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ECO-LODGE LUMAHAI

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ECO-LODGE LUMAHAI
a dustin lucas wekesser design
ECO-LODGE LUMAHAI

by

Dustin Lucas Wekesser

A Terminal Project
Presented to the Faculty of
The College of Architecture at the University of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Master of Architecture
Major: Architecture
Under the Supervision of Professor Ted Ertl
Lincoln, Nebraska
May, 2007
Every year, millions of vacationers escape their daily routines to find peace and relaxation in tropical locations that differ from the worlds they come from. Vacations are becoming more elaborate and the list of destinations is continually being enlarged as the availability of air travel reaches more and more places. Yet as commercialism enters these regions and investors begin cornering the market, the essence of these once exotic locations seems to get overlooked and in time, ultimately forgotten. Places that once consisted of straw huts and bamboo bungalows are now being confronted with crude, insensitive designs that neglect the landscape and the fundamental principles that aided in the development of these regions. The same style of hotel found along the interstate can now be seen along some of the best beaches around the world, forcing me to wonder if their design has solely been dictated by the size of the building and the speed in which it can be constructed.

In order to preserve the landscape and the cultural diversity that is so dynamic in these exotic locations, it is imperative to design accommodations so that in themselves, they showcase the wonder
of the region and create a harmonic balance between culture and architecture. This project aims to investigate the cultural influences that dictate the design of resorts in order to improve the impact they have on their communities and the people who use them. Every hotel has the opportunity to enlighten the public by allowing them to experience more than just a bed and breakfast but rather the lifestyles of another culture. Every aspect of the property can be utilized through materials and symbolic forms to further express how the local societies grew and functioned. A resort can be more than a destination. It can be a cultural experience.

The island of Oahu in Hawaii is home to the most popular beach in the world, Waikiki Beach. The region is known around the world and people flock to this site year round to be engrossed in the Hawaiian culture. However, the main complaint from people who choose to visit Waikiki Beach is that the area lacks character. The beach has lost all forms of cultural connection making it feel as though you could be anywhere in the world, or better yet, nowhere in particular. Despite the ample possibilities that are available to hotels, many of them neglect to truly engage with the site and ultimately brand their plot with their standard design. The hotel branding along the beach has resulted in over 20 different hotels all aiming to outdo their neighbors. The height of the towers increases. The number of rooms doubles. The essence of the island is forgotten. Commercialism has taken over and turned this once exotic getaway into a congested, overcrowded assortment of mediocrity.
One of the specific hotels located along Waikiki Beach is the Hilton Hawaiian Village Resort and Spa. The Hilton name is synonymous with high class hotels that can be found in almost every major city around the world. In fact, they claim to have over 500 different hotels, resorts and spas currently in operation. Yet, due to their name recognition and popularity, they are able to continually build mammoth hotels that solely aim to house the masses and not address the needs of the community or deal with how their accommodations affect the culture of the region. The Hilton Hawaiian Village proudly boasts of its 22-acre site, five different hotel towers, five pools, twenty-two different restaurants and lounges, and the fact that you never have to leave the hotel property throughout your stay. With over twenty different room options at prices from $250 a night all the way to $3,000 per night, the Hilton has tried to provide something for everyone. However, I feel that the experience of staying at a Hilton is similar in New York, Chicago, Omaha, and Honolulu. All that changes is the view.

Even though there are many resorts that fall short of succeeding in providing their guests with luxury and an authentic cultural experience, there are a few that succeed. Las Ventanas is a Ty Warner owned property that was designed a few years ago by HKS in Dallas. It is located in Los Cabos, Mexico, on the southern tip of the Baja Peninsula. The resort is reminiscent of the grand haciendas of Old Mexico and aimed at providing their guests with centuries of tradition in every
room, hallway, lobby and gathering space. Las Ventanas used materials and forms that cohered to the context of the Baja Peninsula, showcasing the region's quality without forcing a Ty Warner branded building on the site. The quality of the spaces and the uniqueness of the resort has made Las Ventanas one of the most popular hotel destinations in Mexico.

Another successful resort is the Bora Bora Pearl Resort in French Polynesia. This resort is much smaller than many of the big name resorts found on Waikiki Beach in Hawaii. Instead of relying on name recognition, this hotel makes a name for itself by the uniqueness of its accommodations offered to its guests. Over water bungalows span into the calm waters of the Pacific Ocean. The bungalows are covered with straw, elevated by wooden pilots and are open to the cool breeze of the crystal blue waters below. The Pearl Resort takes people away from their daily lives and provides them with a world completely different from anything relating to their home. People return from Bora Bora feeling as though they have just experienced a completely different world in a setting which has been able to resist the commercialization around them.
The specific site for this project has been well defined but not physically determined. The program requires an exotic location with a strong cultural influence. It should also be a place where commercialism has overwhelmed the community. A proposed area for investigation is in the state of Hawaii; more specifically, the Island of Kauai. Hawaii is one of the most popular island chains in the world; with that popularity comes an onrush of tourism that needs to be temporarily housed. The island of Kauai is just west of Oahu and has been able resist the tropical exploitation that has corroded many of the world’s beaches. The island is 90% uninhabited and annually receives the highest lever of rainfall in the world. However, as Waikiki Beach has become overcrowded, more and more people are resorting to Kauai. This island offers the opportunity to set the architectural standard for resorts to follow in years to come.

Kauai is known among the Hawaiian Islands as being the outdoorsman island because of the abundance of different activities available in the area. The Na Pali coastline along the northwest rim of the island is one of the most sought after hiking destinations in the world. People apply for camping permits up to a year in advance and spend weeks in the mountains that are only accessible by boat, foot and helicopters. Other activities include snorkeling, scuba diving, surfing, sea and river kayaking, and many others. This location has much to offer its guests in terms of physical activities, cultural heritage and tropical landscapes.

There is a broad range of information available through books and internet sites that will lead to a basic understanding of the culture and the scientific aspects of Kauai. This information will focus around climate, population, history, immigration, local wildlife, building techniques, and other topics found through readings. However, in order to properly understand the location and the culture, it is necessary to experience the area in person. This experience will provide the knowledge that is unattainable though reading and images. In May of 2006, I will be conducting a prolonged site visit where I will visit Waikiki Beach and a number of the surrounding hotels as well as touring the entire island of Kauai. This opportunity will allow me to explore a vast array of properties in search of a site that will best fit my proposed project.
THESIS ADVISORY COMMITTEE

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GOALS

TO PROVIDE THE ADVENTURE TOURISM MARKET OF KAUAII, WITH AN ALTERNATIVE TO THE ARTIFICIAL AND WIDELY OVERDONE LUXURY HOTEL BY ENCOURAGING ITS VISITORS TO LOOSE THEMSELVES IN AN AUTHENTIC TROPICAL LOCATION.

TO UTILIZE THAT NATURAL CHARACTERISTICS OF THE SITE IN ORDER TO DEVELOP A SELF SUSTAINING AND FULLY FUNCTIONING LIVING UNIT.

TO EXIST IN HARMONY WITH THE SURROUNDING ENVIRONMENT BY CELEBRATING AND PRESERVING THE NATIVE VEGETATION AND MINIMIZING THE ECO-FOOTPRINT ON THE SITE.
# TABLE OF CONTENTS

**PREFACE**
- [original thesis proposal]

**RESEARCH AND ANALYSIS**
- [precedent studies]
- [site visit]
- [hawaiian islands]
- [island of kauai]
- [lumahai beach]

**CONCEPTUAL DESIGN**
- [who]
- [eco-lodge]
- [site planning]
- [design tactics]
- [sketches / models]

**PROCESS DOCUMENTATION**
- [sketches / models]
- [techtonics]

**FINAL DESIGN**
- [final presentation material]

**BIBLIOGRAPHY**

**ACKNOWLEDGEMENTS**
RESEARCH AND ANALYSIS
PRECEDE NT STUDY
We believe it is one of the world's most radical hotel concepts and will offer a solution to expensive and boring hotels around the globe. Cabins will be bookable in a four hour block (with extension by the hour thereafter) enabling delayed and transfer passengers to relax privately in a hotel environment. In addition, passengers leaving on those early morning flights can stay the night before to catch some extras hours sleep in the morning and check in online from the comfort of their rooms safe in the knowledge that they are just a casual stroll for their next morning’s departure. Early arriving passengers may also check-in for a few hours before going to a meeting.”

**concept:**

“We believe it is one of the world’s most radical hotel concepts and will offer a solution to expensive and boring hotels around the globe. Cabins will be bookable in a four hour block (with extension by the hour thereafter) enabling delayed and transfer passengers to relax privately in a hotel environment. In addition, passengers leaving on those early morning flights can stay the night before to catch some extras hours sleep in the morning and check in online from the comfort of their rooms safe in the knowledge that they are just a casual stroll for their next morning’s departure. Early arriving passengers may also check-in for a few hours before going to a meeting.”

**YOtel:**

Opening Spring 2007

Gatwick and Heathrow Airports

$70-120 per night
$40 4-hour Block

**75 - 113 SF LUXURY HOTEL ROOM**

YOtel specifically looked at their clients and molded the room design around their exact needs.
The vision that we and the owner (which was very open) created during the concept phase is what makes it different. We wanted to create one of the most intimate places in the world, and to do this you need a small hotel. Las Vantanas is just 64 rooms, all suites. This allows you to break the hotel in small buildings which help you create small intimate spaces between buildings that the guest will discover during their time in the hotel. We like to call this “destinations within a destination.” Also, besides intimate, it needed to be romantic. So the design of the private spaces and the wet areas became a huge part of the concept. Places like bathrooms that open to a courtyard with exterior showers where people can spend their most romantic times. I can go on and on, but you really need to see the place to understand.

-Luis Zapiain,
The Sanya Nanshan Treehouse Resort opened in December of 2000 atop beautiful old tamarind trees, isolated on a magnificent and seemingly never ending virgin beach in the South China Sea. The resort is adjacent to a new 5,000 acre Buddhist and ecological theme park composed mainly of lovely temples, pagodas, botanical gardens and untouched nature from the bottom of the sea to the top of the Nanshan Mountains.

**SANYA NANSHAN RESORT**

Hainan Island, South China Sea

220 - 400 rmb ($28-51)
per night per room

875 - 950 rmb ($112-121)
per night per room

**E A C H  T R E E H O U S E C A N  H O U S E  6 - 2 0  P E O P L E**

The Sanya Nanshan Treehouse Resort opened in December of 2000 atop beautiful old tamarind trees, isolated on a magnificent and seemingly never ending virgin beach in the South China Sea. The resort is adjacent to a new 5,000 acre Buddhist and ecological theme park composed mainly of lovely temples, pagodas, botanical gardens and untouched nature from the bottom of the sea to the top of the Nanshan Mountains.
BORA BORA PEARL
BEACH RESORT

120 miles from Tahiti,
French Polynesia

$530 - 830 per night

room options:
Gardenview Pool Suite
Premium Pool Suite
Beachfront Suite
Over Water Bungalow
Premium Over Water Bungalow
**PROS**
- The resort design was directly related to the cultural heritage of the region.
- The constructed buildings do not seem to impose upon the site, but rather float above it and mesh with it through the use of regional materials.
- The architecture appears to be simply constructed so that the resort can be quickly redeveloped in the event of damage from a tropical storm.
- Luxury is not expressed in the value of the objects in the rooms, but rather in the atmosphere provided through the spaces and surrounding environment.
- The spa is separated and located in a remote location allowing for even greater peace and relaxation.

**CONS**
- Distance to furthest bungalows appears to be burdensome.
- The close proximity to the water elements increases the maintenance needs.
- Many of the beach properties have surrounding fences that segregate the whole complex.
- The thatched roofs appear to be yearning to an ancient time when other construction techniques were unavailable.
“If you measure success in room numbers, Amanresorts hasn’t achieved all that much. We have never focused on being the biggest. We prefer to think small. Intimate. Involving. It’s not that we are better than big hotels because we are small. We are different, that’s all. Amanresorts responds to a contemporary lifestyle. That’s what we offer – a lifestyle experience, without limitations.

There are people with a shared lifestyle the world over. Whether in Europe, Asia, the Americas, they have one thing in common, something that brings them to Amanresorts.

That ‘lifestyle’ is about shared values, a lust for faraway cultures, for the world around that excites, shapes and nourishes. It is an appetite for pampering and a deep appreciation of the creative and elegant – the way an Aman responds to the environment, the way light falls on the table or water fills a pool.

Each of our resorts is quite different in location, look, mood and guest experience. Yet each leaves an impression, an indelible mark. At Amanresorts we have discovered there is an alternate path. That it is possible to build environmentally friendly and aesthetically pleasing resorts. That small is good for business as well as guests. That less is more.”
GREEN MAGIC TREEHOUSE RESORT
Vythiri, Kerala, India

$130 - 240 per night

Green Magic is a “totally dedicated Eco-lodge” situated in one of India’s dense rainforests. Two of their tree houses are at heights of 90 and 100 feet and come with an attached bathroom with flushing toilette, shower, washbasin, running water and hanging rope bridges. The units were each designed using native, eco-sensitive materials such as bamboo and produce their own energy from solar panels and gober gas made from cow dung. Guests eat food grown on the property and drink water filtered from a nearby freshwater stream.
PAIA HAWAII – September 15, 2006. A small company in Hawaii has made a major step in sustainable construction. Bamboo Technologies of Maui, co-founded by architect David E. Sands, AIA, and Jeffree Trudeau, an RPI graduate in Architecture, is providing the first ever ICC certified structural bamboo poles for use in construction, and is currently approved for use in residential construction and small commercial projects. Work is underway to expand certification to larger commercial projects. In fire tests the bamboo poles performed well with low flame spread and fuel contribution numbers.

Bamboo Technologies can provide certified bamboo poles for use in construction projects and can panelize projects for clients throughout the world. In 2005, a bamboo resort in Rarotonga, Cook Islands, designed and built by Bamboo Technologies, sustained three hurricanes with tsunami-like waves and winds in excess of 170 mph. Wood frame resorts nearby were lost while bamboo houses had minimal damage.

The structural bamboo shell for panelized housing can be erected extremely fast. A two-story bamboo home with 2500 s.f. under roof was recently erected in just 8 days on Big Island Hawaii.

A versatile and beautiful material, bamboo is currently being used in various parts of the world for high end homes and resorts, bridges, and factory structures as well as disaster relief housing. One of the aftershocks of the deadly tsunami in the Indian Ocean is the deforestation occurring on the areas hit to get lumber to rebuild. Bamboo provides an ecological alternative. Architects are encouraged to apply their creativity to this new material. The sky is the limit and the result is a cleaner, bluer sky for us all.

In November 2004, Bamboo Technologies received confirmation from ICC Evaluation Service that structural bamboo poles used in Bamboo Living Homes complies with the International Building Codes. This structural bamboo will be included in the Building Code system for permitted buildings. This is the first time a species of bamboo has been approved as a structural material in the Building Code System.

ICC Evaluation Service Report ESR-1636 (Nov. 2004) states Structural Bamboo Poles produced by Bamboo Technologies comply with the provisions of the following codes: 2003 International Building Code (IBC), 2003 International Residential Code (IRC) and 1997 Uniform Building Code (UBC). “The structural bamboo poles are used as structural elements in wall, roof and floor trusses (panels) or as individual compression and/or tension members in Type V non-fire resistance rated residential and commercial construction”. This confirmation provides guidance to code officials faced with approving the use of structural bamboo poles in Bamboo Living Homes under these codes. The evaluation report is available online at www.icc-es.org.
“This is the first certification for bamboo as a structural building material in the USA, Canada and Europe. Getting bamboo in building codes is a huge step forward,” explains Jeffree Trudeau, founder of Bamboo Technologies. “Homebuyers can get permits for bamboo homes with greater ease.”


by David Sands, AIA.
Jamie, a professional surfer with proven talent and skill, has turned his passion for the sport of surfing into teaching. With over 6 years of surf instruction behind him, Jamie provides thorough and effective instruction for all levels of surfing, from first-time beginners to competitive amateurs. Besides surfing, Jamie owns his own surf wax company (FAMOUS) and two local surf shops (Nukumoi Surf Shop). He has lived on the island of Kauai for most of his life and now resides there with his wife and three children. Jamie’s knowledge of the island and his own personal adventure experiences make him an outstanding guide to all the hot spots and the lesser known qualities of island travel.

In preparation for my Design Thesis project, I spent two weeks in Hawaii during the summer of 2006. The trip was divided into two distinct parts: Kauai and Oahu.

While on the island of Kauai, I was able to learn what the life of a Hawaiian is actually like. I lived in the home of a local family, eating at their table, sleeping under their roof and talking with their friends. Mornings were spent surfing at the nearby beaches and the days were spent touring the island. My host, Jamie, served as my own personal guide, answering all my questions and showing me many potential sites for my project.

While on Waikiki, I felt lost among thousands of other tourists. I assume that part of the reason was because of the sheer volume of people around, but also due to where I stayed, the Hilton Hawaiian Village. The resort was very nice. It had thousands of rooms, 6 to 8 restaurants, pools, bars, shops. But nothing was authentic. No matter where you went, you were surrounded by huge buildings, concrete “rocks”, imported trees/sand and cocktail waitresses. Most people there did not think anything of it, but I knew there was something wrong. This was NOT Hawaii. Instead, this is what a naive person thinks of when they picture Hawaii.

I left the islands with two different experiences. Both of which directed my course of action for the entire year.
--The “Locals” tend to be very territorial.
--Jamie opened a surf store in an undeveloped location knowing that he will lose money for about 10 years. However, when the area is finally developed, the locals will shun the new retail stores that pop up and will go to his because it was established before the area was popular.
--Jamie has lived in Poipu, Kauai for over 20 years and still isn’t entirely accepted by the locals.
--Average day for blue-collar worker is 10:00am – 3:00pm. Leaving ample time to surf.
--I am called a “Haole” or a “Barnie” on the islands because I am from the mainland.
--All plants and animals on the Hawaiian Islands were brought there. Because they are made of lava, nothing is technically native to the islands.
--Hawaii lost its ability to function as a major exporter of pineapple and sugarcane when third world countries began to harvest them at a much cheaper price.
--The “Local” boys on the island deter crime more successfully than the cops are able to.
--The Na Pali helicopter tour is one of the best tours in the world.
--On Kauai, it is illegal to build taller than the tallest palm tree on your property.
--The Na Pali hike is rated as a 9/10 in terms of technical difficulty.
--The climate on Kauai does not fluxuate.
--Jamie went surfing the day before Hurricane Iniki hit the island.
--Oprah, Jack Johnson, Ben Stiller, Dustin Hoffman, Britney Spears all own property on the island of Kauai.

**RANDOM THINGS ABOUT THE ISLANDS**

--90% of the island is unreachable by car.
--The last five shark attacks on the island of Kauai all happened near the mouth of rivers.
--As soon as you get into the water, sharks know from a distance of 2 miles, as to whether or not they are going to eat you.
--Japan is just as far away from Hawaii as we are here on the mainland.
--Many movies are filmed on Hawaii because of the variety of terrains: beaches, jungles, forests, caves, deserts, canyons, ocean….
--The common sharks around the Hawaiian Islands are the White Tipped Reef Shark and the Tiger Shark.
--It is illegal to sleep in your vehicle.
--Wearing more than shorts and a t-shirt is considered overdressing.
--Many people who live on Kauai grow their own fruit on their own property.
--The Apple Banana Tree only produces fruit once in its lifetime.
--There is a real shortage of recreational facilities.
--Repeat tourists come here because of solitude and adventure.
THE HAWAIIAN ISLANDS

The Hawaiian Islands were formed thousands of feet below the surface in the cold waters of the Pacific Ocean. Slow venting magma seeped through the earth’s crust and began building upon itself as it moved up towards the water’s surface. As the Pacific plate continued to shift, similar events occurred, which eventually resulted in the creation of the Hawaiian Islands. The islands continue to grow to this day. The Big Island has the chains only active volcano, which is still seeping lava. And off its shores and 3,200 feet below the surface lies the newest Hawaiian Island, Loʻihi.

These islands were desolate places until marine life began inhabiting the recently formed coral reefs and trade winds blew in seeds from thousands of miles away. Tropical storms occasionally brought a bird or stranded animal to the island and over the years, their numbers grew. Because the islands formed out of the ocean, very few things on the island actually came from it. Most species of animals and plants can be traced back to their initial importation to the island.

Between the 4th and 5th centuries A.D., the first known settlers came to the islands on double-hulled canoes. They are thought to have traveled 2,500 miles from their previous home in the Marquesas Islands. These settlers survived off harvesting their shipped plants in the rain-enriched soils of the islands.

In the late 1700’s, Captain John Cook stumbled on the Hawaiian Islands while on his way to Alaska. The locals, convinced that the new visitors were gods, were awed by the new technologies aboard their sea vessels. However, during a ridiculous fight, Captain John Cook was mortally wounded. The great Hawaiian chief, Kamehameha, took Cook’s death as a fault of the island people, which lead him to pursue and conquer all the island chains. However, he fell short of his goal as he attempted to overtake Kauai on two known occasions. In both instances, his armies of thousands were defeated by events beyond their own control, a tropical storm and a typhoid epidemic. Eventually, when Kauai’s king felt that his rule was ending, he submitted his kingdom and island over to Kamehameha.

During the 1900’s, businessmen from around the world collided upon Hawaii, all aiming to profit from the exploitation of the local people and wildlife. Eventually, when the last royal Hawaiian died, the islands became directionless and began selling property. In 1894, the US Government recognized the island of Hawaii and in 1900, it became a US territory.
"Waikiki, a neighborhood of Honolulu, in the City & County of Honolulu, on the south shore of the Island of Oahu, Hawaii. Waikiki extends from the Ala Wai Canal (a channel dug to drain former wetlands) on the west and north, to Diamond Head or Leahi on the east. The name means spouting water in Hawaiian for springs and streams that fed wetlands that once separated Waikiki from the interior. Waikiki has long been a place of relaxation. In particular, the area was a retreat for Hawaiian royalty in the 1800s.

Today it is considered the center of the tourist industry in Hawaii, with an abundance of both high-rise resort hotels (including the Hilton Hawaiian Village, the Halekulani hotel, the Hyatt Regency Waikiki, and the Sheraton Waikiki) and historic hotels dating back to the early 20th century (such as the Moana Surfrider Hotel and the Royal Hawaiian Hotel). Since 2001, there have been free movies on the beach. Many tourists from around the world can view a movie on an outdoor 30-foot screen. This particular free movie event in Waikiki is called “Sunset on the Beach”.

Waikiki Beach is the shoreline fronting Waikiki and one of the best-known beaches in the world. The beach has had its problems because of groynes build-out from the shore. This has led to beach replenishment projects in the past. In the 1920s and 1930s sand was obtained from Manhattan Beach, California, and transported via ship and barges to Waikiki. One disastrous sand replenishment project involved a man-made sand that the gentle surf turned into a concrete-like surface.”

-Wikipedia
Kaua‘i is the oldest island in the Hawaiian chain and often called the Garden Isle because of its endless beauty. It is a place as close to the Garden of Eden as one can find. The island is the forth largest of the Hawaiian Islands and offers a landscape unlike any other. Over 90% of the island is inaccessible by road, leading many people to experience Kauai on a more personal level. The landscape is filled with lush, green hills, waterfalls and white sand beaches. The sculptural masterpiece is the Na Pali Coast, accessible only by boat, helicopter or foot. Here, the scenery is so magnificent it defies description. The only thing that can compare to the natural beauty of this island is the beauty of the people of Kaua‘i with their genuine friendliness and spirit of Aloha.
FACTS
Population: 58,303
Area: 553 sq mi
Size: 33 x 25 mi
Elevation: 5,243 ft (Kawaikini)
Distance from Oahu: 105 mi
Distance from mainland: 2,400 mi
Yearly Rainfall: 19 – 460 in
Shore Line: 113 mi
Average Temperature: 75 F
Average Yearly Range: 72 – 79 F
22 North Latitude 159 West Longitude
Wettest place on earth: 440 in / year (Mount Wai’ale’ale)
Yearly Tourists: 1,000,000
Busiest Time of Year: July
Area Code: 808
Daylight Savings Time: Not observed
Custom: Remove your shoes before entering a home.
Ocean Temperature: 68 – 85 F
Flight Time from Honolulu: 30 min
DEF: A severe tropical cyclone with sustainable winds of 74 mph (64 knots) or greater. Major hazards include high winds, heavy rain, flooding, storm surge and high surf. Hurricane is the term used for systems located in the central and eastern pacific regions. Western pacific storms are called typhoons.

INIKI  Hurricane Iniki, a category 4 hurricane, is the most powerful hurricane to hit the Hawaiian Islands in recorded history. On September 11, 1992, it struck the island of Kaua‘i head on with winds speeds of 145 mph and caused over 2.6 billion dollars in damage. Over 1,400 homes were destroyed and another 5,000 were severely damaged. Early warning allowed for those in danger zones to move inland and helped save many lives.

IWA  Hurricane Iwa, a category 1 hurricane, was the first hurricane in almost 25 years, to reach the Hawaiian Islands. It recorded wind speeds of 90 mph and caused around 507 million dollars in damages to Niihau, Kauai, and Oahu. Many beachfront properties were damaged or destroyed as it slowly curled around the islands.

DOT  Hurricane Dot began just off the coast of the Baja Peninsula and proceeded to travel over 2,500 miles to the islands of Hawaii. It was a category 4 hurricane, but luckily dropped to a level 1 before making landfall on the island of Kaua‘i on August 6, 1959. Winds reached 150 mph and were responsible for stripping the roofs off many properties in Kauai, while on its way to causing 38 million dollars in damage.

NINA  Hurricane Nina, a category 1 hurricane, is considered a minor hurricane in terms of the later ones. Because it never made landfall, the damage was predominately located along the coastal regions of the nearby island of Kauai. The majority of damage was caused by surf 35 feet high, which struck the southern coast of the island causing around 1 million dollars in damage.
When hurricane winds enter into an enclosed space, the initial reaction is to find a way out. If no exit can be found, the winds are renowned for making their own opening by tearing through the roof of the structure.

If building in an area that is prone to hurricanes, it is important to take a few precautions during the design phase of the project.
- Gable roofs are more likely to suffer wind damage than flat roofs.
- Galvanized metal hurricane straps should be installed to firmly secure the roof joists to the wall structure.
- Storm shutters should be design for each window and properly installed

In recent studies, steep pitched were affected the least by heavy winds. The roof acts as an obstacle, deflecting the wind and causing it to change its trajectory. On the contrary, low pitched, gable roofs are most commonly torn off because the shape of the roof functions similarly to that of an airplane. As the wind sweeps across its surface, it is not deflected, but causes a suction reaction. This is how airplanes fly and why hurricane winds rip off roofs.
The tsunami has become one of the stealthiest natural disasters in recent history. Its force is devastating and often deadly, however its presence often goes undetected until it is too late. Ever since Indonesia was swept away by the deadliest tsunami in many years in December of 2004, people have finally begun to think about tsunamis and ways to protect against their deadly attacks.

The word “tsunami” come from the Japanese words tsu (harbor) and nami (wave). It is a wave or series of waves that begin in the deep waters of the ocean stretching hundreds of miles and reaching daunting vertical heights. Tsunamis typically begin at the epicenter of an earthquake deep within the ocean; however strong winds and landslides have also been responsible for numerous tsunamis around the world. Because the ocean is so vast and virtually unobserved, these disasters go unnoticed until their presence is observed from shore, which is too late.

To be clear, a tsunami is actually a typical wave, just at a dangerously large scale. At sea, a tsunami may seem to be nothing but 3ft high wave, but as it reaches shallow ground, the underwater energy is forced up creating massive waves. Besides its size, the speed of tsunamis is a huge factor related to its power. A normal wave travels around 5-60 mph and is usually followed by another wave a few hundred feet back and about 10 seconds later. Tsunamis on the other hand are capable of moving faster than a commercial jet and cross an ocean in just a few hours. They travel around 500-600 mph and have repetitive waves a few hundred miles away that arrive hours after the first.

In recent years, the island of Hawaii have been virtually unaffected by tsunamis and their destructive power. There have been reports of waves 2-6 feet higher than normal, but nothing out of the ordinary. However, back in the 1940’s and 50’s, the islands were struck by a couple dangerously large tsunamis.

Earthquakes in the Aleutian Islands, off the coast of Alaska, resulted in two tsunamis in 1946 and 1957. Both of these waves traversed the Pacific and reported waves nearly 50ft high, crashing against the shore. The island of Kauai was hit by the tsunami of 1946. Lumahai Beach was among the beaches that were hit. At this location, the waves were around 20-30 ft high. Yet due to the topography of the area of the island, the waves were prevent from reaching roads and nearly homes.

Everything built on the first 40 ft of elevation must be structurally able to withstand a flood or be willing to be swept away by the incoming and outgoing surges of water. Structures that build on higher elevations are not completely risk free, they must still deal with the rough waves that can reach massive heights.

DANGER ZONE

The tsunami of 1946 produced waves along the north shore of Kauai in excess of 40 ft above sea level. The rising water was responsible for millions of dollars in damages. Buildings constructed below this elevation take on the risk of being susceptible to flood waters and destructive waves.

Beachfront properties should assume for 20 ft rise in the ocean during a tropical storm. Responding to this, hotels and resorts along the coast usually plan for rough waves by leaving the main floor level open. This allows water to pass through with minimal damage to building structure.
WEATHER

Average monthly highs and lows

Average Temperature: 72 - 79 Degrees
Tropical winds dictate much of Hawaii’s weather. These winds blow from the north and northeast, forcing the tropical humid air up the north and east facing slopes of the mountains. As the air rises, it begins to cool and the humidity starts condensing into rain clouds. This results in much of the air’s moisture being deposited on the northern side of the mountain. By the time the air flows over the mountains, much of the humidity has already been disposed of, making the south and west sides of the island much more sunny and warm.
LUMAHAI BEACH

Lumahai Beach is a picture perfect beach on the north side of the island of Kauai. Its wide, sandy beach stretches for nearly a mile and is blessed with a lush green mountain backdrop that quickly rises to nearly 700 ft. from the shores watery edge.

Lumahai Beach became one of the most recognized beaches in the world after the film South Pacific was filmed on its shores. Yet despite its raw beauty, Lumahai requires extreme caution.

Without a protective coral reef off its shoreline, there is nothing to weaken large ocean waves and strong undercurrents. However, the same treacherous waters that repel the casual swimmer happen to draw in extreme sport enthusiasts. The unprotect coast offers a wide range of surfing and body boarding spots.

As with much of the Hawaiian Islands, Lumahai Beach has numerous areas of unique lava formations, breaking through on the waters edge. The formations appear and vanish with the strength of the tide, yet they exist as a constant reminder of the true origin of Kauai.

Further to the west, Lumahai Beach opens up to the Lumahai Stream and delta. The land surrounding the stream is known to flood during heavy rains, producing strong rip currents and redepositing fertile silt across the landscape.
Lumahai Beach is situated on the north shore of the island of Kauai. Because it lacks a protective coral reef off its coast, the ocean tides have a greater impact on the shoreline. This lack of protection causes the sand to move more freely with the forceful undertow of the sea, moving it east to west and vice versa. Depending on the time of year, the actual width of the beach fluctuates nearly 350 ft on either end of its mile length.
TOPOGRAPHY
During the winter and spring months, huge surf on Lumahai beach causes the sand to shift from the west side of the beach to the east. During the low surf season, summer through fall, the movement is reversed. The beach width varies up to 350 ft depending on the time of year.

The selected site has extreme topographical variation. Within a few thousand feet from the waters edge, the shore rises to a height of 680 ft. The slope varies between a 5 and 80-degree incline. Even though the landscape provides a stunning backdrop, its presence will greatly influence the specific site selection within the chosen area.

The islands of Hawaii are constantly subject to winds as they blow across the Pacific Ocean. On Kauai, the winds typically blow from the north and northeast. The chosen site has a number of high ridgelines that obstruct the wind and provide shallow places of calm atmospheric pressure.

Much of the area is not ideally suitable for construction due to the constant movement of the sand and the unstableness of the continually evolving mountains. However, the site does provide multiple areas where solid foundations may be developed. Large rock cliffs exist on both ends of the site and the local road has existed in its current location for over 50 years. The areas just north of the road appear to provide the best solution for site development.

Because the site has such a topographical variety and is located on the north side of the island (where the majority of rain falls), the drainage cannot be overlooked. The downward flow of water and debris during a torrential rain or tropical storm poses a severe threat that can severely damage any structure if its location is not chosen carefully.
When overlapped, these 5 maps begin to depict areas on the site that would not be suitable for development. These are the darker portions seen on the map. Areas that are lighter, are better suited for development and are expressed by bold dashed lines encapsulate.
LIGHT STUDY 07.21.2007
CONCEPTUAL DESIGN
KAUAI WILL NOT BE FOR EVERYONE
"Who are these visitors and why will they come? Unlike the standard tourist who comprises the traditional backbone of the Hawaiian market, they will be seeking the status of jaded resorts or the sun and sand of the tanning lotion bakeouts. Rather, they will be those despaired of the Waikiki congestion and similar instant Americanism’s; those who seek the essence of the Real Hawaii in the real world with real people engaged in real social pursuits. Nor will they be those who gush over contrived historical tableaus or hokey, simulated Hawaiian cultures. Rather, they will be those tired of artificial paradise who seek only the experience of relaxation, recreation, and personal renewal amongst an honest contemporary Hawaiian society which has neither lost its traditional roots nor stubbornly refuse to express them in new ways. Nor will they be those who are satisfied to experience Hawaii from the roof of a parking structure or a golf cart. Rather, they will be those who increasingly need exhilaration and the peace, the stimulation and the encouragement of magnificent nature-embracing people, their creations, and their activities."

-- AND IT SHOULDN'T TRY TO BE."

- Unknown
ADVENTURE TOURISM

Adventure tourism is a type of niche tourism involving exploration or travel to remote areas, where the traveler should expect the unexpected. This genre of travel is rapidly growing in popularity as tourists explore unusual holiday options more frequently; kinds that differ from the typical beach vacation or oceanic cruise.

Adventure tourism typically entails utilizing the natural resources of a particular area to stimulate entertainment. It may include various forms of physical exertion requiring significant effort or self-motivation. Many of these activities also involve some degree of risk on behalf the people involved.

Many people, when hearing about adventure tourism, initially assume that it is a primarily focused within a certain age bracket consisting of 20 to 30 year olds. This generalization could not be more wrong. This market is geared towards people who are young at heart and who still find fulfillment in physical activity. One commonly used phase is, “I don’t live to work, I work to live,” because these tend to be people who prioritize time for fitness and extracurricular activities.

In recent years, the Island of Kauai has become a hotspot for this aggressive tourism market for many reasons. One has to do with being the most remote of the Hawaiian Island (the only tropical state in the union). And another is due to the wide range of available opportunities that Kauai has to offer.

Here is a list of some of the different activities that can be taken advantage of while staying on Kauai:

--ATV Tours
--Cliff Diving
--Deep Sea Fishing
--Hang Gliding
--Hiking (canyons, swamps, cliffs…)

--Horseback Riding
--Jet Skiing
--Kayaking (sea and river)
--Mountain Biking
--Parasailing

--Scuba Diving
--Snorkeling
--Snuba Diving (a variation of scuba and snorkeling)
--Spelunking
--Surfing
IN ITS PURE STATE, THE ECO-Lodge DENOTES ACCOMMODATIONS THAT ARE ENVIRONMENTALLY, CULTURALLY AND SOCIALLY AWARE, THAT ARE RESPONSIBLE AND SUSTAINABLE, THAT ARE STRIVE TO ENHANCE – NOT EXPLOIT – THE REGION AND THE CULTURES THEY TOUCH.
ABSTRACT

Every year, millions of vacationers escape to Hawaii to be immersed in an island paradise. Yet when they reach their Pacific getaway, they are funneled into mediocre hospitality facilities that simulate an ideological perception of what a Hawaiian vacation should be. Most will spend their time on a congested beach, partaking in an artificially contrived Hawaiian celebration, enjoying a synthetic Hawaiian landscape and then leave, actually believing that they experienced the real Hawaii. So where do people go to receive an authentic experience of what Hawaii is truly like?

OVERVIEW

Kauai, known as the Garden Isle and being 90% inaccessible by road, has become a hotspot for an aggressive adventure tourism market and is ideally located to promote a different kind of resort experience; an [eco-lodge]. The chosen site is located on 30 acres of beach, surf, forest and mountainous terrain on Kauai’s north shore. The design problem is to create an atmosphere where people are able to experience the true essence of the island, its distinct tropical characteristics and not be tricked with artificial interpretations. The project focuses on the individual living units (alternative to hotel rooms) in order to enhance the time each guest spends in their own, private, tropical hideaway. By enhancing the guest's awareness of their natural surroundings, a true Hawaiian experience is made possible.

GOALS

To provide the adventure tourism market of Kauai, with an alternative to the artificial and widely overdone luxury hotel by encouraging its visitors to loose themselves in an authentic tropical location.

To utilize that natural characteristics of the site in order to develop a self sustaining and fully functioning living unit.

To exist in harmony with the surrounding environment by celebrating and preserving the native vegetation and minimizing the eco-footprint on the site.
SITE PLANNING

Initial site planning began as a scheme for ordering the entire site was developed.
SUMMER

100 x 100 FOOT GRID

WINTER

350 FOOT FLUXUATION

1. SAND MOVEMENT
2. The seasonal fluctuation of the shore on Lumahai Beach varies around 350 ft throughout the course of one year.
3. When the grids are overlapped and compared, the median change becomes visible.
ONE UNIT PER SECTION

EXACT LOCATION WITHIN SECTION DETERMINED ON SITE

100 FOOT ‘NO BUILD’ RADIUS

In order to maintain the remote quality of the site, the units are given a 100 ft boundary, of which no other unit may be built.

MULTI FAMILY UNITS

To accommodate multi family groups, some units may be placed within the 100 ft boundary. However, when this is done, the units remain ordered within the grid and the 100 ft boundary is extended around the entire group unit.

MIDPOINTS BETWEEN UNITS DELINEATES PATHWAYS

The main pathways through the site follow the topography and keep an equal distance from the surrounding units.
Eight [8] factors that will undoubtedly affect the design of the units and the design factors that will be implemented to address these issues.

How does our perception of a hotel room evolve into what a hotel room on a beach in Kauai should be? What will guide the decisions?
AIR
With an ideal temperature between 65 and 85 degrees year round, natural ventilation can be utilized as the primary circulatory system. The unit is able to open up, allowing the exterior elements to flood the space with the smells and sounds of the tropics.

LIGHT
The tropical sun’s location directly overhead is capable of generating ample energy to support the minor electrical needs of each unit. The indirect light is also able to flood the livable spaces, making the units feel more like a canopy of trees rather than a confining box.

TOPOGRAPHY
Working with the natural slope of the land is able to provide adequate accessibility while still maintaining a minimal, environmental impact on the surrounding forest. The goal is to allow the guest to experience the landscape without being hindered by it.
**RAIN**
Being the wettest place on earth, Kauai can utilize its consistent rainfall to cool living spaces and provide all of the basic water needs necessary for each unit.

**DISASTERS**
Kauai's history of hurricanes and tsunamis cannot be taken lightly, however, their impact has been able to influence design, strengthening the concept as well as the structure.

**VIEWS**
Even though the site is situated on a beautiful beach, Lumahai Beach provides breathtaking scenery no matter where you are on the property.
The personal need for privacy can be achieved in a number of different ways without having to completely separate the guest from the exterior, but rather through incorporating innovative ideas that achieve similar results.

The selection of building materials is able to showcase the local culture while simultaneously bringing awareness to the structure and the environment.
SKETCHES / STUDY MODELS
FLOOR PLAN DEVELOPMENT
Air Cavity for Circulation
Compostable Toilet
Box to contain toilet container and other mechanical devices with own structural support

Water Cistern
View Towards Beach
12'6"
With plenty of luxury resort and spas already established on the island of Kauai, Eco-Lodge Lumahai aims to capture the clients that want something different; an authentic Hawaiian vacation. This resort is situated among a natural forest filled with hundreds of different species of plants. Its remote location and the overall plan of the facility all work together so the guests will have the privacy and atmosphere of their own personal island paradise.

The rugged, deconstructionist form is attempting to be reminiscent of traditional Polynesian huts while simultaneously, deconstruct the pre-notion of what a hotel room should actually be. If the locals do not need air conditioning or heat, should the guest? Why should a hotel room be a box? Do you really need televisions and radios while you are vacationing? How does the room have to transform in order to heighten ones awareness of the natural attributes of the surrounding environment?

The design takes advantage of Hawaii’s eco-system, using its attributes to dictate form and function. Every facet of the unit has been designed to facilitate that idea. The main living space has been opened up to the exterior allowing the elements to effect the space. Walls and roof planes are beginning to be positioned to control light and heat throughout each day of the year. Even the bathroom has been left exposed, creating an exhilarating experience that everyone should have the privilege to enjoy.

The units have been elevated for a series of reasons. First and foremost, by raising them off the ground, the natural vegetation is allowed to continue growing in, around and under the unit without extensive clearing of the site. The physical footprint is not completely cemented over. Another reason is to partially combat the force of rogue waves and tsunamis that may someday hit the islands northern coast. The elevated status allows waves to pass through the structure without fully exerting its force on the walls and other built planes. Also the change in perspective along with the units location amidst the trees, allows the guests to experience the tropical forest in a different way.

Critics should remember that this resort will not be a place for everyone, but also that it is not trying to be. This resort aims to provide guests with everything they need without loosing the essence of the location. People come to Hawaii to experience Hawaii. Eco-Lodge Lumahai will give them that experience.
PROCESS DOCUMENTATION
SKETCHES / STUDY MODELS
SPATIAL PERSPECTIVES
FINAL DESIGN
CRITICS

Mark Brim, Architect DLR Group
Lori Brown, Faculty Syracuse University College of Architecture
Dennis Coudriet, Architect Bahr Vermeer Haecker Architects
Ted Ertl, Mentor, Faculty UNL College of Architecture
Chris Ford, Faculty UNL College of Architecture
Nathan Krug, Faculty UNL College of Architecture
Jim Potter, Faculty UNL College of Architecture
DESIGN TACTICS AND IMPLEMENTATION
With an ideal temperature between 65 and 85 degrees year round, natural ventilation can be utilized as the primary circulatory system. The unit is able to open up, allowing the exterior elements to flood the space with the smells and sounds of the tropics.

1: The unit’s NW orientation accepts the trade winds coming off the ocean
2: The unit’s opening allows air to reach every corner of the interior and exterior
3: The high-pitched roof draws the warm air up and out of the livable space
The topical sun’s location directly overhead is capable of generating ample energy to support the minor electrical needs of each unit. The indirect light is also able to floor the livable spaces, making the units feel more like a canopy of trees rather than a confining box.

1: The S/SW facade, is closed off keeping the warm afternoon sun from entering the interior

2: Solar Panels are able to produce adequate power to run necessary equipment

3: Since the Hawaiian sun is nearly overhead, the solar paneled roof will be at an appropriate angle (22 degree) to absorb the maximum amount of sun possible

4: The various openings and shading devices allow light to enter from all angles
RAIN HARVESTING

Being the wettest place on earth, Kauai can utilize its consistent rainfall to cool living spaces and provide all the basic water needs necessary for each unit.

1: The roofs all slope to the SW

2: Rain is funneled to one corner and then channeled into a cistern for filtering and recirculation

3: Rain calculation for Lumahai Beach conditions:
\[0.62 \times (\text{sq. ft. of roof}) \times (\text{inches of rain per month}) \times (75 - 90\% \text{ efficacy}) = \text{Gallons harvested per month}\]

\[0.62 \times (675) \times (8) \times (0.75) = 2,511 \text{ gallons / month}\]

\[0.62 \times (575) \times (8) \times (0.90) = 3,013 \text{ gallons / month}\]

2,511 - 3,013 gal/month
Bamboo is an economically viable construction product that has been proven to withstand the natural elements and the test of time. Its expedient growth rate, its ample availability, the ease of its construction and its sensitivity to the natural environment makes bamboo an amazing construction material.

1: Bamboo construction has been proven to withstand wind and water forces better than conventional wood and steep construction techniques

2: Bamboo is a locally harvested and renewable material that has proven to withstand tropical storms while still maintaining a rugged, Polynesian character

3: Various species of Bamboo
TOPOGRAPHY

Working with the natural slope of the land provides adequate accessibility while still maintaining a minimal, environmental impact on the surrounding forest. The goal is to allow the guest to experience the landscape without being hindered by it.
Even though the site is situated on a beautiful beach, Lumahai Beach provides breathtaking views no matter where you are on the property.

1. Lumahai beach has a mountainous backdrop leading into the world recognized Na Pali coastline.
2. The beach on site has golden white sand and crashing waves making it picture perfect year round.
3. The interior of the site is filed with lush vegetation and meandering paths.
Kauai’s history of hurricanes and tsunamis cannot be taken lightly, however, their impact has been able to influence design, strengthening the concept as well as the structure.

1: The paths of the four most recent hurricanes to hit the island of Kauai

2: Recent studies have shown that bamboo construction is able to withstand the forces caused by hurricane and tsunamis better than wood and steel construction

3: Once made structurally sound, the elevated design reduces the risk of extensive tsunami damage
EQUIPMENT

1. Waterless Toilet and Composting Unit
2. Water Pump and Water Collecting Cistern
3. Flexible Photovoltaic Shingles and Battery with Inverter
4. Mini Fridge and Tankless Water Heater
The personal need for privacy can be achieved in a number of different ways without having to completely separate the guest from the exterior, but rather through incorporating innovative ideas that achieve similar results.

1: The elevated status of the unit restricts the view from the ground level

2: Multiple layers of curtains can be used to close off views to the interior space.
MODEL
Multi-Family Units (will be equipped with kitchens for more independence)

Individual Units: PRIMARY FOCUS
- Units will be either on or two bedrooms
- 40+ (actual number based on demand / growth / popularity)

Unit expanded upon in schematic design phase

Lodge: Not developed beyond conceptual phase in order to fully focus upon individual units. Overall conceptual idea is that the individual unit’s design would directly influence the lodge rather than the other way around.

The Lodge will provide the following service:
- Restaurant / Cafeteria
- Shuttle Service
- Tour Office
- Management Offices
- Laundry Room
- Meeting Room
- Maintenance Dept.
- Other services (spa, shops, museums, entertainment…) will continue to be provided by the local community in order to provide guests with an authentic experience of the Island of Kauai and to support local businesses.
ECO - LODGE LUMAHAI
BIBLIOGRAPHY


First and foremost, I must take a moment to thank my parents for all the encouragement and guidance that you both have given me over the last 6 years. Mom, you gave me your love of art and design and Dad, you taught me how to be a respectful, faithful, Godly man. Our journey hasn't been easy, but it has made me resilient and strong, and that is a testament to how well I was raised.

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