crematorium and lead chanting. If no monks are present, family members may lead chanting. Cremated remains may be collected by the family the following day, and may be kept by the family, enshrined in a columbarium or urn garden, or scattered at sea.
Catholic	Historically, the Catholic Church has not supported cremation. However, these days it is acceptable for a Catholic to be cremated. That said, most churches prefer that the body be present for the Funeral Mass, meaning that cremation should occur after the Funeral Mass. Remains should be buried in the ground or at sea or entombed in a columbarium, and should not be scattered.
Eastern Orthodox	Cremation is prohibited in the Eastern Orthodox Church
Hindu	Traditionally, all Hindus—except babies, children, and saints—are cremated.
Jewish	Depending on the degree of the orthodoxy of the deceased, the rules around cremation may vary. For Orthodox Jews, cremation is not acceptable, and the body should be buried, intact, in the ground. While cremation is opposed by Conservative Jews, a Conservative rabbi may still perform a funeral for a person who has been cremated. However, in most Conservative communities, the rabbi will not be present for the interment of the ashes. For Reform Jews, however, cremation is becoming an increasingly common practice, and most Reform rabbis will willingly perform a funeral and interment for someone who has been cremated.
Lutheran	Cremation is acceptable for Lutherans and will not interfere with holding a traditional Lutheran funeral.
Methodist	Cremation is acceptable for Methodists and will not interfere with holding a traditional Methodist funeral.
Mormon	While cremation is not prohibited for Mormons, it is not encouraged, and the Church prefers that bodies be buried rather than cremated.
Muslim	Cremation is forbidden for Muslims.
Presbyterian	Though there is no explicit commandment against cremation, Presbyterians generally do not support cremation, and instead prefer that the body remain intact and be buried in the ground.

---

<sup>65</sup> “Frequently Asked Questions” <https://www.valley-of-the-temples.com/offerings/faqs/> Published by Valley of the Temples, 2017. Electronic Source Accessed February 2<sup>nd</sup>, 20178.

Quaker	There are no religious criteria for interment, and thus Quakers may be buried or cremated.
--------	--

Table 6.3 List of Religions permitting, prohibiting, exceptions of cremation. Table generated from “13 Different Religious Perspectives on Cremation” website<sup>66</sup>

In the process of burning the deceased, toxin substances are released from the emissions such as vaporized mercury. Once the toxin makes it way into the air, it falls back down via rain. <sup>67</sup> Although the method of embalming a body is not needed prior to cremation, chemicals just as harmful as formaldehyde rival the vaporized mercury from cremation. Largely, those who choose cremation are big emitters of greenhouse gases.

<b>PERMITTED</b>	<b>PROHIBITED</b>	<b>ACCEPTED BUT NOT RECOMMENDED</b>
<ul style="list-style-type: none"> <li>• Anglican/Episcopalian</li> <li>• Baptist</li> <li>• Buddhist</li> <li>• Hindu</li> <li>• Lutheran</li> <li>• Methodist</li> <li>• Quaker</li> </ul>	<ul style="list-style-type: none"> <li>• Eastern Orthodox</li> <li>• Muslim</li> <li>• Presbyterian</li> </ul>	<ul style="list-style-type: none"> <li>• Catholic</li> <li>• Jewish</li> </ul>

Figure 6.4 Religious beliefs and non-beliefs in cremation

## 6.8 Ecology and Religion

Multiple religions have ecology or some understanding of nature intersecting with their belief system, influencing a sense spirituality in the environment. Hindu is one of the religions that have robust intersecting belief systems with nature, for example, their

<sup>66</sup> “13 Different Religious Perspectives on Cremation.” <https://www.everplans.com/articles/13-different-religious-perspectives-on-cremation>. Everplans. Electronic website accessed March 01st 2018.

<sup>67</sup> “Green Burials’ Funeral Direct. [www.funeraldirect.co/green-burials/](http://www.funeraldirect.co/green-burials/) 2018. Accessed January 7<sup>th</sup> 2018.

burial ritual called bhakti is where one transition from state to the next; from death to the afterlife and is symbolized in a cremation river ritual. In the Daoist belief system, Daoist mystic author Guo Pu mentions "...human bodies are vital even after death; the bones of the ancestors add life to the land" illustrating the physical makeup of the decaying human body as something supplemental to the earth.<sup>68</sup> For almost every religion, rituals in burials or other methods of condoling the dead indicate significant attitudes about nature and dying.

Catholicism, a religion who although now allows for cremation, the preference of ground burials are still desired by its members. However, there have been trends now that shifted the traditional casket burials towards natural green burials. Amongst the one hundred and twenty-five certified Green Burial cemeteries in the U.S., twelve percent of them are of the Catholic faith.<sup>69</sup> Because of this Catholic's are embracing this trend towards green burials because of leaders within the religion identifying doctrines that cross with the concept of natural interment. Numerous testimonies of significant Catholic members are referenced in articles illustrating how Catholic ideology emulates green burials. One of them is spoken by Andrew Schafer, director of Catholic Cemeteries for the Archdiocese of Newark, New Jersey expressed;

*"For Catholics especially, (natural burial) can be an expression of profound reverence for the body and the sacredness of life, a deep respect for the integrity of creation and God's good earth, and of course, it emulates the most*

---

<sup>68</sup> Miller, James; Dan Smyer Yu and Peter Van Der Veer. Religion and Ecological Sustainability in China. Routledge, April 29, 2015.

<sup>69</sup> Hoffner, Ann. "Why Are 12% of Green Burial Cemeteries Catholic?" Published by Green Burial Naturally website: <https://www.greenburialnaturally.org/blog/2017/2/6/why-are-there-so-many-catholic-green-burial-cemeteries> February 7th, 2017. Electronic source accessed via web March 2<sup>nd</sup> 2018

*famous burial of all,” that of Jesus wrapped in a shroud and buried in a rock tomb.” – Andrew Schafer*<sup>70</sup>

Schafer is pointing out doctrine’s that emphasizes how the human body decays positively that the earth absorbs vital energy from. Another quote was made in the article “Lay Your Loved Ones to Rest The Natural Way” by author Rich Heffern saying “There is no more appropriate way to honor our Catholic Christian tradition of Resurrection faith than by fitting into a natural cycle of death and rebirth where we honor both our loved ones and God’s good earth”<sup>71</sup> Again, the emphasis on a cyclical system in the context of nature is reference in secure connection with death care methods sustainably integrated with the environment. Somewhat green burials, the Hindu religion does permit cremation but does it in a more symbolic ritual manner.

In India, Local culture and Hindu religion have to place sacred value in the waters of Yamuna, Ganges and Narmada rivers. The water is seen as a place of purification, and the ritual of transformation is called bhakti takes place when Hindus die. This ethnic cleansing occurs in these rivers along the banks as the deceased is floating gently downstream while being cremated and symbolizes the transition into rebirth.<sup>72</sup> Bhakti is very spiritually symbolic and is observed to have a secure connection to nature. Modern-day cremation occurs typically in a crematory where air pollutants from smoke are managed more systematically than burning in an open-air area. Rivers and streams are vital sources of water for inland settlements and depending on the location and

---

<sup>70</sup> Hoffner, Ann. “Why Are 12% of Green Burial Cemeteries Catholic?” Published by Green Burial Naturally website: <https://www.greenburialnaturally.org/blog/2017/2/6/why-are-there-so-many-catholic-green-burial-cemeteries> February 7th, 2017. Electronic source accessed via web March 2<sup>nd</sup> 2018

<sup>71</sup> Heffern, Ray. “Lay Your Loved Ones to Rest the Natural Way” Published by the National Catholic Reporter on April 21<sup>st</sup> 2009.

<sup>72</sup> John Grim; Mary Evelyn Tucker. Ecology and Religion. Island Press Jan 2<sup>nd</sup> 2014



directionality of these water bodies the chemicals or toxins from run-off effect these areas downland. However, the ritual of bhakti is not seen as polluting the environment and comes from cultural and social acceptance.

Furthermore, ecology has strong connections with religion and culture which are influencing ecological end of life choices to be incorporated more into existing urban cemeteries. Alternatively, at least initiate discussion between stakeholders to generate quality cemetery designs firmly based on the interconnection between religion, culture, and environment.

## CHAPTER 7: Case Studies

### 7.1 Honolulu, O’ahu and Maui Cemeteries

The selection of cemeteries for the case study research took into the consideration the locality of the cemetery, urban context, and rural counterpart. Amongst the approximate thirty cemeteries in O’ahu, there is only one that is Green Burial Council Certified and has been selected for research investigation to draw a comparison between the urban cemeteries in Honolulu. The research design framework for the case studies looked at site selection criteria, relation to design principles for this thesis and design elements within the cemetery. Compactness, conservation, integration, open space and sense of place were features kept in mind during the case study research justifying strengths, weaknesses, opportunities and external constraints for design consideration of new cemetery design. Based on each key feature the research subcategorizes specific design elements into a comprehensive list for data analysis referenced in table 7.1.<sup>73</sup> This framework has been adopted and reinterpreted from graduates Mohamed Afla and Mohamad Reza of the World Academy of Science, Engineering, and Technology for research applicable to Honolulu.

---

<sup>73</sup> Afla, Mohamed and Mohamed Reza. *Sustainability of Urban Cemeteries and the Transformation of Malay Burial Practices in Kuala Lumpur Metropolitan Region*. World Academy of Science, Engineering and Technology International Journal of Humanities and Social Sciences Vol 6. 11<sup>th</sup> November 2012.

**Table 7.1**

Key Sustainable Features	Focus Elements
<b>1. Compactness</b>	Site Locations Area Grave Arrangement Grave Practices
<b>2. Conservation</b>	Topography Drainage System Vegetation Softscape (graves)
<b>3. Integration</b>	Spatial relationship People Activities Facilities Provided
<b>4. Provide Open Space</b>	Perimeter boundary Degree of Openness Vehicle accessibility
<b>5. Sense of Place</b>	Religion Specific Cultural Influences
<b>6. Burial Methods</b>	Traditional Ground Burials, Inurnment (Niches, Vaults, Graves) Crypts, Mausoleum

Table 7.1. Research framework of critical sustainable features for design consideration <sup>74</sup>

## 7.2 Maui Valley Isle Park and Cemetery

On the Island of Maui, The Valley Isle Memorial Park and Cemetery is the only site in Hawaii certified for “Green burial” or also known as Natural Ground Burial. Located in the rural town of Haiku near the ocean side, the cemetery is listed as a “Hybrid-Burial” memorial park and is twenty-two acres large. It is projected to retain nearly four and a half thousand interred of all different faiths and traditions. The grounds were established in 1968 and received its green burial certification in 2011. Although the

---

<sup>74</sup> Afla, Mohamed and Mohamed Reza. *Sustainability of Urban Cemeteries and the Transformation of Malay Burial Practices in Kuala Lumpur Metropolitan Region*. World Academy of Science, Engineering and Technology International Journal of Humanities and Social Sciences Vol 6. 11<sup>th</sup> November 2012.

location of this memorial park and cemetery is not within an urban environment to that of Honolulu, there are ecological patterns that can be utilized in this research design.

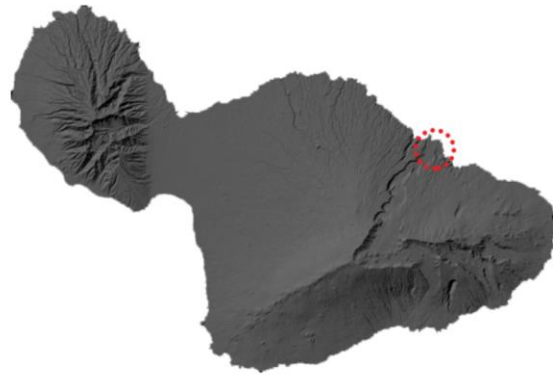


Figure 7.1 Island of Maui Map, Location of Valley Isle Park and Cemetery

The Green Burial Council (GBC) is an independent, nonprofit organization whose mission is to encourage sustainability in caring for the dead. Deathcare is part of an extensive outreach campaign by the GBC to spread awareness to people. A series of standard criteria was established by GBC for both funeral homes and cemeteries while also collaborating with manufactures of green burial products and supplies. Such standards created a framework that encompasses region specific cemeteries where green burials are compliant.

March 6<sup>th</sup> of 2015 the GBC adopted the set of cemetery certification standards, identifying six main topics; Customer relations criteria, Burial Practices criteria, Site Planning, Care of Grounds, Operations and Management, Preservation and

Stewardship.<sup>75</sup> Holistically, these standards thoroughly address the logistics and marketing of their mission. GBC has specified three types of burial grounds based on which of the criteria is met; Hybrid Burial Grounds, Natural Burial Grounds, and Conservation Burial Grounds. (Appendix A)

- i. **Hybrid Burial Grounds**
- ii. **Natural Burial Grounds**
- iii. **Conservation Burial Grounds**

In the case of the Valley Isle Memorial park and Cemetery in Maui, one of the standards in green burial exhibited is standard number 9 (See Appendix A) which states “Preserve, enhance, or restore a historic native or natural community of the region.” Although the methods of natural ground burial or “green burials” are more modern, it attempts to reconcile the traditional Hawaiian natural ground burial. As mentioned in chapter four green burials are the return to traditional burials before coffins, caskets and toxic chemicals.

Within direct support of this research proposal, a critical criterion for the Valley Isle Memorial Park and Cemetery green burial is standard number nine under site planning which states:

*“Conduct an ecological assessment that includes baseline information on existing geology, hydrology, soils, topography, cultural resources, and existing and potential native animals and plants.” - GBC*

---

<sup>75</sup> Green Burial Council. “Green Burial Council Cemetery Certification Standards” Published by Green Burial Council <https://greenburialcouncil.org/> March 6<sup>th</sup>, 2015. Electronic Source accessed December 07<sup>th</sup> 2017

Through this ecological assessment, the data is interpolated and filtered for an urban environment which ultimately integrates municipal infrastructure in the urban fabric of Honolulu.

However, in the 2016 VIMP rules and regulations, ground interments are specified as caskets or alternative containers. The rule specifies minimal dimensions for the container material able to support the weight of an adult, despite the choice of material the cemetery will approve or disapprove before interment. (VIMP Rules and Regs) The rules and regulation of VIMP most recent revision was made on August 2015 and did not specify or integrate the information of green burials but has provided pricing information for the plot space, fees and funerary items such as willow caskets.

“Environmentally Sensitive Burial Options; where end-of-life rituals can be as harmless to the environment as possible” (VIMP pricing sheet) Depending on the location of the plot, traditional interment plots range from \$4,500 to \$5,500 nearly \$2,000 more than the price for a green burial plot at \$3,000 as referenced in table 7.3.

### Green Burial Section VIMP Pricing

<u><b>Green Burial Section</b></u>	<u><b>Pricing</b></u>
<b>Plots:</b>	\$2,995.00
<b>Endowment Care:</b>	\$400.00
<b>Opening and Closing Fees:</b>	\$995.00
<u><b>Eco-friendly Adult Woven Caskets</b></u>	
<b>Bamboo</b>	\$1,995.00
<b>Willow</b>	\$1,995.00
<b>Seagrass</b>	\$2,100.00

Table 7.2 Maui Valley Isle Memorial Park Cemetery Pricing Sheet for green burials (VIMP\$)

Plant species are essential to ecological sustainability and require sensitivity to Hawaii as there is a significant concern for invasive species with destructive behaviors. Successful biodiversity comes from a balance in an ecosystem with native species being the dominant presence. The irony of the cemetery typology as a landscape of death and interaction of living systems is an interesting dichotomy for a design framework. There is more natural landscape features pre-existing in rural Hawaii versus that of urban Honolulu. As part of the natural landscape, most of the plant species in the cemetery are native to the specific geographical location of the cemetery. The ‘Ohe Makai tree shrub is one of the native species and is typically found in lowland dry forests and occasionally found in coastal areas as well. (Hawaii Ethnobotany)

Unlike the given natural elements in a rural environment for the cemetery, an urban cemetery is more prone to less natural resources and fall prey to anthropogenic urban degradation. Unlike the urban cemeteries of Honolulu, the Maui Valley Isle

Memorial park and Cemetery has insignificant concern for toxins from hardscape water runoff.



Figure 7.2 Photo Image of the Valley Isle Memorial Park and Cemetery

### 7.3 Honolulu Urban Cemetery: Explanatory/Exploratory/Descriptive

Existing Honolulu Urban Cemeteries	Area (Acres)	Status	Area Available
Roman Catholic Cemetery on King Street	2.3	Full	0
Kawaiaha'o Cemetery	2.7	Active	900 - Area
Japanese Mō'ili'ili Cemetery	2.4	Active	2,000 - Area

Table 7.3 Urban Cemeteries in the District of Honolulu near High-Density areas

### 7.4 Density/Site Compactness

#### 7.4.1 Site location (soil type, infrastructure, existing and pre-existing)

A lack of connection between the historic Roman Catholic cemetery on King Street and the surrounding residential and public open spaces is evident due to the status of being at full capacity for burials. The segregation between the cemetery and



urban community is a byproduct consecrated by historical sanctification by the Roman Catholics in the presence of urban development. Although the significance and relationship of the cemeteries location and the urban fabric is oppressed by urban planning agendas that may disregard the presence of the cemetery, the inconclusiveness pays homage to preserve the heritage of city architecture.

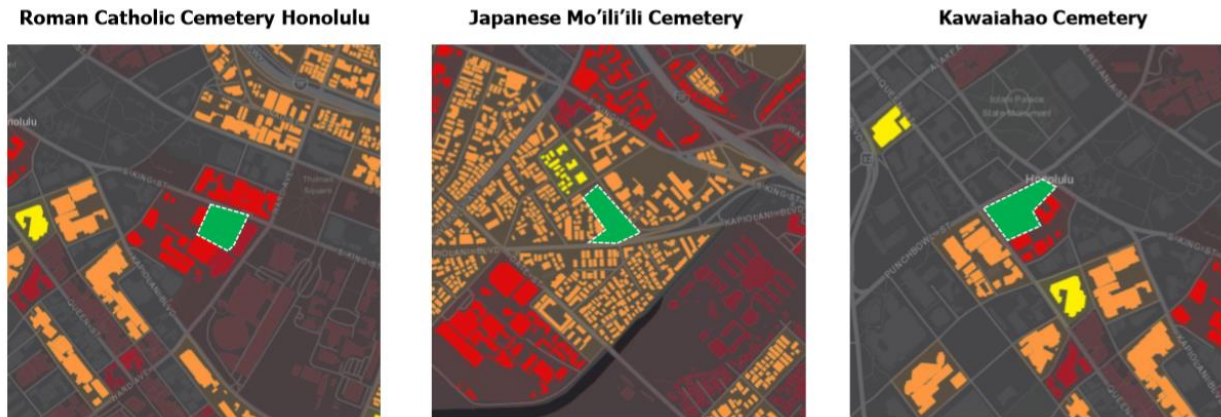
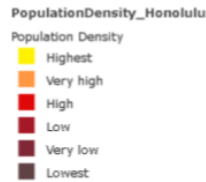


Figure 7.3 Density Map within 1 square mile of the Roman Catholic Cemetery on King Street. Image generated by ArcGIS Honolulu

Three high-rises neighbor the closed roman catholic cemetery on the Ewa side. These high-rises account for the highest density concentration within the one-mile radius of the cemetery. The 801 South King Street high-rise and King Manor have amenities such as open spaces made private for the residence but unable to accommodate high traffic usage of these amenity open spaces thus the inadequacies of nearby parks other than Thomas square which is under construction, is an

inconvenience to those residents. Reprogramming urban cemeteries to be utilized as public recreational space while respecting the sanctity of the site would serve better integration in the urban fabric of Honolulu for nearby residents.

Part of the urban fabric is the adjacencies of transportation infrastructure. South King street runs along the north side of the cemetery as a one-way road. A single entrance to the gated site is shared both for vehicular and pedestrian access mainly for grounds keeping. One could speculate the congestion of vehicles if a funerary service were to take place today due to the already density of interred. Arrival via bus is a standard mode of transportation but today transit-oriented development is new incorporation to the urban fabric of Honolulu. A station is proposed for construction just half a mile south of the cemetery but serves no integral function to the community within the area

#### **7.4.2 Area**

The largest of the three urban cemeteries in high-density areas is the Kawaiaha'o Churchyard Cemetery measuring at nearly three acres with nearly over nine hundred interments. Two to three acres is the average size for these urban cemeteries, but some interments are relative to the burial plot sizes regulated throughout the use of the cemetery. Based on these numbers the ratio is one acre to three hundred interments, but this may vary due to overcrowding in all three of cemeteries being analyzed for the research of this case study. Not only are these cemeteries a repository reflecting religion and culture but also reflecting the density of urban Honolulu today.

When these cemeteries have been established, Kawaiaha'o being the oldest, there was a cemetery shortage in Honolulu during the 1900's. This shortage resulted in the new occupation of land for burial spaces but because newer cemeteries were

established the planning did not accommodate for the rhetoric issue leading to the closure of these cemeteries again. However, this trend of rural to urban is reversed as cemeteries began to sanctify outside of the city with more isolation represented in the natural environment.

The rural counterparts to these urban cemeteries are much larger to accommodate more substantial amounts of burials. Ultimately the space for burials is typically confined to a single planar area, unlike the interment of urns which are accepted to be vertically organized. However, in the time it took to fill these urban cemeteries Honolulu was nearly a century influenced by factors of population growth and death to birth rate ratios.

#### **7.4.3 Grave Arrangement**

The arrangement of graves, no matter the burial type is typically orthogonally arranged and oriented based on the adjacent pathway, surrounding landscape and boundary lines. Initially, one could speculate that the grave arrangement for the three cemeteries studied was well organized systematically. However, evidence especially in the case of the roman catholic cemetery showed reformed arrangements to accommodate a surplus of graves ultimately leading to the overcrowding and closure of the cemetery. After nearly a century of these cemeteries being in existence, the success is exhibited in the efficiency of arrangement reflecting the current capacity of these cemeteries being either open or full.

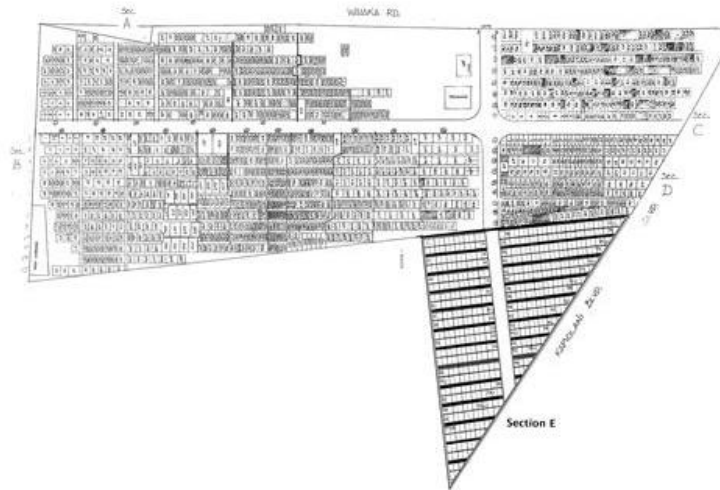


Figure 7.4 Map of Mō'ili'ili Japanese Cemetery<sup>76</sup>

Through observation, one would assume that the sanctity of a cemetery would reflect an orderly system, but in the case of these three cemeteries, one may receive the impression of chaos almost. In the roman catholic cemetery, there are fragments of burial plots with interred generously spaced out as seen in figure 7.5, but also some areas where burials were adjacent touching. Although there is a subtle grid layout consisting of narrow and wide pathways the inconsistencies of grave arrangement are ubiquitous on the site. Even more lack of arrangement are the graves towards the rear of the cemetery where the topography starts to slope downwards to the south.

---

76

**Roman Catholic Cemetery Honolulu**



**Japanese Mo'ili'ili Cemetery**



**Kawaiahao Cemetery**

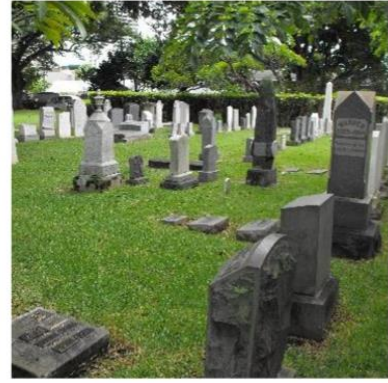


Figure 7.5 Photo is taken by Joern Ryan Vallesteros

Traditionally, the Mō'ili'ili cemetery would be the most densely compact of interments because of Japanese culture and Buddhist religious practices of non-burial vaults. In the case of the Japanese Mō'ili'ili cemetery, the burial vaults for the urns take up less space than the traditional ground burials but almost similar to the roman catholic cemetery these vaults are closely adjacent to one another. From conducted site visit, there are different instances of arrangements throughout the cemetery depicting the epoch of the graves. Upon entering section- A of the cemetery from Waiaka road, the graves were very uniform as this is typical for plots that contain family burials. The grid layout in this area expressed orthogonal consistencies with a hierarchy between the primary pathway and smaller paths circumnavigated the graves as shown in figure 7.4.

In some areas, some graves came in pairs that typically belong to married couples creating spatial inconsistencies on the left and right sides. Overall the graves are oriented linearly from east to west and face towards the center middle road in the cemetery site. Although the grave arrangements may appear quite dense, this has allowed the capacity of the cemetery to reach nearly over two thousand burial plots

The Kawaiaha'o Church and cemetery are one the most famous cemeteries in Honolulu because it is the resting place several royal families of Hawaii. With nearly

over nine thousand interred, the grave arrangement is fragmented and sectioned accordingly based on site observations. The graves for the royal families of Hawaii are located adjacent to the church in the north-west corner of the site with surrounding tombstones in a dense but orderly fashion. The south-west corner of the cemetery near Queens street, the burial plots are much more extensive creating more marginal spaces between one grave to the other appearing to be more spacious than any of the other graves on site. [image reference] Majority of the headstones in this area are miniature compared to the ones north of the cemetery enhancing the illusion of much more vast landscaping. This spaciousness in this portion of the Kawaiaha'o cemetery exhibits a visual dominance in landscaping and exhumed a memorial park-like setting with open space ideally for visitation and not recreation. Out of the three cemeteries used for case studies in this research, the Kawaiaha'o had more success in a grave arrangement based on its response to not overcrowding.

The grave arrangement is key to the success of planning for the past present and future. Spatially the arrangements are influenced by burial type, ephemeral influences, orientation to pathways and the sun, topography and code regulation by the department of health. Such influences should consider a time trajectory that responds to flux in urban phenomena such as population growth and shifts in death rates.

#### **7.4.4 Grave Practices**

Grave practices reflect both religious and cultural expression from the gifting of flowers, to the burning of incense these practices give life and meaning to these cemeteries. There are many different forms of grave practices throughout Hawaii itself due to the multi-cultural population. Grave practices in this case study research refer to

the living or human-related activities memorializing a beloveds grave site to express their connection or background beliefs.<sup>77</sup> Through observation conducting site visits, the cemeteries in this research with regular activity in grave practices were the Kawaiaha‘o and Japanese Mō‘ili‘ili cemeteries. Whereas, the roman catholic cemetery had traditional grave practices evident today.

Although the roman catholic cemetery on king street is full, there were little to almost none of the typical current grave practices occurring. However, the planting of trees, shrubs or the practice of little landscaping is considered a grave practice. Thus, there are instances where trees are planted right over or adjacent to specific graves which can be speculated a grave practice during that time. Although the planting of a tree may not relate to roman catholic religious beliefs directly it could symbolize the family survivor’s attachment to the deceased loved one. From an ecological stance, the logistics of the tree growth may not have been considered to alter the topography, stonework, and below ground activity around the grave. These trees over the nearest grave could be anywhere from fifty to seventy-year-old trees depending on the date of burial. However, just like body decomposer these trees also have a lifespan where different phases exhibit the health of a tree. The tree’s in there a final phase of living may be critical to specific risks such as rotting, collapsing, and loss of root aeration below ground. These ecological phenomena can be utilized to help to understand and

---

<sup>77</sup> Afla, Mohamed and Mohamed Reza. *Sustainability of Urban Cemeteries and the Transformation of Malay Burial Practices in Kuala Lumpur Metropolitan Region*. World Academy of Science, Engineering and Technology International Journal of Humanities and Social Sciences Vol 6. 11<sup>th</sup> November 2012.

integrate ecological end of life choices with cemetery landscape management in designing sustainable urban cemeteries.

In the case of the Japanese Mō'ili'ili cemetery, it is a common practice to burn incense as a symbol of honor and respect to the gone beloved ones. Those practices were apparently taking place as there were remains of incense ashes in open steel containers left on the gravesite. Other pieces of sentiment were also noticeable on these graves, for example, flowers which are typical practices regardless of culture or religion. Also, bowls of fruit were left on several graves as sentiment as well. Lei's which are a traditionally Hawaiian were also found on specific grave sites in the Japanese Mō'ili'ili cemetery which expresses the fusion of culture in Hawaii. These practices are part of an undisclosed responsibility for the living families of these graves with the freedom to maintain the grave site. But are these practices of burning incense sustainable?

Burning incense is a daily practice for Japanese Buddhist religion and the smoke from burning incense contains particulate matter, gas byproducts and may organic compounds. [source incense smoke] Typically incense sticks are composed of 21% herbal and wood powder, 35% of fragrance material, 11% of adhesive powder and 33% of bamboo stick.<sup>78</sup> The preponderance practice of burning incense occurs daily in masses and so the cumulation of these fumes contribute to bad air quality to urban Honolulu. Although the burning of incense is deeply ingrained in religious tradition, part of the purpose of this research is to revere tradition while implementing sustainable alternatives for the environmental cleanliness of urban Honolulu.

---

<sup>78</sup> "Incense" Chinese Customs. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2377255/> source incense burning unsustainable Electronic Source Accessed March 15<sup>th</sup> 2018



Kawaiaha'o, the most famous of the three case study cemeteries... (continued)

## 7.5 Conservation

### 7.5.1 Topography

Topography is vital to the landscape management in cemeteries, more conventionally the three case study cemeteries all exist on flat grounds. Unlike several rural cemeteries such as the Valley Isle memorial park and cemetery in Haiku Maui, grave sites are set on hillsides. The dynamic topography makes for exciting pathways throughout a cemetery creating different experiences of traversing. Since these three case study urban cemeteries reside on flat land, there is more natural access for funerary services and visitors to the site. Although in the case of Urban Honolulu with the significant issue of the watershed, natural topography with elevations and depressions can play an ecological role in hydrology or drainage.

**Roman Catholic Cemetery Honolulu**



**Japanese Mo'ili'ili Cemetery**



**Kawaiaha'o Cemetery**



Figure 7.6 Images of Topography. Photos were taken by Joern Ryan Vallesteros

### 7.5.2 Drainage

Urban Honolulu plays a vital role in the watershed of Oahu, processes of mitigating or treating water runoff is essential for the natural environment. Softscape

and hardscape surfaces in these urban cemeteries determine the rate of percolation or water runoff from rainy weather. Unlike the softscaping surfaces of both the Roman Catholic King Street cemetery and Kawaiaha'o cemetery, the Japanese Mō'ili'ili cemetery is entirely hardscaped. Asphalt roads on site, concrete pathways, with areas of porous gravel and plots of dirt near vegetation facilitates fast moving rainwater on site to the municipal drainage systems. [reference site plan] Inherently the Japanese Mō'ili'ili cemetery takes on the material characteristics of cityscape hard non-porous surfaces.

### **7.5.3 Vegetation**

Plants in Hawaii reflect a similar system that is mimicked by a more substantial system taking place in Urban Honolulu. Biodiversity is essential to the survival of Hawaii's natural environment, and so plant species are crucial to the records of Hawaii. Invasive, endemic and native plants each play a different role in Hawaii's natural environment creating processes of positive and negative biodiversity. In the urban cemetery case studies, vegetation was considered both for landscape atmosphere and functional purposes. Shading from large mature trees for more cooling means radiant spaces and coverage from rain are essential intended functions of these landscape designs. However, understanding the plant species and its biological abilities can be implemented into innovating design approaches to more ecologically sound urban cemeteries in Honolulu.

Since the Japanese Mō'ili'ili cemetery was practically all hardscape surfaces, there was not much vegetation on site. The absence of grass causes the site to heat up in the hot sun with only a few trees on the outskirts of the cemetery to provide shading shown in figure 7.6 Based on old historical maps of Mō'ili'ili, an underground network of

underwater caves is located subsurface beneath the cemetery. One could speculate that the soil conditions were not adequate for tree growth at the time the cemetery had been built due to limestone rock. However, there are entirely a few existing trees on site already located on the outer perimeter of the cemetery. Mature large monkeypod trees, help shade sunlight over the small gathering area near the main entrance. Majority of the trees were plumeria trees blossoming with white plumeria flowers. Plumeria trees are also known as the “Temple Tree” are typically found in Asian cemeteries because they are associated funerals and death. Ti leaf plants were located at the entrance of section A of the cemetery which serves as an example of the cultural fusion between Hawaiian and Japanese culture. The ti leaf plant was brought to the island by the Polynesians and considered these plants to have divine power. Growing ti plants around a home will bring good luck and wards off evil spirits. Just like the plumeria tree, the ti leaf is associated with having spiritual attributes, but rather than visual landscaping elements with ephemeral acknowledgment these plants should be considered for their biological processes in the design of ecological urban cemeteries.

Unlike the hardscape traits of the Japanese Mō'ili'ili cemetery, both the Roman Catholic Cemetery and Kawaiaha'o cemetery had a stronger vegetation presence, Kawaiaha'o cemetery being the lushest and diverse. Again, plumeria trees were planted by the roman catholic cemetery which may either appear confusing or a means of fusion. Majority of the roman catholic church members during the early 1900's was Caucasian which speculates a disconnect from the Asia spiritual attributes of the plumeria tree but still relative to its location. Since plumerias were typically used in cemeteries throughout tropical Asia, the landscaping may be regarded as disconnected

or an indirect fusion of cultural beliefs. [source] But due to the adjacent low-rises and mid-rises surrounding the roman catholic cemetery, lack of sunlight exposure is most likely the reason as to why there are areas of patchy dead grass.



Figure 7.7 Images of the case study cemeteries vegetation. Photos were taken by Joern Ryan Vallesteros.

Giant ficus religiosa or fig trees are also present on site growing from gravesites at the root. Similarly, the fig tree is also associated with cultural and spiritual significance, most prominent in Buddha and Hinduism religion. About the religion of Roman Catholicism, the fig tree is recited in the Bible, where in Genesis 3:7, “Adam and Eve cover their nakedness with fig leaves” This is just one connection to a biblical reference, but the fig tree is interpreted and implemented differently in many religions. The ficus religiosa is traditionally where the Buddha had found bodhi or enlightenment while meditating under the Sacred Fig tree.<sup>79</sup> In ancient Cyprus, the fig tree was sacred and symbolized fertility of human progeny which is ironic to the implantation of these

---

<sup>79</sup> “74. Sacred Ficus – Assures Fertility to Human Progeny”. Herbal Remedies. <http://herbalsatt.blogspot.com/2014/06/sacred-ficus-thousand-years-medicinal.html> . Published June 18<sup>th</sup> 2014. Electronic source accessed March 01<sup>st</sup> 2018

trees in cemeteries where death is personified.<sup>80</sup> Fertility may translate into new birth or life regarding an afterlife and the continuation of life itself in different forms. These religious descriptions of the fig tree are derived from the more scientific biological properties and processes of the tree.

Fig trees are typically found in tropical regions within rainforests and have been said to be critical to the health of rainforest ecosystems. Fig trees could help restore ravaged rainforests, stem the loss of wild species and even limit climate change while also building vital bridges between scientific and faith-based worldview.<sup>81</sup> Despite these fig trees in the roman catholic cemetery being out of place from a rainforest, they are still essential to the urban jungle that is Honolulu. Birds heavily rely on fig trees as a source of food and birds of Hawaii are crucial to a thriving ecosystem in Hawaii through seed germination.

Kawaiaha'o cemetery, the lushest in vegetation out of the three case study cemeteries houses similar plant types such as plumeria trees and ti leaf plants. However, a variety of plant types can be found throughout the site of the cemetery creating a diverse landscape. [to be continued]

The plant types in the vegetation of the case-study cemeteries were similarly used mainly for their representation of spiritual characteristics. Warding off evil spirits and bringing good luck reflected the ephemeral and mysticism of nature in these urban

---

<sup>80</sup> "74. Sacred Ficus – Assures Fertility to Human Progeny". Herbal Remedies. <http://herbalsatt.blogspot.com/2014/06/sacred-ficus-thousand-years-medicinal.html> . Published June 18<sup>th</sup> 2014. Electronic source accessed March 01<sup>st</sup> 2018

<sup>81</sup> 74. Sacred Ficus – Assures Fertility to Human Progeny". Herbal Remedies. <http://herbalsatt.blogspot.com/2014/06/sacred-ficus-thousand-years-medicinal.html> . Published June 18<sup>th</sup> 2014. Electronic source accessed March 01<sup>st</sup> 2018

cemeteries and is an epoch to tradition. By paying careful attention to the biodiversity relationship between plants, native, invasive and or endemic, a sensible design in the landscape can create thriving ecology through the integration of these plant types. Balance is key to a productive ecosystem by considering factors both from the natural and built environment.

#### **7.5.4 Softscape Graves**

Both the Kawaiaha'o and King Street Roman Catholic cemetery have Softscape characteristics, unlike the JMC which has little to none soft scaping features. In the Kawaiaha'o cemetery, there is the presence of maintenance for the graves having lush, healthy grass with mild occasions of dirt exposure, but it is hardly noticeable at first glance. Although there was maintenance work being performed during my field research of the KSRCC, softscaping was inconsistent due to the submersion of soil in some grave plots. In the case of the JMC, softscaping consists of porous white gravel in near the north-west area of the site ideal for optimal drainage. However, due to the additional hardscape surfaces such as the asphalt road, JMC will have a higher run-off coefficient versus that of the KSRCC and the Kawaiaha'o Cemetery.

### **7.6 Integration**

#### **7.6.1 Spatial relationship**

About the site selection criteria basing on adjacency of high-density settlement, each of the cemeteries was located near mid-high rise residential apartments. All case study cemeteries were located near busy, active roads and were prone to noise pollution from cars. JMC's location is adjacent to Kapiolani Boulevard but not accessible

by vehicle, only pedestrian access by an overpass bridge connecting communities despite the road being a physical boundary. JMC is also located near a few temples in connection to the faiths of JMC interred and drew a spiritual connection between the two spaces. Nearby parks are also located around JMC but not integrated as the stigma of cemeteries are separated for preserving sanctity. The imagery of the JMC reflects much of the surrounding mid-high rises portraying the level of density in the neighborhood.

Kawaiaha'o cemetery location had more connection to specific surrounding points of interests involving histories such as the Iolani Palace, State Library, and Ali'iolani Hale where there is a statue of King Kamehameha I. Historically; there is more connection in the contextual spatial relationship of the Kawaiaha'o cemetery versus other cemeteries giving its prestigious recognition.

**Roman Catholic Cemetery Honolulu**



**Japanese Mo'ili'ili Cemetery**



**Kawaiaha'o Cemetery**



Figure 7.8 Images of surrounding context of the case study cemeteries. Photo's take by Joern Ryan Vallesteros.

Upcoming rail transit design is another urban fabric factor, based on the placement of the transit station for Kaka'ako this research portion can be speculative. Both the KSRCC and the Kawaiaha'o cemetery are located within a ten to fifteen-minute

walking radius distance, and the show is no implications of direct integral design features. In my research, I have speculated that the Kawaiaha'o cemetery will be inadvertently susceptible to more visitors because of its historical context in connection with the convenience of rail transit public transportation. In the case of JMC, the cemetery is not within walking distance of one of the proposed rail stations due to the final stop to be located near Ala Moana shopping center

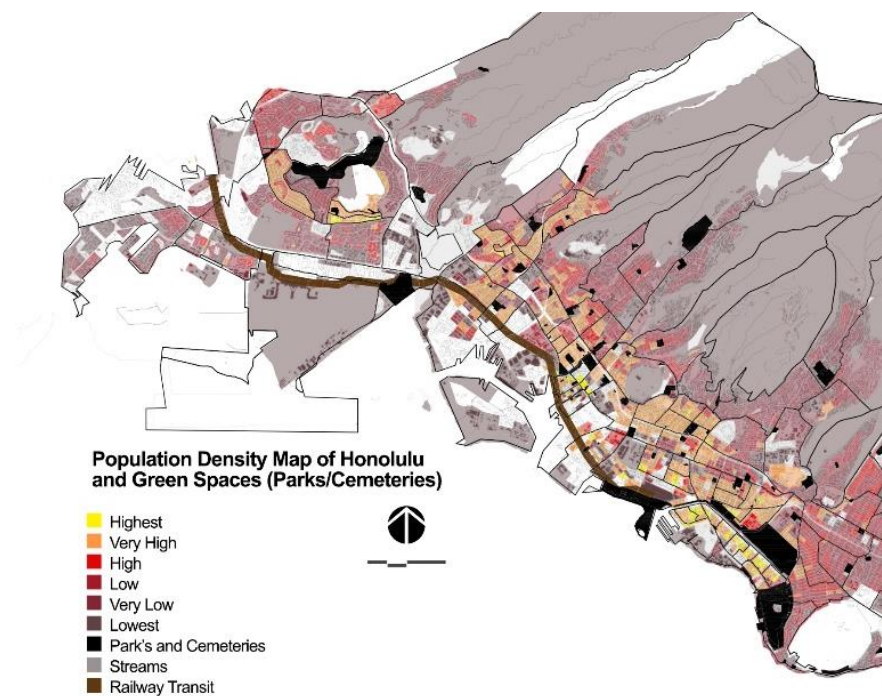


Figure 7.9 ArcGIS map of Honolulu density and proposed rail transit. Image generated from ArcGIS Honolulu data

## 7.6.2 People and Activities

During my case study research investigation, the most visited cemetery was JMC with nearly eight visitors in four hours of performing field research. The visitors were caretaking the inurnment graves of a loved on offering both flowers and fruits. However, there was no burning of incest going on at the time. A few visitors had also made use of



the picnic table near the entrance of JMC to have lunch together under the shade. The visitors during my early portion of the field research access the site via car while the latter visitors accessed via foot, both methods are easily maneuverable throughout the cemetery. In the case of KSRCC there were no visitors because of the private nature of the cemetery, high perimeter fences with signs saying private discouraged visitors. The Kawaiaha'o cemetery also did not have visitors during the time of my field research except for local maintenance workers tending to the site, cutting grass.

### 7.6.3 Facilities Provided

An abundance of facilities is provided in the Kawaiaha'o cemetery with maintenance workspaces, water stations along with the famous Kawaiaha'o church and learning center. Typically, the cemetery would be categorized under the churchyard cemetery type because of its adjacency next to the church thus these facilities allow for better caretaking of the cemetery and a stronger connection to the religious practices performed.

**Roman Catholic Cemetery Honolulu**



**Japanese Mo'ili'ili Cemetery**



**Kawaiaha'o Cemetery**



Figure 7.10 Facilities in the case study cemeteries. Photos were taken by Joern Ryan Vallesteros

Both the KSRCC and JMC lack facilities due to the degree of openness. There are no churches or temples shared on site, nor are there maintenance facilities as well. We may speculate that the absence of facilities reflects the sense of ownership with these cemeteries being entirely cared for by the religious family relatives of the interred and inurned. However, simple water stations are the minimum necessities for the cemeteries for the practice of caretaking by the community and maintenance workers.

## **7.7 Provision of Open Space**

### **7.7.1 Perimeter Boundary**

Various types of boundaries secure the case study cemeteries from high steel and vinyl fences to low shallow rock walls. These boundaries either create the exclusion and or inclusion of the community but also indemnifies the sacredness of the space from its adjacent neighbors. All three of the case study cemeteries had some boundary fence despite being private or public.

In the case of the KSRCC, high fencing takes place parallel to king street with a single gate for both exit and entrance and parallel to the Hawaiian electric company building towards the rear. Since KSRCC is an urban cemetery the adjacent high-rise commercial building on the west and the low-rise commercial building on the east make up the east-west boundaries for the cemetery. The property line is treated as the building wall itself with minor setback between the wall and the nearest grave plot. The imagery of urban density is apparent when only five feet away from a grave site is the foundation wall of a high-rise building.

Kawaiaha'o cemetery has various types of boundary fences from metal picket fencing to tall vinyl fences separating the direct church grounds from the cemetery. The vinyl material gives the cemetery a more modern look and creates contrast with the surrounding metal picket fences. Visually the vinyl fence blocks views of the adjacent church grounds while the outer metal picket fences offer's views to nearby pedestrians.

More engagingly, the JMC has low rock walls from the adjacent side road with pedestrian entrances and exits for easy accessibility. The east side of the cemetery has higher fencing for more security from the Kapiolani Boulevard. However, because of the low rock walls, the sense of invitation and degree of openness is perhaps the reason why there were more visitors in my field research versus the other case study cemeteries.

### **7.7.2 Degree of Openness**

The materiality of the perimeter boundary fences can offer visual connection and increase the degree of openness in cemeteries the same providing windows in a room allows visual connection and a sense of openness between interior and exterior. Per land size, the Kawaiaha'o cemetery is the largest and the grave arrangement reflects more openness because they are less cramped than the arrangement in both the KSRCC and JMC. However, relative to the urban context the degree of openness is compromised by nearby densities unlike the vastness of the Maui Valley Isle Memorial and Park cemetery located in a more rural setting.

**Roman Catholic Cemetery Honolulu**



**Japanese Mo'ili'ili Cemetery**



**Kawaiahao Cemetery**



Figure 7.11 Perimeter conditions of the three case study cemeteries. Photos were taken by Joern Ryan Vallesteros

### **7.7.3 Vehicle accessibility**

All case study cemeteries were accessible via vehicle based on the existing roads and ingress/egress to and from these roads. The level of accessibility is based on the observation of openness and boundaries indicating specific types of access. For example, the KSRCC, due to its closure does not allow access of vehicles from visitors, only from maintenance workers to caretake the site. The JMC has no gates making it much easier to access by vehicle. However, the roads are narrow with minimal to no turning radius provided or the usual allowance of cortege assembly spaces. Uniquely the road layout in JMC is in the shape of a cross. I would speculate that the cross-shape road may have been inadvertently planned.

## **CHAPTER 8: Correlational Studies**

The people of urban Honolulu represent a diverse community, a mix of ethnicities, culture, and religion in a concentrated area. Honolulu's diverse community helps shape the urban fabric of Honolulu, public opinion, and shifts in attitudes toward a green environment. Ecological urban cemeteries and ecological end of life choices may not have enough research support in Hawaii for the public's concern, but this thesis aims to draw significance on the topic. By gathering and measuring census data and survey responses, statistics were generated to draw relationships between variables and constants in the pursuit of a future ecological urban cemetery in Honolulu.

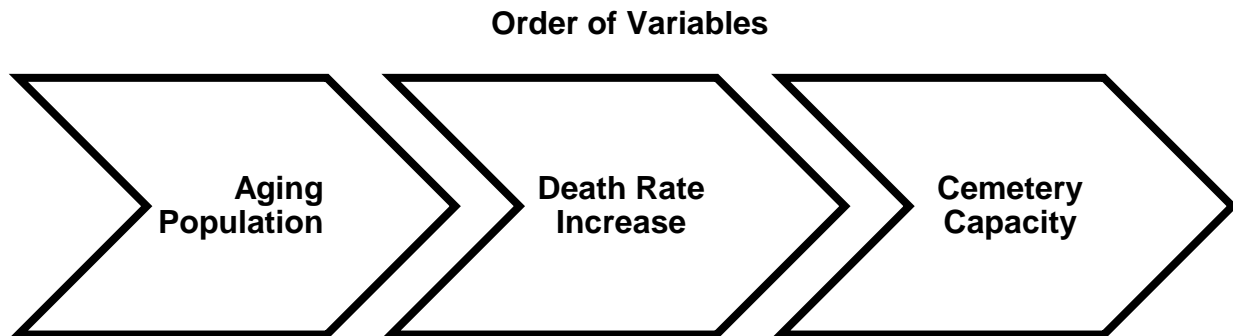


Figure 8.1 Flow Diagram of variable factors affecting each other (Source: generated by Joern Ryan Vallesteros)

Cemetery capacities and compactness are a vital component to the sustainability of Honolulu. The three case study cemeteries were analyzed focusing on the number of interred, area dimensions of the site and the year of establishment to the status of either being closed or opened. In the case of the roman catholic cemetery on king street, the cemetery was closed in the late eighties after being open for nearly eighty-seven years

with nearly seven hundred marked and unmarked interred. [source] Both the Japanese Mō'ili'ili and Kawaiaha'o Cemetery are still active cemeteries with Kawaiaha'o being the oldest out of the three have nearly nine hundred interred. [source] The Japanese Mō'ili'ili cemetery has nearly two thousand graves and is still growing. Based on figure 8.2, Honolulu's population is growing, but the death rate is also affected by population increase. By the year 2040, Honolulu's population will grow to nearly over a million people. Initially, the relationship between population growth would reflect an increase in death rates and the filling of cemeteries. However, there are twenty-eight cemetery/graveyard/memorial parks on the island of Oahu, twenty of which are outside of Honolulu. There is not enough census data for the number of interred for each of the twenty-eight repository locations on the island of Oahu; this data would aid to predict trajectories in filling up of cemeteries and allow for improvements on future planning.

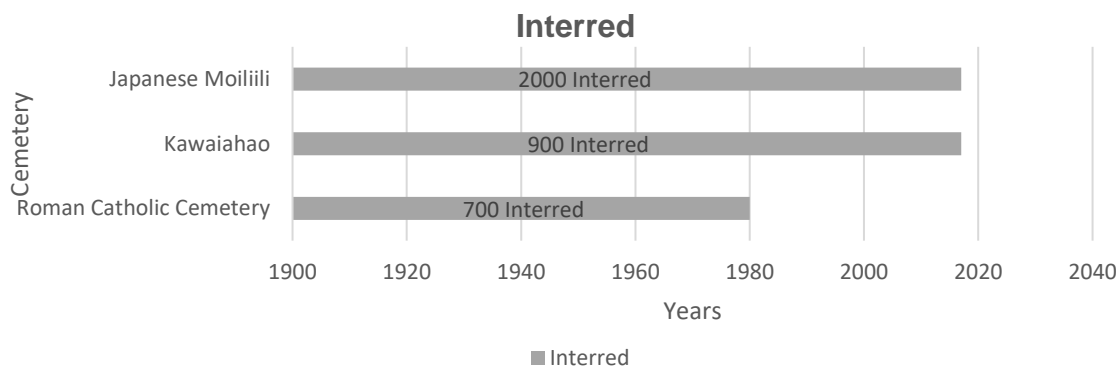


Figure 8.2 Number of interred in the case study cemeteries (Source: generated by Joern Ryan Vallesteros)

In the early 1900's there was a cemetery shortage in Honolulu due to improper burial methods and dangerous threats to the living community.

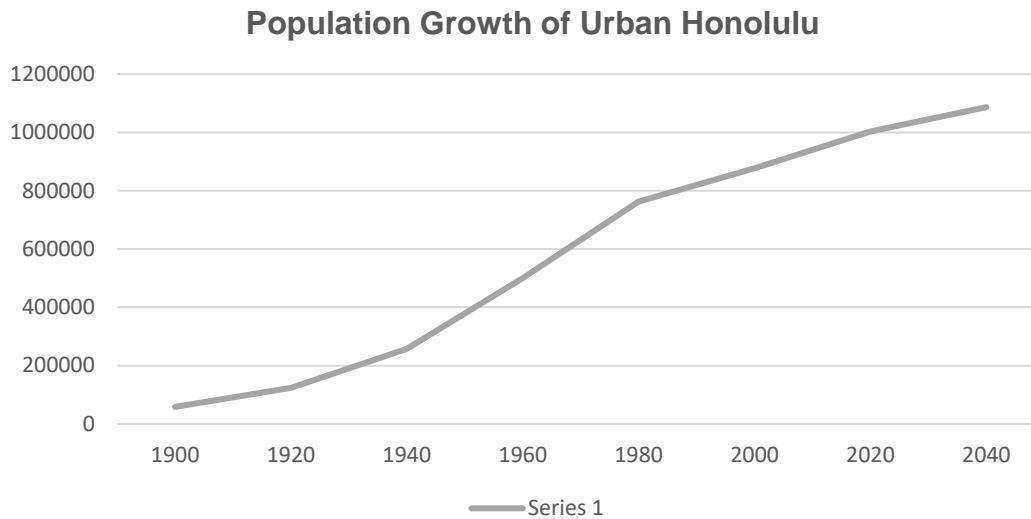


Figure 8.3 Honolulu Population increasing (source: Honolulu Census Data 2010)

In a 2013 survey, Hawaii was measured to have seventy percent of those who passed on cremated which ranked Hawaii high amongst other states in the U.S. Cremation is a burial method that conserves grave plot space rather than traditional burials, but the logistics of cremation may not be the most sustainable. A survey generated for this thesis research later discusses the relationship between ethnicities and religions that commonly practice cremation and more sustainable or ecological integrations with this method. However, if the population of Hawaii is growing in the number of cremation interred this would allow for the slowing down of cemeteries filling up, but back in the EIS for the expansion of the Hawaii Memorial park is a study was noted about the demand for ground burials will still be trending in the future. Therefore, space is still limited and should be considered in the future growth and planning of cemeteries in general. Understanding and analyzing the stakeholders involved allows for information to be gathered towards generating efficient future planning for cemeteries.

Majority of the participants in the conducted survey were in the age range between twenty-four and twenty-nine. This age group would be considered as the age of the millennials who are described as a generation of shifting trends. The survey also indicated that most people in this age range practiced daily sustainable activities such as recycling, commute by walking, public transportation, conserving water and electricity. Ideally, this would be the age range where most are concerned with climate change and are environmentally conscious about their carbon footprints.

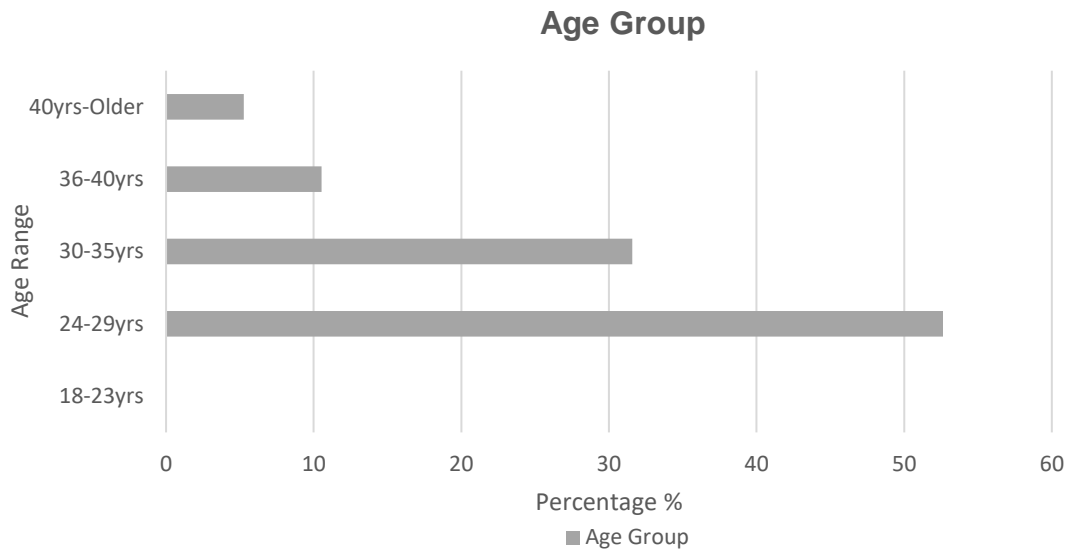


Figure 8.4 Age Group of Participants (Source: generated by Joern Ryan Vallesteros)

In retrospect, the concern for climate change reflects their activity in sustainability, and so the survey pointedly asked, “What method of burial would you prefer for your funeral?” The replies to this survey question had a mixture of responses but oddly “traditional ground burials” which are criticized for not being sustainable, ranked at twenty-six percent. But this statistic may be affected by an affiliated religion that influences beliefs traditional ground burials.



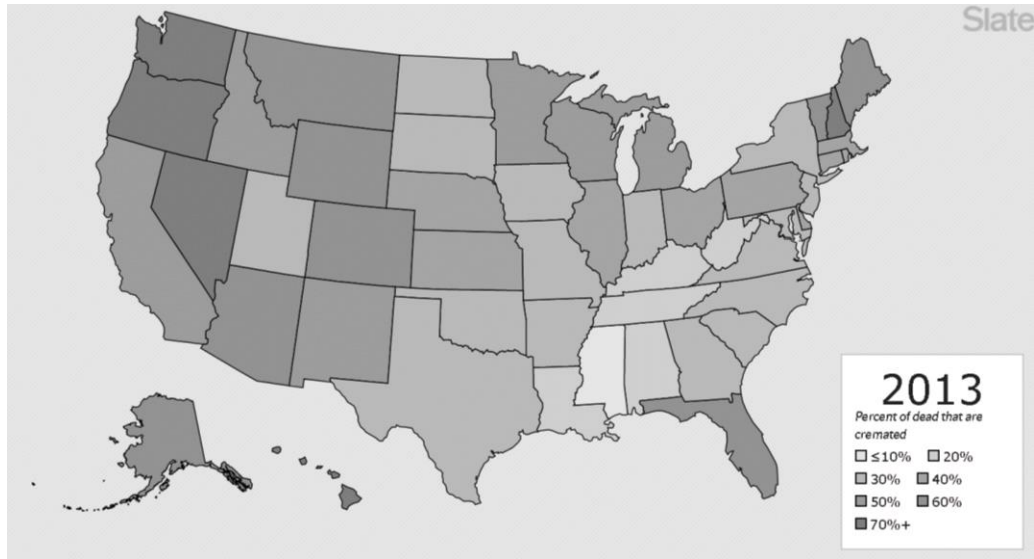


Figure 8.5 Hawai'i Ranks 72% in 2013 in the amount of cremation. (Image Source: NFDA)

Christianity ranked in at forty-seven percent make-up of the survey participants.

Traditional ground burials in caskets with the use of embalming fluids are typical of specific Christian burial methods as they believed in the second coming of Christ and needed the deceased bodies intact rather than cremated for the resurrection based on biblical references. The Catholic religion ranked second highest who also recommend traditional ground burials rather than cremation. Most of the Catholic participants were in alignment with their respective rituals of burials such as ground burials and cremation. However, a few Christian participants opted for cremation and scattering of ashes at sea when most Christian belief systems reflect that cremation is a pagan act. However, although it may or may not be a deviation these instances can serve as potential religious reinterpretation responding to urban development pressures and sustainability.

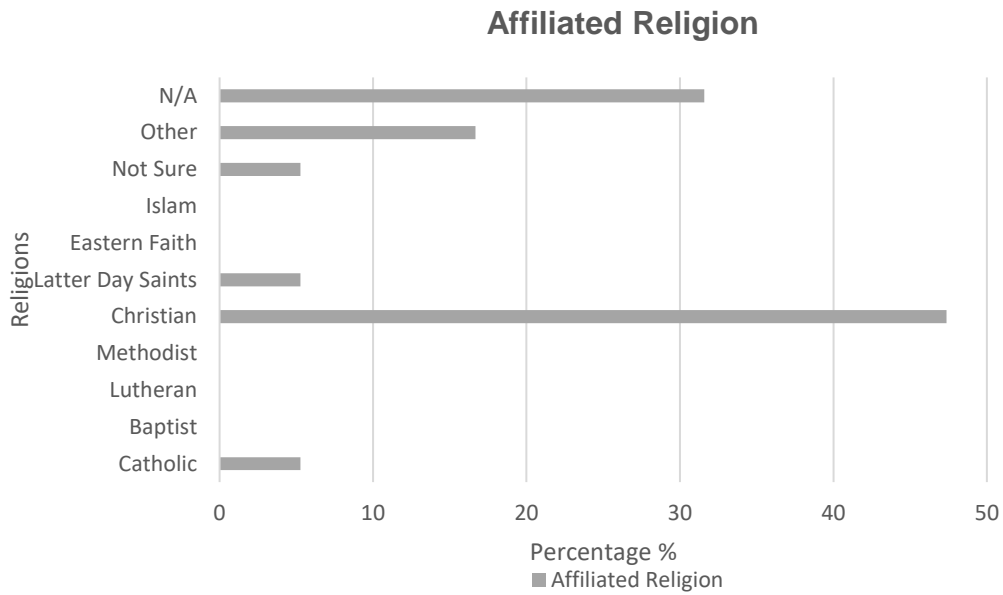


Figure 8.6 Participants affiliated with a religion. (Source: generated by Joern Ryan Vallesteros)

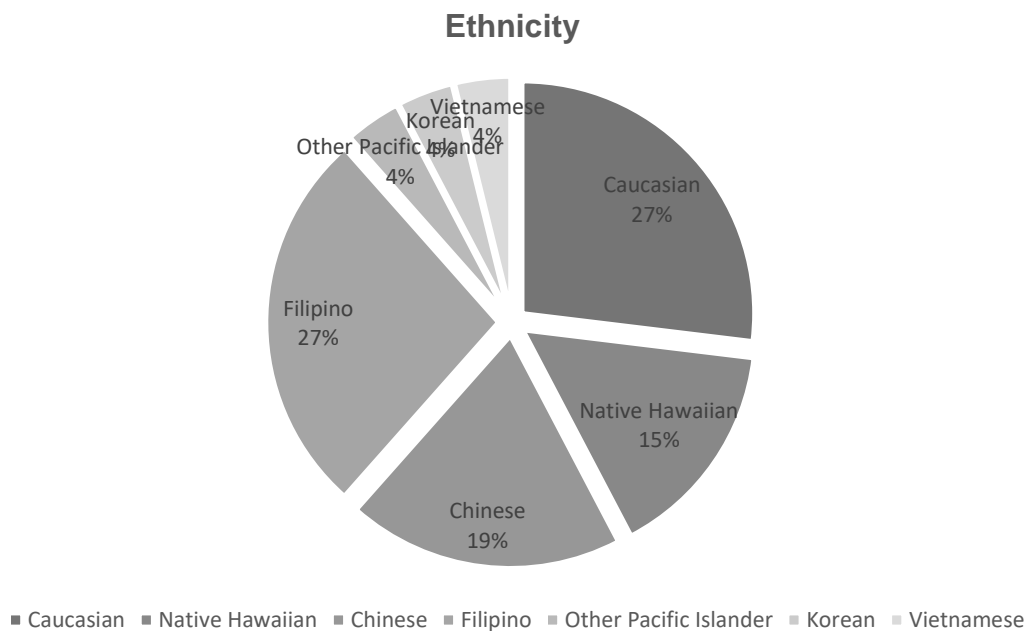


Figure 8.7 Ethnicity of Survey Participants (Source: generated by Joern Ryan Vallesteros)

## **8.7 Interview**

### **8.7.1 Interview with Bishop Larry Silva of the Diocese Honolulu**

In my interview with Bishop Clarence “Larry” Silva, we discussed the Catholic religion perspectives on the topic of this dissertation. Bishop Silva had been appointed as the fifth Bishop of the Diocese of Honolulu and was kind enough to discuss the importance of sustainability of cemeteries in Honolulu. The interview consists of a series of open-ended questions prompted after a brief presentation of the research findings in this dissertation. Bishop Silva’s responses illustrated the types of relationships the Catholic church system in Honolulu has with other stakeholders involved with death care, indicating the church's goals and limitations in this subject matter.

The interview began with a brief overview of the research topic explaining the goals from the conceptual framework organized for this dissertation. Once the overview had been presented Bishop Silva initially pointed out cultural differences in funeral customs between Hawai`i and his former home in Oakland, California saying “Normally burials are immediately followed after death around three to four days” whereas most customs in Hawai`i prolong the funeral mourning period for a longer time. The focus on time from death to burial also had Bishop Silva discuss his religious understanding of embalming saying “Embalming is not in the doctrine” thus it is not something that the Catholic faith strongly opposes but rather is influenced by the cultural customs and the Hawai`i DOH regulations. As mentioned in chapter four, no state law requires embalming of bodies, however since most customs prolong the time of death to burial with ongoing funeral services the process of embalming is needed for the preservation

of the body. Bishop Silva is firmly aware of the hierarchy of factors influencing different procedures of dealing with the deceased limiting control for different stakeholder's.

Although it was noted earlier in this dissertation about the topic of cremation being allowed in the Roman Catholic faith, I had asked Bishop Silva on his thoughts of the cremation method and his awareness of the consensus within his church congregation on those choosing to be cremated. Bishop Silva's responses were consistent saying that "Cremation is allowed" because of the main Vatican announcing that it was permitted back in 1963.<sup>82</sup> However, Bishop Silva also noted that the cremation ashes should be kept in a safe spot and mentions that "Scattering of ashes is not permitted." Responses from the conducted survey identified Catholic's choosing to have ashes scattered at sea which is another favorite trend here in Hawai'i. Sustainability is also trending in the operations of religions today in Hawai'i illustrating deeper connection with the environment.

---

<sup>82</sup> Gallagher, Delia. Daniel Burke and James Masters. "Vatican Issues Guidelines on Cremation, Says No to Scattering Ashes" CNN World News October 25, 2016

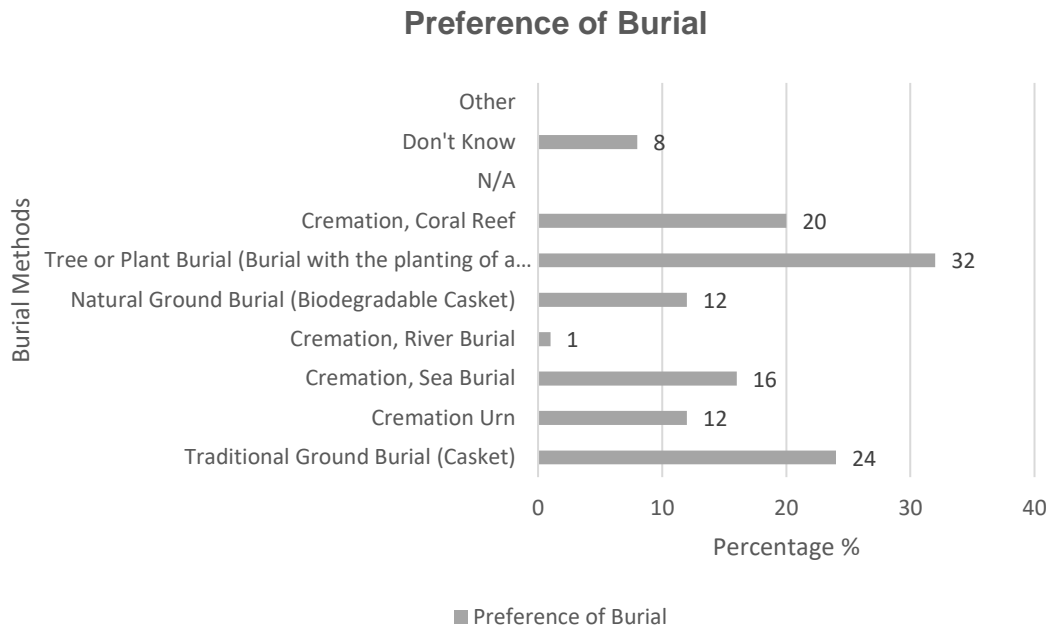


Figure 8.8 Preference of Burial methods responses from survey Participants (Source: generated by Joern Ryan Vallesteros)

Several parish cemeteries on the island are own by the Catholic group; most well-known is the Roman Catholic Cemetery on King Street, one of the case study cemeteries in this dissertation. Although the RCC is now closed most of its members are buried in the other parish owned plots of Hawai`i Memorial Park and Valley of the Temple Cemetery. I had asked Bishop Larry Silva about the concern for inurnment and interment spaces, and he had mentioned that there were ideas of providing additional inurnment spaces in the existing Roman Catholic Cemetery. “We thought of adding columbarium spaces alongside the perimeters of the cemetery. However, historical preservation regulations made it hard to do so,” said Bishop Silva with concerns for the capacity of cemeteries. In the process, Bishop Silva indicated that the church administration works with a sustainability consultant for projects they propose, cemetery plots were one of the projects on the list. Although these initial ideas concerning space

conservation and sustainability were thoughtful Bishop Silva expressed the limitations also set by cemetery operators and funerary businesses.

### **Correlational/Statistics Summary Findings**

Relationships between age, religion, culture, ethnicity, home

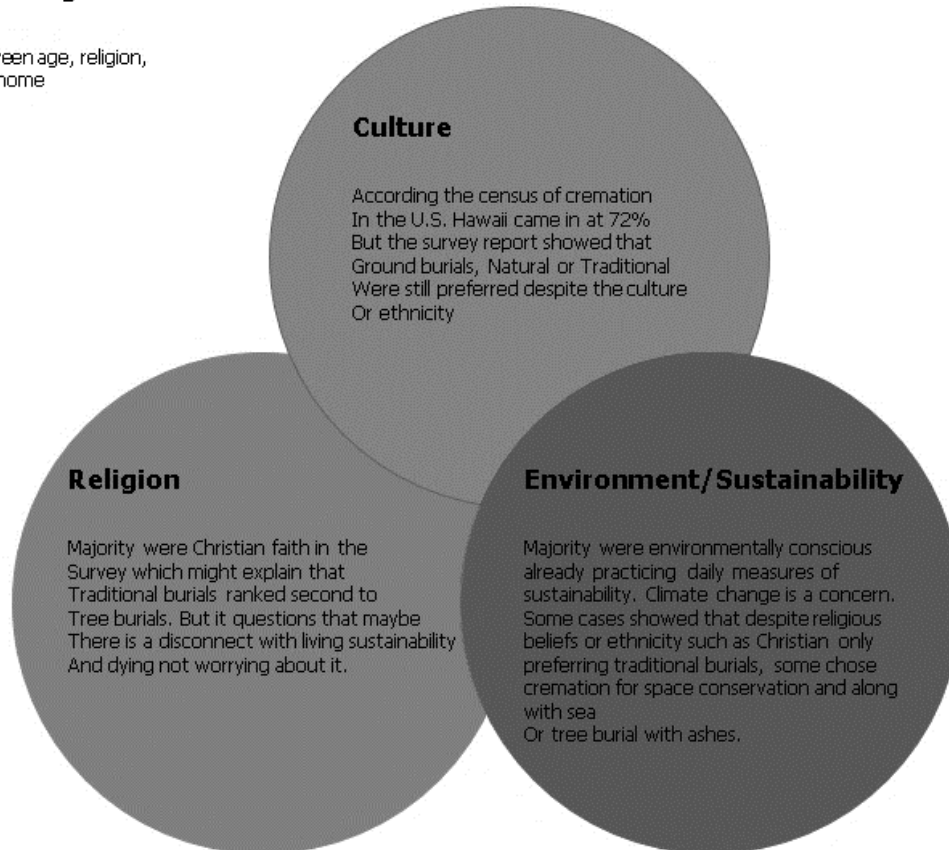


Figure 8.9 Relationship between Culture, Religion, and Environment. Image generated by Joern Ryan Vallesteros

Religious groups highly influential to cemetery operators and funerary goods and services providers because they make up the other party in a transaction. However, most times there is a hierarchy in who has more control of influencing trends in the realm of death care even though there are associations maintain ethical operations. Based on the typology study of cemeteries Church graveyards were cemeteries that had direct control from the respective religious group whereas proprietary cemeteries do not offer full control of a section of plots owned by the religious group. For example, the

interview conducted asked Bishop Larry Silva on his thoughts on natural burials saying “It is not against Catholic teachings, but it is rare under current circumstances because of funeral customs” referring to the extended period of viewing and visitations before burials here in Hawai`i. Bishop Silva expressed that the infrastructure is not there for natural burials and that their cemetery suppliers do not have the tools to do so. Again, this is the disconnect between the stakeholders; the religious groups, Federal Trade Commission, Department of Health, Funerary Businesses and the public, information is inconsistent or intentionally left out.

## **CHAPTER 9: Concept Design**

### **9.1. Design Approach**

Even with the amount of data to perform trajectory predictions, we can speculate how design may manifest over time, especially in the case of ecological and landscape design. The site selected is in urban Honolulu within the Nu'uaniu watershed area for the proposal of a future ecological urban cemetery. The proposed site is the recreational park called 'A'ala Park, located near Honolulu harbor and at the gateways to Chinatown near the central business district. The approach used for the proposed design application pays careful attention to existing, changing and future site conditions up to a century from today. Although 'A'ala park is infamous for high drug activity and homelessness it is a place within the Nu'uaniu watershed which is rich in both culture and religion.

Based on the research performed, a theoretical framework is put in place to conceptualize a design for a future urban ecological vertical cemetery. The synthesis of data from historical, ecological and religious sources provided a strong foundation for responding to the research. Research data from the case studies and correlational studies identified real-world issues affected by problematic urban development and social influences. This design concept investigates different architectural strategies towards a rational design to which it responds to the contextual issues. Spatial mapping, studies, site survey and field reports were all exercised to gain clear sources of information. After investigation and architectural studies, a design rationale was created. Also, a management plan based on the SITES sustainable certification agency was



generated to maintain the life of the theoretically designed cemetery along with a masterplan concept for the entirety of the surrounding context.

## **9.2 Nu‘uanu Watershed Field Research**

‘A‘ala park lies within the Nu‘uanu watershed and despite ‘A‘ala park’s reputation for high drug activity and homelessness the area of Nu‘uanu holds significant spirituality based on the numerous churches and temples, cemeteries, and historical sites.

Nu‘uanu in English translation means “Cool Height” and represents the amount of moisture in the upland area of the watershed.<sup>83</sup> The watershed is a vital entity to Hawai‘i in the pass and more importantly today. Several historic sites exist within this sacred watershed such as the ruins of King Kamehameha Palace and Queen Emma’s Summer Palace. When Nu‘uanu increased in density size, the pressures of development began to compromise the sanctity of the space and turned the once rural cemeteries into the public repositories for the interred today.

### **9.2.1 Cemeteries within Nu‘uanu Watershed**

Despite the densification of the Nu‘uanu watershed today, there are remnants of the most notable place with a significant number of famous cemeteries, numerous temples, and churches from different religions and pre-Hawaii history. There are at least 5-6 cemeteries on record within the Nu‘uanu watershed referenced in table 9.1 with famous ones such as Kawaiaha‘o cemetery and Honolulu Memorial park where royal Hawaiian ancestors are interred. One notable observation is that four of the cemeteries

---

<sup>83</sup> Atlas of Hawaiian Watersheds & Their Aquatic Resources. Nu‘uanu, O‘ahu. Watershed Features. DAR Watershed April 2008.

were adjacent to perennial streams which are vital for the sustenance of Nu'uuanu ahupua'a. The Waolani and Nu'uuanu stream flow from the headwaters of the Ko'olau ridge and converge into one right before the highway near the Foster Botanical Garden.

<sup>84</sup> Stream ecology is vital for the life of the land and is an imperative source of an ancient ahupua'a. In addition to the three case study cemeteries researched in this thesis, the cemeteries in O'ahu were additional case study sources for the development of a design concept. Observing the relationship between the cemeteries and the stream is supplemental as the three case study cemeteries did not have existing water bodies adjacent.

<b><u>Cemeteries/Memorial Parks within Nu'uuanu Watershed</u></b>	<b><u>Location within watershed (Upland, Midland, and lowlands)</u></b>
Chapel Cemetery	Midland
City Memorial Park	Midland
Honolulu Memorial Park	Midland
Kawaiaha'o Cemetery	Lowland
Nu'uuanu Memorial Park & Mortuary	Midland
O'ahu Cemetery & Crematory	Midland
Uluhaimalama	Midland (Summit of Punchbowl)

Table 9.1. List of Cemeteries located in Nu'uuanu watershed generated by Joern Ryan Vallesteros referenced from google maps.

Having a cemetery near a water body would serve as a potential place for the scattering of ashes, the streams are essential to the watershed because they are the receptacles for the land runoff. Majority of these cemeteries adjacent to the stream are

<sup>84</sup> Atlas of Hawaiian Watersheds & Their Aquatic Resources. Nu'uuanu, O'ahu. Watershed Features. DAR Watershed April 2008.

inurnment cemeteries. The O'ahu cemetery and crematory has a columbarium space located a few yards from the Waolani stream and has no physical perimeter boundaries on the outside cemetery grounds. Through observation, site and sound were notable as the stream was a natural element enhancing the space. There was wildlife activity with duck's swimming in the stream, and the rustling of the trees from a wind breeze was not only heard, but they are also felt as well. The idea of biophilia or man returning to nature seemed present in the cemetery grounds and disregarded the surrounding urban neighborhood. This setting allowed for the intimate and private atmosphere of the space. The single functionality because of separation of space for these cemeteries is carried on by traditional customs with the means of not mixing in recreational spaces. Also, most Asian cultures find it taboo to live near a cemetery because of cultural speculations.



Figure 9.1 Picture of the O'ahu cemetery Columbarium taken January 31<sup>st</sup> by Joern Ryan Vallesteros.

The Honolulu Memorial Park is located 'Ewa of Nu'uaniu stream on a hill sloping down towards to the stream. While observing other components within the context of the cemetery, there are churches north of the burial grounds which have a strong relation to the cemetery as this relationship is a commensal relationship where one space benefits from one another. Commensalism is a term used in ecology to describe the relationship between two organisms, mutualism is the relationship where both organisms benefit from one unharmed and parasitism is also another type of relationship where one organism benefits from the other at the same time is harmed. In figure 9.2 the diagrams generated are from the base map of Honolulu memorial park indicated spatial adjacencies, activity, physical or visual boundaries and so forth. A mid-rise apartment complex is located adjacent south of the memorial park and shares a driveway road to both spaces which can be observed as mutualism, but the drive also acts as the physical boundary separating the burial grounds from the living. It is safe to speculate however that the surrounding community is family survivors of the nearby cemeteries with plots owned by them.

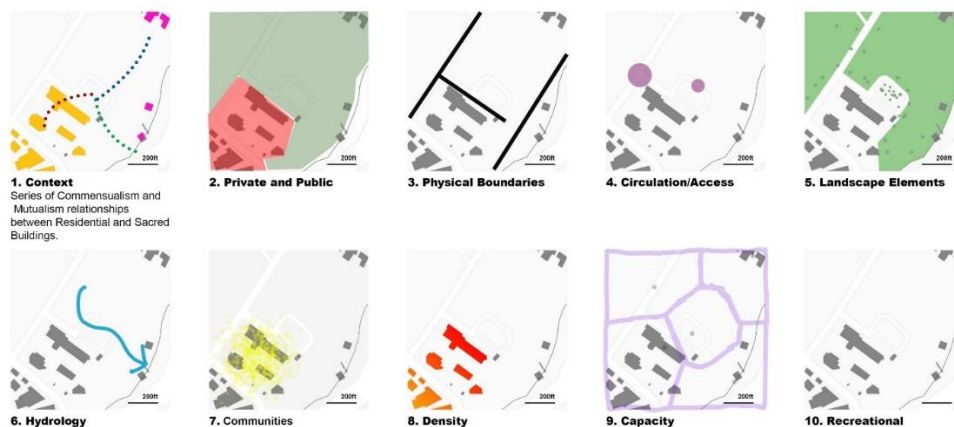


Figure 9.2 Diagrams are showing spatial relationships between various points of interest. Diagrams generated by Joern Ryan Vallesteros, referenced google maps for the base.

The Uluhaimala Cemetery is another cemetery located within the watershed east of the Pauoa stream and near the northwest side of punchbowls summit. Pauoa stream does not connect to the Nu'uuanu and Waolani stream but feeds into the river body in which those streams are converged from. Auwaiolimu street divides the cemetery in half with the upper grounds in an unkempt state. However, some sections appear to be newer with more recent interred while the lower grounds are well maintained as seen in figure 9.3.



Figure 9.3. Ulumaihala Cemetery Lower grounds. The photo was taken by Joern Ryan Vallesteros.

Near the lower grounds of the cemetery, there are residential houses located on the same lot parcel indicating a mutual relationship between the living and the dead. Near the Pauoa stream is a bridge leading to another small portion of the cemetery grounds that appear to be family owned and quite generously spacious in plot sizes as they were not the typical orthogonal spacing one may find in typical cemeteries. The bridge is often used by locals crossing through the neighborhood as a group of

teenagers was seen during my field research site analysis. Also, fishing in these streams via the bridge access can be speculated as well, describing the relationship the cemetery has with the stream. The bridge reflects the upkeep of the cemetery and appears to be in good condition which also states a sense of community involvement in the area regarding respect for the lower grounds.



Figure 9.4 Ulumaihala Lower Grounds Cemetery Bridge. Photo Taken by Joern Ryan Vallesteros

## 9.2 Foster Botanical Garden (FBG)

Another point of interest in the Nu‘uanu watershed and a supplement to the design concept is the Foster Botanical Garden located in the lowland area of the watershed. Located in the gardens are numerous species of trees both native and endemic to Hawaii along with historical elements of Hawaii’s history. The gardens are also located next to the stream convergence and near the H1 highway system. FBG also supports a space reserved for community gardens for nearby residence to plant fruits and veggies of their desire. There is a small fee to own the adequately sized

garden space and has mainly drawn an attraction to the elderly residence. Community gardens are quality spaces that foster community engagement and brings both locals and visitors to FBG daily. FBG also performs their own soil composting on-site which is an ecological and sustainable process to maintaining the health of the gardens. A Chinese temple also neighbors the gardens inviting the local Chinese from Chinatown and all over to foster ceremonial events. There is also a flower and plant sale for nearby flower shops in Chinatown becoming a local commodity to neighborhood consumers. The flower and plant sale can also be positively affected by cemeteries near for funerary services. FBG also serves as an educational resource inviting young children and scholars to study the gardens and contribute to research agendas that are currently active such as this dissertation.



Figure 9.5. Photo of the community gardens pathway between the garden plots.  
Photo Taken by Joern Ryan Vallesteros.

### 9.3 Izumo Tashakyo of Hawaii and Lum Sai Ho Tang Temples

Closer to the immediately proposed site of the design concept there are more elements connected to the midland areas in the watershed, for example, there is both a Japanese and Chinese temple located near North Kukui along the hard edges of the converged stream banks. The Izumo Taishakyo Mission of Hawaii temple is a definite tourist attraction inviting numerous Japanese visitors as well as locals. Lum Sai Ho Tong is a Chinese temple where both local and foreign Chinese come to visit. Even more relevant to this dissertation are the mortuaries located near the proposed site, and there are a few of them within a mile radius. The Borthwick Mortuary and Hosoi Garden Mortuary are also located on North Kukui Street headed east. These religious and memorial spaces of interest extend the sacredness of the Nu'uuanu watershed area towards the lowlands and to the estuary waters of Honolulu Harbor.



Figure 9.6. Photo of the Izumo Taishakyo Mission of Hawaii temple on a rainy day near North Kukui Street. Photo was taken by Joern Ryan Vallesteros



## **9.4 Homeless and Drug Activity**

Within the immediate surroundings of the proposed site 'A'ala Park, there are high volumes of homeless and drug activity despite the number of Chinese locals gathering to the Chinese cultural plaza nearby. 'A'ala Park is recognized as a park for the homeless and discourages much of the community recreational activity. The grim appearance of these threats is also supplemented by the amount of pollution in the area. Despite the points of poverty in the area, there are non-profit organizations in the vicinity that help the less fortunate. Organizations such as Aloha United Way and the salvation army are all advocates for supporting the homeless. However, they do not supply housing shelter even though there are tent cities located near the buildings of these organizations.

## **9.5 Site Analysis of proposed site for design conceptualization.**

### **9.5.1 History of The Site**

'A'ala park is a recreational park located on a triangular parcel near downtown Honolulu. The park was established in 1899 soon after the Nu'uuanu stream was constructed with hard boundaries. In it, the park housed two baseball diamonds and a bandstand. Baseball was a huge thing in the 1900's for the residents of the 'A'ala park area drawing crowds of fans supporting their local teams. This type of activity pulls

people into the site, providing an amenity to the city.<sup>85</sup> Streetcars were also used for public transportation at the time and remains of the track can be spotted on the lanes for buses only. Unlike today's conditions of 'A'ala Park, most of the community are less engaged to come to the park, not seeing it as an amenity and lacking a sense of ownership despite recent efforts in trying to reclaim the park. Through my experience, I was always scared to enter or pass through the park, at most I would occupy the skatepark and skate.

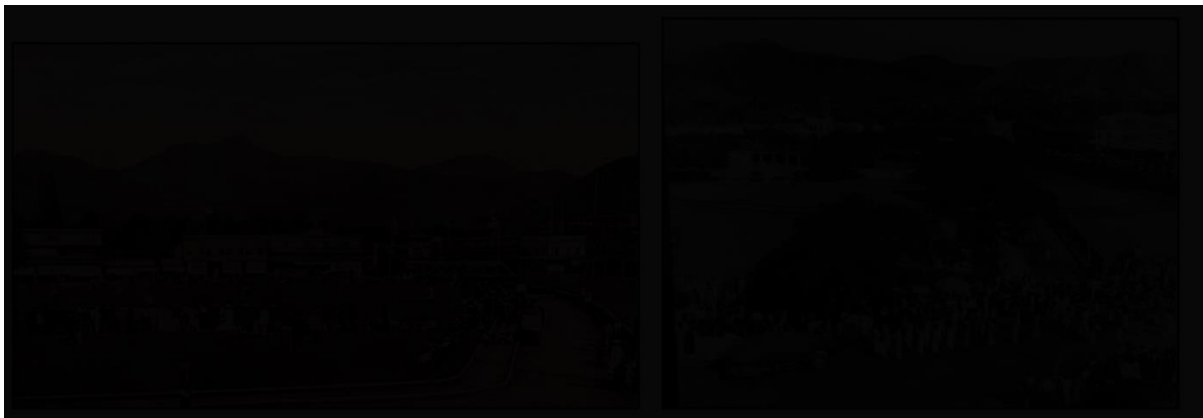


Figure 9.7 'A'ala park circa 1904 during "Streetcar Days in Honolulu."<sup>86</sup>

### 9.5.2 Zoning

'A'ala is 6.69 acres large and is split into two different tax map key parcels from east to west. These two parcels are classified differently; the lower parcel is classified as P-2 general, and the upper parcel is classified under three different zonings which are A-2 for medium density, BMX-3 for business mix used community and P-2 for general.<sup>87</sup> The surrounding zones include Business mix used areas within Chinatown,

---

<sup>85</sup> "A'ala Park" Hawaii History. <http://www.hawaiihistory.org/index.cfm?fuseaction=ig.page&PageID=550> Electronic Source Accessed February 7<sup>th</sup>, 2018.

<sup>86</sup> Simpson, MacKinnon. "Street Car Days in Honolulu" Honolulu Advertised 2002. Electronic Source accessed February 7<sup>th</sup> 2018

<sup>87</sup> 280 King Street. City & County of Honolulu, Department of Planning & Permitting. <http://gis.hicentral.com/pubwebsite/TMKDetails.aspx?tmk=17027002> Electronic Source Accessed March 6<sup>th</sup> 2018.

and medium to high-density residences in the housing area. Figure 9.8 shows the array of zones; with a diverse amount of zoning classifications, the eclectic community is an advantage feature in considering the proposed design based on their needs.



Figure 9.8 Tax Map Key two parcels for one park<sup>88</sup>



Figure 9.9 Diagrams of Zoning, Accessibility, Circulation, Natural Elements of 'A'ala Park. Generated by Joern Ryan Vallesteros.

<sup>88</sup> 280 King Street. City & County of Honolulu, Department of Planning & Permitting.  
<http://gis.hicentral.com/pubwebsite/TMKDetails.aspx?tmk=17027002> Electronic Source Accessed March 6<sup>th</sup> 2018.

### 9.5.2 Circulation, Accessibility for pedestrian and vehicles

Circulation and accessibility were exciting elements within the park and outside. Through observation of the site, there was an instance of certain phenomena taking place. Not many users were traversing through the park, whether it be a leisure stroll or a shortcut between blocks. Depending on the time of day, the feeling of safety is compromised. I felt that the park paths were underutilized mainly because of people feeling nervous around the homeless community. Again, this phenomenon is unfortunate for the community and segregates rather than integrate different people together. Vehicular accessibility is adequate on the east side of the park. However the one-way street on the south west corner of the park makes it difficult to reach the entry point. Primarily, the sidewalks on the perimeter of the parks were mainly except for the south edge of the perimeter near the river edge, most likely because of safety being compromised.



Figure 9.10 South Perimeter of 'A'ala park riverfront walkway. Photo was taken by Joern Ryan Vallesteros

### 9.5.3 Natural elements (vegetation, annual water rain, soil, topo)

At first glance during the observation, the natural elements of the park appear to be not thriving. Area's of patchy grass and unsettled dirt showcase a lack of maintenance performed on the park. Street trees are mature in age and size providing comfort and shade for pedestrians, and small-scale gardens with a bit of plant variety are appreciated by park dwellers. During the rainy seasons between October and March, the monthly average amount of rainfall is three inches shown in figure 9.11. Upon rainfall, the hydrology is easy going due to the subtle topography of the site. The highest point is located near the center of the park, and the lowest elevation point with a difference of negative eight to ten feet is near the south-west corner of the park. The topo makes sense because of the parcel's flood classification which accounts for the hundred-year flood and the rising sea level.

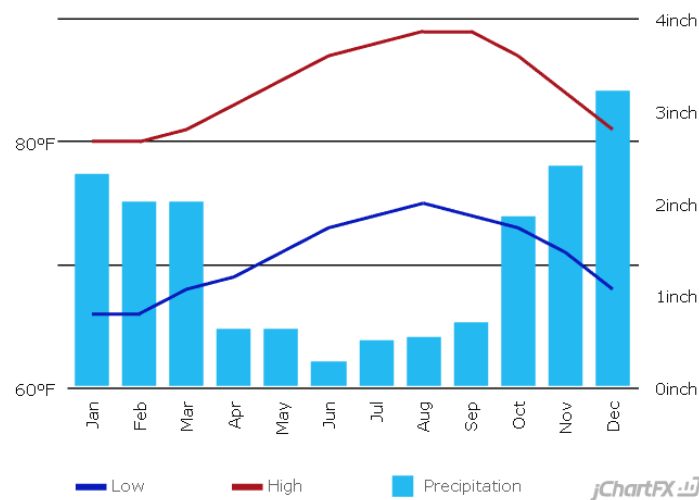


Figure 9.11 Climate Data for Honolulu, High and Low temperatures, and annual precipitation.<sup>89</sup>

<sup>89</sup> "Climate Honolulu – Hawaii". U.S Climate Data. 2018  
<https://www.usclimatedata.com/climate/honolulu/hawaii/united-states/ushi0026> 2018 Electronic Source Accessed February 7<sup>th</sup>, 2018.

Based on the soil atlas provided by the College of Tropical Agriculture and Human Resources CTAHR via GIS, the soil conditions in 'A'ala park are well-suited for a broad range of agriculture which includes sugarcane and diversified crops.<sup>90</sup> The soil fertility class is moderate and well-supplied in calcium, magnesium, and potassium with an acidity rating of 6.6-7.8 pH (neutral). Also, water holding capacity is moderate with adequate permeability because of typical dry conditions in the park, soil atlas advises irrigation on site.<sup>91</sup> Since the soil levels are in a neutral state, it is the reason why bones are found in Hawai'i's soils because they are preserved rather than disintegrated. However, as mentioned in chapter six of body decomposition, the humidity will affect the rate of decomposition in soils there it would be an issue here for Hawai'i.

#### **9.5.4 Spatial studies**

Inclusive to the site analysis, a series of spatial studies took into consideration the existing elements both in and out of the site to investigate types of relationships. These studies identified strong surrounding elements and are categorized individually for specificity and type. One of the studies is titled "trajectory" seen in figure 9.12 and illustrates the connection of the site with adjacent high-rise buildings through the extension of building footprints. The study showed a potential concentration area for the programming to take place possibly. Water velocity and street tree clusters were natural elements of interest used for the spatial studies and mapped out different points of the site relating to those elements. Views were also fundamental in establishing a

---

<sup>90</sup> "Soil Atlas" CTAHR 2018 <http://gis.ctahr.hawaii.edu/SoilAtlas/Map#> Electronic Source Accessed February 8<sup>th</sup> 2018.

<sup>91</sup> "Soil Atlas" CTAHR 2018 <http://gis.ctahr.hawaii.edu/SoilAtlas/Map#> Electronic Source Accessed February 8<sup>th</sup> 2018.

connection to the site as they are visual cues to ideating the program. Two other intricate spatial studies adopted both the Voronoi and delaughney methods. Interestingly, the Voronoi diagram took all the surrounding hotspot areas and connected every portion of the site; this was either an advantage or disadvantage to the building program. However, the concept of Voronoi diagrams is essentially an artform; the art of “decomposition.” Thus, this concept became the descriptor word and footing for the design proposal of the urban ecological cemetery.

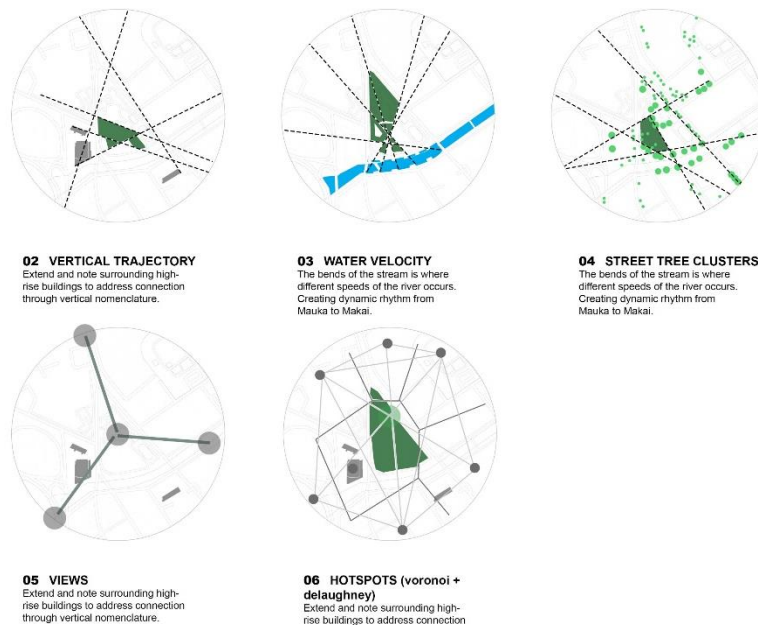


Figure 9.12 Diagrams of Spatial Studies for ‘A’ala Park. Generated by Joern Ryan Vallesteros

### 9.5.5 SWOTS

A strength, weakness, opportunities and threats analysis were conveyed and noted for the development of the design. Some of the site's strengths were the inherent size of the two parcels which is relatively adequate for nearly six hundred plot spaces per acre and reflects a seventy-year capacity per acre. The weakness of the site is the soil conditions because of lack of it appearing fertile although soil atlas identifies that they are fertile. Opportunities for the site include the reprogramming and multi-

functionality of open space and the natural topography playing to the advantage of program placement. The threats are most obviously the issues of homelessness compromising safety and segregating the community. Above all the SWOTS support the conceptual framework in detailing the proposed design.

### **9.5.6 Design Principles**

Five fundamental design principles were developed for the foundation of the design proposal, each emphasizing the sensitivity around the topic of life and death. The first design principle is titled “Sacredness of Life” which aims to maintain the sanctity of space both preserving and respecting religious and cultural freedom in burial practices (see figure 9.13) The second design principle is termed “Ecology” and focuses on integrating traditional and contemporary landscape management practices with ecological end of life choices. “Memory” is the third design principle which maintains disclosure and record keeping of the deceased through means of both traditional and modern methods such as headstones and GPS respectively. The fourth design principle is called “Community” with the goal to provide quality open space for events and activities engaging the community; gardens, dog parks, and public recreational areas are entities recommended. Future growth is the fifth design principle and looks at maintaining thorough management plans with ongoing schedule assessments based on the SITES certification standards by USGBC. These principles are vital to the success of the design and the prosperity of both the living and the remembered community.





Figure 9.13 Five Key Design Principles for the Design Proposal. Image generated by Joern Ryan Vallesteros

### 9.5.7 Programming

The programming was influenced and reinterpreted based on the National Cemetery Association design criteria narrative for National cemeteries. Permanently the operational components in the program were adopted as the base logistics of the design proposal and then modified to emphasize the integration of ecological end of life choices and cemetery landscapes. Ideally, the most significant spaces of the program are the burial spaces measuring up to 92,620 square feet in size. The back of house spaces come in at the second largest whereas the admin spaces are third most extensive and the public info center as the fourth largest at 1,220 square feet. Since the size of the park parcel is a generous 6.9 acres, the burial spaces are strategically planned over three phases to maintain capacity over an expected time of over two hundred years or so.

Ideally, the program is also modified to create a multifunctional building and open space that caters to everyone in the community while preserving sanctity from the first design principle. Education and Human resource services are essential components of the program to help promote green burials and acknowledge these methods concept of biophilia or the feeling of nature being a source of healing. The program chart can be viewed in Appendix F and G of this dissertation. In figure 9.14 the program distribution also shows the depth of the spaces most notably in the burial grounds because of the cubic volume being a significant piece of dimension information. During phases of verticality, the depth of the burial grounds is vital to the allocation of plot spaces for graves of both internment and inurnment.

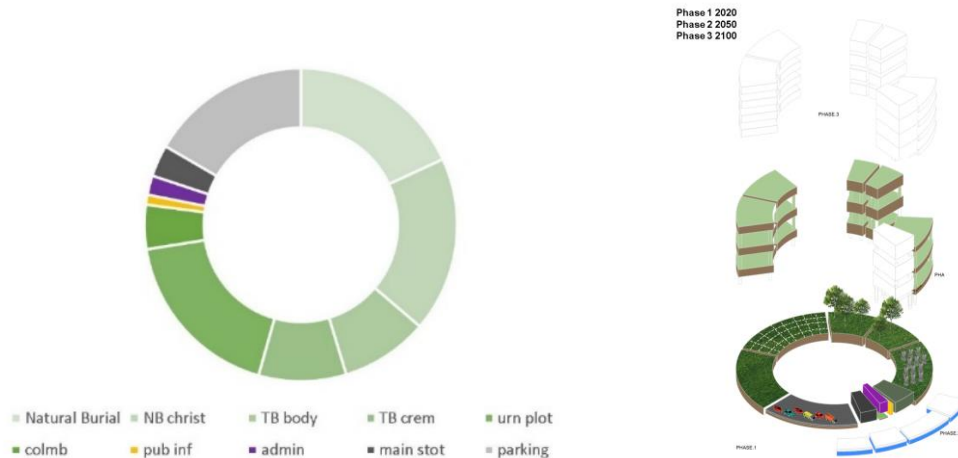


Figure 9.14 2d and 3d Pie Chart of program distribution of the proposed cemetery design. Generated by Joern Ryan Vallesteros.

### 9.5.8 Program Adjacency

The program adjacency diagrams generated in figures 9.15-9.18 are generated from the NCA design criteria narrative and then modified based on the emphasis of the design principles. Although the spaces are organized on a single planar level, they have

been modified to set up phase two and three and respond to the SWOT analysis performed. Service roads, cortege assembly areas, drop off and pick up and road entries all delineate a horizontal circulation but does not show the vertical circulation essential to the vertical construction of the cemetery.

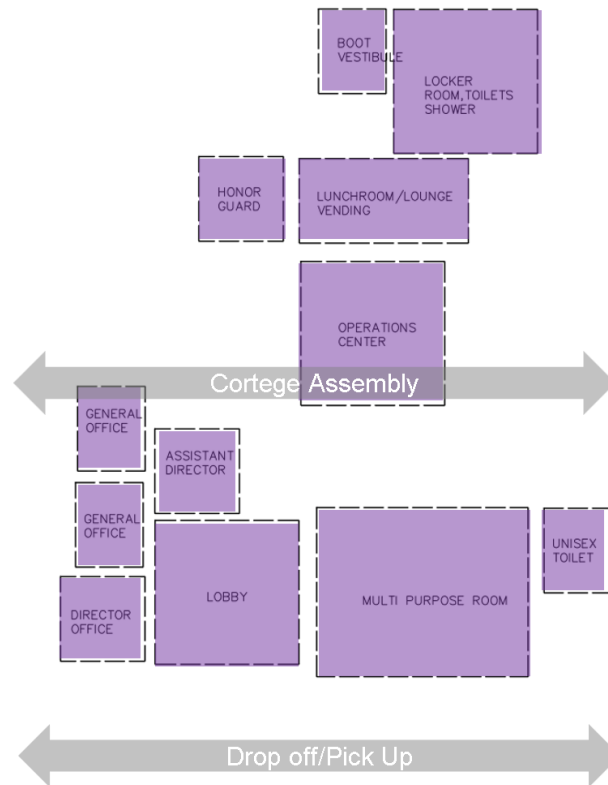


Figure 9.15 Program Adjacency of Admin Spaces. Generated from the National Cemetery Association Design Criteria Narrative

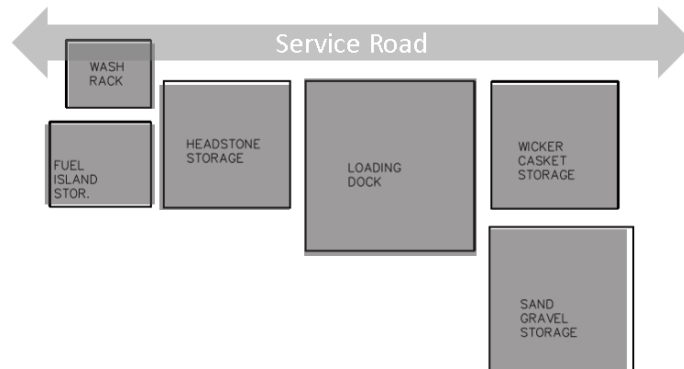


Figure 9.16 Program Adjacency of Back of house spaces. Generated from the National Cemetery Association Design Criteria Narrative

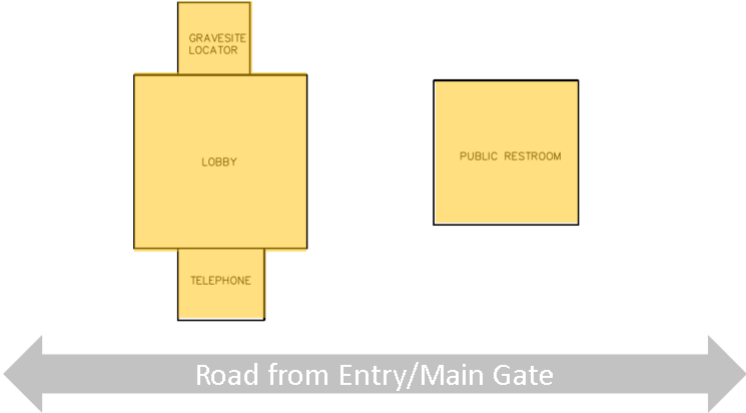


Figure 9.17 Program Adjacency of Public Information Spaces. Generated from the National Cemetery Association Design Criteria Narrative

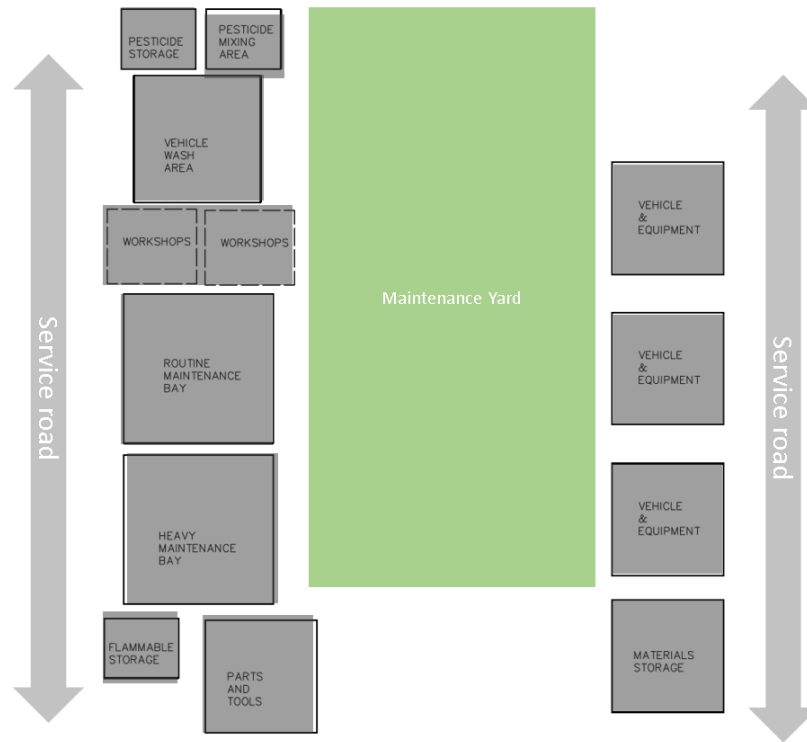


Figure 9.18 Program Adjacency of Maintenance Spaces. Generated from the National Cemetery Association Design Criteria Narrative

### 9.5.9 Form Studies

Upon calculating program area dimensions, the appropriate sizes were then scaled to perform massing studies of how the program will relate to the site. The first trials of massing were dispersing pieces of the program throughout the site whereas few other trials tested the program to fit in a more vertical form. Keeping in mind, the FAR or floor area ratio in Hawaii is noted in the LUO or land use ordinances regulating your building footprint to building height. Based on the research performed, the notions of urban gestures, and typology studies of urban buildings expressed the idea of building up, therefore, the urban cemetery intended to withstand the pressures of urban development and will be designed as a vertical cemetery as shown figure 9.19 “BB

Stand-Up” massing. Additionally, the versatility of the cemetery expresses numerous symbolism of spiritual hierarchy, life, and religious analogies.

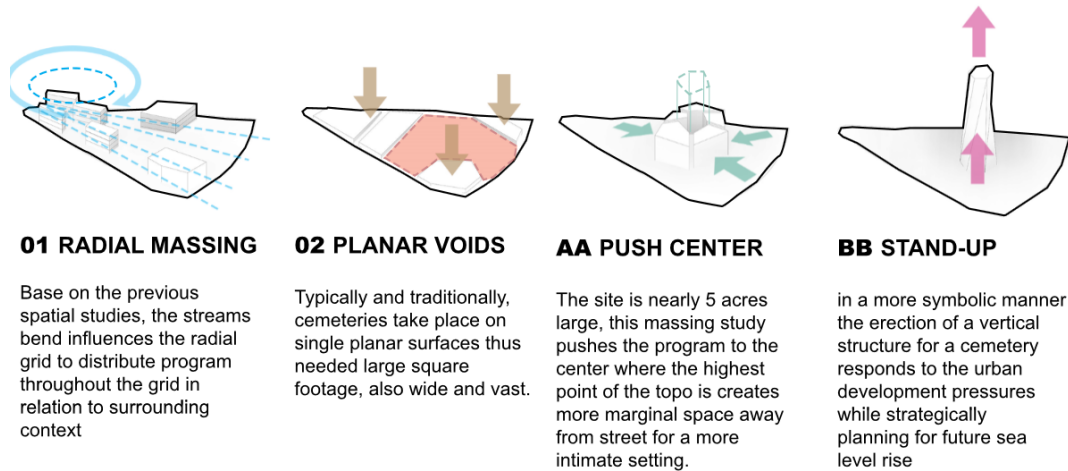


Figure 9.19 Massing Studies Generated by Joern Ryan Vallesteros

## 9.6 Design Rational

After the site analysis, spatial and massing studies, the design of the cemetery progressively came to fruition from one iteration to the next. In collaboration with my mentors mainly with Professor Simon Bussiere, the design of the cemetery considers and responds to significant feedback for the consistency of the research performed. The five design principles are fulfilled and carried out by the concept design and actively carry on for the phases across a centuries time.



Figure 9.20 3d Rendering of Proposed Vertical Cemetery. Generated by Joern Ryan Vallesteros

The vertical cemetery is comprised of three towers merging into one as a symbolic gesture of community or teamwork and stands fifty stories' high in the regulation of Honolulu's LUO max height code. The building is inspired by the ancient oracle tower as shown in figure 9.21 in which the Hawaiian's would use to pray to the gods and leave offerings such as fruit. Although the tower stands fifty stories' high, some levels are intentionally removed to allow for both double and triple volume heights for tree burials. Each floor will differ in plate thickness based on the burial type and will measure double or triple volume heights for the trees to reach full maturity. However, the tree's will be small to medium species capping at fifteen to twenty feet high.

The connection to the site takes place in the podium like a form of the vertical cemetery. The park is a general triangle establishing a dominant shape and based on the spatial studies the lower part of the vertical cemetery curves outward in the direction of important surrounding context. For example, the new pedestrian bridge from the

south end, the affordable housing area from the northeast and the commercial/industrial area from the west are all vital elements in the site context where the vertical cemetery begins the slight curvature and erecting into the tower.

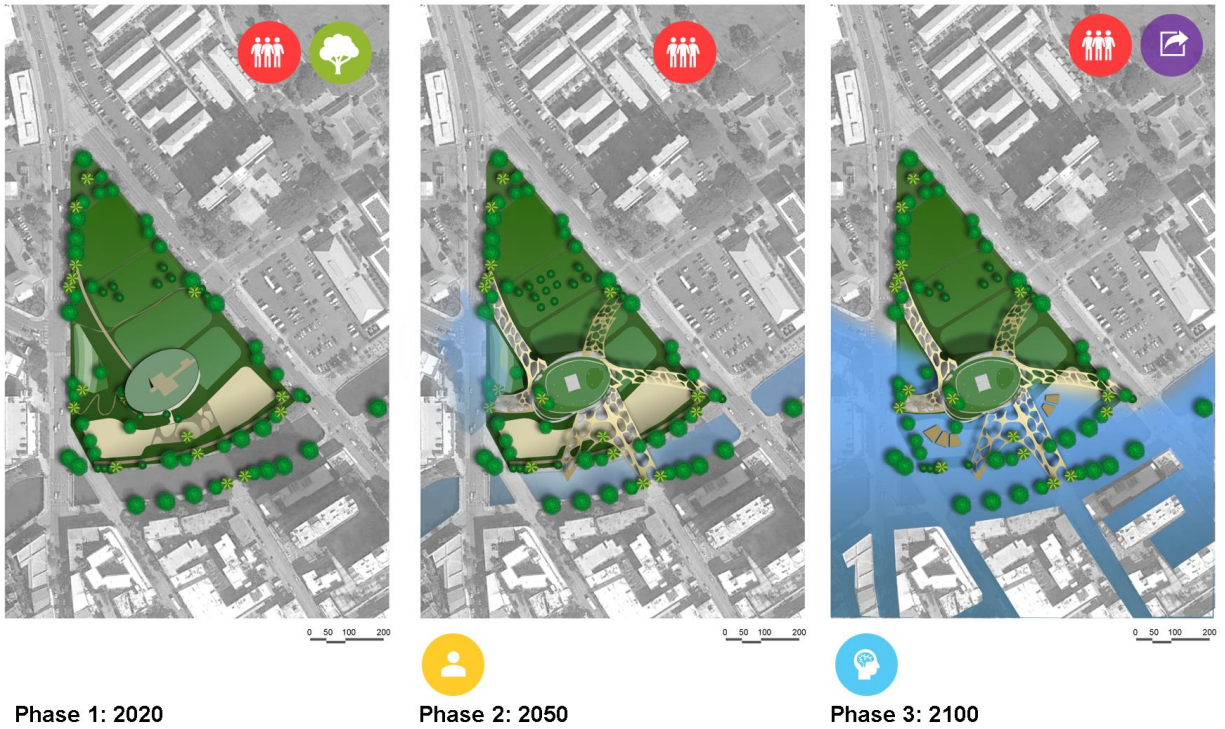


Figure 9.21 Site Plan rendering of phases over time. Generated by Joern Ryan Vallesteros

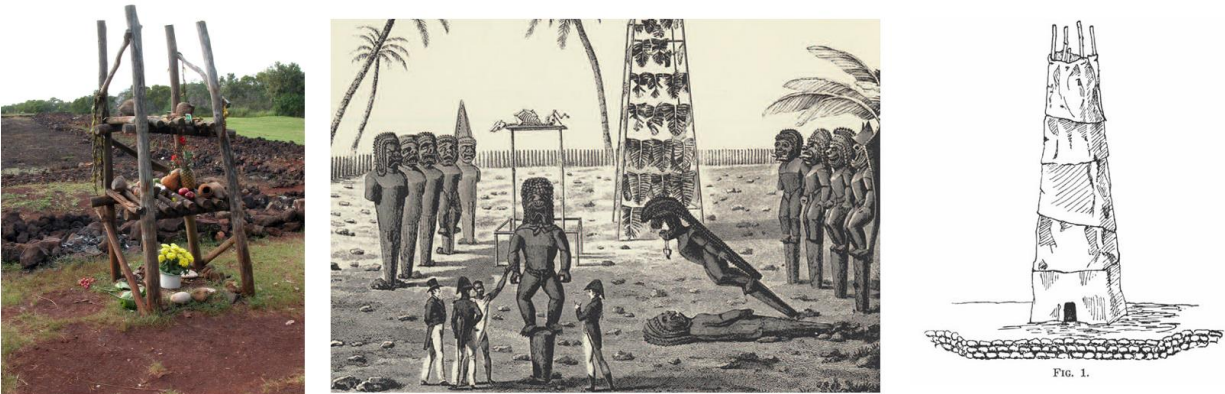




Figure 9.22 Images of oracle towers. Source<sup>92</sup>

The form of the tower took on several different iterations to connect with cultural and religious attributes from the research. Instead, the round cylindrical hourglass form was an iteration that was more a foreign object placed on the site appearing almost as an afterthought as shown in figure 9.23. Following the hourglass iteration is the twisting oracle tower which symbolized movement, rhythm, and life for a program that houses death. However, the form was dominantly literal to that of an actual oracle tower and did not convey ideas of urban integration. The third and rationalized final form took into consideration the phases over time and the goal for future reprogramming. For example, the top portion of the cemetery almost looks residential and introduces the thought of a mix-used cemetery that incorporates both the living and the dead.

---

<sup>92</sup> Redmond, Jodee. Hawaii Burial Methods. Love to Know 2014

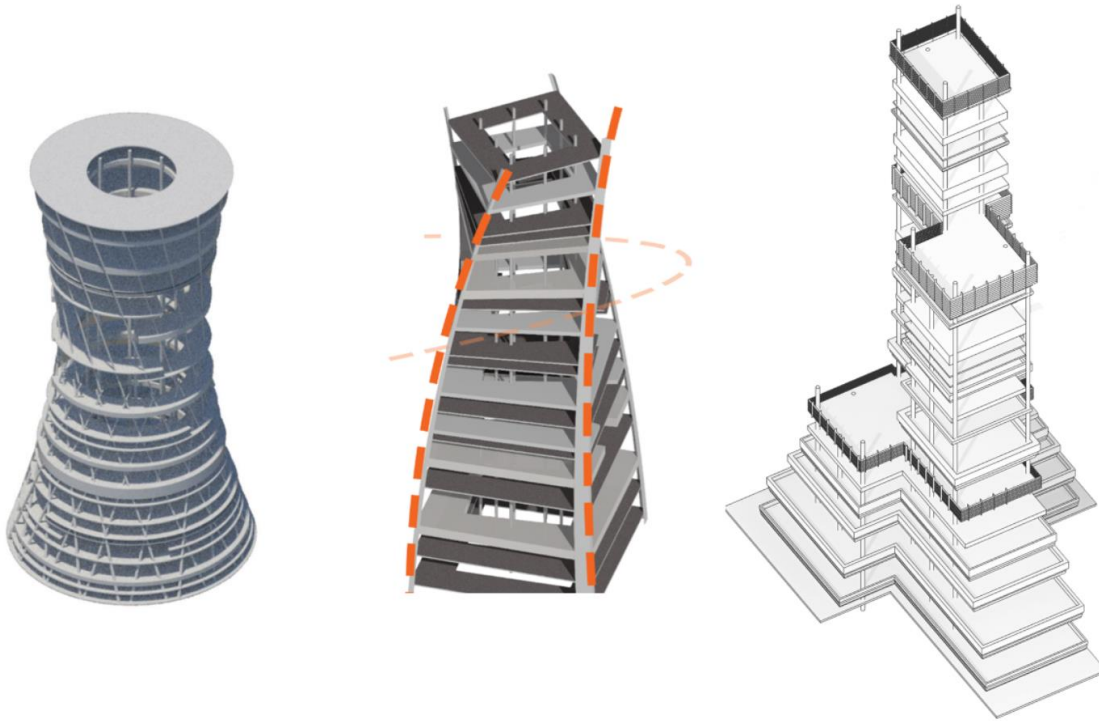


Figure 9.23 Progression Iterations of Vertical Cemetery. Generated by Joern Ryan Vallesteros

The burial spaces as shown in figure 9.24 were the focus in the program and the priority when it came to designing the vertical cemetery. Keeping in mind, the five design principles are incorporated into the architecture of the cemetery. Future growth is considered because the step pyramid structure allows for additional floors to be erected, however, because the burial plot spaces overcompensate the population growth, birth, and death ratio, the projected amount of years until capacity will take place far in the future. On this basis, the life expectancy of the building is expected to carry more than a hundred years. It would be an excellent idea to incorporate this Avant Garde goal within the petals of the Living Building Challenge.

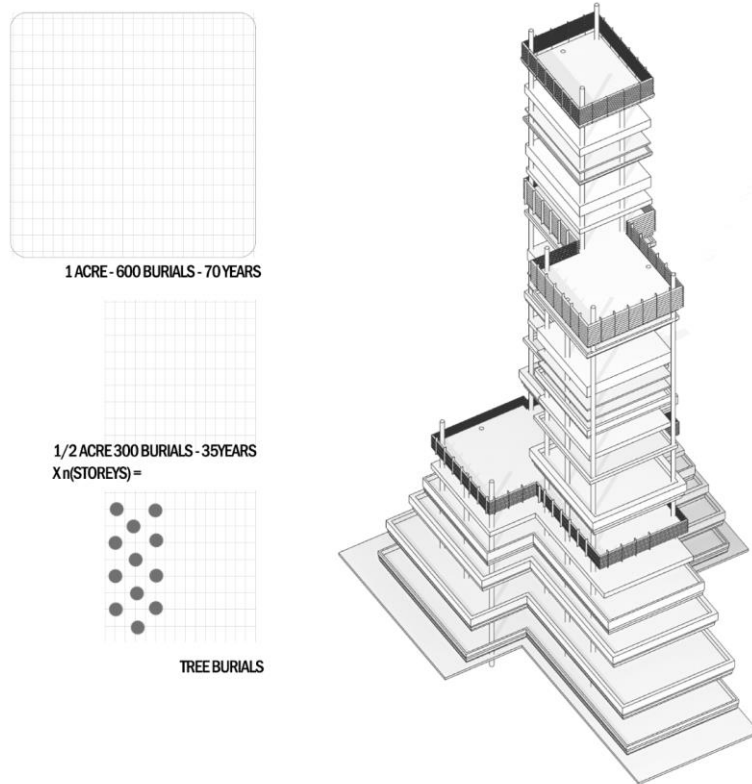


Figure 9.24 Burial Plots per floor level. Generated by Joern Ryan Vallesteros

The floor plates are also not just for burial grounds; the program is mostly entirely on the lower level in the podium area where it sits above the base flood elevation in the lower half parcel. In between, there are floor levels for recreational use such as sky parks or community gardens and dog parks as a neighborhood amenity for the community. Indeed, one of the principles is to maintain sacredness, and that is done so in the inherent vertical design of the cemetery.

Memory is also important and tested in the floor plate studies as seen in figure 9.25 and 9.26. In figure 9.25 the floor plates indicate different thickness for the different burial types, in this organization the relationship between the different burial spaces and

ecology of the structure aims to work in harmony. For example, the most profound floor plates are eight feet higher than the recreational floor plates and serve as a potential opportunity to integrate columbaria into the retaining walls. The insisted topography of the plates also manages the water towards the central core for retainment, cleaning, and potable usage. On-site composting is also managed on site.

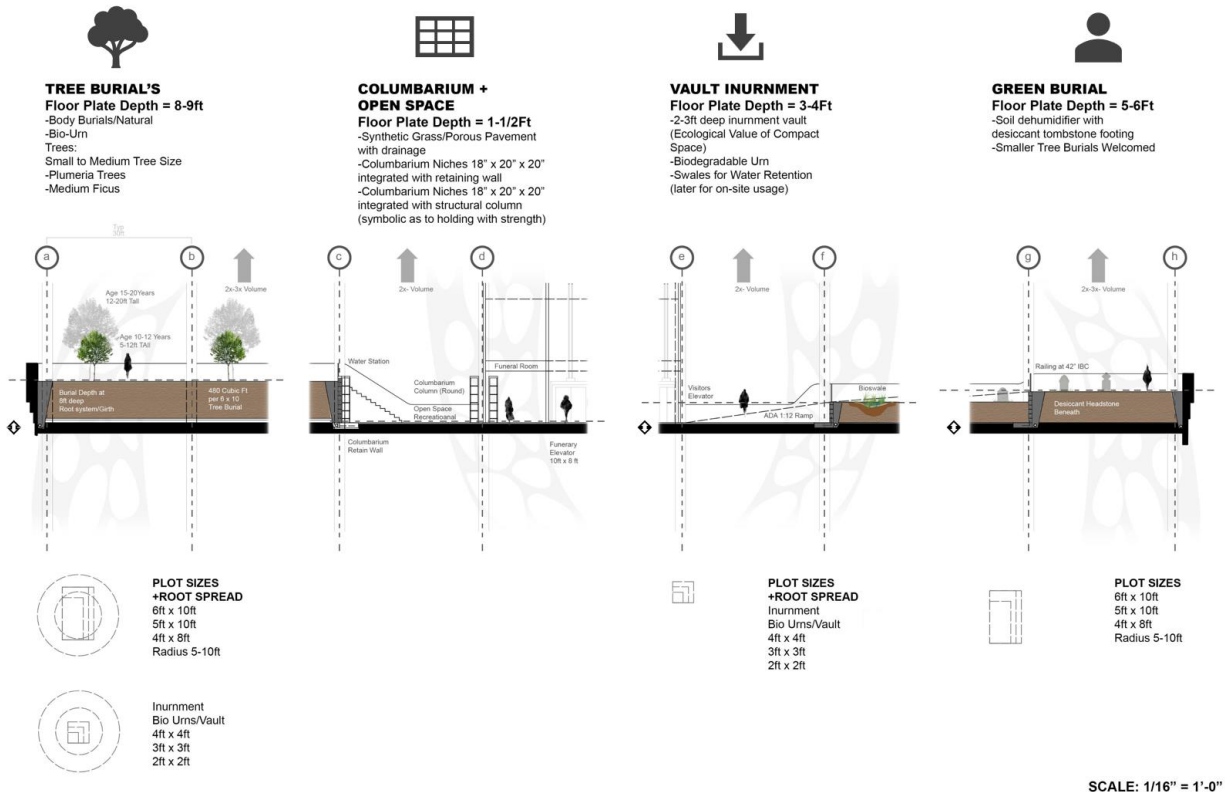


Figure 9.25 Section Cut testing burial floor plates and interment/inurnment methods. Generated by Joern Ryan Vallesteros

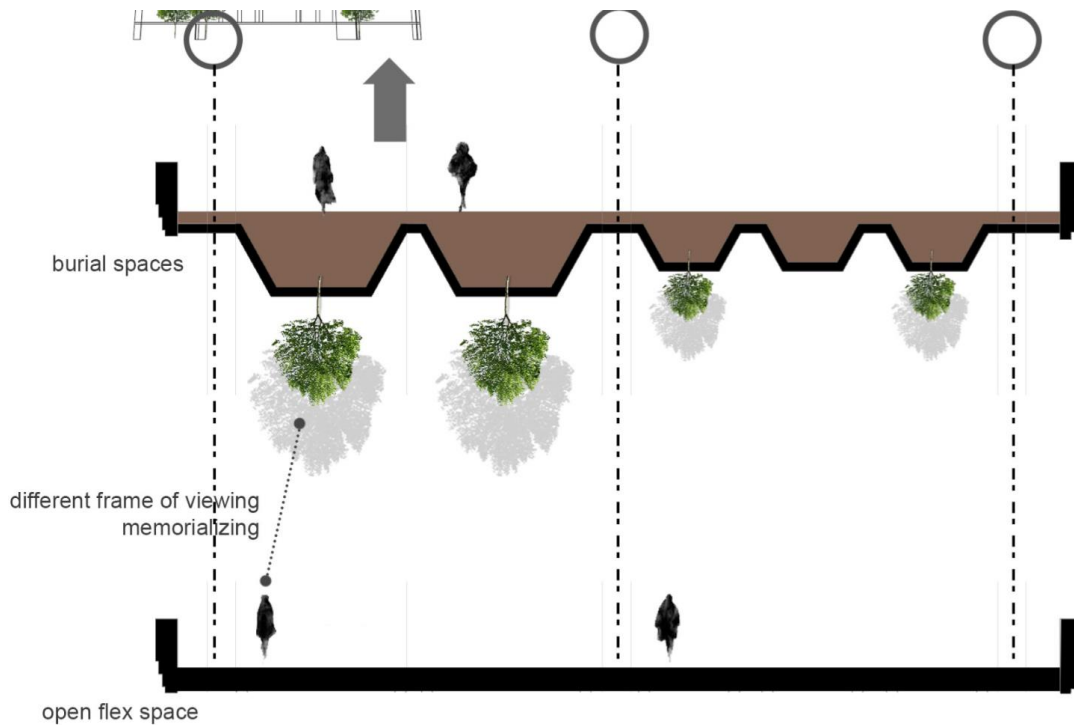


Figure 9.26 Progression Iterations of Floor Plate Section. Generated by Joern Ryan Vallesteros

In figure 9.26 the floor plates were reiterated to take on a new method of memorialization, one that is symbolic the vertical design. Figure 9.26 shows the burial grounds protruding into the form of the floor plate and is viewed from the lower level beneath. Also, the suspension of trees creates this sense of connection different than typical burials in the ground. The idea of looking up as a metaphor for looking towards a higher power, entity or calling is the gesture in this design.

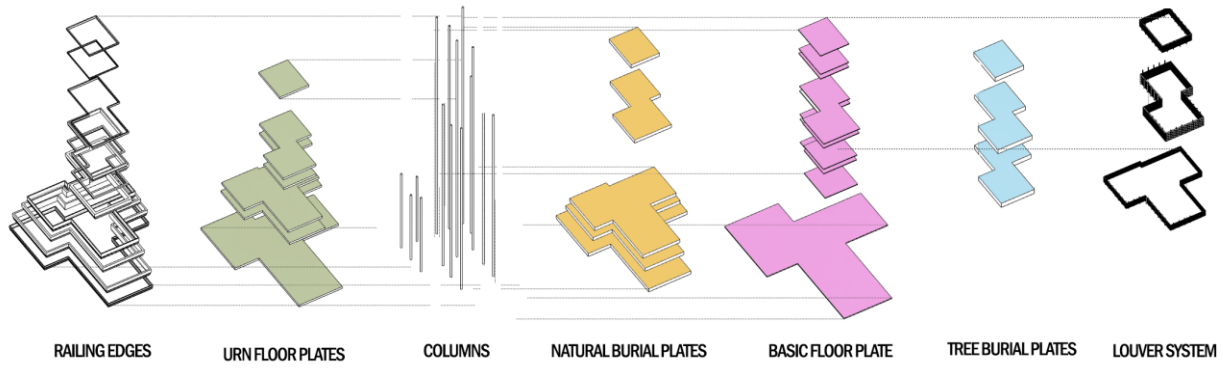


Figure 9.27 Exploded Axon of Vertical Cemetery Tower. Levels of Burial Grounds. Generated by Joern Ryan Vallesteros



Figure 9.28 3d Renderings of Vertical Cemetery. Generated by Joern Ryan Vallesteros

## **CHAPTER 10: Conclusion**

### **10.1 Summary**

Cemeteries in Honolulu are challenged with the pressures of urban development and unfortunately become a forgotten relic for a few of them. City planners and designers should be equipped with such skillset in managing future growth of the city and incorporating agendas of sustainability into cemeteries with other all spaces in Honolulu. Funerary businesses also play a considerable role in consumerism affecting burial and funeral trends monitored by the FCA and NDFA. Amongst the crucial stakeholders involved in the research of this dissertation are religious groups in Honolulu because they can influence trends of burial methods and funeral services.

The results from the case study research identified physical elements in urban spaces and or open spaces familiar to city planners and designers and can be used as vital information to implementing policy and regulation for sustainable cemeteries, green burials, and a more inclusive urban environment. The concept of grave arrangements in the case study research is analogous to the planning of urban spaces so much so that strategic pre-planning is necessary for the longevity, life, and capacity of the space. The results from the case study research also directly support funerary businesses, religious groups, and targeted age groups by measuring adverse effects of traditional ground burials and cremation in Honolulu.

The survey responses and collection of data for measuring trajectory in burial logistics indicated the vitality of time. After gathering numbers from the case study cemeteries, calculations were performed to measure burial capacity rates and potential

movements in public attitudes towards ecological cemeteries. The age group ranging from eighteen to thirty is the ideal target age group speculate the manifestation of increasing green burial trends.

An interview with a religious group leader who is also a significant stakeholder in the topic identified the relationship between religion and ecology. Bishop Larry Silva of the Diocese in Honolulu provided vital information that was both compliant with the research and holds potential for ongoing development or research. The takeaway was the concern for lack of infrastructure in certain cemeteries where Bishop Larry Silva's church owns plots in. Cemetery operators are not keen to an abrupt transition towards natural burials because trends will need to take time and are often then capitalized by most funerary businesses.

The results from the application of a conceptual design showcased potential design narratives carefully responding to the research questions and significance of the identified problem. Approaches of reinterpretation and adaptation were utilized rationally in the result of a vertical cemetery. The issues of demand for burial space, integration of ecological end of life choices and Hawai'i landscape management practices potentially had been resolved in the process of developing the conceptual design.

## **10.2 Conclusion**

The data and findings from the research were pointed out both consistencies and inconsistencies within the literature review. Much of the findings from the case study research had several implications of

## **10.3 Interpretation**



## 10.4 Recommendations

### Bibliography

- [1] Adams, Barbara. *Egyptian Mummies*. Aylesbury: Shire Publications, Ltd., 1984.  
Brewer, Douglas, and Emily Teeter. *Egypt and the Egyptians*. Cambridge:  
Cambridge University Press: 1999.
- [2] Afla, Mohamed and Mohamed Reza. *Sustainability of Urban Cemeteries and the Transformation of Malay Burial Practices in Kuala Lumpur Metropolitan Region*. World Academy of Science, Engineering and Technology International Journal of Humanities and Social Sciences Vol 6. 11<sup>th</sup> November 2012.
- [3] “Aloha + Challenge” <http://www.hawaii greengrowth.org/aloha-challenge> Published by Hawai'i Green Growth 2016. Electronic Source accessed December 7<sup>th</sup>, 2017.
- [4] Atlas of Hawaiian Watersheds & Their Aquatic Resources. *Nu'uauu, O'ahu*. Watershed Features. DAR Watershed April 2008.
- [5] Bernal, Guillermo. *Cultural Adaptations: Tools for Evidence-Based Practice with Diverse Populations*. American Psychological Association, 2012.
- [6] Cemetery Travel. *Cemetery of the Week #48: Kawaiaha'o Churchyard*. Cemetery Travel, 26<sup>th</sup> January 2012. <https://cemeterytravel.com/2012/01/26/cemetery-of-the-week-48-kawaiahao-churchyard/>. Accessed via web 1<sup>st</sup>, November 2017.
- [7] “Chapter 22 Mortuaries, Cemeteries, Embalmers, Undertakers, and Mortuary Authorities” Title 11 Administrative Rules Department of Health Hawaii. Dec 7<sup>th</sup>, 1981
- [8] Clayden, Andy; Trish Green, Jenny Hocky, Mark Powell. *Natural Burial: Landscape, Practice, and Experience*. Routledge, Jul 17, 2014
- [9] Cleghorn, June Noelani Johnson. 1987 *“Hawaiian Burial Reconsidered: An Archaeological Analysis.”* Order No. 1331952, University of Hawaii.
- [10] “Climate Honolulu – Hawaii”. U.S Climate Data. 2018  
<https://www.usclimatedata.com/climate/honolulu/hawaii/united-states/ushi0026> 2018  
Electronic Source Accessed February 7<sup>th</sup>, 2018.
- [11] Davies, Douglas, Hannah Rumble. *Natural Burial: Traditional – Secular Spiritualities and Funeral Innovation*, A&C Black 2012.
- [12] Dhiman, Satiner. Joan Marques. *Spirituality and Sustainability: New Horizons and Exemplary Approaches*. Springer, 13<sup>th</sup> June 2016
- [13] Doris, Francis. *Cemeteries as Cultural Landscapes*. Museum of International Folk Art, Santa Fe, New Mexico, USA. Mortality, Vol. 8, No.2, 2003

- [14] Dow, Steven; Susan Wyche. *Designing for Place in Urban Cemeteries*. Published by Georgia Institute of Technology 2008
- [15] *Egyptian Mummification*  
<http://www.spurlock.illinois.edu/exhibits/online/mummification/artifacts6.html>  
 published by Illinois Spurlock Museum of World Cultures 2016. Electronic source accessed January 7<sup>th</sup>, 2018
- [16] Ehrlich, Steven. *Steven Ehrlich Architects: Multicultural Modernism*. Images Publishing 25<sup>th</sup> November 2006.
- [17] Engler, Mira E. *Designing America's Waste Landscapes*. JHU Press, 26<sup>th</sup> April 2004.
- [18] Falvey, Lindsay. *Religion and Agriculture: Sustainability in Christianity and Buddhism*. Lindsay Falvey, 2005.
- [19] Fogli, D. *Techniques of Decomposition of Bodies Adopted in Cemeteries and Their Relations with the Environment*. May 2009, Electronic Source Accessed Jan 28, 2018
- [20] Forman, Richard T. T. "Urban Ecology: Science of Cities. Cambridge University Press, Feb 2014 pg 3
- [21] "Frequently Asked Questions" <https://www.valley-of-the-temples.com/offerings/faqs/>  
 Published by Valley of the Temples, 2017. Electronic Source Accessed February 2<sup>nd</sup>, 20178.
- [22] Gallagher, Delia. Daniel Burke and James Masters. "Vatican Issues Guidelines on Cremation, Says No to Scattering Ashes" CNN World News October 25, 2016.
- [23] Greece, Meg. *Rest in Peace: A History of American Cemeteries*. Twenty-First Century Books, 2008.
- [24] Green Burial Council. "Green Burial Council Cemetery Certification Standards" Published by Green Burial Council <https://greenburialcouncil.org/> March 6<sup>th</sup>, 2015. Electronic Source accessed December 07<sup>th</sup> 2017
- [25] Green Burial Council. "The Science Behind Green and Conventional Burial; In Lay Terms." Published by Green Burial Council 2016. Electronic Source Accessed Dec 17<sup>th</sup>, 2017
- [26] Green, Laura C., and Martha Warren Beckwith. 1926. "Hawaiian Customs and Beliefs Relating to Sickness and Death." *American Anthropologist* 28
- [27] Greenfield, Rebecca. Our First Public Parks: The Forgotten History of Cemeteries. *The Atlantic*, March 16, 2011.

- [28] Groat, Linda N. ; David Wang. *Architectural Research Methods Second Edition*. Published by John Wiley & Sons, Inc. 2013
- [29] Haas, Michael. *Multicultural Hawaii: The Fabric of Multiethnic Society*. Taylor and Frances published 1998.
- [30] Helber Hastert and Fee, Planners. "Hawaiian Memorial Park Cemetery Expansion; Draft Environmental Impact Statement" May 2008.
- [31] Heffern, Ray. "Lay Your Loved Ones to Rest the Natural Way" Published by the National Catholic Reporter on April 21<sup>st</sup>, 2009.
- [32] Hennigan, Tom; Jean Lightner. "The Ecology Book" Published by New Leaf Publishing Group, April 15<sup>th</sup> 2013.
- [33] Higgins, Jessica Faith. "Deathscapes: Designing Contemporary Landscapes to Solve Modern Issues in Cemeteries. Published by Texas Tech University, 2010.
- [34] Hoffner, Ann. "Why Are 12% of Green Burial Cemeteries Catholic?" Published by Green Burial Naturally website:  
<https://www.greenburialnaturally.org/blog/2017/2/6/why-are-there-so-many-catholic-green-burial-cemeteries> February 7th, 2017. Electronic source accessed via web March 2<sup>nd</sup>, 2018
- [35] *How it's Made*. Discovery Channel. 2015.  
[https://www.youtube.com/watch?v=85GYWH\\_rerQ](https://www.youtube.com/watch?v=85GYWH_rerQ) Film Accessed March 2<sup>nd</sup>, 2018.
- [36] John Grim; Mary Evelyn Tucker. *Ecology and Religion*. Island Press Jan 2, 2014
- [37] Mangieri, Gina. *What Lies beneath? As Kakaako Develops Up, Questions Raised About Infrastructure Below*. KHON 2 news, 30<sup>th</sup>, October 2017. Accessed via web 1<sup>st</sup>, December 2017.
- [38] Mariaca-Sullivan, Katherine (2011). *When a Loved One Dies*. Amherst, N.H.: Kaleidoscope Books.
- [39] Marzluff, John M. "Urban Ecology" Published by Springer 2008 pg 357
- [40] M-Gillies. "The 15 Types of Cemeteries" Mysendoff.  
<https://mysendoff.com/2012/05/the-15-types-of-cemeteries/> May 2012. Electronic Source accessed March 3<sup>rd</sup>, 2018.
- [41] Miller, James; Dan Smyer Yu and Peter Van Der Veer. *Religion and Ecological Sustainability in China*. Routledge, April 29, 2015.
- [42] Mio, Jeffery Scott, Lori Barker-Hackett, Jaydee Tumambing. *Multicultural Psychology: Understanding Our Diverse Communities*. Oxford University Press, 2012.

- [43] Mulholland, John F. *Hawaii's Religions*. Tuttle Publishing, 15<sup>th</sup> December 1989.
- [44] Mytum H.C. *Mortuary Monuments and Burial Grounds of the Historic Period*. Springer Science & Business Media 2004.
- [45] Myers, Patricia (2011). *Embracing the Teardrops: A Simple, Step-By-Step Guide to Planning a Funeral That Is Dignified, Memorable, and Affordable*. Bloomington, Ind.: XLibris.
- [46] Native Plants Hawaii. *Thespesia Populnea*.  
[http://nativeplants.hawaii.edu/plant/view/thespesia\\_populnea](http://nativeplants.hawaii.edu/plant/view/thespesia_populnea). Accessed via web 1<sup>st</sup>, December 2017
- [47] "Ohe makai" *Hawaii Ethnobotany Online Database*. Bernice P. Bishop Museum. Retrieved 2009-11-23.
- [48] Özkan B, Küçükerba E, Kaplan A, Aslan N (1996). Açık- Yeil alan Ve Rekreasyon Alanı Olarak Mezarlıkların Planlama ve Tasarımı Sorunları le Çözüm Olanaklarının zmir Kenti Örneinde Aratırılması. Ege Üniversitesi Aratırma Fonu Aratırma Raporu, Proje No: 1994/006, Bornova, zmir
- [49] Palazzo, Danilo and Frederick R. Steiner. *Urban Ecological Design: A Process for Regenerative Places, Volume 12*. Island Press, 22<sup>th</sup>, June 2012
- [50] Pitz, Marylynne (January 30, 2008). "Eternally green: Woodland burials are a natural alternative to an embalmed afterlife". *Pittsburgh Post-Gazette*. Retrieved September 6, 2014.
- [51] Richerson, Peter J. Morten H. Christiansen. *Cultural Evolution: Society, Technology, Language, and Religion*. MIT Press 1<sup>st</sup> November 2013.
- [52] Riker, Marina. *The Cost of Dying*. Hawaii Business, October 31,2016.
- [53] Rugg, Julie. *Defining the place of Burial: What Makes a cemetery a cemetery* Published by the University of York. The United Kingdom. Mortality Vol. 5, No. 3, 2000
- [54] Redmond, Jodee. *Hawaii Burial Methods*. Love to Know 2014
- [55] Rugg, Julie. *Defining the place of Burial: What Makes a cemetery a cemetery* Published by the University of York. The United Kingdom. Mortality Vol. 5, No. 3, 2000
- [56] Taylor, John H. *Egyptian Coffins* Aylesbury: Shire Publications, Ltd., 1989
- [57] Selkirk, Anthea J. *An Urban Cemetery: Weaving an Architectural Thread Between the Sacred and the City*. University of Memphis, 2014
- [58] Shanahan, Mike. *Why Fig Trees Are Critical to Health of Rainforest Ecosystems*. Chelsea Green Publishing 2016 December 7<sup>th</sup>.

- [59] Simpson, MacKinnon. "Street Car Days in Honolulu" Honolulu Advertised 2002. Electronic Source accessed February 7<sup>th</sup> 2018
- [60] Slocum, Josh; Carlson, Lisa (2011). *Final Rights: Reclaiming the American Way of Death*. Hinesburg, Vt.: Upper
- [61] "Soil Atlas" CTAHR 2018 <http://gis.ctahr.hawaii.edu/SoilAtlas/Map#> Electronic Source Accessed February 8<sup>th</sup> 2018.
- [62] Stevens, Hal. *How To Plan A Funeral*. CemeterySpot Inc. 2008  
 Summer, Peter O., and Christopher Balme. *Fusion of Cultures?* Rodopi 1996.
- [63] Spencer, A.J. *Death in Ancient Egypt*. New York: Penguin Books, 1982.
- [64] Speed, Barbara. "High-Rise Cemeteries Are Now a Thing"  
<https://www.citymetric.com/skylines/high-rise-cemeteries-are-now-thing-371>  
 Published my City Metric October 9<sup>th</sup>, 2014. Electronic source accessed March 03<sup>rd</sup> 2018.
- [65] "Urn" <https://en.wikipedia.org/wiki/Urn> Electronic Source Accessed Dec 07 2017
- [66] Uslu, Aysel; Emin Baris and Elmas Erdogan. *Ecological Concerns Over Cemeteries*. Ankara University of Agricultural Faculty Department of Landscape Architecture, Diskapi Ankara, Turkey. P
- [67] Valley Isle Memorial Park Cemetery. *General Price List*. August 9,2017
- [68] Valley Isle Memorial Park Cemetery. *Rules and Regulations*. August 2015
- [69] Walter T (1993). Dust not Ashes. *The American Preference for Burial*. Landscape, Berkeley, California, USA. 32(1): 42-48.
- [70] Weber, Austin "*The History of Caskets*" *Assembly Magazine*. Published October 2<sup>nd</sup>, 2009. Electronic source Accessed Feb 26, 2018
- [71] "*Why a Burial Vault*" <https://www.trigard.com/burial-vaults/why-a-burial-vault/>  
 Published by Triguard 2018. Electronic Source Accessed January 7<sup>th</sup>, 2018.
- [72] Ziegler, Alan C. "*Hawaiian Natural History, Ecology, and Evolution*" University of Hawaii Press, 2002.
- [73] *Fig Trees*. <https://www.alternet.org/environment/why-fig-trees-are-critical-health-rainforest-ecosystems>. Accessed 7<sup>th</sup> December 2017

[74] *13 Different Religious Perspectives on Cremation*

<https://www.everplans.com/articles/13-different-religious-perspectives-on-cremation>.  
Everplans. Electronic website accessed March 01st 2018.

[75] *74. Sacred Ficus – Assures Fertility to Human Progeny*. Herbal Remedies.

<http://herbalsatt.blogspot.com/2014/06/sacred-ficus-thousand-years-medicinal.html> .  
Published June 18<sup>th</sup>, 2014. Electronic source accessed March 01<sup>st</sup> 2018

[76] 280 King Street. City & County of Honolulu, Department of Planning & Permitting.

<http://gis.hicentral.com/pubwebsite/TMKDetails.aspx?tmk=17027002> Electronic Source  
Accessed March 6<sup>th</sup>, 2018.



**Green Burial Council  
Cemetery Certification Standards  
Adopted March 6, 2015**

## APPENDIX A

New Standard #	Criteria	Hybrid	Natural Burial Grounds	Conservation Burial Grounds
<b>CUSTOMER RELATIONS CRITERIA</b>				
1.	Accurately represent earned level of GBC certification in marketing materials, websites, and conversations with the public, clients, and the media.	√	√	√
2..	Obtain GBC certification for any funeral homes that operate on the premises.	√	√	√
<b>BURIAL PRACTICES CRITERIA</b>				
3.	Provide clients and families with the opportunity to participate in the burial and ritual process in keeping with state law and with these standards.	√	√	√
4.	Accept for burial only decedents that have not been embalmed or those embalmed only with GBC-approved, nontoxic chemicals.	√	√	√
5.	Prohibit the use of a vault (partial, inverted, or otherwise), a vault lid, concrete box, slab or partitioned liner in the burial plot.	√	√	√
6.	Limit burial containers, shrouds, and all associated materials to those made from biodegradable, natural materials.	√	√	√
<b>SITE PLANNING</b>				
7.	Operate only outside sensitive areas as identified in the ecological assessment.		√	√
8.	Conduct an ecological assessment that includes baseline information on existing geology, hydrology, soils, topography, cultural resources, and existing and potential native animals and plants.		√	√
9.	Preserve, enhance, or restore a historic native or natural community of the region.			√
10.	Conserve or restore minimum of 10 acres, or 5 acres if contiguous to other protected lands.			√

New Standard #	Criteria	Hybrid	Natural Burial Grounds	Conservation Burial Grounds
<b>CARE OF GROUNDS</b>				
11.	Compile a list of native plants based on the ecological assessment to use memorial features and to enhance plant diversity on the site.		✓	✓
12.	Develop a plan for protecting or salvaging rare plants identified in the ecological assessment.		✓	✓
<b>OPERATIONS AND MANAGEMENT</b>				
13.	Develop a Maintenance and Operations Manual to be given to all staff members, contractors, and volunteers to communicate site goals and methods of meeting them.	✓	✓	✓
14.	Implement an invasive plant and pest control plan to employ best management practices for the control of invasive species and to discourage the use of pesticides, except as a last resort.	✓	✓	✓
15.	Develop a plan for dealing with unauthorized grave decoration and landscaping.	✓	✓	✓
16.	Use excavation and burial techniques that minimize impacts on soil health and plant diversity.		✓	✓
17.	Develop a plan for limiting the types, sizes, and visibility of memorial markers/features to preserve or restore naturalistic vistas in the cemetery landscape.		✓	✓
18.	Develop a plan for limiting access to sensitive areas as well as policies for families who choose backcountry or off-trail burial		✓	✓
<b>PRESERVATION AND STEWARDSHIP</b>				
19.	Establish an endowment fund to ensure the long-term maintenance of the site by setting aside at least 10% of all burial plot sales.	✓	✓	✓
20.	Guarantee preservation of burial ground by deed restriction, conservation easement, or other legally binding and irrevocable agreement that runs with the land and is enforceable in perpetuity.		✓	✓
21.	Operate in conjunction with a government agency or a nonprofit conservation organization that has legally binding responsibility for perpetual enforcement of the easement and must approve any substantive changes to operational or conservation policies that might impact the ecological objectives of the site.			✓



# APPENDIX B

## DESIGNING ECOLOGICAL URBAN CEMETERIES IN HONOLULU, HAWAI'I



**HIDESIGN**  
ARCH HAWAII  
SCHOOL OF ARCHITECTURE

2018 D.Arch Candidate/Researcher Joern Ryan Vallesteros is performing research in proposal of designing future ecological urban cemeteries in Honolulu. As Honolulu continues to develop and urbanize into a future metropolis, the responsibility for sustainability becomes more significant than ever. In support of 'Hawaii's 2050 Sustainability plan, the need for

ecological cemeteries becomes urgent as a sustainable component to the urban fabric of Honolulu. Future cemeteries shall potentially serve as green spaces in which they contribute to biodiversity and the reduction of the Honolulu's carbon footprint. Cultural, religious and social factors are highly influential entities to the purpose of this research. Mahalo for your participation

1. Which age range do you fall in to?  18-23yrs  24-29yrs  30-35yrs  36-40yrs  40yrs and older

2. Are you affiliated with one or more religion(s), if so please check one or all that apply.

Catholic  Baptist  Lutheran  Methodist  Christian  Latter Day Saints  Eastern Faith  
 Islam  Not Sure  Not Affiliated  N/A  Other; Please Specify \_\_\_\_\_

3. Ethnic Background (please check all that apply):

Caucasian  African American  Chinese  Filipino  Japanese  Korean  Vietnamese  Native Hawaiian  
 Chamorro  Samoan  Other Pacific Islander  Other Asian  N/A  Other Ethnicity: \_\_\_\_\_

4. How much does climate change concern you? Please Circle

N/A	NOT CONCERNED		MILDLY CONCERNED		HIGHLY CONCERNED
0	1	2	3	4	5

5. Which methods of sustainability do you practice daily? Please check all that apply or list other

Recycle  Conserve Water  Conserve Electricity  Use of Public Transportation  Drive an Electric or Hybrid Vehicle  
 Subscribe to news via web  Commute by Walking  Other: \_\_\_\_\_

6. Are you currently a resident of Honolulu? Please check Yes, No or N/A..... yes..... no..... N/A

If you're not a current resident of Honolulu please list the city/town you currently reside in. Please specify here: \_\_\_\_\_

7. Which burial method would you consider for your funeral? Please check ONLY one. If other please specify

Traditional Ground Burial (Casket/Embalming Fluid)  Cremation; Urn  Cremation; Sea Burial  Cremation; River Burial  
 Natural Ground Burial "Green Burial" (Biodegradable Casket)  Tree or Plant Burial (Buried with the planting of new tree)  
 Cremation; Coral Reef (Ashes used in building a living coral reef)  N/A  Don't Know  
 Other; Please Specify \_\_\_\_\_

All survey participants and responses are to remain anonymous. No name(s) shall be recorded on this survey. The data collected from this survey will be analyzed in competence of U.H. Manoa academic policy.

## APPENDIX C

<b>List of Cemeteries/Graveyards/Memorial Parks on the Island of Oahu</b>				
<b>Cemetery Name</b>	<b>Area (Acres)</b>	<b>District Location</b>	<b>Status</b>	<b>Established</b>
<b>Aiea Cemetery</b>				
<b>City Memorial Park</b>				
<b>Catholic Church Cemetery</b>				
<b>Diamond Head Memorial Park</b>				
<b>Ewa Community Cemetery</b>				
<b>Hawaiian Memorial Park Cemetery</b>				
<b>Honolulu Memorial Park</b>				
<b>Japanese Graveyard North Shore</b>				
<b>Japanese Cemetery Mō'ili'ili</b>				
<b>Kawaiaha'o Cemetery</b>				
<b>King Street Roman Catholic Cemetery</b>				
<b>Lin Yee Ching Manoa Chinese Cemetery</b>				
<b>Mililani Memorial Park</b>				
<b>Maluhia Cemetery</b>				
<b>Makiki Cemetery</b>				
<b>National Memorial Cemetery of the Pacific</b>				
<b>Nanakuli Homestead Cemetery</b>				
<b>Nuuanu Memorial Park and Mortuary</b>				
<b>Puuiki Cemetery</b>				
<b>Sunset Memorial Park</b>				
<b>Sacred Hearts Cemetery</b>				
<b>Valley of the Temples Cemetery</b>				
<b>Ziaona Hou Church Cemetery</b>				

# APPENDIX D

## Urn Types

Name	Description
Keepsake Urns	These small urns are useful for families who live far from one another but wish to share the ashes of a loved one. Families also use keepsake urns to keep a portion of the remains of a loved-one whose ashes have been otherwise scattered. Keepsake Urns have a variety of uses, and we have a large selection from which to choose the urn that perfectly matches the personality for whom it is meant.
Decorative Urns	These urns have two primary purposes. First, they can serve as a temporary urn when a family needs an urn for a cremation ceremony but has not decided upon a permanent urn for a loved one's ashes. Decorative Urns are also often used for displaying urns in a columbarium niche or an urn garden.
Wood Urns	These are made from every type of wood on Earth, but the most common are made from cherry, maple, pine, oak, walnut, and poplar. Some of the more exotic woods used for wood urns include mahogany, paduk, yellowheart, and zebrawood. Generally, urns are stained and often adorned with inlays and laser etchings. Most are hand assembled by some of the best carpenters in the world.
Ceramic Urns	These urns are handcrafted from porcelain or clay that is burned in a particular stove. The result is a glass-like finish that is covered with a hand-painted glaze. Artists can use the paint to create beautiful scenes that fit the personality for whom the urn is intended. It should be noted that ceramic urns are very fragile. Ceramic ash holders are one of the oldest forms of cremation urn
Marble Urns	These urns start off as blocks of natural limestone that is then highly polished and processed into beautiful marble products. Marble is, aside from being one of the most intriguingly gorgeous stone products on Earth, also one of the world's most sturdy materials. Marble urns are designed to withstand the elements for generations.
Metal Urns	The most popular metal material for urns is bronze, but metal urns can also be made from brass, copper, and pewter. Metal urns are machines crafted and then polished and lacquered to become a durable, beautiful home for a loved one's ashes. Metal urns are often used when the ashes are to be buried, but metal urns are also commonly displayed in homes. Cloisonné Urns: These are highly detailed work of art. Handcrafted out of brass and enamel, each cloisonné urn begins with the forming of a shape and is followed by many steps until the urn is gilded and polished to a perfect, bright and shining, finish. The cloisonné process dates back many centuries. Chinese artisans used it as early as the 14th century.
Biodegradable Urns:	These environmentally friendly urns are quickly becoming among the most popular in the industry today. Biodegradable urns are most commonly used when ashes are to be scattered, especially at sea. They are handmade from non-toxic paper and meet all government requirements, and their careful construction prevents ashes from being haphazardly scattered by the wind. For sea dispersions, biodegradable urns will be fully degraded within two to three days of being placed in water. These biodegradable memorials offer a way to honor the beliefs of a loved one, as well as our natural environment.
Discount Urns	These urns are among the best sellers mostly because of the economical prices that make them some of the best memorial values available. But, the low prices do not require a sacrifice of elegance and prestige. Some of these beautiful pieces, most made from cast brass, have even been featured on national television dramas and even in at least one film
Religious Urns	These urns are available in a variety of styles and materials, but they all have one thing in common: they feature scenes and words they relate directly to the spiritual realm. People of all faiths will be able to find a religious urn that will reflect the devotion they have spent their lives showing to their heavy pursuits
Bronze Urns	These urns feature the long-lasting beauty of bronze sculpture. Bronze vessels for ashes are suitable for burial, of course, but, because of their intricate beauty, many customers choose to include them in some sort of outdoor memorial display. These marvelous pieces stand up well to the harshest of elements -- and develop a rich and valuable patina as they age -- and that makes the fit for just about any memorial purpose imaginable.
Companion Urns	These very special urns allow loving couples who have spent their entire lives together to remain together for eternity. Two main types of these models are available: double or single compartment. Many couples wish to have their cremation remains mixed together, and the single compartment urns do just that. Double compartments allow the ashes to be stored separately within the same piece.
Glass Urns	Glassblowers across the world are becoming more and more proficient at producing these colorful works of art that are suitable for memorial displays. Today's innovative memorial industry thinkers have even begun offering a surprising twist on glass vessels for ashes: some pieces can be made using tiny amounts of the deceased's remains itself. They are directly mixed into the hot glass while it is being blown and can be made to be visible in the final product
Cloisonne Urns	The ancient Asian art of cloisonne uses wire casing on a ceramic piece to create colorful, and realistic pictures and designs upon a sturdy, beautiful work of art. The production process used in these urns combines the best a variety of arts that have been in use for centuries
Infant Urns	These urns can be a great comfort to families who have suffered the loss of an infant or a child (or even those who have suffered a stillborn death). Infant urns are available in a large variety of styles and designs, and many are specifically built to bring about the carefree, playful themes of childhood, in an attempt to keep the young spirit alive for the ages
Sport Urn	Sports urns are specially designed to capture for the ages the spirit and personality of any person devoted to the outdoors. Many of these urns feature scenes of fishing or hunting, but they also can be shaped in the form of balls or other sports equipment. Any athlete or sports fan can have the memorial of his or her dreams with a sports urn
Hobby Urns	These are much like sports urns, (and in fact, in some cases, the names can be interchangeable), but they also include a few hobbies that may not be included in traditional "sports" realm. Those who are fans of needle crafts, for example, may be nicely memorialized with a beautiful metal urn shaped like a ball of yarn.
Military & Veteran Urns	These urns pay tribute to the heroes of America's centuries-long defense of freedom. Military & Veteran urns are available in a wide variety of styles and designs, but all are careful to reflect the significant ideals upon which American soldiers base their lives
Funeral Urns	Funeral urns are suitable for display during a funeral. The name "funeral urn" often creates confusion among people who may assume that only a particular type of urn can be displayed in a funeral. That is not the case. In fact, any urn can be thought of as a "funeral urn. But urns that are formally labeled Funeral Urns are designed with the specific idea that they will be seen by loved ones during a memorial service
Urns for Airlines	Many urns are unsuitable for travel on airlines because airline security X-ray machines cannot see through them. This requires that they be searched manually and, once an urn has been filled, this is not usually a desirable thing to do. (In fact, many airlines prohibit their employees from this practice altogether.) Urns for airlines are beautiful, hearty pieces made from felt or some other non-metallic material that can be easily X-rayed by airport machines
Art Urns	These urns are works of fine art that have been designed to include a storage place for cremation ashes. Some art urns are commissioned well in advance of death to reflect the personality of the deceased precisely. But, even in cases in which the urn is selected from pre-made pieces, a family is sure to find an artistically fantastic work that captures the loved-one's personality perfectly.
Sculpted Urns	The term "sculpted urn" is often used interchangeably with "art urn," and that is perfectly acceptable. Sculpted urns are merely beautiful mini-sculptures that have been designed to accommodate cremation remains. And, since sculpture is a fine art, it is appropriate to think of these urns as being art urns as well.
Nature Urns	Anyone who has enjoyed spending time out of doors will be ideally suited to be memorialized with a nature urn. These beautiful pieces reflect the natural world in a large variety of ways. Some nature urns are sculpted in the form of something natural, such as a rock or a butterfly, and still, others include a beautifully crafted, painted scene of the natural world

Table generated from Urn Types List from <https://www.memorials.com/Urns-Urn-Types-information.php>

# APPENDIX E

## Urban Ecological Cemetery Program (Phase 1)

Space	Area	Qty	Total Area	Religion	Open/ Enclosed	A/C	Phase	Depth/ Height	Notes
<b>INTERMENT AREAS</b>									
Natural Burial	5 Acre	1	.5 Acre	Catholic	Open	No	1 (70yr)	6ft D	Reserved for X % Cathaloic, burial plots 4' x 10' , 5' x 11' , 6' x 12'
Natural Burial	5 Acre	1	.5 Acre	Christian	Open	No	1(70yr)	6ft D	Reserved for X% of christian population
Tree Burials (Body)	.25 Acre	1	.25 Acre	Japanese, All Religion	Open	No	1	8ft D	Tree Bunals specific to tree species and the depth of root penetration
Tree Burials (Cremated)	.25Acre	1	.25Acre	Excluding Christians	Open	No	1	8ft D	Tree bunals for cremated remains buried less deep than body
Urn Graves	5 Acre	1	.5 Acre	Excluding Christians	Open	No	1	3.5ft D	Urn Graves Typical Dimensions 3ft x 3ft x 3.5ft deep. Headstone height
Columbarium Niches	5,500 sf	x	5,500 sf	Excluding Christians	Open/Closed	Yes	1	12ft H	Stacked Niches based on volume height of columbarium spaces. Configuration for Outdoor and Indoor location throughout the site. (Garden Niche's, Wall of Remembrance)
<b>92,620sf</b>									

Space	Area	Qty	Total Area	Religion	Open/ Enclosed	A/C	Phase	Depth/ Height	Notes
<b>PUBLIC INFO CENTER</b>									
Telephone Recept.	120 sf	1	120 sf	N/A	Enclosed	Yes	1		
Gravesite Locator	100 sf	1	100 sf						
Public Restrooms	400 sf	1	800 sf	N/A	Enclosed	Yes	1		
Lobby	600 sf	1	600 sf	N/A	Enclosed	Yes	1		
Cortege Assembly Area (Parallel Parking Lanes)		1		N/A	Open	No	1		
Visitor Parking Area (pull-off)		1		N/A	Open	No	1		Parking to follow Code Req.
<b>1,220 sf</b>									

Administration	Area	Qty	Total Area	Religion	Open/ Enclosed	A/C	Phase	Depth/ Height	Notes
Lobby	320 sf	1	320 sf	n/a	sheltered	yes	1		
Multipurpose Room	500 sf	1	500 sf	n/a	enclosed	yes	1		
Director	100 sf	1	100 sf	n/a	enclosed	yes	1		
Assiistant Director	100 sf	1	100 sf	n/a	enclosed	yes	1		
General Office	80 sf	2	160 sf	n/a	enclosed	yes	1		
Operations Center	300 sf	1	300 sf	n/a	enclosed	yes	1		
Lunchroom/Lounge & Vending	200 sf	1	200 sf	n/a	enclosed	yes	1		
Honor Guard	100 sf	1	100 sf	n/a	enclosed	yes	1		
Boot Vestiuble	80 sf	1	80 sf	n/a	enclosed	yes	1		
Locker Room, Toilets & Shower	300 sf	1	300 sf	n/a	enclosed	yes	1		
Workshops	120 sf	2	240 sf	n/a	enclosed	yes	1		
			<b>2,400 sf</b>						

# APPENDIX F

Maintenance/Storage	Area	Qty	Total Area	Religion	Open/ Enclosed	A/C	Phase	Depth/ Height	Notes
<b>Vehicle &amp; Equipment Maintenance</b>									
Routine Main. Bay	400 sf	1	400 sf	n/a	enclosed	no	1	n/a	
Heavy Main Bay	400 sf	1	400 sf	n/a	enclosed	no	1	n/a	high bay rolling doors 12' wide
Vehicle Wash Area	300sf	1	300sf	n/a	sheltered	no	1	n/a	Open/Covered Area
Parts and Tools	240 sf	1	240 sf	n/a	enclosed	no	1	n/a	Secured at all times from theft
Materials Storage	240 sf	1	240 sf						
Flammable Storage	80 sf	1	80 sf	n/a	enclosed		1	n/a	
Pesticide Storage and Mixing/Loading	80 sf	1	80 sf						
Vehicle & Equipment Storage	240 sf	1	240 sf	n/a	enclosed	no	1	n/a	Allocate for two buggy vehicles
<b>Maintenance Yard</b>								n/a	
Vehicle & Equipment Storage	240 sf	1	240 sf	n/a	unsheltered	no	1	n/a	
Vehicle & Equipment Storage	240 sf	1	240 sf	n/a	sheltered	no	1	n/a	
Pesticide/Herbicide Mixing Area (Sheltered)	80 sf	1	80 sf	n/a	sheltered	no	1	n/a	
Wash Rack	80 sf	1	80 sf	n/a				n/a	
Fuel Island (fuel storage tanks & pumps)	120 sf	1	120 sf	n/a				n/a	
Headstone Storage	240 sf	1	240 sf	n/a				n/a	
Wicker Casket Storage	240 sf	1	240 sf	n/a				n/a	
Loading Dock	400 sf	1	400 sf	n/a				n/a	
Sand & Gravel Storage Bins	320 sf	1	320 sf	n/a				n/a	
			<b>3,940 sf</b>						

**Total Program Space**                      **100,180 sf**  
**10% Circulation**                              **10,018 sf**  
**Total Interior SF**                              **110,018 sf**

<b>Parking</b>									
<b>Staff</b>									
<b>Visitor</b>									
<b>Cortege Assembly</b>									